Salisbury Transport Strategy

Options Assessment Report

January 2010

Notice

This report was produced by Atkins Limited for Wiltshire Council for the specific purpose of the Salisbury Transport Strategy.

This report may not be used by any person other than Wiltshire Council without Wiltshire Council's express permission. In any event, Atkins accepts no liability for any costs, liabilities or losses arising as a result of the use of or reliance upon the contents of this report by any person other than Wiltshire Council.

Document History

JOB NUMBER: 5084299			DOCUMENT REF: 5084299 - STS - Options Assessment Report v2 5.doc			
Revision	Purpose Description	Originated	Checked	Reviewed	Authorised	Date
0.0	Draft review	GB	WW	TM	TM	24/12/09
1.0	Draft to client	GB	WW	TM	TM	24/12/09
2.0	Draft to client	GB	WW	TM	TM	06/01/10
2.5	Final to client	GB	JH	TM	TM	11/01/10

Contents

Section Page

List of Tables

List of Figures

Appendices

List of Tables

1. Introduction

Background

1.1 Wiltshire Council (WC) is developing an updated transport strategy for the Salisbury and Wilton area to frame the identification of investment and network operation priorities over the coming years. In part this is because many of the components of the existing strategy for Salisbury have been implemented as part of the Council's first and second Local Transport Plans (LTPs), and the strategy needs to inform the development of LTP3. The review of transport strategy is also critically driven by the need to plan effectively for growth in both housing and employment in the South Wiltshire area, of which Salisbury and Wilton are part, over the next 15 or so years.

1.2 The strategy therefore needs to contribute to the formulation of the Local Development Framework (LDF) for Wiltshire – which will define and shape the county's future development and form the basis of future planning decisions. Most immediately the transport strategy will support the formulation of the Core Strategy element of the LDF.

1.3 The Regional Spatial Strategy (RSS) for the South West sets out the numbers of houses and jobs that should be provided for in Wiltshire 2026. The Secretary of State's Proposed Changes to the Draft RSS for the South West indicates a housing requirement of 12,400 homes for South Wiltshire for the period 2006- 2026. This would require an average housing delivery of 620 dwellings per year. The locations and confirmed levels of development, as currently envisaged by the South Wiltshire Core Strategy, are shown in Figure 1.1; the levels and locations of other developments remain as areas of search.

Approach to Transport Strategy Development

1.4 WC has commissioned consultants Atkins to prepare a transport strategy according to objective-led planning principles.

1.5 The strategy needs to define a set of transport initiatives for the Salisbury and Wilton area that that are able to address the impacts of additional transport demand caused by expected new development in the area up to 2026.

1.6 The strategy development process needs:

- to be based on a clear evidence base building upon a knowledge of existing and future transport and transport-related problems and using the transport model to identify, develop and assess alternative options as part of a systematic process of determining a preferred transport strategy.
- to be objective-led and use an evaluation framework that is able to demonstrate how a preferred strategy best meets the County's sustainable development objectives;
- to be developed with an appropriate level of stakeholder and public consultation to ensure that there is sufficient challenge on the transport measures within the strategy and to ensure that there is sufficient support from key stakeholders;
- to support and be linked with the County's wider Core Strategy development approach and timetable – including consultation; and
- to provide the framework for the subsequent development of an implementation plan and a more detailed parking strategy, including identifying funding sources

1.7 This overall process is shown in Figure 1.2 and this report forms part of the Strategy Development process.

Figure 1.1 – Location of Proposed Developments

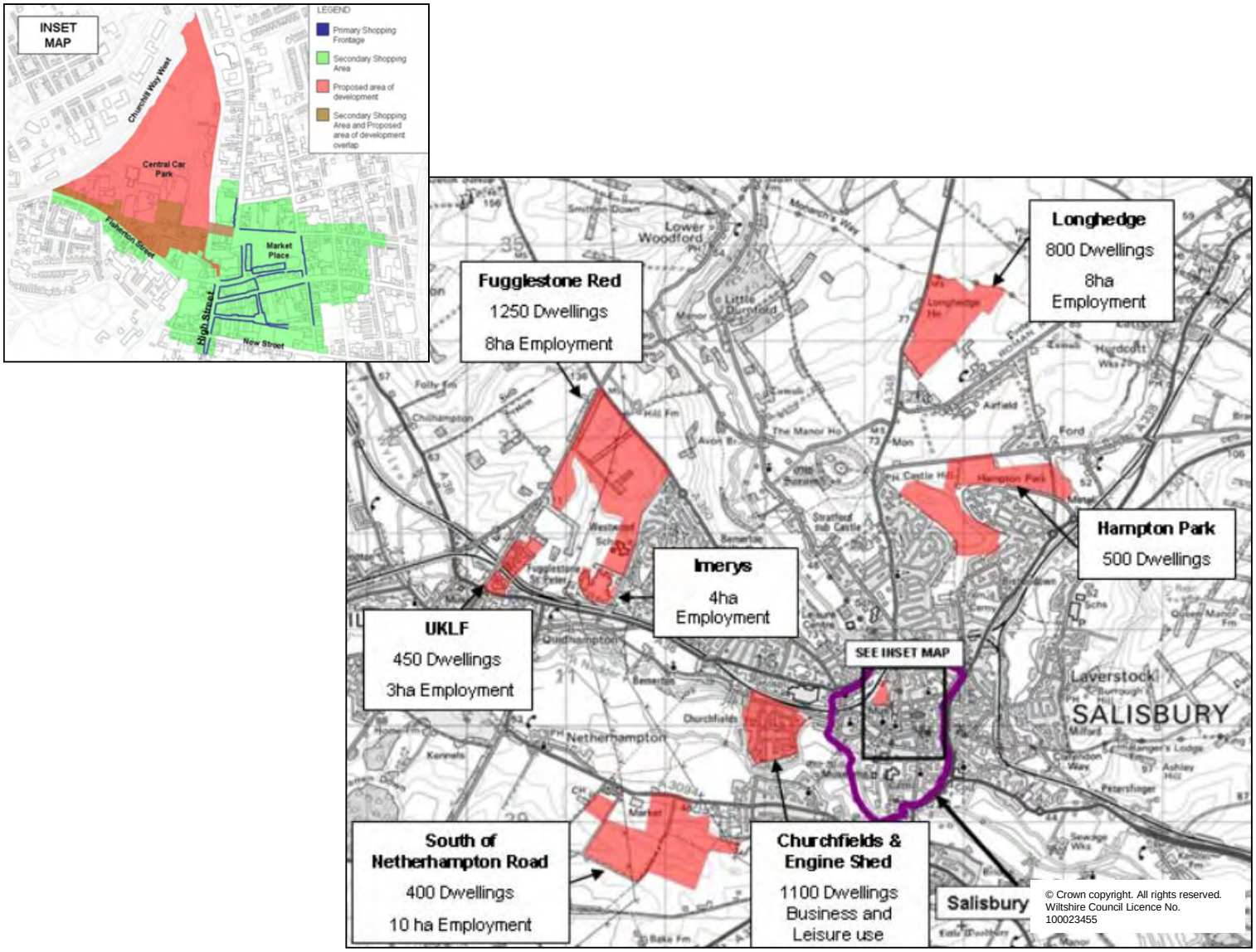
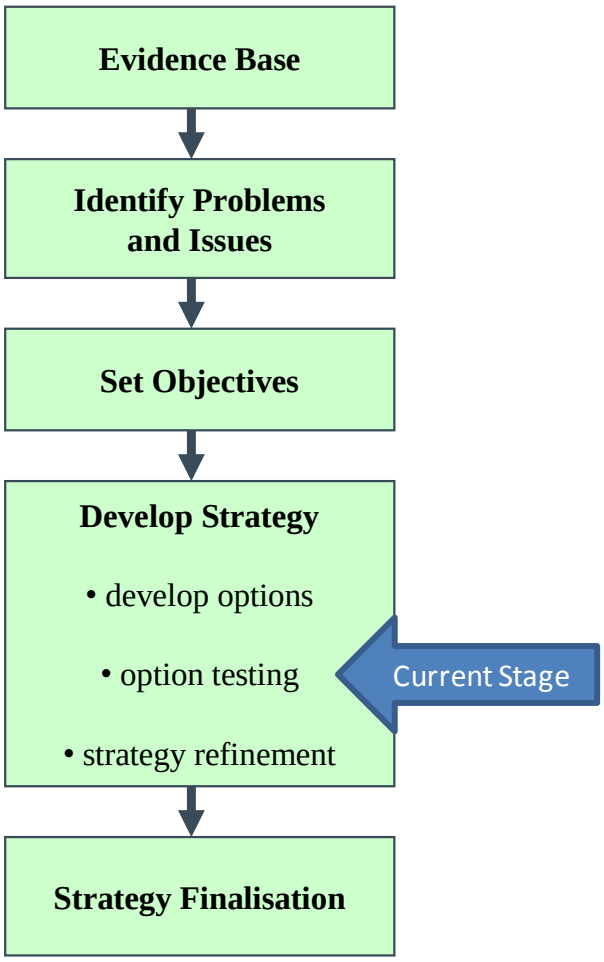


Figure 1.2 - Salisbury Transport Strategy Study Process



Role of this Document

1.8 This document is the Options Assessment Report and forms the first part of the Strategy Development. This considers the performance of two options: Established Approach and a Radical Option. Whilst these two approaches are not opposites, they provide a means of comparing a continuation of established policies in a financially constrained environment against a range of radical measures that relies more heavily upon developer funding.

1.9 The remainder of this document is structured as follows:

- Chapter Two described the study objectives and means of measuring the strategies performance against the objectives and a short-list of interventions for consideration in the Radical Option;
- Chapter Three provides details of the forecast in terms of numbers of housing and employment opportunities;
- Chapter Four describes the Established Approach and its performance;
- Chapter Five describes the Radical Option and its performance;
- Chapter Six provides results; and
- Chapter Seven provides a conclusion.

2. Study Objectives, Interventions and Metrics

Introduction

2.1 This section describes the study objectives and how these objectives will be measured. The study objectives have been derived from Wiltshire Council's Local Transport Plan 3 (LTP3) objectives, as these are consistent with latest national and regional guidelines and to also ensure consistency in approach between strategies in Wiltshire. Further details of the derivation of the objectives can be found in Atkins Report *5084299 - STS - Study Objectives v1.1.* The metrics for comparing the performance of the strategy against each objective are described below.

Study Objectives

2.2 The starting point for the study objectives was the Wiltshire LTP3 objectives. These objectives flow from DaSTS and regional policy objectives and provide due consideration to the objectives of Salisbury Vision. In addition to the LTP3 objectives, an additional objective of affordability and deliverability has been added.

2.3 To ensure that this Options Assessment stage could focus on a primary set of objectives it was necessary to categorise the objectives in to three groups. The study Steering Group was asked to assess the order of importance of each of the objectives from their own perspectives. The objectives were not ranked but placed into one of three categories from primary to tertiary. The categorised objectives are listed below:

- Primary Objectives
  - To support and help improve the vitality, viability and resilience of Salisbury's economy.
  - To support planned growth and ensure that developments provide for their transport requirements and mitigate their traffic impacts.
  - To provide, support and promote a choice of sustainable transport alternatives.
  - To minimise traffic delays and disruption, and improve journey time reliability on key routes.
  - To ensure that the Salisbury Transport Strategy is affordable and capable of being delivered.
- Secondary Objectives
  - To make the best use of the existing transport infrastructure through effective design, management and maintenance.
  - To reduce the level of air pollutant and climate change emissions from transport.
  - To improve sustainable access to a full range of opportunities particularly for those people without access to a car and reduce barriers to transport and access for people with disabilities and mobility impairment.
  - To reduce the impact of traffic on people's quality of life and Salisbury's built and natural environment.
  - To reduce the need to travel, particularly by private car.
- Tertiary Objectives

- To enhance Salisbury's public realm and streetscene.
- To improve safety for all road users and to reduce the number of casualties on Salisbury's roads and reduce the impact of traffic speeds in towns and villages.
- To encourage the efficient and sustainable distribution of freight around Salisbury.
- To promote travel modes which are beneficial to health.

2.4 The purpose of this categorising exercise was twofold. Firstly, it enabled the strategy to be tailored to ensure that the Primary Objectives steer the strategy derivation. Secondly, it enabled the long list of interventions to be sifted to create a short-list of interventions that should meet the needs of the study objectives.

Intervention Short-list

2.5 During the Problems and Issues stage of the study, a review of previous transport-related consultations in the Salisbury was undertaken to ensure that a full list of transport interventions and suggestions for Salisbury could be considered in a long-list of interventions. These interventions were added to a generic list of intervention measures that the Department for Transport (DfT) suggests are considered for all transport projects (WebTAG unit 2.3: Policy instruments).

2.6 The combination of these two items created a long-list of possible intervention measures for the Salisbury Transport Strategy. However, not all of these measures would be applicable, affordable or acceptable in Salisbury. To determine this, the study Steering Group assessed the ability of each intervention on the long-list to meet the individual objectives of the study. These scores were combined and weighted by the categorised objectives to create a ranked list of intervention measures.

2.7 Further to this, the inventions were assessed in detail by Wiltshire Council Officers against the following criteria to ensure that invention measures would be deliverable:

- legislative risk;
- design risk;
- consultation risk;
- planning risk;
- implementation risk;
- operating risk; maintenance risk; and
- use risk.

2.8 This process is standard procedure and ensures that the strategy contains only those elements that could be delivered without unacceptably high risk.

2.9 The short-list of intervention measures are listed in Appendix A.

Measuring Objectives

2.10 In order to assess the ability of the strategy to meet the objectives, each objective needs a scoring mechanism – or metric. The metrics can include quantitative and qualitative measures in line with DfT guidelines.

2.11 The objectives and metrics are shown in Table 2.1. This assessment focuses upon ability of each scenario to meet the Primary Objectives. The draft transport strategy will be assessed against all objectives. It should be noted that the assessment of scenario performance against Primary Objectives includes all of the key, quantitative transport related measurements.

Table 2.1 – Study Metrics

Objective	Metric
Primary Objectives	
To support and help improve the vitality, viability and resilience of Salisbury's economy.	Access to city centre by car and public transport
To support planned growth and ensure that developments provide for their transport requirements and mitigate their traffic impacts.	Network performance Air quality
To provide, support and promote a choice of sustainable transport alternatives.	Mode share
To minimise traffic delays and disruption, and improve journey time reliability on key routes.	Journey time and delay analysis
To ensure that the Salisbury Transport Strategy is affordable and capable of being delivered.	Strategy implementation and ongoing operating cost
Secondary Objectives	
To make the best use of the existing transport infrastructure through effective design, management and maintenance.	Strategy cost review Network performance
To reduce the level of air pollutant and climate change emissions from transport.	AQMA and city-wide impact on: NOX, PM10 and carbon
To improve sustainable access to a full range of opportunities particularly for those people without access to a car and reduce barriers to transport and access for people with disabilities and mobility impairment.	Bus accessibility Qualitative assessment
To reduce the impact of traffic on people's quality of life and Salisbury's built and natural environment.	Traffic on residential roads
To reduce the need to travel, particularly by private car.	Mode share
Tertiary Objectives	
To enhance Salisbury's public realm and streetscene.	Qualitative assessment
To improve safety for all road users and to reduce the number of casualties on Salisbury's roads and reduce the impact of traffic speeds in towns and villages.	Accident analysis
To encourage the efficient and sustainable distribution of freight around Salisbury.	Qualitative assessment
To promote travel modes which are beneficial to health.	Mode share Qualitative assessment

3. Forecast Modelling

Introduction

3.1 Previous reporting has been based upon interim forecasts of future land use provided by Wiltshire Council. Recent reviews have confirmed modifications and changes to these assumptions. This chapter describes the updated land use and transport assumptions used for this report.

3.2 The Regional Spatial Strategy (RSS) for the South West sets out the numbers of houses and jobs that should be provided for in Wiltshire 2026. The Secretary of State's Proposed Changes to the Draft RSS for the South West indicates a housing requirement of 12,400 homes and 37 ha of employment land for South Wiltshire for the period 2006- 2026.

3.3 This chapter describes the current thinking on changes in land use and transport provision that would occur without the transport strategy between the end of 2008 (when the transport model was developed) and the 2026 Core Strategy time horizon.

Land Use

3.4 The latest land use assumptions were circulated and approved by Wiltshire Council[1]. These assumptions are described in Table 3.1. The Core Strategy requires 12400 dwellings by 2026 and the table shows the number of additional dwellings that are required. The figure that has been added to Salisbury Transport Model excludes those developments that have taken place between 2006 and the end of 2008.

3.5 The employment land has been converted to jobs for the transport model, based upon the likely employment density of the land available.

Table 3.1 – Land Use Certainty

Certainty of Development	Employment (jobs)	Dwellings
Already built (2006-2008)	n/a	2001
Extant consents	0	213
Local Plan Allocations	1631	974
Strategic Sites	9103	6000
Areas of search	1799	1161
Site specific DPD	10178	2051
Total	22711	12400

Transport

3.6 The only changes to the transport network that are planned to occur between the end of 2008 and 2026 are Petersfinger Park and Ride and a bus lane on Downton Road. All other changes will be part of the transport strategy.

[1] Email titled Salisbury Development and dated Fri 11/12/2009 12:12

Modelling

3.7 The approach to “macro-level” modelling, collectively referred to as the Salisbury Transport Model (STM) has been developed using:

- an EMME demand model representing modal switching and redistribution effects and is referred to as the Salisbury Demand Model (SDM);
- a SATURN model to represent the highway network and highway travel demands, referred to as the Salisbury Highway Model (SHM); and
- an EMME model representing the public transport network with individual bus, rail and park and ride services coded and is referred to as the Salisbury Public Transport Model (SPTM).

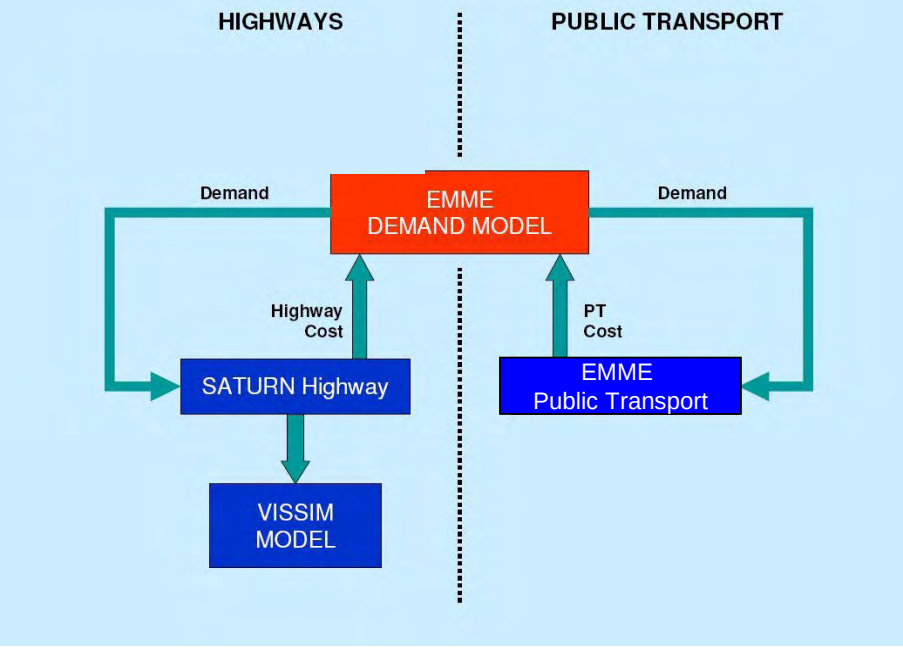
3.8 The models have been developed in accordance with Department for Transport guidance and are described in more detail in respective Demand, Highway and Public Transport development and validation reports. The models have achieved satisfactory levels of validation, meaning they reproduce observed transport demand, highway traffic levels and public transport patronage to levels specified by the Department for Transport.

3.9 The models represent the following three times of day:

- morning peak hour (8am to 9am);
- inter-peak period (average of one hour between 10am and 4pm); and
- evening peak hour (5pm to 6pm).

3.10 As shown in Figure 3.1, the demand model takes travel costs (a combination of travel time, travel distance and fares where applicable) from the highway model and public transport model to determine the frequency of a trip, the mode of a trip, the time of a trip and the destination of a trip. The highway and public transport models then determine the route of the trip (or more accurately , the collection of all trips in the Salisbury area).

Figure 3.1 – Modelling Approach



3.11 When used in forecasting mode, the model requires changes in land use and transport networks (as described above). These are added to the respective models: land use to the demand model and network changes to highway and public transport models accordingly, to create a Do-Nothing

Scenario. Further changes to the highway and public transport model networks and services have been undertaken to produce the Established Approach and Radical Option.

3.12 Car parking and smarter choices interventions are dealt with off-line using bespoke spreadsheet models that have been created by Atkins for a number of projects across the UK and where possible and relevant, follow principles set out in DfT guidance for transport modelling.

3.13 The VISSIM model is a 'micro' level model and can be used to determine the impacts of interventions in more detail but for specific areas only. This has not been used in this report as it is an Option Assessment Report rather than detailed Strategy Report. However, the proprietary junction software TRANSYT has been used to determine specific junction operation in more detail.

4. Established Approach

Introduction

4.1 This chapter provides a description of the scenario that is a continuation of established transport policies in Wiltshire. The performance of this approach against the Primary Objectives can be found in Chapter Six.

Scenario Interventions

4.2 This scenario is a continuation of established transport policies in Wiltshire Council. The position is one of making best use of the existing infrastructure whilst ensuring that the operation of park and ride is both affordable and still caters for passenger demand.

4.3 Public transport provision to developments (and other locations within Salisbury urban area) is at least two buses per hour in the morning and evening peaks. Transport demand is managed by changes to parking charges. The highway network is improved by reviewing traffic signal performance and ensuring that the UTC system optimises conditions for buses.

4.4 The list of transport interventions for the continuation of the Established Approach scenario include:

- travel plans for new developments and continued promotion of walking and cycling;
- improved signals and review of capacity / lane allocation;
- better use of the existing UTC system for buses currently fitted with transponders;
- public transport – two bus services per peak hour to all new development;
- park and ride frequency - every 12 to 15mins;
- park and ride price - increase existing fare by 50p in real terms;
- off-street parking price - 5% increase in real terms; and
- off-street parking quantum - no significant difference in number or share of short and long stay.

5. Radical Option

Introduction

5.1 This Chapter describes the contents of the Radical Option. This scenario is a departure from current policies in practices and a much wider range of policy instruments are used to meet the study objectives. In this instance, the scenario is heavily influenced by the Steering Group assessment of the long-list that was used to create a shortlist of intervention measures.

5.2 For this Options Assessment Report, both scenarios are judged by their ability to meet the Primary Objectives:

- To support and help improve the vitality, viability and resilience of Salisbury's economy;
- To support planned growth and ensure that developments provide for their transport requirements and mitigate their traffic impacts;
- To provide, support and promote a choice of sustainable transport alternatives;
- To minimise traffic delays and disruption, and improve journey time reliability on key routes; and
- To ensure that the Salisbury Transport Strategy is affordable and capable of being delivered.

5.3 The guiding feature of the Radical Option is to accommodate growth in the most sustainable manner possible whilst improving economic vitality. This combines highway measures on key routes to ensure ease of movements for buses, HGVs and cars on these routes. To encourage sustainable travel, demand management is off-set by improved bus services and increased frequency park and ride services. A review of cycling and walking routes shall also ensure that sustainable journeys are catered for through enhanced smarter choices.

5.4 Essential to this is the ability to accommodate growth whilst locking-in benefits of the improvements. Demand management, smarter choices, public transport and park and ride improvements would contribute to reducing demand for highways traffic and ITS would focus upon locking-in traffic reductions rather than inducing additional traffic.

Scenario Interventions

Demand Management

5.5 Demand management is a means of controlling the demand for travel. This can apply across the whole network, in specific places or be targeted at particular journey types or particular vehicles. The short-list includes the following items:

- encourage and promote the use of the Park and Ride service;
- consider extending the Park and Ride service to Churchfields;
- extend the Park and Ride service to serve the rail station if appropriate;
- parking charges to manage demand; and
- parking controls can control car use by reducing the supply of spaces, restricting duration or opening hours, regulating use through permits or charging.

5.6 The short-list is geared towards managing demand through the means of parking controls and park and ride provision. Whilst these are both options within the Established Approach strategy, this radical approach takes these further.

5.7 Parking

5.8 Salisbury has over 2800 public off-street parking spaces in the city centre spread over ten different sites operated by Wiltshire Council plus other large car parks in the city centre that serve major retails stores and The Old George Street Mall has 548 spaces and Salisbury Station has 270 spaces.

5.9 Culver Street car park has over 500 long-stay spaces. Analysis of demand revealed that this car park is underutilised. If this was converted to short-stay parking, it would still leave Salisbury with over 800 long stay spaces but would create additional short-stay capacity to the east of the city.

5.10 Evidence shows that a 10% increase in parking charges should reduce overall parking demand by 1.6% in the long term (TRACE, 1999[2]). Therefore, substantial changes in parking charges are going to be required to manage demand. However, it is important that Salisbury maintains its economic vitality and viability and any increases in parking charges would need to be sensitive to this objective.

5.11 A 50% increase in parking charges would result in an 8% reduction in parking demand but would increase car-sharing, public transport and walking / cycling. In current terms, the cost of one hour would rise to £1.50 and the daily long stay charge of £5.50 would increase to £8.25.

5.12 Park and Ride

5.13 Park and Ride is widely available in Salisbury and comparatively well used given the relative price difference between parking in the city centre and park and ride. However, the Established Approach recognises that park and ride frequencies must reduce and prices must rise to meet financially constrained operating conditions.

5.14 The Radical Option proposes to increase “turn up and go” park and ride fares by 20% (50p) but keep pre-purchased tickets at the same price. The Radical Option also proposes to maintain frequencies at current levels of six per hour. The revised turn up and go cost of £3 (in today’s prices) makes park and ride equivalent to two hours short-stay parking and almost the third of the price of long-stay parking.

5.15 The Wilton Park and Ride service will be altered to pass along Churchfields Road and serve Salisbury Station. The aim of this is to provide an alternative to station car parking for some rail commuters. This should free some station car parking space whilst providing an alternative means of parking for those who currently find the station car park full (note that changes to station car park size and price is beyond the scope of this strategy).

5.16 The scaling down of the size of Churchfields as an industrial estate reduces the need for park and ride to serve Churchfields in the future. However, as part of the east-west public transport corridor, buses from Wilton Park and Ride will serve Wilton, Churchfields, the station and the city centre before terminating at Petersfinger Park and Ride (details below).

5.17 Hypothecation of Parking Charges

5.18 The Salisbury Transport Strategy should include the hypothecation of parking revenues to be spent on other transport projects, such as improvements to park and ride, other bus services and enhanced smarter choices support. The hypothecation of this revenue could be controlled to ensure that it was only spent on providing access to the city centre for alternatives to the car.

5.19 It is noticeable that the Established Approach reduces park and ride frequency and increases fares compared to the current service. In this instance, the hypothecation of parking revenues may result in maintain service intervals and prices.

---

[2] TRACE is a comprehensive research programme, carried out by a consortium of European consultants and Universities (ARPA from Italy, Hague Consulting Group from the Netherlands, Heusch/Boesefeldt from Germany, Stratec from Belgium and the University of Cergy-Pontoise from France), which started in January 1998 with the financial support of the European Commission (DGVII)

Traffic Management

5.20 Traffic management is a means of controlling and gaining the most equitable performance for traffic on the highway. It can range from junction improvements to banning access for certain vehicles along certain roads / lanes of traffic. The short-list includes the following items:

- improve the A36 Southampton Road as an important gateway to the city making it attractive for commuters and tourists; this could include priority measures for buses and cyclists and high quality public transport stops.
- high occupancy vehicle lanes (buses and car share or buses and HGV);
- improve the streetscape within the core of the city through shared surfaces giving priority to pedestrians;
- major junction improvements (increase / change footprint);
- minor junction improvements (within existing footprint);
- develop a hierarchy of routes that restricts traffic movement;
- conventional traffic management includes measures such as one-way streets, redesign of junctions, banned turns and controls on on-street parking;
- car sharing lanes;
- traffic restraint measures are designed to reduce the adverse environmental and safety impacts of car include traffic calming and also the use of bus lanes;
- lorry routes and bans; and
- rationalise the number of access points on to Southampton Road from adjacent streets and access roads

5.21 These form the following themes, each of which are explored in more detail below:

- road hierarchy;
- traffic restraint and route ambience enhancement; and
- junction improvements.

Road Hierarchy

5.22 The starting point for the traffic management component of Radical Strategy is to develop a road hierarchy. This means identifying roads and routes in accordance with the function they serve for not only an economically viable Salisbury, but also a liveable Salisbury. At one end of the hierarchy is the need for traffic to flow with minimal delay, whilst at the other end is the need for people to be able to walk and cycle safely and freely. The proposed hierarchy is show below:

- Pedestrian / cycle only roads;
- Shared surfaces roads (all users sharing the same space, typically with no hard delineation between pavement and road space);
- Mixed use roads (conventional highway network with possible traffic calming);
- Distributor roads (conventional highway network including residential feeder roads and non-principle roads); and
- Principal roads (conventional highway network with a focus on movement of all vehicles).

5.23 The application of the hierarchy to Salisbury is being considered at present by comparing preferred walk and cycle routes with bus routes and traffic volumes. However, it has guided our

approach to facilitating improved traffic conditions on routes like the A36 whilst aiming to preserve lower levels of traffic on other roads for walking and cycling.

Traffic Restraint and Route Ambience Enhancement

5.24 Having established the road hierarchy there is a need to restrain traffic at some locations and improve route ambience at others:

- A36 Southampton Road route ambience improvements;
- Shared surfaces in the city centre (Market Square); and
- HGV ban on Mill Road as HGV demand reduces at Churchfields.

5.25 A review of carriageway width shows little scope for additional vehicle lanes (including bus lanes) without reducing or completely removing the shared footpath / cycle way on Southampton Road. The off-line provision of cycle and pedestrian routes is important along this corridor and we suggest urban realm work to improve ambience along this corridor, taking advantage of open, river views to the south and improvements to the central reserve to improve the 'gateway to Salisbury'.

5.26 Around Market Square we propose creating shared surfacing along Minster Street and Blue Boar to facilitate greater pedestrian movement around Market Square, with Figure 5.1 showing an example of this.

Figure 5.1 – Shared Surfaces (New Road, Brighton)

Source: DeFacto (Wikipedia)

5.27 The HGV ban on Mill Road should reduce HGV traffic through the city centre as there will be less HGV demand for Churchfields if the proposed residential development occurs. This ban would need to be implemented at an appropriate point in time when the number of HGVs at Churchfields has significantly reduced.

Network Improvements

5.28 At the other end of the hierarchy are principal roads and the movement of as much traffic (cars, buses and HGVs) with minimal delay is paramount. To achieve this, the following junctions have been considered for improvement:

- Harnham Gyratory;
- Exeter Street Roundabout;
- College Roundabout;

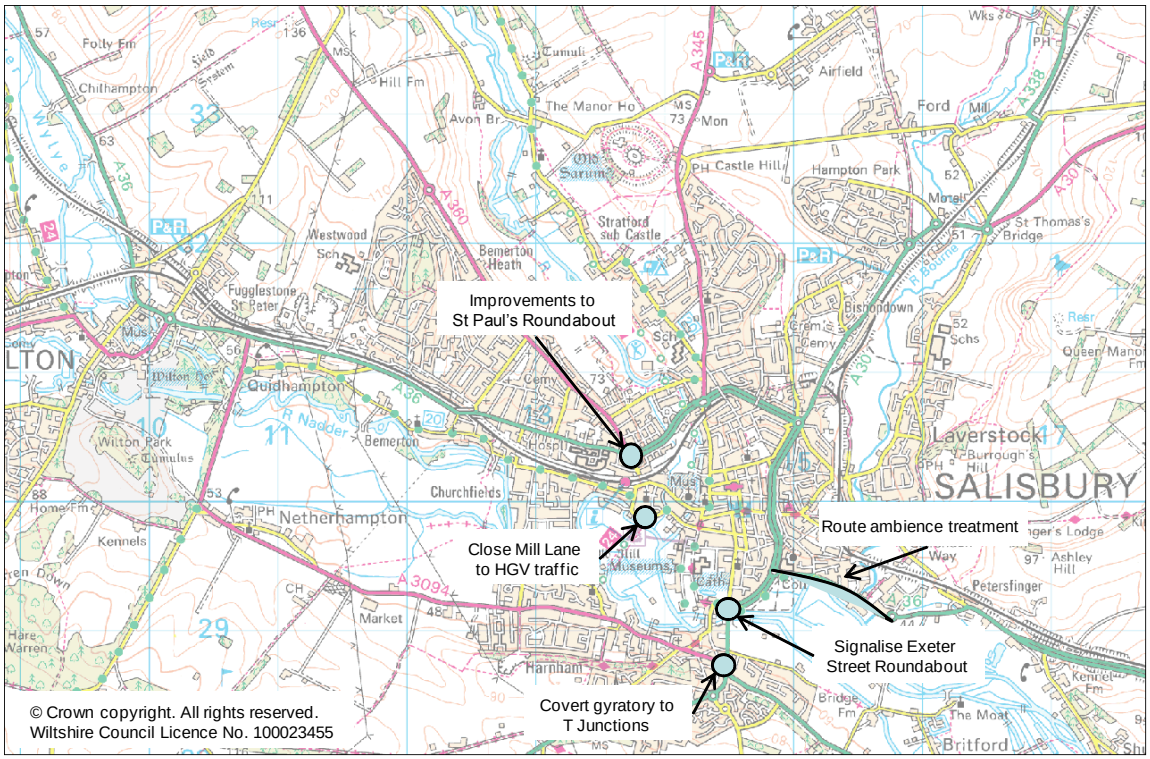
- St Mark's Roundabout;
- Castle Roundabout;
- St Paul's Roundabout; and
- Park Wall Junction.

5.29 An initial review of the above junctions revealed that little could be done to improve College Roundabout, as it is required for u-turns, St Mark's and Castle Roundabouts also had little scope for redesign.

5.30 A review of options at Park Wall Junction, including a re-alignment to the east of the farm on the eastern side of Netherhampton Road, provided no noticeable benefit. Further work controlling all signals in Salisbury may improve this situation, but improvements at Park Wall Junction send more traffic through Harnham and causes problems there.

5.31 Only St Paul's Roundabout, Exeter Street Roundabout and Harnham Gyratory contained scope for improvement. Broad proposals for each junction are shown in Figure 5.2 and described in more detail below.

Figure 5.2 – Highway Improvements



Harnham Gyratory

5.32 The existing Harnham Gyratory operates reasonably well once traffic reaches the gyratory. However, there are significant queues on the approaches to the gyratory, with traffic performing 'rat running' to avoid queues.

5.33 Our approach would be to convert the gyratory into a 'T Junction'. This provides extra stacking capacity whilst reducing time spent within the gyratory junction. The revised layout is shown in Figure 5.3. This layout is indicative at this stage and requires further work to determine land take, implications for utilities and landscaping.

5.34 The junction has been modelled in both the Salisbury Highway Model and a TRANSYT model of the junction to ensure that this layout would operate below capacity.

Exeter Street Roundabout

5.35 The roundabout at Exeter Street presently suffers from congestion blocking back from Exeter Street, which in turn flows back to the Harnham Gyratory. Much of the problem here is associated with stopping traffic on Exeter Street.

5.36 Our proposal is to create a signalised 'T Junction' with St Nicholas Road connecting to the north. This frees space for a 'drop off zone' and controls flow accessing Exeter Street. The revised layout is shown in Figure 5.4. This layout is indicative at this stage and requires further work to determine land take, implications for utilities and landscaping.

5.37 The junction has been modelled in both the Salisbury Highway Model and a TRANSYT model of the junction to insure that this layout would operate below capacity.

St Paul's Roundabout

5.38 St Paul's Roundabout is the start of the northern bypass of Salisbury when approaching from the west. This roundabout provides for through movements on the A36 as well as movements into and out of the city centre. The principle problem with this junction occurs at the entry of the A360 Devises Road.

5.39 Our desktop review reveals that some minor improvements can be made to the roundabout (Figure 5.5). The junction has been modelled in both the Salisbury Highway Model and a TRANSYT model of the junction to ensure that this layout would operate below capacity. However, discussions with Highways Agency would be required before pursuing this layout.

Figure 5.3 – Proposed Harnham Junction

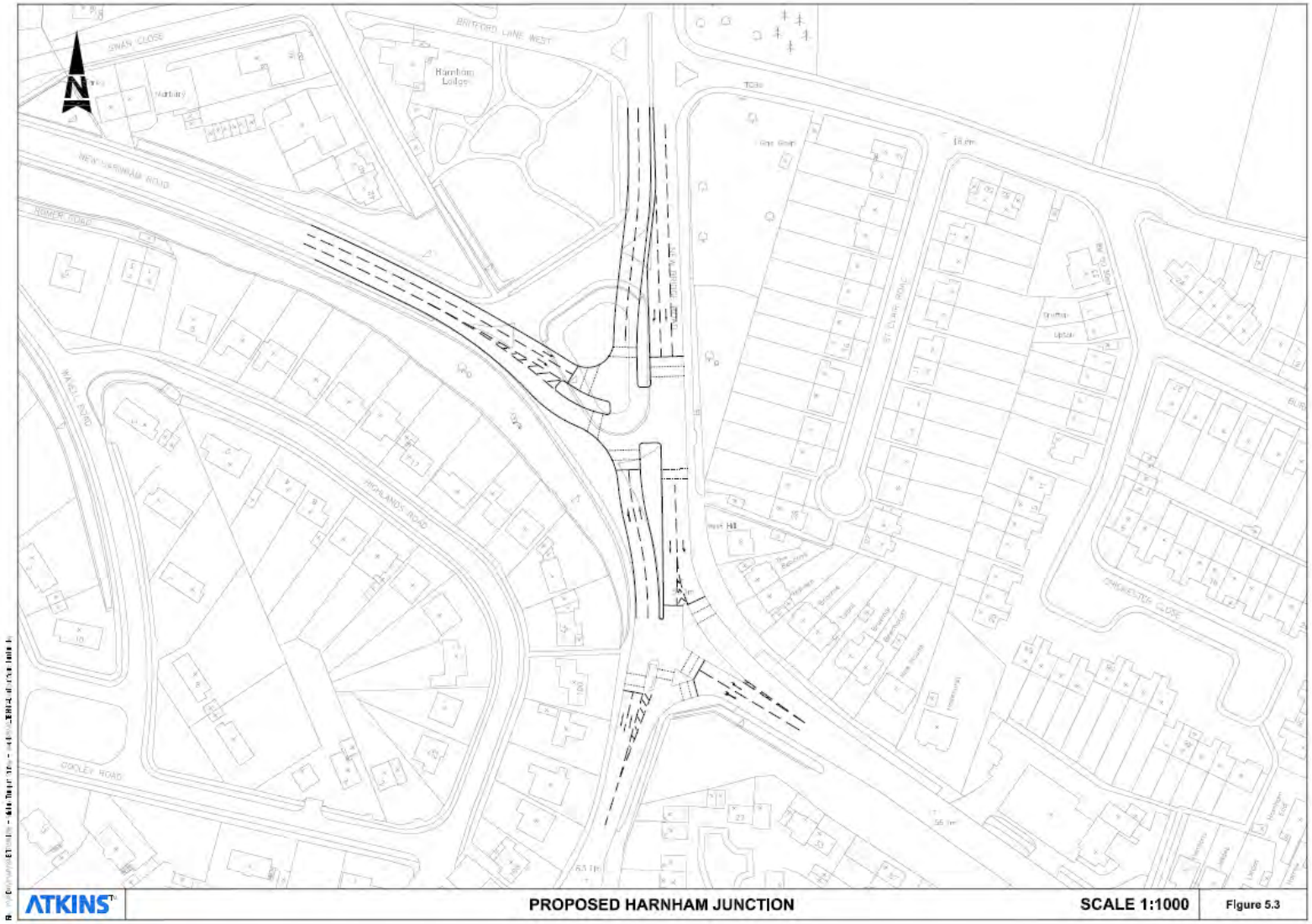


Figure 5.4 – Proposed Exeter Street Junction

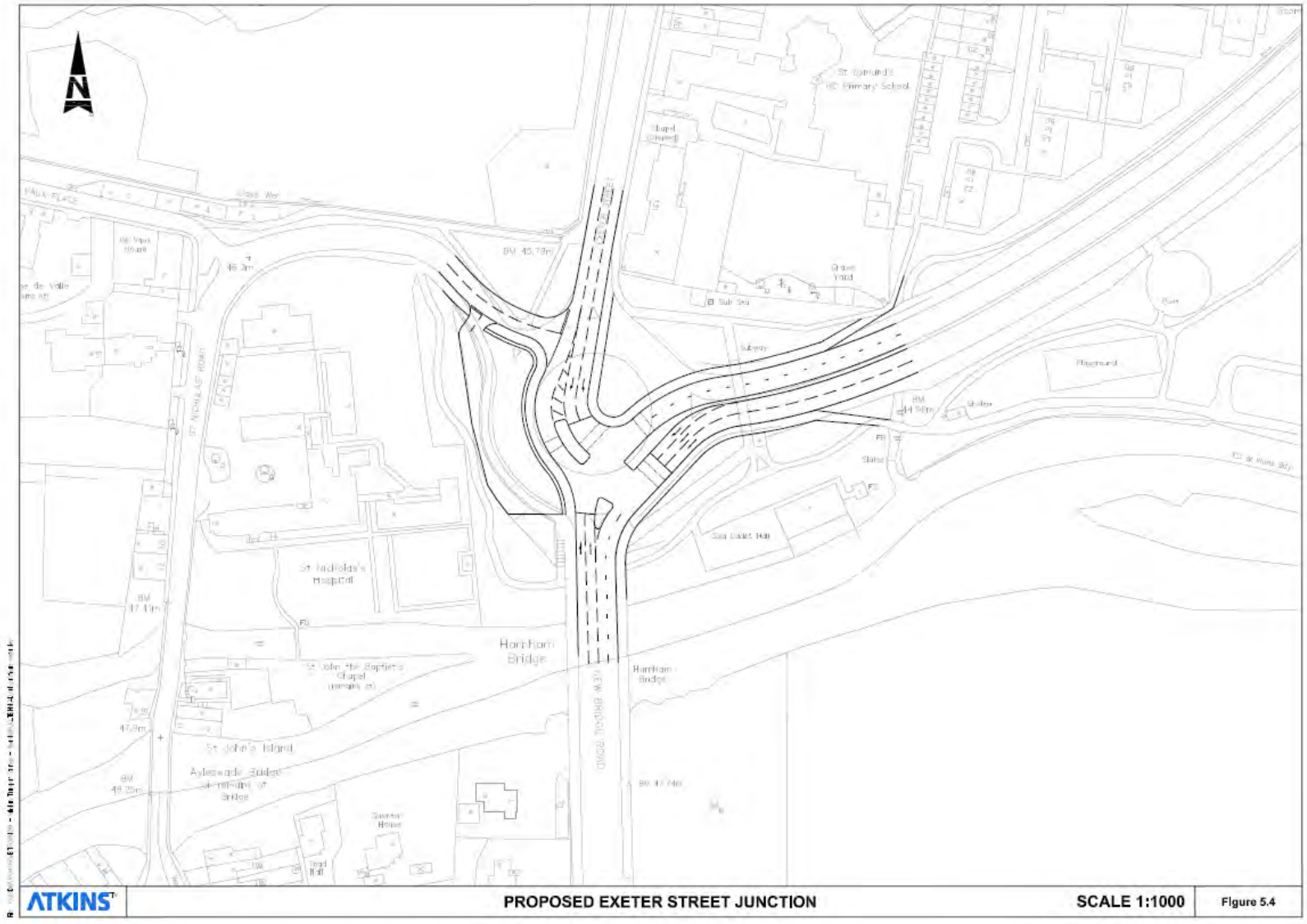
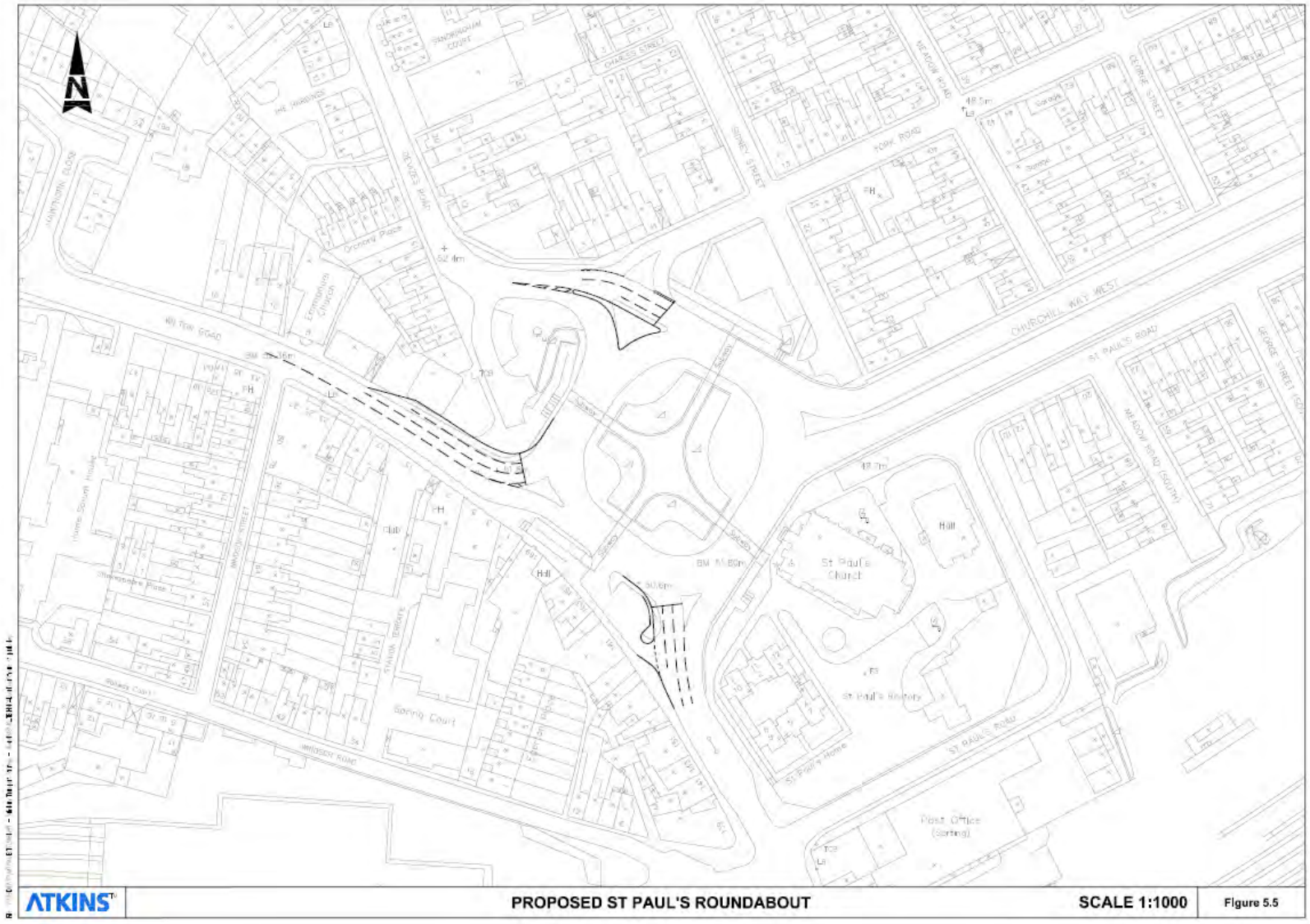


Figure 5.5 – Proposed St Paul's Roundabout



Intelligent Transport Systems (ITS)

5.40 ITS refers to efforts to add information and communications technology to transport infrastructure and vehicles in an effort to manage factors such as traffic flows and traffic routing to improve safety and reduce transportation times and fuel consumption.

5.41 The short-list includes the following items:

- Intelligent Transport Systems (ITS) includes selective vehicle priority (buses), queue management techniques;
- Urban traffic control (UTC) systems use signal settings to optimise a given objective function;
- Real-Time Passenger Information (RTPI); and
- Design and implement a signage and car park management system that directs the driver to the nearest car park at their initial entry corridor to the city centre and/or at Park and Ride entry points.

5.42 Salisbury has an existing ITS system that includes many of the items described above, although not all are used to their full potential. ITS requires a strategy in its own right, with its own set of objectives and an implementation plan and as such, can only be described in broad contextual terms at this level. However, it is envisaged that the ITS will be dealt with in two distinct phases:

- undertake a complete review and make recommendations for improvements to existing systems and implement if required; and
- programme of implementation of future systems.

Complete review and overhaul of existing systems

5.43 There are two reasons for carrying out a full detailed study and overhaul of the systems already in place. Firstly it enables a greater understanding of the level of new or upgrading of infrastructure that is required. Secondly, the review enables the existing system to maximise its benefits and for additional features or improvements to be added.

5.44 After the review of the system, further reviews of SCOOT regions or MOVA operated junctions and other vehicle actuated signal sites would be undertaken to understand what improvements / changes could be made realise further benefits in traffic flows.

5.45 Then the approach would focus on checking the existing RTPI system to ensure correct or up to date timetable and stop data was being uploaded and used by the system and that correct information was being provided to the public. This includes ensuring that the bus operator's schedules were realistic. A similar approach would be adopted for the VMS network.

5.46 In such a circumstance it is possible to consider that select vehicle detection for buses may not be required as the traffic signals provide stability to the network and ensure that buses run to timetable; although options to improve bus journeys would be considered.

Programme of implementation of future systems

5.47 It is envisaged that the programme and scope of te future system will involve the following elements:

- update and optimisation of SCOOT / UTC signal control, possible use of fixed time plans during times of network saturation;
- uoll out of plans within UTC to allow greater network management of traffic during planned and unplanned events;
- VMS and further car park guidance (if required) to influence traffic and allow drivers to make informed decisions. This will also coincide with any car park and public information strategies that exist;

- estimated journey travel times for the network;
- implementation of Automatic Number Plate Recognition (ANPR) to measure network performance and provide drivers with information;
- air quality management, via the use of air quality monitors providing data to a central database and allowing the UTC to effect traffic if required, (although it should be noted that such an action may simply shift the problem elsewhere).

Public Transport

5.48 Public transport is a key feature of Radical Scenario as it is a part of all of the strategy components. The short-list includes the following items (although those shown in italics are beyond the scope of the study on commercial grounds – as WC is not able to directly determine private operators' commercial strategies):

- public transport service levels can be modified to increase patronage;
- increase the local bus frequency for local commuters;
- provide key public transport stops next to significant city centre destinations or improve existing stops to cater for the increase in demand; this includes high quality shelters, signage and cycle parking;
- wherever possible introduce bus priority measures on all Park and Ride routes into the city centre;
- *fare levels to encourage patronage;*
- improve the rail station as a public transport interchange;
- provide a west to east public transport link from Churchfields stopping at key destinations within the city centre to Southampton Road; this includes a bus/pedestrian and cycle-only connection from Exeter Street through to Southampton Road;
- bus priorities enable buses to bypass congested traffic;
- extend and divert some of the bus services to serve the rail station;
- wider availability of 'Plusbus' rail tickets to encourage bus to station;
- concessionary fares (wider availability of concessionary fares - students);
- *fares structures (zonal fares - £x to travel within Salisbury for x hours);*
- create a space for bus stops and bus turn around within the station forecourt;

Fares

5.49 Where new services run parallel to existing services, it is reasonable to assume that fares should broadly mirror the prevailing fares charged. This is because, at least during the pump-priming phases, these services will receive subsidy from public funds. It could be construed as anti-competitive if services in receipt of public funds undercut established commercially-provided services.

5.50 It may be possible, however, to negotiate with bus operators a cap on the maximum fare charged as part of a voluntary or statutory Quality Bus Partnership. The most probable context would be that in return for, say, provision of bus priority measures, the operator(s) sign up to specified quality standards – including a maximum fare. The powers are contained in the Local Transport Act 2008. To date we are not aware of any agreement concluded with this term included.

5.51 Local authorities have statutory duties and powers to offer concessions. They have a duty to offer an off-peak free concession to the over 60's (eligibility to be pegged to the female retirement age

in due course) and certain classes of disabled persons. Authorities have powers to extend this concession to all-day and to offer a concession to young people aged 16-19 in full-time education. Certain authorities have used well-being powers to extend the latter concession to all young people aged 16-19.

5.52 So whilst it is unlikely that fares could be modified to influence demand without significant agreement with existing operators, we recommend extending the existing PlusBus zone to cover the new developments (Figure 5.6).

Figure 5.6 – Existing PlusBus Zone

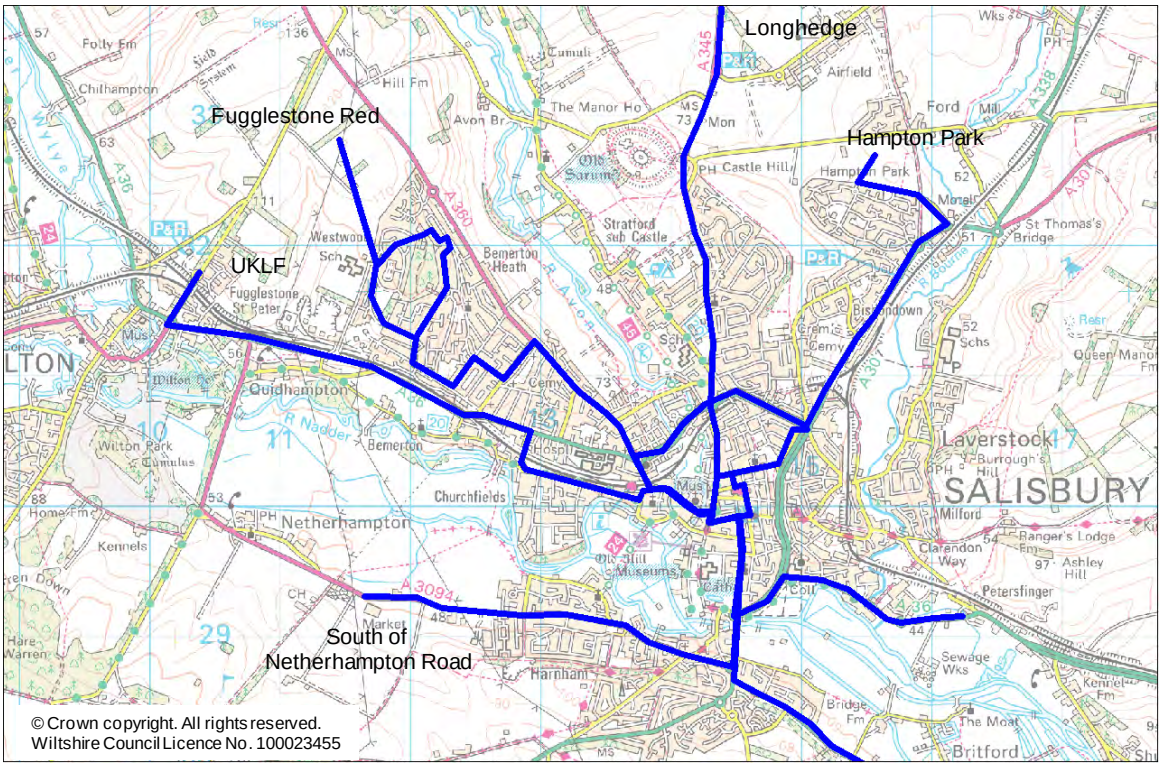
5.53 Bus Routes

5.54 The Established Approach ensured that all new developments had bus services of at least two per hour in the peaks to Salisbury city centre. The Radical Scenario takes that further, with the following proposals:

- high frequency (six/hour) from Wilton Park and ride to Petersfinger Park and Ride, serving Wilton, Churchfields, Salisbury Station, the city centre and Southampton Road;
- high frequency (six/hour) from Longhedge via A345 to the city centre, with three/hour serving the Salisbury Station;
- high frequency (six/hour) from Hampton Park development to South of Harnham Road development via the city centre, with three/hour serving the Salisbury Station; and
- extending the Pulseline service from Salisbury Hospital to Fugglestone Red development, ensuring high frequency (six/hour).

5.55 These services will take of advantage of the proposed ITS system , with signals optimised to ensure that buses run to realistic timetables and advantages given to buses through the provision of bus lanes / gates where possible. These routes are shown in Figure 5.7.

Figure 5.7 – Proposed High Frequency Bus Routes



5.56 Bus Infrastructure

5.57 The Radical Approach includes all bus stops be replaced with bus shelters that include seating and real time passenger information.

5.58 The enhanced bus routes will ensure that there are at least three buses per hour along every radial corridor to serve Salisbury Station. The station approach will be enhanced to provide circulation capacity for the buses and the station area enhanced to provide covered waiting areas.

Smarter Choices

5.59 'Smarter choices' refers to marketing and promotional campaigns, and other measures (e.g. travel plans, car sharing and car clubs) that try to change 'hearts and minds' and encourage travel in more sustainable ways. The short-list includes the following items:

- improve crossing facilities for pedestrians/cyclists and junction improvements along the A36 ring road; and
- create cycle parking and taxi ranks within the station forecourt.

5.60 Wiltshire Council's main achievements to date in this are

- creating a Smarter Choices team with its own website;
- helping 80% of schools complete a school travel plan and creating Wiltshire Sustainable Modes of Travel Strategy';
- completing the Council's own travel plan;
- use the planning system to develop residential and business travel plans and publishing a Supplementary Planning Document on Development Related Travel Plans;
- the creation and promotion of the Wiltshire Car Share Scheme; and

- promoting 'Smarter Choices Communities' which aims to improve sustainable access to services in Wiltshire.

Opportunities to Improve

5.61 Looking at the good practice from transport and other areas of behaviour change we have identified the following key areas where change could be made:

- **Creating a Social Marketing Strategy** - Examples from areas such as drink-driving and smoking cessation suggest that fundamental change is possible but it will require a coordinated approach, guided by a clear strategy. Social Marketing is often (incorrectly) described as the advertising of social things. It actually describes a form of bottom-up marketing in which the development of a shared understanding of a problem leads promoter, partners and the public themselves to arrive at a solution.
- **Developing an Understanding -** A Social Marketing Guide compares various alternatives for understanding behaviour change and suggests a 'Three Ns' model as a useful conceptual framework, based loosely on the Theory of Planned behaviour. This considers the Need to travel, the Networks for non-car users and the 'Niceties' of personal inclination to change and highlights how there is no single solution. Greatest change will be gained where there is understanding of how change happens. Current thinking stresses the importance of making it clear to participants that the desired change in behaviour is within their capacity (known as 'perceived behavioural control').
- **Partnership Working -** The five goals of the DfT DaSTS strategy suggests that a key requirement for achieving goals will be partnership working. This will involve more than just traditional partners and will especially require forming links with the health sector and those working to support employment and connectivity.

Potential Impact of Smarter Choices

5.62 The DfT Smarter Choices guidance lists 10 separate measures, with further ideas developed since its publication, including residential travel plans and measures to support low carbon driving. Although LTP1 guidance focussed exclusively on work and school travel plans it is clear that a more holistic approach will be needed.

5.63 As Table 5.1 shows, smarter choices interventions from other parts of the UK demonstrate that there is more to Smarter Choices than just travel plans. This table also begins to suggest the level of change possible.

Table 5.1 – Potential Impact of Smarter Choices

Journey purpose	Soft factor	Impact* Non-urban	Impact * Urban
Journey to work	Workplace travel plans	2 or 4%	5 or 9%
	Car sharing	0.6 or 11%	0.6 or 11%
	Teleworking	3 or 12%	3 or 12%
Combined impact of workplace travel plans, car sharing and teleworking, allowing for double counting		*5 or 24%*	*8 or 26%*
Journey to school	School travel plans	4 or 20%	4 or 20%
Business journeys	Tele-conferencing	2.5 or 18%	2.5 or 18%
Shopping trips	Home shopping for groceries	1 or 4%	1 or 4%
Personal business trips	Local collection points	1.5%	1.5%

Journey purpose	Soft factor	Impact* Non-urban	Impact * Urban
Multiple journey purposes	Personalised travel planning	<1%	1 or 3%
	Public transport information and marketing	0.1 or 0.3%	0.3 or 1.1%
	Travel awareness campaigns	0.1 or 1%	0.1 or 1%
	Car clubs		0.03% - 0.06% (up to 3% long term)

From DfT (2004) page 348 expressed as a percentage reduction in car mileage for car clubs, car sharing, home shopping for groceries and local collection points otherwise car trips.

Next Steps

5.64 Targeted interventions are essential to continued success, once blanket coverage of workplace and school travel plans have been undertaken as Smarter Choices is an on-going campaign to:

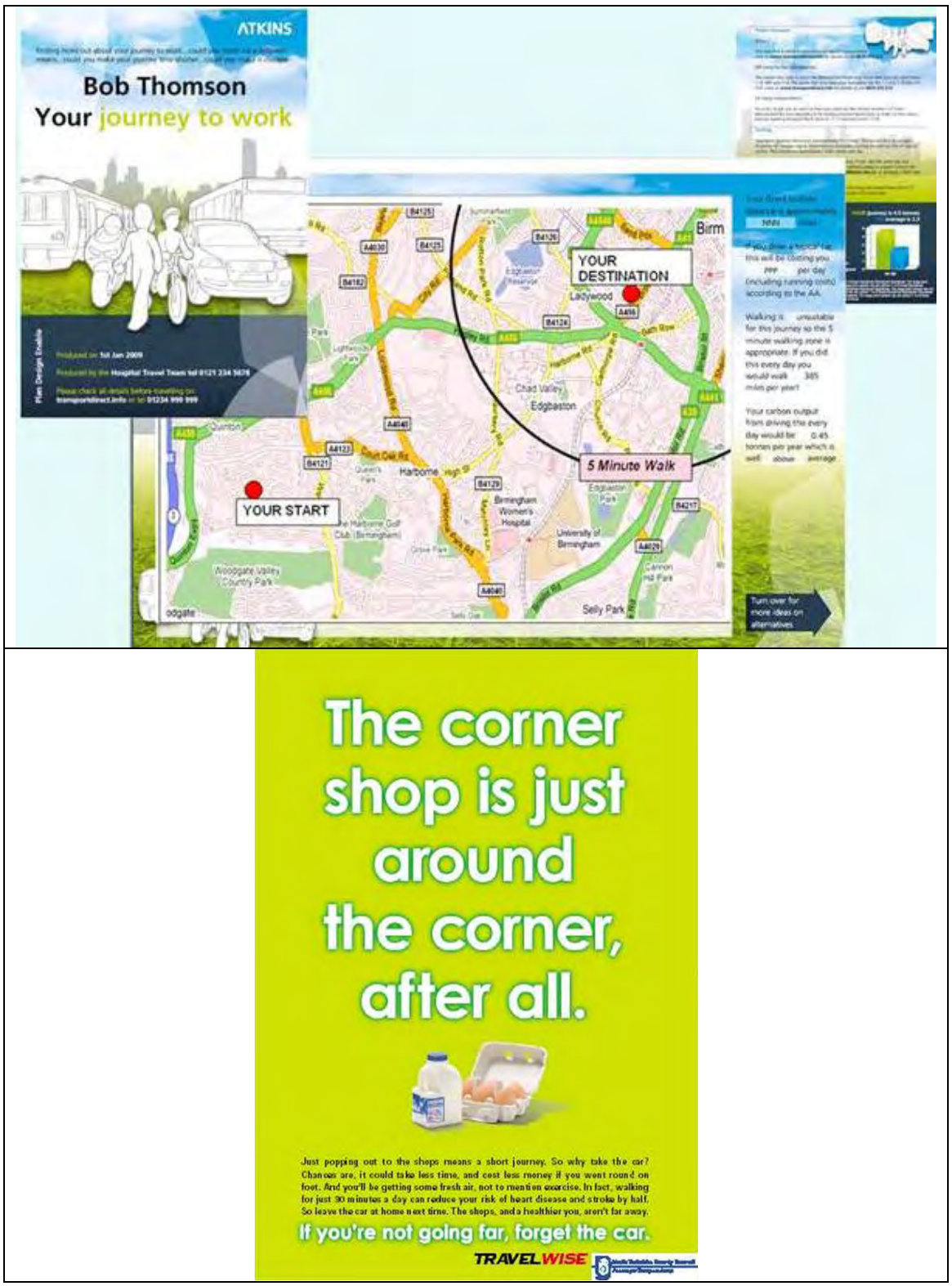
- firstly, ensure that behaviour change is re-enforced; and
- secondly, that benefits from reduce car traffic are not eroded by induced traffic.

5.65 An approach being followed by some areas is to target schools based on their capacity for change, based on analysis of things such as how many people live within easy cycling, walking or free school bus distance. The campaign effort is then focused on those areas with the greatest potential for continued change rather than concentrating on a district-wide or school-wide approach.

5.66 As part of an overall strategy marketers in other fields would commonly create a marketing communications plan based on a balanced marketing mix. This will, for example, work to a hierarchy of marketing communications in which there will be:

- An overall campaign to raise awareness of the need to consider a sustainable approach to travel and access. This will include internal marketing and lobbying (for example with respect to the location of post offices and the need for housing estates that are both crime free and permeable)
- A set of thematic interventions at a medium intensity. For example the school travel plan campaign fits into this level.
- A direct, highly targeted approach. The highest cost approach can also achieve the biggest changes. This will be reserved for areas of special need and will include Personalised Travel Planning and potentially more cost-effective semi-personalised approaches (see Figure 5.8).

Figure 5.8 – Marketing Options



An Action Plan for Salisbury

5.67 The Radical Approach includes the following actions:

- continue our effective programme of school, workplace and residential travel planning and promotion of Wiltshire Car Share.

- increase our understanding of the complex nature of behaviour change
- create a Social Marketing Strategy
- create an action plan based on the full range of Smarter Choices interventions
- create a map to show where each of the DaSTS goals show greatest need and use this to plan suitable interventions.
- designate a workstream to develop partnerships and do internal marketing in important areas such as accessibility planning

Likely Impacts

5.68 The most influential evaluation of sustainable transport promotion is the “Smarter Choices” report published by DfT in 2004. This concluded that a high intensity scenario – defined as being one with a fully integrated package of smarter travel choice measures complemented by supportive demand management measures - could achieve reductions in peak period urban traffic of about 21%.

5.69 Three DfT-funded Sustainable Travel Demonstration Towns ran a full package of 'smarter choices' schemes over five years between 2004 and 2008. At the end of the five-year project, car use had fallen by up to 9 per cent across the three towns.

5.70 Our estimate is that we can achieve a maximum of 10 to 15% percent in peak traffic in specially targeted areas, though this reduction would need to be accompanied by measures to lock in the benefits for this to be sustained. For access to the city centre, we have assumed a long term reduction in traffic of 3%, with the ITS system being used to look in this reduction in traffic.

6. Performance against Objectives

Introduction

6.1 This chapter provides an assessment of the performance of the two options - the Established Approach and Radical Option – against the five primary objectives the strategy needs to meet. The performance of the strategy options has been assessed making use of the transport modelling and analysis tools described in Chapter 3. The assessment process makes use of forecasts of travel patterns and transport system performance to compare each of the two strategy options against the Do-Nothing scenario (also described in Chapter Three) using the metrics defined in Chapter Two.

To support and help improve the vitality, viability and resilience of Salisbury's economy

Metrics

6.2 The achievement of this objective has been assessed by assessing the extent to which each of the options enables:

- travel to Salisbury city centre - as measured by the estimated forecast demand for travel to the city centre by car and public transport. If the vitality of Salisbury's economy is be maintained and enhanced then a successful transport strategy would be expected to enable more perople to travel to the city centre than in a without-strategy scenario; and
- the level of provision for access to the city centre as defined by the number of parking spaces available and the level of park-and-ride and bus provision.

Performance

6.3 Forecast daily[3] demand for travel to the city centre in 2026 is shown in Figure 6.1. The figure shows the number of daily trips made by individuals (person trips) to destinations within Salisbury city centre.

6.4 There is approximately a 9% increase in daily trips to the city centre between 2008 and 2026. This increase is not as high as typical growth in travel between 2008 and 2026 (approximately 30%) because only a limited amount of the proposed development occurs in the city centre.

6.5 Compared with the Do-Nothing Scenario, the Established Approach results in 2% more daily car trips to the city centre but 16% fewer daily public transport trips. The overall affect of the Established Approach results in 1% fewer daily trips to the city centre.

6.6 The Radical Option, when compared against the Do-Nothing Scenario results in a 6% decrease in daily car trips but a 29% increase in daily public transport trips. This is a result of increase parking charges, increased public transport provision and, the Smarter Choices initiatives, that will lead to more walking and cycling to the city centre. The overall affect of the Radical Option results in 2% more trips to the city centre.

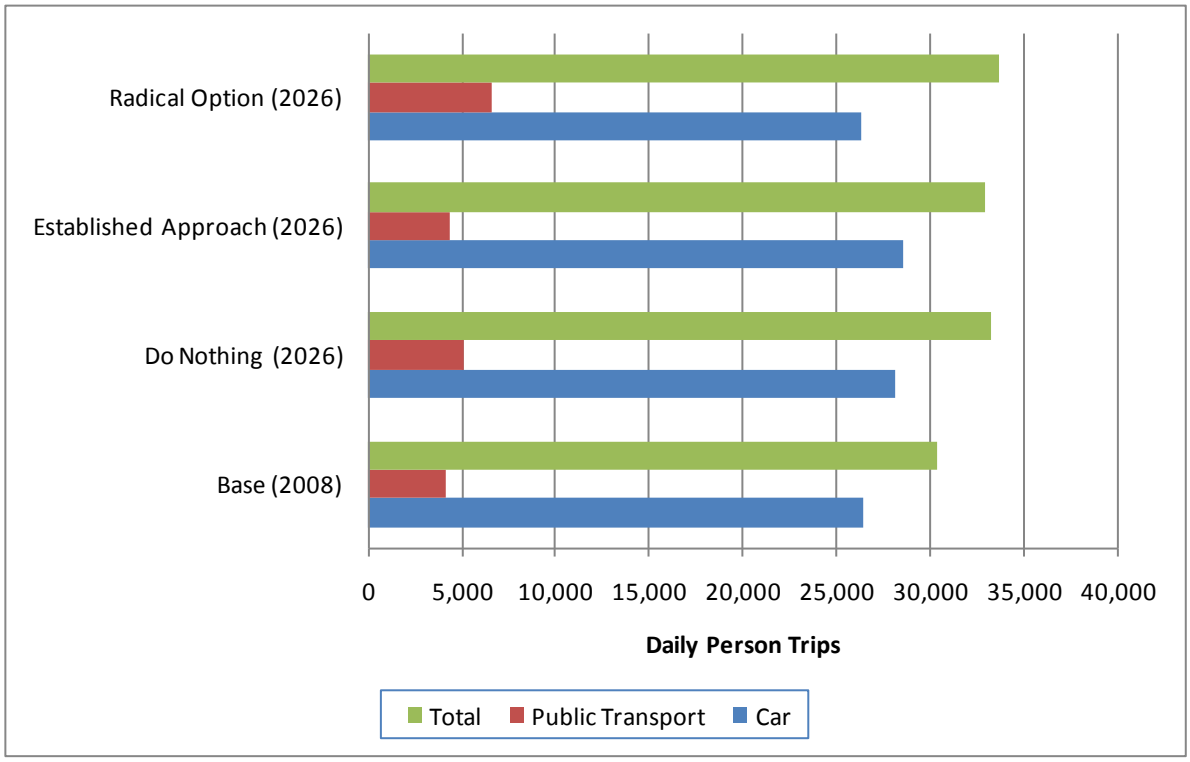
6.7 Detailed analysis indicates that:

- The Established Approach is forecast to result in more trips to be made to the city centre by car – in both morning and inter peak – but because of a lower level of public transport and park-and-ride provision the total number of trips in the morning peak is less than in the Do-Nothing scenario. In the inter peak, levels of travel to the city centre are similar to the Do-Nothing scenario.

[3] Daily travel assumes morning peak hour x 2 + inter-peak hour x 6 + evening peak hour x 2

- The Radical Option enables more trips to be made to the city centre in the morning peak – though with a substantially higher proportion of trips made by public transport than in either the Do-Nothing scenario or the Established Approach. However, the Radical Option is not forecast to increase motorised travel to the city centre in the inter peak, partly due to the increase in car parking charges and also as a result of the Smarter Choices initiatives that should ensure that more people travel to the city centre by walking or cycling.

Figure 6.1 – Daily Person Trips to City Centre



6.8 The level of provision for city centre destinating trips is shown in Table 6.1. The purpose of this table is to show how much parking and public transport capacity exists in the city centre (parking spaces refer to those off-street spaces operated by Wiltshire Council).

6.9 The Established Approach does not change the amount of parking or number of buses into the city centre. The Radical Approach converts Culver Street car park from long stay to short stay and considerably increases the number of buses to the city centre.

Table 6.1 –City Centre Parking and Morning Peak Bus Provision

	Do-Nothing	Established Approach	Radical Option
Long-stay parking	1391	1391	861
Short-stay parking	1470	1470	2000
Park and Ride spaces	2336	2336	2336
Buses in morning peak	84	74	111

Note: Parking spaces refer to those off-street spaces operated by Wiltshire Council

Conclusion

6.10 This objective aims to support and help improve the vitality, viability and resilience of Salisbury's economy. The objective was measured by considering demand to the city centre, access to the city centre in terms of parking and public transport and highway journey times to the city centre.

6.11 In the base year there are approximately 30,000 daily trips by car and public transport to the city centre and there are approximately 2800 parking spaces in the centre of Salisbury operated by Wiltshire Council and approximately 80 buses arriving in Salisbury between 8am and 9am.

6.12 The impact of the two strategy options can be summarised as:

- The Established Approach forecasts a 1% decrease in daily trips to the city centre compared with the Do-Nothing Scenario;
- The Radical Option forecasts a 2% increase in daily trips to the city centre, with a reduction in car trips and an increase in public transport trips; and
- Neither the Established Approach nor Radical Option alters parking spaces within the city centre, but the Radical Option increases the number of buses serving the city centre.

6.13 The Radical Option therefore contributes most towards maintaining the vitality, viability and resilience of Salisbury's economy.

To support planned growth and ensure that developments provide for their transport requirements and mitigate their traffic impacts

Metrics

6.14 The achievement of this objective has been assessed by assessing the extent to which each of the options enables:

- transport system performance to be maintained and improved, as measured by the amount of travel on the highway and public transport networks, time spent travelling and the level of congestion;
- air quality problems as a result of emissions from transport sources to be minimised; and
- carbon dioxide emissions from transport sources to be minimised.

Performance

6.15 Network Performance

6.16 Highway performance, as measured by PCU kilometres[4] – reflecting changes in traffic, PCU hours – reflecting changes in congestion, and speed are shown in Table 6.2 for the morning peak, inter-peak and evening peak.

6.17 There is an increase in traffic of between 30-35% between the base year and the 2026 Do-Nothing Scenario for all time periods yet congestion increases by approximately 60% in the morning peak hour, 45% in the inter-peak and 90% in evening peak hour. This results in forecast decreases in average journey speed of 18%, 8% and 30% for morning peak hour, inter-peak and evening peak hour respectively.

6.18 The Established Approach results in marginal decreases in traffic and congestion in all time periods compared to the Do-Nothing scenario.

[4] Traffic reduction is estimated using reduction in passenger car unit (pcu) kilometres travelled on the network as a proxy for vehicle kilometres. Pcus enable the impact of different sizes of vehicles to be represented as a single measure (e.g. a typical HGV is represented as a pcu of 3 whereas a car has a pcu value of 1). Congestion reduction uses reduction in pcu hours travelled on the network as a proxy – an indicator of the total time spent travelling.

6.19 The Radical Option, with smarter choices, demand management and improved public transport and ITS results in a more significant reduction in traffic and congestion compared to the Do-Nothing scenario and subsequently higher speeds throughout the day . The Radical Option is forecast to reduce congestion by approximately 8% compared with the Do-Nothing scenario. The Radical Option also has a considerable impact in the evening peak, when congestion is forecast to reduce by over 15%.

Table 6.2 – Base Year (2008) and Forecast Year (2026) Highway Performance in Salisbury Urban Area

	2008 Base Year	2026 Do-Nothing	2026 Established Approach	2026 Radical Option
Morning Peak Hour				
Traffic (PCU kilometres)	60,577	79,451	78,366	76,026
Congestion (PCU hours)	1,703	2,735	2,663	2,522
Speed (km/hr)	36	29	29	30
Inter-Peak Hour				
Traffic (PCU kilometres)	45,453	60,393	60,532	58,393
Congestion (PCU hours)	1,226	1,761	1,747	1,658
Speed (km/hr)	37	34	35	35
Evening Peak Hour				
Traffic (PCU kilometres)	58,010	77,791	77,449	74,381
Congestion (PCU hours)	1,600	3,052	2,988	2,552
Speed (km/hr)	36	26	26	29

6.20 Public transport performance as measured by passenger kilometres, passenger hours and passenger boardings are shown in Table 6.3 for the morning peak, inter-peak and evening peak. These metrics provide a means of comparing time and distance travelled

6.21 These statistics show the Radical Option produces more bus boardings and subsequently more bus hours and bus kilometres than the Established Approach. Further work will be done in the Preferred Strategy phase of the study to demonstrate the accessibility of key locations to key services and attractions.

Table 6.3 – Public Transport Performance Salisbury Urban Area

	2008 Base Year	2026 Do-Nothing	2026 Established Approach	2026 Radical Option
Morning Peak Hour				
Passenger kilometres	61,669	63,508	63,657	66,627
Passenger hours	1,133	1,300	1,291	1,519
Passenger boarding	2,545	3,319	2,992	4,258
Inter-Peak Hour				
Passenger kilometres	47,302	48,299	51,990	52,799
Passenger hours	841	903	1,047	1,124
Passenger boarding	1,720	2,056	2,245	2,692
Evening Peak Hour				
Passenger kilometres	77,460	80,348	84,895	86,244
Passenger hours	1,285	1,438	1,618	1,739
Passenger boarding	2,432	3,060	3,381	3,956

Air Quality

6.22 The calculation of NO_X, and PM_{10}[5] is based upon NAEI emissions factors and fleet composition forecasts as defined in DfT appraisal guidance. Modelled speed and flow in the morning peak and inter-peak has been used to calculate these changes in vehicle emissions. The calculations assume that vehicle fleet and fuel technology improves over time to reduce NO_X and PM_{10} pollutants.

6.23 Air quality performance for Salisbury Air Quality Management Area (AQMA) against the base year, as measured by changes in NO_X and PM_{10} are shown Table 6.4. Reductions in NO_X and PM_{10} are assumed to occur due to changes in technology that we will result in lower emissions of these gases and particles; different transport interventions will affect the rate of this change.

6.24 The Radical Option is forecast to produce the greatest reduction in NO_X and PM_{10} compared with the base year.

Table 6.4 – AQMA Performance Against Base Year

	Do-Nothing	Established Approach	Radical Option
NO_X	-31%	-33%	-34%
PM_{10}	-27%	-28%	-29%

[5] The PM10 (particles measuring 10µm or less) standard was designed to identify those particles likely to be inhaled by humans, and PM10 has become the generally accepted measure of particulate material in the atmosphere in the UK and in Europe.
Nitrogen oxides (NOx) include various nitrogen compounds like nitrogen dioxide (NO2) and nitric oxide (NO). These compounds play an important role in the atmospheric reactions that create harmful particulate matter, ground-level ozone (smog) and acid rain. NOx forms when fuels are burned at high temperatures.

Contribution to Tackling Climate Change

6.25 Carbon dioxide CO_2 is a principal greenhouse gas. With greenhouse gas emissions from transport representing 21 per cent of total UK domestic emissions, decarbonising transport is consider to be an essential part of the solution to reducing greenhouse emissions (*DfT 2009, Low Carbon Transport: A Greener Future*).

6.26 The calculation of CO_2 is based upon National Atmospheric Emissions Inventory (NAEI) emissions factors and fleet composition forecasts as defined in DfT appraisal guidance. Modelled speed and flow in the morning peak and inter-peak has been used to calculate these changes in vehicle emissions. The calculations assume that vehicle fleet and fuel technology improves over time to reduce CO_2 pollutants, although increase in traffic will outweigh these benefits.

6.27 Doing nothing to the transport network in Salisbury would increase transport related carbon emissions by 2% compared to base year in the AQMA (Table 6.5). The Established Option would lead to a 1% increase whilst the Radical Option would not change transport related carbon emissions in the AQMA. Further work will be undertaken to determine the city-wide carbon emissions.

Table 6.5 – Carbon Performance Against Base Year in AQMA

	Do-Nothing	Established Approach	Radical Option
Carbon	+2%	+1%	0%

Conclusion

6.28 This objective aims to support planned growth and ensure that developments provide for their transport requirements and mitigate their traffic impacts. The objective was measured by considering network-wide highway and public transport performance statistics and air quality statistics as an indication of mitigation. The network-wide approach is important for the Salisbury Transport Strategy as the impact of any particularly development will be felt across the whole network and should not be considered in isolation.

6.29 The average base year network-wide speeds are approximately 36km/h in the morning and evening peaks and 37km/h in the inter-peak. This implies that over the course of the modelled hour, the whole network is relatively uncongested; although that is not to say that there is no congestion, specifically at some locations and certain times. The impact of the proposed growth reduces these network-wide speeds by 18% in the morning peak and 30% in the evening peak when compared with the Do-Nothing Scenario.

6.30 The impact of the approaches can be summarised as:

- The Established Approach has only a marginal impact on the levels of traffic and congestion across the network compared with the Do-Nothing Scenario in 2026;
- The Radical Option is forecast to reduce congestion by approximately 8% compared with the Do-Nothing scenario in 2026 in the morning peak hour and over 15% in the evening peak hour;
- The Radical Option contributes to the greatest reduction in NO_X and PM_{10}.
- The Radical Option does not change carbon emissions compared with the Base Year but reduces carbon compared with the Do-Nothing Scenario and Established Approach.

6.31 The Radical Option therefore contributes towards supporting planned growth and ensuring that developments provide for their transport requirements and mitigate their traffic impacts.

To provide, support and promote a choice of sustainable transport alternatives

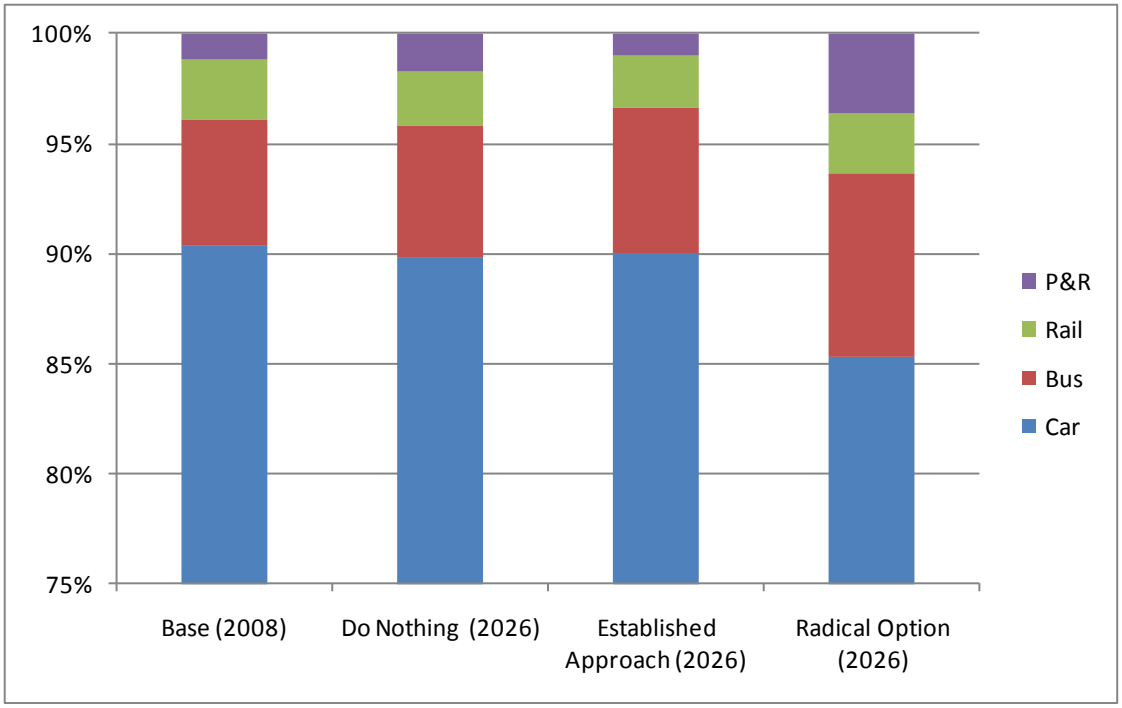
Metrics

6.32 The achievement of this objective has been assessed by assessing the extent to which each of the options is forecast to reduce the proportion of journeys made by car.

Performance

6.33 Daily mode share for all trips within, to, from and through Salisbury is shown in Figure 6.2. In the base year, the daily mode share for car trips is approximately 90%. This remains the same for the Do-Nothing Scenario and the Established Approach. The Radical Option, with higher parking charges, improved bus and park and ride services and smarter choices reduces daily car mode share to approximately 85%.

Figure 6.2 – Daily Mode Share for all Trips



6.34 Table 6.6 shows the motorised mode share for journeys to Salisbury city centre and across the urban area for the morning peak. In the base year, 76% of trips to the city centre were by car and 90% of trips within the urban area were by car.

6.35 The forecasts show that:

- The Do-Nothing scenario has a slight decrease in car mode and an increase in bus mode share compared with the base year, as congestion increases and park and ride becomes more attractive;
- The reduced park and ride services in the Established Approach results in increased car mode share and decreased bus mode share both to the city centre and within the urban area compared with the Do-Nothing Scenario; and
- The Radical Option, with significant investment in park and ride and public transport, results in greatly reduced car mode share to the city centre. The mode share to the city centre is forecast to change from approximately one quarter by public transport to one third. Although more modest, the Radical Option is also forecast to reduce car mode share for journeys within the urban area.

Table 6.6 – Mode Share in the Morning Peak Hour

	2008 Base Year	2026 Do-Nothing Scenario	2026 Established Approach	2026 Radical Option
All journeys to the city centre				
Car	76%	74%	81%	66%
Bus	21%	24%	17%	33%
Rail	2%	1%	2%	1%
Journeys within Salisbury Urban Area (including urban area to the city centre)				
Car	90%	88%	91%	85%
Bus	9%	11%	8%	14%
Rail	1%	1%	1%	1%

Conclusion

6.36 In the base year the mode share for travel by car was approximately 90% for journeys throughout Salisbury and also within the urban area in the morning peak hour (the period of most intense traffic). This suggests a high propensity to drive as well as an ease to both drive and park in Salisbury.

6.37 Mode sare figures change little between the base year (2008) and the Do-Nothing Scenario in 2026, although increased congestion has resulted in slight increases in park and ride demand.

6.38 The Established Approach reduces sustainable transport alternatives and car use to the city centre increases as a result.

6.39 The Radical Option significantly increases sustainable transport alternatives, particularly for journeys to the city centre. This is reflected in the reduced car mode share not just for journeys to the city centre but for journeys in the urban area too.

6.40 The Radical Approach therefore contributes towards providing, supporting and promoting a choice of sustainable transport alternatives.

To minimise traffic delays and disruption, and improve journey time reliability on key routes

Metrics

6.41 The achievement of this objective has been assessed by assessing the extent to which each of the options is forecast to improve highway network performance as measured by:

- junction delays; and
- journey times along key routes.

Performance

6.42 Junction delay is a more detailed review of network performance. The junctions at which the most significant delays can occur in the Salisbury area, and which critically determine the overall performance of the highway network, are considered to be:

- Harnham Gyratory;

- Exeter Street Roundabout;
- College Roundabout;
- St Mark's Roundabout;
- Castle Street Roundabout;
- St Paul's Roundabout; and
- Park Wall Junction.

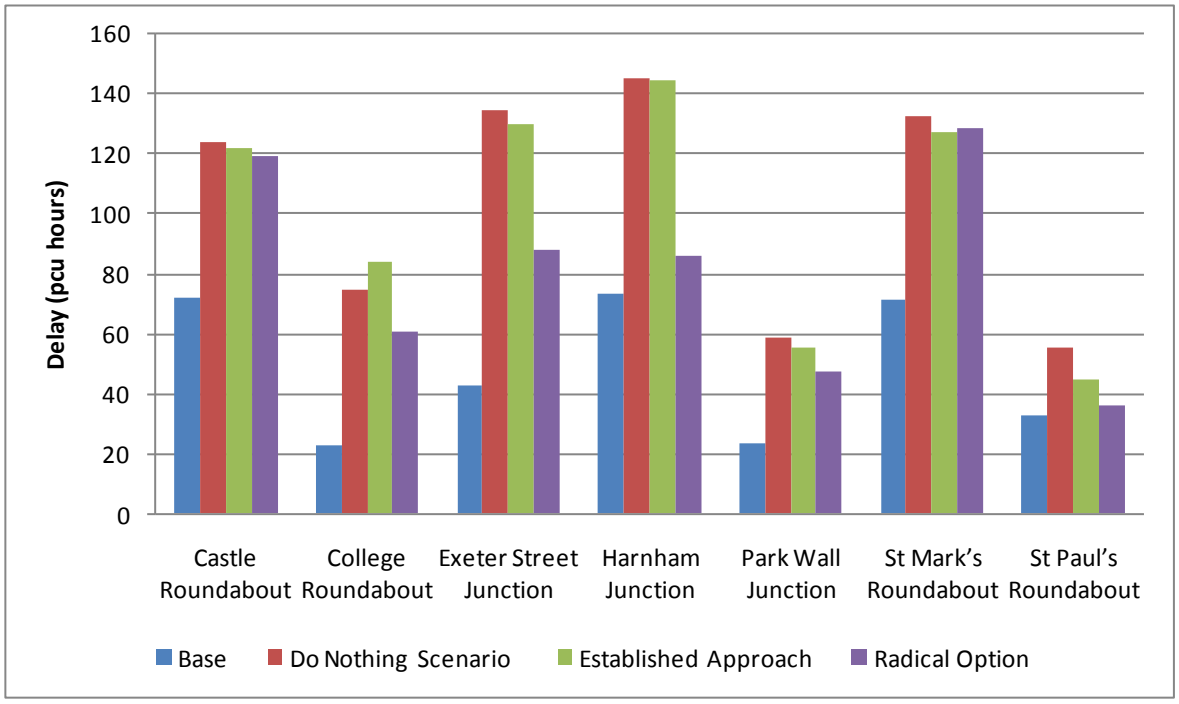
6.43 Junction improvements tend to result in more traffic passing through a particular junction and thus consume any of the additionally created capacity. This is particularly so in Salisbury, where the Netherhampton Road provides an alternative route for traffic passing through Salisbury and changes to junctions such as Harnham Gyratory can result in more traffic travelling along certain routes.

6.44 Estimated total morning peak delays (measured in pcu hours) experienced at each of the key junctions in Salisbury are shown in Figure 6.3 for the base year and each forecast scenario. This is a measure of the total amount of delay at the junction, i.e. summed over all vehicles passing through the junction and not the average delay per vehicle.

6.45 The Figure shows how delay increases at each junction from the base to the Do-Nothing Scenario. The Figure also shows that there is very little difference between the Do-Nothing Scenario and the Established Approach.

6.46 The Radical Approach has improved delays at all junctions compared with the Do-Nothing Scenario and the revised Exeter Street and Harnham Junctions have reduced delays below the Do-Nothing Scenario level.

Figure 6.3 – Morning Peak Hour Junction Delays (pcu hours)

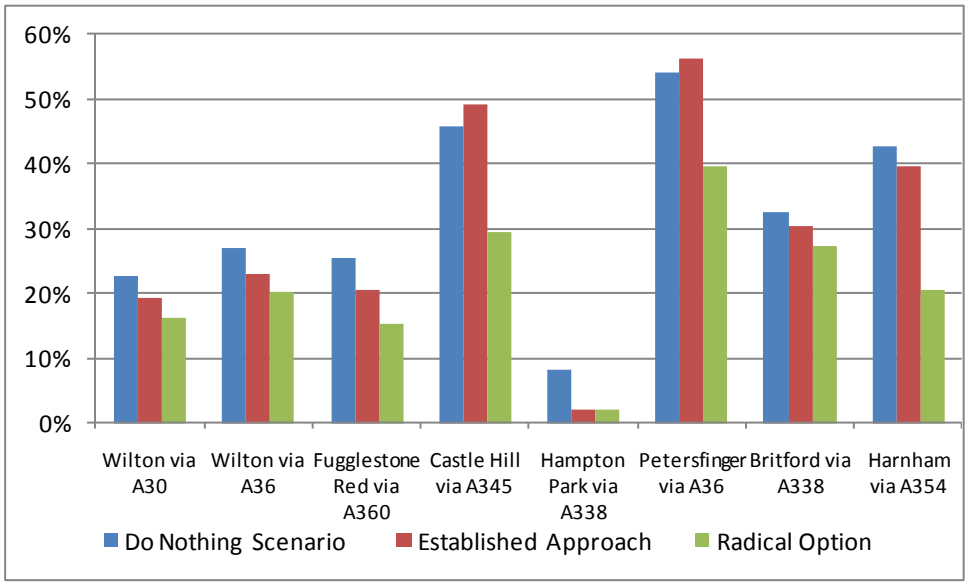


6.47 Detailed analysis shows that most of the junctions listed above still have high volume to capacity ratios[6] but these results show that, despite the high levels of traffic passing through the junctions, delays are being reduced in the Radical Approach.

6.48 Changes in morning peak hour journey times for routes into Salisbury city centre compared with the base year are shown in Figure 6.4. The morning peak hour shows that greatest changes in journey times.

6.49 Journey times from the west to the city centre typically increase by 20% in the morning peak hour when comparing the 2026 scenarios against the 2008 base year. Increases are greater from Castle Hill, Britford and Harnham. However, the Radical Option manages to keep increases in journey time to below 40% (no more than three minutes) when compared against the base year.

Figure 6.4 - Changes in Journey Times to City Centre



Summary

6.50 The junctions highlighted in this report are generally the worst performing in Salisbury. The delays at these junctions in the morning peak hour are forecast to double or in some cases treble between 2008 and 2026 in the Do-Nothing Scenario and the Established Approach.

6.51 The Radical Option manages to prevent delays from doubling, and although the junctions are operating close to capacity, they do not exceed capacity.

6.52 Further work is required before the new junction layouts at Harnham and Exeter Street can be considered as part of the final Salisbury Transport Strategy but network-wide statistics show that the Radical Option reduces congestion across the network.

6.53 It is not possible to model journey time reliability using the tools available, although it can be concluded that with reduction in delays at key junctions and improved ITS, the network should be more reliable.

6.54 The Radical Approach therefore contributes towards minimising traffic delays and disruption and improves journey time reliability on key routes.

[6] A volume to capacity ratio compares the volume of traffic using a particular arm of a junction to the capacity of that arm. A value of 1 or more indicates that the junction is at or above capacity.

To ensure that the Salisbury Transport Strategy is affordable and capable of being delivered

Metrics

6.55 This objective has been assessed by assessing the extent to which each of the options can be implemented given the likely level is funding available, comprising both capital and revenue funding.

Performance

6.56 The intervention measures considered for the Salisbury Transport Strategy have all been assessed by Wiltshire Council officers and have been considered capable of being delivered.

6.57 The cost of this Radical Option has been estimated as shown in Table 6.7. The costs are indicative only and contain a number of exclusions that require verification. The Radical Option is more expensive than the Established Approach.

6.58 The Established Approach has limited cost that could be attributed to developers as most of the actions would be a continuation of work that Wiltshire Council would do in Salisbury. There would be a small cost in ensuring that at least two buses per hour served the developments due to re-routing some services and there would be a further cost of ITS improvements as required.

6.59 The Radical Option is likely to cost something in the region of £15 million. It has previously been calculated that developments in Salisbury could attract a Sustainable Transport levy in the region of £20 million pounds (further details will be available in subsequent reports).

Table 6.7 – Cost Summary

Item	Established Approach	Radical Option						
Parking	No change	Requires further investigation						
Park and ride	Reduction on present costs	Approximate annual cost £1.5 million Approximate annual revenue £1.8 million						
Highway measures Note that this excludes land costs, statutory undertakings (utilities etc) and design and procurement fees.	NA		St Paul's	Harnham	Exeter	Market Sq	Other works	Total
		Road	£310K	£810K	£610K	£800K	£50K	£2580K
		Signals	£110K	£300K	£210K	0K	£500K	£1120K
		Other	£90K	£220K	£370K	£300K	£1000K	£1980K
		Total	£510K	£1330K	£1190K	£1100K	£1550K	£5680K
ITS	Relatively small cost	Approximately £0.5 million (varies greatly depending on scope and duration)						
Public transport	Relatively small cost	Approximate annual cost £2.1 million Approximate annual revenue £0.9 million						
Smarter choices	NA	Approximate annual cost £0.15 million						

7. Conclusions and Recommendations

Impact of Growth on Salisbury's Transport Network

7.1 Assessment undertaken to date – reported in the Salisbury Transport Strategy Forecasting Report – shows that travel by all motorised modes in and around Salisbury can be expected to grow by around 20% by 2026.

7.2 This growth in travel is due to the combined effects of: expected future growth in prosperity and activity; and the impact of higher population and employment levels in the Salisbury area.

7.3 Analysis presented in the Forecasting Report shows that this growth will place the City's transport network under increasing pressure, particularly the highway network; by 2026 congestion levels are forecast such that average speeds on the highway network could be around 10-15% lower than at present.

7.4 However, the Forecasting Report concluded that, while the increases in travel demand and deterioration in transport network performance are projected to be significant, the growth in travel demand could feasibly be accommodated by adopting an appropriately progressive transport strategy comprising a set of interventions that could reasonably be implemented and afforded by Wiltshire Council.

The Identification of Transport Strategy Options

7.5 An objective-led approach to the identification of suitable strategy options has been followed: first identifying key objectives that an implemented transport strategy must aim to address; then defining the range of potential transport interventions that could achieve the objectives. This is to ensure that the strategy is not solution-led. The following primary objectives were identified and agreed by the Steering Group:

- to support and help improve the vitality, viability and resilience of Salisbury's economy;
- to support planned growth and ensure that developments provide for their transport requirements and mitigate their traffic impacts;
- to provide, support and promote a choice of sustainable transport alternatives;
- to minimise traffic delays and disruption, and improve journey time reliability on key routes; and
- to ensure that the Salisbury Transport Strategy is affordable and capable of being delivered.

7.6 At this stage of the strategy development process, two alternative strategy options were developed as a means of achieving these objectives: an Established Approach; and a Radical Option. Whilst these two approaches are not opposites, they provide a means of comparing a continuation of established policies in a financially constrained environment against a range of radical measures that relies more heavily upon developer funding.

- The **Established Approach** is a continuation of transport policies by Wiltshire Council. The position is one of making best use of the existing infrastructure whilst ensuring that the operation of park and ride is both affordable and still caters for passenger demand. The approach assumes public transport provision to developments (and other locations within Salisbury urban area) of at least two buses per hour in the morning and evening peaks and would also benefit from better use of the existing Urban Traffic Control (UTC) system for

buses currently fitted with transponders, whilst transport demand is managed by changes to parking charges.

- The **Radical Option** is more extensive and the guiding feature is to accommodate growth in the most sustainable manner possible. This combines demand management in the form of increased parking restraint in central Salisbury with highway measures on key routes to ensure ease of movements for buses, HGVs and cars. To encourage sustainable travel, demand management is off-set by improved bus services and increased frequency park and ride services. A review of cycling and walking routes shall also ensure the suggestion of safe routes for these journeys. Essential to this is the ability to accommodate growth whilst locking-in benefits of the improvements. Demand management, smarter choices, public transport and park and ride improvements would contribute to reducing demand for highways traffic and Intelligent Transport Systems (ITS) would focus upon locking-in traffic reductions rather than induce additional traffic.

Performance of the Identified Options

7.7 The Option Assessment process has attempted to quantitatively assess the projected performance of each of the two options against the transport strategy objectives, making use of analytical tools and models developed specifically to support the analysis of transport challenges and potential solutions in and around Salisbury.

7.8 The performance of each the two options has been assessed by comparing the extent to which objectives are forecast to be achieved. This has employed metrics drawn from projections of travel demand and network performance in 2026 (the end of the current Regional Spatial Strategy period) for a with-strategy transport scenario against those for a 2026 without-strategy scenario. The without-strategy scenario is termed a “Do-Nothing” scenario.

7.9 Table 7.1 presents an overall summary of the performance of each option against the objectives. The summary indicates whether the strategy makes a negative, neutral or positive impact.

Table 7.1 – Summary of Transport Strategy Option Performance against Primary Objectives

	Established Approach	Radical Option
To support and help improve the vitality, viability and resilience of Salisbury’s economy.	Slight negative	Positive
To support planned growth and ensure that developments provide for their transport requirements and mitigate their traffic impacts.	Neutral	Positive
To provide, support and promote a choice of sustainable transport alternatives.	Slight negative	Positive
To minimise traffic delays and disruption, and improve journey time reliability on key routes.	Neutral	Positive
To ensure that the Salisbury Transport Strategy is affordable and capable of being delivered.	Affordable	Affordable (but requires levy mechanism)

7.10 It is considered that the Radical Option performs better than the Established Approach, for the following reasons:

- it enables more people to enter the city centre - supporting the vitality, viability and resilience of Salisbury's economy;
- compared to the Do-Nothing it makes the greatest contribution of the two options to reducing congestion across the day, and it is projected to improve the performance of the most critical junctions in the highway network;
- it contributes to increasing the use of more sustainable modes of travel – as indicated by the bus mode share for journeys to the city centre improving from one quarter to one third; and
- it has the least impact in terms of air quality and carbon.

7.11 The Radical Option would, though, cost more to implement and operate than the Established Approach. However, although further work is required on scheme costs, it is considered affordable within the expected envelope of total funding likely to be available from local sources, providing funding is secured through an appropriate levy mechanism on new developments. Similarly, although further work is required to assess the detailed deliverability of the interventions included in the Radical Option strategy, none of the schemes require powers that are not already available to WC or rely on untested solutions.

Recommendations and Next Steps

7.12 Based on the Options Assessment process, it is concluded that a strategy based on the Radical Option described above would best enable Salisbury to meet the challenges of addressing future growth in travel demand in a sustainable manner.

7.13 It is recommended that the Radical Option strategy is further refined. Certain of the interventions require more detailed confirmation of their effectiveness, design and cost. In addition, the balance between demand management interventions, public transport improvements and highway improvements needs to be optimised. This is also expected to require more extensive stakeholder consultation. It is also recommended that further work is undertaken to develop: a sufficiently detailed implementation programme; and a mechanism for funding the implementation of the strategy and the subsequent and operation of schemes.

Appendix A

A.1 Long-list of Interventions

Table A.1 – Long-list of Interventions

Group	Intervention
Demand management	Public transport service levels can be modified to increase patronage
Demand management	Fare levels to encourage patronage
Demand management	Bus priorities enable buses to bypass congested traffic
Demand management	Parking charges to manage demand
Demand management	Wide availability of 'Plusbus' rail tickets to encourage bus to station
Demand management	High occupancy vehicle lanes (buses and car share or buses and HGV)
Demand management	Concessionary fares (wider availability of concessionary fares - students)
Demand management	Fares structures (zonal fares - £x to travel within Salisbury for x hours)
Demand management	Light rail (within Salisbury and Wilton)
Demand management	Additional rail provision (new stop within Salisbury and Wilton)
Demand management	Parking controls can control car use by reducing the supply of spaces, restricting duration or opening hours, regulating use through permits or charging.
Demand management	Additional park and ride
Demand management	Car sharing lanes
Demand management	Traffic restraint measures are designed to reduce the adverse environmental and safety impacts of car include traffic calming and also the use of bus lanes
Demand management	Minimise the intrusion of car parking and vehicle access
Demand management	Provide new car parking arrangements at the rail station interchange (multi-storey) and central car park as part of redevelopment proposals
Demand management	Regulatory restrictions on car use (permits and number plate restrictions)
Demand management	Remove on-street public short-stay car parking from the city centre, particularly within the historic Chequers area, and allocate the spaces for local residents, disabled people, cyclists and loading/unloading
Demand management	Guided bus (within Salisbury and Wilton)
Demand management	Urban and Inter-urban charging

Group	Intervention
Demand management	Increase the number of parking spaces at the station to meet extra demand from rail passengers
Demand management	Workplace Parking Levy
Demand management	Reduction in off-street parking spaces
Demand management	Maintain the existing car parks near the A36 ring road such as Culver Street, whilst closing car parks within the city centre such as Brown Street, Salt Lane, and Market Place
Demand management	Increase in off-street parking spaces
Demand management	Consider reducing the spaces at private car parks by implementing planning policy and utilise the spaces for commercial development
Demand management	Charge per person at park and ride (not per vehicle)
Public transport	Increase the local bus frequency for local commuters
Public transport	Improve the rail station as a public transport interchange
Public transport	Provide a west to east public transport link from Churchfields stopping at key destinations within the city centre to Southampton Road. This includes a bus/pedestrian and cycle-only connection from Exeter Street through to Southampton Road
Public transport	Extend and divert some of the bus services to serve the rail station
Public transport	Extend the Park and Ride service to serve the rail station if appropriate
Public transport	Create a space for bus stops and bus turn around within the station forecourt
Public transport	Real-time bus service information
Public transport	Provide more tourist coach parking and layover at Park and Ride sites with drop off and pick up points close to the Cathedral and city centre
Public transport	Provide layover space and facilities for bus services
Smarter choices	Smarter Choices (techniques for influencing people's travel behaviour towards more sustainable means)
Smarter choices	Provide or upgrade cycle routes along all major thorough fares including Southampton Road, Exeter Street, Churchfields Road and Castle Street. These should link, where possible, with National Cycle routes passing through the city centre
Smarter choices	Encourage and promote the use of the Park and Ride service
Smarter choices	Provide key public transport stops next to significant city centre destinations or improve existing stops to cater for the increase in demand. This includes high quality shelters, signage and cycle parking
Smarter choices	Consider extending the Park and Ride service to Churchfields
Smarter choices	Improve crossing facilities for pedestrians/cyclists and junction improvements along the A36 ring road
Smarter choices	Create cycle parking and taxi ranks within the station forecourt
Smarter choices	Create a new station square intended as an active urban space where people can meet and interact
Smarter choices	Include high quality, simple and coordinated public realm elements such as boulevard planting, street furniture, lighting, paving and public art.

Group	Intervention
Traffic management	Improve the A36 Southampton Road as an important gateway to the city making it attractive for commuters and tourists; this could include priority measures for buses and cyclists and high quality public transport stops.
Traffic management	Wherever possible introduce bus priority measures on all Park and Ride routes into the city centre
Traffic management	Intelligent Transport Systems (ITS) includes selective vehicle priority (buses), queue management techniques.
Traffic management	Urban traffic control (UTC) systems use signal settings to optimise a given objective function
Traffic management	Improve the streetscape within the core of the city through shared surfaces giving priority to pedestrians
Traffic management	Major junction improvements (increase / change footprint)
Traffic management	Minor junction improvements (within existing footprint)
Traffic management	Develop a hierarchy of routes that restricts traffic movement
Traffic management	Conventional traffic management includes measures such as one-way streets, redesign of junctions, banned turns and controls on on-street parking.
Traffic management	Design and implement a signage and car park management system that directs the driver to the nearest car park at their initial entry corridor to the city centre and/or at Park and Ride entry points
Traffic management	Lorry routes and bans
Traffic management	Rationalise the number of access points on to Southampton Road from adjacent streets and access roads
Traffic management	Minimise coach traffic through the city whilst ensuring drop-off points to service the Cathedral and city centre
Traffic management	De-clutter, where possible, areas of the public realm through the rationalisation of highway signage, barriers, bollards and other highway related items
Traffic management	Trans-shipment facilities
Traffic management	Lorry parks
Traffic management	Carry out a feasibility study on measures to reduce congestion
Traffic management	New road construction (bypass)

A.2 Short-list of Interventions

Table A.2 – Short-list of Interventions

Group	Intervention
Demand management	Public transport service levels can be modified to increase patronage
Demand management	Fare levels to encourage patronage
Demand management	Bus priorities enable buses to bypass congested traffic
Demand management	Parking charges to manage demand
Demand management	Wide availability of 'Plusbus' rail tickets to encourage bus to station
Demand management	High occupancy vehicle lanes (buses and car share or buses and HGV)
Demand management	Concessionary fares (wider availability of concessionary fares - students)
Demand management	Fares structures (zonal fares - £x to travel within Salisbury for x hours)
Demand management	Light rail (within Salisbury and Wilton)
Demand management	Additional rail provision (new stop within Salisbury and Wilton)
Demand management	Parking controls can control car use by reducing the supply of spaces, restricting duration or opening hours, regulating use through permits or charging.
Demand management	Additional park and ride
Demand management	Car sharing lanes
Demand management	Traffic restraint measures are designed to reduce the adverse environmental and safety impacts of car include traffic calming and also the use of bus lanes
Public transport	Increase the local bus frequency for local commuters
Public transport	Improve the rail station as a public transport interchange
Public transport	Provide a west to east public transport link from Churchfields stopping at key destinations within the city centre to Southampton Road. This includes a bus/pedestrian and cycle-only connection from Exeter Street through to Southampton Road
Public transport	Extend and divert some of the bus services to serve the rail station
Public transport	Extend the Park and Ride service to serve the rail station if appropriate
Public transport	Create a space for bus stops and bus turn around within the station forecourt
Public transport	Real-time bus service information
Smarter choices	Smarter Choices (techniques for influencing people's travel behaviour towards more sustainable means)
Smarter choices	Provide or upgrade cycle routes along all major thorough fares including Southampton Road, Exeter Street, Churchfields Road and Castle Street. These should link, where possible, with National Cycle routes passing through the city centre
Smarter choices	Encourage and promote the use of the Park and Ride service

Group	Intervention
Smarter choices	Provide key public transport stops next to significant city centre destinations or improve existing stops to cater for the increase in demand. This includes high quality shelters, signage and cycle parking
Smarter choices	Consider extending the Park and Ride service to Churchfields
Smarter choices	Improve crossing facilities for pedestrians/cyclists and junction improvements along the A36 ring road
Smarter choices	Create cycle parking and taxi ranks within the station forecourt
Traffic management	Improve the A36 Southampton Road as an important gateway to the city making it attractive for commuters and tourists; this could include priority measures for buses and cyclists and high quality public transport stops.
Traffic management	Wherever possible introduce bus priority measures on all Park and Ride routes into the city centre
Traffic management	Intelligent Transport Systems (ITS) includes selective vehicle priority (buses), queue management techniques.
Traffic management	Urban traffic control (UTC) systems use signal settings to optimise a given objective function
Traffic management	Improve the streetscape within the core of the city through shared surfaces giving priority to pedestrians
Traffic management	Major junction improvements (increase / change footprint)
Traffic management	Minor junction improvements (within existing footprint)
Traffic management	Develop a hierarchy of routes that restricts traffic movement
Traffic management	Conventional traffic management includes measures such as one-way streets, redesign of junctions, banned turns and controls on on-street parking.
Traffic management	Design and implement a signage and car park management system that directs the driver to the nearest car park at their initial entry corridor to the city centre and/or at Park and Ride entry points
Traffic management	Lorry routes and bans