Salisbury Transport Strategy

Options Assessment Report Addendum

August 2011

Notice

Document History

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1. Introduction

Background

1.1 Wiltshire Council 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). 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 supports the formulation of the Core Strategy element of the LDF which sets out the spatial planning framework for South Wiltshire.

1.3 In 2010 Atkins produced an *Options Assessment Report*[1], which described in some detail a range of transport strategy interventions for Salisbury and considered the performance of two options: an Established Approach and a Radical Option. Since then, the government has now stated its intention to abolish Regional Spatial Strategies. The draft Localism Bill published in December 2010 contains the relevant clause providing the mechanism for its future revocation.

1.4 In light of the intention to formally abolish regional spatial strategies the council has sought to review the level of growth identified within the draft RSS and the South Wiltshire Core Strategy. The review establishes the housing requirement from 2006-2026, and concludes that 9,900 is the appropriate housing requirement for South Wiltshire and that over the same period 10,900 jobs should also be delivered. The location of the proposed revised Core Strategy developments is shown in Figure 1.1.

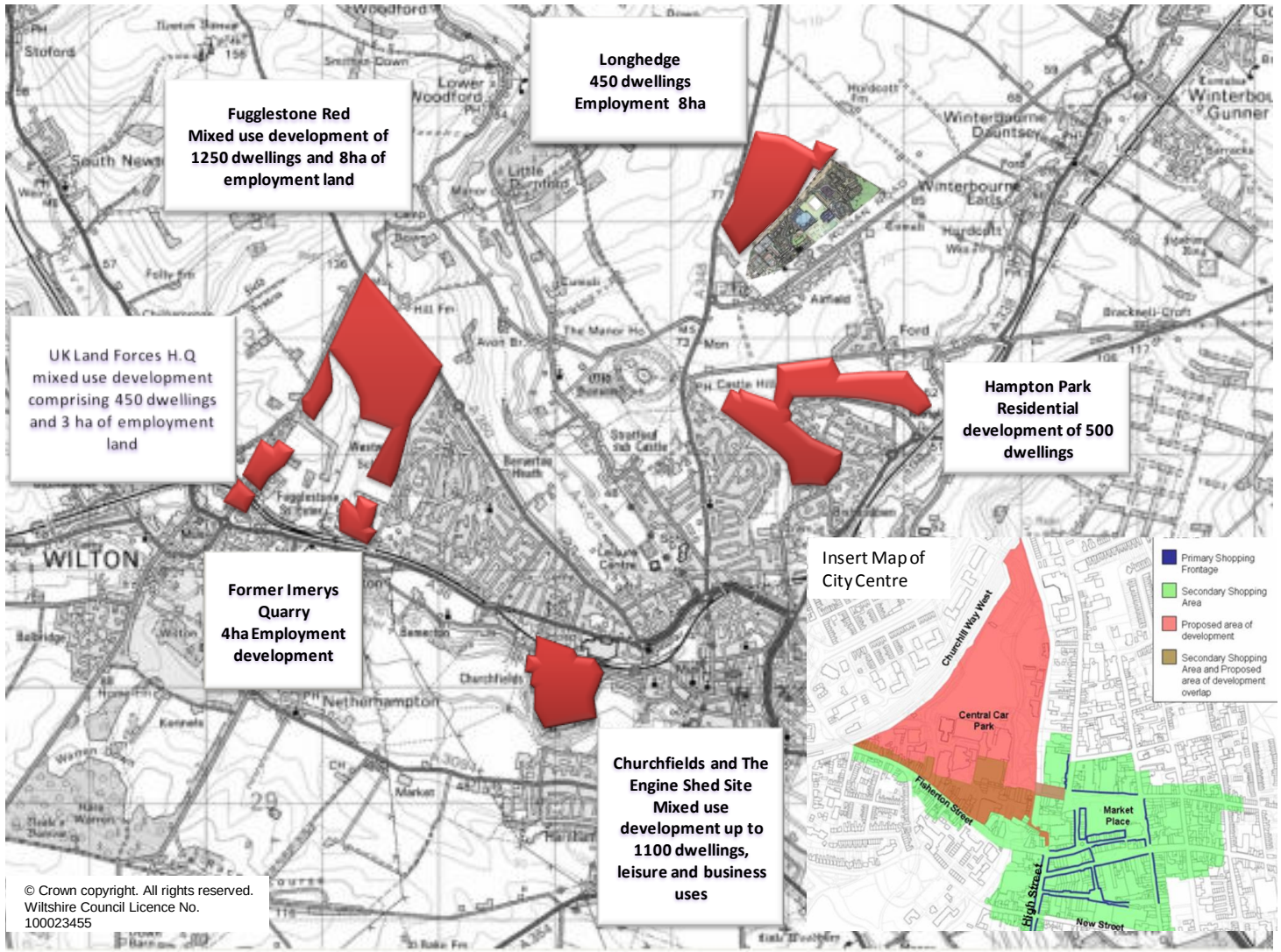
1.5 This *Options Assessment Report Addendum* revises the 2010 report with future year transport forecasts based upon the revised Core Strategy land use assumptions provided by Wiltshire Council. Crucially, this version takes account of recent changes in park and ride and car parking charges in Salisbury and in this addendum this is referred to as the *Do-Minimum Option*. In light of the changes described above, the Radical Option as been revised to address the specific requirements of the latest Core Strategy developments and in this addendum this is referred to as the *Do-Something Option*.

1.6 The format of this report follows that of the early *Options Assessment Report*. The components of the Do-Something Option is described and results presented. The remainder of this document is structured as follows:

- Chapter Two reviews future year travel patterns as a result of the revised South Wiltshire Core Strategy;
- Chapter Three describes the Do-Minimum Scenario and Chapter Four describes the Do-Something Scenario; and
- Chapter Four reviews the performance of the strategies against the objectives; and
- Chapter Five provides a conclusion and recommendations.

[1] 5084299 - STS – Options Assessment Report v1.1

Figure 1.1 – Location of Proposed Core Strategy Development Sites



2. Forecast Modelling

Introduction

2.1 The revised housing and employment land allocation for the South Wiltshire Core Strategy, which now plans for 9,910 dwellings by 2026 and 10,900 jobs, is shown in Table 2.1. The model has a base year of 2008 and therefore includes all developments between 2006 and 2008. In addition, there is an existing Local Plan allocation at Solstice Park which is anticipated to be completed within the life of the Core Strategy.[2]

Table 2.1 – Revised Core Strategy Land Use Allocations for South Wiltshire

Certainty of Development	Dwellings	Employment (jobs)
Completions / commitments since 2006-2008	350	
Completions / commitments since 2008	1,263	
Local Plan Allocations	1,538	1,534
Core Strategy Strategic Sites	5,250	6,463
Core strategy Community area allocations	1,509	2,903
Core Strategy Total	**9,910**	**10,900**
Local Plan allocation at Solstice Park		3,528
Total	**9,910**	**14,428**

2.2 The DfT modelling guidance (WebTAG) advises that trip end calculation for local land use development assumptions are all constrained to be equal to the benchmark trip ends set by TEMPRO. TEMPRO produces trip end growth forecasts by mode, vehicle and time period and this growth is then distributed amongst the new developments. Controlling to TEMPRO ensures consistency amongst different geographic areas and provides a means of establishing growth in traffic beyond South Wiltshire that will affect traffic in Salisbury.

[2] Hughes, Email: PKA - revised housing figures 9900 20 05 11.xlsx, 23/5/11

3. Do Minimum Approach

Introduction

3.1 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 Five.

Scenario Interventions

3.2 This scenario assumes a continuation of present interventions and policies. The model has been updated to reflect that current (2011) car parking charges and park and ride changes to frequency and pricing regime. Other changes include:

- existing public transport provision to developments (and other locations within Salisbury urban area);
- the highway network is improved by reviewing traffic signal performance and ensuring that the UTC system optimises conditions for buses and other vehicles; and
- the Salisbury Vision includes the redevelopment of the Maltings and the South Wiltshire Core Strategy assumes that Central car park will be redeveloped; so it is assumed that as a result of the redevelopment there will be no long stay car parking at Central car park.

4. Do-Something Approach

Introduction

4.1 This Chapter describes the Do-Something Strategy (formally called the Radical Option) for Salisbury following revisions to the Core Strategy housing and employment allocations and associated changes in transport interventions.

Do-Something Strategy Interventions

Demand Management

4.2 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.

Parking

4.3 We have not assumed any changes to parking charges given recent changes to the charging regimes. However, there could also be scope to introduce higher parking charges upon a certain level of delivery of the Core Strategy, although this could be investigated further to determine the trigger point and its implications.

Park and Ride

4.4 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. We have assumed modifications to park and ride services, comprising improved frequencies to services to every ten minutes throughout the day and minor route changes such as through running from Wilton to Petersfinger Park and Ride sites. We have introduced a 10% increase in park and ride charges, reflecting the proposed improvements to the service.

Hypothecation of Parking Charges

4.5 If the Salisbury Transport Strategy were to propose increased parking charges we recommend the hypothecation of parking revenues to be spent on other transport projects, such as improvements bus services and enhanced smarter choices support.

Traffic Management

4.6 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.

Road Hierarchy

4.7 The starting point for the traffic management component of the Do-Something 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 shown 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).

Traffic Restraint and Route Ambience Enhancement

4.8 Having established the road hierarchy improvements could be made 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.

Network Improvements

4.9 At the other end of the hierarchy are principal roads where 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:

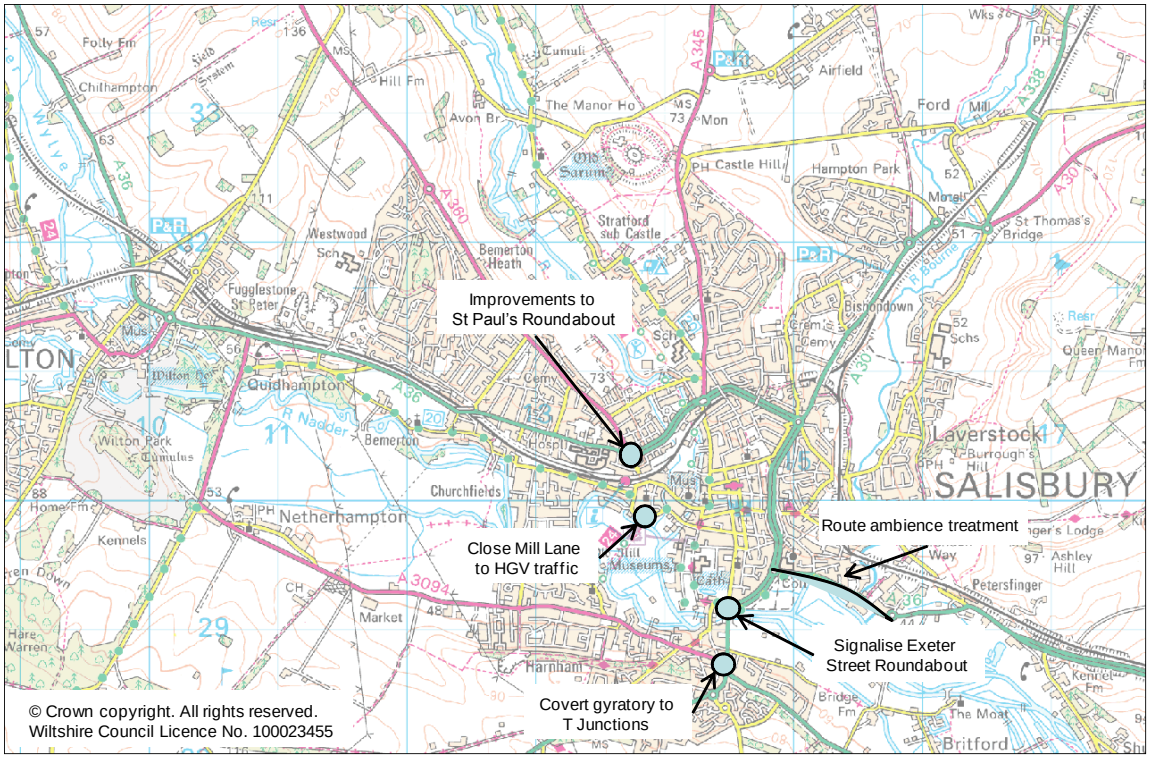
- Harnham Gyratory;
- Exeter Street Roundabout;
- College Roundabout;
- St Mark's Roundabout;
- Castle Roundabout;
- St Paul's Roundabout; and
- Park Wall Junction.

4.10 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.

4.11 A review of options at Park Wall Junction concluded that controlling all signals in Salisbury may improve this junction, but that improvements at Park Wall Junction send more traffic through Harnham and causes problems there. As such, we do not propose any changes at Park Wall Junction other that modifying signal time settings to achieve the optimum balance of traffic through the junction.

4.12 Only St Paul's Roundabout, Exeter Street Roundabout and Harnham Gyratory contained scope for improvement. Broad proposals for each junction are shown in Figure 4.1 and described in more detail below.

Figure 4.1 – Highway Improvements



Harnham Gyratory

4.13 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.

4.14 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 4.2. This layout is indicative at this stage and requires further work to determine land take, implications for utilities and landscaping.

4.15 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

4.16 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.

4.17 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 4.3. This layout is indicative at this stage and requires further work to determine land take, implications for utilities and landscaping.

4.18 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

4.19 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 Devizes Road.

4.20 Our desktop review reveals that some minor improvements can be made to the roundabout (Figure 4.4). 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 4.2 – Proposed Harnham Junction

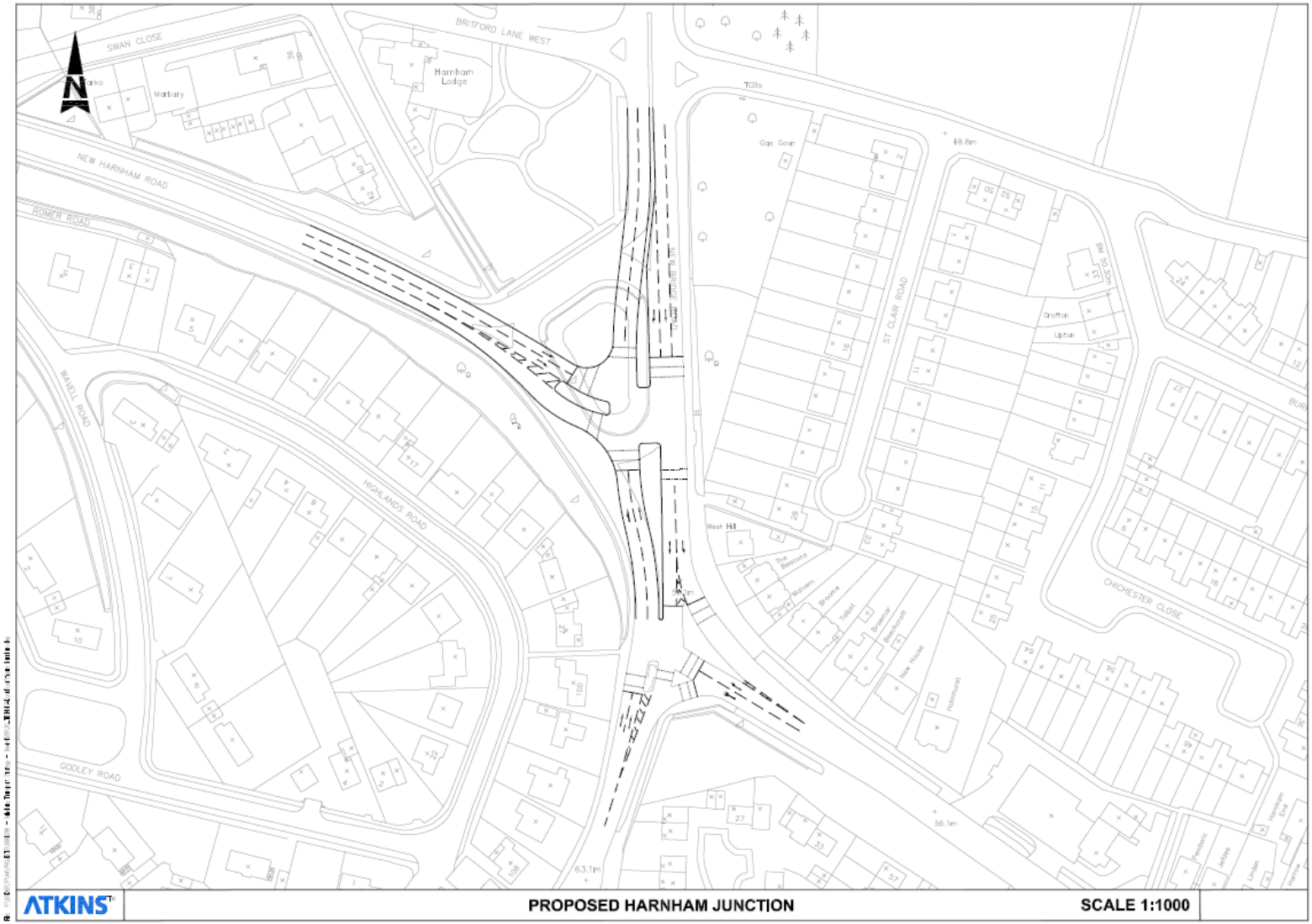


Figure 4.3 – Proposed Exeter Street Junction

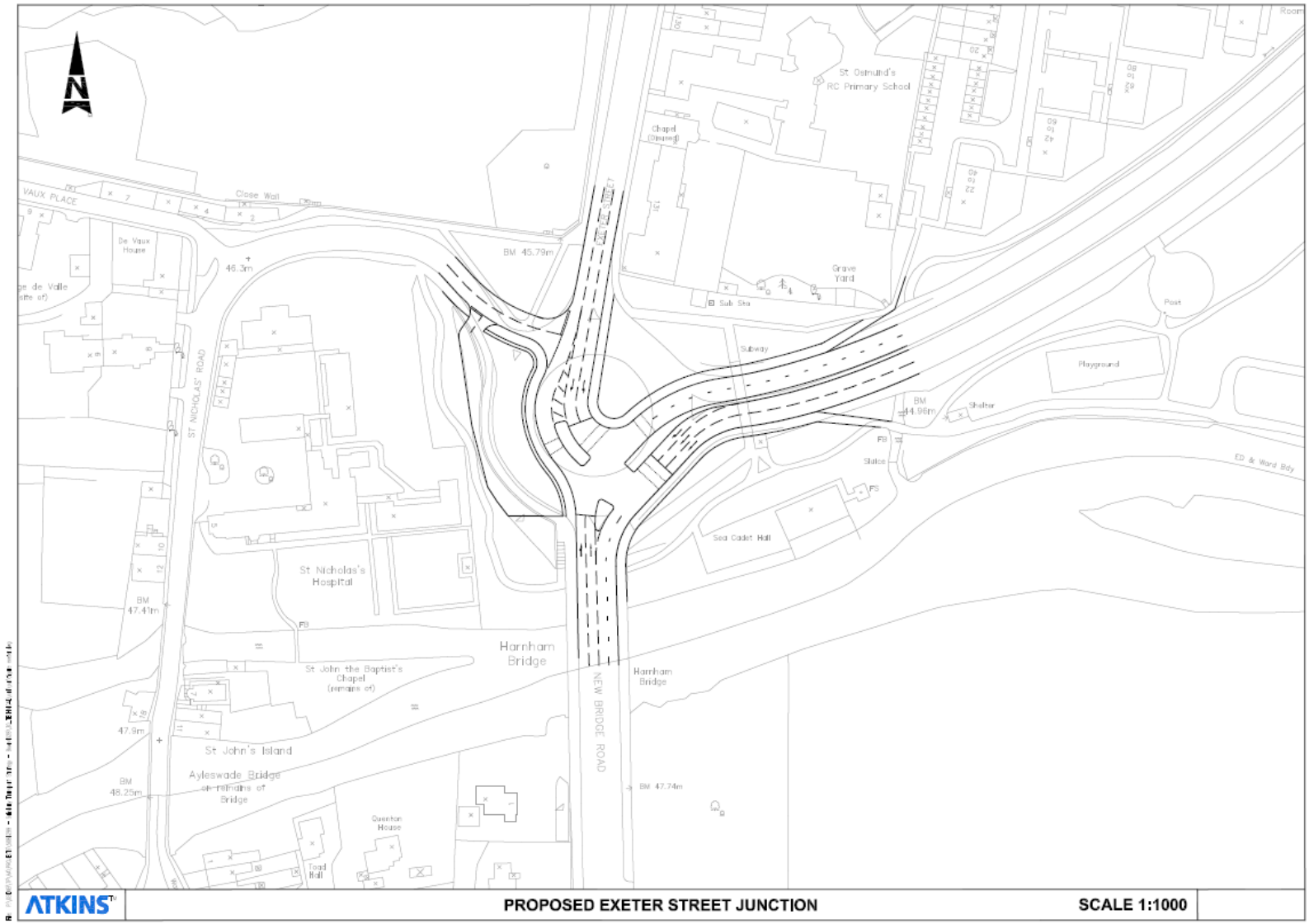
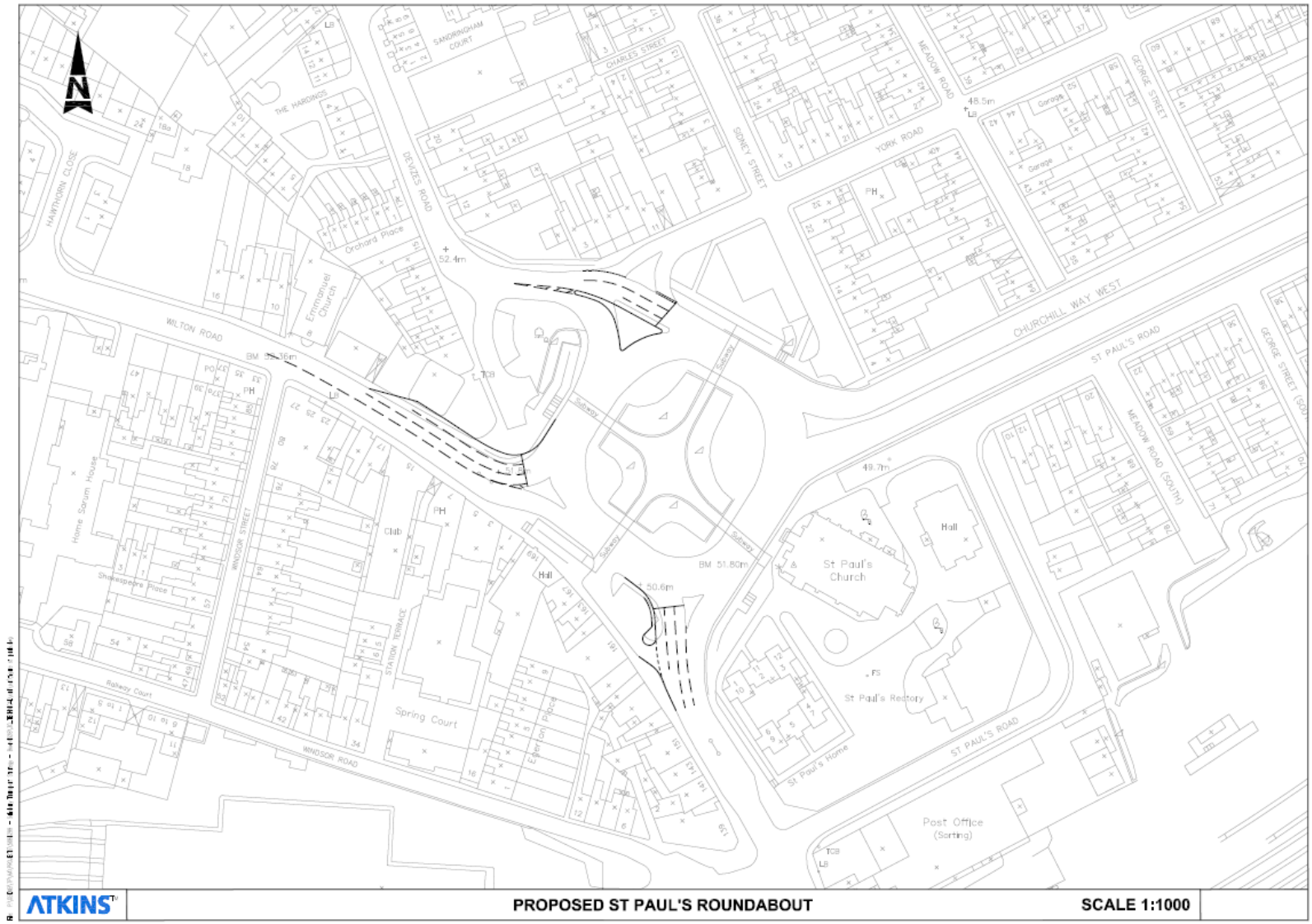


Figure 4.4 – Proposed St Paul's Roundabout



Intelligent Transport Systems (ITS)

4.21 ITS refers to utilising 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.

Complete review of existing systems

4.22 There are two reasons for carrying out a full review 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.

4.23 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 to realise further benefits in traffic flows.

4.24 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.

4.25 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.

Public Transport

Fares

4.26 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.

4.27 Bus Routes

4.28 The Do-Something Strategy includes the increasing the frequency of the following services to ensure that all Core Strategy Strategic Sites are served by at least two buses per hour:

- Route 25 - Salisbury - Hindon – Gillingham and Route 26 - Salisbury- Hindon / Shaftesbury – Gillingham; serving the Tisbury and Mere DPD sites and
- Route 10 - Salisbury - Devizes Road extended to serve Fuggelstone Red development.

4.29 These services will take of advantage of the ITS changes above, 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.

Smarter Choices

4.30 '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.

An Action Plan for Salisbury

4.31 The Do-Something Scenario includes the following actions:

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

- increase 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

Likely Impacts

4.32 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%.

4.33 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.

4.34 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 ensure that any benefits from this reduction in traffic could 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 ensure that any benefits from this reduction in traffic could be sustained.

5. Performance against Objectives

Introduction

5.1 This chapter provides an assessment of the performance of the two options - the Do-Minimum Scenario and the Do-Something Scenario – against the five primary objectives the strategy needs to meet. The assessment process makes use of forecasts of travel patterns and transport system performance to compare each of the two strategy options against the base year conditions.

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.

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

Metrics

5.3 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 people 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

5.4 Forecast daily[3] demand for travel to the city centre in 2026 is shown in Figure 5.1. The figure shows the number of daily vehicle trips made by individuals (person trips) to destinations within Salisbury city centre.

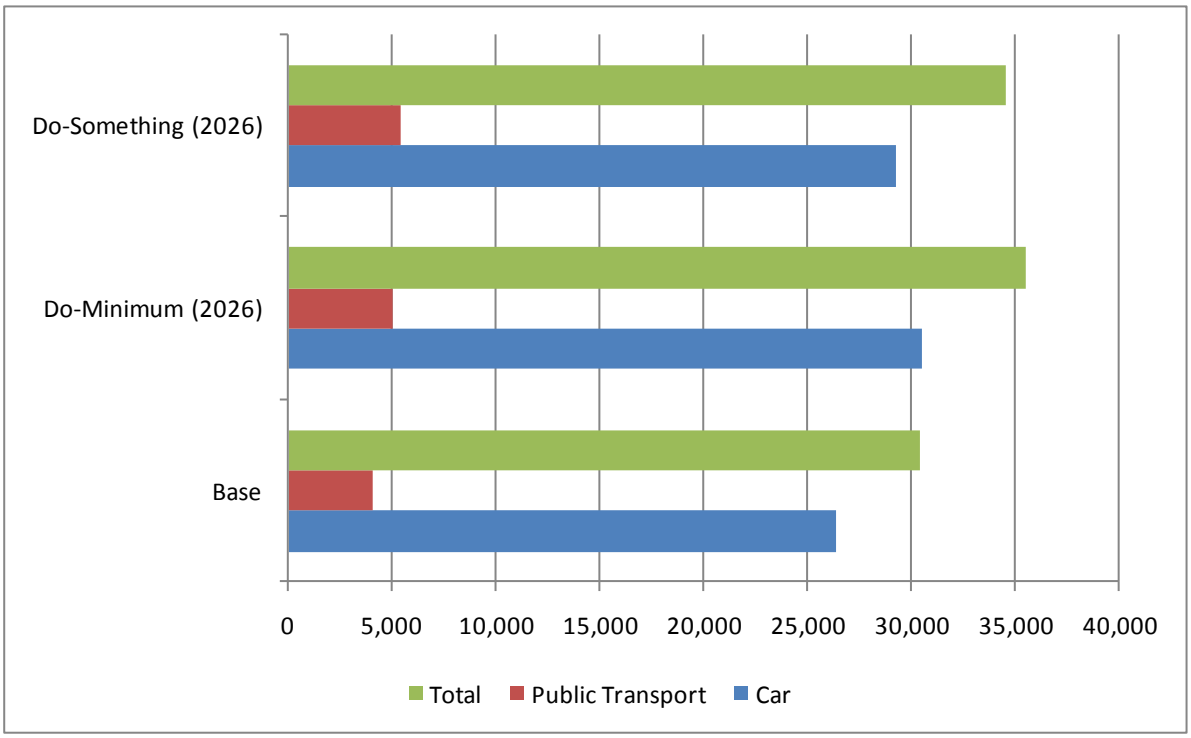
5.5 The Do-Minimum Scenario in 2026 results in 17% more person vehicle trips per day to the city centre than in the base year, with a 16% increase in person trips by car and a 22% increase in person trips by public transport.

5.6 The Do-Something Scenario in 2026 results in 14% more person vehicle trips per day to the city centre than in the base year, with an 11% increase in person trips by car and a 32% increase in person trips by public transport. This scenario includes a greater focus on smarter choices and there would be more people walking and cycling to the city centre. This scenario has improved

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

park and ride services and improved bus services from new developments to the city centre compared with the Do-Minimum Scenario.

Figure 5.1 – Daily Person Vehicle Trips to City Centre



5.7 The level of transport provision for city centre trips is shown in Table 5.1. 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). It should be noted that the Core Strategy assumes redevelopment of Central car park as part of the Maltings development, leading to a complete reduction in long-stay spaces at Central car park.

Table 5.1 –City Centre Parking and Morning Peak Bus Provision

	Do-Minimum	Do-Something
Long-stay parking	693	693
Short-stay parking	1316	1316
Park and Ride spaces	2236	2236
Buses in morning peak	82	88

Note: Parking spaces refer to those off-street spaces operated by Wiltshire Council and buses to the city centre includes park and ride buses

Conclusion

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

5.9 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.

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

- The Do-Minimum Scenario forecasts an 17% increase in daily vehicle trips to the city centre compared with the base year;
- The Do-Something Scenario forecasts a 14% increase in daily vehicle trips to the city centre compared with the base year but there will be an increase in people walking and cycling to the city centre that at least matches the Do-Minimum Scenario; and
- Neither the Do-Minimum Scenario nor the Do-Something Scenario alters parking spaces within the city centre, but the Do-Something Scenario increases the number of buses serving the city centre.

5.11 *The Do-Something Scenario therefore contributes as much towards maintaining the vitality, viability and resilience of Salisbury's economy as the Do-Minimum Scenario.*

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

Metrics

5.12 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

5.13 Network Performance

5.14 Highway performance, as measured by PCU kilometres[4] – reflecting changes in traffic, PCU hours – reflecting changes in congestion, and speed are shown in Table 5.2 for the morning peak, inter-peak and evening peak.

5.15 There is an increase in traffic of between 25-30% between the base year and the 2026 Do-Minimum Scenario for all time periods yet congestion increases by approximately 37% in the morning peak hour, 29% in the inter-peak and 39% in evening peak hour. This results in forecast decreases in average journey speed of 9%, 3% and 8% for morning peak hour, inter-peak and evening peak hour respectively.

5.16 The Do-Something Scenario, 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-Minimum scenario and subsequently higher speeds throughout the day. The Do-Something Scenario is forecast to reduce congestion by approximately 4% compared with the Do-Minimum scenario in the morning peak and by approximately 3% in the evening peak.

[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.

Table 5.2 – Base Year (2008) and Forecast Year (2026) Highway Performance in Salisbury Urban Area

	2008 Base Year	2026 Do-Minimum	2026 Do-Something
Morning Peak Hour			
Traffic (PCU kilometres)	67,578	83,816	82,557
Congestion (PCU hours)	1,837	2,513	2,406
Speed (km/hr)	37	33	34
Inter-Peak Hour			
Traffic (PCU kilometres)	51,293	64,067	63,263
Congestion (PCU hours)	1,337	1,729	1,711
Speed (km/hr)	38	37	37
Evening Peak Hour			
Traffic (PCU kilometres)	62,615	80,233	79,140
Congestion (PCU hours)	1,740	2,423	2,343
Speed (km/hr)	36	33	34

5.17 Public transport performance as measured by passenger kilometres, passenger hours and passenger boardings are shown in Table 5.3 for the morning peak, inter-peak and evening peak.

5.18 These statistics show the Do-Something Scenario produces more bus boardings and subsequently more bus hours and bus kilometres than the Do-Minimum Scenario. 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 5.3 – Public Transport Performance Salisbury Urban Area

	2008 Base Year	2026 Do-Minimum	2026 Do-Something
Morning Peak Hour			
Passenger kilometres	61,669	60,152	60,935
Passenger hours	1,133	1,176	1,231
Passenger boarding	2,545	2,884	2,999
Inter-Peak Hour			
Passenger kilometres	47,302	49,478	53,518
Passenger hours	841	909	1,076
Passenger boarding	1,720	1,991	2,321
Evening Peak Hour			
Passenger kilometres	77,460	78,458	81,572
Passenger hours	1,285	1,350	1,497
Passenger boarding	2,432	2,691	2,967

Air Quality

5.19 Forecast changes in traffic volumes and speeds between 2008 and 2026 will result in changes in the emissions of local air pollutants in the air quality management area (AQMA).

5.20 Estimates of the resultant changes in emissions can be made by combining outputs from the Salisbury Transport Model (of speed, distance, flow and composition in the morning and inter-peak hours) with NAEI emissions functions and fleet composition forecasts as recommended in DfT guidance.

5.21 The emissions functions estimate emissions (in g/km) produced by a given vehicle type at a given speed and both the functions and composition forecasts account for predicted changes in vehicle technology that will significantly reduce emissions produced per kilometre of travel.

5.22 This approach does not produce direct estimates of air quality in the AQMA as this would require estimates of concentrations of pollutants in the area and the exposure of sensitive receptors to them, requiring detailed information on other sources of pollution, location of receptors and the form of the urban area. However, changes in total emissions of NO_x and PM_{10} released within the area will be a key influence on changes in air quality and therefore this approach provides a good indication of likely scale and direction of change of air quality in the area.

5.23 The changes in NO_X and PM_{10} emissions in the Salisbury AQMA between 2008 and 2026 are shown in Table 5.4. The figures show that the significant forecast improvements in technology and associated reductions in emissions rate more than offset the forecast traffic increase to produce a substantial net reduction in emissions in the area. This would lead to an improvement in air quality in the area. The Do-Something Scenario is forecast to produce the greatest reduction in NO_X and PM_{10} emissions compared with the base year, adding a further 1% to the reductions achieved.

Table 5.4 – AQMA Performance Against Base Year

	Do-Minimum (2026)	Do-Something Scenario (2026)
NO_X	-30%	-31%
PM_{10}	-26%	-27%

5.24 Table 5.5 shows the change in emissions excluding the impact of technology improvements (i.e. applying the 2008 emissions functions in 2026 as well). The figures shown are largely the result of traffic growth but also reflect changes in traffic composition (balance between HGVs and light vehicles) and speed (which have slightly different impacts on NOX and PM10 emissions).The Do-Something Scenario is forecast to reduce the scale of the increase in NOX and PM10 emissions compared with the base year by 1% to 2%.

Table 5.5 – Changes in NO_X and PM_{10} Emissions within the AQMA (assuming no technology improvements from 2008)

	Do-Minimum (2026)	Do-Something Scenario (2026)
NO_X	14%	13%
PM_{10}	18%	16%

Contribution to Tackling Climate Change

5.25 A similar approach can be taken to use the model outputs to estimate changes in CO_2 emissions from Salisbury road traffic between 2008 and 2026. In this case changes in fuel consumption are estimated from changes in travel speed and distance (using the fuel consumption functions set out

in WebTAG) and then converted into changes in CO_2 emissions on the basis of the average mass of carbon per litre of fuel (as set out in WebTAG).

5.26 CO_2 does not damage local air quality but it is a greenhouse gas that contributes to global climate change. Therefore reductions in emissions levels help to contribute to sub-national and national targets to reduce emissions significantly (as formalised in the Climate Change Act 2008).

5.27 Table 5.6 shows the percentage change in CO_2 emissions forecast between 2008 and 2026 across the Salisbury urban area[5]. Again significant improvements in vehicle technology are forecast over the period between 2008 and 2026, as vehicle manufacturers work to meet the reductions in emissions for new cars required by the EU Framework (95g/km by 2020) and to reduce emissions from LGVs. This leads to improvements in fuel efficiency and therefore net reductions in CO_2 emissions.

5.28 If nothing is done to the transport network in Salisbury transport related carbon emissions would reduce by 14% compared to base year across the urban area (Table 5.6). The Do-Something Scenario would cause a small extra reduction, leading to a total decrease of 15%.

Table 5.6 – Carbon Performance Against Base Year in Salisbury

	Do-Minimum (2026)	Do-Something Scenario (2026)
Carbon Dioxide	-14%	-15%

5.29 Table 5.7 shows the equivalent figures without the impact of technology improvement i.e. with both 2008 and 2026 emissions calculated using 2008 emissions factors. The increase in emissions shown is again largely the result of traffic growth but also reflects changes in speed and traffic composition (the balance between HGVs and light vehicles). Again, the Do-Something Scenario is forecast to slightly reduce the scale of the increase in emissions.

Table 5.7 – Changes in CO_2 Emissions within the Salisbury Area (assuming no technology improvements from 2008)

	Do-Minimum (2026)	Do-Something Scenario (2026)
Carbon Dioxide	24%	22%

Conclusion

5.30 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.

5.31 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 3% in the morning peak and 6% in the evening peak when comparing the base year with the Do-Something Scenario.

5.32 The impact of the approaches can be summarised as:

[5] The estimated change in CO2 emissions between 2008 and 2026 have changed considerably from a 12% net increase to a 14% net reduction since the last version of this report. This largely reflects revisions to the DfT's forecasts for future improvements in vehicle fuel efficiency to meet EU greenhouse gas emission targets by 2020 and assuming a continued improvement to 2026

- The Do-Something Scenario is forecast to reduce congestion by approximately 4% compared with the Do-Minimum scenario in 2026 in the morning peak hour and over 3% in the evening peak hour;
- The Do-Something Scenario contributes to the slightly greater reductions in NO_X and PM_{10} and carbon emission then the Do-Minimum Scenario.

5.33 *The Do-Something Scenario 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

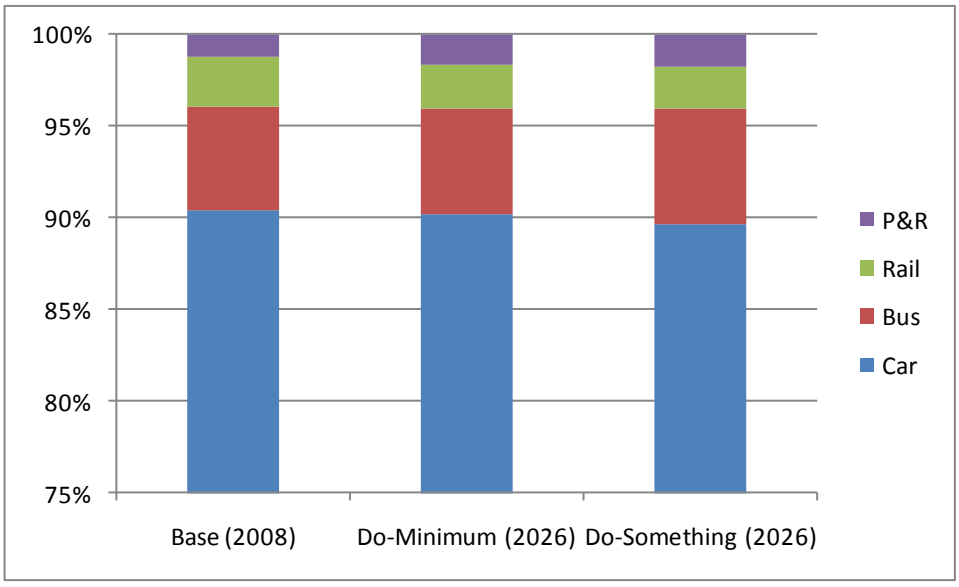
Metrics

5.34 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

5.35 Daily mode share for all trips within, to, from and through Salisbury is shown in Figure 5.2. In the base year, the daily mode share for car trips is approximately 90%. This remains the same in the Do-Minimum Scenario and the decreases slightly in the Do-Something Scenario.

Figure 5.2 – Daily Mode Share for all Motorised Trips



5.36 Table 5.8 shows the motorised mode share for motorised journeys to Salisbury city centre and across the urban area for the morning peak. In the base year, 82% of trips to the city centre were by car and 93% of trips within the urban area were by car.

5.37 The forecasts show that:

- The reduced park and ride services in the Do-Minimum scenario results in slightly increased car mode share and decreased bus mode share both to the city centre and within the urban area compared with the base year; and

- The Do-Something Scenario, with investment in park and ride and public transport, results in slightly 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.

Table 5.8 – Mode Share of Motorised Modes in the Morning Peak Hour

	2008 Base Year	2026 Do-Minimum Scenario	2026 Do-Something
All journeys to the city centre			
Car	81.9%	82.5%	81.7%
Bus	16.3%	16.2%	17.1%
Rail	1.8%	1.3%	1.2%
Journeys within Salisbury Urban Area (including urban area to the city centre)			
Car	93.4%	91.7%	91.6%
Bus	6.6%	8.3%	8.4%
Rail	0.0%	0.0%	0.0%

Conclusion

5.38 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.

5.39 Mode share figures change little between the Do-Minimum Scenario and the Do-Something Scenario in 2026, although increased congestion has resulted in increases in park and ride demand in the Do-Something Scenario.

5.40 The impact of smarter choices in the Do-Something Scenario would result in the share of motorised journeys to the city centre reducing by 3%.

5.41 The Do-Something Scenario 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

5.42 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

5.43 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.

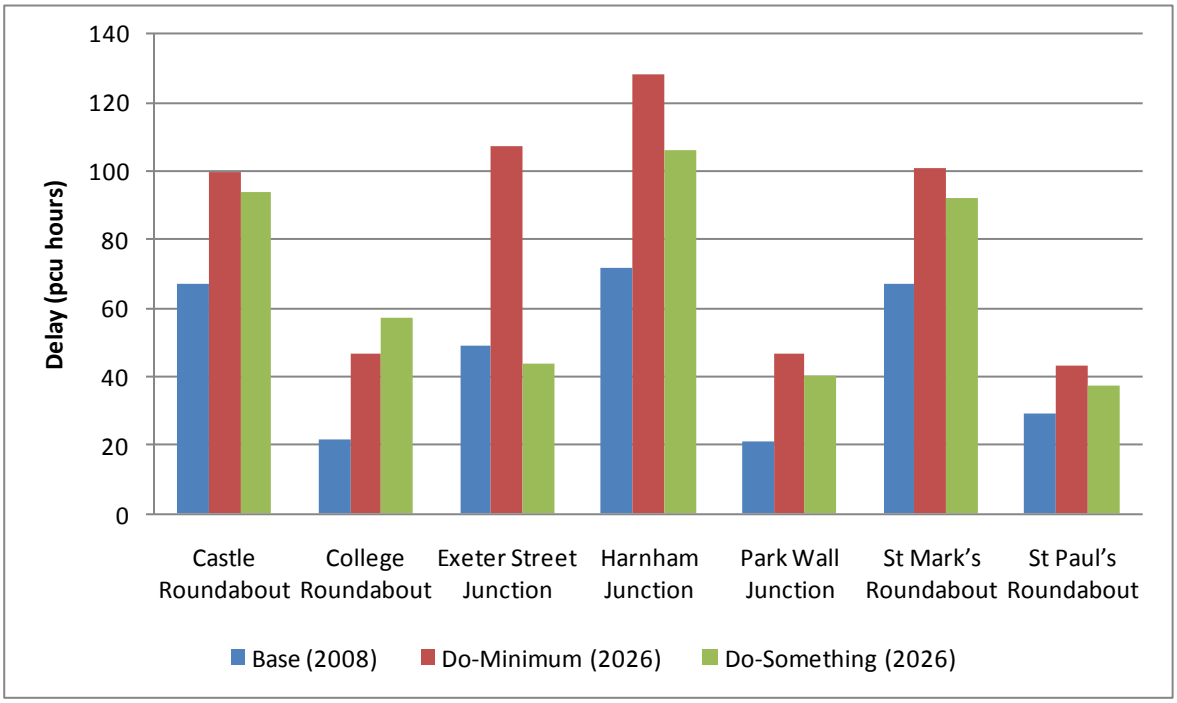
5.44 Junction improvements tend to result in more traffic passing through a particular junction and thus consume any of the additionally created capacity. This is particularly so in Salisbury, where the Netherhampton Road provides an alternative route for traffic passing through Salisbury and changes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

5.45 Estimated total morning peak delays (measured in pcu hours) experienced at each of the key junctions in Salisbury are shown in Figure 5.3 for the base year and each 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.

5.46 The Do-Minimum Scenario results in increased delays at all junctions in the morning peak when compared against the base year, with delays forecast to double (or more) at, College Roundabout, Exeter Street and at Park Wall Junction in the morning peak hour:

5.47 The Do-Something Scenario, with specific improvements at the Exeter Street and the Harnham junctions and signal timing improvements elsewhere, result in significant reductions in delay when compared against the Do-Minimum Scenario.

Figure 5.3 – Morning Peak Hour Junction Delays (pcu hours)

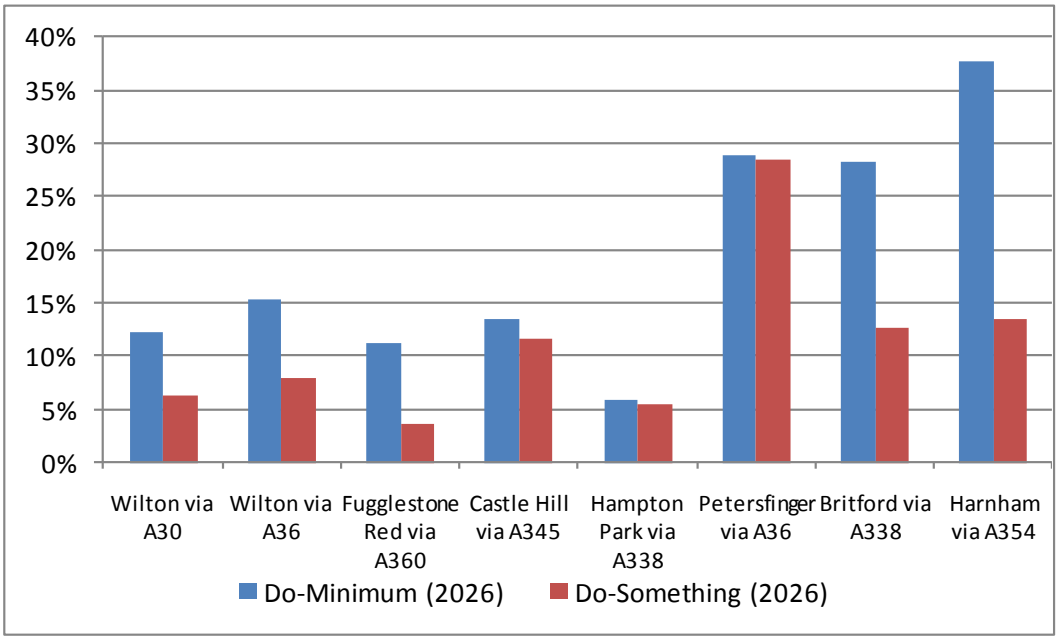


5.48 Detailed analysis shows that most of the junctions listed above still have high volume to capacity ratios[6] but these results show that, despite the high levels of traffic passing through the junctions, delays are being reduced in the Do-Something Scenario.

5.49 Changes in morning peak hour journey times for routes into Salisbury city centre compared with the base year are shown in Figure 5.4. The morning peak hour shows that greatest changes in journey times.

5.50 Morning peak hour journey times from the west to the city centre typically increase by 13% in the Do-Minimum Scenario and by 6% in the Do-Something Scenario when compared against the 2008 base year. Increases are greater from Petersfinger, Britford and Harnham; typically a 32% increase in the Do-Minimum Scenario and an 18% increase in the Do-Something Scenario when compared against the 2008 base year. The Do-Something Scenario is forecast to result in improved journey times compared against the Do-Minimum Scenario.

Figure 5.4 - Changes in Morning Peak Hour Journey Times to City Centre Compared with Base Year



Summary

5.51 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.

5.52 Further design 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 Do-Something Scenario reduces congestion across the network and that the targeted improvements result in shorter journey times to the city centre than during the Do-Minimum Scenario.

5.53 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] 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.

5.54 *The Do-Something Scenario therefore contributes towards minimising traffic delays and disruption and improves journey time reliability on key routes*.

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

Metrics

5.55 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

5.56 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.

5.57 The cost of this Do-Something Scenario has been estimated as shown in Table 5.9. The costs are indicative only and contain a number of exclusions that require verification.

Table 5.9 – Cost Summary

Item	Do-Minimum	Do-Something						
Parking	No change	Requires further investigation						
Park and ride	No change	Approximate annual cost £0.5 million Approximate annual revenue £0.2 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 £0.8million Approximate annual revenue £0.1 million						
Smarter choices	NA	Approximate annual cost £0.15 million						

6. Conclusions and Recommendations

Impact of Growth on Salisbury's Transport Network

6.1 Assessment undertaken to date – reported in the *Salisbury Transport Strategy Problems and Issues Report Addendum*– shows that travel by all motorised modes in and around Salisbury can be expected to grow by around 25% by 2026.

6.2 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.

6.3 Analysis presented in the *Salisbury Transport Strategy Problems and Issues Report Addendum* 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% lower in the morning and evening peaks than at present.

6.4 However, it can be 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 appropriate transport strategy comprising a set of interventions that could reasonably be implemented and afforded by Wiltshire Council.

The Identification of Transport Strategy Options

6.5 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.

6.6 At this stage of the strategy development process, we have compared a Do-Minimum Scenario and a Do-Something Scenario. The key features of these scenarios are:

- The **Do-Minimum Scenario** makes best use of the existing infrastructure and includes recent changes to city centre parking charges and the revised park and ride operation and charges. The approach assumes public transport provision to developments (and other locations
- The **Do-Something Scenario** is more extensive and the guiding feature is to accommodate growth in the most sustainable manner possible. This combines highway measures on key routes to ensure ease of movements for buses, HGVs and cars with sustainable travel, including improved bus services and increased frequency park and ride services. Intelligent Transport Systems (ITS) would be used to lock-in the benefits of these improvements.

Performance of the Identified Options

6.7 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.

6.8 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.

6.9 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 6.1 – Summary of Transport Strategy Option Performance against Primary Objectives

	Do-Minimum	Do-Something
To support and help improve the vitality, viability and resilience of Salisbury's economy.	Neutral	Slight 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.	Neutral	Slight 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

6.10 It is considered that the Do-Something Scenario

- enables more people to enter the city centre - supporting the vitality, viability and resilience of Salisbury's economy;
- reduces congestion across the day, and it is projected to improve the performance of the most critical junctions in the highway network;
- contributes to increasing the use of more sustainable modes of travel; and
- has the least impact in terms of air quality and carbon.

6.11 The Do-Something Scenario would cost money to implement and operate. An estimate of the costs of the interventions has been undertaken and 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 Do-Something Scenario, none of the schemes require powers that are not already available or rely on untested solutions.

Recommendations and Next Steps

6.12 Based on this Options Assessment process, it is concluded that the Do-Something Scenario described above would contribute towards Salisbury meeting the challenges of addressing future growth in travel demand in a sustainable manner.

6.13 It is recommended that the Do-Something Scenario is further refined. Certain of the interventions require more detailed confirmation of their effectiveness, design and cost. In addition, a greater balance between demand management interventions and public transport improvements and highway improvements needs to be considered.

6.14 It is also expected that a more extensive stakeholder consultation is undertaken to refine the Salisbury Transport Strategy and 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.