Staffordshire County Council

Appendix 3.1

Traffic Assessment Report
Atkins, 2014

Stafford Western Access Route

Traffic Assessment Report

Staffordshire County Council

12 August 2014

ATKINS

Plan Design Enable

Notice

This document and its contents have been prepared and are intended solely for Staffordshire County Council's information and use in relation to the Stafford Western Access Route.

Atkins Ltd assumes no responsibility to any other party in respect of or arising out of or in connection with this document and/or its contents.

This document has 91 pages including the cover.

Document history

Job number:			**Document ref:**			
Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
Rev 1.0	Draft	DD	CS	PB	PB	12/8/14

Client signoff

Client	Staffordshire County Council
Project	Stafford Western Access Route
Document title	Traffic Assessment Report
Job no.	5128885
Copy no.	
Document reference	

Table of contents

Tables

Figures

1. Introduction

1.1. Overview

Atkins has been appointed by Staffordshire County Council (SCC) to assess the impact of the proposed Stafford Western Access Route.

This Traffic Assessment Report (TAR) details the development of future year models and the analysis undertaken to determine the impact of the proposed improvements. A number of sensitivity tests have been undertaken and their findings presented.

1.2. Background

The Stafford Western Access Route includes a proposed link between the A518 and the A34 utilising stretches of Martin Drive and Doxey Road. It forms part of the wider sustainable integrated transport strategy for Stafford. This TEAR considers the traffic and economic impact of Sections A and B of the Western Access Route between the A34 and Doxey Road. It is assumed that Section C between Doxey Road and Castlefields will be built in 2018 using developer funds and is included in the Do-Minimum scenario.

The A518 Primary Route, which provides a key link between the A5/M54 at Telford, the M6, and the A50 at Uttoxeter, passes through Stafford Town Centre, resulting in the severance of many critical Town Centre activities, and acting as a restraint on proposals to regenerate a significant number of edge-of-centre locations. In particular, two of the largest car parks for the Town Centre are situated immediately adjacent to the A518, resulting in significant pedestrian movements across the traffic flow.

In 2013, the Planning Inspector at the Examination into the Plan for Stafford Borough accepted that the full Stafford Western Access Route is critical infrastructure needed to deliver the full development requirements of Stafford Town up to 2031. This includes provision of 5,233 new homes, largely on three Strategic Development Locations, and 36 hectares of new employment land in Stafford Town. Section C is required as an access road to serve 2,200 new homes at the Strategic Development Location in the West of Stafford. Reduced journey times and congestion will allow expansion of economic activity in the town centre (employment, retail and education), enabling the town to thrive. The scheme will also make it possible to downgrade town centre roads and increase provision for sustainable modes.

The key objectives of the Stafford Western Access proposals are:

- Provide high quality transport infrastructure required to deliver development in Stafford
- Reduce congestion on routes into and around the town centre which act as a constraint on growth proposals
- Facilitate improved access by sustainable modes between housing growth areas and the town centre

1.3. Report Structure

This report focuses on the model forecasting from a 2007 base year to a 2018, 2025 and 2033 future years of the scheme. Sections contained in this report are as follows:

- **Section 2** outlines the existing **Base Year Model** and considers the suitability of its use for the current assessment;
- **Section 3** provides an overview of the **Forecasting Approach** used to develop the future year models and considers the requirements for ‘uncertainty’ testing;
- **Section 4** details the **Forecast Network and Matrix Development** and considers the highway schemes to be included in the future year models, growth factors used and key developments;
- **Section 5** describes the **Forecast Assignment** and the use of variable demand modelling;
- **Section 6** presents the **Traffic Forecasts for the Stafford Western Access Route** including impacts of network statistics, traffic flow changes, junction stress, journey routing and journey times;
- **Section 7** presents the traffic impact results of the **Sensitivity Tests**;
- **Section 8** provides a **Summary** of the model development and forecasting stages**;**

The following appendices are provided:

- **Appendix A** – Scheme Drawings;
- **Appendix B** – Growth Factors;
- **Appendix C** – Traffic Flow Figures – AADT
- **Appendix D** – Network Statistics for Sensitivity Tests;
- **Appendix E** – Pre and Post DIADEM Trip Patterns; and

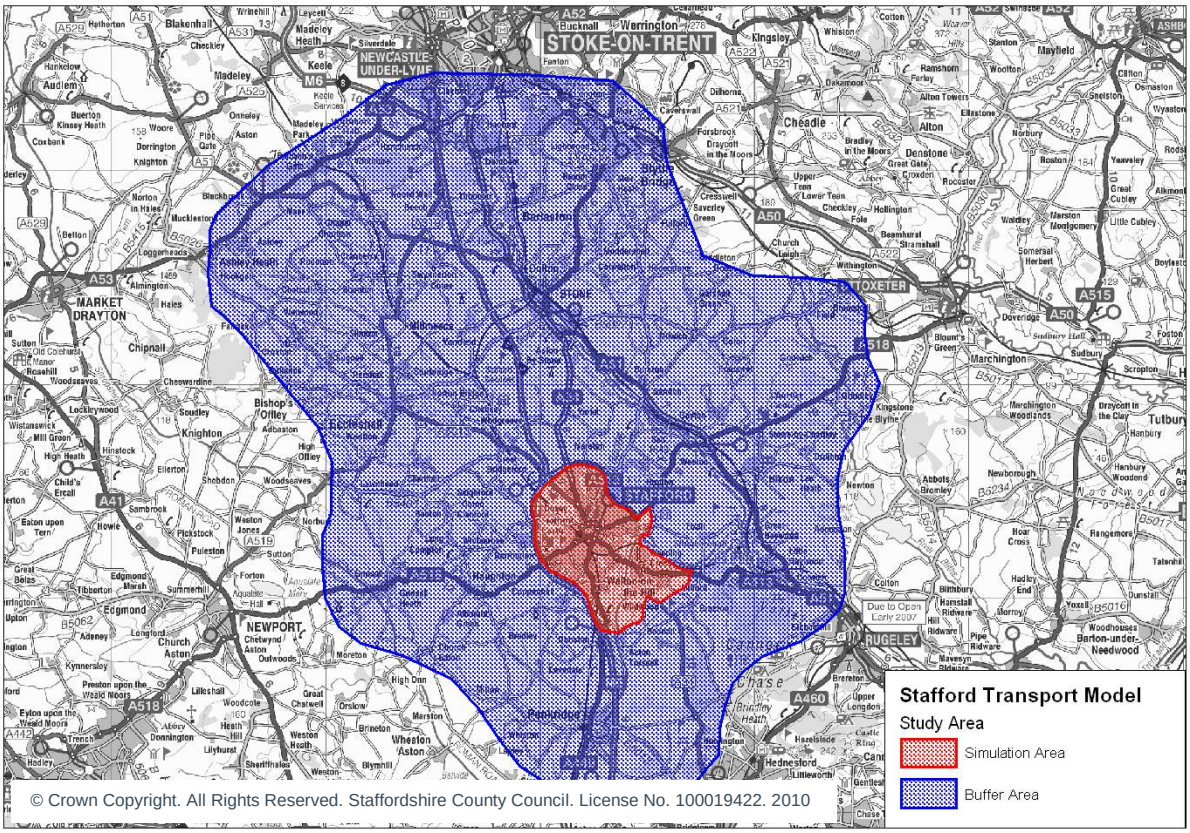
2. Base Year Model

The original Stafford Transport base year model was developed by Atkins in 2008 covering the Stafford study area using roadside interview data, car park data and journey time data collected in 2007, in addition to traffic count data collected between 2004 and 2007.

The model was updated in 2009, using the original data, to ensure it would be WebTAG compliant for the assessment of the Stafford Western Access Route. The key revision to the model has been to include demand segmentation with generalised costs for both time and distance to enable variable demand modelling using DIADEM. This model was recalibrated and revalidated as detailed in the Local Model Validation Report, prepared by Atkins, dated February 2010.

The geographical extent of the model is shown in Figure 2.1.

Figure 2.1 – Stafford Model Area



The modelled study area is sufficiently wide in coverage to allow a detailed analysis of the routing decisions that will likely be affected by the proposed Stafford Western Access Route, without being so large as to increase the risk of model noise being incorporated into subsequent economic assessment.

Models have been developed to represent traffic conditions at two different times of day for a 2007 base year, namely:

- AM Peak Hour – 0800 to 0900 hours; and
- PM Peak Hour – 1700 to 1800 hours.

Six vehicle user classes are modelled as shown in Table 2.1.

Table 2.1 – User Classes

User Class	Description	User Class	Description
1	Car – Employer's Business	4	Light Goods Vehicles
2	Car – Commuting	5	Other Goods Vehicles, class 1
3	Car – Other Purpose	6	Other Goods Vehicles, class 2

Table 2.2 shows a comparison between the car journey purposes split for the Stafford model and national averages from the National Travel Survey (1999-2001) provided in WebTAG Table A1.3.4 (WebTAG Data Book).

Table 2.2 - Comparison between Stafford Model and National Averages

Peak Period	User Class	Stafford Model	National Average
AM Peak	Car – Business	7%	7%
	Car – Commuting	53%	41%
	Car – Other	40%	52%
PM Peak	Car – Business	7%	6%
	Car – Commuting	44%	32%
	Car – Other	49%	62%

Table 2.2 demonstrates that the journey purpose split derived for the Stafford model correlate well with national averages. There are, however, a higher proportion of car – 'commuting' journey purpose trips and a lower proportion of car – 'other' journey purpose trips than the national average.

The model has been calibrated and validated to a 2007 base year for an AM and PM peak hour in line with WebTAG and DMRB guidance in terms of:

- Link flow calibration and validation;
- HGV Link flow calibration and validation;
- Screenline validation; and
- Journey time Validation.

It is also noted that the model has been used in several funding applications including the original Stafford Western Access submission.

In considering the suitability of the existing 2007 base year traffic model for the current assessment and appraisal of the Stafford Western Access Road, a review has been undertaken focussing on the following:

- Change in Land Use between 2007 and 2013;
- Predicted growth in demand based on National Trip End (NTEM) forecasts between 2007 and 2013;
- Change in observed demand within Stafford; and
- Change in average journey times.

These are discussed in more detail below.

2.1. Change in Land Use

Discussions with Staffordshire County Council have highlighted that there has been minimal changes in land use across the town between 2007 and 2014 within Stafford. Whilst it is recognised that the Council itself has moved to their new site located at Staffordshire Place in the town centre the car park for the site has not moved and hence the origin and destination travel patterns in this area would remain consistent compared to the 2007 base year.

2.2. NTEM Growth

Consideration of the NTEM (v6.2 issued in July 2011) growth forecasts for the Stafford (Main) zone between 2007 and 2013 has highlighted the following:

AM Peak Period

- Origin growth = 0.8%; and
- Destination growth = 4.2%

PM Peak Period

- Origin Growth = 4.2%; and
- Destination Growth = 2.2%

Overall this suggests a growth in car driver trip ends of around 3% between 2007 and 2013 on the basis of the NTEM forecasts.

2.3. Changes in Observed Demand

Staffordshire County Council collates long term monitoring data at several sites across Stafford. These provide total vehicle flows by hour and have been obtained for 2007 and 2013, with the exception of A513 (Main Road) which only has data up until 2012. The overall flow differences for the AM, PM peak hours and the AADT flows are provided in Table 2.1 below.

This shows that, in general, the level of flow has reduced by around 5% in the AM peak, 4% in the PM peak and around 4% at the AADT flow level between 2007 and 2013.

Overall the analysis of the available data has suggested that there has been a general reduction in demand within Stafford between 2007 and 2013. This reduction in flow is likely to be predominately due to the impact of the recession across the UK combined with increasing fuel prices over this period.

It is noted, however that this observed growth compares to a predicted growth within NTEM of around 3% for Stafford (Main) and hence suggests that the use of NTEM to forecast the matrices between 2007 and 2013 would potentially over estimate the level of flow in the study area.

Table 2.3 – Long Term Monitoring data

Description	Direction	2007			2013 (except A513)			Percentage Difference		
		AM Flow 08:00 - 09:00	PM flow 17:00 - 18:00	AADT	AM Flow 08:00 - 09:00	PM flow 17:00 - 18:00	AADT	AM Flow	PM flow	AADT
A34 Lichfield Road Stafford	NBnd	647	608	9387	584	563	8834	-10%	-7%	-6%
	SBnd	773	626	9574	696	597	9091	-10%	-5%	-5%
B5066 Sandon Road Stafford	EBnd	411	471	4317	386	395	3898	-6%	-16%	-10%
	WBnd	450	413	4224	401	380	3736	-11%	-8%	-12%
C252 Tixall Road Stafford	EBnd	129	239	1743	102	226	1661	-21%	-5%	-5%
	WBnd	351	114	1905	334	116	1842	-5%	2%	-3%
A513 Main Road Milford (2012)	EBnd	424	357	4759	392	361	4522	-8%	1%	-5%
	WBnd	386	436	4652	371	400	4424	-4%	-8%	-5%
A518 Newport Road Stafford	NBnd	474	374	5124	497	360	4910	5%	-4%	-4%
	SBnd	361	555	5287	313	527	4986	-13%	-5%	-6%
A5013 Eccleshall Road Stafford	NBnd	504	702	6438	509	759	6639	1%	8%	3%
	SBnd	812	516	6346	766	488	6103	-6%	-5%	-4%
A518 Weston Road Stafford	EBnd	548	678	7737	602	649	7563	10%	-4%	-2%
	WBnd	787	598	7904	752	624	7697	-4%	4%	-3%
Total		7057	6687	79397	6705	6445	75906	-5%	-4%	-4%

2.4. Journey Times

A comparison of the journey times, between 2007 and 2012, on two key routes, reflecting the corridors impacted by the development of the SWAR, has been undertaken, namely:

- A518 Newport Road between the M6 and Bridge Street; and
- A34 Stone Road between Chell Road and the A513

It is noted that this assessment has used the observed journey time surveys undertaken in 2007 for the development of the existing traffic mode, and presented in the 2009 Local Model Validation Report; whilst the 2012 data has been obtained from Traffic Master data (traffic master data was unavailable for 2007). This discrepancy in data sources should be considered when comparing the results as some of the journey time differences may be a result of this.

These journey times are presented in Table 2.2 below.

Table 2.4 – Journey Times

Route	Dir	Time (Sec) 2007		Time (Sec) 2012		Percentage Difference	
		AM	PM	AM	PM	AM	PM
A34	NBND	262	338	290	367	11%	8%
A34	SBND	354	267	349	320	-2%	20%
A518	NBND	242	245	214	217	-12%	-11%
A518	SBND	440	336	377	241	-14%	-28%

This table shows that journey times on the A518 have reduced between 2007 and 2012 whilst on the A34 they have predominately increased. For the A518 this change in journey times broadly reflects the reduction in traffic flows presented in Table 2.

As noted above, however, the differences in the journey time data sources between 2007 and 2013 may have impacted on the overall comparison and hence these results should be considered in this light.

2.5. Summary of Impact

Overall this assessment has demonstrated that the existing base year 2007 model has been fully validated and calibrated. Origin/destination travel patterns between the 2007 and present year will have remained consistent due to the limited changes in land uses across the study area. It is recognised, however that the TEMPRO forecasted and observed changes in demand between 2007 and 2013 are not consistent, with observed flows in general reducing by around 4% based on the long term monitoring data. Journey times on the A518 and A34 have been shown to decrease and increase respectively; however the accuracy of this comparison is reduced due to the different data sources available.

As a result the proposed adjustments to reflect the observed reduction in demand between 2007 and 2013 will be addressed in the model forecasting stage as discussed below.

3. Forecasting Approach

3.1. Forecasting Procedure

The planned opening year of the Stafford Western Access Route is 2018. The economic assessment of the scheme requires a minimum of the opening year and a design year (usually 15 years after opening). DfT guidance suggests that the modelling of an interim year is desirable for assessment purposes, as it provides additional points to further define the benefit curve.

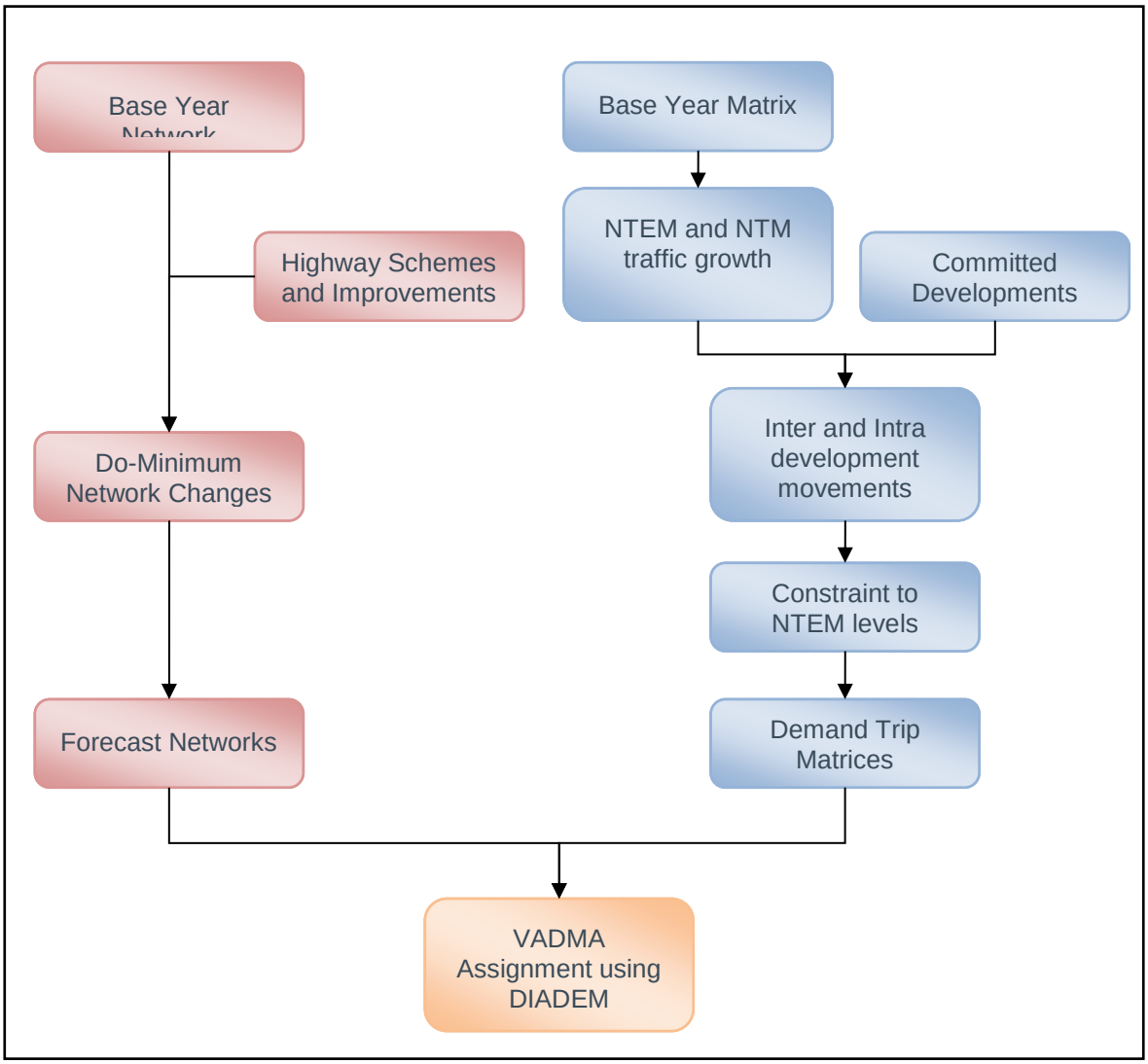
Future year models have, therefore, been developed for the following key forecast years:

- 2018;
- 2025; and
- 2033.

The forecasting approach, along with the key inputs and outputs for each stage, is shown diagrammatically in Figure 3.1.

Variable Demand Modelling will be utilised in the assignment process as detailed in Section 5.

Figure 3.1 – Forecasting Approach



3.2. Uncertainty

WebTAG Unit M4 (May 2014) sets out the guidance for treatment of uncertainty in model forecasting. Determining uncertainty around input assumptions on demand forecasts is used to develop and assess alternative scenarios.

The guidance anticipates that a 'core' scenario will be developed and a range of sensitivity tests and/or alternative scenarios will also be developed to account for future uncertainty.

The key issues in assessing uncertainty are:

- The range of possible inputs;
- The likelihood of each input; and
- The interaction between different elements which affect inputs.

In order to analyse uncertainty it is necessary to create an uncertainty log. This log highlights all the local and external uncertainties and factors likely to affect the traffic/patronage, revenues and delivery of scheme benefits.

The uncertainty log includes an assessment of the uncertainty of each individual input by placing it into one of four categories, as defined in Table 3.1 (taken from WebTAG M4 Appendix A Table A2)

Table 3.1 - Classification of Future Inputs

Probability of the Input	Status
Near Certain: The outcome will happen or there is a high probability that it will happen.	Intent announced by proponent to regulatory agencies; Approved development proposals; and Projects under construction
More than likely: The outcome is likely to happen but there is some uncertainty.	Submission of planning or consent application imminent; Development application within the consent process; and Projects under construction.
Reasonably Foreseeable: The outcome may happen, but there is significant uncertainty.	Identified within a development plan; Not directly associated with the transport strategy/scheme, but may occur if the strategy/scheme is implemented; Development conditional upon the transport strategy/scheme proceeding; Or, a committed policy goal, subject to tests (e.g. of deliverability) whose outcomes are subject to significant uncertainty.
Hypothetical: There is considerable uncertainty whether the outcome will ever happen.	Conjecture based upon currently available information; Discussed on a conceptual basis; One of a number of possible inputs in an initial consultation process; Or a policy aspiration.

The development of the 'core' scenario and the consideration of uncertainty in relation to developments and highway schemes will be considered in Section 4.

4. Forecast Network and Matrix Development

4.1. Do-Minimum Network

The Do-Minimum networks for the forecast years 2018, 2025 and 2033 have been developed from the 2007 base year model.

Staffordshire County Council, with consultation of key stakeholders, produced a list of highway schemes and related uncertainties.

The list of key highway schemes identified and their level of uncertainty is shown in Table 4.1:

Table 4.1 – Highway Schemes Uncertainty Log

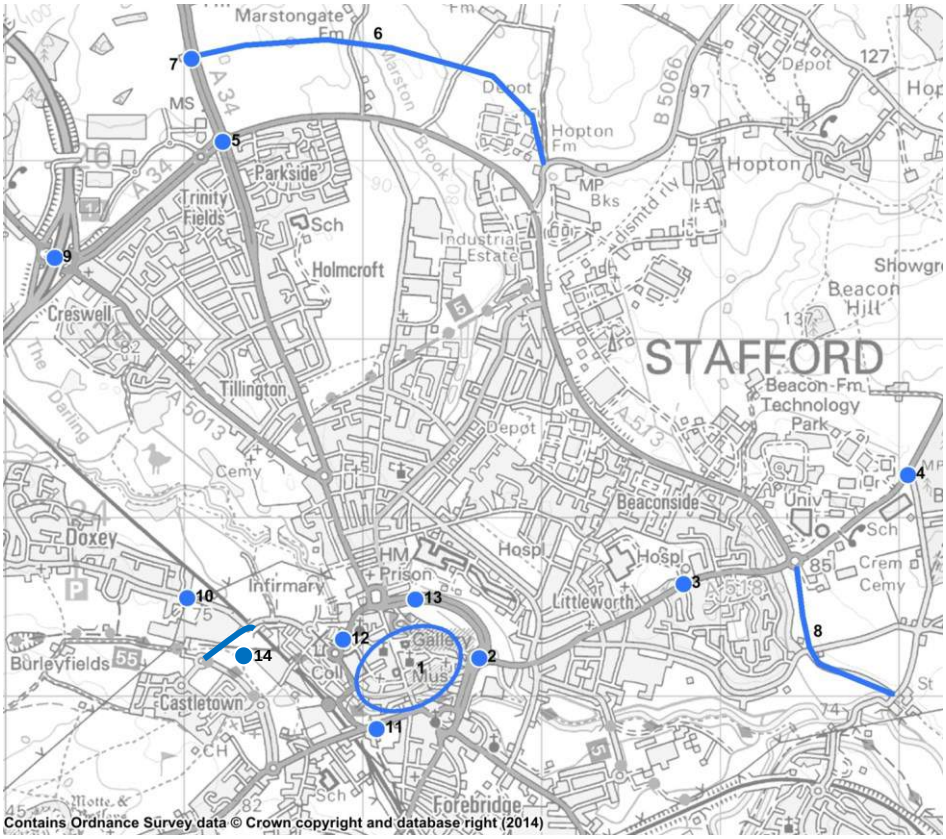
Reference	Highway Scheme	Uncertainty	Comments	Modelled Years
1	Town Centre Traffic Measures	NC	Completed or programmed for completion by 2011	2018,2025, 2033
2	Lammascote Gyratory Signalisation	NC	Completed 2009	2018,2025, 2033
3	A518 Weston Road / Hospital Junction Improvement	NC	Completed	2018,2025, 2033
4	A518 Weston Road / Blackheath Lane / Beacon Business Park entrance	NC	Under construction	2018,2025, 2033
5	Beaconside Urban Boulevard and Redhill Roundabout Signalisation	NC		2025,2033
6	Stafford Northern Perimeter Road (inc roundabout on Sandon Road / Beaconside and link in to the Redhill Business Park Signals)	MTL		2033
7	A34 / Redhill Business Park Signals	NC	Under construction	2018,2025, 2033
8	Stafford Eastern Distributor Road (between Beaconside and St. Thomas Lane))	NC		2025,2033
9	M6 Junction 14 Improvements	NC	Completed	2018,2025, 2033
10	New signals on Doxey Road / Reed Ave / Baxter Green	NC	Completed	2018,2025, 2033
11	Tesco Signal Improvements	NC	Completed	2018,2025, 2033
12	New Pedestrian Crossing on Chell Road	NC	Completed	2018,2025, 2033
13	New Signalised Junction at A34	NC	Completed	2018,2025,

Reference	Highway Scheme	Uncertainty	Comments	Modelled Years
	Queensway / North Walls Car Park / St. Georges Development			2033
14	Stafford Western Access Road – Section C	MTL		2018,2025, 2033

Staffordshire County Council have outlined that both of the expected highway schemes are 'near certain' to be in place by the first forecast model of 2018 and thus shall be included in all of the forecast year models.

The location of the highway schemes are shown on Figure 4.1.

Figure 4.1 – Location of Highway Schemes



Scheme drawings for the highway schemes are included in Appendix A.

It is noted that Section C of the SWAR will be built independently of the rest of the scheme. This will be developer funded and will not be dependent on the construction of Sections A and B of the SWAR and hence has been included in the Do Minimum scenario.

4.2. Uncertainty Tests

WebTAG guidance M4 states that the 'core' scenario will form the basis for the analysis reported in the Appraisal Summary Table (AST) and should represent the best basis for decision-making given current evidence. It should be based on published plans, unbiased, coherent, self-consistent, realistic and plausible.

The guidance states that all inputs categorised as 'near certain' should be included in the core scenario. It is also expected that those inputs categorised as 'more than likely' would be included. Inputs in the 'reasonably foreseeable' category are expected to be excluded from the core scenario and it is presumed that no inputs categorised as 'hypothetical' will be included.

The guidance suggests that sensitivity tests might look at varying degrees of certainty, for example including developments and schemes which are also reasonably foreseeable.

In relation to the Stafford Model Do-minimum networks, all potential highway schemes have been defined as 'near certain' or 'More than Likely' by Staffordshire County Council and have, therefore, been included in the 'core' scenario and all sensitivity tests.

4.3. Do-Something Network

This TAR assesses the impact of the sections A and B of SWAR, as show in Appendix A. These lie to the north of Section C which, as discussed above, will be constructed independently through developer funding and hence is not dependant on the remaining sections of the SWAR being built. Sections A and B consists of a single carriageway road between Doxley Road (at the railway bridge) and Foregate Street, to the west of Stafford town centre. The scheme will incorporate:

- A re-alignment of Doxey Road with new junctions with Timberland Road and Rosewood Gardens;
- A new roundabout on SWAR to include Doxey Road and a retail access;
- Improvements to the Foregate Street/Grey Friars Place junction to incorporate SWAR; and
- A new left-turning lane into Browning Street.

4.4. Forecast Matrix Development

The development of the forecast matrices for the Stafford model has been undertaken in accordance with current DfT guidance contained in WebTAG Unit M4, which requires the use of the National Trip End Model (NTEM) for the derivation of travel demand growth factors.

As previously discussed, the 2007 base year matrices are split into six user classes, for the AM and PM peak hours. The traffic growth for the 2018, 2025 and 2033 forecast matrices has been determined separately for each user class.

The weighting of the traffic growth within the modelled area has been determined by identifying and modelling major developments. Overall growth within each district area has however been constrained to NTEM growth.

4.5. Observed Growth between 2007 to 2013

As discussed in Section 2, a comparison between 2007 and 2013 traffic counts on key roads within the Stafford area has been undertaken to determine change in traffic flows. This demonstrates that there has been an average reduction in traffic flow of approximately 4%.

In order to produce 2013 matrices for the basis of model forecasting, the following process has been used:

- Major developments completed between 2007 and 2013 have been identified and included in the future models; and
- A background growth factor has been applied to the 2007 matrices such that there is a reduction in total trips of 4% between 2007 and 2013, when the completed developments above are included.

4.6. General Traffic Growth

The future year growth matrices have been derived using growth factors from the following sources:

- National Trip End Model (NTEM) 6.2 datasets, obtained from the TEMPRO database, have been utilised for car vehicle growth factors; and
- National Transport Model (NTM13) – National growth forecasts used in this study to derive Light and Heavy Goods Vehicle growth (released July 2013).

The NTEM growth factors are calculated according to geographic areas based on the NTEM zoning system. The geographic areas considered were:

- Stafford, consisting of Rural; Stone (Staffordshire); Gnosall; Stafford (Main);
- South Staffordshire, consisting of Penkridge; Rural; Stafford (Part of);
- Newcastle-Under-Lyme, consisting of Rural; Madeley/Middle Madeley; Audley; Newcastle-Under-Lyme (Main); Stoke-on-Trent (Part of);
- Stoke-on-Trent, consisting of Stoke-on-Trent (Main);
- Staffordshire Moorlands, consisting of Biddulph; Stoke-on-Trent (Part of); Rural; Leek; Cheadle;
- East Staffordshire, consisting of Rural; Uttoxeter; Burton Upon Trent;
- Lichfield, consisting of Rural; Armitage; Lichfield; Burntwood;
- Cannock Chase, consisting of Rugeley; Rural; Norton Canes; Cannock (Main);
- South Staffordshire, consisting of Great Wyrley; Rural; Codsall;
- Tamworth, consisting of Fazeley (Part of); and
- Telford & Wrekin, consisting of Newport; Telford.

Different methodologies for light and other goods vehicles were applied as discussed in the following sections.

4.6.1. Cars

The growth factors for cars within the study area has been obtained from NTEM based on the geographical location of each zone. Beyond the study area, NTEM growth factors for West Midlands have been used.

NTEM provides growth factors for the following journey purposes:

- Home-based employer's business (HBEB);
- Non-home-based employer's business (NHBEB);
- Home-based work (HBW);
- Home-based education (HBE);
- Home-based shopping (HBS);
- Non-home-based education (NHBE); and
- Non-home-based shopping (NHBS).

Table 4.2 shows which NTEM journey purposes have been used in the derivation of the three modelled car purpose growth factors.

Table 4.2 – Derivation of Modelled Journey Purposes

Modelled Car Purpose	NTEM Journey Purpose
Employer’s business	HBEB and NHBEB
Commuting	HBW
Other	HBE, HBS, NHBE and NHBS

The background growth factors adopted for the model are provided in Appendix B.

4.6.2. Light Goods Vehicles and Other Goods Vehicles

The National Transport Model (2013) forecasts have been used to derive growth factors for Light Goods Vehicle and Other Goods Vehicle trips from 2013 to 2018, 2025 and 2033. These factors have been adjusted in line with the TEMPRO relationships between the relevant NTEM zone and ‘West Midlands’ to provide a local focus, in line with WebTAG guidance. The formula used was:

$$\frac{TemproValue(NTEMZone)}{TemproValue(WestMidlands)} \times NTM(2013)WestMidlandsValue$$

4.7. Development Trips

In order to obtain the correct weighting of traffic growth within the study area, key developments have been included in the future year models.

Staffordshire County Council (SCC) provided a list of developments including their size, type, phasing and level of uncertainty.

Tables 4.3 and 4.4 provide a breakdown of the developments including their modelled years, uncertainty and land use type, for employment and residential developments respectively.

Table 4.3 – Major Employment Developments Uncertainty Log

Reference	Development Land Use	Site Area (Ha)	Uncertainty	Opening Year or Open By
C1	Land at Riverside	1.38	NC	2018
C2	Lammascote Road Leisure Centre	0.36	NC	Completed
C3	Prime Point 14, J14 M6	1.03	NC	Completed
C4	GEC A34 Lichfield Road	1.48	NC	Completed
C5	Kingsmead / North Walls	0.93	NC	2018
C6	MOD Stafford	6.02	NC	2018
C7	Astonfields Industrial Estate	0.44	NC	2018
C8	Tipping Street	0.30	NC	Completed
C9	Tollgate Business Park	0.20	NC	2018
C10	Staffordshire Technology Park	0.20	NC	Completed
C11	Land at Beacon Business Park (B1/B2/B8)	0.82	NC	2018
C12	Land at Beacon Business Park (B1/B8)	0.51	NC	2018
C13	Beacon Business Park Extension (B1/B2/B8)	21.0	NC	2018
C14	Beacon Business Park Extension (A3/A4)	0.42	NC	2018
C15	Plot 23 Beacon Business Park	0.22	NC	2025
C16	Land at Paton Drive	3.34	NC	2018
C17	Land south of Creswell grove adjoining the M6	10.65	NC	2025
C18	Common Road Industrial Estate	0.82	NC	2018
C19	East of Fairway	2.80	NC	2018
C20	The Kings Arms Public House (East of Kingsway)	0.62	NC	Completed

Reference	Development Land Use	Site Area (Ha)	Uncertainty	Opening Year or Open By
C21	West of Stone Road A34 (Redhill)_ 25ha	25.00	NC	2018
C22	West of Stone Road A34 (Redhill)_11ha	11.00	RF	2033
C23	Riverway Offices (Old SCC Building)	0.41	NC	2018

Key: NC=Near Certain, MTL=More Than Likely, RF = Reasonably Foreseeable

Table 4.4 – Major Residential Developments Uncertainty Log

Reference	Development Land Use	Quantity (Dwellings)	Uncertainty	Opening Year or Open By
H1	St Georges	379	NC	Phased from 2018
H2	Former Universal Grinding Wheel, Doxey Rd	145	NC	2018
H3	Former Staffordshire Police Headquarters	191	NC	2025
H4	GEC A34 Lichfield Road	169	NC	Completed
H5	Friars Terrace	45	NC	2018
H6	Brunswick Terrace	59	NC	Completed
H7	Derelict Land, Foregate Street	42	NC	2018
H8	The Former Eagle Inn & 14/14A Newport Road	32	NC	Completed
H9	Land At Castle Wharf/Castle View/Castle Street	24	NC	Completed
H10	Site Off Mill Bank	20	NC	Completed
H11	88 Wolverhampton Road, Forebridge	18	NC	2033
H12	St Thomas Priory	25	NC	2018
H13	Westhorpe And The Laurels, Rowley Avenue	27	NC	2018
H14	Sandon road motors, Sandon road	25	NC	Phased from 2025
H15	Land at Stone Road, south of Co-operative St.	36	NC	2018
H16	Stafford North SDL (North of Parkside)	1100	NC/MTL	Phased from 2018
H17	Stafford North SDL (North of Beaconside)	2000	MTL	2033
H18	Stafford East SDL (West of Baswich Lane)	634	NC	Phased from 2018

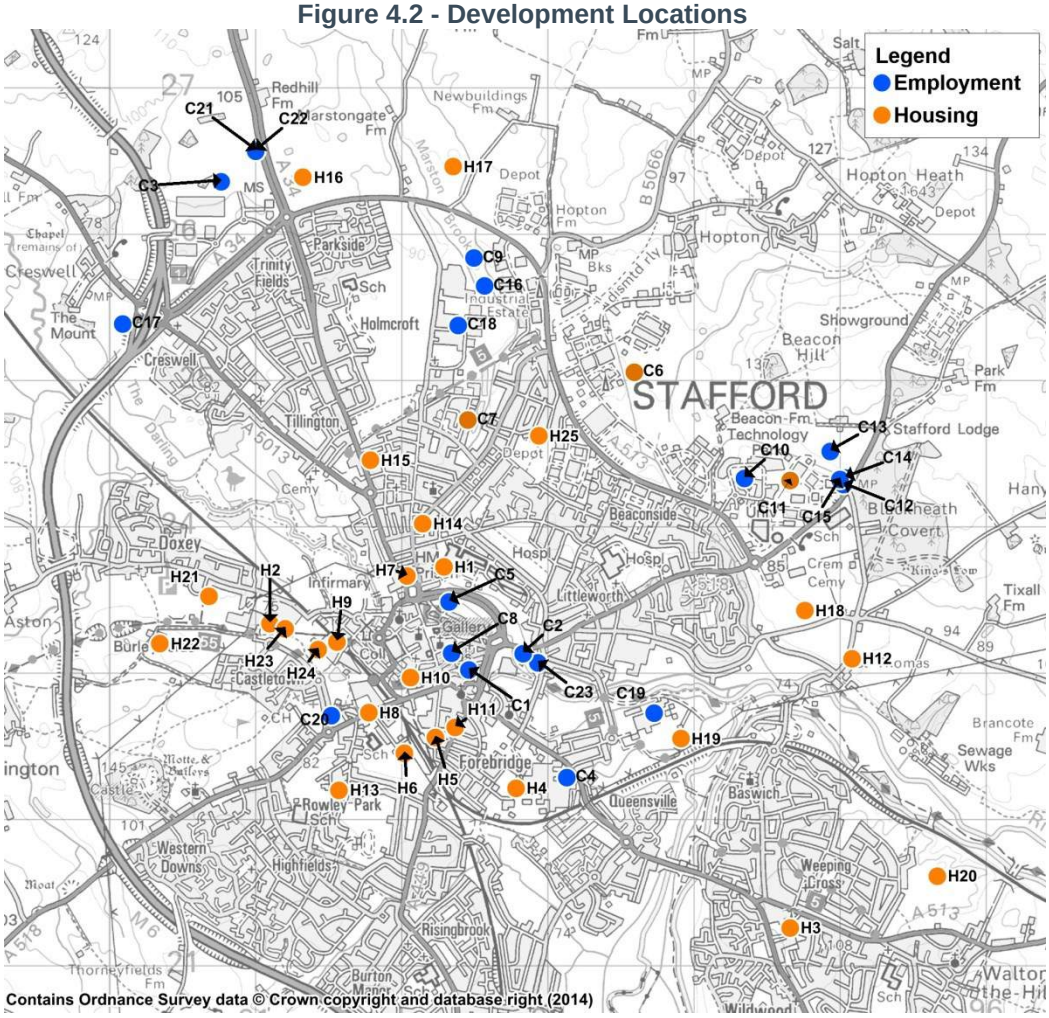
Reference	Development Land Use	Quantity (Dwellings)	Uncertainty	Opening Year or Open By
H19	East of Fairway	270	NC	2033
H20	East of Stockton Lane	100	NC	2025
H21	Stafford West SDL (South of Doxey Road)	170	MTL	2018
H22	Stafford West SDL (Castlefields Burleyfields)	1950	MTL	Phased from 2018
H23	Stafford West SDL (St Gobain)	150	MTL	2033
H24	Stafford West SDL (St. Modwens)	80	MTL	2025
H25	Borona (MoD Housing)	370	NC	2018

Key: NC=Near Certain, MTL=More Than Likely, RF = Reasonably Foreseeable

The number of trips generated by the proposed developments have been derived using trip rates obtained from the TRICS database. The developments are modelled as separate zones within the network.

The locations of the developments are shown on Figure 4.2.

Figure 4.2 - Development Locations



4.8. Distribution of development trips

The distribution of development trips has been derived from the Journey to Work Census data. This has been given a Stafford focus by agglomerating all zones within Stafford together and reversing the origin and destinations to get the journey from work reverse movement.

The development matrices have been adjusted to account for intra and inter-development movements. Intra-development trips are trips which remain entirely within a mixed use site, whilst inter-development trips are trips between proposed developments.

For mixed-use developments, a reduction in trips has been applied to account for intra-development trips. It is assumed that 20% of the trips occur within the zone and the trip generation has been adjusted accordingly.

4.9. Combination of Matrices

The two components of matrix growth (general traffic and development trips) have been combined to produce the Pre-constrained matrices for the AM and PM peaks, 2018, 2025 and 2033.

The total number of trips within the pre-constrained matrices has been compared to the number of trips derived using TEMPRO factors adjusted for the proposed increase in households and jobs in Stafford Borough. As the TEMPRO adjusted trip totals are lower than the pre-constrained matrix totals, as expected due to the potential for double counting of movements between the existing and new developments, the matrices have been constrained at a district level, consistent with WebTAG guidance. This constraining ensures that the overall growth in trips across the study area is in line with the TEMPRO forecasts for

Stafford district and hence ensures that the model will not unduly over predict the levels of congestion within Stafford and hence potentially overestimate the benefits of the proposed scheme.

Table 4.5 shows the proposed number of households and jobs for each year used to derive the TEMPRO growth factors.

Table 4.5 – Proposed Growth in Households and Jobs in Stafford Borough

Year	Households	Jobs
2013	56,134	64,701
2018	58,634	76,180
2025	62,134	78,201
2033	66,134	80,187

4.10. Uncertainty

WebTAG guidance M4 states that the uncertainty in NTEM traffic growth should also be considered. It states that an appropriate way to do this would be to look at a range about the central forecast of ±2.5% for forecasts one year ahead, rising with the square root of the number of years to ±15% for forecasts 36 years ahead (i.e. 5% four years ahead, 7.5% nine years ahead, 10% sixteen years ahead, 12.5% twenty five years ahead).

Given that there are no reasonably foreseeable highway schemes and only one reasonably foreseeable development, no land-use sensitivity test has been undertaken.

The scenarios assessed can be summarised as follows:

- Core Scenario – with near certain and more than likely developments and highway schemes;
- Core Scenario with low growth; and
- Core Scenario with high growth.

The base and future year matrix trip numbers for each user class for the AM and PM peak period are shown in Tables 4.6 and 4.7 respectively for the 'core' scenario. Tables showing the matrix trip totals for each user class for the sensitivity tests are included in Appendix D.

Table 4.6 – Matrix Trip Numbers – AM Peak

User Class	2007	2013	2018	% Increase from 2013	2025	% Increase from 2013	2033	% Increase from 2013
Car–Bus	1877	1803	1963	9%	2047	14%	2135	18%
Car–Commute	13351	13894	14989	8%	15692	13%	16424	18%
Car-Other	10759	10329	11230	9%	11935	16%	12727	23%
LGV	2970	2854	3291	15%	3928	38%	4635	62%
OGV1	3773	3604	3725	3%	3932	9%	4163	16%
OGV2	1870	1786	1846	3%	1949	9%	2064	16%
Total	35698	34270	37044	8%	39485	15%	42147	23%

Table 4.7 - Matrix Trip Numbers – PM Peak

User Class	2007	2013	2018	% Increase from 2013	2025	% Increase from 2013	2033	% Increase from 2013
Car–Bus	2039	1960	2128	9%	2223	13%	2324	19%
Car–Commute	13080	12573	13541	8%	14162	13%	14815	18%
Car-Other	14264	13695	14921	9%	15881	16%	16988	24%
LGV	2849	2735	3149	15%	3766	38%	4458	63%
OGV1	2541	2429	2511	3%	2700	11%	2820	16%
OGV2	2123	2029	2097	3%	2255	11%	2355	16%
Total	36897	35420	38346	8%	40987	16%	43760	24%

4.11. Derivation of AADT and AAWT Factors

Modelled traffic flows have been developed for the environmental assessment of this study. These have focussed on the 24 hour Average Annual Daily Traffic (AADT) and 18 hour Annual Average Weekday Traffic Flow (18hr AAWT). The factors, adopted in this study and used to produce the AADT and AAWT forecasts from the model outputs, were calculated by using 2013 traffic count data from key roads in the Stafford area. Separate factors were obtained for light vehicles and for heavy goods vehicles which have different flow profiles during the day, for local roads and for the M6.

The AADT and AAWT factors used in this study are presented in Table 4.8 below for total vehicles and heavy goods vehicles.

Table 4.8 – AADT and AAWT Factors

All Vehicles	Motorway	Non-Motorway
24hr AADT	7.08 * (AM + PM)	5.45 * (AM + PM)
18hr AAWT	7.02 * (AM + PM)	5.79 * (AM + PM)
Heavy Goods Vehicles	**Motorway**	**Non-Motorway**
24hr AADT	9.48 * (AM + PM)	8.43 * (AM + PM)
18hr AAWT	9.56 * (AM + PM)	8.56 * (AM + PM)

The formal assessment of observed and modelled base year flows is presented in the Local Model Validation Report. It is useful, however, at this stage to present a comparison of the observed and modelled flows across the study at the AADT and AAWT level. This has been based on flow data that was used in the calibration and validation of the Stafford model at key locations near to the access road. The purpose of this exercise is to demonstrate the validity of the AADT and AAWT factors modelled against observed.

In general, modelled flows will seldom exactly match observed ones. However, whilst there is no guidance within either WebTAG or the DMRB as to the acceptability criteria for variation in daily modelled and observed values, modelled values within the range of plus or minus fifteen per cent of the observed data are generally deemed to provide a good correlation between observed and modelled values.

As can be seen from Table 4.9, the correlation between the observed and modelled AADT and AAWT flows is high with 87% and 80% meeting the 15% criteria respectively. Closer investigation of the results reveals that many of those that do not meet the criteria fail by a small margin. It should be noted that the AADT flows validate well for Doxey Road, A518 Castle Bank and A38 Stone Road, which are key locations for the proposed scheme. Overall it is considered, based on the results presented above, that the factors derived to create the AADT and 18Hr AAWT flows are acceptable for use across the study area.

Table 4.9 - Summary of Observed and Modelled Aggregated AADT/18hr AAWT Values

		24Hr AADT				18Hr AAWT			
Count Location	**Site ID**	**Observed**	**Modelled**	**% Diff**	**Criteria**	**Observed**	**Modelled**	**% Diff**	**Criteria**
A449 Mosspit	ATC 1	17189	19536	14%	✓	16553	20755	25%	×
A34 Stone Road	ATC 2	16179	16276	1%	✓	15875	17292	9%	✓
A34 Cannock Road	ATC 3	15497	15123	-2%	✓	15253	16066	5%	✓
A513 Milford Road	ATC 4	8844	9145	3%	✓	8703	9716	12%	✓
A518 Weston Road	ATC 5	17262	17280	0%	✓	16856	18359	9%	✓
A518 Castle Bank	ATC 6	9113	8218	-10%	✓	8964	8731	-3%	✓
A5013 Eccleshall Road	ATC 7	12524	15349	23%	×	12202	16307	34%	×
A513 Beaconside	ATC 8	18772	19676	5%	✓	18333	20903	14%	✓
Doxey Road	ATC 9	4564	4891	7%	✓	4477	5196	16%	×
B5066 Sandon Road	ATC 10	8444	6951	-18%	×	8308	7386	-11%	✓
B5066 Gaol Road	SDR 21287	11578	10637	-8%	✓	11353	11300	0%	✓
A34 Queensway (Gaol Square	PVOL 3280	24070	21169	-12%	✓	23613	22490	-5%	✓
A34 Lichfield Road	PVOL 9324	18962	17847	-6%	✓	18650	18960	2%	✓
A449 Dunston	LCLS 11104	17499	15819	-10%	✓	16876	16807	0%	✓
D44 Alstonfields Road	SDR 13608	6630	6592	-1%	✓	6473	7004	8%	✓
Total					**87%**				**80%**

5. Forecast Assignments

5.1. Introduction

Forecast trip matrices and networks have been developed for each of the test scenarios for 2018, 2025 and 2033, with and without the Stafford Western Access Route scheme. The forecast trip matrices have been assigned to the networks using the DfT's software DIADEM (Dynamic Integrated Assignment and Demand Modelling) which accounts for variable demand. The variable demand modelling for this assessment has been undertaken in line with WebTAG Unit M2 (January 2014).

The variable demand responses, resulting from a change in travel costs due to highway improvements, include:

- Retiming journeys to take advantage of improved conditions;
- Travelling to new destinations;
- Switching to/from car, from or to other modes; and
- Changing route.

The VDM guidance details that where variable demand is assessed, realism tests should be carried out on the base year model to ensure that it behaves realistically to changes in travel costs and time, and the overall model response conforms to general experience.

5.2. Generalised Cost – Time and Distance

The assignments for each scenario are a composite of the separate assignments for each of the six user-classes. The assignments differ between the user classes in that 'minimum-cost' paths are built separately for each, according to the sum of their respective generalised-cost parameters, defined as 'pence per minute (PPM)' and 'pence per kilometre (PPK)'.

Generalised cost combines time and money into a composite measure of the cost of travel. Generalised cost can be measured in different units, for example, in units of time or in monetary units. In order to transform monetary costs into an equivalent amount of time, or vice versa, it is necessary to apply the concept of a value of time.

Values of time are defined in units of pence per minute. Dividing a monetary cost in pence by the value of time in pence per minute gives an equivalent cost in minutes.

Values of time have been calculated for this study according to the method set out in Transport Analysis Guidance (TAG) Unit A1.3 using values provided in the TAG Data Book (May 2014). The values are expressed in 2010 prices.

Vehicle operating costs are an important element of generalised cost. These costs are calculated in SATURN according to an input rate measured in pence per kilometre. Allowance has to be made for the different average rates of vehicle operating cost between classes of user. Vehicle operating costs are also expected to change in real terms over time in years as vehicles become more efficient and the real cost of fuel changes.

SATURN calculates generalised cost as the sum of two parts, one based on time and the other based on distances. This requires two parameters: pence per minute (PPM) and pence per kilometre (PPK). Generalised cost is therefore expressed as time in minutes (PPK x distance in kilometres / PPM).

The values of PPM and PPK used are shown in

Table 5.1 and Table 5.2 respectively.

Table 5.1 – Pence-Per-Minute (PPM) Generalised Cost Values

Time Period	User Class	2007	2018	2025	2033
AM Peak	Car–Bus	44.01	47.97	54.69	63.86
	Car–Commute	13.00	14.14	16.10	18.78
	Car-Other	16.79	17.91	20.15	23.18
	LGV	19.72	21.65	24.80	29.11
	OGV1	19.97	21.93	25.12	29.48
	OGV2	19.97	21.93	25.12	29.48
PM Peak	Car–Bus	42.31	46.12	52.59	61.42
	Car–Commute	12.69	13.85	15.80	18.46
	Car-Other	17.92	19.18	21.63	24.94
	LGV	19.72	21.65	24.80	29.11
	OGV1	19.97	21.93	25.12	29.48
	OGV2	19.97	21.93	25.12	29.48

Table 5.2 – Pence-Per-Kilometre (PPK) Generalised Cost Values

Time Period	User Class	2007	2018	2025	2033
AM Peak	Car–Bus	11.87	11.89	11.05	10.65
	Car–Commute	6.25	6.44	5.51	5.14
	Car-Other	6.25	6.44	5.51	5.14
	LGV	15.60	16.57	15.75	15.69
	OGV1	28.58	34.44	36.30	38.46
	OGV2	47.82	56.85	59.73	63.05
PM Peak	Car–Bus	11.87	11.89	11.05	10.65
	Car–Commute	6.25	6.44	5.51	5.14
	Car-Other	6.25	6.44	5.51	5.14
	LGV	15.84	16.83	15.99	15.93
	OGV1	28.98	34.98	36.89	39.09
	OGV2	48.13	57.30	60.21	63.59

5.3. Development of VDM Structure

WebTAG guidance has been followed for the setting up of an appropriate variable demand model structure for the Stafford model. The suitability of each of the above demand responses is discussed below:

5.3.1. Mode Choice

The mode choice mechanism allocates trips to each of the main modes included in the model. The guidance recommends the use of a mode choice model in all variable demand modelling. However, the guidance also notes that if mode choice is not considered to be important, then trip frequency modelling should be included as a proxy for trips transferred to the car mode from other modes and vice versa.

The proposed Stafford Western Access Route scheme is expected to reduce congestion in the existing west of town centre streets and address severance issues regarding pedestrians accessing the town centre. The scheme is not proposed to be a public transport scheme and does not include any changes to passenger-transport services in the study area. The existing levels of bus use within Stafford are low at just below 5% and observed patronage levels have reduced over recent years. As a result it is considered that as the influence of transfer to/from public transport may be low and that the scheme itself should not cause significant benefits or disbenefits to public transport, the mode choice response has not been considered other than the use of a frequency response as noted in the next section.

5.3.2. Trip Frequency

Trip frequency response implicitly represents the change in the number of trips generated due to changes in travel cost. The guidance states that:

- If the modal split mechanisms include slow modes, then there is no need to model the response of trip frequency to changes in travel cost, as the overall trip rates will be fairly stable; and
- If there is a realistic representation of choice between car and public transport, the effect of trip frequency is likely to be small.

The Stafford Transport model is a highway only model and does not explicitly model public transport use. The guidance currently does not suggest any specific parameters for this response and notes that it only really applies to the more elastic journey purposes such as shopping.

As noted in the previous section, however, where public transport has not been specifically modelled then this response should be applied through frequency. As the mode choice is applied for all user classes, the frequency response has been used for all car journey purposes, at varying degrees. The lowest level of frequency has been used for car -'business' purpose to account for an element of mode choice, but excluding transfer to slow modes, whilst the highest level has been used for car – 'commuting' purpose to account for both trip frequency and mode choice.

5.3.3. Trip Distribution

Trip distribution response spreads the forecast trips over the available destinations, depending on the generalised cost of reaching that destination. The guidance insists that, as a minimum requirement, a trip distribution response should be included in all variable demand modelling, as its effects on economic benefits is deemed likely to be stronger than other demand responses (such as mode choice, and time period choice).

For modelling trip distribution, guidance recommends the use of:

- A logit type formulation to represent the influence of travel costs on choice of destination;
- An incremental form for predicting the change from a base of largely observed data; and
- A doubly constrained mechanism for commuting trips and singly constrained (production constrained) for work and other category trips.

The demand model for this study includes trip distribution response, and following the guidance, it models doubly constrained distribution for commuting trips and singly (production) constrained for employers business and other category trips.

5.3.4. Time of Day Choice

The time of the day choice is split into two categories:

- Macro time period choice – which involves transfer of trips between broad time periods, for example from peak periods to Inter Peak etc; and
- Micro time period choice, or peak spreading – which involves spreading of the additional demand generated in the peak to the shoulders of the peak.

The guidance mentions that if the demand modelling uses the typical division of time into two peak periods and an Inter Peak, then the freedom of most trips to transfer between them will be severely constrained. Only a few work trips, for example, could move outside the three-hour peak period entirely. Time of day choice would then only be relevant for trips such as shopping trips.

Macro time of day choice response is not included in the demand model for this study, as there is little scope for trips to move from one time period to another as only the AM and PM peaks are being modelled. Micro time period choice response is also not included in the demand model, as currently the DIADEM software does not offer this facility.

5.3.5. Modelled Responses

As previously discussed, the Stafford Western Transport model has 6 user classes: cars (split by purpose type: Employer's business, Commuting and Other), Light Goods Vehicles (LGV), Other Goods Vehicles Category 1 (OGV1) and Category 2 (OGV2). Currently, the guidance recommends that LGV, OGV1 and OGV2 vehicle types are treated as fixed. Hence, variable demand modelling is only applied to car user classes, for this study. Furthermore, the Stafford Western Access Route should have no impact on through movements on the M6 that runs directly through the study area. Therefore, car trips between external (out of Stafford) zones are also fixed. A description of user classes and the selected demand responses considered, based on the information outlined above, is given in Table 5.3.

Table 5.3 – Demand Segments and Modelled Responses

Assignment User Class	Person Type	Description	Demand Segment	Response Modelled
User Class 1 (UC1)	1	Car - Business	DS1	Trip Frequency & Distribution – Origin Constrained
	7	Car – Business (External to External Trips)	DS1	Fixed
User Class 2 (UC2)	2	Car – Commuting	DS2	Trip Frequency & Distribution – Doubly Constrained
	8	Car – Commuting (External to External Trips)	DS2	Fixed
User Class 3 (UC3)	3	Car – Other	DS3	Trip Frequency & Distribution – Origin Constrained
	9	Car – Other (External to External Trips)	DS3	Fixed
User Class 4 (UC4)	4	Light Goods Vehicles (LGV)	DS4	Fixed
User Class 5 (UC5)	5	Other Goods Vehicles (OGV1)	DS5	Fixed

Assignment User Class	Person Type	Description	Demand Segment	Response Modelled
User Class 6 (UC6)	6	Other Goods Vehicles (OGV2)	DS6	Fixed

5.3.6. Realism Testing

The VDM guidance prescribes that where variable demand is assessed, realism tests should be carried out on the base year model to ensure that the it behaves realistically to changes in travel costs and time, and the overall model response conforms to general experience.

The parameters resulting from the realism tests, subsequently used in the forecast modelling assignments are provided in Table 5.4.

Table 5.4 – Sensitivity Parameters (Lambda)

Assignment User Class	Person Type	Description	Parameter Value
User Class 1 (UC1)	1	Trip Frequency & Distribution – Origin Constrained	**-0.1060**
	7	Fixed	-
User Class 2 (UC2)	2	Trip Frequency & Distribution – Doubly Constrained	**-0.1808**
	8	Fixed	-
User Class 3 (UC3)	3	Trip Frequency & Distribution – Origin Constrained	**-0.1000**
	9	Fixed	-
User Class 4 (UC4)	4	Fixed	-
User Class 5 (UC5)	5	Fixed	-
User Class 6 (UC6)	6	Fixed	-

Table 5.5 lists the algorithm and stopping criteria used in the DIADEM runs.

Table 5.5 – Sensitivity Parameters (Lambda)

Parameter	Description	Value
Algorithm	Algorithm adopted for the demand model iterations	Fixed Step Length
Maximum Iterations	Upper limit for iterations	1000
Flow Change Max	Stopping criteria – if the largest change in cell value is less than this value, then DIADEM will stop	N/A
Absolute Gap	The limit for the absolute gap. If absolute gap falls below this value, then DIADEM will stop.	N/A
Relative Gap (%)	The limit for the absolute gap. If relative gap falls below this value, then DIADEM will stop.	0.2

5.3.7. Convergence testing

Based on the lambda parameters derived in the realism tests, the forecast models have been run through DIADEM. In assessing the outputs of the model runs, the main parameter of importance is the 'relative gap', which is the measure of convergence between demand and supply.

Current WebTAG guidance recommends a relative gap of at least 0.2%. However, the guidance also notes that the level of convergence needs to be assessed in context to the scale of benefits of the scheme being appraised relative to the network used for the appraisal.

5.3.7.1. Convergence Statistics

Demand model assignments have been carried out for all time periods (AM and PM peak periods), for all forecast years (2018, 2025 and 2033) for the Do-Minimum and Do-Something scenarios.

Table 5.6 presents the convergence statistics for the Core scenario.

Table 5.6 – Model Convergence Statistics

	Do-Minimum		Do-Something	
	AM	PM	AM	PM
Forecast Year 2018				
Iteration No	10	9	9	8
Step Length	0.35	0.35	0.35	0.35
Max Flow Change	0.1672	0.0753	0.0866	0.3135
Rel. Gap	0.17%	0.12%	0.14%	0.19%
Forecast Year 2025				
Iteration No	11	11	11	11
Step Length	0.35	0.35	0.35	0.35

	Do-Minimum		Do-Something	
	AM	PM	AM	PM
Max Flow Change	0.1504	0.2521	0.1471	-0.1489
Rel. Gap	0.19%	0.15%	0.17%	0.16%
Forecast Year 2033				
Iteration No	12	19	12	14
Step Length	0.35	0.35	0.35	0.35
Max Flow Change	0.1583	-0.1492	-0.2531	-0.0756
Rel. Gap	0.17%	0.15%	0.17%	0.16%

Table 4.6 demonstrates that a good level of convergence is achieved for all the model runs with a relative gap of less than 0.2% achieved for all model runs.

It is also noted that, whilst not presented here, all of the assignments for each year and scenario have achieved a relative gap of less than 0.2%.

5.4. Variable Demand Matrix Changes

The impact of DIADEM on the number of trips suppressed/induced for each assignment and the effect on trip patterns has been assessed.

Table 5.7 shows the trip matrix sizes pre-DIADEM and post-DIADEM to demonstrate the impact of DIADEM on the number of modelled trips.

Table 5.7 – DIADEM Matrix Changes – Core Scenario

Year	Peak Period	Pre-DIADEM Trips	Post-DIADEM Trips Do-Minimum		Post-DIADEM Trips Do-Something	
			Trips	% Change	Trips	% Change
2018	AM	37044	37049	0.01%	37053	0.02%
	PM	38346	38351	0.01%	38354	0.02%
2025	AM	39485	39575	0.23%	39586	0.26%
	PM	40987	41065	0.19%	41074	0.21%
2033	AM	42147	42274	0.30%	42292	0.34%
	PM	43760	43860	0.23%	43875	0.26%

Table 4.7 demonstrates that the overall change in number of trips due to DIADEM is low with a marginal increase up to 0.34%. The number of trips for the Do-Something scenarios is marginally higher than for the Do-Minimum scenarios due to the increased capacity available, as would be expected.

The impact of DIADEM on trip patterns has also been considered using a sector analysis. The trips to and from 9 sectors has been analysed pre-DIADEM and post-DIADEM to determine changes in trip patterns. The sectoring system is shown in Figure 5.1.

Figure 5.1 – Sectoring System

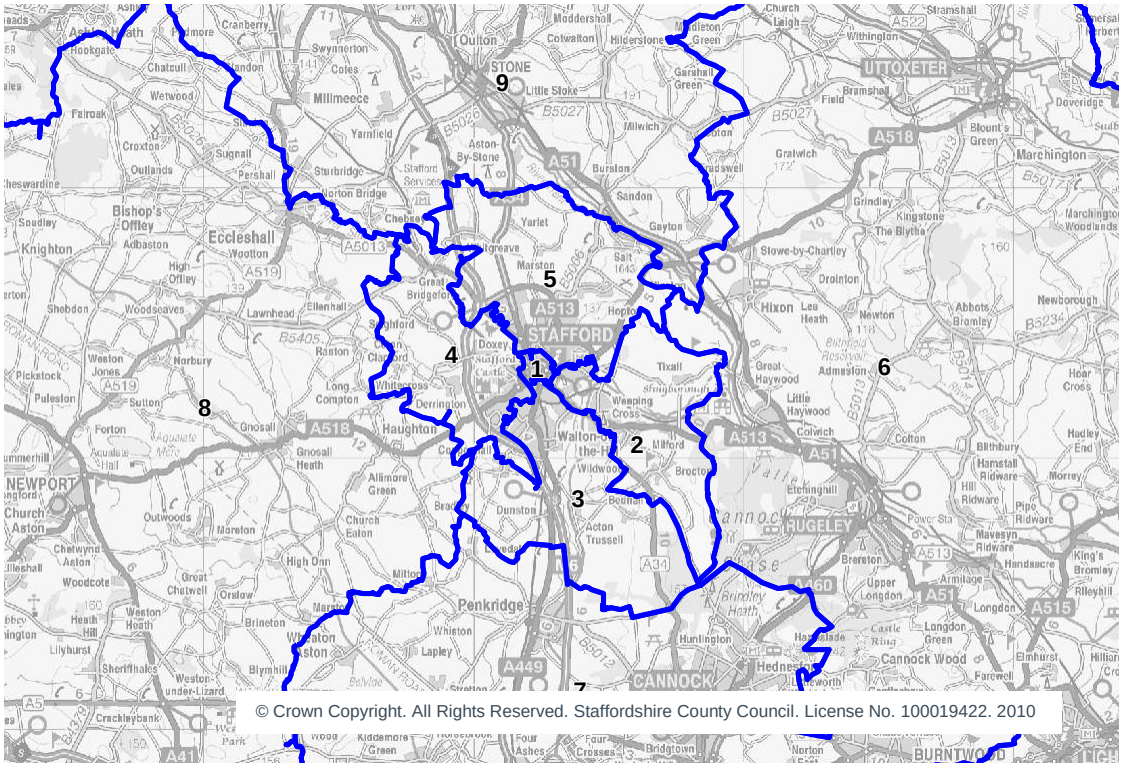


Table 5.8 shows the sectored matrices pre- and post-DIADEM for the 2033 AM peak in the Do-Something Core scenario. Furthermore, the difference in trips in absolute and percentage terms is displayed.

Tables for all the Core Do-Minimum and Do-Something scenarios for all years and time periods are included in Appendix E.

Table 5.8 -Impact of Variable Demand Modelling - 2033 AM Do Something

Pre-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	134	117	119	165	298	175	173	76	176	1,432
	2	366	249	277	156	475	295	294	90	278	2,480
	3	356	287	309	284	417	394	422	98	235	2,802
	4	429	162	312	392	775	333	334	171	352	3,261
	5	538	366	452	312	1,848	636	492	293	670	5,606
	6	578	282	323	202	1,266	899	377	361	791	5,079
	7	482	216	289	193	889	433	342	134	4,561	7,539
	8	345	131	123	167	638	556	132	292	564	2,949
	9	584	301	229	237	995	819	4,454	610	2,770	10,999
	Totals	3,811	2,111	2,433	2,109	7,602	4,539	7,021	2,125	10,396	42,147

Post-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	131	110	115	164	296	176	174	79	187	1,433
	2	338	227	267	147	482	306	311	93	312	2,483
	3	338	268	294	265	417	426	444	103	254	2,809
	4	421	153	295	382	753	341	346	183	392	3,265
	5	531	363	441	304	1,788	666	539	305	678	5,615
	6	565	279	324	199	1,318	858	381	362	818	5,103
	7	484	214	289	193	902	441	308	139	4,599	7,568
	8	350	127	120	169	616	564	137	289	596	2,969
	9	620	318	234	251	990	833	4,526	671	2,605	11,046
	Totals	3,776	2,058	2,379	2,075	7,562	4,611	7,165	2,225	10,441	42,292

Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	-3	-7	-4	-1	-2	1	2	4	12	1
	2	-28	-22	-10	-9	7	10	17	3	34	3
	3	-19	-19	-15	-19	0	32	22	5	19	8
	4	-8	-10	-17	-10	-22	8	11	12	39	4
	5	-6	-3	-11	-7	-60	31	47	11	8	9
	6	-13	-3	1	-3	51	-41	4	2	27	25
	7	2	-2	0	0	13	8	-35	5	38	29
	8	4	-3	-3	3	-23	8	5	-3	32	20
	9	36	17	5	14	-5	14	72	61	-165	47
	Totals	-35	-52	-54	-33	-41	72	145	100	44	145

Percentage Change

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	-2%	-6%	-3%	-1%	-1%	0%	1%	5%	7%	0%
	2	-8%	-9%	-4%	-6%	1%	4%	6%	4%	12%	0%
	3	-5%	-6%	-5%	-7%	0%	8%	5%	5%	8%	0%
	4	-2%	-6%	-5%	-3%	-3%	2%	3%	7%	11%	0%
	5	-1%	-1%	-2%	-2%	-3%	5%	9%	4%	1%	0%
	6	-2%	-1%	0%	-2%	4%	-5%	1%	1%	3%	0%
	7	0%	-1%	0%	0%	1%	2%	-10%	4%	1%	0%
	8	1%	-2%	-3%	2%	-4%	1%	4%	-1%	6%	1%
	9	6%	6%	2%	6%	-1%	2%	2%	10%	-6%	0%
	Totals	-1%	-2%	-2%	-2%	-1%	2%	2%	5%	0%	0%

It can be observed that there is generally a reduction in trips to all Stafford areas of the model (sectors 1-5) with a corresponding increase in trips to external sectors. The change in trip patterns away from high cost

routes to lower cost routes is an expected response from DIADEM and demonstrates that the program is functioning correctly.

The total change in trips to each sector is generally less than 2%, with a maximum increase in trips of 5% to sector 8 (west of Stafford). This change in trips is predominantly due to an increase in trips from sector 9 to sector 8. The low change in trips resulting from DIADEM is consistent across all time periods and scenarios as shown in Appendix E.

The change in trips from sector to sector are all reasonably low with the highest change being -165 trips within sector 9. This change, however, forms a very small proportion of trips from Sector 9 at 1.5%.

The increase in trips tends to be slightly greater in the Do-Something scenarios compared to the Do Minimum. This is to be expected given the extra capacity in the Do-Something resulting from the Stafford Western Access Route.

6. Traffic Forecasts – Stafford Western Access Route

6.1. Introduction

The traffic impacts of the Stafford Western Access Route (SWAR) scheme have been assessed by comparing the Do-Minimum and Do-Something forecasts for the 2018 and 2033 future year scenarios and time periods (AM/PM). These forecasts have been used to identify the effects of the scheme on:

- Network performance;
- Traffic flows on links;
- Volume to Capacity (V/C) ratios for the Do-Minimum and Do-Something networks at key junctions around the study area;
- Journey times; and
- Routing.

The traffic impacts outlined in this section compare the Do-Minimum and Do-Something for the Core scenario. As discussed in Section 4, this scenario is the most likely to occur based on the local authorities' view of development proposals.

6.2. Forecast Network Performance

Table 6.1 and

Table 6.2 present the assignment summary statistics for the 2007, 2018 and 2033 traffic models for the Do-Minimum and Do-Something scenarios for the AM and PM peak periods respectively. Of particular note are the overcapacity queued time, which is generally taken as a measure of congestion, and the average speed, which summarises operating conditions for all drivers included in the trip matrices (those passing through the study area). The total travel time, made up of cruise time, transient queued time (e.g. waiting at a red light at signals) and overcapacity queued time, and total travel distance are summed over full journey lengths for all modelled trips. These together determine the average overall journey speed.

Table 6.1 – Forecast Network Assignment Statistics – Core Scenario AM Peak

Statistics	2007	2018		2033	
		Do-Min	Do-Som	Do-Min	Do-Som
Total Assigned Trips (pcus)	35,698	37,049	37,053	42,274	42,292
Link Cruise Time (pcu-hrs)	19,950	20,030	20,026	23,045	23,040
Transient Queued Time (pcu-hrs)	1,292	1,397	1,380	2,094	2,084
Overcapacity Queued Time (pcu-hrs)	236	282	260	648	436
Total Travel Time (pcu-hrs)	21,478	21,709	21,666	25,787	25,560
Travel Distance (pcu-kms)	1788952	1787192	1786858	2033190	2032640
Average Journey Speed (kph)	83.3	82.3	82.5	78.8	79.5

Table 6.2 - Forecast Network Assignment Statistics – Core Scenario PM Peak

Statistics	2007	2018		2033	
		Do-Min	Do-Som	Do-Min	Do-Som
Total Assigned Trips (pcus)	36,897	38,351	38,354	43,860	43,876
Link Cruise Time (pcu-hrs)	19,774	19,871	19,867	22,921	22,908
Transient Queued Time (pcu-hrs)	1,218	1,345	1,328	1,997	1,992
Overcapacity Queued Time (pcu-hrs)	156	200	195	614	453
Total Travel Time (pcu-hrs)	21,148	21,415	21,390	25,533	25,354
Travel Distance (pcu-kms)	1753286	1754298	1753935	2001801	2000712
Average Journey Speed (kph)	82.9	81.9	82.0	78.4	78.9

Table 6.1 to

Table 6.2 demonstrate that between 2007 and 2033 without SWAR there will be increases in overcapacity queued time of 175% and 294% in the AM and PM peaks respectively. There will be corresponding reduction in average journey speeds over the same period of 5% and 5% in the AM and PM peak periods respectively. The location of the key changes in delay will be considered in more detail in the following sections. An increase in overcapacity queued time and a reduction in journey speeds would be expected due to the increase in trips in the future years.

The proposed SWAR scheme is predicted to improve the overall performance of the network, reducing overcapacity queued time by 33% and 26% in the 2033 AM and PM peaks respectively.

6.3. Link Flows

Forecast flows on the proposed Stafford Western Access Route scheme, as well as on a number of other key links within the study area, for 2007, 2018 and 2033 for the Do-Minimum and Do-Something are shown in Table 6.3 and Table 6.4 for the AM and PM peak hours respectively.

The locations of the links are shown in Figure 6.1. It should be noted that it is northern section of the SWAR, labelled “SWAI 1” which is the proposed scheme being assessed in this TAR, as previously discussed.

Figure 6.1 - Location of Key Links

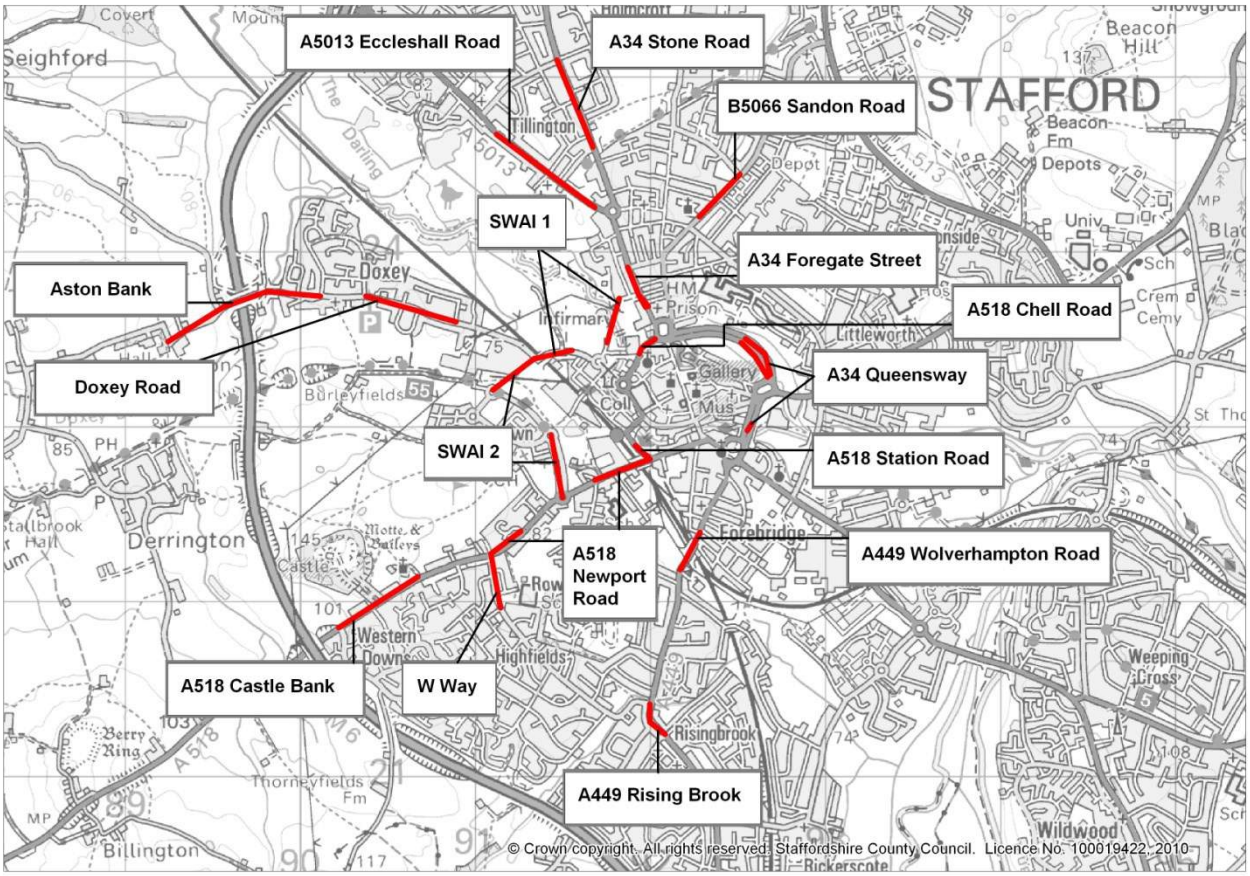


Table 6.3 – Two-way flow (vehicles/hr) on key links – AM Peak

Link Road	2007	2018		2033	
		Do-Min	Do-Som	Do-Min	Do-Som
Aston Bank	375	249	261	253	276
Doxey Road	795	669	684	662	719
A518 Castle Bank	938	1039	1047	985	1062
W Way	734	829	949	896	1021
A518 Newport Road Eastern	1479	1572	1338	1746	1535
A518 Newport Road Western	1340	1551	1694	1519	1778
SWAI 1 Northern	N/A	N/A	1501	N/A	1832
SWAI 1 Southern	1018	1122	1536	1643	2302
SWAI 2 Northern	N/A	447	835	973	1523
SWAI 2 Southern	300	483	867	934	1289
A5013 Eccleshall Road	1288	1373	1386	1509	1611
A449 Wolverhampton Road	1377	1440	1411	1597	1531
A518 Chell Road	1741	2111	951	2389	1396
A34 Stone Road	1729	1869	1865	1983	2034

Link Road	2007	2018		2033	
		Do-Min	Do-Som	Do-Min	Do-Som
B5066 Sandon Road	998	1129	1095	1405	1441
A34 Queensway (northern)	2105	2432	2146	2816	2712
A34 Foregate Street	2569	2690	2801	2884	3251
A518 Station Road	1257	1323	1208	1332	1087
A449 Rising Brook	1957	2050	2136	2228	2292

Table 6.4 - Two-way flow (vehicles/hr) on key links – PM Peak

Link Road	2007	2018		2033	
		Do-Min	Do-Som	Do-Min	Do-Som
Aston Bank	490	257	262	274	325
Doxey Road	773	544	551	563	637
A518 Castle Bank	1069	1328	1343	1153	1348
W Way	645	737	764	870	961
A518 Newport Road Eastern	1666	1573	1512	1727	1701
A518 Newport Road Western	1393	1772	1816	1697	1992
SWAI 1 Northern	N/A	N/A	1503	N/A	1988
SWAI 1 Southern	982	1327	1438	1757	2229
SWAI 2 Northern	N/A	724	894	1131	1612
SWAI 2 Southern	377	724	883	1131	1378
A5013 Eccleshall Road	1263	1376	1371	1455	1533
A449 Wolverhampton Road	1581	1718	1721	1857	1745
A518 Chell Road	1901	2378	1202	2526	1626
A34 Stone Road	1596	1840	1870	2018	2075
B5066 Sandon Road	1272	1461	1377	1693	1676
A34 Queensway (northern)	1779	1813	1699	2028	2020
A34 Foregate Street	2463	2570	2695	2770	3142
A518 Station Road	1550	1516	1559	1475	1451
A449 Rising Brook	2003	2154	2183	2278	2328

Figure 6.2 to Figure 6.6 shows the traffic flow on these key links in each direction for the 2007 base scenario, 2016 Do-Minimum, 2016 Do-Something, 2031 Do-Minimum and 2031 Do-Something scenarios respectively.

Figure 6.2 – 2007 Base Scenario Traffic Flows (vehicles/hour)

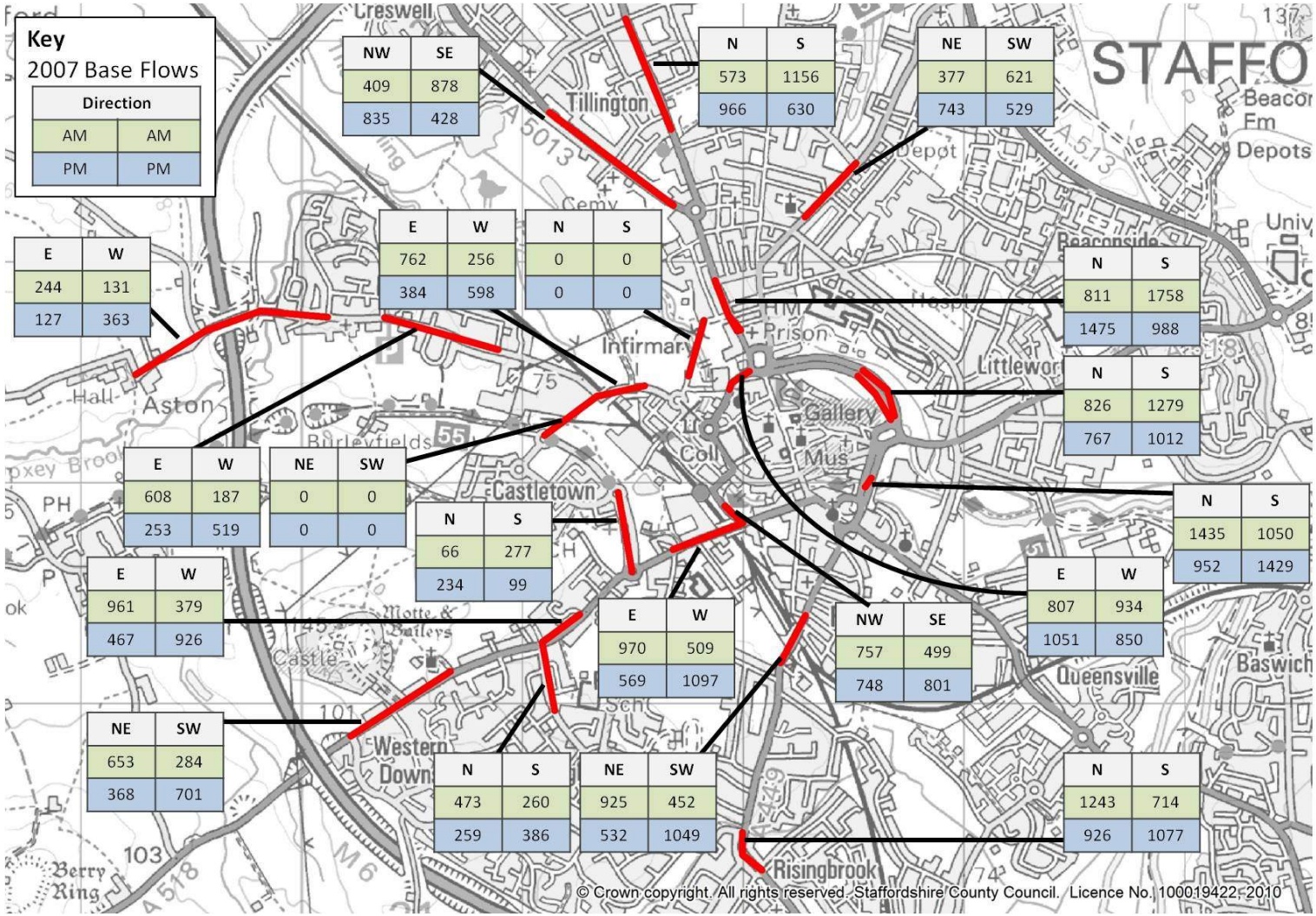


Figure 6.3 – 2018 Do-Minimum Traffic Flows (vehicles/hour)

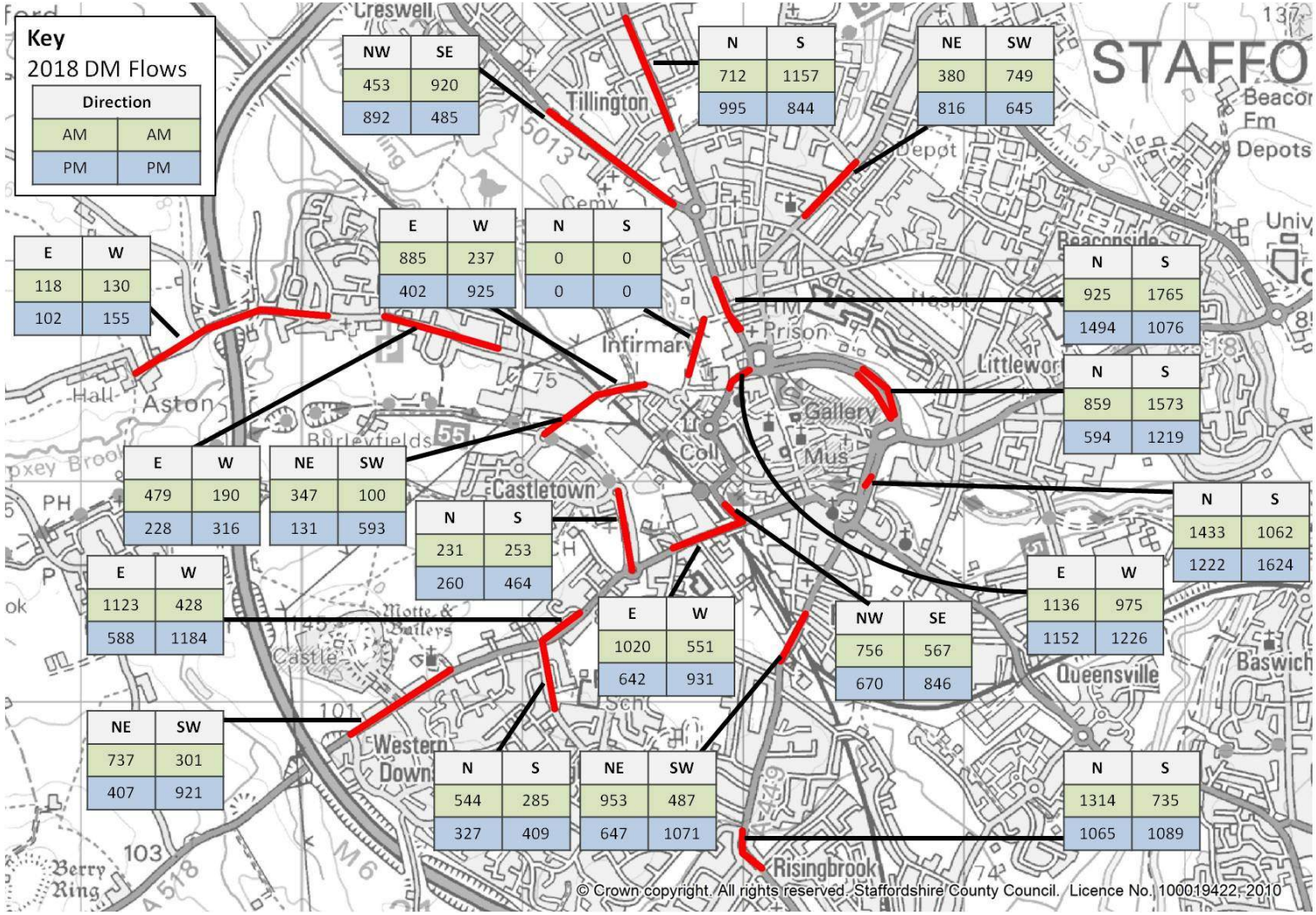


Figure 6.4 – 2018 Do-Something Traffic Flows (vehicles/hour)

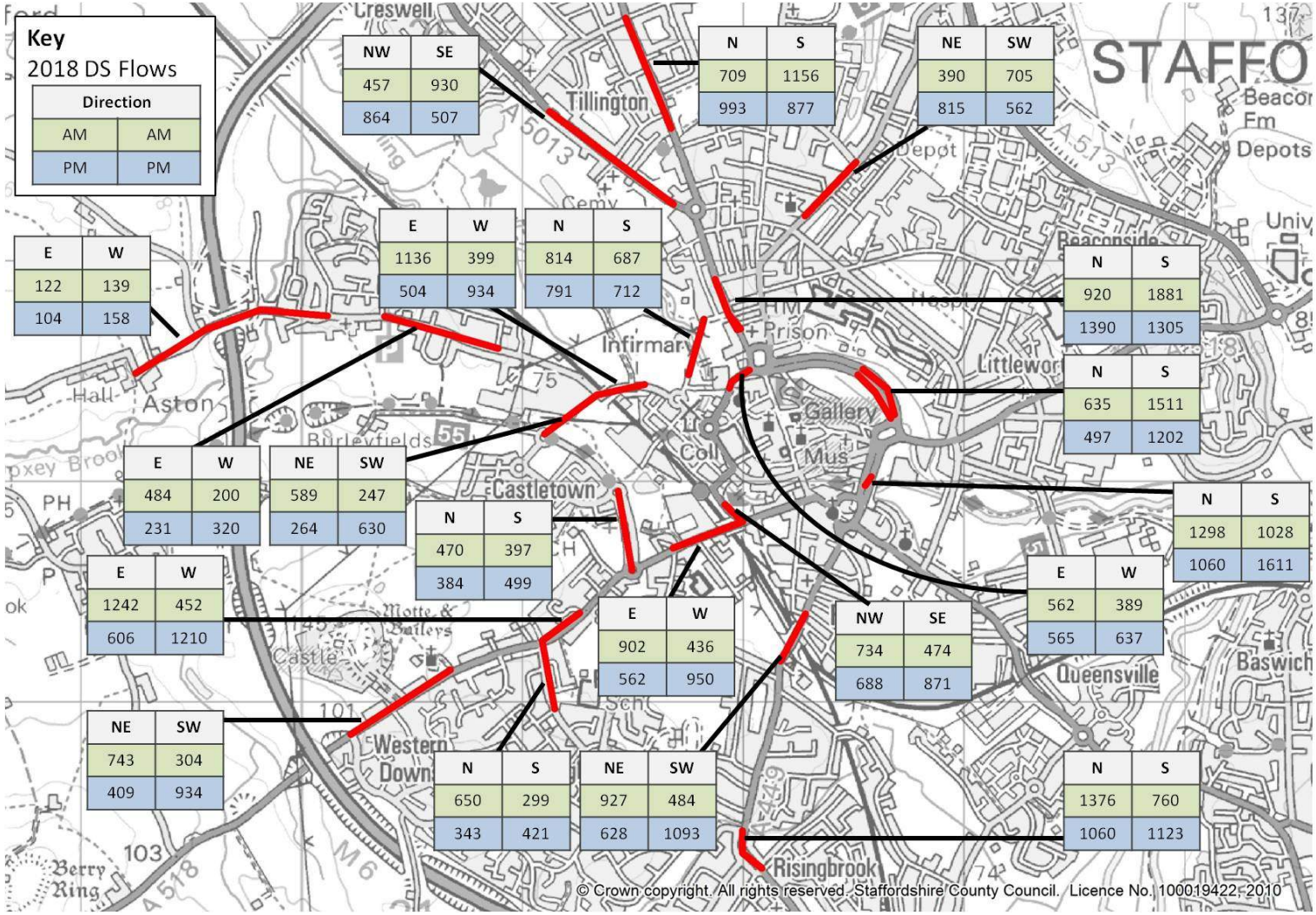


Figure 6.5 – 2033 Do-Minimum Traffic Flows (vehicles/hour)

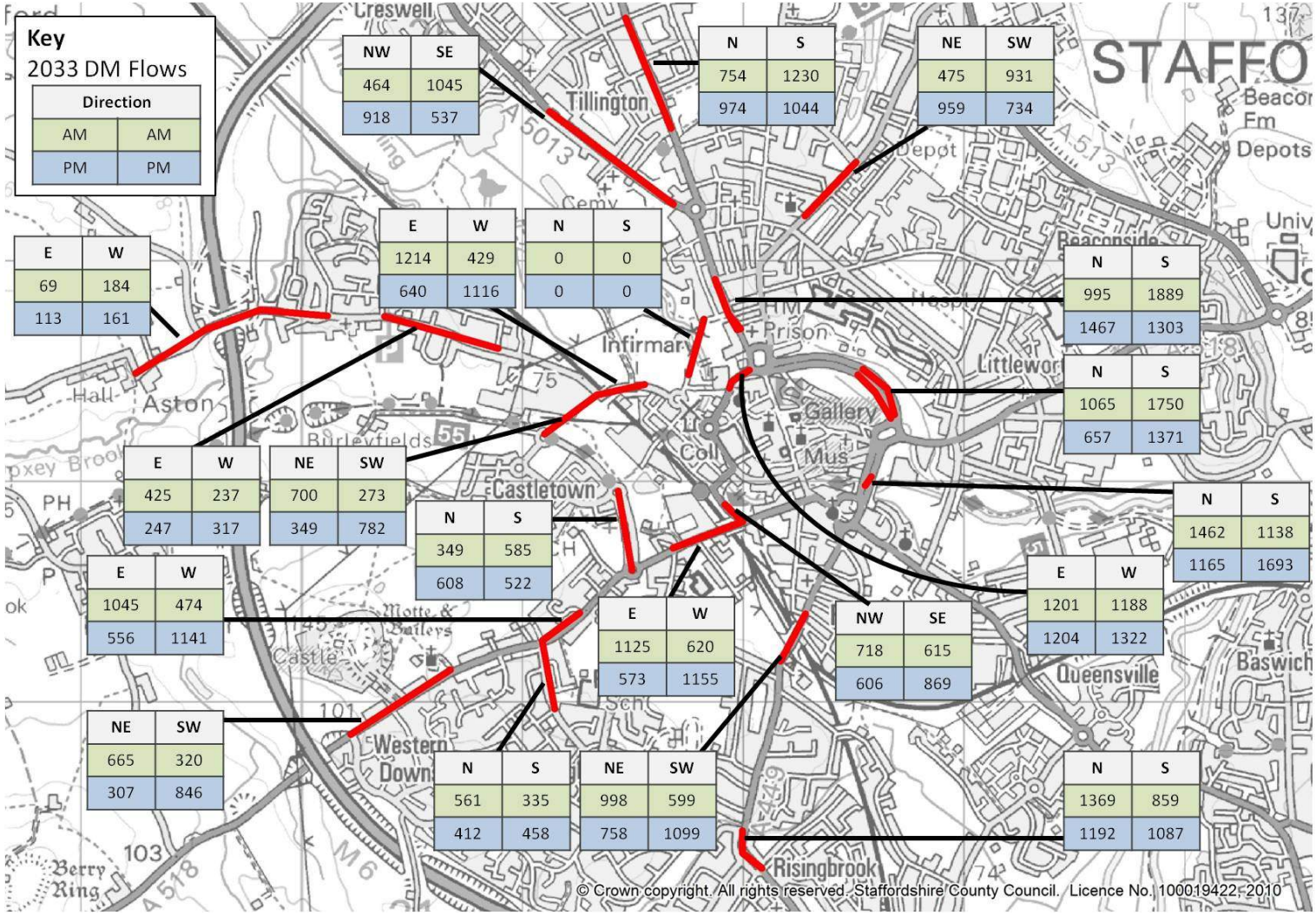


Figure 6.6 – 2033 Do-Something Traffic Flows (vehicles/hour)

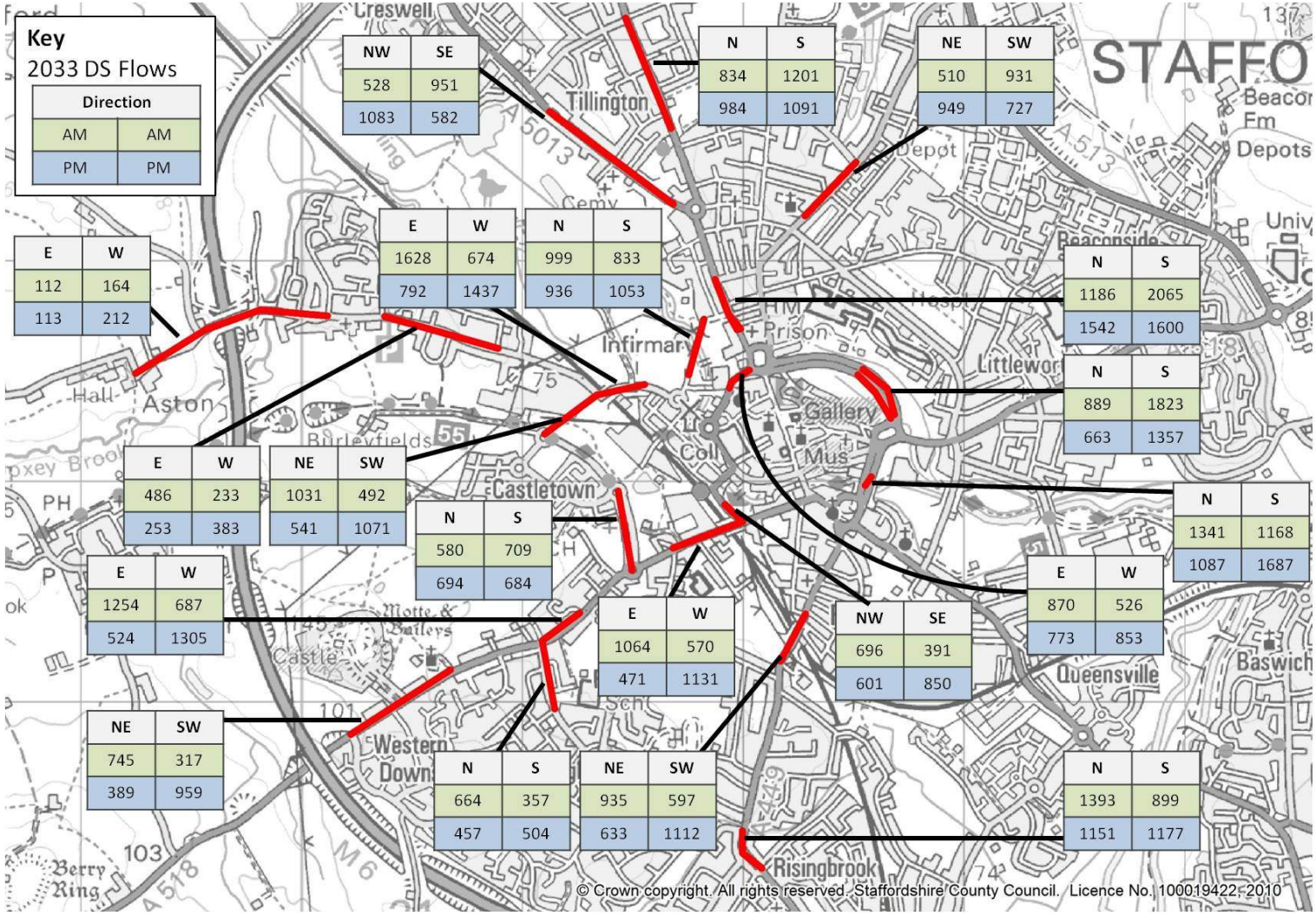

Key
2033 DS Flows
Direction
AM AM
PM PM
NW SE
528 951
1083 582
N S
834 1201
984 1091
NE SW
510 931
949 727
E W
1628 674
792 1437
N S
999 833
936 1053
E W
112 164
113 212
N S
1186 2065
1542 1600
N S
889 1823
663 1357
E W
486 233
253 383
NE SW
1031 492
541 1071
N S
580 709
694 684
N S
1341 1168
1087 1687
E W
1254 687
524 1305
E W
1064 570
471 1131
NW SE
696 391
601 850
E W
870 526
773 853
NE SW
745 317
389 959
N S
664 357
457 504
NE SW
935 597
633 1112
N S
1393 899
1151 1177
Creswell
Tillington
Infirmary
Prison
Aston
Castletown
Castle
Western Down
Risingbrook
Queensville
Littlewood
Gallery
Depot
Beacon Fm
Depots
Baswich
Berry Ring
© Crown copyright. All rights reserved. Staffordshire County Council. Licence No. 100019422-2010

Figure 6.7 and Figure 6.8 show the change in traffic flow between the Core Scenario Do-Something compared to the Do-Minimum in 2033 for the AM and PM peak periods. An increase (red) shown in the figure demonstrates that the flows in the Do-Something are higher than in the Do-Minimum.

Figure 6.7 – Change in Traffic Flow between Do-Minimum and Do-Something – 2033 AM Peak

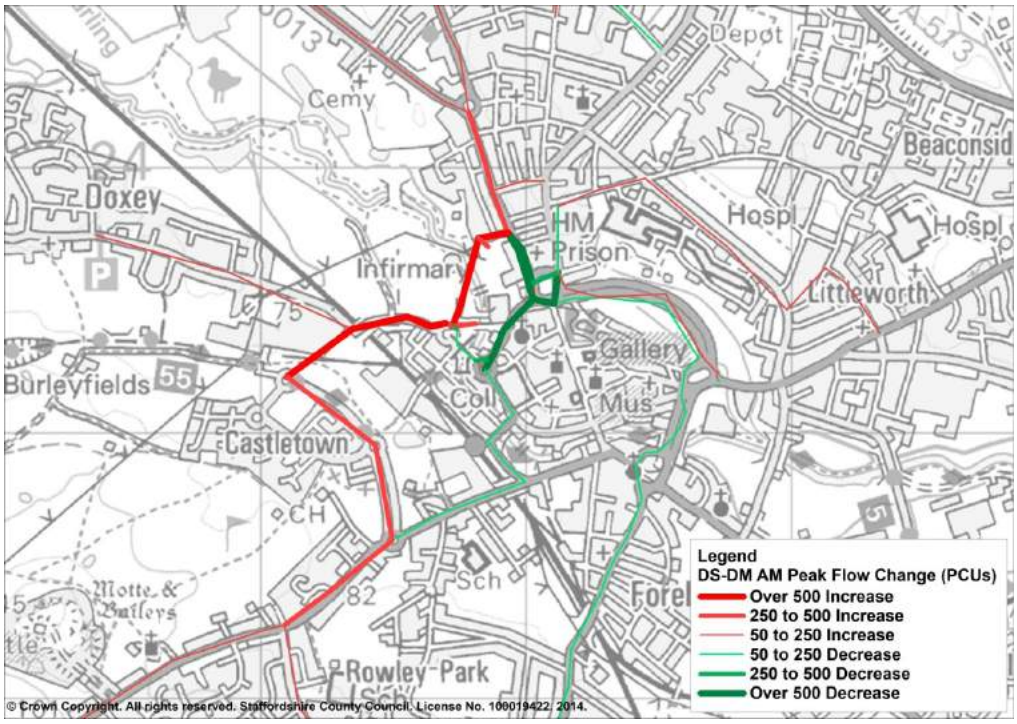
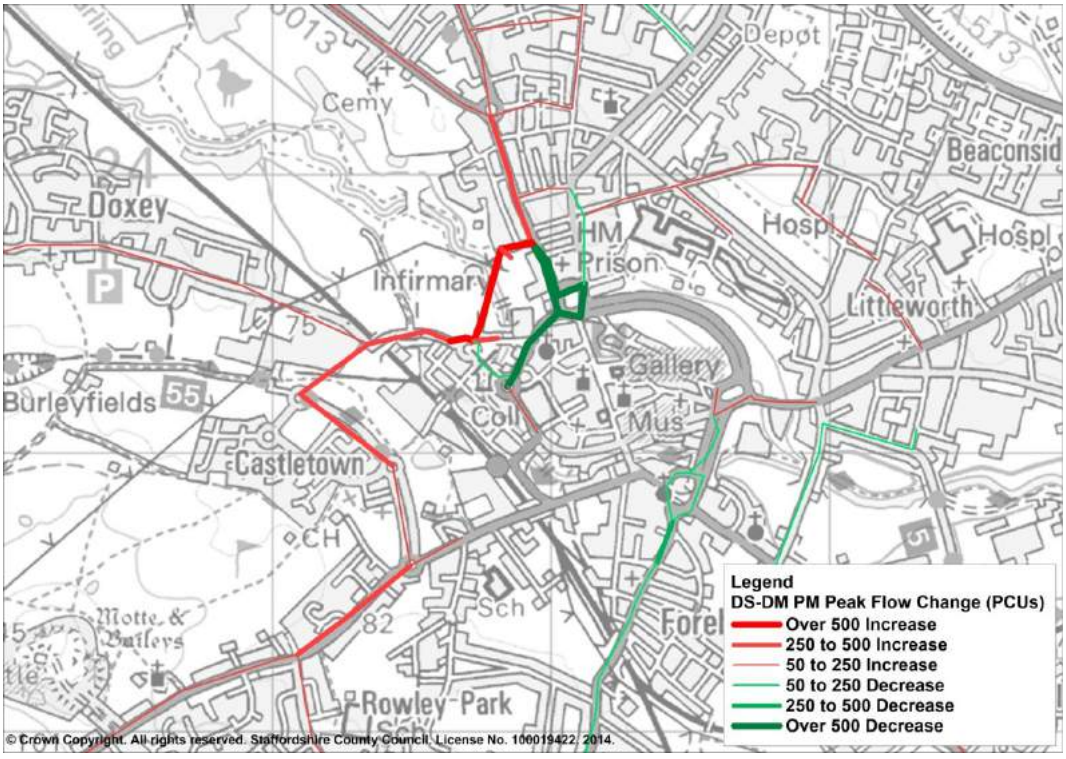


Figure 6.8 – Change in Traffic Flow between Do-Minimum and Do-Something – 2033 PM Peak



It can be observed from Table 6.3 and Table 6.4 that in general there will be an increase in traffic flow on all major roads within the study area, for both peak hours for the Do-Minimum scenario between 2007 and 2033. This means that without action, the already heavily congested town centre will become further congested. For example, traffic flow on the congested Chell Road increases 37% and 33% in the AM and PM peak respectively between 2007 and 2033. It is noted that there is a reduction in traffic flow on Aston Bank and Doxey Road between 2007 and 2018. This is due to traffic reassigning onto the A518 and utilising the southern section of the SWAR (between the A518 and Doxey Road) which is included in the Do-Minimum scenario.

However, the introduction of the SWAR is predicted to reduce the impact of this traffic growth on the town centre. On some key roads, the proposed scheme will result in lower traffic levels in the 2033 Do-Something scenario than in the Base Year. Traffic flows on A518 Chell Road, for example, reduce by 20% and 14% in the AM and PM peaks respectively compared to the base year.

The alternative routes to the SWAR scheme generally show lower flows in the Do Something than in the Do Minimum. This is demonstrated in Figure 6.7 and Figure 6.8 where the alternative routes around the town centre are largely green indicating less traffic in the Do Something. Traffic flow on the A518 Chell Road reduces significantly as traffic currently using this road, both from Doxey Road and from Tenterbanks, can divert via the northern section of the SWAI.

The areas of the diagrams that show an increase in traffic flow in the Do Something are largely radial routes that either draw traffic into the SWAR or make use of the less congested town centre.

Increases in traffic along A518 Newport Road, A518 Castle Bank, West Way, A5013 Eccleshall Road, A34 Stone Road, A449 Rising Brook and A34 Foregate Street are all examples of where traffic has re-assigned either onto the Western Access Improvements or into the less congested town centre.

The stretch of Doxey Road that will form part of the SWAR shows much higher traffic levels in the Do Something than the Do Minimum due to the fact that this will become part of a key route in the Do Something.

The re-assignment of traffic due to the SWAR will have an impact on key junction performance as discussed in the following section.

AADTs for 2018 and 2033 are presented for key links in diagrammatic form in Appendix G.

6.4. Operational Capacity at Junctions

Average volume/capacities (V/C) ratios have been identified at key junctions in the study area for 2007 and 2033 for the Do-Minimum and So-Something scenarios. These junctions have been selected as they are impacted upon by the proposed scheme.

The junction stress levels presented below are a weighted average of Volume over Capacity of all turns at a junction, hence an average calculated for the junction as a whole and not individual turns. Above 85% suggests that the junction is reaching its capacity and may start to have significant delays. It should be noted that although the average junction stress may not exceed 85%, individual turns approaching the junction may exceed 85%. Likewise, although a link stress may not exceed 85% an individual turn may exceed capacity.

The location of the key junctions considered is shown in Figure 6.9.

Figure 6.9 – Location of Key Junctions

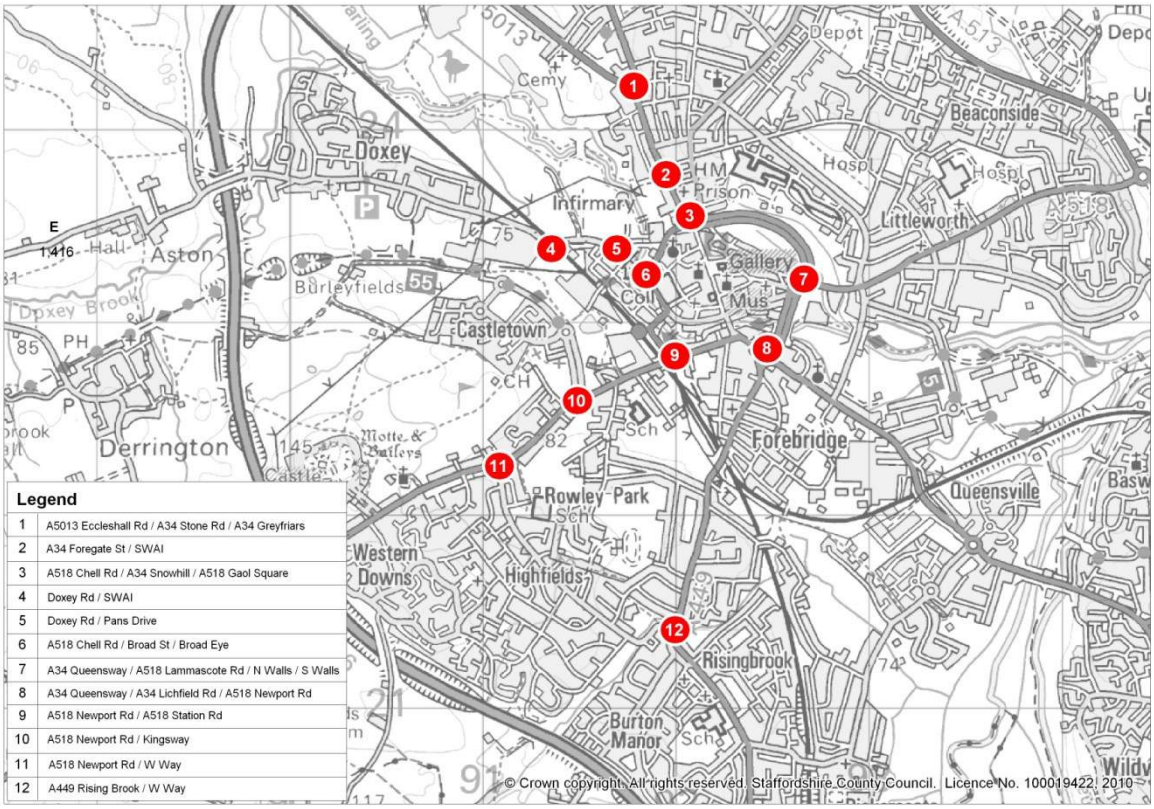


Table 6.5 – Average Junction Stress (%) at Key Junctions – AM Peak

Link Road	2007	2018		2033	
		Do-Min	Do-Som	Do-Min	Do-Som
1 - Eccleshall Rd/A34 Stone Road	59	65	68	74	81
2 - A34 Foregate Street/SWAI	43	44	44	48	53
3 - Gaol Square Gyratory	52	59	46	66	57
4 - Doxey Road/SWAI	30	29	39	43	61
5 - Doxey Road/Pans Drive	39	37	35	54	49
6 - A518 Chell Rd/Broad Street	42	47	36	55	46
7 - A34 Queensway/A518 Lammascote Rd	51	50	49	54	55
8 - A34 Queensway/A34 Lichfield Rd/A518 Newport Rd	50	55	54	59	59
9 - A518 Newport Rd/A518 Station Rd	51	56	51	61	55
10 - A518 Newport Rd/Kingsway	34	40	43	46	53
11 - A518 Newport Rd/West Way	52	53	57	53	61
12 - A449 Rising Brook/West Way	67	69	71	75	75

Table 6.6 - Average Junction Stress (%) at Key Junctions – PM Peak

Link Road	2007	2018		2033	
		Do-Min	Do-Som	Do-Min	Do-Som
1 - Eccleshall Rd/A34 Stone Road	53	59	63	67	74
2 - A34 Foregate Street/SWAI	45	46	47	49	55
3 - Gaol Square Gyratory	51	65	44	71	52
4 - Doxey Road/SWAI	29	33	37	45	59
5 - Doxey Road/Pans Drive	36	42	38	55	58
6 - A518 Chell Rd/Broad Street	44	55	39	57	50
7 - A34 Queensway/A518 Lammscote Rd	35	52	51	55	56
8 - A34 Queensway/A34 Lichfield Rd/A518 Newport Rd	72	79	78	85	79
9 - A518 Newport Rd/A518 Station Rd	74	70	72	77	77
10 - A518 Newport Rd/Kingsway	34	43	45	47	54
11 - A518 Newport Rd/West Way	41	53	54	51	60
12 - A449 Rising Brook/West Way	66	71	72	78	76

The proposed scheme and the resultant re-assignment of traffic from adjacent roads will result in improved performance of a number of junctions. Specifically, the improvement is noticed in the town centre which previously experienced high stress. The town centre junctions – 3, 5, 6, 7, 8 and 9 – all demonstrate reduced stress during the AM or PM peak as a result of traffic using the SWAR.

The junctions with the greatest improvement are the following, three of which are in the north-west town centre area:

- Gaol Square Gyratory in the AM and PM peaks;
- A518 Chell Rd/Broad Street in the AM and PM peaks;
- A518 Newport Road / A518 Station Road during the AM peak; and
- A34 Queensway / A34 Lichfield Road / A518 Newport Road in the PM peak.

This demonstrates that the scheme helps to improve junction performance around the town centre enabling the traffic that remains using the town centre to benefit from this improvement.

While some of the junctions have increased stress levels, they tend to be the radial routes (Newport Road and the A34) as the increased capacity in the town centre encourages more traffic into the area. While this does cause some increases, these stress levels are still much lower than 85%.

6.5. Journey Time Analysis

Comparisons of journey times have been carried out to identify the travel time savings achieved by the SWAR. Journey times have been considered for three routes in both directions as listed below:

- Route 1 – Western Downs Residential to Eccleshall Road;
- Route 2 – Doxey Residential to A34 Industry; and
- Route 3 – A449 to Tillington Housing.

Figure 6.10 shows the extent of the three journey time routes geographically. The routes shown as a dotted line are potential alternative routes using the proposed scheme.

Figure 6.10 – Journey Time Routes

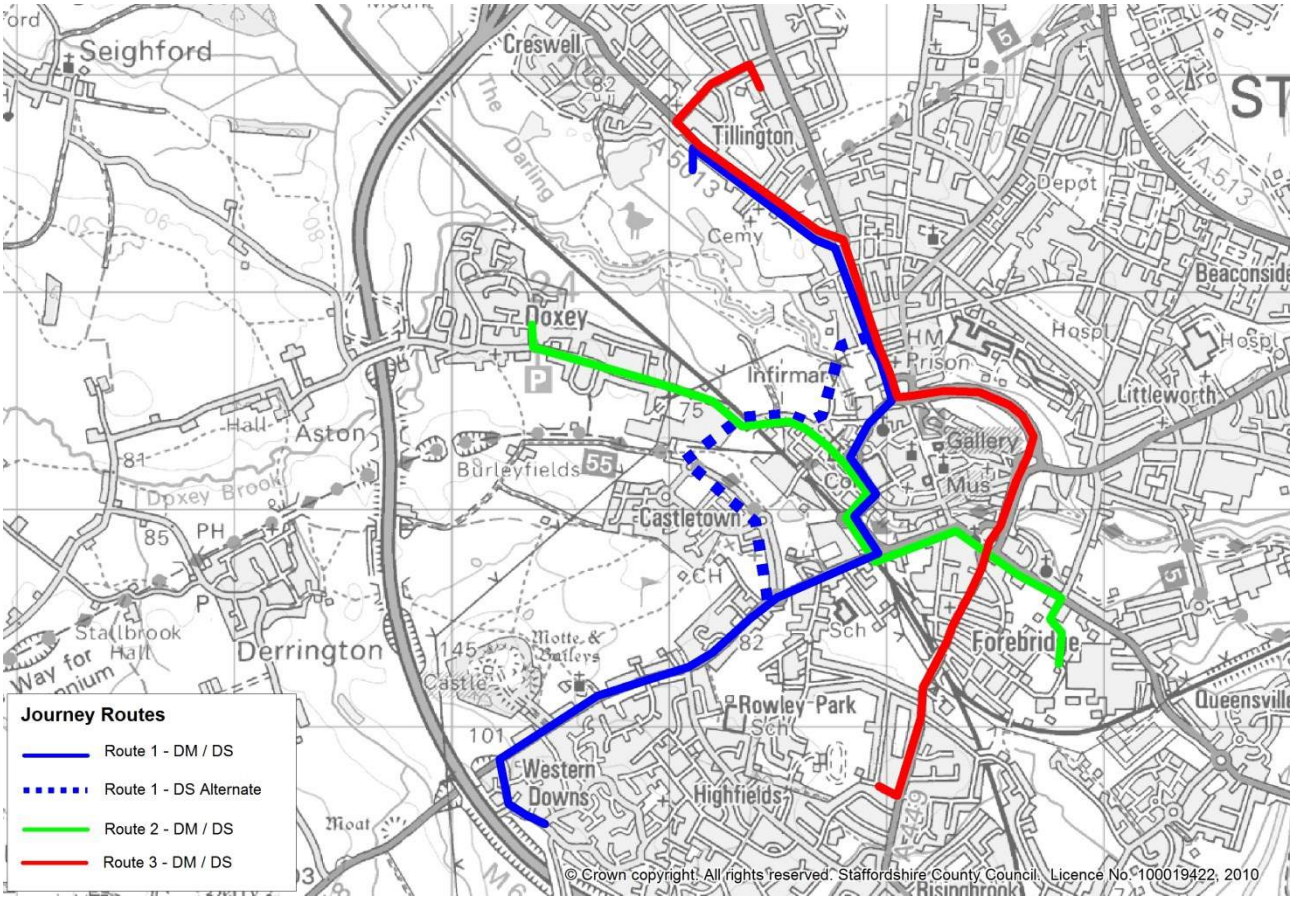


Table 6.7 and Table 6.8 show the results of the journey time assessments for 2033 scenarios for the AM and PM peaks respectively. Figure 6.11 and Figure 6.12 show the journey times graphically.

Figure 6.11 – Journey Time Routes – 2033 AM Peak

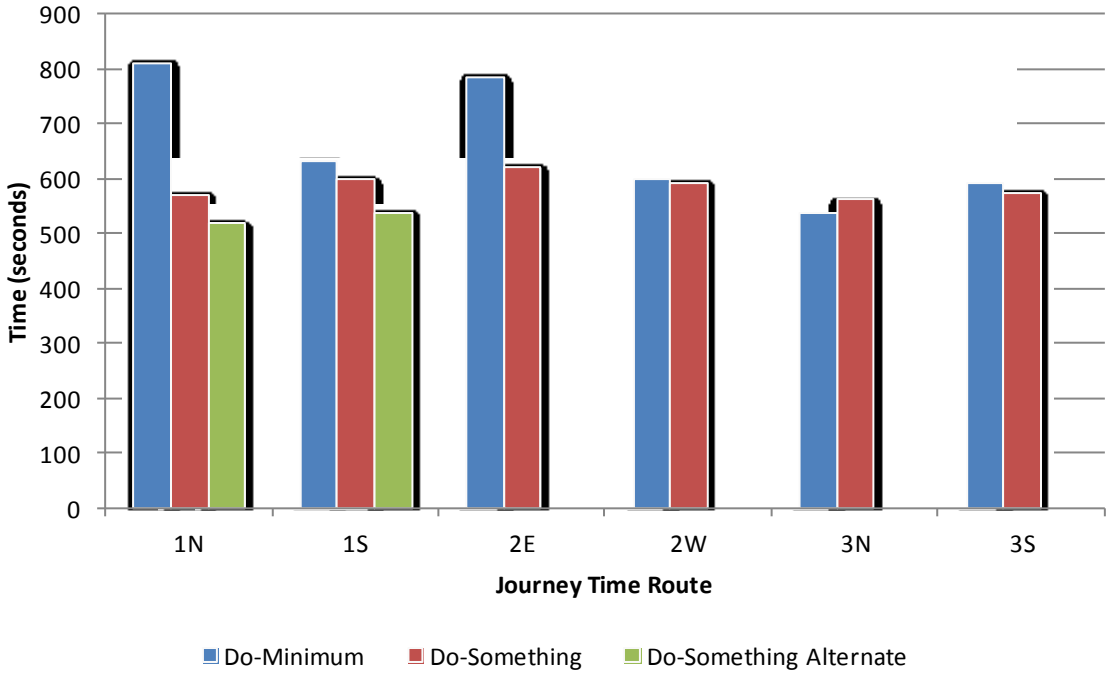


Table 6.7 – Journey Time Savings in 2033 – AM Peak

Route	Journey Times (min:sec)				
	DM	DS	% Diff	DS Alt	% Diff
Route 1– Northbound	13:32	09:31	-30%	08:39	-36%
Route 1- Southbound	10:33	09:59	-5%	08:59	-15%
Route 2- Eastbound	13:07	10:22	-21%	N/A	N/A
Route 2– Westbound	09:59	09:53	-1%	N/A	N/A
Route 3– Northbound	08:59	09:22	4%	N/A	N/A
Route 3 – Southbound	09:54	09:36	-3%	N/A	N/A

Figure 6.12 - Journey Time Routes – 2033 PM Peak

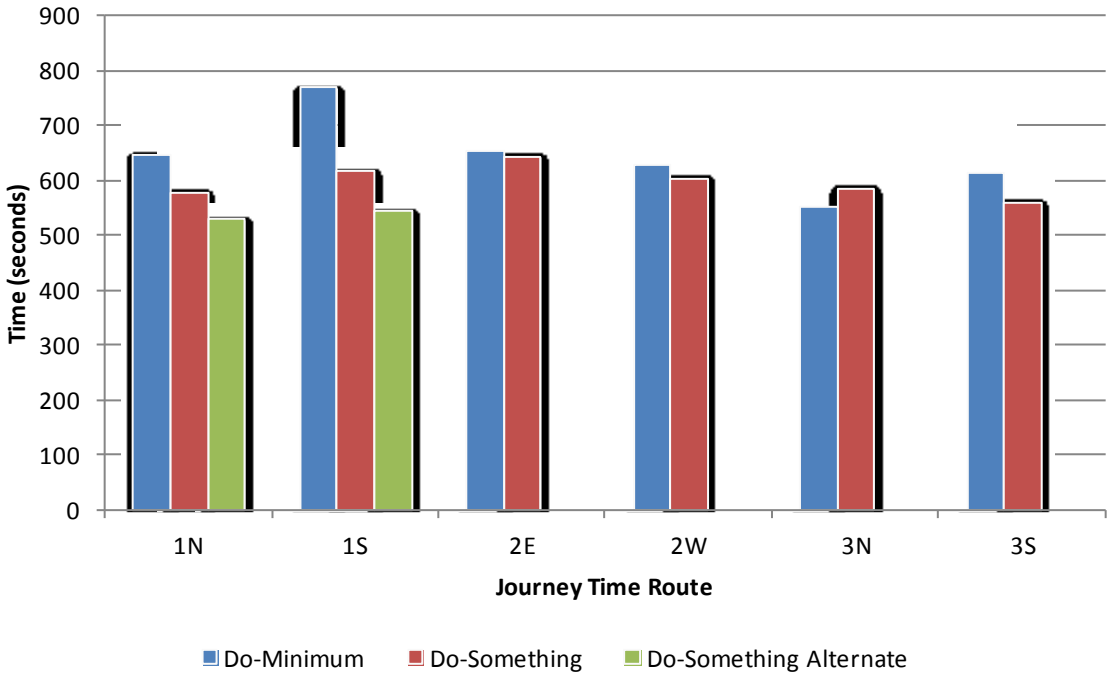


Table 6.8 - Journey Time Savings in 2033 – PM Peak

Route	Journey Times (min:sec)				
	DM	DS	% Diff	DS Alt	% Diff
Route 1– Northbound	10:47	09:37	-11%	08:49	-18%
Route 1- Southbound	12:50	10:17	-20%	09:04	-29%
Route 2- Eastbound	10:54	10:44	-2%	N/A	N/A
Route 2– Westbound	10:29	10:05	-4%	N/A	N/A
Route 3– Northbound	09:14	09:46	6%	N/A	N/A
Route 3 – Southbound	10:15	09:20	-9%	N/A	N/A

It can be observed from Table 6.7 and Table 6.8 that the proposed Stafford Western Access Improvements will significantly improve almost all journey times on all routes in both directions.

The largest reduction in journey time is seen on Route 1, which would be expected as the scheme is to the north-west of the town centre and provides improved movement between the north and west of the town centre. Use of the proposed scheme reduces the journey time northbound by 36% during the AM peak and 29% southbound during the PM peak.

There are also predicted to be significant journey time savings on Route 2 eastbound during the AM peak, as a result of the scheme due to the reduction in congestion in the town centre.

There is predicted to be a slight increase in journey times northbound, of up to 6%, on route 3 due to increased delays on the A34 as a result of junction changes for the proposed scheme.

6.6. Journey Routing

The proposed SWAR will lead to a change in routing of trips within the study area.

Figure 6.13 and

Figure 6.14 show the routes used between the housing south of the scheme between the A518 and A449 to Eccleshall Road in the 2033 AM peak for the Do-Minimum and Do-Something respectively.

This shows that the introduction of the scheme draws trips into the western corridor and reroutes traffic away from the town centre onto the scheme as would be expected.

Figure 6.13 – Route from A518 to Eccleshall Road – 2031 AM Peak Do-Minimum

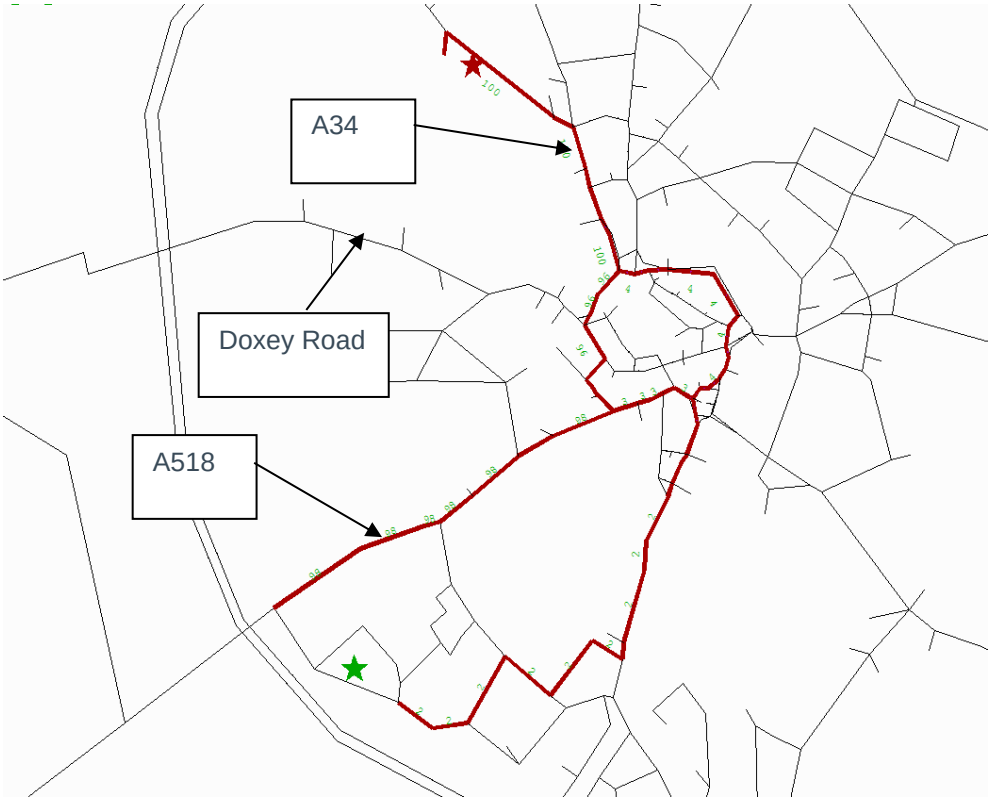
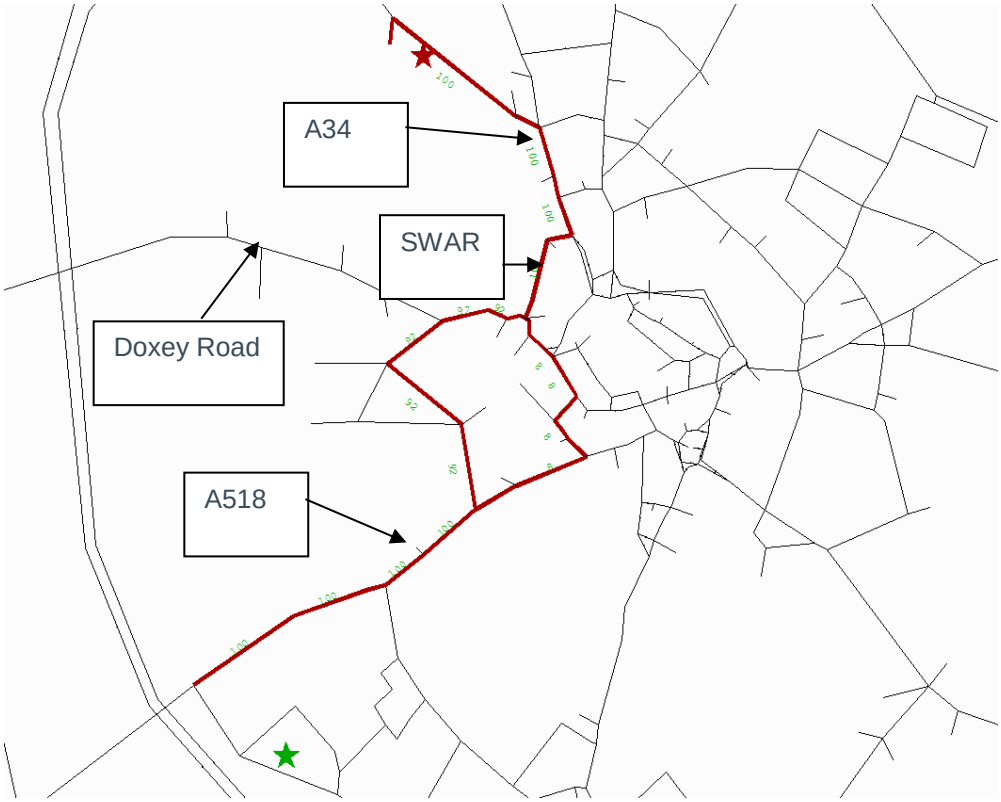


Figure 6.14 - Route from A518 to Eccleshall Road – 2031 AM Peak Do-Something



7. Sensitivity Tests

7.1. Introduction

A number of sensitivity tests have been carried out to demonstrate the impact of the proposed access road scheme for a range of scenarios. The key additional scenarios tested are:

- Core scenario with high traffic growth; and
- Core scenario with low traffic growth.

The full network statistics for these sensitivity tests are included in Appendix D. The key findings of the tests are presented in this section.

7.2. High and Low Traffic Growth

For the high traffic growth scenario, the proposed scheme will have even greater benefits than for the Core scenario due to the higher level of congestion in the Do-Minimum scenario. In contrast, for the low traffic growth scenario there will be less congestion in the Do-Minimum which will reduce the benefits of the proposed scheme.

Table 7.1 and Table 7.2 show a comparison between the change in overcapacity queued time for the Core, high growth and low growth scenarios in 2033 for the AM and PM peaks respectively.

Table 7.1 – Overcapacity Queued Time – 2033 AM Peak

Scenario	Overcapacity Queued Time (pcu-hrs)			
	Do-Minimum	Do-Something	Change	% Change
Core Scenario	648	436	-212	-33%
Core Scenario with high growth	1149	854	-295	-26%
Core Scenario with low growth	350	258	-92	-26%

Table 7.2 - Overcapacity Queued Time – 2033 PM Peak

Scenario	Overcapacity Queued Time (pcu-hrs)			
	Do-Minimum	Do-Something	Change	% Change
Core Scenario	614	453	-161	-26%
Core Scenario with high growth	990	748	-241	-24%
Core Scenario with low growth	318	246	-72	-23%

Tables 7.1 and 7.2 demonstrate that there are higher levels of overcapacity queued time with the higher traffic growth and subsequently a greater reduction, although not a greater percentage reduction, in overcapacity queued time with the implementation of the SWAR.

7.3. SWAR Traffic Flows Sensitivity

This section considers the volume of traffic using the SWAR for the various sensitivity tests. Tables 7.3 and 7.4 show the change in traffic flows on the scheme for each of the test scenarios, for the 2033 AM and PM peaks. This has been split into 'North' and 'South Western' where North is the section between Doxey Road and Foregate Street and 'South-West' the section between Martin Drive and Doxey Road.

Table 7.3 – SWAR Two-way Traffic Flow – 2033 AM Peak

Scenario	SWAR Traffic Flow (two-way vehicles/hr)		
	Do-Something	Change to Core	% Change to Core
North Section			
Core Scenario	1,832	N/A	N/A
Core Scenario with high growth	1,949	117	6%
Core Scenario with low growth	1,666	-166	-9%
South-West Section			
Core Scenario	2,302	N/A	N/A
Core Scenario with high growth	2,372	70	3%
Core Scenario with low growth	2,077	-224	-10%

Table 7.4 – SWAR Two-way Traffic Flow – 2033 PM Peak

Scenario	SWAR Traffic Flow (two-way vehicles/hr)		
	Do-Something	Change to Core	% Change to Core
North Section			
Core Scenario	1,988	N/A	N/A
Core Scenario with high growth	2,193	205	10%
Core Scenario with low growth	1,814	-174	-9%
South-West Section			
Core Scenario	2,229	N/A	N/A
Core Scenario with high growth	2,391	162	7%
Core Scenario with low growth	1,953	-276	-12%

It can be observed from Tables 7.3 and 7.4 that there will be higher traffic flows on SWAR with high growth and lower flows with low growth as would be expected. With low growth, traffic flow on both sections of the scheme reduce by approximately 10% during the AM and PM peaks. For the high growth scenario, traffic flow on the scheme would be approximately 5% higher during the AM peak and 8% higher during the PM peak.

8. Summary

This report has detailed the methodology used in assessing the impact of the Stafford Western Access Route scheme. The impact of the scheme has been assessed for a range of scenarios, in 2018, 2025 and 2033, to analyse the sensitivity of the scheme benefits to traffic growth.

The future year networks and matrices have been developed using WebTAG guidance on 'uncertainty' testing. Future year assignments have been carried out using DIADEM in line with Variable Demand Modelling guidance. The effect of DIADEM on the trip matrices have been analysed and the changes are considered realistic.

The impact of the proposed Stafford Western Access Route has been assessed using a range of indicators, including:

- Network assignment statistics;
- Link flow changes;
- Junction stress;
- Journey times; and
- Journey routing.

The proposed improvement scheme will divert traffic away from the congested town centre with reductions in traffic flow on key routes such as the A518 Chell Road and the A34 Queensway. This reduction in traffic will result in improved performance at key junctions, including Gaol Square Gyratory, thus reducing journey times through Stafford. There is predicted to be significant reductions in overcapacity queuing delays of 33% and 26% in the AM and PM peaks in 2033 respectively due to the scheme.

A number of sensitivity tests have been assessed including high and low traffic growth assumptions. These tests demonstrate that the scheme will be well utilised with both high and low traffic growth.

Appendix A. Highway Scheme Diagrams

Appendix B. Background Growth Factors

B.1. Background Growth Factors

B.1.1. The growth factors for light vehicles -business purpose, commuting and other are summarised in Tables B.1 to B.3 respectively for the AM and PM peak period hours.

Table 0.1 – Light Vehicles – Business Purpose - Growth Factors

TEMPRO Level	Area	AM Peak			PM Peak		
		2013-2018	2013-2025	2013-2033	2013-2018	2013-2025	2013-2033
GB	GB	1.043	1.082	1.119	1.043	1.083	1.121
Region	WM	1.034	1.074	1.116	1.034	1.076	1.119
Authority	Stafford	1.012	1.025	1.039	1.013	1.028	1.043
41UG0	rural (Stafford)	1.008	1.018	1.026	1.010	1.022	1.032
41UG3	Stafford(main)*	1.001	1.016	1.033	1.001	1.017	1.036
41UG4	Stone (Staffordshire)	1.010	1.022	1.038	1.013	1.027	1.041
41UG5	Gnosall	1.006	1.021	1.042	1.018	1.037	1.043
Authority	Telford and Wrekin	1.026	1.060	1.087	1.028	1.066	1.097
00GF1	Telford	1.025	1.059	1.087	1.028	1.065	1.096
00GF10	Newport nr Telford	1.033	1.082	1.122	1.040	1.090	1.138
County	Staffordshire	1.023	1.046	1.068	1.023	1.048	1.071
Authority	Cannock Chase	1.033	1.063	1.090	1.032	1.063	1.091
41UB0	rural (Cannock Chase)	1.044	1.075	1.085	1.021	1.060	1.093
41UB1	Cannock(main)	1.032	1.061	1.088	1.032	1.062	1.088
41UB2	Rugeley	1.037	1.069	1.101	1.034	1.069	1.099
41UB3	Norton Canes	1.029	1.064	1.091	1.032	1.064	1.090
Authority	East Staffordshire	1.035	1.077	1.118	1.037	1.080	1.122
41UC0	rural (East Staffordshire)	1.043	1.098	1.149	1.046	1.103	1.155
41UC00	rural (East Staffordshire)	1.030	1.066	1.096	1.034	1.076	1.110
41UC1	Burton Upon Trent	1.033	1.072	1.111	1.034	1.073	1.113
41UC3	Uttoxeter	1.031	1.066	1.102	1.033	1.072	1.109

TEMPRO Level	Area	AM Peak			PM Peak		
		2013-2018	2013-2025	2013-2033	2013-2018	2013-2025	2013-2033
Authority	Lichfield	1.037	1.073	1.098	1.037	1.074	1.100
41UD0	rural (Lichfield)	1.041	1.080	1.106	1.040	1.081	1.109
41UD4	Burntwood	1.031	1.062	1.081	1.031	1.062	1.082
41UD5	Lichfield	1.040	1.077	1.105	1.040	1.077	1.107
41UD6	Armitage	1.030	1.059	1.073	1.033	1.057	1.074
Authority	Newcastle-under-Lyme	1.015	1.031	1.048	1.017	1.034	1.054
41UE0	rural (Newcastle-under-Lyme)	1.015	1.032	1.050	1.018	1.036	1.058
41UE1	Newcastle-under-Lyme(main)	1.015	1.032	1.050	1.017	1.036	1.056
41UE3	Stoke-on-Trent(part of)	1.000	1.000	1.000	1.000	1.000	1.000
41UE4	Audley	1.011	1.029	1.040	1.022	1.038	1.049
41UE5	Madeley/Middle Madeley	1.011	1.032	1.032	1.027	1.047	1.064
Authority	South Staffordshire	1.007	1.012	1.015	1.007	1.011	1.014
41UF0	rural (South Staffordshire)	1.011	1.020	1.026	1.010	1.018	1.024
41UF00	rural (South Staffordshire)	1.003	1.002	1.001	1.004	1.005	1.005
41UF4	Great Wyrley	1.007	1.008	1.010	1.004	1.003	1.006
41UF6	Stafford(part of)	1.250	1.250	1.250	1.000	1.000	1.000
41UF8	Codsall	1.011	1.021	1.034	1.013	1.025	1.033
41UF9	Penkridge	0.998	0.997	0.995	1.002	0.995	1.001
Authority	Staffordshire Moorlands	1.020	1.043	1.065	1.020	1.044	1.066
41UH0	rural (Staffordshire Moorlands)	1.021	1.045	1.066	1.020	1.046	1.068
41UH1	Stoke-on-Trent(part of)	1.018	1.043	1.063	1.016	1.041	1.064
41UH2	Leek	1.023	1.048	1.072	1.023	1.048	1.074
41UH3	Biddulph	1.018	1.041	1.059	1.013	1.038	1.055
41UH4	Cheadle	1.016	1.033	1.052	1.016	1.037	1.056
Authority	Stoke-on-Trent	1.025	1.053	1.082	1.026	1.056	1.088
00GL1	Stoke-on-Trent(main)	1.025	1.053	1.082	1.026	1.057	1.088
Authority	Tamworth	1.017	1.023	1.022	1.017	1.023	1.023
41UK2	Fazeley(part of)	1.014	1.024	1.019	1.020	1.024	1.024

*Assumes no change in households and jobs

Table 0.2 – Light Vehicles – Commuting – Growth Factors

TEMPRO Level	Area	AM Peak			PM Peak		
		2013-2018	2013-2025	2013-2033	2013-2018	2013-2025	2013-2033
GB	GB	1.041	1.080	1.116	1.039	1.076	1.111
Region	WM	1.034	1.076	1.119	1.032	1.071	1.112
Authority	Stafford	1.013	1.028	1.042	1.012	1.025	1.039
41UG0	rural (Stafford)	1.012	1.026	1.037	1.011	1.024	1.035
41UG3	Stafford(main)*	0.998	1.013	1.029	0.997	1.010	1.025
41UG4	Stone (Staffordshire)	1.012	1.027	1.041	1.011	1.025	1.038
41UG5	Gnosall	1.017	1.031	1.047	1.014	1.027	1.044
Authority	Telford and Wrekin	1.032	1.076	1.113	1.031	1.075	1.110
00GF1	Telford	1.032	1.075	1.113	1.031	1.073	1.109
00GF10	Newport nr Telford	1.038	1.094	1.139	1.038	1.094	1.139
County	Staffordshire	1.022	1.047	1.069	1.020	1.043	1.063
Authority	Cannock Chase	1.029	1.059	1.085	1.027	1.054	1.076
41UB0	rural (Cannock Chase)	1.028	1.057	1.083	1.027	1.054	1.079
41UB1	Cannock(main)	1.029	1.057	1.082	1.026	1.051	1.073
41UB2	Rugeley	1.032	1.065	1.093	1.029	1.059	1.085
41UB3	Norton Canes	1.030	1.061	1.087	1.027	1.055	1.078
Authority	East Staffordshire	1.038	1.084	1.123	1.035	1.078	1.115
41UC0	rural (East Staffordshire)	1.048	1.110	1.161	1.046	1.105	1.155
41UC00	rural (East Staffordshire)	1.040	1.089	1.130	1.038	1.086	1.126
41UC1	Burton Upon Trent	1.035	1.075	1.113	1.031	1.068	1.101
41UC3	Uttoxeter	1.034	1.074	1.108	1.033	1.071	1.104
Authority	Lichfield	1.033	1.070	1.095	1.031	1.065	1.088
41UD0	rural (Lichfield)	1.038	1.082	1.112	1.036	1.077	1.106
41UD4	Burntwood	1.027	1.057	1.076	1.025	1.052	1.069
41UD5	Lichfield	1.034	1.072	1.098	1.032	1.066	1.090
41UD6	Armitage	1.024	1.051	1.063	1.023	1.044	1.056
Authority	Newcastle-under-Lyme	1.018	1.038	1.059	1.016	1.035	1.054
41UE0	rural (Newcastle-under-Lyme)	1.018	1.039	1.063	1.016	1.036	1.059

TEMPRO Level	Area	AM Peak			PM Peak		
		2013-2018	2013-2025	2013-2033	2013-2018	2013-2025	2013-2033
41UE1	Newcastle-under-Lyme(main)	1.018	1.038	1.060	1.017	1.035	1.056
41UE3	Stoke-on-Trent(part of)	1.016	1.032	1.098	1.075	1.150	1.150
41UE4	Audley	1.014	1.031	1.048	1.014	1.028	1.045
41UE5	Madeley/Middle Madeley	1.016	1.043	1.050	1.017	1.043	1.054
Authority	South Staffordshire	1.004	1.005	1.003	1.002	1.001	0.998
41UF0	rural (South Staffordshire)	1.007	1.011	1.011	1.005	1.007	1.005
41UF00	rural (South Staffordshire)	1.003	1.004	1.000	1.002	1.002	0.998
41UF4	Great Wyrley	1.001	0.999	0.997	0.999	0.995	0.990
41UF6	Stafford(part of)	1.031	1.031	1.015	1.000	0.981	0.981
41UF8	Codsall	1.007	1.013	1.017	1.005	1.008	1.012
41UF9	Penkridge	1.000	0.998	0.995	0.999	0.995	0.991
Authority	Staffordshire Moorlands	1.017	1.040	1.058	1.015	1.037	1.055
41UH0	rural (Staffordshire Moorlands)	1.018	1.043	1.063	1.017	1.041	1.061
41UH1	Stoke-on-Trent(part of)	1.016	1.041	1.059	1.015	1.038	1.055
41UH2	Leek	1.017	1.039	1.058	1.016	1.035	1.053
41UH3	Biddulph	1.015	1.035	1.051	1.013	1.032	1.047
41UH4	Cheadle	1.013	1.031	1.046	1.013	1.029	1.042
Authority	Stoke-on-Trent	1.027	1.060	1.095	1.025	1.056	1.089
00GL1	Stoke-on-Trent(main)	1.027	1.060	1.095	1.025	1.056	1.090
Authority	Tamworth	1.013	1.018	1.020	1.011	1.013	1.013
41UK2	Fazeley(part of)	1.013	1.018	1.015	1.011	1.014	1.009

*Assumes no change in households and jobs

Table 0.3 – Light Vehicles – Other – Growth Factors

TEMPRO Level	Area	AM Peak			PM Peak		
		2013-2018	2013-2025	2013-2033	2013-2018	2013-2025	2013-2033
GB	GB	1.051	1.117	1.184	1.051	1.114	1.179
Region	WM	1.044	1.098	1.153	1.045	1.099	1.158
Authority	Stafford	1.027	1.058	1.093	1.028	1.058	1.095
41UG0	rural (Stafford)	1.028	1.059	1.095	1.029	1.061	1.098
41UG3	Stafford(main)*	1.010	1.039	1.073	1.010	1.039	1.074
41UG4	Stone (Staffordshire)	1.028	1.061	1.098	1.029	1.060	1.097
41UG5	Gnosall	1.037	1.069	1.111	1.034	1.067	1.111
Authority	Telford and Wrekin	1.069	1.166	1.243	1.065	1.157	1.236
00GF1	Telford	1.067	1.160	1.232	1.062	1.150	1.224
00GF10	Newport nr Telford	1.074	1.186	1.274	1.071	1.177	1.269
County	Staffordshire	1.037	1.077	1.120	1.038	1.081	1.127
Authority	Cannock Chase	1.037	1.073	1.111	1.042	1.085	1.132
41UB0	rural (Cannock Chase)	1.036	1.080	1.117	1.041	1.083	1.131
41UB1	Cannock(main)	1.036	1.070	1.108	1.041	1.083	1.129
41UB2	Rugeley	1.040	1.078	1.119	1.042	1.088	1.137
41UB3	Norton Canes	1.035	1.074	1.115	1.043	1.087	1.135
Authority	East Staffordshire	1.048	1.107	1.168	1.053	1.117	1.186
41UC0	rural (East Staffordshire)	1.059	1.132	1.206	1.064	1.145	1.229
41UC00	rural (East Staffordshire)	1.065	1.151	1.242	1.067	1.154	1.246
41UC1	Burton Upon Trent	1.041	1.088	1.138	1.046	1.100	1.160
41UC3	Uttoxeter	1.049	1.110	1.178	1.052	1.116	1.186
Authority	Lichfield	1.042	1.082	1.119	1.046	1.092	1.136
41UD0	rural (Lichfield)	1.048	1.098	1.142	1.053	1.108	1.159
41UD4	Burntwood	1.035	1.070	1.102	1.040	1.081	1.120
41UD5	Lichfield	1.041	1.079	1.115	1.046	1.089	1.131
41UD6	Armitage	1.038	1.076	1.111	1.041	1.084	1.121
Authority	Newcastle-under-Lyme	1.033	1.074	1.121	1.036	1.078	1.126
41UE0	rural (Newcastle-under-Lyme)	1.030	1.070	1.117	1.034	1.075	1.124

TEMPRO Level	Area	AM Peak			PM Peak		
		2013-2018	2013-2025	2013-2033	2013-2018	2013-2025	2013-2033
41UE1	Newcastle-under-Lyme(main)	1.034	1.076	1.124	1.037	1.079	1.129
41UE3	Stoke-on-Trent(part of)	1.000	1.025	1.025	1.034	1.118	1.137
41UE4	Audley	1.033	1.071	1.112	1.035	1.072	1.114
41UE5	Madeley/Middle Madeley	1.037	1.082	1.118	1.038	1.081	1.116
Authority	South Staffordshire	1.016	1.034	1.054	1.020	1.040	1.064
41UF0	rural (South Staffordshire)	1.016	1.035	1.055	1.022	1.044	1.069
41UF00	rural (South Staffordshire)	1.022	1.050	1.083	1.025	1.053	1.088
41UF4	Great Wyrley	1.010	1.019	1.030	1.013	1.026	1.042
41UF6	Stafford(part of)	1.000	1.000	1.053	1.015	1.046	1.111
41UF8	Codsall	1.021	1.042	1.066	1.024	1.048	1.080
41UF9	Penkridge	1.015	1.040	1.066	1.019	1.040	1.068
Authority	Staffordshire Moorlands	1.040	1.091	1.146	1.041	1.092	1.148
41UH0	rural (Staffordshire Moorlands)	1.043	1.098	1.158	1.044	1.101	1.162
41UH1	Stoke-on-Trent(part of)	1.039	1.090	1.143	1.039	1.090	1.144
41UH2	Leek	1.041	1.088	1.143	1.042	1.089	1.143
41UH3	Biddulph	1.036	1.082	1.131	1.037	1.083	1.133
41UH4	Cheadle	1.039	1.085	1.137	1.040	1.086	1.137
Authority	Stoke-on-Trent	1.048	1.100	1.159	1.044	1.093	1.149
00GL1	Stoke-on-Trent(main)	1.048	1.100	1.159	1.044	1.093	1.149
Authority	Tamworth	1.022	1.035	1.049	1.027	1.046	1.068
41UK2	Fazeley(part of)	1.017	1.024	1.029	1.024	1.037	1.050

*Assumes no change in households and jobs

B.1.2. The growth factors for light goods vehicles and heavy goods vehicles are summarised in Tables B.4 to B.5 respectively for the AM and PM peak period hours.

Table 0.4 – Light Goods Vehicles – Growth Factors

TEMPRO Level	Area	AM Peak			PM Peak		
		2013-2018	2013-2025	2013-2033	2013-2018	2013-2025	2013-2033
Region	WM	1.111056	1.317058	1.541393	1.112449	1.320457	1.548814
Authority	Stafford	1.09031	1.262335	1.445009	1.092797	1.267718	1.456644
41UG0	rural (Stafford)	1.089682	1.260838	1.440332	1.092829	1.268325	1.455339
41UG3	Stafford(main)*	1.074008	1.243415	1.424609	1.075663	1.247223	1.433357
41UG4	Stone (Staffordshire)	1.09012	1.262457	1.445943	1.093024	1.268008	1.457178
41UG5	Gnosall	1.097045	1.270991	1.461135	1.09843	1.276802	1.473304
Authority	Telford and Wrekin	1.116627	1.339095	1.566175	1.12149	1.352763	1.591682
00GF1	Telford	1.115394	1.335457	1.560761	1.119362	1.346775	1.582052
00GF10	Newport nr Telford	1.124712	1.367002	1.613876	1.130583	1.382679	1.64545
County	Staffordshire	1.100336	1.285531	1.481859	1.103217	1.292403	1.496109
Authority	Cannock Chase	1.105911	1.294088	1.492048	1.108378	1.301012	1.507028
41UB0	rural (Cannock Chase)	1.105451	1.29692	1.493212	1.107207	1.300776	1.509377
41UB1	Cannock(main)	1.105	1.291458	1.487692	1.10773	1.298742	1.503288
41UB2	Rugeley	1.108522	1.301105	1.503952	1.110005	1.307476	1.517396
41UB3	Norton Canes	1.105385	1.295951	1.495349	1.108893	1.303153	1.509778
Authority	East Staffordshire	1.115342	1.32643	1.551195	1.118605	1.335139	1.570153
41UC0	rural (East Staffordshire)	1.12608	1.357539	1.602951	1.130265	1.368569	1.626928
41UC00	rural (East Staffordshire)	1.121718	1.3464	1.586375	1.126932	1.361128	1.615735
41UC1	Burton Upon Trent	1.110265	1.312055	1.528108	1.112494	1.318087	1.542075
41UC3	Uttoxeter	1.113283	1.320617	1.544117	1.117276	1.331241	1.565098
Authority	Lichfield	1.110124	1.306423	1.504455	1.113504	1.313071	1.518801
41UD0	rural (Lichfield)	1.116154	1.322187	1.529541	1.119804	1.329088	1.54511
41UD4	Burntwood	1.10349	1.291984	1.480356	1.106457	1.299039	1.496468
41UD5	Lichfield	1.111036	1.306836	1.506057	1.113843	1.311782	1.516853
41UD6	Armitage	1.102875	1.289221	1.472679	1.106395	1.296035	1.488275
Authority	Newcastle-under-Lyme	1.096191	1.27768	1.474033	1.099616	1.285447	1.488936

TEMPRO Level	Area	AM Peak			PM Peak		
		2013-2018	2013-2025	2013-2033	2013-2018	2013-2025	2013-2033
41UE0	rural (Newcastle-under-Lyme)	1.095125	1.277653	1.476047	1.0987	1.285186	1.49077
41UE1	Newcastle-under-Lyme(main)	1.096962	1.279039	1.47698	1.100296	1.286741	1.491786
41UE3	Stoke-on-Trent(part of)	1.081212	1.2499	1.441554	1.117808	1.358098	1.541415
41UE4	Audley	1.094667	1.274406	1.464993	1.100203	1.281898	1.479543
41UE5	Madeley/Middle Madeley	1.097332	1.286734	1.468045	1.102967	1.295777	1.486403
Authority	South Staffordshire	1.080114	1.234939	1.393864	1.083787	1.242676	1.409856
41UF0	rural (South Staffordshire)	1.082179	1.240534	1.401726	1.086548	1.249564	1.419592
41UF00	rural (South Staffordshire)	1.082129	1.240902	1.404608	1.08667	1.251639	1.426643
41UF4	Great Wyrley	1.076482	1.224272	1.376272	1.078451	1.229314	1.387381
41UF6	Stafford(part of)	1.102801	1.251887	1.416507	1.079662	1.238288	1.441901
41UF8	Codsall	1.084341	1.244936	1.41256	1.088142	1.25279	1.430575
41UF9	Penkridge	1.077375	1.232039	1.392556	1.082054	1.238738	1.407902
Authority	Staffordshire Moorlands	1.098979	1.288255	1.489159	1.103386	1.299155	1.510376
41UH0	rural (Staffordshire Moorlands)	1.100345	1.293826	1.498494	1.105463	1.3066	1.523552
41UH1	Stoke-on-Trent(part of)	1.09835	1.28988	1.489983	1.102057	1.298617	1.508019
41UH2	Leek	1.100251	1.28687	1.488879	1.10442	1.296803	1.50763
41UH3	Biddulph	1.095907	1.280879	1.476368	1.099027	1.289647	1.493915
41UH4	Cheadle	1.095871	1.278582	1.473505	1.101002	1.289786	1.493864
Authority	Stoke-on-Trent	1.107895	1.305492	1.522866	1.108638	1.30776	1.528187
00GL1	Stoke-on-Trent(main)	1.108051	1.305724	1.523267	1.108743	1.307995	1.52859
Authority	Tamworth	1.088826	1.24529	1.404306	1.091923	1.252855	1.419716
41UK2	Fazeley(part of)	1.08635	1.240834	1.391121	1.091192	1.248505	1.405532

*Assumes no change in households and jobs

Table 0.5 – Heavy Goods Vehicles – Growth Factors

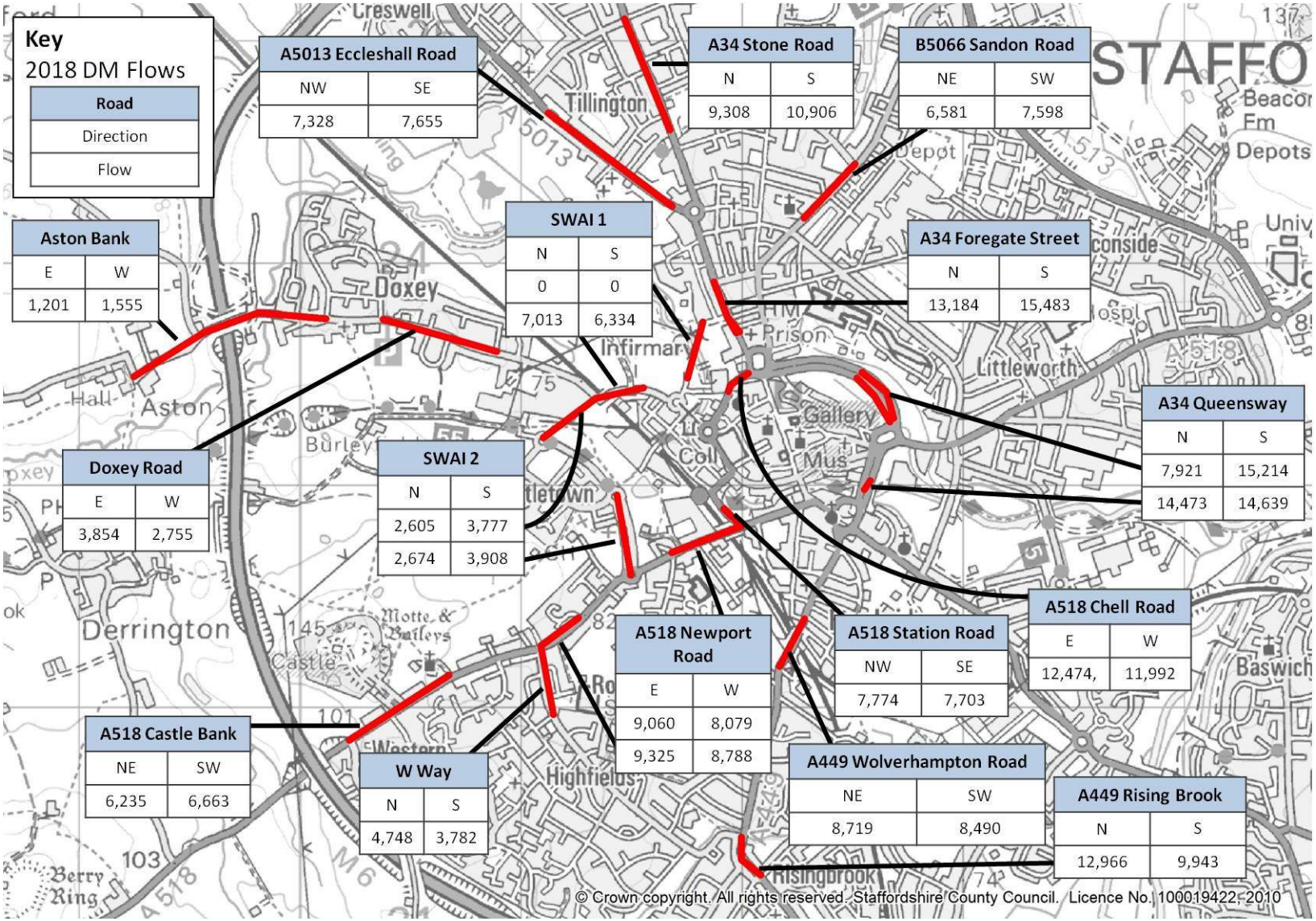
TEMPRO Level	Area	AM Peak			PM Peak		
		2013-2018	2013-2025	2013-2033	2013-2018	2013-2025	2013-2033
Region	WM	1.009105	1.060436	1.116577	1.010371	1.063173	1.121953
Authority	Stafford	0.990263	1.016376	1.046757	0.992522	1.020709	1.055186
41UG0	rural (Stafford)	0.989693	1.01517	1.043369	0.992551	1.021198	1.054241
41UG3	Stafford(main)*	0.975457	1.001142	1.031979	0.97696	1.004208	1.038317
41UG4	Stone (Staffordshire)	0.990091	1.016473	1.047434	0.992728	1.020943	1.055572
41UG5	Gnosall	0.99638	1.023345	1.058439	0.997638	1.028024	1.067254
Authority	Telford and Wrekin	1.014165	1.078179	1.134529	1.018582	1.089184	1.153006
00GF1	Telford	1.013046	1.075251	1.130607	1.016649	1.084363	1.146031
00GF10	Newport nr Telford	1.021508	1.100649	1.169084	1.02684	1.113271	1.191956
County	Staffordshire	0.999369	1.035052	1.073451	1.001986	1.040585	1.083774
Authority	Cannock Chase	1.004433	1.041942	1.080832	1.006673	1.047517	1.091683
41UB0	rural (Cannock Chase)	1.004015	1.044222	1.081675	1.00561	1.047327	1.093385
41UB1	Cannock(main)	1.003605	1.039824	1.077677	1.006084	1.045689	1.088974
41UB2	Rugeley	1.006804	1.047592	1.089455	1.008151	1.052721	1.099194
41UB3	Norton Canes	1.003954	1.043442	1.083223	1.007141	1.04924	1.093675
Authority	East Staffordshire	1.012999	1.067982	1.123678	1.015962	1.074994	1.137411
41UC0	rural (East Staffordshire)	1.022751	1.09303	1.16117	1.026551	1.101911	1.178539
41UC00	rural (East Staffordshire)	1.018789	1.084061	1.149162	1.023524	1.09592	1.17043
41UC1	Burton Upon Trent	1.008387	1.056408	1.106954	1.010411	1.061264	1.117071
41UC3	Uttoxeter	1.011129	1.063301	1.118551	1.014755	1.071856	1.133749
Authority	Lichfield	1.008259	1.051873	1.08982	1.011329	1.057226	1.100212
41UD0	rural (Lichfield)	1.013735	1.064566	1.107992	1.017051	1.070122	1.11927
41UD4	Burntwood	1.002234	1.040247	1.072362	1.004929	1.045928	1.084034
41UD5	Lichfield	1.009087	1.052206	1.09098	1.011637	1.056188	1.0988
41UD6	Armitage	1.001675	1.038023	1.066801	1.004873	1.043509	1.078099
Authority	Newcastle-under-Lyme	0.995605	1.028731	1.067782	0.998715	1.034985	1.078578
41UE0	rural (Newcastle-under-Lyme)	0.994636	1.028709	1.069241	0.997884	1.034774	1.079907
41UE1	Newcastle-under-Lyme(main)	0.996304	1.029825	1.069917	0.999332	1.036026	1.080642

TEMPRO Level	Area	AM Peak			PM Peak		
		2013-2018	2013-2025	2013-2033	2013-2018	2013-2025	2013-2033
41UE3	Stoke-on-Trent(part of)	0.982	1.006364	1.044254	1.015238	1.09348	1.116593
41UE4	Audley	0.99422	1.026095	1.061234	0.999248	1.032127	1.071773
41UE5	Madeley/Middle Madeley	0.99664	1.036021	1.063445	1.001758	1.043301	1.076743
Authority	South Staffordshire	0.981003	0.994317	1.009708	0.984339	1.000547	1.021292
41UF0	rural (South Staffordshire)	0.982878	0.998822	1.015403	0.986847	1.006093	1.028345
41UF00	rural (South Staffordshire)	0.982832	0.999118	1.017491	0.986957	1.007764	1.033453
41UF4	Great Wyrley	0.977704	0.985729	0.996964	0.979492	0.989789	1.005012
41UF6	Stafford(part of)	1.001608	1.007964	1.02611	0.980592	0.997014	1.044506
41UF8	Codsall	0.984842	1.002367	1.023251	0.988294	1.008691	1.036301
41UF9	Penkridge	0.978515	0.991983	1.008761	0.982765	0.997376	1.019877
Authority	Staffordshire Moorlands	0.998137	1.037245	1.078739	1.002139	1.046022	1.094108
41UH0	rural (Staffordshire Moorlands)	0.999378	1.041731	1.085502	1.004025	1.052016	1.103654
41UH1	Stoke-on-Trent(part of)	0.997565	1.038553	1.079336	1.000932	1.045588	1.092402
41UH2	Leek	0.999291	1.03613	1.078536	1.003078	1.044127	1.092119
41UH3	Biddulph	0.995347	1.031306	1.069473	0.99818	1.038366	1.082185
41UH4	Cheadle	0.995314	1.029457	1.067399	0.999974	1.038478	1.082147
Authority	Stoke-on-Trent	1.006235	1.051123	1.103156	1.006909	1.05295	1.107011
00GL1	Stoke-on-Trent(main)	1.006376	1.051311	1.103447	1.007004	1.053139	1.107303
Authority	Tamworth	0.988916	1.002652	1.017272	0.991728	1.008743	1.028435
41UK2	Fazeley(part of)	0.986667	0.999064	1.007721	0.991064	1.00524	1.01816

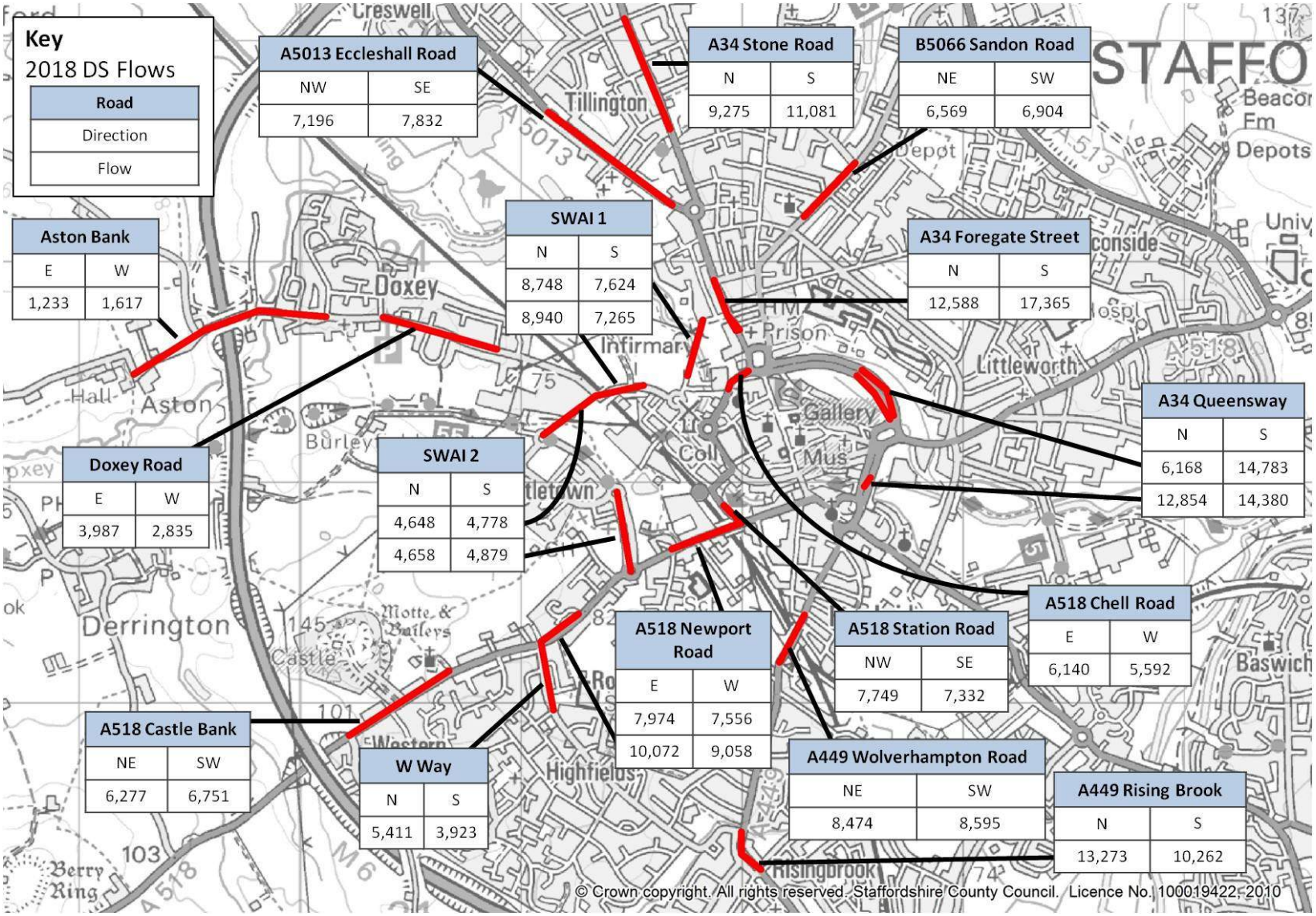
*Assumes no change in households and jobs

Appendix C. AADT Traffic Flows

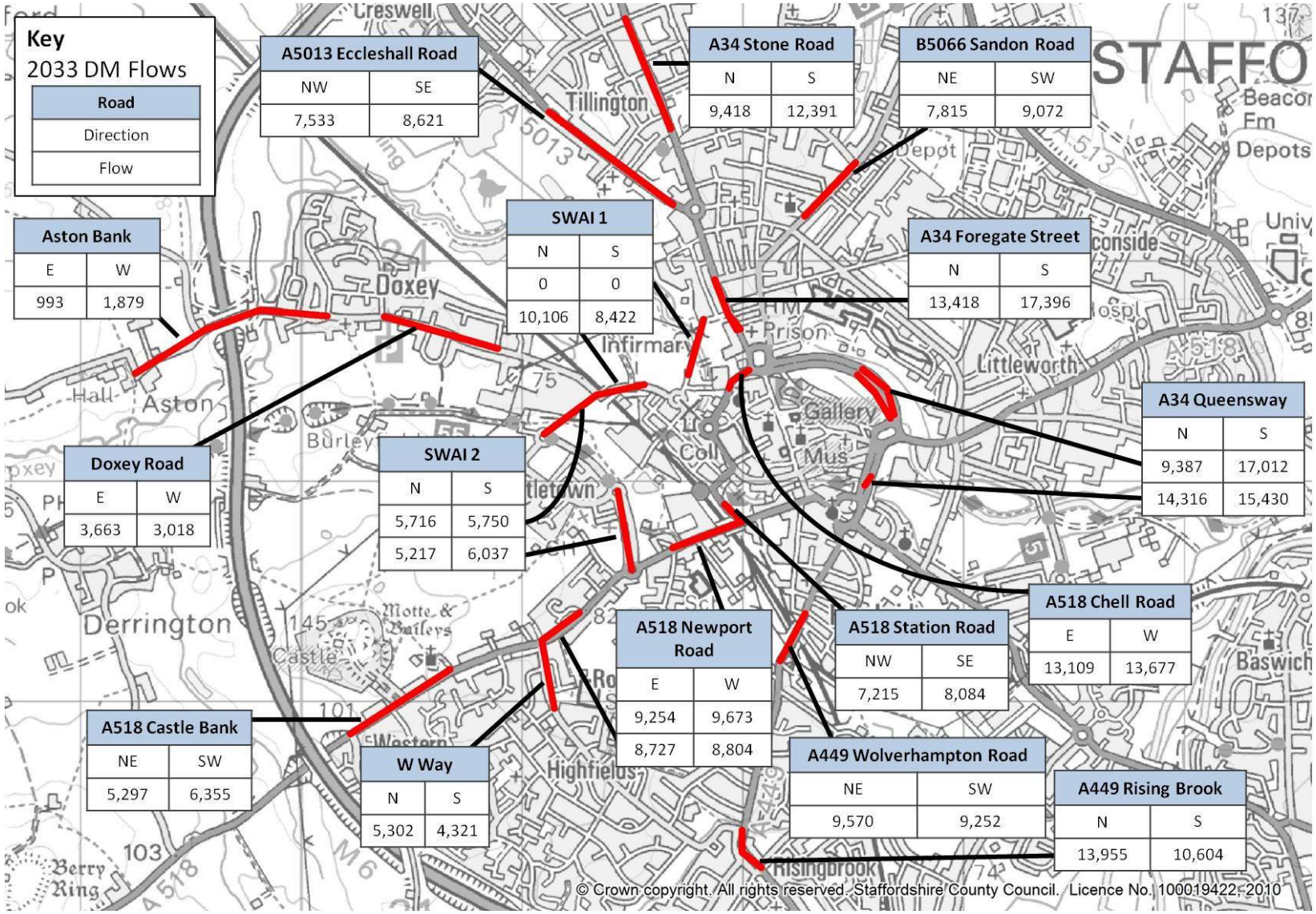
C.1. 2018 Do-Minimum AADT



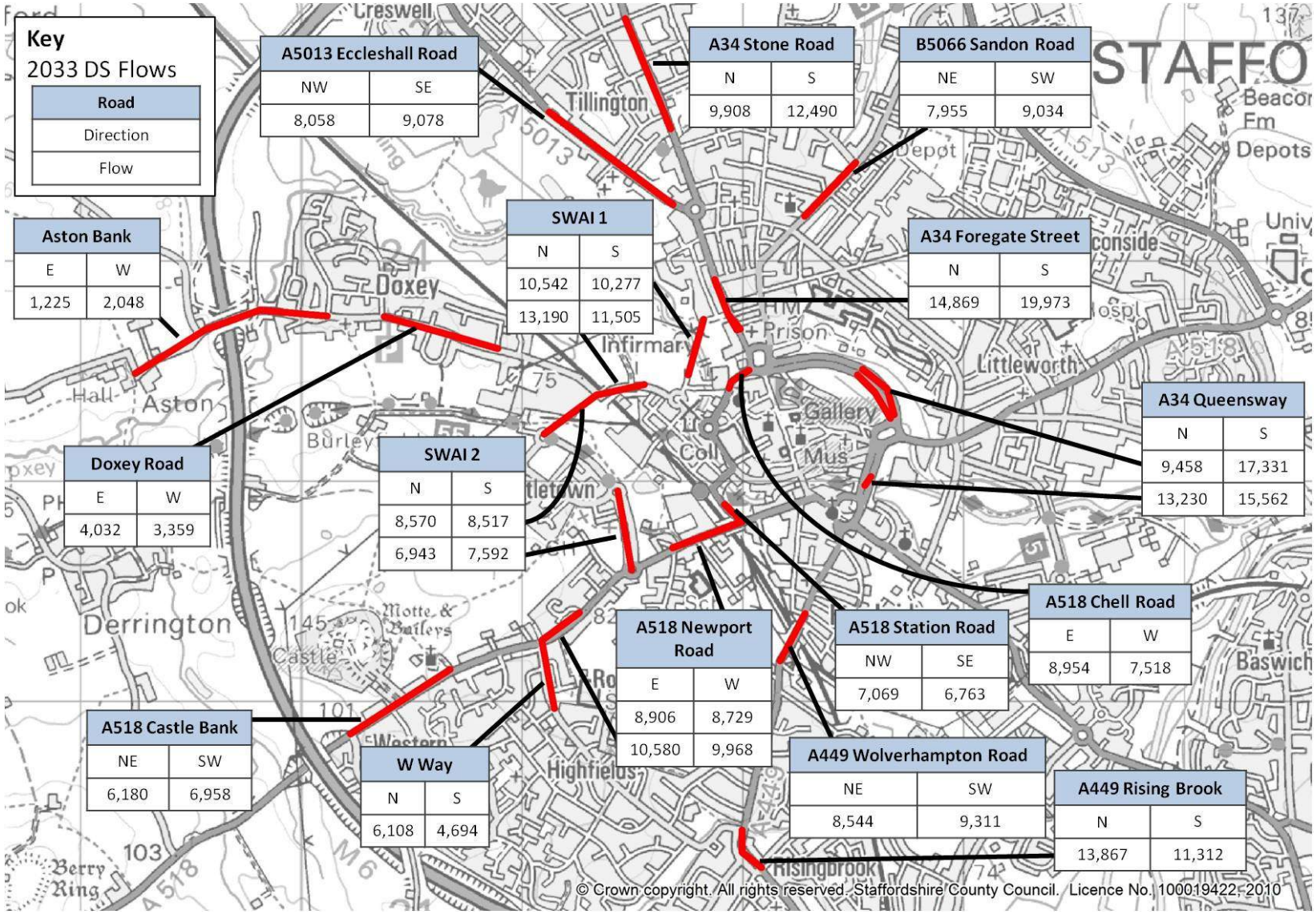
C.2. 2018 Do-Something AADT



C.3. 2033 Do-Minimum AADT



C.4. 2033 Do-Something AADT



Appendix D. Network Statistics for Sensitivity Tests

D.1. Network Statistics

D.1.1. Table D.1 to D.6 include the network statistics for all assignments for the Core Scenario, Core Scenario with low growth and Core Scenario with high growth.

Table D.1 – Network Statistics – Core Scenario – Do-Minimum

Statistics	2018		2025		2033	
	AM	PM	AM	PM	AM	PM
Total Assigned Trips (pcus)	37,049	38,351	39,575	41,065	42,274	43,860
Link Cruise Time (pcu-hrs)	20,030	19,871	21,485	21,437	23,045	22,921
Transient Queued Time (pcu-hrs)	1,397	1,345	1,747	1,654	2,094	1,997
Overcapacity Queued Time (pcu-hrs)	282	200	414	347	648	614
Total Travel Time (pcu-hrs)	21,709	21,415	23,646	23,438	25,787	25,533
Travel Distance (pcu-kms)	1,787,192	1,754,298	1,909,152	1,882,391	2,033,190	2,001,801
Average Journey Speed (kph)	82.3	81.9	80.7	80.3	78.8	78.4

Table D.2 – Network Statistics – Core Scenario – Do-Something

Statistics	2018		2025		2033	
	AM	PM	AM	PM	AM	PM
Total Assigned Trips (pcus)	37,053	38,354	39,586	41,074	42,292	43,876
Link Cruise Time (pcu-hrs)	20,026	19,867	21,483	21,428	23,040	22,908
Transient Queued Time (pcu-hrs)	1,380	1,328	1,725	1,645	2,084	1,992
Overcapacity Queued Time (pcu-hrs)	260	195	328	269	436	453
Total Travel Time (pcu-hrs)	21,666	21,390	23,536	23,342	25,560	25,354
Travel Distance (pcu-kms)	1,786,858	1,753,935	1,908,781	1,881,732	2,032,640	2,000,712
Average Journey Speed (kph)	82.5	82.0	81.1	80.6	79.5	78.9

Table D.3 - Network Statistics – Low Growth – Do-Minimum

Statistics	2018		2025		2033	
	AM	PM	AM	PM	AM	PM
Total Assigned Trips (pcus)	35,145	36,381	36,625	38,013	38,466	39,925
Link Cruise Time (pcu-hrs)	18,923	18,786	19,758	19,734	20,767	20,701
Transient Queued Time (pcu-hrs)	1,213	1,167	1,404	1,353	1,611	1,541
Overcapacity Queued Time (pcu-hrs)	204	137	250	180	350	318
Total Travel Time (pcu-hrs)	20,340	20,090	21,412	21,268	22,728	22,560
Travel Distance (pcu-kms)	1,696,212	1,664,785	1,768,968	1,744,664	1,853,534	1,826,033
Average Journey Speed (kph)	83.4	82.9	82.6	82.0	81.6	80.9

Table D.4 - Network Statistics –Low Growth – Do-Something

Statistics	2018		2025		2033	
	AM	PM	AM	PM	AM	PM
Total Assigned Trips (pcus)	35,150	36,384	36,631	38,019	38,476	39,932
Link Cruise Time (pcu-hrs)	18,922	18,784	19,753	19,727	20,764	20,687
Transient Queued Time (pcu-hrs)	1,196	1,155	1,388	1,340	1,589	1,529
Overcapacity Queued Time (pcu-hrs)	186	136	214	146	258	246
Total Travel Time (pcu-hrs)	20,304	20,074	21,355	21,213	22,610	22,461
Travel Distance (pcu-kms)	1,695,928	1,664,575	1,768,538	1,744,119	1,853,231	1,824,915
Average Journey Speed (kph)	83.5	82.9	82.8	82.2	82.0	81.2

Table D.5 - Network Statistics –High Growth – Do-Minimum

Statistics	2018		2025		2033	
	AM	PM	AM	PM	AM	PM
Total Assigned Trips (pcus)	38,944	40,316	42,517	44,110	46,062	47,783
Link Cruise Time (pcu-hrs)	21,144	20,968	23,266	23,172	25,411	25,234
Transient Queued Time (pcu-hrs)	1,604	1,543	2,154	2,030	2,684	2,548
Overcapacity Queued Time (pcu-hrs)	428	279	647	537	1,149	990
Total Travel Time (pcu-hrs)	23,176	22,791	26,067	25,740	29,244	28,771
Travel Distance (pcu-kms)	1,877,529	1,843,214	2,048,822	2,019,019	2,212,954	2,176,853
Average Journey Speed (kph)	81.0	80.9	78.6	78.4	75.7	75.7

Table D.6 - Network Statistics –High Growth – Do-Something

Statistics	2018		2025		2033	
	AM	PM	AM	PM	AM	PM
Total Assigned Trips (pcus)	38,949	40,322	42,534	44,125	46,085	47,807
Link Cruise Time (pcu-hrs)	21,140	20,965	23,265	23,163	25,390	25,218
Transient Queued Time (pcu-hrs)	1,586	1,525	2,138	2,024	2,696	2,559
Overcapacity Queued Time (pcu-hrs)	407	260	492	408	854	748
Total Travel Time (pcu-hrs)	23,134	22,750	25,895	25,595	28,940	28,525
Travel Distance (pcu-kms)	1,877,268	1,842,805	2,048,520	2,018,465	2,211,687	2,176,304
Average Journey Speed (kph)	81.1	81.0	79.1	78.9	76.4	76.3

Appendix E. Pre and Post DIADEM Trip Patterns

2018 AM Do-Minimum

Pre-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	124	108	121	121	263	108	168	76	178	1,266
	2	347	228	256	131	431	225	287	82	257	2,244
	3	379	277	318	253	424	317	455	97	245	2,764
	4	319	126	252	344	616	199	241	145	270	2,513
	5	466	320	413	240	1,669	450	444	270	592	4,863
	6	410	191	211	103	968	653	198	269	612	3,615
	7	491	199	308	153	832	300	268	115	4,104	6,770
	8	342	117	126	153	606	462	126	278	528	2,739
	9	593	284	223	195	962	688	4,043	566	2,716	10,270
	Totals	3,470	1,850	2,229	1,692	6,771	3,404	6,230	1,898	9,501	37,044

Post-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	124	105	120	121	267	107	165	76	180	1,265
	2	331	226	258	126	438	232	290	81	261	2,244
	3	367	277	318	247	420	327	466	100	240	2,762
	4	315	122	246	345	621	193	244	149	275	2,511
	5	469	320	409	235	1,682	449	444	267	587	4,863
	6	399	192	215	101	950	661	199	269	627	3,615
	7	484	199	312	154	834	302	267	116	4,105	6,774
	8	341	114	122	156	611	460	127	279	531	2,740
	9	605	283	218	193	954	692	4,046	571	2,712	10,274
	Totals	3,435	1,838	2,219	1,680	6,777	3,423	6,248	1,909	9,519	37,049

Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	-1	-3	-1	0	5	-1	-3	0	3	-1
	2	-16	-2	2	-4	7	7	2	-1	5	0
	3	-12	0	0	-5	-4	10	11	3	-4	-2
	4	-3	-4	-6	1	5	-6	3	4	4	-2
	5	3	0	-4	-4	13	-2	1	-2	-5	0
	6	-10	1	4	-2	-19	8	1	1	16	1
	7	-7	0	4	1	2	2	-1	1	1	3
	8	-1	-3	-4	3	5	-2	1	1	3	2
	9	12	0	-6	-3	-8	4	4	5	-4	3
	Totals	-34	-11	-11	-13	6	20	19	12	18	5

% Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	0%	-3%	-1%	0%	2%	-1%	-2%	0%	2%	0%
	2	-5%	-1%	1%	-3%	2%	3%	1%	-1%	2%	0%
	3	-3%	0%	0%	-2%	-1%	3%	2%	3%	-2%	0%
	4	-1%	-3%	-2%	0%	1%	-3%	1%	3%	2%	0%
	5	1%	0%	-1%	-2%	1%	0%	0%	-1%	-1%	0%
	6	-2%	1%	2%	-2%	-2%	1%	1%	0%	3%	0%
	7	-1%	0%	1%	1%	0%	1%	0%	1%	0%	0%
	8	0%	-3%	-3%	2%	1%	-1%	1%	0%	1%	0%
	9	2%	0%	-3%	-1%	-1%	1%	0%	1%	0%	0%
	Totals	-1%	-1%	0%	-1%	0%	1%	0%	1%	0%	0%

2018 AM Do-Something

Pre-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	124	108	121	121	263	108	168	76	178	1,266
	2	347	228	256	131	431	225	287	82	257	2,244
	3	379	277	318	253	424	317	455	97	245	2,764
	4	319	126	252	344	616	199	241	145	270	2,513
	5	466	320	413	240	1,669	450	444	270	592	4,863
	6	410	191	211	103	968	653	198	269	612	3,615
	7	491	199	308	153	832	300	268	115	4,104	6,770
	8	342	117	126	153	606	462	126	278	528	2,739
	9	593	284	223	195	962	688	4,043	566	2,716	10,270
	Totals	3,470	1,850	2,229	1,692	6,771	3,404	6,230	1,898	9,501	37,044

Post-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	123	105	120	121	268	107	165	76	181	1,265
	2	331	226	258	126	437	233	291	81	260	2,245
	3	369	278	319	246	423	327	465	98	240	2,763
	4	319	121	245	342	621	193	238	148	285	2,512
	5	473	319	409	241	1,678	447	445	268	584	4,863
	6	399	193	216	101	949	662	199	269	627	3,615
	7	484	199	313	152	837	302	266	116	4,104	6,774
	8	343	114	122	155	614	460	127	277	529	2,741
	9	617	282	217	200	949	690	4,045	574	2,701	10,275
	Totals	3,458	1,837	2,218	1,684	6,775	3,421	6,241	1,907	9,513	37,053

Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	-1	-3	-1	0	5	-1	-2	0	4	-1
	2	-15	-2	2	-5	6	8	4	-1	4	0
	3	-10	1	1	-7	-1	10	10	1	-5	-1
	4	0	-5	-7	-2	4	-6	-3	3	15	-1
	5	7	-1	-4	1	8	-3	1	-2	-7	0
	6	-11	2	5	-2	-19	9	1	1	16	1
	7	-7	0	4	-1	6	2	-2	1	0	4
	8	2	-3	-4	2	8	-3	1	-1	1	2
	9	24	-2	-7	5	-13	2	3	7	-15	4
	Totals	-11	-13	-12	-9	4	18	12	9	12	10

% Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	-1%	-3%	-1%	0%	2%	-1%	-1%	0%	2%	0%
	2	-4%	-1%	1%	-4%	1%	4%	1%	-1%	1%	0%
	3	-3%	0%	0%	-3%	0%	3%	2%	1%	-2%	0%
	4	0%	-4%	-3%	0%	1%	-3%	-1%	2%	5%	0%
	5	2%	0%	-1%	1%	0%	-1%	0%	-1%	-1%	0%
	6	-3%	1%	2%	-2%	-2%	1%	1%	0%	3%	0%
	7	-1%	0%	1%	0%	1%	1%	-1%	0%	0%	0%
	8	0%	-3%	-3%	1%	1%	-1%	1%	0%	0%	0%
	9	4%	-1%	-3%	3%	-1%	0%	0%	1%	-1%	0%
	Totals	0%	-1%	-1%	-1%	0%	1%	0%	0%	0%	0%

2018 PM Do-Minimum

Pre-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	180	303	385	619	659	454	402	366	631	3,997
	2	239	210	450	69	219	191	171	101	164	1,813
	3	244	343	493	342	381	234	352	142	307	2,838
	4	259	103	221	308	335	107	130	136	157	1,756
	5	463	378	454	400	1,643	696	525	439	788	5,788
	6	190	240	324	194	444	713	341	458	701	3,603
	7	207	272	542	264	409	242	415	136	3,981	6,468
	8	114	54	92	158	258	276	133	307	514	1,906
	9	271	424	243	245	478	580	4,162	480	3,295	10,177
	Totals	2,167	2,327	3,205	2,599	4,824	3,493	6,631	2,564	10,537	38,346

Post-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	178	297	377	643	657	450	396	370	627	3,995
	2	236	211	451	66	220	194	173	99	164	1,813
	3	243	343	502	335	370	240	359	141	303	2,836
	4	255	99	218	317	332	106	133	139	155	1,755
	5	458	378	441	405	1,654	697	529	442	784	5,788
	6	189	242	325	185	442	712	342	457	711	3,605
	7	207	272	552	259	406	243	412	137	3,983	6,470
	8	112	54	92	160	257	275	134	307	517	1,908
	9	267	421	232	250	477	583	4,168	487	3,296	10,181
	Totals	2,145	2,317	3,189	2,620	4,814	3,500	6,647	2,578	10,540	38,351

Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	-2	-5	-8	24	-2	-4	-6	3	-3	-2
	2	-3	1	1	-3	0	2	2	-1	0	0
	3	0	0	8	-7	-11	6	8	-1	-4	-1
	4	-3	-4	-3	9	-3	-1	3	2	-2	-1
	5	-5	0	-13	5	10	1	4	2	-4	0
	6	-1	2	1	-8	-2	-1	1	0	10	2
	7	-1	0	10	-5	-3	1	-3	1	2	3
	8	-2	-1	0	2	-1	-1	1	0	2	1
	9	-4	-4	-11	5	-1	4	6	7	1	3
	Totals	-22	-10	-16	21	-10	7	16	14	3	4

% Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	-1%	-2%	-2%	4%	0%	-1%	-1%	1%	-1%	0%
	2	-1%	1%	0%	-5%	0%	1%	1%	-1%	0%	0%
	3	0%	0%	2%	-2%	-3%	2%	2%	-1%	-1%	0%
	4	-1%	-4%	-1%	3%	-1%	-1%	3%	2%	-1%	0%
	5	-1%	0%	-3%	1%	1%	0%	1%	1%	-1%	0%
	6	-1%	1%	0%	-4%	0%	0%	0%	0%	1%	0%
	7	0%	0%	2%	-2%	-1%	0%	-1%	1%	0%	0%
	8	-2%	-1%	0%	1%	0%	0%	0%	0%	0%	0%
	9	-2%	-1%	-4%	2%	0%	1%	0%	1%	0%	0%
	Totals	-1%	0%	0%	1%	0%	0%	0%	1%	0%	0%

2018 PM Do-Something

Pre-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	180	303	385	619	659	454	402	366	631	3,997
	2	239	210	450	69	219	191	171	101	164	1,813
	3	244	343	493	342	381	234	352	142	307	2,838
	4	259	103	221	308	335	107	130	136	157	1,756
	5	463	378	454	400	1,643	696	525	439	788	5,788
	6	190	240	324	194	444	713	341	458	701	3,603
	7	207	272	542	264	409	242	415	136	3,981	6,468
	8	114	54	92	158	258	276	133	307	514	1,906
	9	271	424	243	245	478	580	4,162	480	3,295	10,177
	Totals	2,167	2,327	3,205	2,599	4,824	3,493	6,631	2,564	10,537	38,346

Post-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	179	298	376	638	660	450	396	370	629	3,996
	2	236	211	451	66	219	194	173	99	165	1,813
	3	243	344	502	334	370	240	360	141	303	2,836
	4	255	99	217	313	335	106	132	139	160	1,756
	5	463	378	442	412	1,644	696	528	445	781	5,789
	6	189	241	325	186	442	712	342	457	711	3,605
	7	206	272	552	257	407	243	413	137	3,983	6,470
	8	113	54	92	160	258	275	133	305	518	1,908
	9	270	419	233	265	475	582	4,167	486	3,285	10,182
	Totals	2,154	2,317	3,190	2,629	4,809	3,498	6,644	2,580	10,535	38,354

Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	-1	-5	-8	19	1	-4	-6	4	-1	-2
	2	-3	1	1	-3	0	2	2	-1	1	0
	3	0	1	9	-9	-11	6	8	-1	-3	-1
	4	-4	-4	-4	5	0	-1	2	2	3	0
	5	0	-1	-13	11	1	-1	3	6	-7	1
	6	-1	2	1	-8	-2	0	1	0	10	2
	7	-1	0	10	-7	-2	1	-2	1	2	3
	8	-2	0	0	2	0	-1	0	-2	3	1
	9	-1	-5	-11	20	-3	2	5	7	-9	4
	Totals	-13	-10	-16	30	-15	5	13	16	-2	8

% Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	-1%	-2%	-2%	3%	0%	-1%	-2%	1%	0%	0%
	2	-1%	1%	0%	-5%	0%	1%	1%	-1%	0%	0%
	3	0%	0%	2%	-3%	-3%	2%	2%	-1%	-1%	0%
	4	-1%	-3%	-2%	1%	0%	-1%	2%	2%	2%	0%
	5	0%	0%	-3%	3%	0%	0%	0%	1%	-1%	0%
	6	-1%	1%	0%	-4%	0%	0%	0%	0%	1%	0%
	7	0%	0%	2%	-3%	0%	0%	-1%	1%	0%	0%
	8	-1%	-1%	0%	1%	0%	0%	0%	-1%	1%	0%
	9	0%	-1%	-4%	8%	-1%	0%	0%	1%	0%	0%
	Totals	-1%	0%	0%	1%	0%	0%	0%	1%	0%	0%

2025 AM Do-Minimum

Pre-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	125	111	119	150	277	114	170	77	177	1,319
	2	357	238	266	147	455	257	285	86	268	2,359
	3	368	282	312	275	421	356	431	97	240	2,783
	4	397	149	293	378	723	284	298	163	323	3,007
	5	505	344	434	283	1,779	531	465	284	634	5,260
	6	418	220	238	148	1,041	735	237	308	673	4,018
	7	480	206	287	173	856	362	351	128	4,331	7,174
	8	349	124	126	163	628	516	132	290	552	2,879
	9	593	292	225	219	983	764	4,252	594	2,765	10,686
	Totals	3,592	1,964	2,300	1,937	7,164	3,919	6,620	2,026	9,962	39,485

Post-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	125	104	117	154	270	114	172	80	182	1,318
	2	333	219	258	138	469	264	293	86	298	2,360
	3	352	268	299	260	428	380	444	100	257	2,788
	4	392	142	279	390	685	288	316	179	333	3,004
	5	499	348	434	271	1,735	554	498	289	639	5,267
	6	408	216	238	144	1,081	707	239	308	693	4,035
	7	480	203	284	173	871	368	323	131	4,361	7,193
	8	349	120	122	168	602	521	136	297	576	2,891
	9	621	308	231	221	984	775	4,306	626	2,647	10,719
	Totals	3,560	1,929	2,262	1,919	7,125	3,970	6,730	2,097	9,985	39,575

Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	0	-6	-3	4	-7	0	3	4	5	-1
	2	-24	-19	-8	-9	15	7	8	0	30	1
	3	-16	-14	-12	-15	6	24	13	3	16	5
	4	-4	-7	-13	12	-39	4	19	16	10	-3
	5	-6	5	-1	-13	-44	23	33	4	5	7
	6	-10	-3	0	-4	40	-28	2	1	20	17
	7	-1	-3	-3	0	14	6	-28	3	30	20
	8	1	-4	-3	5	-27	4	5	7	24	12
	9	27	17	6	2	1	11	54	32	-118	32
	Totals	-32	-35	-38	-18	-40	51	110	70	23	90

% Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	0%	-6%	-2%	3%	-2%	0%	2%	5%	3%	0%
	2	-7%	-8%	-3%	-6%	3%	3%	3%	0%	11%	0%
	3	-4%	-5%	-4%	-6%	1%	7%	3%	3%	7%	0%
	4	-1%	-5%	-5%	3%	-5%	1%	6%	10%	3%	0%
	5	-1%	1%	0%	-4%	-2%	4%	7%	1%	1%	0%
	6	-2%	-2%	0%	-3%	4%	-4%	1%	0%	3%	0%
	7	0%	-1%	-1%	0%	2%	2%	-8%	2%	1%	0%
	8	0%	-3%	-3%	3%	-4%	1%	4%	2%	4%	0%
	9	5%	6%	3%	1%	0%	1%	1%	5%	-4%	0%
	Totals	-1%	-2%	-2%	-1%	-1%	1%	2%	3%	0%	0%

2025 AM Do-Something

Pre-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	125	111	119	150	277	114	170	77	177	1,319
	2	357	238	266	147	455	257	285	86	268	2,359
	3	368	282	312	275	421	356	431	97	240	2,783
	4	397	149	293	378	723	284	298	163	323	3,007
	5	505	344	434	283	1,779	531	465	284	634	5,260
	6	418	220	238	148	1,041	735	237	308	673	4,018
	7	480	206	287	173	856	362	351	128	4,331	7,174
	8	349	124	126	163	628	516	132	290	552	2,879
	9	593	292	225	219	983	764	4,252	594	2,765	10,686
	Totals	3,592	1,964	2,300	1,937	7,164	3,919	6,620	2,026	9,962	39,485

Post-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	122	105	117	149	278	114	171	79	185	1,320
	2	332	219	258	139	468	265	295	87	297	2,360
	3	353	268	300	261	429	380	443	99	255	2,789
	4	391	143	280	369	709	288	305	172	355	3,010
	5	504	347	433	279	1,724	553	500	292	635	5,267
	6	407	217	239	145	1,078	708	240	309	692	4,035
	7	478	203	285	173	873	368	324	131	4,359	7,194
	8	352	121	124	166	613	522	136	287	572	2,893
	9	635	306	230	232	973	773	4,307	632	2,632	10,720
	Totals	3,575	1,930	2,265	1,914	7,145	3,969	6,719	2,088	9,983	39,586

Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	-3	-6	-3	-1	0	0	1	2	9	1
	2	-25	-19	-9	-8	14	7	10	1	30	1
	3	-15	-14	-11	-15	8	24	12	2	15	6
	4	-6	-6	-12	-9	-15	4	7	9	32	3
	5	0	3	-2	-4	-56	22	35	7	1	7
	6	-11	-3	1	-3	37	-27	3	1	19	17
	7	-2	-2	-2	0	16	6	-27	3	29	20
	8	3	-3	-2	3	-15	5	5	-3	19	13
	9	42	14	5	13	-10	9	54	38	-133	33
	Totals	-17	-35	-35	-23	-20	49	99	61	20	101

% Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	-2%	-5%	-2%	-1%	0%	0%	1%	3%	5%	0%
	2	-7%	-8%	-3%	-6%	3%	3%	3%	1%	11%	0%
	3	-4%	-5%	-4%	-5%	2%	7%	3%	2%	6%	0%
	4	-2%	-4%	-4%	-2%	-2%	1%	2%	5%	10%	0%
	5	0%	1%	0%	-1%	-3%	4%	8%	3%	0%	0%
	6	-3%	-1%	0%	-2%	4%	-4%	1%	0%	3%	0%
	7	0%	-1%	-1%	0%	2%	2%	-8%	2%	1%	0%
	8	1%	-2%	-2%	2%	-2%	1%	3%	-1%	4%	0%
	9	7%	5%	2%	6%	-1%	1%	1%	6%	-5%	0%
	Totals	0%	-2%	-2%	-1%	0%	1%	2%	3%	0%	0%

2025 PM Do-Minimum

Pre-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	181	308	383	698	701	461	399	370	625	4,127
	2	244	220	465	90	233	232	177	106	167	1,934
	3	245	357	503	386	406	280	351	141	310	2,979
	4	300	118	251	340	386	173	159	146	183	2,057
	5	487	392	461	485	1,726	769	544	449	803	6,116
	6	198	284	378	287	536	838	408	524	798	4,250
	7	206	278	542	320	438	299	410	139	4,203	6,837
	8	114	57	95	175	268	328	138	320	537	2,032
	9	269	432	240	289	508	669	4,400	498	3,351	10,656
	Totals	2,244	2,445	3,319	3,070	5,203	4,049	6,987	2,692	10,977	40,987

Post-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	175	293	369	723	687	463	403	377	639	4,128
	2	236	213	456	85	242	235	183	107	179	1,936
	3	241	352	498	375	400	286	364	144	322	2,981
	4	297	112	239	348	374	171	174	154	187	2,055
	5	462	402	456	469	1,697	817	582	441	799	6,124
	6	195	285	382	278	543	814	411	533	822	4,262
	7	206	273	545	319	441	303	385	147	4,232	6,853
	8	112	56	94	178	262	328	144	315	553	2,041
	9	261	458	242	290	510	686	4,454	537	3,246	10,685
	Totals	2,185	2,442	3,280	3,066	5,156	4,103	7,100	2,754	10,979	41,065

Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	1	2	3	4	5	6	7	8	9	45
	2	-8	-7	-9	-5	9	3	6	1	12	2
	3	-4	-5	-6	-11	-7	6	14	3	12	2
	4	-3	-6	-12	8	-12	-2	15	7	5	-1
	5	-25	10	-6	-16	-29	48	38	-8	-4	8
	6	-2	1	3	-9	7	-24	3	9	24	12
	7	0	-5	3	-1	3	4	-24	8	28	16
	8	-2	-1	-1	3	-6	0	5	-4	16	9
	9	-8	26	2	1	2	17	54	39	-104	29
	Totals	-52	14	-22	-26	-28	59	117	63	-3	122

% Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	1%	1%	1%	1%	1%	1%	2%	2%	1%	1%
	2	-3%	-3%	-2%	-5%	4%	1%	3%	1%	7%	0%
	3	-2%	-1%	-1%	-3%	-2%	2%	4%	2%	4%	0%
	4	-1%	-5%	-5%	2%	-3%	-1%	9%	5%	2%	0%
	5	-5%	2%	-1%	-3%	-2%	6%	7%	-2%	0%	0%
	6	-1%	0%	1%	-3%	1%	-3%	1%	2%	3%	0%
	7	0%	-2%	1%	0%	1%	1%	-6%	6%	1%	0%
	8	-2%	-2%	-1%	2%	-2%	0%	4%	-1%	3%	0%
	9	-3%	6%	1%	0%	0%	3%	1%	8%	-3%	0%
	Totals	-2%	1%	-1%	-1%	-1%	1%	2%	2%	0%	0%

2025 PM Do-Something

Pre-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	181	308	383	698	701	461	399	370	625	4,127
	2	244	220	465	90	233	232	177	106	167	1,934
	3	245	357	503	386	406	280	351	141	310	2,979
	4	300	118	251	340	386	173	159	146	183	2,057
	5	487	392	461	485	1,726	769	544	449	803	6,116
	6	198	284	378	287	536	838	408	524	798	4,250
	7	206	278	542	320	438	299	410	139	4,203	6,837
	8	114	57	95	175	268	328	138	320	537	2,032
	9	269	432	240	289	508	669	4,400	498	3,351	10,656
	Totals	2,244	2,445	3,319	3,070	5,203	4,049	6,987	2,692	10,977	40,987

Post-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	177	294	367	708	694	465	401	380	644	4,129
	2	236	212	456	86	241	235	183	108	179	1,936
	3	241	351	498	372	400	287	365	144	323	2,982
	4	294	112	239	339	382	172	172	152	196	2,056
	5	483	399	454	492	1,671	810	577	452	790	6,127
	6	196	284	381	281	541	813	411	533	820	4,262
	7	206	273	547	314	443	304	387	146	4,233	6,853
	8	112	56	94	177	264	329	143	311	556	2,041
	9	271	457	242	318	505	683	4,452	535	3,224	10,687
	Totals	2,216	2,439	3,278	3,087	5,142	4,096	7,090	2,761	10,965	41,074

Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	1	2	3	4	5	6	7	8	9	45
	2	-8	-7	-9	-4	8	3	6	2	12	2
	3	-4	-6	-5	-14	-6	7	14	4	13	3
	4	-6	-6	-12	-1	-5	-1	12	6	13	0
	5	-4	7	-7	7	-55	41	33	3	-13	11
	6	-1	0	3	-6	6	-25	3	10	22	13
	7	0	-5	5	-6	5	4	-23	7	30	16
	8	-2	-1	-1	2	-4	1	5	-9	18	10
	9	2	25	2	29	-3	14	52	37	-127	31
	Totals	-22	10	-22	11	-49	49	109	67	-23	130

% Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	1%	1%	1%	1%	1%	1%	2%	2%	1%	1%
	2	-3%	-3%	-2%	-4%	3%	1%	3%	2%	7%	0%
	3	-2%	-2%	-1%	-4%	-1%	2%	4%	3%	4%	0%
	4	-2%	-5%	-5%	0%	-1%	-1%	8%	4%	7%	0%
	5	-1%	2%	-2%	1%	-3%	5%	6%	1%	-2%	0%
	6	-1%	0%	1%	-2%	1%	-3%	1%	2%	3%	0%
	7	0%	-2%	1%	-2%	1%	1%	-6%	5%	1%	0%
	8	-2%	-1%	-1%	1%	-1%	0%	3%	-3%	3%	0%
	9	1%	6%	1%	10%	-1%	2%	1%	7%	-4%	0%
	Totals	-1%	0%	-1%	0%	-1%	1%	2%	2%	0%	0%

2033 AM Do-Minimum

Pre-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	134	117	119	165	298	175	173	76	176	1,432
	2	366	249	277	156	475	295	294	90	278	2,480
	3	356	287	309	284	417	394	422	98	235	2,802
	4	429	162	312	392	775	333	334	171	352	3,261
	5	538	366	452	312	1,848	636	492	293	670	5,606
	6	578	282	323	202	1,266	899	377	361	791	5,079
	7	482	216	289	193	889	433	342	134	4,561	7,539
	8	345	131	123	167	638	556	132	292	564	2,949
	9	584	301	229	237	995	819	4,454	610	2,770	10,999
	Totals	3,811	2,111	2,433	2,109	7,602	4,539	7,021	2,125	10,396	42,147

Post-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	136	109	115	174	282	176	177	82	180	1,431
	2	338	227	268	145	486	305	309	91	314	2,483
	3	336	268	293	263	418	426	445	103	256	2,808
	4	430	150	287	426	704	339	357	199	363	3,254
	5	523	366	443	291	1,804	669	537	299	683	5,615
	6	565	278	324	196	1,324	856	380	361	819	5,104
	7	485	214	288	192	904	441	306	138	4,600	7,568
	8	347	124	116	173	593	562	138	308	605	2,966
	9	601	321	235	235	1,008	836	4,526	662	2,622	11,045
	Totals	3,762	2,056	2,367	2,094	7,522	4,611	7,175	2,244	10,442	42,274

Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	2	-8	-5	9	-15	0	4	7	5	-1
	2	-27	-21	-10	-12	10	10	15	2	36	3
	3	-20	-19	-16	-21	1	33	23	5	21	7
	4	1	-12	-26	33	-71	7	23	27	11	-7
	5	-15	-1	-9	-21	-44	33	45	5	14	9
	6	-12	-4	1	-6	57	-43	3	1	27	25
	7	3	-2	-1	-1	15	8	-37	4	39	29
	8	2	-7	-8	7	-46	6	5	16	41	17
	9	17	20	6	-2	13	17	72	52	-148	46
	Totals	-50	-54	-66	-14	-80	72	155	119	46	127

% Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	2%	-7%	-4%	5%	-5%	0%	2%	9%	3%	0%
	2	-7%	-9%	-3%	-7%	2%	3%	5%	2%	13%	0%
	3	-6%	-7%	-5%	-7%	0%	8%	6%	5%	9%	0%
	4	0%	-8%	-8%	8%	-9%	2%	7%	16%	3%	0%
	5	-3%	0%	-2%	-7%	-2%	5%	9%	2%	2%	0%
	6	-2%	-1%	0%	-3%	5%	-5%	1%	0%	3%	0%
	7	1%	-1%	0%	-1%	2%	2%	-11%	3%	1%	0%
	8	1%	-5%	-6%	4%	-7%	1%	4%	5%	7%	1%
	9	3%	7%	3%	-1%	1%	2%	2%	9%	-5%	0%
	Totals	-1%	-3%	-3%	-1%	-1%	2%	2%	6%	0%	0%

2033 AM Do-Something

Pre-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	134	117	119	165	298	175	173	76	176	1,432
	2	366	249	277	156	475	295	294	90	278	2,480
	3	356	287	309	284	417	394	422	98	235	2,802
	4	429	162	312	392	775	333	334	171	352	3,261
	5	538	366	452	312	1,848	636	492	293	670	5,606
	6	578	282	323	202	1,266	899	377	361	791	5,079
	7	482	216	289	193	889	433	342	134	4,561	7,539
	8	345	131	123	167	638	556	132	292	564	2,949
	9	584	301	229	237	995	819	4,454	610	2,770	10,999
	Totals	3,811	2,111	2,433	2,109	7,602	4,539	7,021	2,125	10,396	42,147

Post-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	131	110	115	164	296	176	174	79	187	1,433
	2	338	227	267	147	482	306	311	93	312	2,483
	3	338	268	294	265	417	426	444	103	254	2,809
	4	421	153	295	382	753	341	346	183	392	3,265
	5	531	363	441	304	1,788	666	539	305	678	5,615
	6	565	279	324	199	1,318	858	381	362	818	5,103
	7	484	214	289	193	902	441	308	139	4,599	7,568
	8	350	127	120	169	616	564	137	289	596	2,969
	9	620	318	234	251	990	833	4,526	671	2,605	11,046
	Totals	3,776	2,058	2,379	2,075	7,562	4,611	7,165	2,225	10,441	42,292

Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	-3	-7	-4	-1	-2	1	2	4	12	1
	2	-28	-22	-10	-9	7	10	17	3	34	3
	3	-19	-19	-15	-19	0	32	22	5	19	8
	4	-8	-10	-17	-10	-22	8	11	12	39	4
	5	-6	-3	-11	-7	-60	31	47	11	8	9
	6	-13	-3	1	-3	51	-41	4	2	27	25
	7	2	-2	0	0	13	8	-35	5	38	29
	8	4	-3	-3	3	-23	8	5	-3	32	20
	9	36	17	5	14	-5	14	72	61	-165	47
	Totals	-35	-52	-54	-33	-41	72	145	100	44	145

% Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	-2%	-6%	-3%	-1%	-1%	0%	1%	5%	7%	0%
	2	-8%	-9%	-4%	-6%	1%	4%	6%	4%	12%	0%
	3	-5%	-6%	-5%	-7%	0%	8%	5%	5%	8%	0%
	4	-2%	-6%	-5%	-3%	-3%	2%	3%	7%	11%	0%
	5	-1%	-1%	-2%	-2%	-3%	5%	9%	4%	1%	0%
	6	-2%	-1%	0%	-2%	4%	-5%	1%	1%	3%	0%
	7	0%	-1%	0%	0%	1%	2%	-10%	4%	1%	0%
	8	1%	-2%	-3%	2%	-4%	1%	4%	-1%	6%	1%
	9	6%	6%	2%	6%	-1%	2%	2%	10%	-6%	0%
	Totals	-1%	-2%	-2%	-2%	-1%	2%	2%	5%	0%	0%

2033 PM Do-Minimum

Pre-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	193	319	375	732	740	610	399	367	617	4,352
	2	253	231	474	104	254	290	189	111	175	2,080
	3	245	367	501	408	431	365	351	138	309	3,115
	4	321	129	265	358	424	224	182	153	203	2,260
	5	514	416	464	535	1,794	965	571	458	822	6,538
	6	278	327	434	337	651	1,012	493	568	865	4,965
	7	207	289	532	357	470	430	408	140	4,395	7,228
	8	112	60	94	184	275	375	145	324	550	2,119
	9	265	441	234	319	541	781	4,615	510	3,394	11,102
	Totals	2,388	2,580	3,374	3,333	5,580	5,053	7,353	2,769	11,330	43,760

Post-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	186	303	358	776	718	616	413	386	594	4,352
	2	242	223	465	98	260	296	199	113	188	2,083
	3	239	362	493	394	420	376	375	144	315	3,117
	4	321	121	246	371	400	223	206	168	200	2,256
	5	475	423	451	506	1,760	1,032	629	447	822	6,545
	6	274	328	437	326	659	979	497	580	902	4,982
	7	208	287	543	360	480	436	378	153	4,404	7,249
	8	109	59	91	186	265	375	153	317	578	2,132
	9	252	458	233	310	546	808	4,665	578	3,293	11,143
	Totals	2,306	2,562	3,316	3,327	5,508	5,143	7,516	2,886	11,297	43,860

Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	-7	-16	-17	44	-22	6	15	19	-23	-1
	2	-11	-8	-10	-6	6	6	10	2	14	3
	3	-6	-6	-9	-14	-11	11	24	6	6	2
	4	-1	-8	-19	13	-24	-1	24	15	-3	-4
	5	-39	7	-13	-29	-35	67	58	-10	0	6
	6	-4	1	3	-11	8	-33	5	12	37	17
	7	1	-2	10	4	10	7	-30	13	9	21
	8	-2	-1	-3	2	-10	-1	8	-7	28	14
	9	-13	16	-1	-9	5	28	50	68	-101	42
	Totals	-82	-17	-59	-6	-71	89	163	117	-33	100

% Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	-4%	-5%	-5%	6%	-3%	1%	4%	5%	-4%	0%
	2	-4%	-3%	-2%	-6%	2%	2%	5%	1%	8%	0%
	3	-2%	-2%	-2%	-3%	-2%	3%	7%	4%	2%	0%
	4	0%	-6%	-7%	4%	-6%	-1%	13%	10%	-1%	0%
	5	-8%	2%	-3%	-5%	-2%	7%	10%	-2%	0%	0%
	6	-1%	0%	1%	-3%	1%	-3%	1%	2%	4%	0%
	7	1%	-1%	2%	1%	2%	2%	-7%	9%	0%	0%
	8	-2%	-2%	-3%	1%	-4%	0%	5%	-2%	5%	1%
	9	-5%	4%	-1%	-3%	1%	4%	1%	13%	-3%	0%
	Totals	-3%	-1%	-2%	0%	-1%	2%	2%	4%	0%	0%

2033 PM Do-Something

Pre-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	193	319	375	732	740	610	399	367	617	4,352
	2	253	231	474	104	254	290	189	111	175	2,080
	3	245	367	501	408	431	365	351	138	309	3,115
	4	321	129	265	358	424	224	182	153	203	2,260
	5	514	416	464	535	1,794	965	571	458	822	6,538
	6	278	327	434	337	651	1,012	493	568	865	4,965
	7	207	289	532	357	470	430	408	140	4,395	7,228
	8	112	60	94	184	275	375	145	324	550	2,119
	9	265	441	234	319	541	781	4,615	510	3,394	11,102
	Totals	2,388	2,580	3,374	3,333	5,580	5,053	7,353	2,769	11,330	43,760

Post-DIADEM Sectored Matrix

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	190	304	358	748	732	621	413	388	601	4,355
	2	243	222	464	99	257	295	199	115	188	2,083
	3	240	361	493	392	422	376	374	145	315	3,118
	4	315	123	248	356	415	224	205	163	210	2,258
	5	508	420	450	540	1,722	1,021	621	465	803	6,549
	6	276	327	436	330	657	977	497	582	901	4,983
	7	207	287	544	356	482	437	380	152	4,405	7,249
	8	110	59	91	185	269	376	152	310	580	2,133
	9	267	456	233	346	539	803	4,665	574	3,266	11,146
	Totals	2,355	2,559	3,318	3,351	5,495	5,131	7,505	2,894	11,268	43,875

Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	-4	-15	-17	16	-7	11	14	21	-16	2
	2	-9	-9	-10	-4	4	5	10	4	13	3
	3	-5	-7	-8	-16	-9	11	23	7	6	3
	4	-6	-6	-17	-2	-9	0	22	11	7	-2
	5	-6	4	-15	6	-73	56	50	7	-19	11
	6	-2	0	2	-6	6	-35	4	13	36	18
	7	0	-2	12	-1	12	7	-28	12	10	21
	8	-2	-1	-2	1	-6	1	7	-13	30	14
	9	1	14	-1	26	-2	22	49	63	-128	45
	Totals	-33	-20	-56	18	-85	77	152	125	-62	116

% Change in Matrices

		TO									
	Sectors	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**Totals**
FROM	**1**	-2%	-5%	-5%	2%	-1%	2%	3%	6%	-3%	0%
	2	-4%	-4%	-2%	-4%	1%	2%	5%	3%	7%	0%
	3	-2%	-2%	-2%	-4%	-2%	3%	7%	5%	2%	0%
	4	-2%	-5%	-6%	-1%	-2%	0%	12%	7%	3%	0%
	5	-1%	1%	-3%	1%	-4%	6%	9%	2%	-2%	0%
	6	-1%	0%	0%	-2%	1%	-3%	1%	2%	4%	0%
	7	0%	-1%	2%	0%	3%	2%	-7%	8%	0%	0%
	8	-2%	-1%	-3%	0%	-2%	0%	5%	-4%	5%	1%
	9	0%	3%	0%	8%	0%	3%	1%	12%	-4%	0%
	Totals	-1%	-1%	-2%	1%	-2%	2%	2%	4%	-1%	0%

Craig Shipley
Atkins
10 Holliday Street
Birmingham
West Midlands
B1 1TF

Email	**craig.shipley@atkinsglobal.com**
Telephone	**0121 483 5000**
Direct telephone	**0121 483 6144**
Fax	**0121 483 5252**