The Plan for Stafford Borough

Transport Evidence to Support a Western Direction of Growth

October 2012

Staffordshire County Council

Front cover illustration shows Chell Road, Stafford

1. Purpose of Report

The purpose of this report is to:

a) Summarise the strategic planning context for Stafford
b) Summarise 2010/11 conditions on the transport network in the west
c) Present the evidence that identifies a 'western direction of growth' as the most sustainable option from a transport perspective for a strategic housing allocation of up to 2,200 new homes
d) Identify the new infrastructure necessary to make the western direction of growth acceptable in transport terms in 2031, in the context of the Stafford growth agenda
e) Recommend whether a 2016 development phase is acceptable without the delivery of new highway infrastructure

2. Strategic Planning Context

2.1 Draft Plan for Stafford Borough

Stafford Borough Council is preparing the new Local Plan for the area. In 2011, the Council identified strategic development locations for housing and employment as part of the 'Plan for Stafford Borough – Draft Publication' document, with proposed locations at Stafford, as shown in Figure 1.

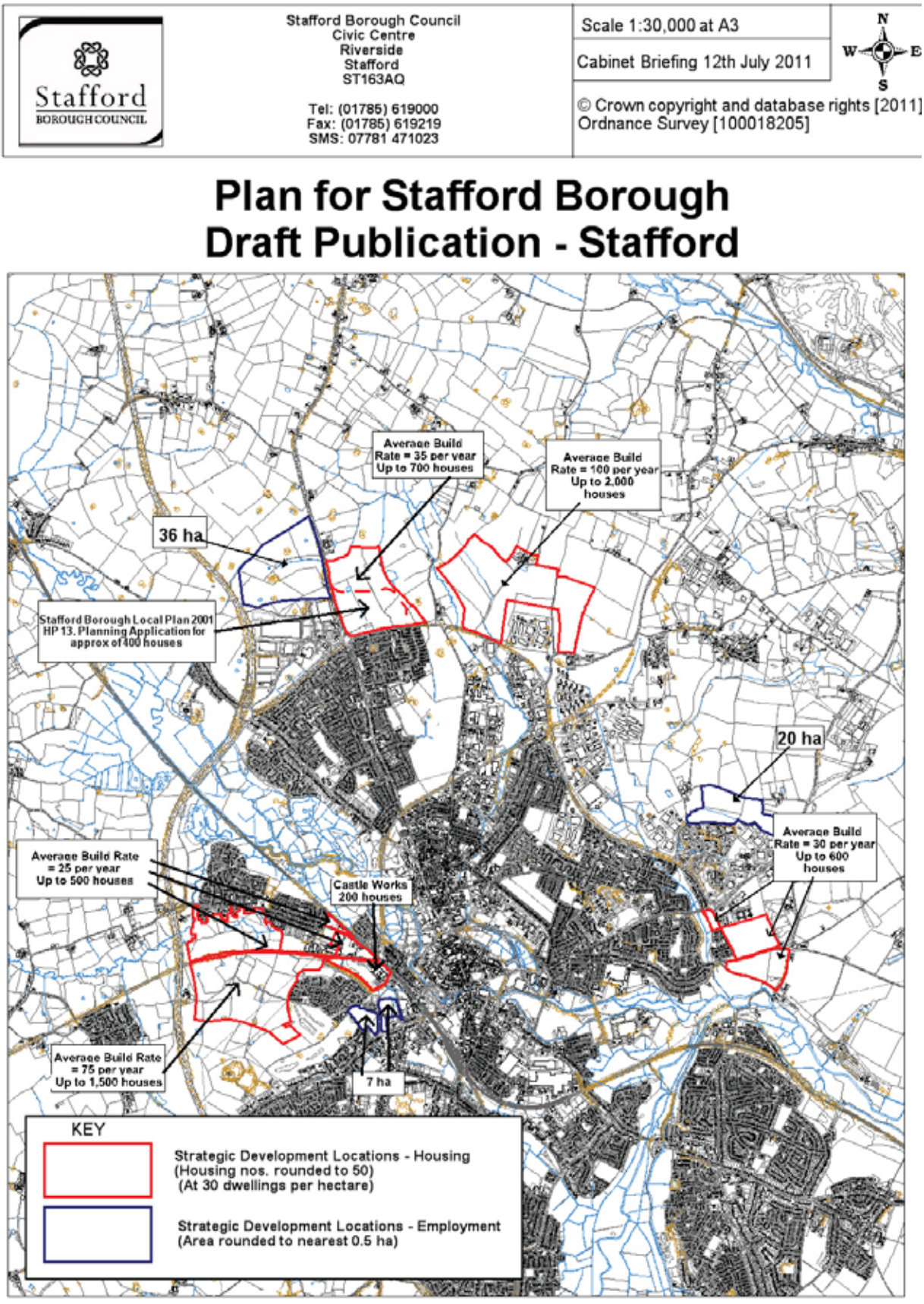
In the period to 2031 the Borough Council is planning for growth including:

- 500 new homes per annum with 72% proposed at Stafford, with the majority on greenfield sites, 8% in Stone, 12% in key service villages and 8% in the rest of the rural areas. Currently, there is planning permission for approximately 3,000 new homes across the Borough area, equivalent to 6 years supply.

- 8 hectares of new employment land each year with at least 40 hectares every 5 years including new employment at Stafford Town during the plan period. Up to 36 hectares of land north of Primepoint 14 / west of A34, Stafford and 16 hectares of land east of Beacon Business Park are identified in their 2011 consultation document *'Delivering the Plan for Stafford Borough - Local Choices'* .

- 38,000 square metres of non-food (comparison) and retail development and 45,000 square metres of office development will be provided in the Borough to support local jobs. Currently there is planning permission for 22,000 square metres of retail, mainly at Stafford and Trentham Gardens, together with 58,000 square metres of office developments, mainly at Stafford.

Figure 1: Proposed Strategic Development Locations



Following the consultation period on the Plan for Stafford Borough – Draft Publication together with a series of public exhibitions, including two events for the Stafford western direction of growth, the key concern from the local community was the impact of additional traffic on the existing road network arising from new development together with the lack of existing services and facilities. Furthermore local representatives have stated that no development should take place before the new road infrastructure has been delivered for the western direction of growth

The Core Policy 5 on the West of Stafford in the Draft Plan for Stafford Borough states the following:

Within the area identified West of Stafford a sustainable, well designed mixed use development will be delivered by 2031. Any application for development on a part or the whole of this area must be preceded by, and consistent with, a comprehensive Master Plan for West of Stafford including building Design Statements which have been agreed by the Council as a Supplementary Planning Document. Subject to a viability assessment the development must deliver the following key requirements:

- Phased delivery of up to 2,200 new homes with 30% being affordable housing in a mix of housing types, tenures, sizes and styles and a greater proportion will be 2 and 3 bedroom properties;
- Significant provision to meet the needs of an ageing population through new extra care and specialist housing provision close to Stafford town centre;
- The development takes place on a 'neighbourhood' approach with the provision of a mix of uses including local retail facilities, social and physical infrastructure, a primary school, a library service, health facilities and public open space;
- At least 7 hectares of new employment land with comprehensive links to existing and new housing development areas;
- Proposals relate to the whole Strategic Development Location or if less do not in any way prejudice implementation of the whole development;
- A comprehensive flood management scheme is essential to implement development at the West of Stafford Strategic Development Location including off-site measures to alleviate flooding and surface water management on Doxey Brook;
- The development should be based on maximising opportunities to use sustainable construction methods;
- The development should maximise on-site renewable or low carbon energy production including associated infrastructure to facilitate site-wide renewable energy solutions;
- Existing hedgerows and tree lines to be retained and enhanced to support the provision of a network of green infrastructure including natural grasslands and wetlands, play areas, green corridors allowing wildlife movement and access to open space together with necessary measures to avoid and mitigate the impact of development on the Cannock Chase Special Area of Conservation including Suitable Alternative Natural Greenspace;
- An access and transport strategy is developed for the Strategic Development Location that maximises accessibility by non-car transport modes to Stafford town centre through walking and cycling connections including retention of the disused railway line, nearby existing and new employment areas, identifies access points to the site and between the site and the existing settlement, identifies construction

- Support delivery of the Western Access Improvement Scheme and associated transport improvements from Martin Drive to Doxey Road;
- Measure to conserve and enhance historic environment assets including the setting of Stafford Castle and sight lines to St Mary's Church in Stafford town centre;
- Protect nature conservation interests including Doxey Brook (Biodiversity Alert Site) and Doxey Marshes SSSI;
- A clear hierarchy of roads (from distributor to home zones) producing discernable and distinctive neighbourhoods integrated and linked to existing areas.

A development tariff approach will be applied to all planning applications within the West of Stafford Strategic Development Location. The tariff will contribute towards the strategic infrastructure required to achieve a comprehensive sustainable development. Details of the development tariff will be set out in a future Developer Contributions SPD.

2.2 Staffordshire County Council's Strategic Plan

This report provides evidence that the Stafford Western Access Improvements will help to achieve the following two Priority Outcomes in the County Council's Strategic Plan:

1. Staffordshire's economy prospers and grows, together with jobs, skills, qualifications and aspirations to support it. This will be achieved by creating the infrastructure for a modern economy by:
    - Encouraging housing development of the right type in the right place
    - Maintaining and developing the highways and transportation networks needed to support business and communities

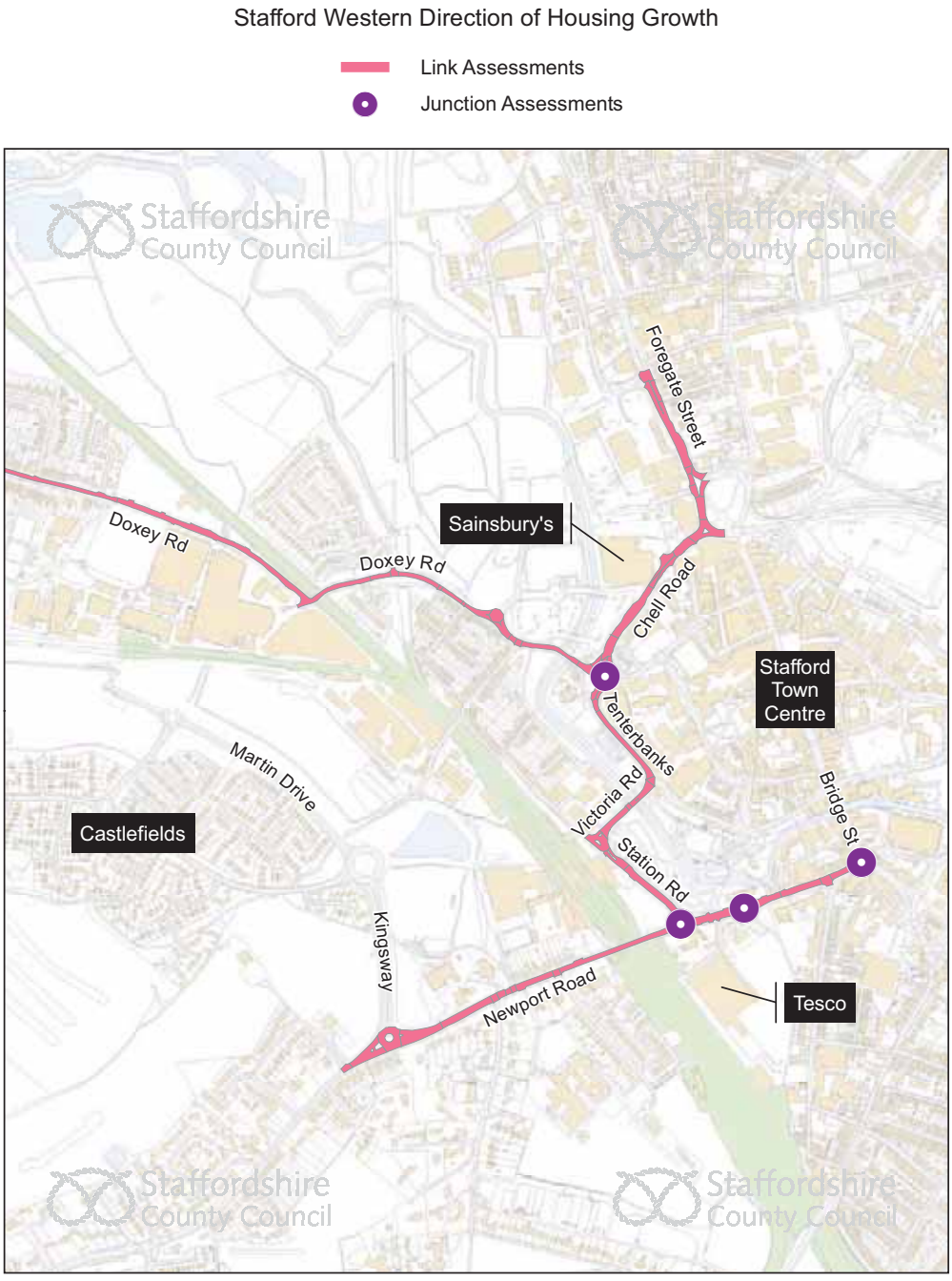
2. Staffordshire is a place where people can easily and safely access everyday facilities and activities through the highways and transport networks. This will be achieved by ensuring that our highways and transport strategies and programmes support economic prosperity, connectivity and equality of access by:
    - Promoting access to jobs, training, education and services
    - Promoting connectivity to help businesses access suppliers, markets and a workforce
    - Reducing congestion on our roads and mitigating the potential congestion caused by economic growth
    - Making 'access' a key consideration when planning new housing, employment sites, services and facilities
    - Promoting access to jobs, and key services and facilities
    - Providing an infrastructure which encourages active and sustainable travel

3. Existing Transport Problems in the West of Stafford

3.1 Introduction

This section of the report provides a summary of existing transport problems in the study area identified in Figure 2, looking at journey time reliability, travel delays and safety.

Figure 2: Study Area



Stafford lies at the intersection of several strategic routes (A34, A518 and A449) resulting in severance of many critical town centre activities and acting as a constraint on proposals to regenerate a number of edge-of-centre locations. As well as causing severance for pedestrians and cyclists, and safety concerns, traffic volumes are acting as a barrier to improved bus service frequency and reliability in Stafford, deterring the potential for journeys to be made by sustainable modes.

An analysis of travelling conditions experienced by road users between September 2008 and August 2011 on key routes between Stafford town centre and the urban boundary has been completed for the 8-9 AM peak, 5-6 PM peak and Saturday (12-13 PM) using up-to-date local traffic counts and Department for Transport GPS Trafficmaster data. Delays and travel times were estimated at 15 minute intervals within each of these hourly periods and delays were calculated by comparing night time journey times and off-peak journey times to peak hour journey times. Normalised delay is defined as the delay in seconds expressed as a percentage of free flow travel time. Delays below 100% mean that journeys are not twice as long during the AM peak as free flow travel conditions. Longer routes will experience higher free flow travel times because of the greater distance to cover. The reliability of individual routes has also been assessed and expressed as a % variability of the weekly average travel time in the peak hours. Basically the smaller the % value returned, the more 'reliable' the route is.

Overall, Stafford's radial 'A' roads have the largest delays during the morning commute, but during the evening commute, town centre roads exhibit the highest delays. During the Saturday peak (12:00 – 13:00) town centre roads can experience delays in excess of 200%, although the urban traffic control system helps to minimise interruptions to traffic flows at peak times. 2007 traffic flows in the study area are listed in Tables 7 and 8 of this report.

3.2 Newport Road and Station Road Corridor

Newport Road provides access to The Hollies employment area, a high school, the Royal Mail depot, car retail outlets and a supermarket. Station Road provides access to the railway station and associated dropping off and parking facilities. Both roads also provide at-grade crossings for pedestrians.

Whilst in isolation, some of the links and junctions within the corridor might appear to be within theoretical capacity, site observations and traffic data have shown that this level of interaction reduces the operational capacity of the whole corridor. The corridor is already under significant pressure in the peak hours. During the AM peak (0800 to 0900) delays were the heaviest on the Newport Road travelling inbound during 2010/11. The heaviest period on the Newport Road is 0830 – 0845 having delays of 176%. Variability of travel times is also a concern along this route. The 2008/09 data previously showed that this route provided the worst levels of journey time reliability in Stafford and suffered from higher levels of delay, with 230% normalised delay. In 2009/10 journey time reliability along Newport Road was worse than in 2008/09, the second worst in Stafford and the least reliable route within the study area.

Queuing (AM peak/eastbound/inbound) at the Newport Road / Bridge Street junction often blocks back through the Tesco junction, which in turn can cause blocking back

across the Newport Road / Station Road junction. In addition, the pedestrian crossing on Station Road, along with the vehicular interaction at the railway station can also cause blocking back through the Newport Road / Station Road junction. In the AM peak hour this queuing and additional vehicular activity related to the high school, the Royal Mail depot and the local employment area can contribute to queues developing along the Newport Road in excess of 1km on the eastbound approach to the Newport Road / Station Road junction.

3.3 Doxey

Doxey is a major residential area within Stafford and Doxey Road provides direct access to many properties and local community facilities, including Doxey Primary School. There are no congestion issues but the road is heavily traffic calmed due to past safety and speeding issues and, based on research, this will constrain the maximum capacity of the route by around 10%.

3.4 Chell Road

An important bus interchange serving the town centre is located on Chell Road and there is also a high pedestrian movement across Chell Road which provides access between Sainsbury's and the town centre. There are two controlled crossings and a 12 hour count, taken at the most popular crossing location, showed that 5,069 people crossed in one direction and 4,833 people in the other. In 2007 on Chell Road there were 1800 vehicles per hour (two-way peak hour flow) which is the second highest link flow in the study area after A34 Foregate Street. In 2010/11, Chell Road experienced the highest delays of 90% southbound during the period 1700 to 1715.

3.5 Foregate Street

Foregate Street links the north of Stafford to the town centre and provides direct access to local facilities and an edge-of-town retail area. In 2007, there were PM peak two-way traffic flows of 5110 vehicles per hour and AM flows of 4980 vehicles per hour, however there are not currently considered to be any concerns regarding stress at key junctions along the route. During the PM peak (1700 to 1800) delays were heaviest on Foregate Street travelling inbound at 123% between 1715 and 1730.

3.6 Accident Analysis

A five year accident analysis from 1 January 2007 – 31 December 2011 has been completed. An indication of identified accidents at key junctions within the study area is provided in Table 1 and Table 2 provides an analysis of accidents on key links.

Table 1: Accident Issues at Key Junctions

Junction	Fatal	Serious	Slight	Total	Remediation
Greyfriars/ Stone Road/ Eccleshall Road	0	0	10 (1 cyclist)	10	-
Greyfriars/ Browning Street	0	0	2	2	-

Gaol Square	0	0	19 (5 cyclists)	19	-
Broadeye/ Chell Road/ Tenterbanks	0	0	7 (1 cyclist and 1 pedestrian)	7	Oct 2006 (6 slights since then)
Tenterbanks/ Victoria Road	0	0	2 (1 cyclist)	2	-
Railway Station Access	0	0	3	3	2010 new multi-storey
Station Road /Newport Road	0	0	6 (3 pedestrians)	6	-
Newport Road/Tesco Junction	0	1	19 (4 cyclists and 1 pedestrian)	20	Completed in 2011

Table 2 identifies that observed accident rates are significantly higher than expected on Newport Road between Station Road and Lichfield Road, and there are also safety concerns along Chell Road and at Gaol Square.

Table 2: Road Traffic Accidents Observed and Expected in the West of Stafford

Section (from/to)	**Observed (per year)**	**Expected (per year)**
From:Thorneyfields Lane/Castle Bank (A518) **To**: Kingsway/Newport Road	1.8	4.8
From: Doxey Fields **To**: Doxey Road/opposite Works	0.6	3.6
From: A518 Newport Road/Kingsway **To**: Station Road/Newport Road	2.8	2.9
From: Newport Road/Kingway **To**: Martin Drive/Rose Hill	0.4	0.9
From: Broad Eye **To**: Doxey Road/opposite Works	1.2	1.3
From: Broadeye **To**: Tenterbanks	0	0.8
From: Station Rd/Newport Rd **To**: Station Rd/Victoria Rd	1	1
From: Station Road/Victoria Road **To**: Victoria Road/Tenterbanks	0.4	0.7
From: Tenterbanks/Victoria Road **To**: Broadeye	0	1.4
From: Broadeye/Chell Road **To**: Chell Road/Gaol Square	2.4	1.9
From: Gaol Square/Foregate Street **To**: Greyfriars Place/Foregate Street	1.6	1.8
From: Greyfriars Place/Foregate Street **To**: Grey Friars/Eccleshall Road/Stone Road	2.4	6.3
From: Gaol Square/Gaol Rd **To**: Browning St/Foregate St	2	1.5
Gaol Square Gyratory	3.8	2.9
From: Newport Rd/Station Rd **To**: Newport Rd/Lichfield Rd	5.2	1.4

4. Summary of High Level Transport Evidence to Support Stafford Growth Agenda

4.1 Introduction

Since 2007 the County and Borough Councils have actively engaged in planning for growth in Stafford town. Atkins consultants have produced a SATURN transport model and undertaken a Transport Study to help understand the impact of this growth. During 2008 and 2009 the model was used, together with Accession analysis, to assess the global traffic impact of housing growth of 7,000 and 10,000 dwellings, the relative merits of concentrating development in different locations, and employment growth of around 17,000 to 20,000 new jobs.

This model has been applied during the preparation of the Stafford Western Access Improvements Major Scheme Business Case and a bid for Community Infrastructure Funds for a package of sustainable transport measures for the town. It has also been used to inform the development of the County Council's Stafford Borough Integrated Transport Strategy for 2011 to 2026.

4.2 Assessment of Housing and Employment Growth Options

The key conclusion to emerge from this work is that at peak times all growth options significantly impact on the highway network and all options will require new transport infrastructure to accommodate this level of development in Stafford.

When comparing the options in overall transport terms, without considering the deliverability of new transport infrastructure, the most efficient way to provide 7,000 new dwellings and a growth in jobs of 17,274 in Stafford is to focus the majority of greenfield development in the north and the west. The most efficient way of increasing households by 10,000 and a growth in jobs of 20,237 in Stafford (again without road infrastructure improvements) is by focussing development in the west, north and south. To arrive at these conclusions, the options for housing growth were ranked against the strategic key performance indicators in Table 3 related to sustainability and highway capacity.

Table 3: Key Performance Criteria

Objective	Local Sub Objective
Impact on all users	Vehicle Hours
	Vehicle Kilometres
	Average Speed
	Average vehicle distance per trip
	Demand
Impact on strategic routes	Change in Flow on the M6
New Development Trips	Development Trip Vehicle Hours
	Development Trip Vehicle Kilometres
	Development Trip Average Speeds
	Development Trip average trip length
	Development Demand
Network Impacts	Junctions
	Links
Environmental Issues	Impact on CO2 emissions
	Impact on NOX emissions
Access to Existing Public Transport	Total Number of existing services passing the developments
	Direct access to Rail
Access to non motorised modes	Access to national cycle network

The overall number of vehicle hours is a measure of how long it takes users to complete their trips; the overall average speed gives an indication of how well the network keeps traffic moving; and the trip length indicator will change in response to the location of new developments and congestion on the network which can also result in suppressed trip making. With regard to the latter, increased levels of housing and employment opportunities in Stafford could result in reduced journey distances as there would be less need for long-distance commuting and increased levels of congestion can have a suppressing effect on trip making. Table 4 compares low (1a to 1c) and higher growth options (2 to 4) that have been assessed as part of this evidence base and picks out the salient points from the analysis.

Table 4: Traffic impact of land use options (with no new road infrastructure)

Option	Total jobs / dwellings	Location	Traffic Impact
1a	7,000 dwellings 17,274 net total jobs	North and west Development opportunities in the west tend to be closer to the town centre, encouraging travel by a range of modes.	Lowest vehicle hours, vehicle kilometres and shortest average trip length compared to the other options 1b and 1c. There are localised impacts that affect certain sensitive links and junctions, but its overall impact is less compared to options 1b and 1c. Performs the best in terms of the proportion of development sites that can access the town centre in 15 minutes by cycling.

1b	7,000 dwellings 17,274 net total jobs	North and east	This option only performs best in terms of average speed of trips generated from new developments.
1c	7,000 dwellings 17,274 net total jobs	South and east	This option provides the best results in terms of the lowest number of links and junctions that have a volume to capacity ratio of over 85%. However development locations in the south and east of Stafford currently have limited public transport access.
2	10,000 dwellings 20,237 net total jobs	West, north and south	This option is generally the most efficient way of increasing houses and jobs in Stafford to this higher total, although its overall performance is only marginally better than options 3 and 4. However, the localised impact is greater because traffic is generated from fewer, but larger sites. It is also the least sustainable in terms of the distance of development sites to key services in the town centre.
3	10,000 dwellings 20,237 net total jobs	West, north and east	This option performs the weakest overall, although there is very little difference between the performance of options 3 and 4.
4	10,000 dwellings 20,237 net total jobs	West, south and east	This option is the weakest in terms of creating the highest overall vehicle kilometres. However it does not have the localised impact of large development sites in the north.

Even though the evidence concludes that the preferred focus for accommodating 7,000 dwellings is in the west and north (Option 1a) there would still be increased congestion on the network without the appropriate infrastructure in place. The main impacts of Option 1a are:

- Congestion is forecast to increase on the A518 Newport Road in the AM and PM peaks due to the proposed housing development at this location. Junctions along this route would become over capacity in both peaks
- The A34 Stone Road / A513 Beaconside junction is predicted to experience an increase in delays on the east and west approaches in both peaks and reduced capacity on the A34 southbound approach in the PM peak.
- A5013 Eccleshall Road into Stafford is forecast to operate over capacity in the AM peak
- Other junctions to the north and west of the town centre would become over capacity as the volume of traffic increases.

4.3 Sustainability of Development Sites in the West of Stafford

Existing journey times to Stafford town centre have been mapped for walking, cycling and bus using Accession software. The results are shown on Figures 3, 4 and 5.

Housing growth in the west of Stafford at Castlefields and Burleyfields would generally be within a 20 minute cycle time of the town centre. Walking times would vary between 15 minutes towards the eastern boundaries of the site up to over 30 minutes from the western half of the site. The existing Castlefields estate is currently only penetrated by an infrequent bus service. If new housing is designed in a way that maximises permeability, and a new bus service is provided, some future residents would be able to access the town within 15 minutes using bus services operating via Doxey Road and within 10 minutes via Newport Road. To make this development acceptable in transport terms it is therefore essential that the whole site is designed to be permeable for walking and cycling and is served by a new frequent service that provides no more than a 20 minute bus journey time between the new development and the town centre.

Figure 3:

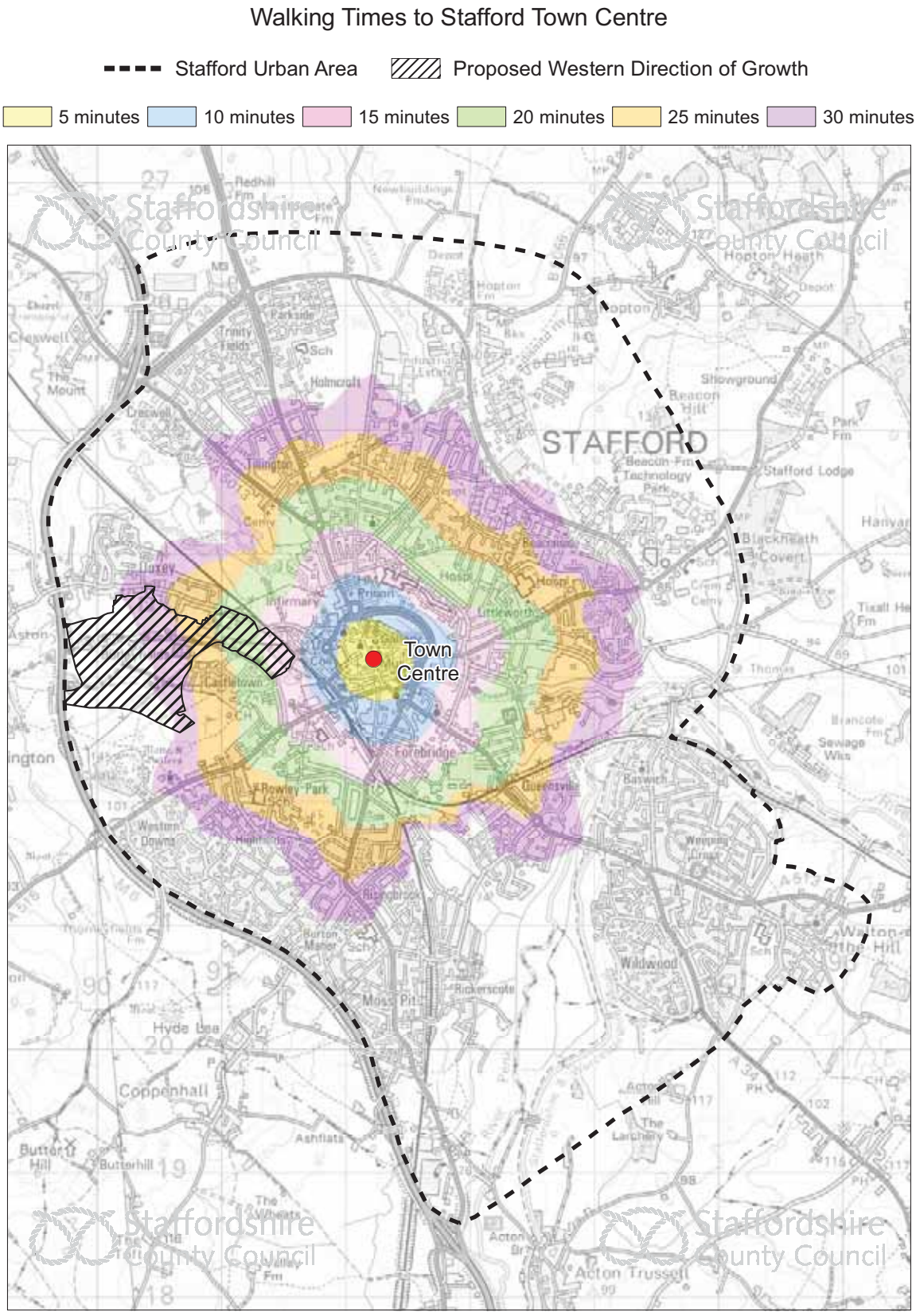


Figure 4:

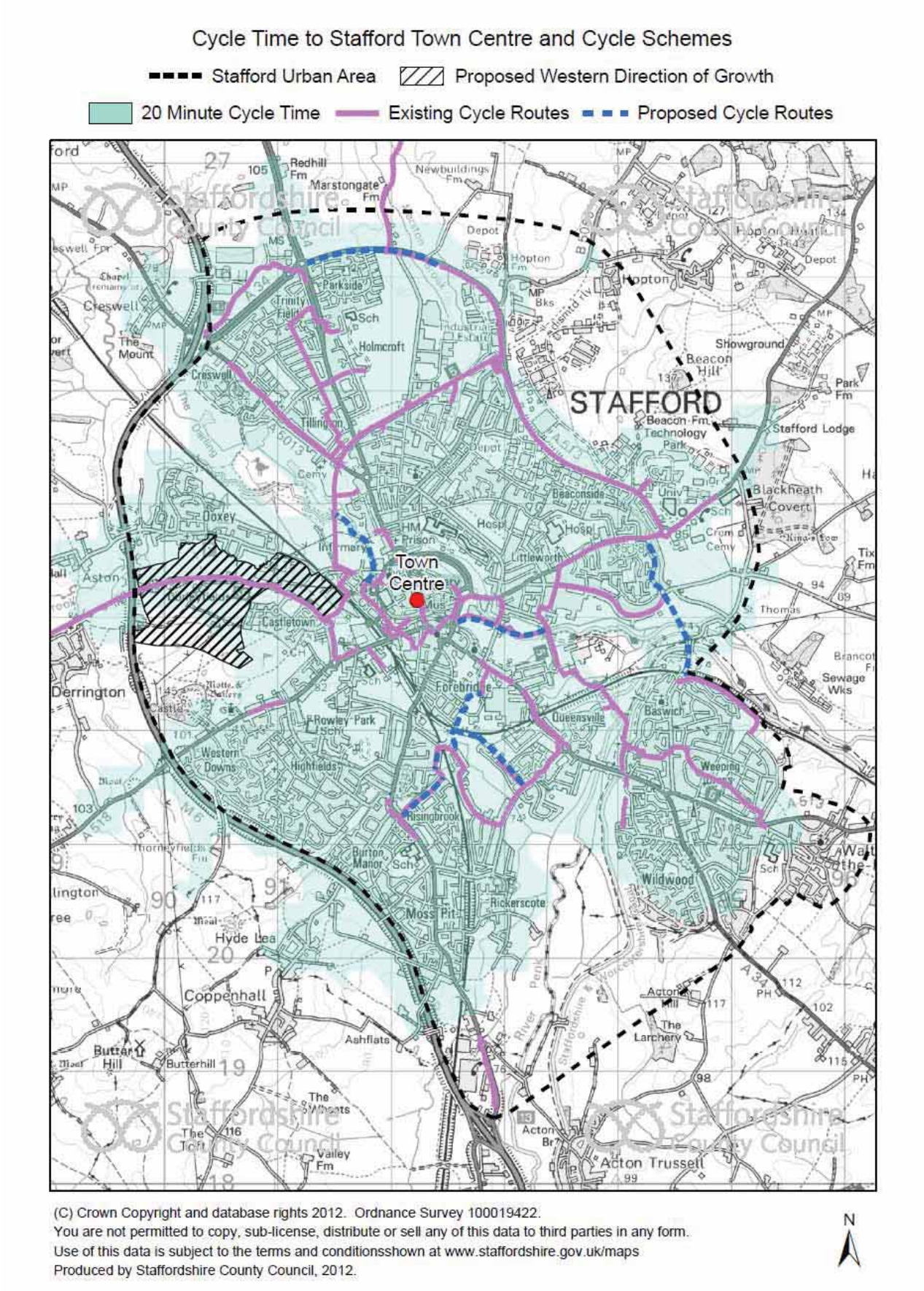


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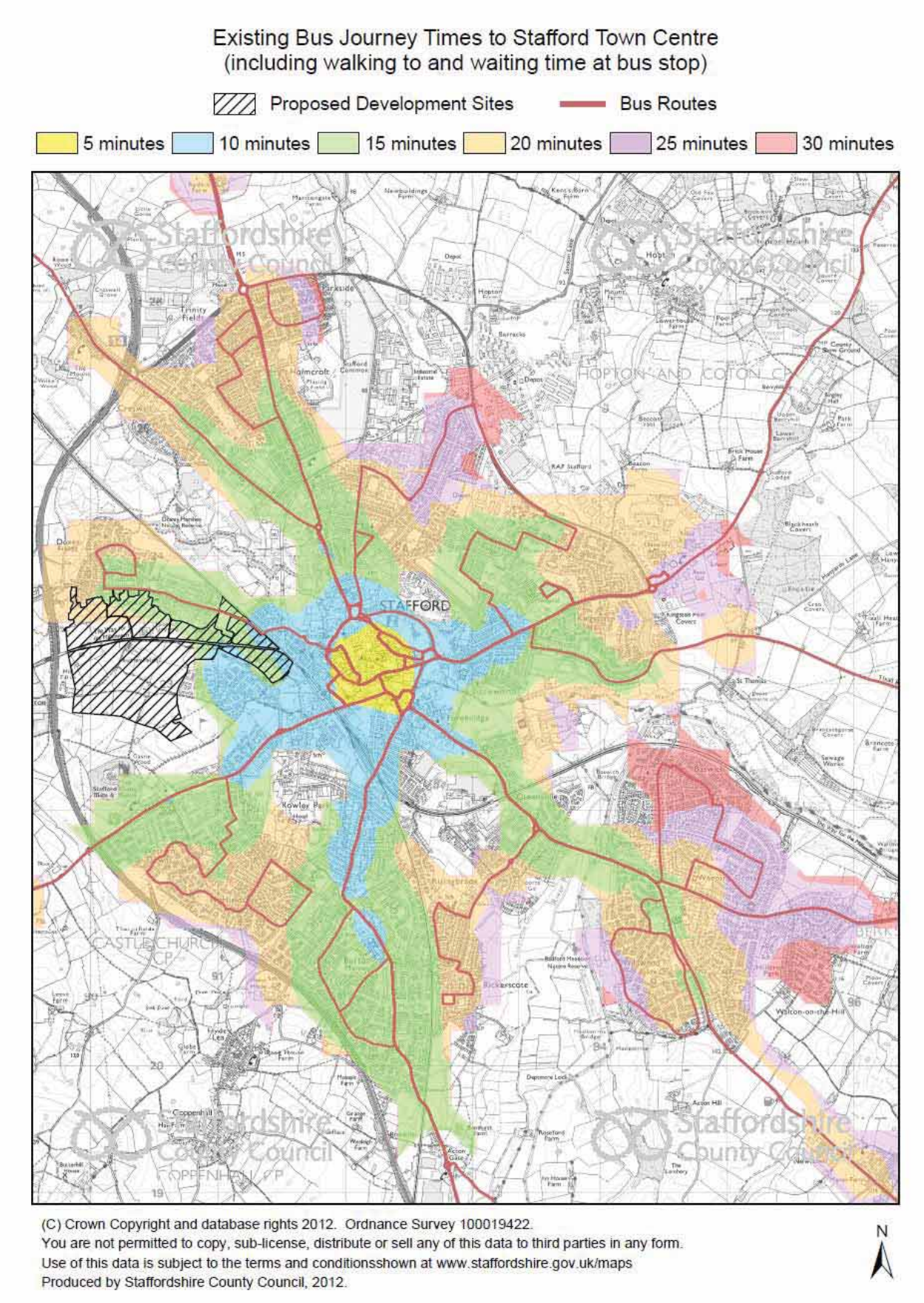
Figure 5:



5. Stafford Western Access Improvements Major Scheme Business Case

5.1 Introduction

This section explains the need to provide the Stafford Western Access Improvements to deliver the Borough Council's Local Plan up to 2031. It provides a short summary of the Major Scheme Business Case that was prepared in 2010. The business case included an Options Assessment Report that identified the preferred alignment for the new highway component and a detailed webTAG compliant transport appraisal of the preferred option. As part of the Options Assessment Report a Sustainable Transport Only option was assessed as well as the option of only providing Sections B and C (see Figure 7) of the Western Access Route from Castlefields to Doxey Road (Section C) and along Doxey Road to Timberfields Road (Section B). The full Major Scheme Business Case can be found on the Staffordshire County Council website.

The Stafford Western Access Improvements consists of a Western Access Route and complementary sustainable transport measures which are an intrinsic part of the sustainable integrated transport strategy for Stafford for the period to 2031. The full Western Access Route will enable the removal of through traffic from the town centre, creating improved conditions for bus services, pedestrians and cyclists and opening up further opportunities to provide complementary sustainable transport measures within and to the town centre. It will also help to accommodate future development traffic in Stafford and, in particular, it will improve the access arrangements to potential development sites in the west. The sustainable transport measures expected to be funded by a combination of public funds and developer contributions include:

- Enhanced bus services
- Enhanced bus interchange and pedestrian environment on Chell Road
- Real Time Bus Passenger Information
- Extension of the Urban Traffic Control network
- Bus priority at signal controlled junctions
- High quality, safe and convenient pedestrian and cycle routes
- Traffic management and safety measures on adjacent local roads

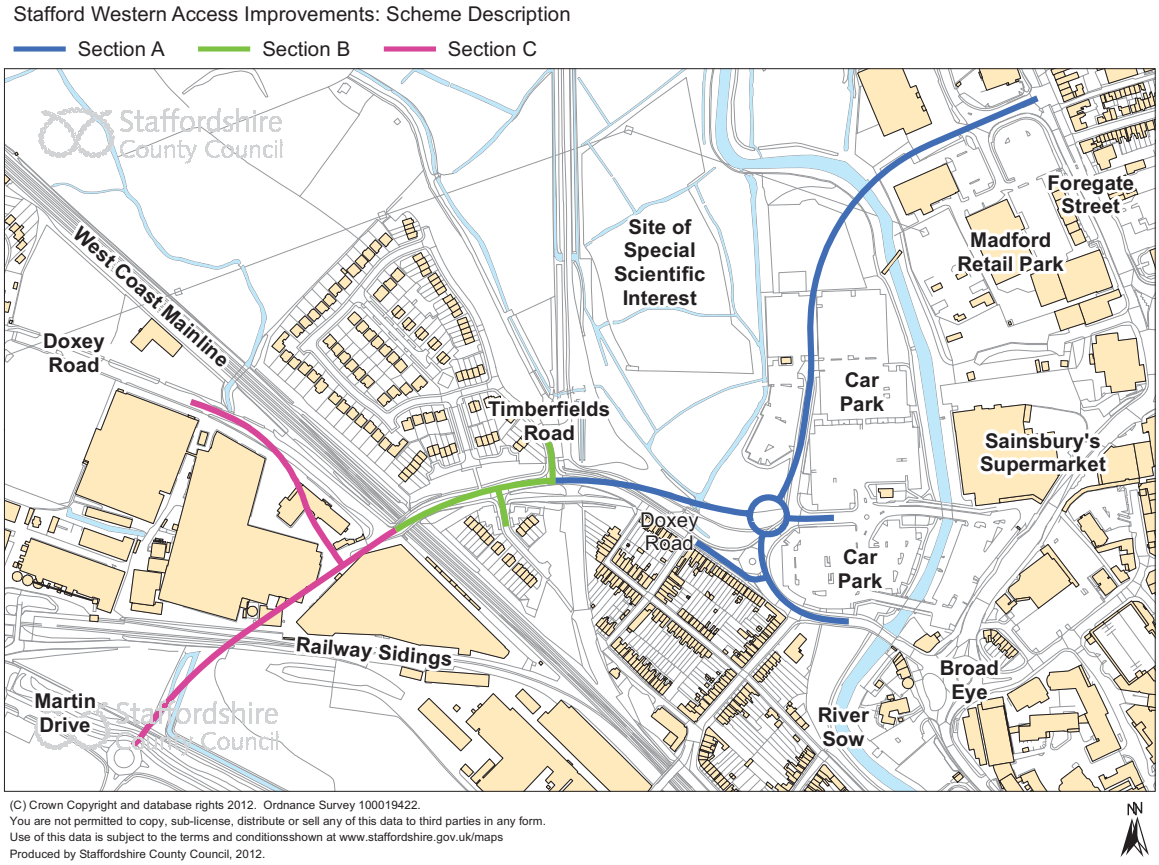
5.2 Stafford Western Access Improvements – Preferred Scheme

A number of route options for the Western Access Route were assessed and the preferred alignment, which forms the key element of the improvement package, is shown on Figure 6. The preferred road scheme has been separated into the following three sections:

Section A: A34 Foregate Street to Timberfields Road/Doxey Road Junction (approximately 700 metres)
Section B: Along Doxey Road from Timberfields Road including Doxey Road Railway Bridge (approximately 160m)
Section C: Doxey Road (west of the Railway Bridge) to Martin Drive, Castlefields (approximately 320 metres)

The preferred scheme has been designed as a 7.3 metre wide, two lane, single carriageway road, approximately 1.2 kilometres in length between the junction of Martin Drive/Rose Hill and the A34 Foregate Street. It includes 3 metre wide footway/cycleways on both sides of the road for the full length. The road will be street lit to current design standards, minimising light pollution and will be subject to a 30 mph speed limit. Preliminary junction designs have been completed based on predicted traffic flows from the SATURN model, and are provided in the Major Scheme Business Case.

Figure 6: Stafford Western Access Route



The objectives and need for the Stafford Western Access Improvements, including the Western Access Route and sustainable transport measures, is summarised in Table 5

Table 5: Objectives of Scheme

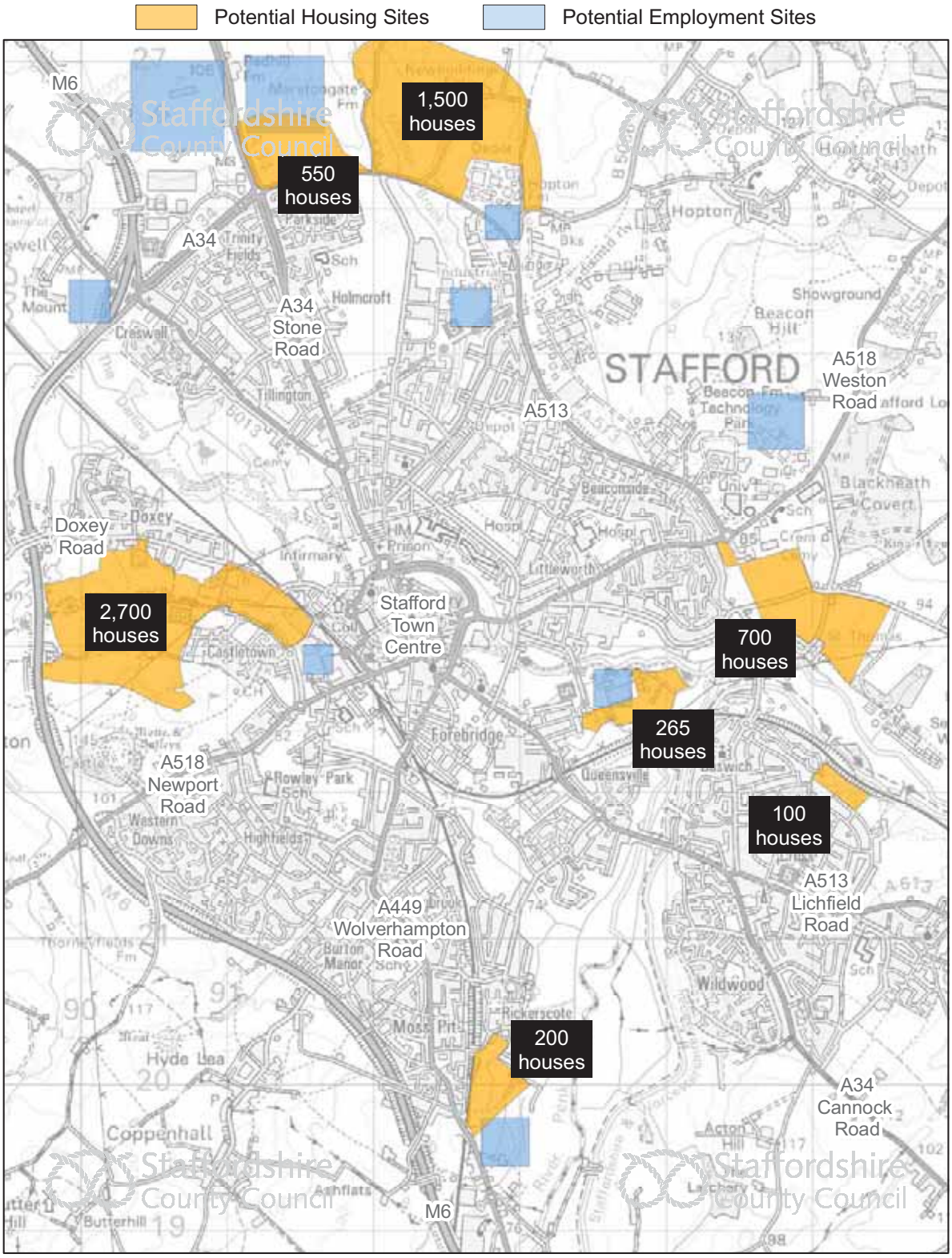
Scheme Objective	Impact of Stafford Western Access Improvements
To provide high quality transport infrastructure required to deliver development in Stafford	The scheme will help the town to serve new homes and jobs planned for Stafford including a strategic housing allocation.
To reduce congestion on routes into and around the town centre which act as a constraint on regeneration proposals	By removing traffic in the town centre the scheme will make it easier for existing and new residents of Stafford to benefit from a thriving and regenerated town.
To facilitate improved access by sustainable modes between	The scheme facilitates the development of a sustainable greenfield site in Stafford which is

housing growth areas and the town centre	within walking and cycling distance of the railway station and the town centre. Walking, cycling and public transport facilities will be significantly enhanced between development sites in the west and the town centre as a result of the scheme.
To facilitate improved access to public transport services	The scheme will provide the opportunity to increase the frequency of existing bus services and allow new services to access potential development sites. Increased road space in the town centre will allow bus facilities to be extended and safer access to bus stops to be provided for pedestrians. The scheme will reduce congestion near to the railway station and will also facilitate significant levels of housing that will have convenient access to the railway station.
To improve safety and security for all road users	This is not a key priority for the scheme as the current accident rate within the local study area is equivalent to the expected annual accident rate. However the scheme will be designed to high safety and security standards and the COBA analysis estimates £3.64m of accident savings.

The Major Scheme Business Case was based upon the land use option shown in Figure 7 which is similar to the low growth option assessed in Chapter 4.

Figure 7:

Stafford Western Access Improvements : Land Use Scenario Assumptions
Stafford Greenfield Development Proposals 2006 - 2026



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The results of the Major Scheme Business Case appraisal are summarised in Table 6.

Table 6: Stafford Western Access Route Assessment Summary

NATA Objective	**Overall Assessment of the Western Access Route** *(Note: the sustainable transport element of the scheme is not assessed)*
Economic Impact	• The scheme will provide wider economic benefits • The scheme represents good value for money with a Benefit to Cost Ratio of 2.22 (BCR of 2.74 with inclusion of inter-peak benefits) • There will be reduced congestion and improved journey times in the town centre
Environmental Impact	• National air quality strategy objectives will not be exceeded • Carbon emissions will reduce, providing £1.57m benefits • Net population annoyed by noise is estimated to be 22 persons • There will be landscape benefits and a neutral impact on the Site of Special Scientific Interest • The potential impact on archaeological remains is low • Evidence suggests the impact on water can be mitigated. Hydrological Assessments will confirm this • There will be large journey ambience benefits
Safety Impact	• There will be reduction in accidents, generating benefits of £3.64m
Accessibility Impact	• Severance for pedestrians will be significantly reduced • The Western Access Route does not improve bus services although complementary public transport measures will be provided in the town as part of the overall scheme
Integration Impact	• Local, regional and national policies will benefit • No wider policies will be hindered

The overall impact of the scheme is demonstrated through the analysis of monetised costs and benefits. The majority of benefits identified were in the form of travel time savings (£74m) together with reduced vehicle operating costs (£8m), accidents and carbon emissions. The scheme will provide a shorter route for many trips and will reduce congestion and improve journey times around the town centre resulting in time savings for traffic not directly using the proposed new road.

Tables 7 and 8 provide a comparison of 2007 flows and forecast flows for 2016 and 2031 with and without the Western Access Route, in both the AM and PM peak hours. The location of the key links observed is shown in Figure 8. It can be observed 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 scenarios (without the new road). This means that without action, the town centre will become more congested. For example, traffic flow on Chell Road increases 39% and 42% in the AM and PM peak respectively between 2007 and 2031.

The introduction of the Western Access Route is predicted to reduce the impact of this traffic growth and the overall performance of the network is expected to improve with queued times reducing by 40% and 39% in the 2031 AM and PM peaks respectively. On some key roads, the proposed scheme will result in lower traffic levels in the 2031 do-something scenario than in 2007. Traffic flows on A518 Chell Road, for example, reduce by 29% and 5% in the AM and PM peaks respectively

compared to 2007. The routes that show an increase in traffic flow in the do-something (with the road) are largely radial routes that either draw traffic to the Western Access Route or make use of the less congested town centre, for example A518 Castle Bank, West Way, Eccleshall Road and Stone Road.

Figure 8: Location of Key Links

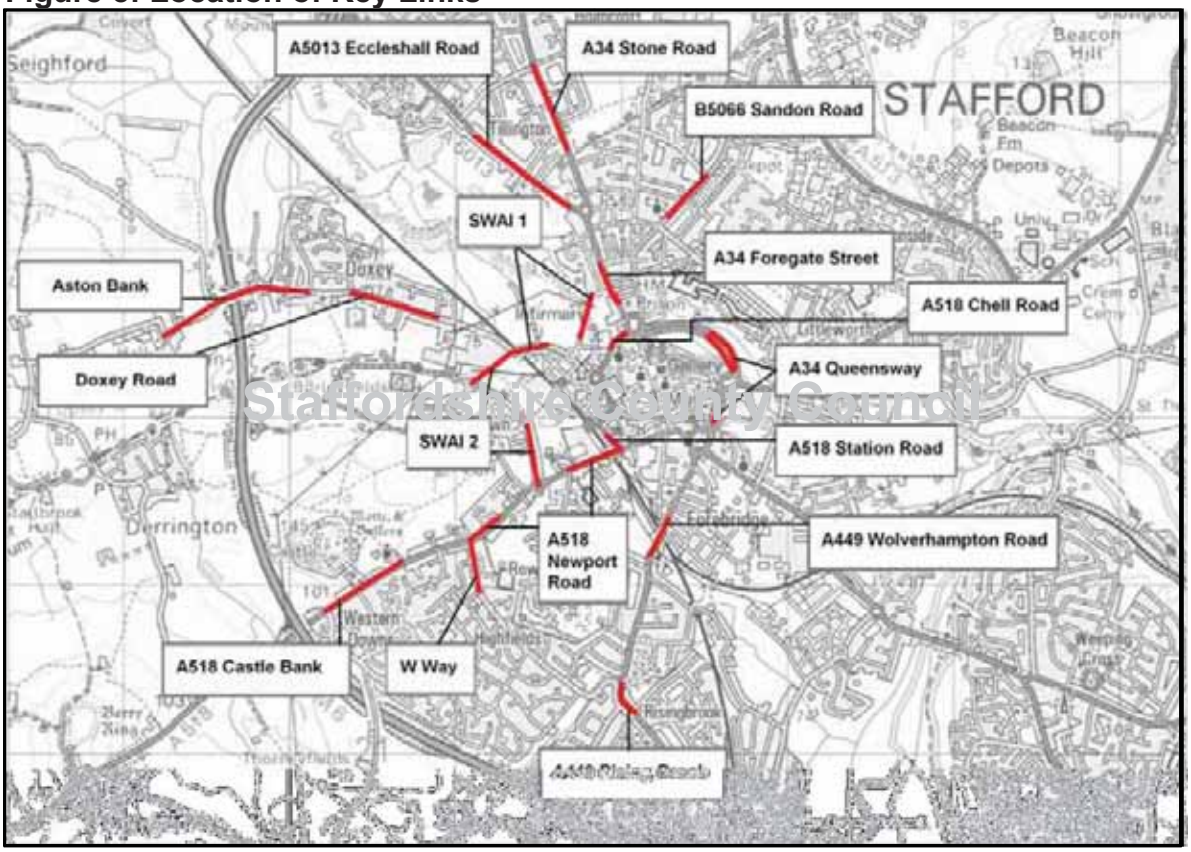

Table 7: Two-way flow (vehicle/hr) on key links – AM peak

▪ ink Road	2007	2016		2031	
		Do-Min	Do-Som	Do-Min	Do-Som
Aston Bank	369	440	390	304	299
Doxey Road	786	807	761	1186	564
A518 Castle Bank	942	889	955	959	1030
W Way	670	715	893	753	998
A518 Newport Road Eastern	1420	1439	1321	1857	1659
A518 Newport Road Western	1284	1244	1543	1220	1740
SWAI 1 Northern	N/A	N/A	1443	N/A	1975
SWAI 1 Southern	1008	1084	1348	1406	2137
SWAI 2 Northern	N/A	N/A	479	735	1329
SWAI 2 Southern	296	258	629	1130	1435
A5013 Eccleshall Road	1195	1248	1281	1290	1400
A449 Wolverhampton Road	1409	1448	1404	1495	1402
A518 Chell Road	1778	2059	928	2470	1260
A34 Stone Road	1637	1725	1731	1929	1975
B5066 Sandon Road	954	931	925	1180	1154
A34 Queensway	N/A	4535	4229	4846	4467
A34 Foregate Street	4980	5057	4035	5640	4603
A518 Station Road	1358	1539	1433	1399	1181
A449 Rising Brook	1922	1993	2124	2032	2220

Table 8: Two-way flow (vehicle/hr) on key links – PM peak

Link Road	2007	2016		2031	
		Do-Min	Do-Som	Do-Min	Do-Som
Aston Bank	482	614	480	446	519
Doxey Road	763	876	746	1413	732
A518 Castle Bank	1046	1026	1190	937	1241
W Way	644	611	698	830	929
A518 Newport Road Eastern	1644	1580	1457	1919	1741
A518 Newport Road Western	1367	1291	1574	1381	1815
SWAI 1 Northern	N/A	N/A	1578	N/A	2126
SWAI 1 Southern	972	1158	1305	1681	2403
SWAI 2 Northern	N/A	N/A	437	736	1119
SWAI 2 Southern	375	317	620	1201	1246
A5013 Eccleshall Road	1209	1375	1387	1672	1708
A449 Wolverhampton Road	1594	1745	1714	1760	1659
A518 Chell Road	1875	2355	1221	2661	1777
A34 Stone Road	1622	1750	1816	1837	1887
B5066 Sandon Road	1267	1293	1218	1380	1408
A34 Queensway	N/A	5068	4604	5238	4757
A34 Foregate Street	5110	5254	4222	5860	4674
A518 Station Road	1585	1646	1715	1597	1718
A449 Rising Brook	2033	2143	2177	2240	2274

DM = No Stafford Western Access Route (SWAR), DS = With SWAR
Development included detailed in MSBC Forecasting Report – Table C.1

The proposed Western Access Route and the resultant re-assignment of traffic from adjacent roads will result in improved performance of a number of junctions, as indicated in Tables 9 and 10. The most significant improvements are noticed at Gaol Square Gyratory, Doxey Road/Pans Drive (Sainsbury's roundabout) and A518 Chell Road/Broad Eye.

While some of the junctions have increased stress levels, they tend to be the radial routes (Newport Road and the A449) 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%.

Table 9: Average Junction Stress (%) at Key Junctions – AM Peak

Link Road	2007	2016		2031	
		Do-Min	Do-Som	Do-Min	Do-Som
1 - Eccleshall Rd/A34 Stone Road	54	58	60	67	76
2 - A34 Foregate Street/SWAI	41	41	43	46	53
3 - Gaol Square Gyratory	51	56	42	65	50
4 - Doxey Road/SWAI	30	32	26	40	53
5 - Doxey Road/Pans Drive	38	39	22	46	30
6 - A518 Chell Rd/Broad Street	44	45	38	70	41
7 - A34 Queensway/A518 Lammscote Rd	48	45	44	48	48
8 - A34 Queensway/A34 Lichfield Rd/A518 Newport Rd	51	61	59	64	58
9 - A518 Newport Rd/A518 Station Rd	51	56	54	63	57
10 - A518 Newport Rd/Kingsway	33	31	38	44	52
11 - A518 Newport Rd/West Way	50	49	52	51	58
12 - A449 Rising Brook/West Way	64	66	69	66	70

Table 10: Average Junction Stress (%) at Key Junctions – PM Peak

Link Road	2007	2016		2031	
		Do-Min	Do-Som	Do-Min	Do-Som
1 - Eccleshall Rd/A34 Stone Road	52	56	61	71	78
2 - A34 Foregate Street/SWAI	45	45	46	50	53
3 - Gaol Square Gyratory	51	61	45	89	51
4 - Doxey Road/SWAI	29	34	26	48	49
5 - Doxey Road/Pans Drive	36	40	25	53	42
6 - A518 Chell Rd/Broad Street	46	55	45	62	58
7 - A34 Queensway/A518 Lammscote Rd	33	59	56	60	60
8 - A34 Queensway/A34 Lichfield Rd/A518 Newport Rd	72	82	75	85	75
9 - A518 Newport Rd/A518 Station Rd	73	74	72	83	80
10 - A518 Newport Rd/Kingsway	34	31	38	45	50
11 - A518 Newport Rd/West Way	40	38	50	41	58
12 - A449 Rising Brook/West Way	65	69	69	75	73

Figures 9 and 10 provide an indication of where congestion is expected in the AM and PM peak hours following the construction of the Western Access Route. Links are classified as; grey 'uncongested', blue 'approaching capacity' and red 'congested'.

Figure 9:

Stafford Western Access Improvements
Castlefields / Doxey Road / Foregate Street (Green Route F)
2031 AM Peak Hour

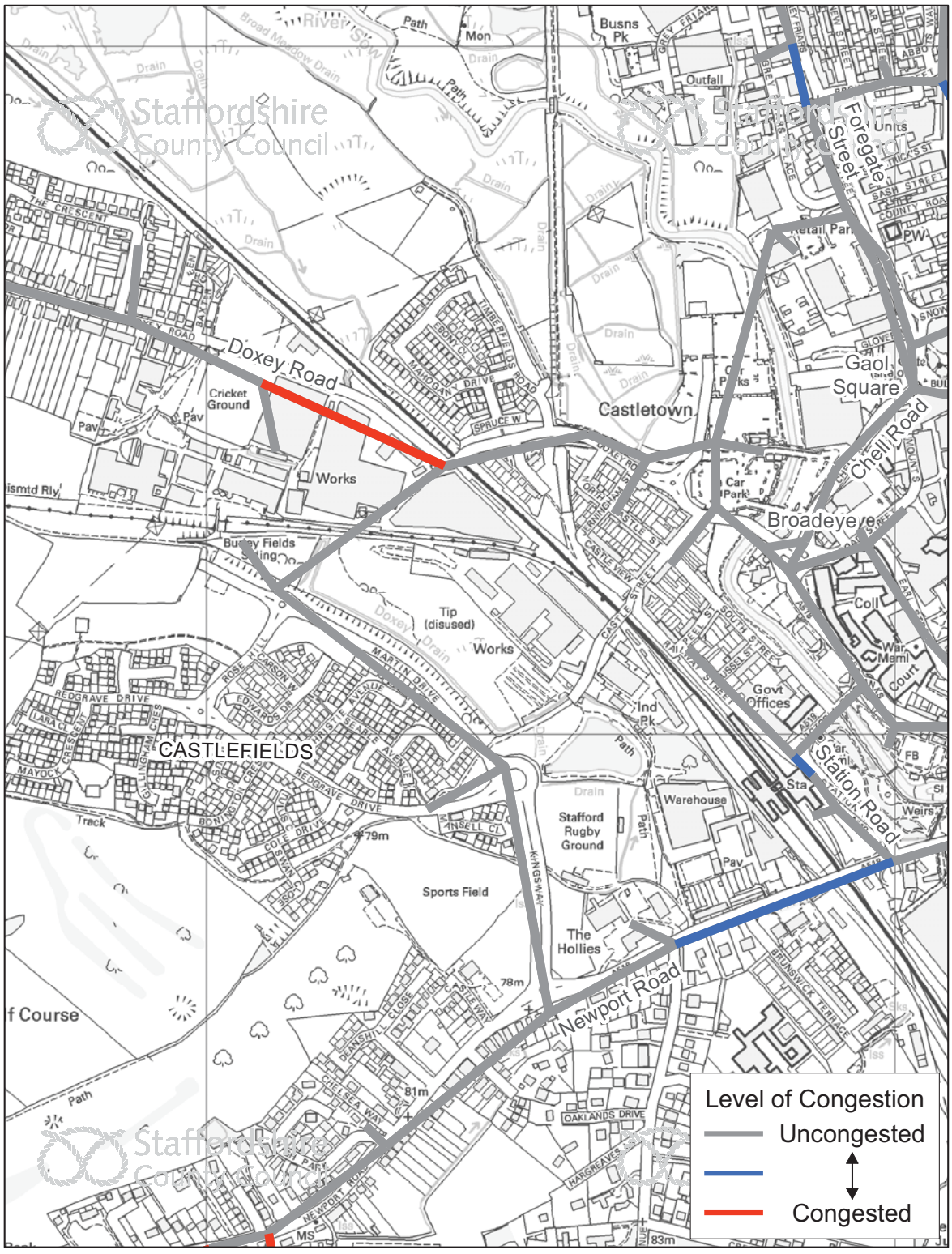

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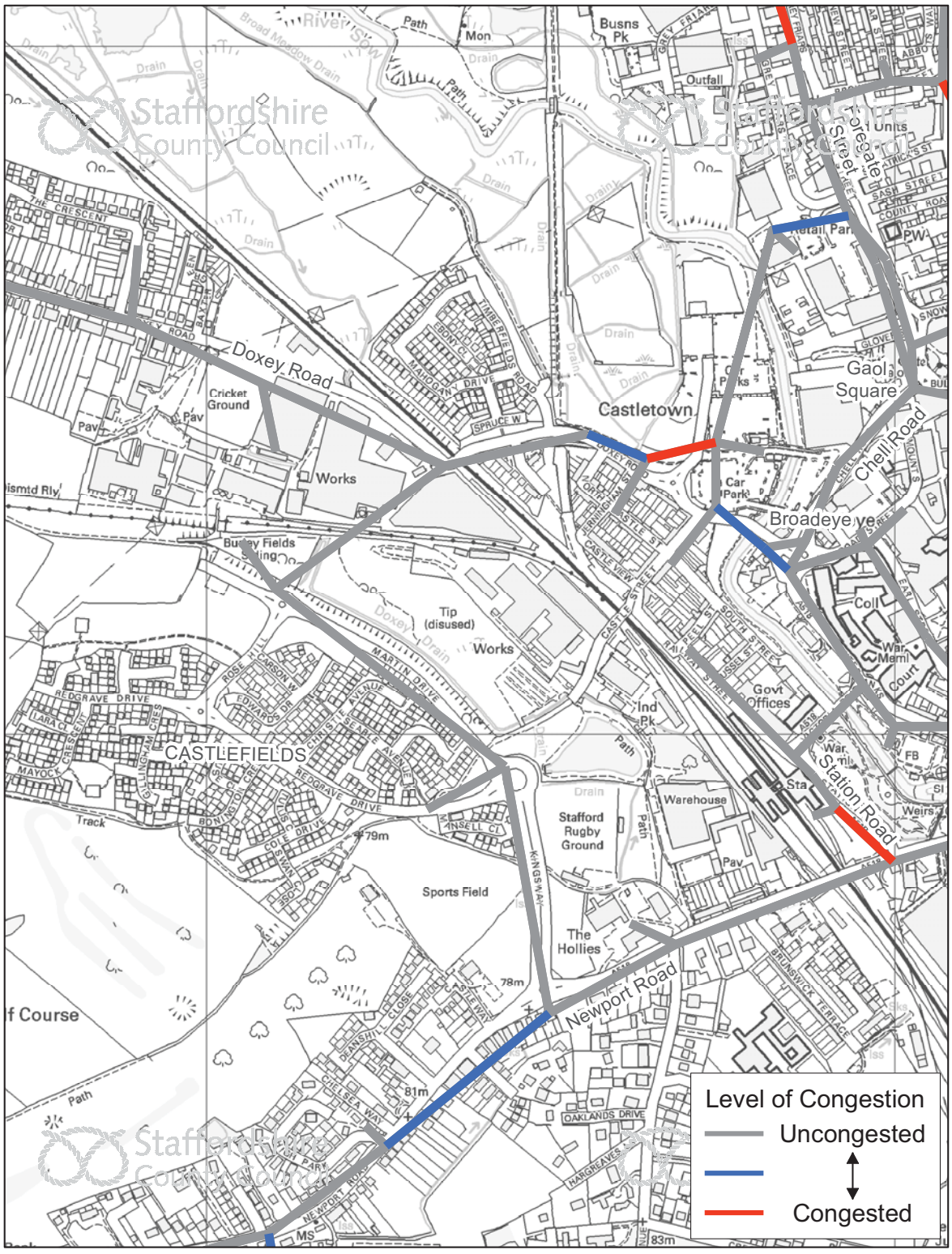
Figure 10:

Stafford Western Access Improvements
Castlefields / Doxey Road / Foregate Street (Green Route F)
2031 PM Peak Hour

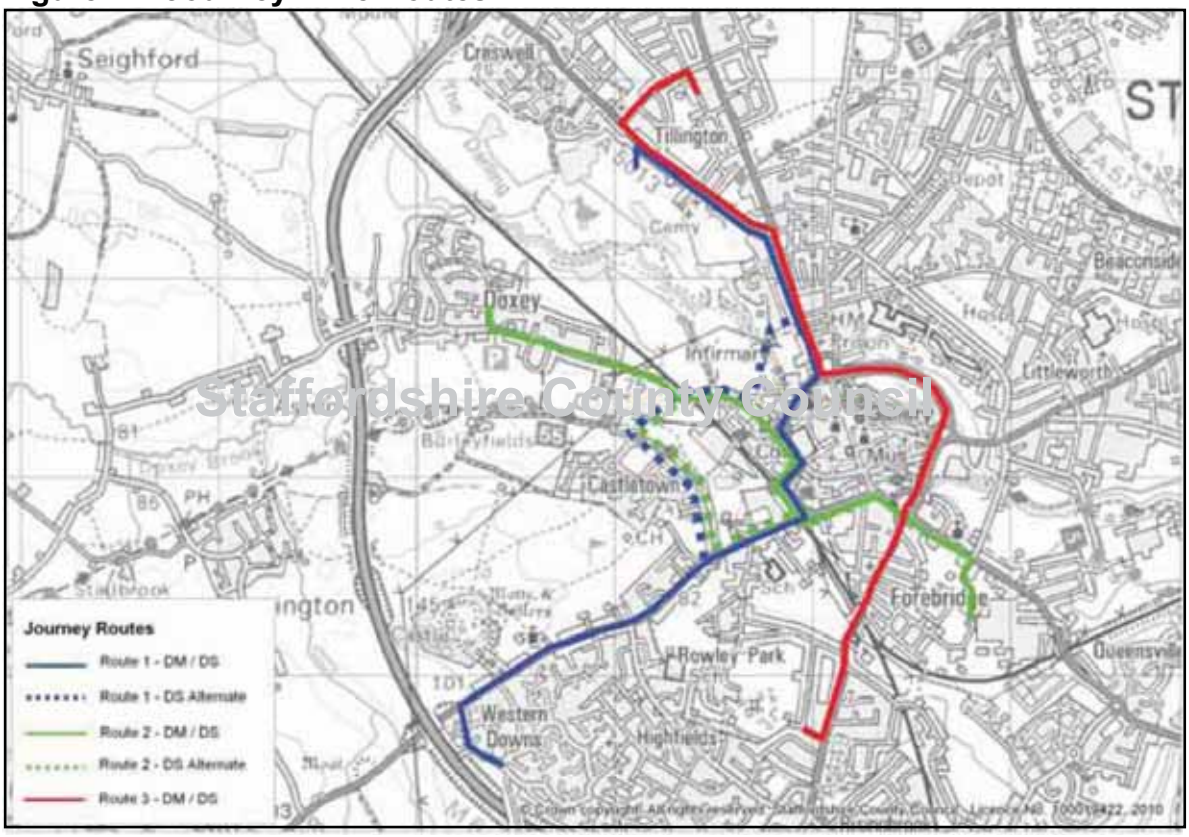


Journey Time Analysis

Comparisons of journey times have also been carried out to identify the travel time savings achieved by the Western Access Route. Journey times have been considered for the following three routes (shown on Figure 11) and the results are shown in Tables 11 and 12:

Route 1 – Western Downs residential area to Eccleshall Road
Route 2 – Doxey residential area to A34 Lichfield Road employment and retail
Route 3 – A449 to Tillington residential area.

Figure 11: Journey Time Routes



Tables 11 and 12 refer to do-minimum without the road (DM) and do-something with the road (DS). The do-something alternative routes (DS Alt) for 1 and 2 make use of the Western Access Route.

Table 11: Journey Time Savings in 2031 – AM Peak

Route	Journey Times (min:sec)				
	DM	DS	% Diff	DS Alt	% Diff
Route 1– Northbound	13:01	09:15	-29%	08:25	-35%
Route 1- Southbound	09:39	09:23	-3%	08:40	-10%
Route 2- Eastbound	12:35	09:48	-22%	09:10	-27%
Route 2– Westbound	10:55	10:20	-5%	09:33	-13%
Route 3– Northbound	09:05	09:31	5%	N/A	N/A
Route 3 – Southbound	09:18	09:12	-1%	N/A	N/A

Table 12: Journey Time Savings in 2031 – PM Peak

Route	Journey Times (min:sec)				
	DM	DS	% Diff	DS Alt	% Diff
Route 1– Northbound	10:02	09:11	-8%	08:34	-15%
Route 1- Southbound	13:51	10:11	-26%	09:04	-35%
Route 2- Eastbound	10:11	08:49	-13%	09:26	-7%
Route 2– Westbound	09:58	08:34	-14%	08:27	-15%
Route 3– Northbound	09:11	09:36	5%	N/A	N/A
Route 3 – Southbound	10:24	09:20	-10%	N/A	N/A

It can be observed that the proposed Western Access Route will significantly improve journey times on routes in both directions, with the exception of route 3 - northbound. The largest reduction in journey time is seen on Route 1 between the north and west of the town centre. Use of the proposed scheme reduces the journey time northbound by 35% during the AM peak and 35% southbound during the PM peak. There are also predicted to be significant journey time savings on Route 2 as a result of the scheme due to the reduction in congestion in the town centre. Use of the proposed scheme as an alternative route reduces the journey time eastbound by 27% during the AM peak and 15% westbound during the PM peak.

Accident Benefits of the Western Access Route Preferred Option

Section 3.6 concludes that there are currently accident concerns on the Newport Road (Station Road to Lichfield Road), along Chell Road and at Gaol Square. The spatial distribution of accident benefits as a result of the Western Access Road is shown in Figure 12. The majority of the benefits are predicted to occur on the alternative routes to the Western Access Route where traffic levels are expected to fall as drivers re-route to use the new road. This reduction largely occurs in the town centre and other key benefits are seen on Doxey Road to the west of the scheme as traffic is encouraged to use A518 Newport Road to enter the town centre instead. Dis-benefits occur on the new Western Access Route, together with Newport Road (west of Kingsway) and Foregate Street where traffic is predicted to increase on sections that provide access to the new route. Increased traffic levels can often result in increased accident rates.

Figure 12: Spatial Distribution of Accident Benefits (60 year appraisal period)

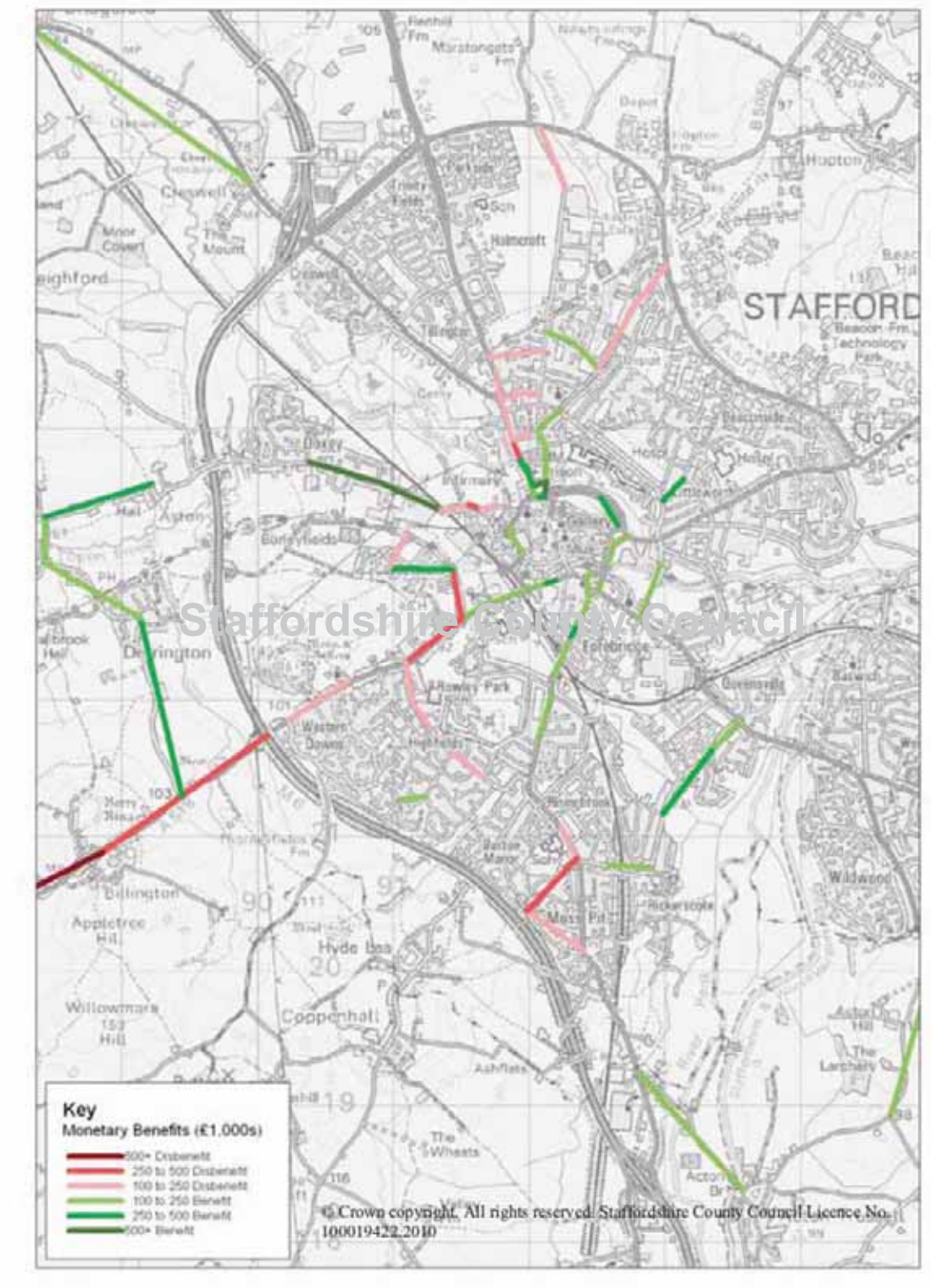
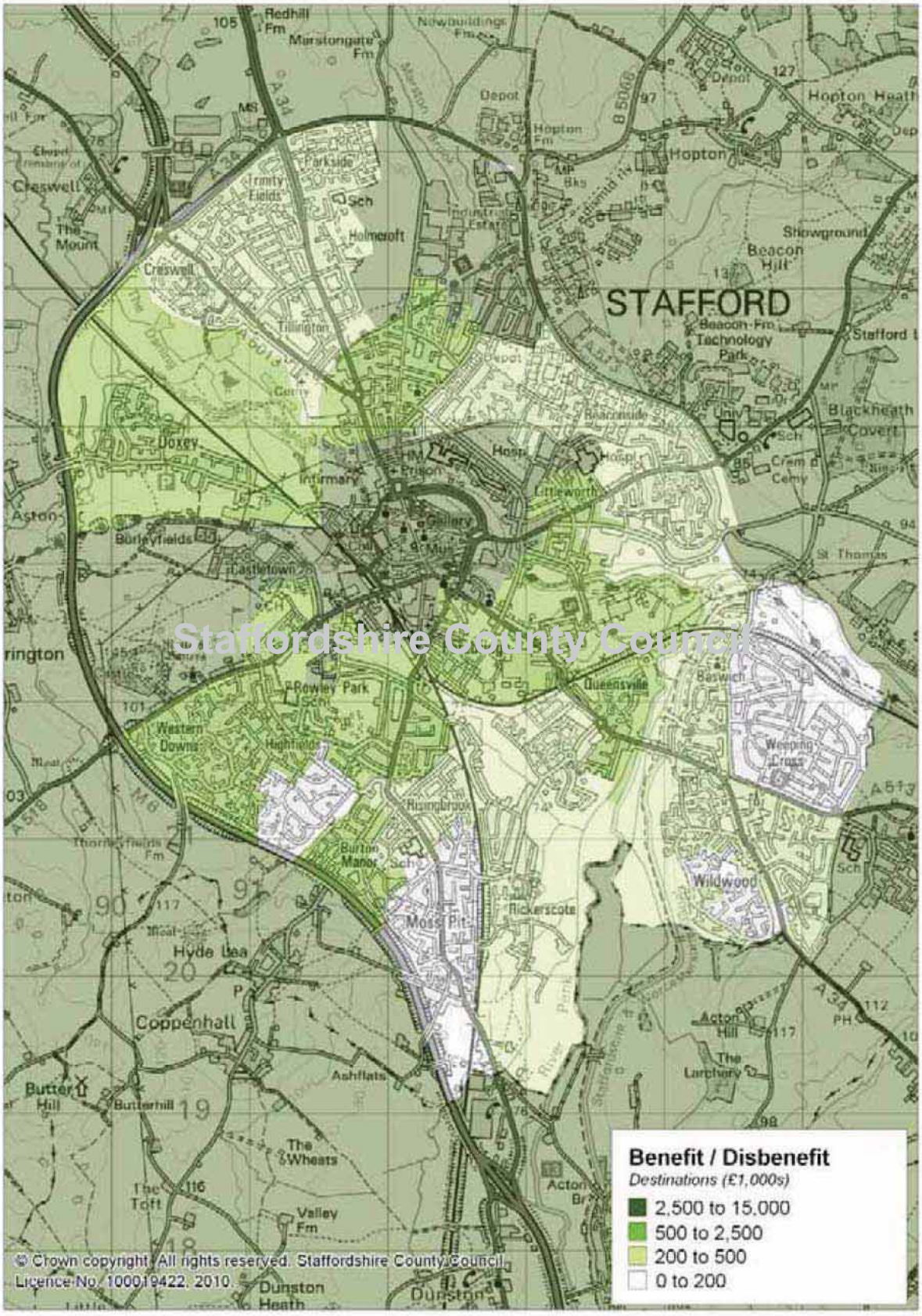


Figure 13 demonstrates that benefits created by the Western Access Route are evident for all sectors within Stafford urban area, with a particularly strong focus in the town centre and west. The north of Stafford also achieves significant benefits with only the southern sectors producing a lower level of benefits, which is to be expected. Further details on how this assessment was carried out can be found in the Major Scheme Business Case on the Staffordshire County Council website.

Figure 13: Monetary Benefits by Sector Destinations (60 year appraisal period)



5.3 Stafford Western Access Improvements - Castlefields to Doxey Road Access Route

The Options Assessment Report considered the construction of only Sections B and C from Castlefields to Doxey Road/Timberfields Road, excluding Section A which is the wider link from Doxey Road to Foregate Street. A summary of the benefits and disbenefits of this option are provided in Table 13. Figures 14 and 15 also give an impression of peak hour network efficiency under this option in 2031, showing two-way link flows expressed as a percentage of design capacity. The completion of just Sections B and C does not reduce congestion on Newport Road (east of Kingsway), Station Road, Tenterbanks, Doxey Road (south of Sainsbury's) and Chell Road. The Options Assessment Report can be found in Appendix 2.1 of the Major Scheme Business Case.

Table 13: Benefits and Disbenefits of Castlefields to Doxey Road Access Route

B: Castlefields to Doxey Road
Benefits
• Provides new access road to new development in Western Stafford, reducing the need to travel through Doxey • Does not take land from Site of Special Scientific Interest (SSSI) • Minimal landscape and biodiversity issues • Cheaper to construct than alternative options
Disbenefits
• Low value for money • Only provides a link between Martin Drive and Doxey Road • No congestion relief to 'old town centre route' (compared to Do Minimum) • Additional congestion at Newport Road / West Way junction • Route passes over infrequently used railway sidings owned by Network Rail • Area within highest risk Flood Zone 3 • Does not reduce pedestrian severance in the town

The Options Assessment Report published in 2010 indicates that this option would achieve a Benefit to Cost Ratio of 0.83 thus offers low value for money. Schemes with a BCR of less than 2 are unlikely to receive public funds. The link to Doxey Road offers minimal wider benefits and will function mainly as an access to development sites in the west.

Figure 14: 2031 AM Peak Hour - Castlefields to Doxey Road

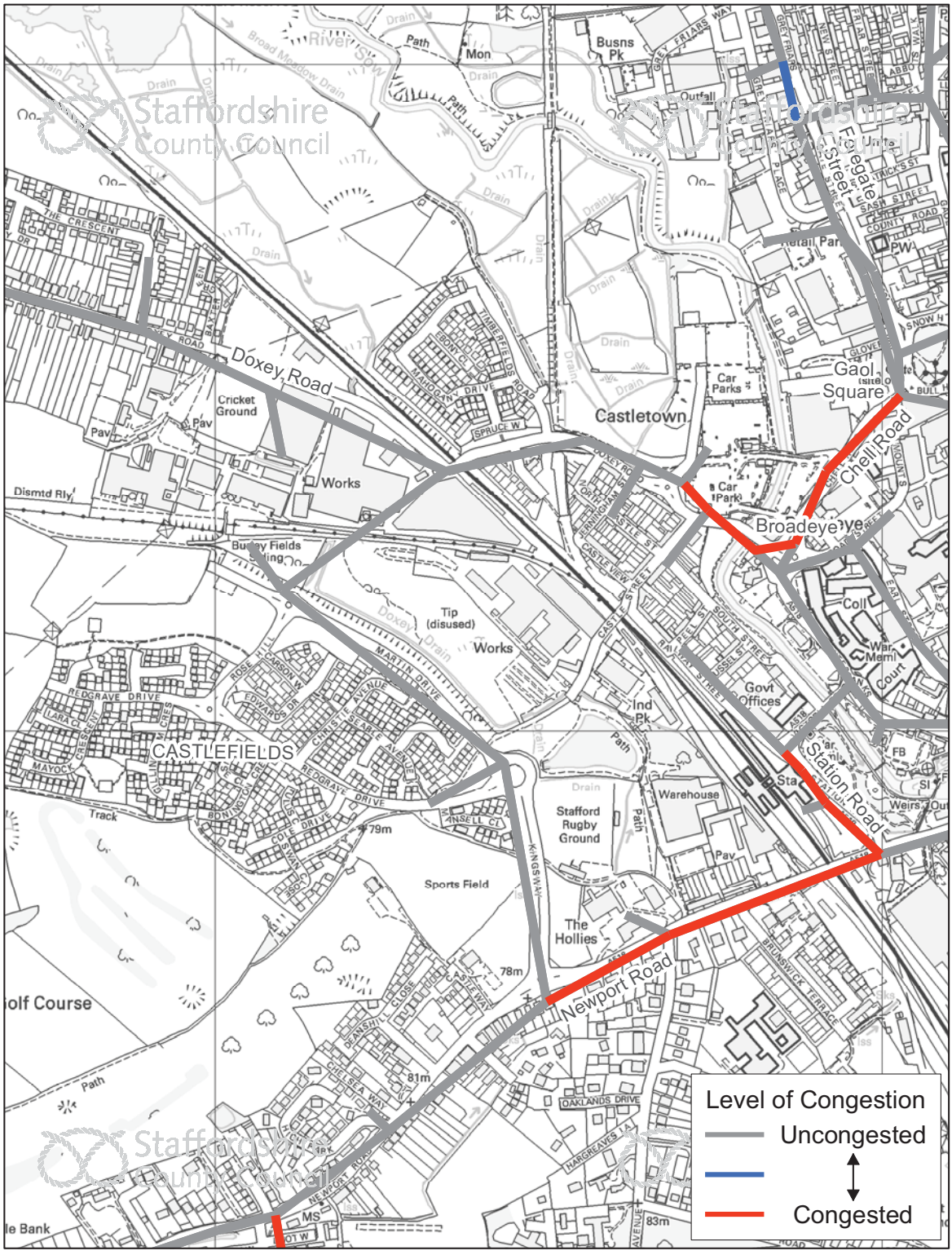


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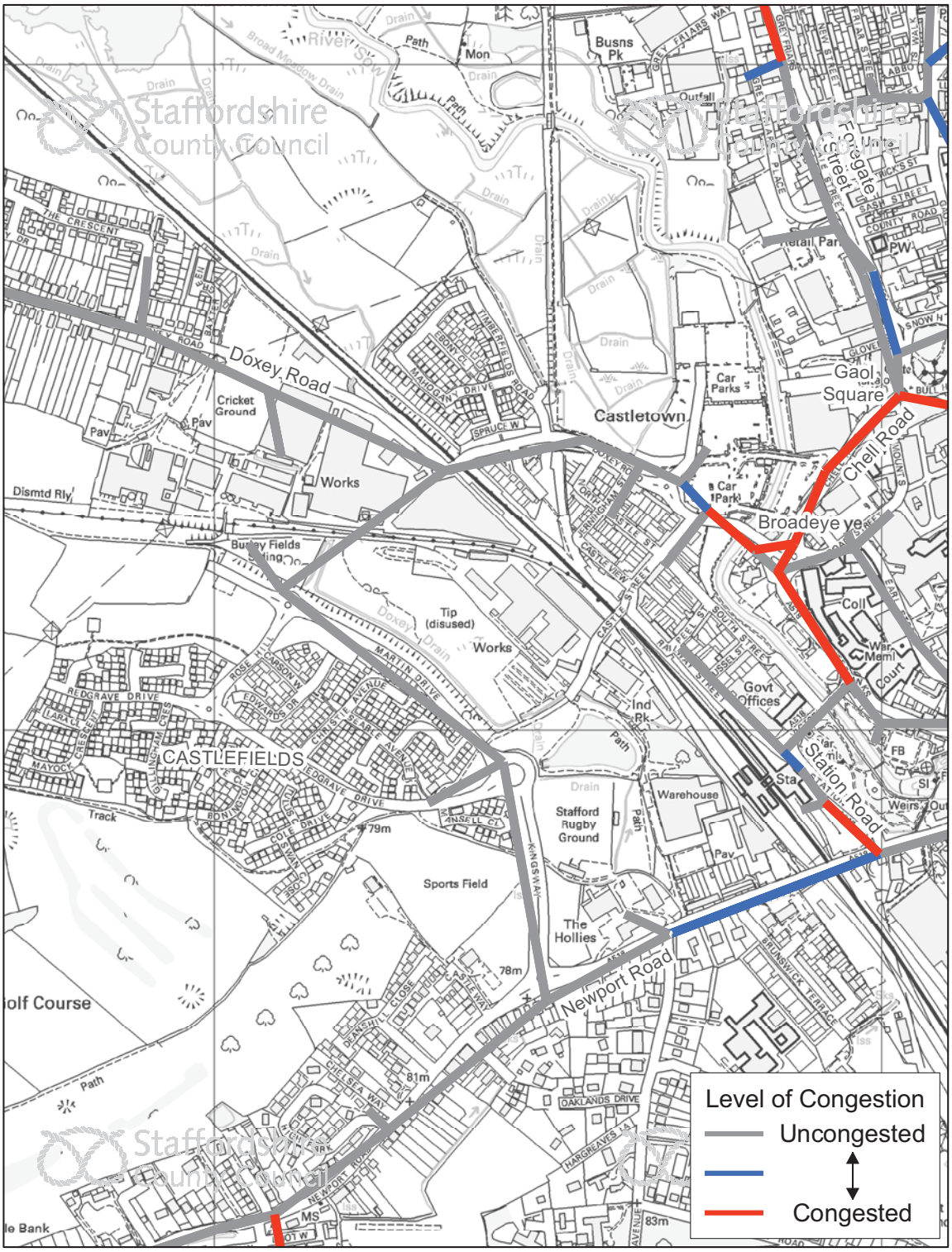
Figure 15: 2031 PM Peak Hour - Castlefields to Doxey Road



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5.4 Stafford Western Access Improvements - Sustainable Transport Option

In addition to the Western Access Route, the benefits of a sustainable transport package have been examined. Capacity for the private car is not increased with this option. Instead, the overall effect of delivering this option will be the creation of improved opportunities to use sustainable transport and a better managed and safer transport network. However, schemes that are essential to make sustainable travel more attractive, such as bus priority and pedestrianisation, can ultimately disbenefit car drivers by lengthening journey times. Full details of the Sustainable Transport Option appraisal can be found in Appendix 2.2 of the Major Scheme Business Case.

The economic analysis took into account the benefits from SATURN model outputs, a public transport spreadsheet model and benefits accruing to cycle and walk-based modes. Fixed land use appraisals were used for the assessments whereby all proposed development up to 2026 (see Figure 6) was included within the do-minimum scenario (assuming a situation without transport intervention) and do-something (with the investment). The key points of note from the economic assessment are as follows:

- Total present value of user benefits (PVB) is negative at £-6.03 million
- Highway (car, HGV) users contribute £-56.2 million of disbenefit
- Corresponding bus-based benefits amount to £50.2 million
- There are physical fitness benefits of £4.3 million
- Despite this, benefits to consumers using the bus outweigh the corresponding disbenefits generated by car-based consumers, but the relatively low proportion of business users on the bus mean that disbenefits generated by car users in business travel are substantially higher. This marked disparity in business user benefits is what generates the overall negative PVB.

The appraisal of the sustainable transport strategy shows that it cannot on its own satisfactorily deliver the Stafford growth agenda in transport terms. Additional highway capacity needs to be a key element of a sustainable transport solution. As well as helping to accommodate housing growth, a combination of new highway capacity and sustainable transport improvements will provide the opportunity to enhance bus services and facilities, walking, cycling and environmental enhancements within the town centre and improved access to the railway station.

6. Updated Assessment of Traffic Impact of Borough Council's Revised Land Use Allocation (2031)

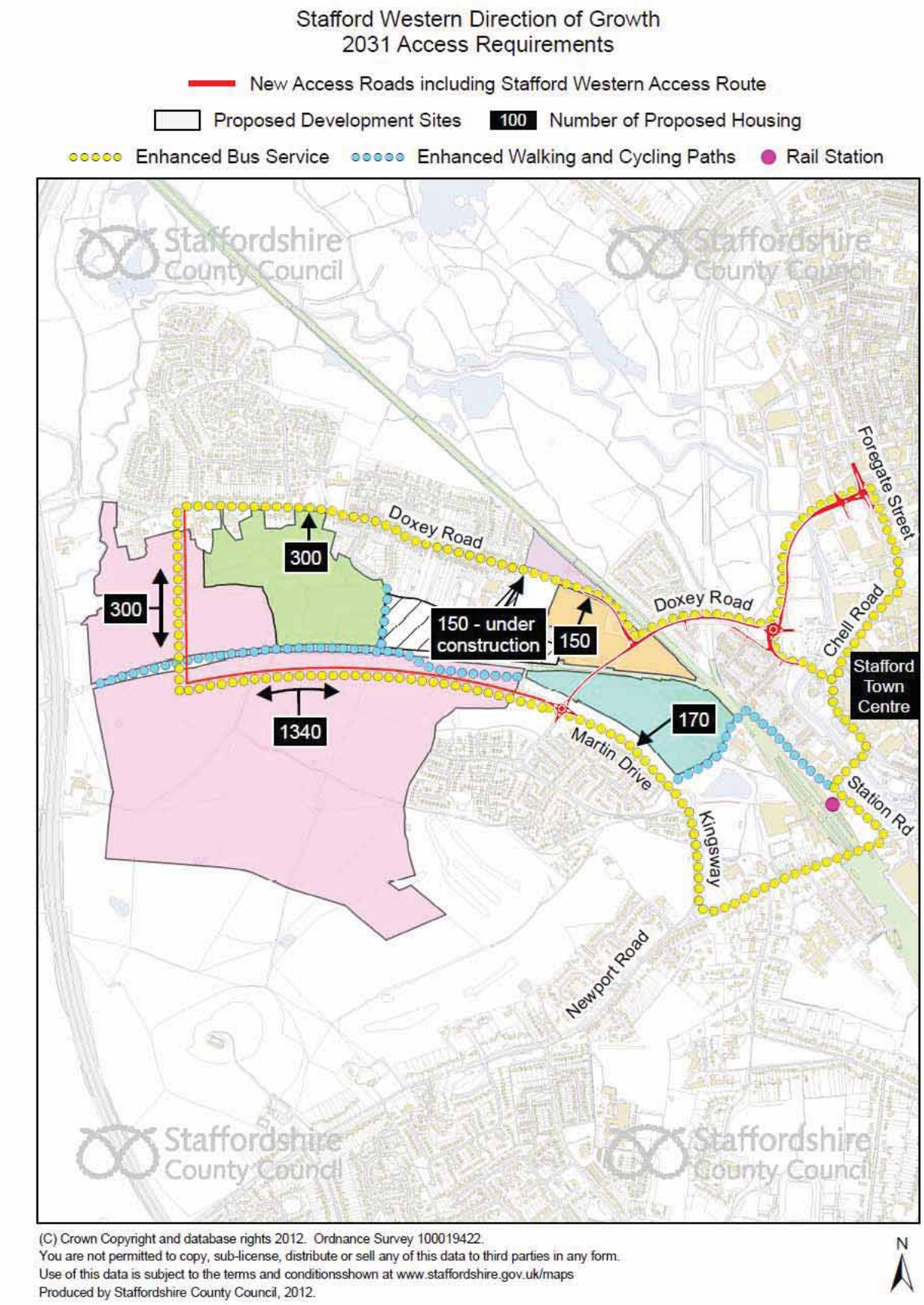
6.1 Introduction

An updated assessment using the revised 2031 land use allocations included in Stafford Borough Council's Plan for Stafford Borough 2011 (see Figure 1) has been completed to validate the conclusions of the 2010 business case. The assessment examines the traffic impact in the west of Stafford in the context of the revised distribution of development planned for the whole of Stafford as part of the growth agenda. For 2031, the following model scenarios have been created:

- 2031 Do Minimum (DM) AM / PM Peak with all development proposed for Stafford, including 2,260 dwellings and 7 hectares of employment in the west of Stafford and the Western Access Route (Section C only)
- 2031 Do Something (DS) AM / PM Peak with all development proposed for Stafford, including 2,260 dwellings and 7 hectares of employment in the west of Stafford and the full Western Access Route

Figure 16 shows the site access arrangements in 2031 for the Castlefields and Burleyfields sites as informed by the plan provided by the developer consortium included in Appendix 1. It includes 170 dwellings at Castletown accessing onto Martin Drive in line with the long term aim to direct development traffic onto the Stafford Western Access Route and promote Castle Street as a walking and cycling link.

Figure 16:


Stafford Western Direction of Growth
2031 Access Requirements
New Access Roads including Stafford Western Access Route
Proposed Development Sites
100 Number of Proposed Housing
Enhanced Bus Service
Enhanced Walking and Cycling Paths
Rail Station
Staffordshire County Council
Doxey Road
300
300
150 - under construction
150
Doxey Road
Foregate Street
Chell Road
Stafford Town Centre
1340
Martin Drive
170
Station Rd
Kingsway
Newport Road
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Produced by Staffordshire County Council, 2012.
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The area over which the assessment has been made is shown in Figure 2. It includes Newport Road (between Kingsway and Bridge Street) including the traffic signalised junctions at Newport Road / Station Road, Newport Road / Tesco, and Newport Road / Bridge Street; Station Road; Victoria Road; Tenterbanks including Broadeye roundabout; Chell Road; Foregate Street; and Doxey Road (between Broadeye and Universal). This is essentially the route that would be relieved by the introduction of the Western Access Route, and that which currently suffers from peak hour congestion and journey time unreliability.

Table 14 displays the SATURN model output statistics which have been used in the assessment of these links and junctions.

Table 14: SATURN Model Output Statistics

Link Assessment	Junction Assessment
• Delays • Journey Times • Speeds • Ratio of Volume to Capacity (V/C ratio)	• Flow Queuing Here [1] • Average Queue • Delay • V/C ratio (by turning movement) [2]

[1] Flow Queuing here - Rate at which a queue builds up at the stop line assuming that the arrival flow exceeds the capacity.
[2] A V/C of 85% is usually taken to demonstrate that a junction or link is starting to approach capacity.

SATURN is a strategic modelling tool which assigns a matrix of trips to a generalised model of the highway network. This process produces estimates of average peak hour traffic flows. Whilst this corridor is within the simulated part of the model, there still has to be some level of generality and coarseness which, in this case, means that the precise nature of the interactions within the corridor are not fully modelled. For example, the access points on Newport Road between Station Road and Kingsway can play a key role in how traffic builds up on Newport Road. However, they are not modelled individually but grouped and loaded on to the network at one point, midway along the link. This grouping includes, amongst others, trips generated by the Royal Mail depot, the high school and The Hollies employment area. It should therefore be understood that the SATURN outputs are likely to underestimate the queues and delays along this corridor.

Equally, if the flows from the model were used to build an isolated LINSIG model of one of the signalised junctions, it too is likely to underestimate the queues and delays as blocking back from nearby junctions and the interaction of nearby access points will not be modelled.

The difference between the 2031 Do Minimum (DM) and Do Something (DS) scenarios is summarised in sections 6.2 to 6.10.

6.2 Newport Road (west of Kingsway)

In 2031, there is an increase in the ratio of Volume to Capacity (V/C ratio) on this link in the DS scenario when compared to the DM. However, the AM peak eastbound direction has the highest V/C ratio at 78%, and this is manageable in 2031. Journey times, delays and speeds are also at manageable levels and do not differ between the DM and DS scenarios. The junction with Newport Road / Kingsway also operates within capacity in the DM and DS.

6.3 Newport Road (west of Station Road)

Traffic conditions on this link in the DM scenario will worsen between 2016 and 2031 with the V/C ratio reaching 101% (eastbound) in the AM peak. Delays (53 seconds) and speeds (16kph) are becoming a problem. With the Western Access Route in place, these improve to more acceptable standards with smaller delays, higher speeds and the V/C ratio reducing to 88%. This is aided by a reduction in traffic flow due to re-routing to access the Western Access Route. The model outputs for the AM peak this link are displayed in Table 15:

Table 15: Newport Road (west of Station Road) (2031 AM Peak)

Model Output	Direction	AM Peak		
		2031 DM	2031 DS	Diff.
Delays (Secs)	EB	53	26	-27
	WB	8	5	-3
Journey Time (Secs)	EB	78	52	-26
	WB	34	30	-4
Net Speed (kph)	EB	16	24	+8
	WB	36	40	+4
V/C (%)	EB	101	88	-13
	WB	78	63	-15

6.4 Newport Road (Station Road to Bridge Street)

In both the DM and DS scenarios (AM and PM peak), slow speeds are a feature of Newport Road (west of Tesco). In the AM peak speeds are as low as 8kph in a westerly direction. However, delays and V/C ratios are within reasonable levels.

West of Bridge Street, the Newport Road speeds are very slow eastbound in both peaks (3kph). Delay accounts for a very large proportion of the total journey time on this section of the link (90 seconds of a 96 second journey time in the PM peak DM). This delay is slightly reduced by the introduction of the Western Access Route, however, the overall V/C ratio is not improved and remains in excess of 100% in both peaks.

6.5 Newport Road Traffic Signal Junctions

At the Newport Road / Station Road traffic signals in 2031 DM scenario, both peaks have V/C ratios in excess of 100% on certain turns and this is only slightly improved in the DS scenario. This is significantly higher than recorded in the Major Scheme Business Case, although it indicates that there is likely to be congestion problems on Station Road in the 2031 PM peak (see Section 5.2).

The AM peak suffers from the worst queues and delays at the Station Road junction. Average queues of around 19 vehicles are present on the Newport Road (west) arm, with associated delays of just over a minute for the straight-on movement. Delays on other arms are in excess of 40 seconds. The DS scenario shows queues and delays reducing by 50% on the Newport Road (west) approach. Delays increase on the Newport Road (east) right turn, but overall the operation of the junction improves under the DS scenario. There is no clear indication of improved junction performance in the PM peak.

In the DM PM peak, delays at the Tesco junction are in excess of a minute on the Newport Road (east). Associated average queues are 17 vehicles and the V/C ratio for this movement is 102%. In addition, over the hour, 22 vehicles fail to get through the junction. With the Western Access Route constructed, queues and delays reduce by about 50% or better, although the V/C ratio on the Newport Road (east) approach stays the same. The model highlights no problems in the AM peak, and no significant difference between the DM and DS scenarios.

The junction of Newport Road / Bridge Street is over capacity in both peaks. In the PM peak (DM), delays on the Newport Road (west) are 90 seconds, queues are 13 vehicles and 7 vehicles are still queuing at the end of the hour total. The DM and DS scenarios are not too dissimilar with only slight reductions in queues and delays being achieved.

6.6 Station Road and Tenterbanks

Both the 2031 DM and DS scenarios indicate that there are no capacity issues on Station Road. This is explained by the fact that the main relief to this congested corridor is provided by Section C of the Western Access Route which is included in the DM scenario in 2031.

Tenterbanks provides access to Stafford College on one side and Victoria Park and a public car park on the other. Consequently, there are significant pedestrian flows in this location which are assisted by a controlled crossing. Provision of the scheme reduces the V/C ratio on Tenterbanks from 54% to 46% in the AM peak and from 89% to 74% in the PM peak. Associated delays are not excessive but speeds reduce to 24kph in the DM scenario, rising to 32kph in the DS.

6.7 Doxey Road (between Universal and Broadeye)

Table 16 displays the relevant SATURN outputs for the DM and DS scenarios.

The section of Doxey Road to the south of Sainsbury's (in an inbound direction) is shown as having unacceptably low running speeds at peak times with delays of >40 seconds per vehicle and a V/C ratio in excess of 100%, indicative of congested conditions in both peak hours. However following the introduction of the Western Access Route congestion is removed and free-flow conditions return.

Although the introduction of the Western Access Route attracts traffic to the section of Doxey Road lying to the west of Sainsbury's, raising the V/C ratio, this does not lead to additional vehicular delays or reduce running speeds.

The impact of the Western Access Route on Doxey Road, west of the former access to the Universal Works (St. Gobain) is to bring about a slight increase in AM congestion levels. However this is attributable to traffic from Doxey having to give way to the traffic using the Western Access Route and overall the link V/C ratio remains within acceptable limits. The model operational statistics for the new junction at the intersection of Doxey Road and Martin Drive show that in the AM peak the V/C ratio on Doxey Road (west) increases to 100% from 69%. Delays increase to 50 seconds per vehicle but the queues formed are small. In the PM peak the V/C ratio

on Doxey Road (east) increases from 81% to 96% however the level of queuing and delays are broadly acceptable. In practice, the opportunity to increase the operational efficiency of this new junction will be taken at the detailed design stage.

During the PM peak, the impact of the Western Access Route slightly increases the V/C ratio in this location, but has an insignificant impact on vehicle delays and queues.

Table 16: Doxey Road (2031)

Model Output	Link	Direction	AM Peak			PM Peak		
			2031 DM	2031 DS	Diff.	2031 DM	2031 DS	Diff.
Delay (secs)	Doxey Road (west of Universal)	EB (Inbound)	7	40	+33	7	6	-1
		WB (Outbound)	0	0	0	0	0	0
	Doxey Road (west of Sainsburys)	EB (Inbound)	0	0	0	0	1	+1
		WB (Outbound)	0	0	0	0	0	0
	Doxey Road (south of Sainsburys)	SB (Inbound)	40	0	-40	60	0	-60
		NB (Outbound)	0	0	0	0	0	0
Speed (kph)	Doxey Road (west of Universal)	EB (Inbound)	37	17	-20	36	37	0
		WB (Outbound)	48	48	0	48	48	+1
	Doxey Road (west of Sainsburys)	EB (Inbound)	48	48	0	45	44	-1
		WB (Outbound)	48	48	0	48	48	0
	Doxey Road (south of Sainsburys)	SB (Inbound)	5	48	+43	3	48	+45
		NB (Outbound)	48	48	0	48	48	0
V/C (%)	Doxey Road (west of Universal)	EB (Inbound)	54	67	+13	32	41	+9
		WB (Outbound)	21	23	+2	38	43	+5
	Doxey Road (west of Sainsburys)	EB (Inbound)	58	76	+18	30	51	+21
		WB (Outbound)	26	35	+9	60	75	+15
	Doxey Road (south of Sainsburys)	SB (Inbound)	102	66	-38	103	47	-56
		NB (Outbound)	36	35	-1	65	65	0

6.8 Broadeye Roundabout

The Doxey area is connected to the town centre via Broadeye roundabout, leading onto Chell Road and Tenterbanks. These links form part of the route that is relieved by the full Western Access Route and their smooth operation (along with Station

Road) is vital to the traffic travelling in and around the town centre. The junction operates within capacity in both peaks. However, V/C ratios reach 84% and 74% on the Tenterbanks and Chell Road arms respectively. In the DS scenario, large reductions in V/C ratios are achieved with Tenterbanks reducing by 20% to 64% and Chell Road by 38% to 36%.

6.9 Chell Road

Chell Road is expected to be operating in excess of design capacity in 2016 (without the road) and will deteriorate further by 2031 with just the construction of Section C. Table 17 shows this link will be characterised by delays, low running speeds and high V/C ratios, particularly in the southbound direction in both peaks. Once the Western Access Route is included, significant improvements are in evidence bringing the link back within operational capacity. This is due to the large reductions in traffic flows as vehicles transfer to the Western Access Route. In practice, this improvement in conditions will enable buses to traverse Chell Road without congestion disrupting timetables.

Table 17: Chell Road (2031)

Model Output	Direction	AM Peak			PM Peak		
		2031 DM	2031 DS	Diff.	2031 DM	2031 DS	Diff.
Delay (secs)	NB	19	19	0	18	18	0
	SB	36	5	-31	96	5	-91
Speed (kph)	NB	18	19	+1	19	19	0
	SB	12	35	+23	5	34	+29
V/C (%)	NB	79	45	-34	75	49	-26
	SB	101	41	-60	104	58	-46

6.10 A34 Foregate Street

Overall, the A34 operates within acceptable levels with and without the new junction to the Western Access Route. The link V/C ratio reduces fairly significantly with the introduction of the Western Access Route, as a result of the overall reduction in the amount of traffic using Foregate Street to the south of the new junction. However the introduction of the new A34 junction is expected to cause an increase in northbound delays on Foregate Street.

7. Traffic impact of a 2016 Development Phase without New Highway Infrastructure

7.1 Introduction

This chapter examines whether an initial phase of 400 dwellings in the west of Stafford could be accommodated on the existing local highway network. Sections 7.2 to 7.11 of this report examine and compare the output statistics from the following 2016 DN and DM SATURN models:

- The 2016 Do Nothing (DN) AM / PM Peak scenarios include all committed development but no additional development at Burleyfields and no sections of the Western Access Route

- The 2016 Do Minimum (DM) AM / PM Peak scenarios include all committed development, with an additional 400 dwellings at Burleyfields and no sections of the Western Access Route

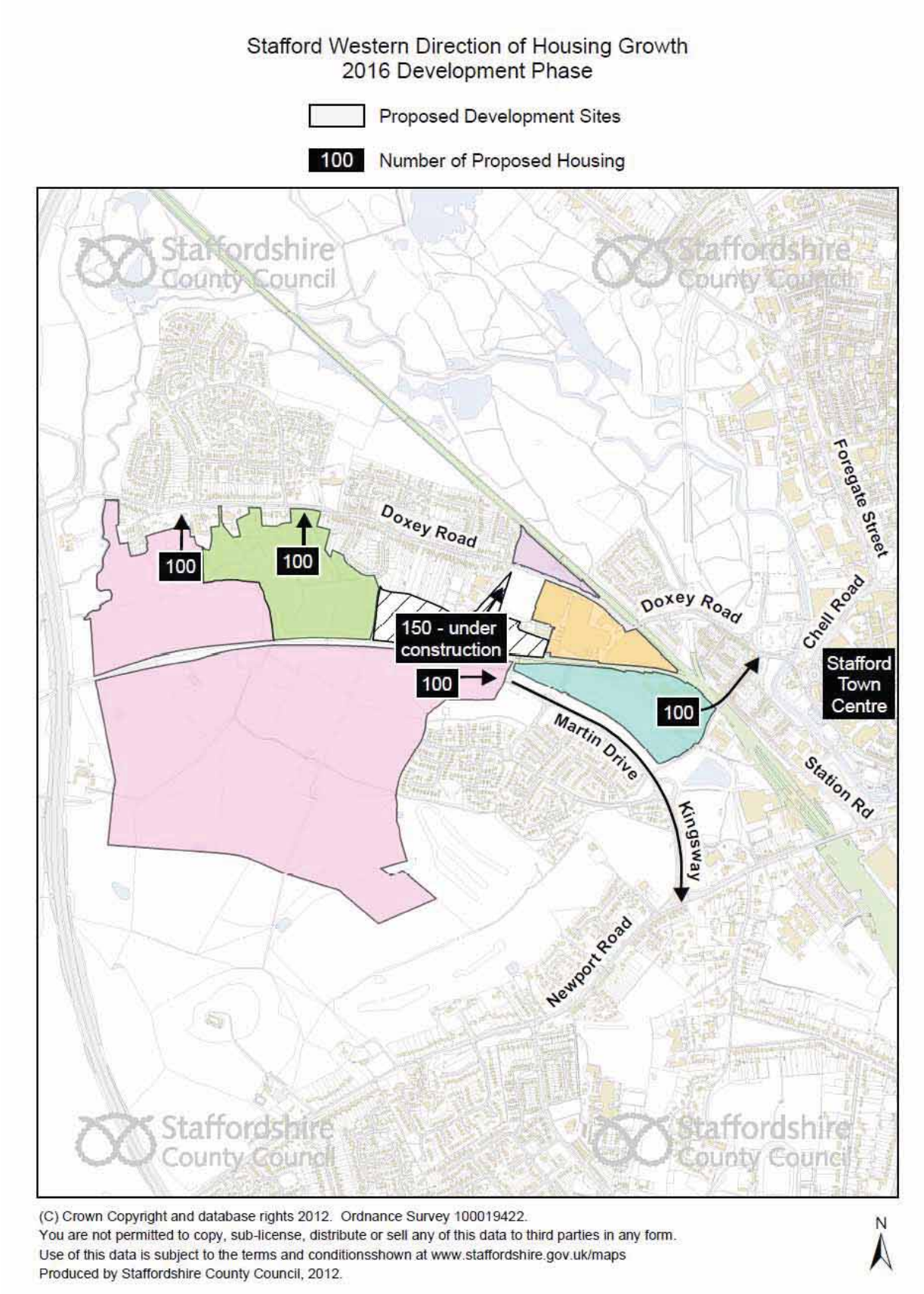
The historic Castlefields residential estate already contains 400 dwellings served from a single point of access formed at the intersection of Kingsway and Newport Road. To retain conformity with the current Staffordshire Design Guide, an additional 100 units could be permitted at Castlefieds under this access arrangement. Thereafter, a second vehicular access would be required to allow the number of dwellings at Castlefields to exceed 500 units in total. This appraisal therefore assumes that 300 units would be served from Doxey Road and 100 from Newport Road. Figure 17 indicates the suggested access arrangements for the 400 dwellings.

Committed development proposals contained within the 2016 traffic models were identified using an 'Uncertainty Log'. This technique requires an assessment of the relative uncertainty of each individual input by placing it into one of four categories, as defined in Appendix 2 (taken from WebTAG Guidance Note 3.15.5 'The Treatment of Uncertainty in Model Forecasting'). For this exercise, the 400 new homes under consideration were classified as 'near certain / more than likely' even though they currently have no planning status.

A Select Link Analysis of the 2016 DM models shows the likely distribution of trips from the 400 houses under consideration (see Appendix 3). Three diagrams are presented to show how trips from the 100, 300 and 400 homes would impact with the assumed access arrangements. As can be seen the trips generated impact upon the Newport Road (east of Station Road), Station Road, Victoria Road, Tenterbanks, Chell Road and Foregate Street.

It is appropriate to reiterate that SATURN is a strategic modelling tool and does not individually model every address or access point along a pa rticular route. Whilst in isolation, some of the links and junctions within the study area appear to be within their theoretical capacity, site observations and traffic data have shown that this level of interaction reduces the operational capacity of the whole corridor.

Figure 17:


Stafford Western Direction of Housing Growth
2016 Development Phase
Proposed Development Sites
100
Number of Proposed Housing
Staffordshire County Council
Doxey Road
Doxey Road
Foregate Street
Chell Road
Stafford Town Centre
100
100
150 - under construction
100
100
Martin Drive
Kingsway
Station Rd
Newport Road
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7.2 Newport Road (west of Kingsway)

The majority (around 80%) of the trips associated with an additional 100 dwellings accessing from Kingsway, travel towards the town centre. In contrast, very few trips from the new housing areas accessed from the Doxey Road sites travel along this section of Newport Road. The impact of 400 homes on Newport Road (west of Kingsway) is therefore limited, and this is demonstrated by the model output statistics. Link V/C ratios are 60% or lower and there are no changes in delay or speeds in the 2016 DM scenario when compared to the 2016 DN scenario. However it is known that in the AM peak, traffic can queue along this section of Newport Road from the Station Road / Newport Road signals.

7.3 Newport Road (west of Station Road)

The model analysis shows that the Newport Road link to the west of Station Road is operating at very close to 85% of its design capacity, with low speeds and sizeable eastbound delays in the AM peak. Vehicles queuing back from the Station Road / Newport Road junction, together with the interaction of vehicles accessing nearby businesses, hinders the efficient operation of this link in the peak hours. The DM scenario shows that the additional vehicles add marginally to this problem, as indicated by the slight increases in journey delays, journey times and V/C ratios. The relevant model outputs for this link are displayed in Table 18.

Table 18: Newport Road (west of Station Road) (2016 AM Peak)

Model Output	Direction	AM Peak		
		2016 DN	2016 DM	Diff.
Delays (Secs)	EB	55	64	+9
	WB	5	5	0
Journey Time (Secs)	EB	81	88	+7
	WB	30	31	+1
Net Speed (kph)	EB	15	14	-1
	WB	40	40	0
V/C (%)	EB	82	83	+1
	WB	62	64	+2

7.4 Newport Road (Station Road to Bridge Street)

In the DN scenario (AM peak), delays account for 60 seconds of a 68 second journey time (westbound) on the Newport Road link (west of Tesco). Delays and journey times worsen further once traffic generated by new housing is added and speeds remain slow at only 23kph and 6kph in the westbound and eastbound directions respectively. Slow speeds are also a feature of the PM peak hour DN and DM models.

The Newport Road (west of Bridge Street) also suffers from similar problems, with small increases in delay, journey time and the V/C ratio in the PM peak on an already congested link. East bound speeds are only 6kph in both scenarios. The link is also over capacity in the AM peak, but there is no increase from the DN situation. Speeds are as low as 3kph and delays account for 67 seconds of a 72 second journey time in both the DN and DM scenarios.

7.5 Newport Road Traffic Signal Junctions

In the 2016 DN scenario, all three arms of the Newport Road / Station Road traffic signalised junction are operating in excess of 90% V/C (90% – 104%) in the AM peak. This worsens in the DM scenario with modest increases in queues and some V/C ratios. Delays are in excess of 90 seconds on the left turn from Newport Road (west) and the right turn from Newport Road (east), an increase of 16 seconds and 5 seconds respectively from the DN scenario. The results are similar in the PM peak, with V/C ratios ranging from 80% – 104% in the DN scenario and worsening on certain arms in the DM scenario. DN delays on Station Road are nearly 3.5 minutes for the right turn movement and 1 minute 49 seconds for the left turn. In the DM, the left turn delay increases to just over 2 minutes.

Clearly, at these levels of congestion only a limited number of new trips can be allowed to pass through the junction without the need for remedial measures to relieve congestion. However, land is constrained in this area and further capacity enhancements are unlikely to be practically achievable. New road infrastructure in the form of the Western Access Route is likely to be required to provide the necessary relief going forward.

The DM situation also shows an intensification of the capacity problems around the busy Tesco / Newport Road junction in the PM peak hour. The Newport Road (east) arm is worst affected with an increase in the V/C ratio from 87% in the DN scenario to 93% in the DM.

The junction with Newport Road / Bridge Street is similarly impacted with increases in the V/C ratio in the PM peak. In the DM, the two Newport Road arms have V/C ratios of 100% or worse. In the AM peak, delays on the Newport Road (west) are in excess of 1 minute. However, there is no significant difference between the DN and DM scenarios. In the PM peak, all turns experience delays in excess of 30 seconds with the Newport Road (east) arm worsening in the DM.

On-site observations show that queuing from the Newport Road / Bridge Street junction often blocks back to the Tesco junction, thereby reducing the effectiveness of that junction.

7.6 Station Road

In the PM peak the DM scenario shows an exacerbation of the problems that exist in the DN situation. Delays and journey times begin to increase, while speeds fall to 9kph. This causes the link V/C ratio to increase from 100% to 101%. It can be seen that the smallest of increases in the V/C ratio on an already congested link can start to have a more significant effect on network conditions. Table 19 displays the relevant outputs from the SATURN model.

Table 19: Station Road (2016 PM Peak)

Model Output	Direction	PM Peak		
		2016 DN	2016 DM	Diff.
Delays (Secs)	NB	4	4	0
	SB	9	21	+12
Journey Time (Secs)	NB	8	8	0
	SB	14	25	+11
Net Speed (kph)	NB	27	27	0
	SB	16	9	-7
V/C (%)	NB	55	56	+1
	SB	100	101	+1

7.7 Victoria Road / Tenterbanks

There are no issues on Victoria Street resulting from the introduction of 400 houses at Castlefields / Burleyfields in 2016. Tenterbanks is operating very close to capacity (83%) in the PM peak with 400 houses modelled. This is an increase from 78% in the DN scenario. Delays, journey times and speeds all worsen very slightly as a result. The introduction of any more traffic along here in the future could begin to cause problems.

7.8 Doxey Road (between Universal and Broadeye)

The outputs in Table 20 demonstrate that the three sections; west of Universal (St. Gobain), west of Sainsbury's, and south of Sainsbury's are affected in a very similar way by the 300 houses accessing directly off it. Trips from the other 100 houses at Castlefields do not reach Doxey Road.

For each section, no changes to delays, journey times or speeds occur following the introduction of the housing in the DM scenario. Small increases in the V/C ratio are witnessed in one or both of the peak hours. None of the increases are significant, and all link V/C ratios are less than 85%. The highest V/C ratio is 61%, an increase of 7% from 54%. In the AM peak the increases are outbound from Doxey, and the PM peak inbound heading back to the Doxey area. However is should be noted that Doxey Road provides direct access to many properties and local community facilities, including Doxey Primary School and is heavily traffic calmed which constrains maximum capacity.

Table 20: Doxey Area (2016)

Link	Direction	AM Peak			PM Peak		
		2016 DN	2016 DM	Diff.	2016 DN	2016 DM	Diff.
Doxey Road (west of Universal)	EB (Inbound)	48	51	+3	22	24	+2
	WB (Outbound)	16	17	+1	45	50	+5
Doxey Road (west of Sainsburys)	EB (Inbound)	48	52	+4	23	26	+3
	WB (Outbound)	16	17	+1	45	49	+4
Doxey Road (south of Sainsburys)	SB (Inbound)	54	60	+6	43	47	+4
	NB (Outbound)	33	35	+2	54	61	+7

7.9 Broadeye Roundabout

An examination of Broadeye roundabout shows that the junction continues to operate within overall capacity once trips from the 400 new houses are included. Queues and delays do not increase and V/C ratios at each turn of the junction remain within acceptable limits. The highest V/C ratio is 74%, up 5% from the DN scenario on the Tenterbanks approach in the PM peak. The introduction of more housing is likely to push this junction closer to the 85% - 100% range, requiring the consideration of remedial action.

7.10 Chell Road

Chell Road is already operating with a high V/C ratio in the DN scenario. Table 21 shows how this is worsened in the DM in both peaks. Delays, journey times and speeds remain fairly constant however speeds in the northbound direction are quite slow at 19kph in both scenarios, and in both peak hours. Further increases in traffic are likely to begin to have an adverse affect as V/C ratios are already approaching 100% in both peaks.

Table 21: Chell Road (2016)

Model Output	Direction	AM Peak			PM Peak		
		2016 DN	2016 DM	Diff.	2016 DN	2016 DM	Diff.
V/C (%)	NB	67	73	+6	75	75	0
	SB	95	99	+4	89	93	+4

7.11 Foregate Street

There are no changes to delays, speeds or V/C ratios on Foregate Street resulting from the introduction of 400 houses at Burleyfields in 2016. However, speeds are low in a northerly direction in both peaks (14kph AM; 11kph PM).

8. Conclusions

The transport evidence compiled within this report supports a western direction of growth to Stafford town as long as it is developed as a sustainable urban extension in line with the draft Core Policy 5. Development must be designed and delivered through comprehensive master planning and access must be a key consideration.

This report confirms that the town centre, particularly to the west, currently suffers from peak hour congestion which, without appropriate mitigation, will become unacceptable in 2031, assuming that planned development occurs. This will potentially jeopardise economic prosperity and growth of retail and services in the town which are required to support the housing and employment growth proposed in Borough Council's draft Local Plan. Many of these problems can be managed by delivering the full Western Access Route together with a complementary package of sustainable transport and demand management measures. Traffic levels would be reduced further with a pronounced change in travel behaviour.

This report and the Options Assessment Report produced for the Stafford Western Access Improvements Major Scheme Business Case has examined the access options required to deliver growth in the west of Stafford. A sustainable transport option with no new highway infrastructure will not solve traffic problems created by the level of development proposed for Stafford and an access only link to Doxey Road will deliver minimal wider benefits.

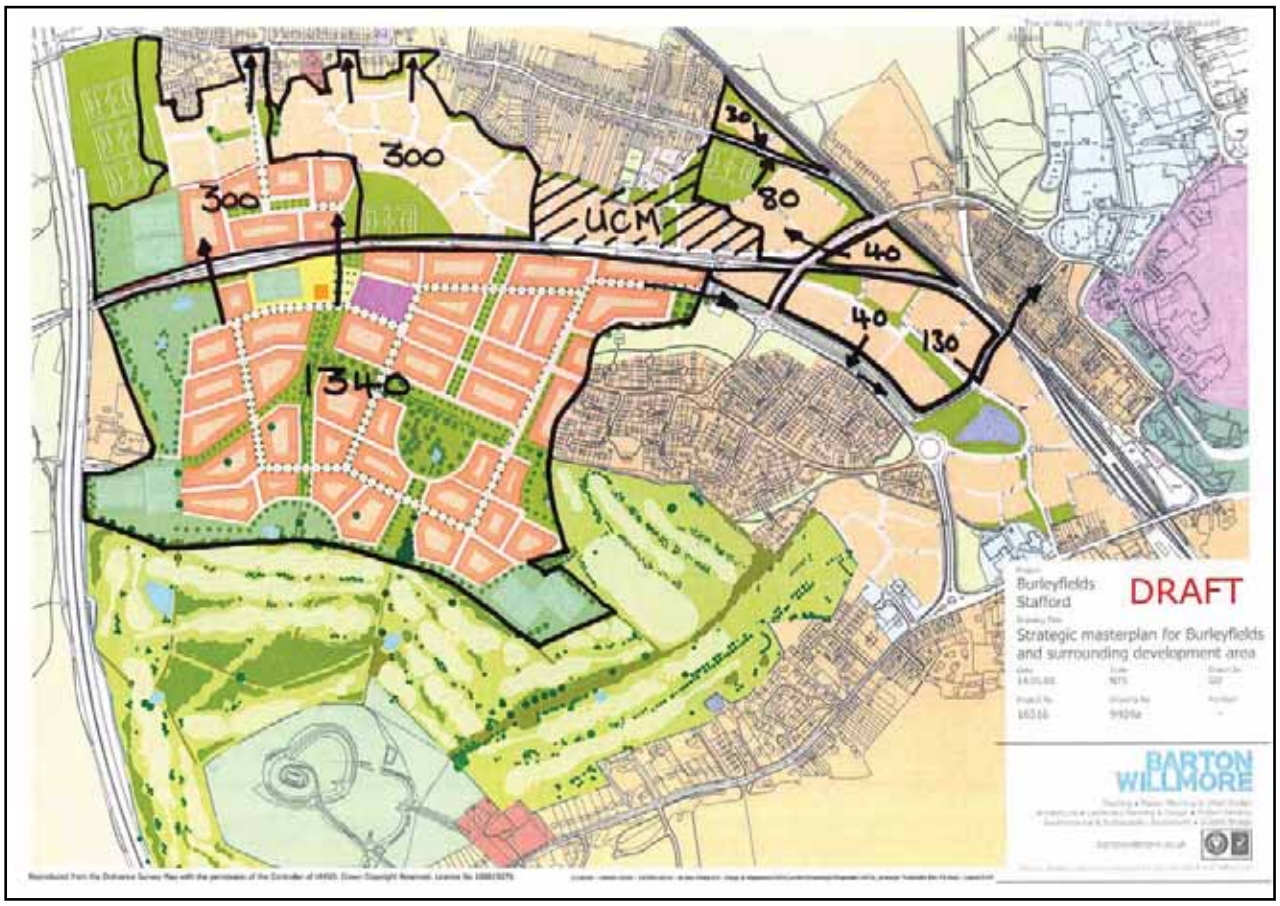
The Stafford Western Access Improvements (including sustainable transport measures), funded by a combination of public and private sector funds during the plan period, will enable the delivery of the Stafford growth agenda including 2,200 new houses to be delivered in the west, on the most sustainable greenfield location in Stafford. It will help to minimise the number of likely congested links and junctions particularly along Newport Road, making Stafford an easier and safer place to access.

Without the Stafford Western Access Improvements, there is expected to be congestion on the network in 2016 although it is considered that there is likely to be just sufficient capacity to accommodate a first phase of development in the west if it is developed in line with Core Policy 5. In 2016:

- 100 additional dwellings accessing onto the Newport Road will begin to place unacceptable pressure on Station Road and on the Newport Road, particularly at the Station Road / Newport Road junction and near to Tesco and Bridge Street
- No capacity issues will arise from the construction of 300 dwellings off Doxey Road, although there may be significant environmental and community concerns
- 400 additional dwellings will create an adverse affect on Chell Road and Tenterbanks

To go beyond 400 homes (or an equivalent traffic envelope) and eventually deliver the target of 2,200 new homes, the development consortium will need to construct Section C of the Western Access Route between Martin Drive, Castlefields, and Doxey Road to provide a second means of access to the Castlefields and Burleyfields, together with an agreed package of sustainable transport interventions.

Appendix 1: Indicative access arrangements proposed by the developer consortium



Appendix 2: Uncertainty Log

Committed developments contained within these models have been identified using an 'Uncertainty Log'. The 'Uncertainty Log' includes an assessment of the uncertainty of each individual input by placing it into one of four categories, as defined in below (taken from WebTAG Guidance Note 3.15.5: 'The Treatment of Uncertainty in Model Forecasting'). It refines and updates the original log for the Western Access Route traffic model to ensure that the preferred option of Stafford Borough Council's development plan was modelled.

Classification of Future Inputs

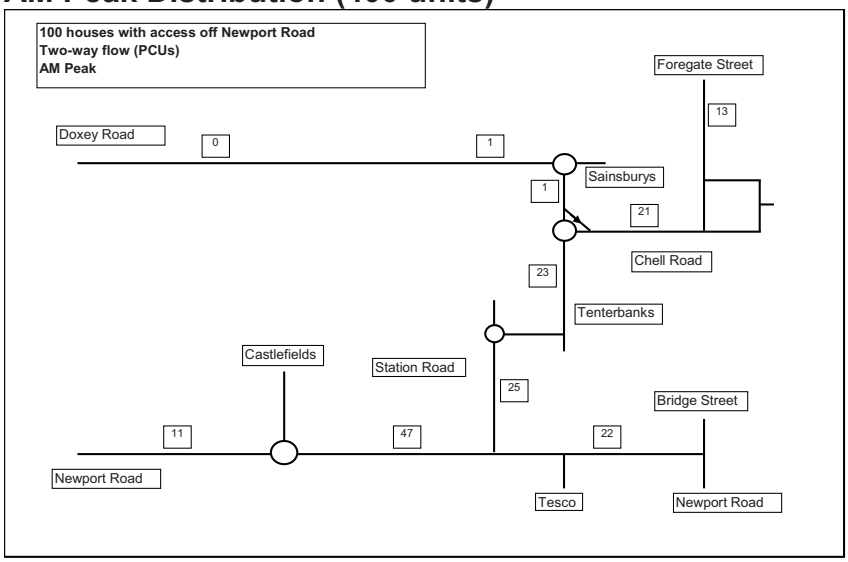
Probability of the Input	Status
Near certain The outcome will happen or there is a high probability that it will happen.	• Intent announced by proponent to regulatory agencies. • Approved development proposals. • Projects under construction.
More than likely The outcome is likely to happen but there is some uncertainty.	• Submission of planning or consent application imminent. • Development application within the consent process.
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.

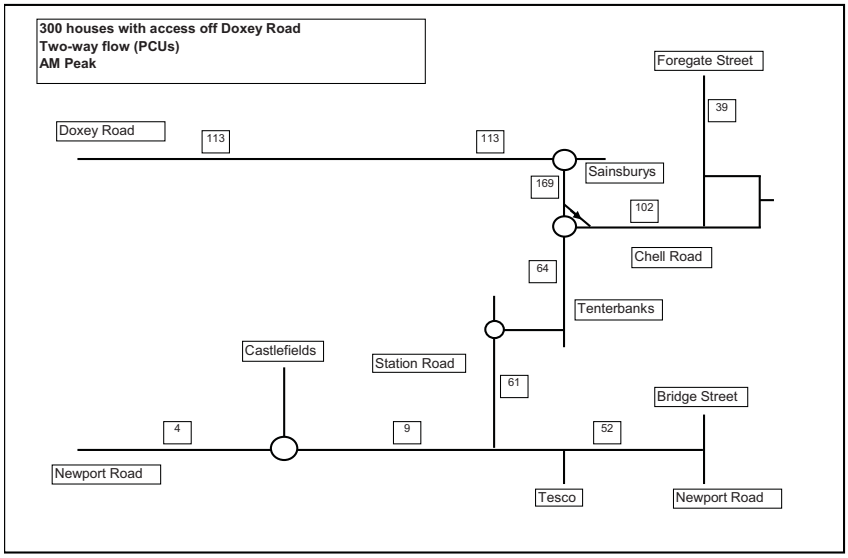
Uncertainty Log

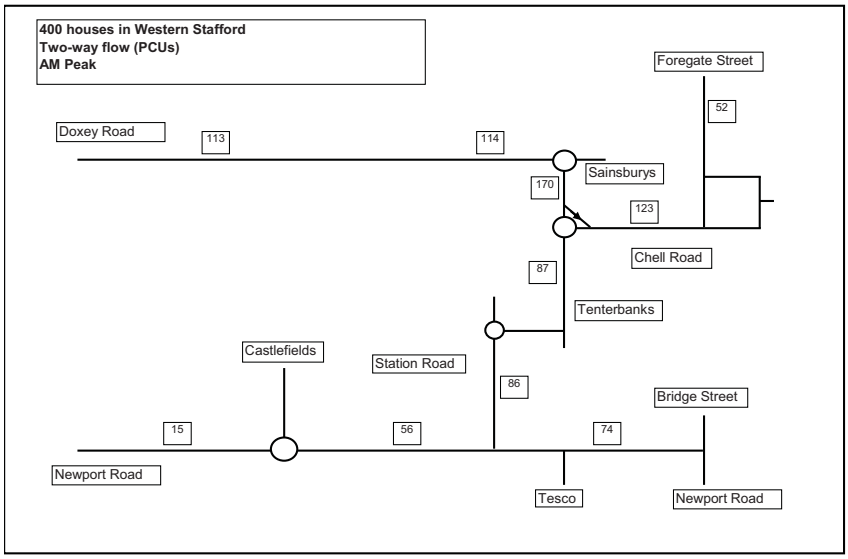
Zone Number	Development	Land Use	Size (Dwellings/ Ha GFA)	Uncertainty	Included in modelled years
Employment/Industry Developments					
2001	Former Riverside Recreation Site (A)	Industry	1.35 (inc. 180 space car park)	Reasonably Foreseeable	All
2002	Former Riverside Recreation Site (B)	Industry	0.17(inc. 584 space car park)	Reasonably Foreseeable	All
2005	Lammascote Road Leisure Centre	Industry	0.6	Near Certain	All
2006	Prime Point 14, J14 M6	Industry	1.7	Near Certain	All
2007	GEC A34 Lichfield Road	Industry	0.7	Near Certain	All
2008	Kingsmead / North Walls	Industry	0.67	Reasonably Foreseeable	All
2009	Tipping Street	Industry	1.8	Near Certain	All
2018	Tollgate Business Park	Industry	3.1	Near Certain	All
2019	Staffordshire Technology Park	Industry	0.2	Near Certain	All
2020	Greyfriars Industrial Estate	Industry	0.2	Near Certain	All
2021 / 2026	Land at Beacon Business Park	Industry	0.5	Near Certain	All
			1.6	More Than Likely	All
			7.8	More Than Likely	2031
2022	Moss Pit	Industry	0.3	Near Certain	All
2023	Common Road Industrial Estate	Industry	0.6	Reasonably Foreseeable	All
2024	Astonfields Industrial Estate	Industry	0.1	Reasonably Foreseeable	All
2025	17 Salter St	Industry	0.04	Near Certain	All
2013	East of Fairway	Industry	2.8	Near Certain	All
2015	East of Kingsway	Industry	2.8	Reasonably Foreseeable	2031
2017 / 2029	West of Stone Road A34	Industry	36	More Than Likely	25ha. by 2016
				Reasonably Foreseeable	36ha. by 2031
2027	Redevelopment of retail units West of Chell Road	Industry	6.76	Reasonably Foreseeable	All
2030	1 Form Entry Primary School to support Berona project	School	210 Pupils	Reasonably Foreseeable	All
Residential Developments					
2104	St Georges A	Houses	367	Near Certain	All
2107	Former Universal Grinding Wheel, Doxey Rd	Houses	150	Near Certain	All
2108	Former Staffordshire Police Headquarters	Houses	200	Near Certain	All
2109	GEC A34 Lichfield Road	Houses	181	Near Certain	All
2111	Friars Terrace	Houses	51	Near Certain	All
2124	Brunswick Terrace	Houses	59	Near Certain	All
2126	Derelict Land, Foregate Street	Houses	42	Near Certain	All
2127	The Former Eagle Inn & 14/14A Newport Road	Houses	32	Near Certain	All
2128	Land At Castle Wharf/Castle View/Castle Street, Castletown	Houses	24	Near Certain	All
2129	9 - 10 Salter Street	Houses	21	Near Certain	All
2130	Site Off Mill Bank	Houses	20	Near Certain	All
2131	Westgate, Bellasis Street	Houses	18	Near Certain	All
2132	88 Wolverhampton Road, Forebridge	Houses	18	Near Certain	All
2133	24 St Leonards Avenue, Queensville	Houses	15	Near Certain	All
2134	The Former Bed Centre, Rowley Street	Houses	15	Near Certain	All
2135	Westhorpe And The Laurels, Rowley Avenue	Houses	12	Near Certain	All
2136	16 & 17 Lichfield Road	Houses	12	Near Certain	All
2137	11-11A Princes Street	Houses	12	Near Certain	All
2138	Land At Albert Terrace	Houses	11	Near Certain	All
2139	St Thomas Priory	Houses	25	Near Certain	All
2140	18 - 20A Browning Street	Houses	10	Near Certain	All
2141	Land To Rear Of 7,9,11,13,15 Weeping Cross	Houses	9	Near Certain	All
2142	North Stafford Garage, Stone Road	Houses	8	Reasonably Foreseeable	All
2143	The Hawthorns, 27 Newport Road	Houses	6	Near Certain	All
2144	The Royal Oak, Rising Brook	Houses	6	Near Certain	All
2145	Former Staff Houses, Rotherwood Drive, Rowley Park	Houses	6	Near Certain	All
2146	Land Between 56 -57 Queensville Avenue	Houses	5	Near Certain	All
2147	176 Sandon Road	Houses	5	Near Certain	All
2151	Riverway	Houses	118	More Than Likely	All
2112 / 2152	Beaconside / A34 Stone Road	Houses	1100	More Than Likely	409 houses by 2016
				Reasonably Foreseeable	1100 houses by 2031
2113	North of Beaconside	Houses	2000	Reasonably Foreseeable	2031
2115	West of Baswich Lane	Houses	600	Reasonably Foreseeable	2031
2116	East of Fairway	Houses	265	Near Certain	All
2117	East of Stockton Lane	Houses	100	More Than Likely	All
2123	South of Doxey Road (Belway)	Houses	300	More Than Likely	100 houses by 2016
					300 houses by 2031
2122	Castlefields Burleyfields (Taylor Wimpey)	Houses	1340	Reasonably Foreseeable	100 houses by 2016
					1340 houses by 2031
2148	Adjacent to South of Doxey Road (Taylor Wimpey)	Houses	300	Reasonably Foreseeable	100 houses by 2016
					300 houses by 2031
2149	St Gobain (Belway)	Houses	150	Reasonably Foreseeable	2031
2150	St. Modwens	Houses	170	Reasonably Foreseeable	100 houses 2016
					170 houses by 2031
2153	Berona (MoD Housing)	Houses	400	Reasonably Foreseeable	All

Appendix 3: 2016 DM Select Link Analysis showing likely distribution of trips from the 400 houses

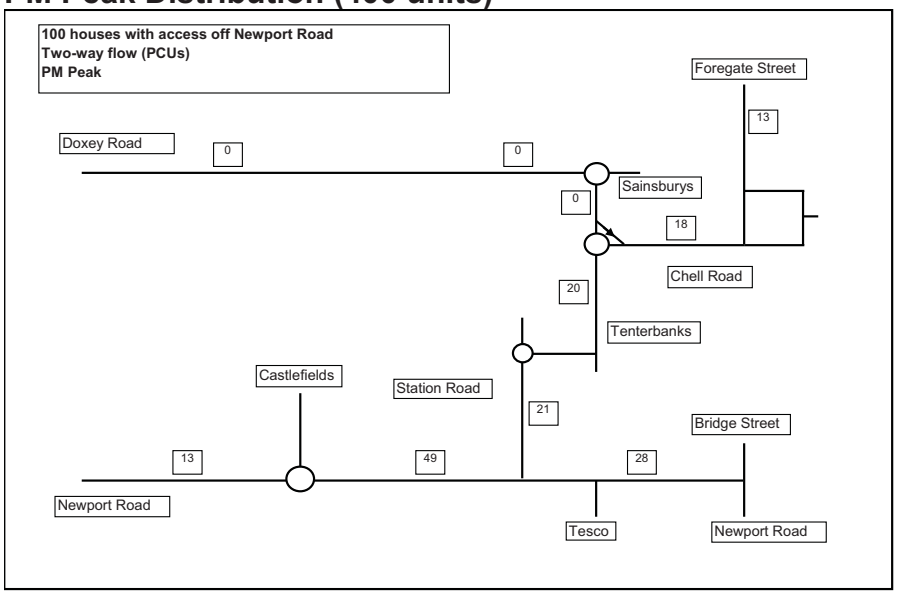
AM Peak Distribution (400 units)

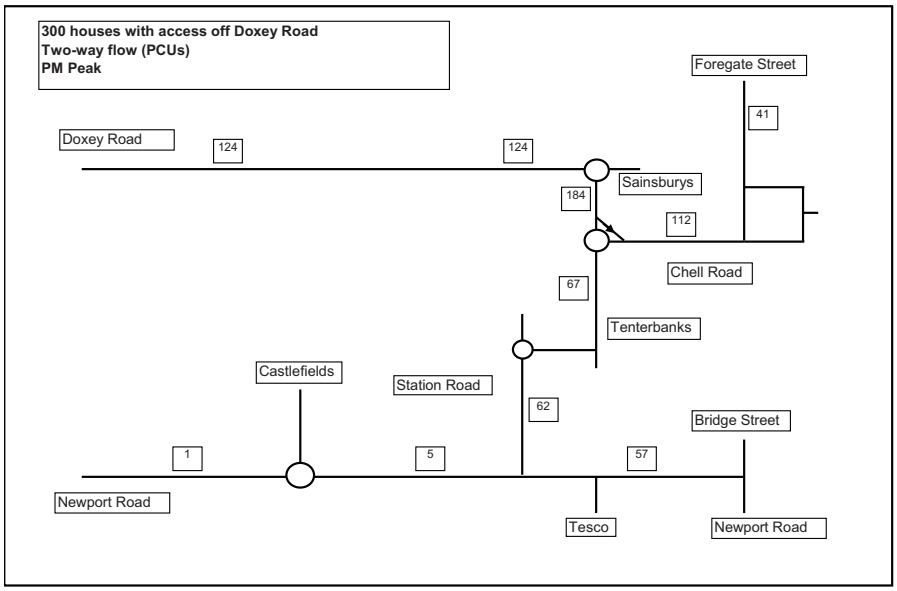


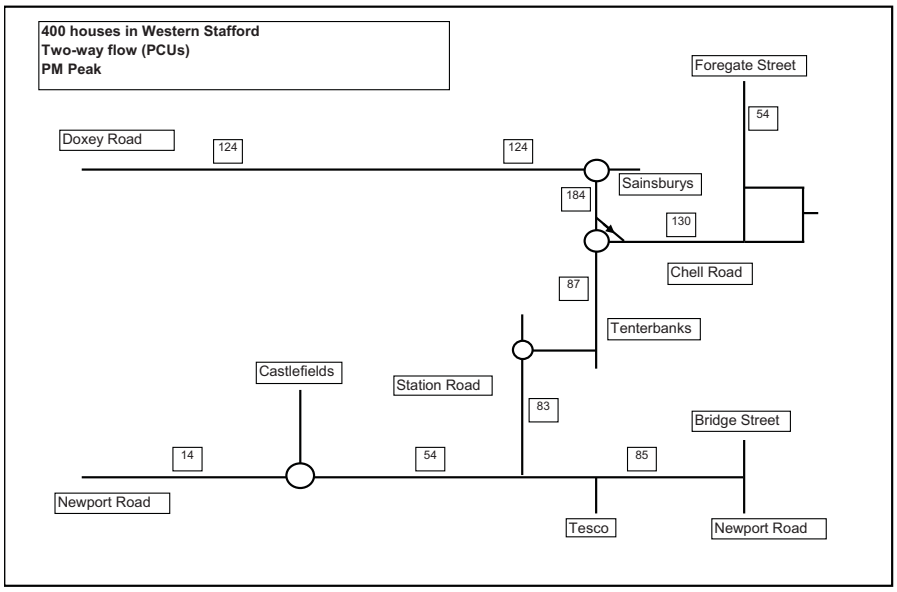




PM Peak Distribution (400 units)





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