Somerset County Council Transport Policies EVIDENCE BASE, GOALS AND CHALLENGES



X



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ANNEX A - DATA AND EVIDENCE 22 **1.1** Having defined the policy background that influenced our strategy and outlined the background data in support of the trends and behaviours in Somerset, it important to focus this information into determining our goals and challenges. This work has helped inform the development of our Future Transport Plan (FTP).

The Five Government Goals

1.2 The Government has developed five national goals that the transport sector is encouraged to contribute to. These are to:

- Reduce Carbon Emissions
- Support Economic Growth
- Promote Equality of Opportunity
- Contribute to Better Safety, Security and Health
- Improve Quality of Life and a Healthy Natural Environment

1.3 In the following section, we see how these government goals relate to Somerset by presenting the evidence and data to show the linkages. We have also used this data to help us then develop our own goals and challenges for Somerset. A more detailed look at this data can be found in Annex A of this document.

Climate Change

1.4 The UK has agreed to *reduce carbon emissions* by 80% of 1990 levels by 2050 and this goal is therefore critical to help achieve this. At national, regional and local levels, stakeholders are expected to help to deliver quantified reductions in greenhouse gas emissions consistent with the Climate Change Bill, as well as EU targets.

What's Climate Change got to do with Somerset?

There is wide consensus that we need to reduce carbon dioxide emissions to at most 50% of 1990 levels by 2050 if we are to have even a 50% chance of preventing temperature rises above 2 °Celsius of pre-industrial levels - potentially this is the tipping point for catastrophic and irreversible climate change.

A core concept in the transition to a low carbon travel economy is the local production and consumption of goods, and hence local travel for both freight and people. This can also contribute to the local economy, maintain employment, and enable people to appreciate their local environment; less distance travelled and less motorised travel does not need to mean a lower quality of life.

We know that as a rural county, Somerset will have higher levels of CO_2 than more built up areas, simply because the more miles covered leads to more CO_2 being produced.

In Somerset, the greatest challenge is an increase in flooding – not only from rivers, but also from the sea, as levels rise. Somerset has always had to cope with flooding, particularly on the Levels, but now the risk is much greater⁽¹⁾.

Somerset has about 235 square miles at, or a few metres above, sea-level. Sea-levels are expected to rise in the South West by between 20cm and 80cm by the year 2080, meaning this land is at risk of flooding⁽²⁾.

At the moment, there is about a 1 in 200 risk of the M5 in Somerset flooding from the sea. If we continue to burn fossil fuels at the current rate, the risk will be 1 in 17 by the year $2060^{(3)}$.

4.9 million tonnes of end user carbon dioxide (CO_2) emissions were released in Somerset in 2007. Of these emissions, 30% (1.5 million tonnes) came from road transport. A total of 10 tonnes of CO_2 were released per person in Somerset in 2007, 3 tonnes of this came from transport. In Somerset, we produce 25% more CO_2 than the South West average.

All local authorities in Somerset showed little change in their total emissions between 2005 and 2007 with approximately 1% increases seen in Sedgemoor and West Somerset and decreases in the other Districts. With our high emissions rate and our high risk of flooding, we need to cut back.

Economic Growth

1.5 The task of *supporting economic growth* has been made more challenging as a result of the current economic downturn. It is expected that reducing lost productive time and improving the connectivity and access to labour markets will achieve this. It is also anticipated that this goal will help to deliver the sustainable provision of housing as well as making the transport network more resilient to unplanned events.

- 1 www.risingtothechallenge.org.uk
- 2 UK Climate Impacts Programme
- 3 Environment Agency and Met Office

What's the Economy got to do with Somerset?

Research commissioned by the South West Regional Development Agency suggests that connectivity to other regions is more important to economic growth in the South West than links within it⁽⁴⁾. In terms of inter-regional connections, a later study⁽⁵⁾ highlighted the importance of the West of England as a hub connecting most parts of the region, including Somerset. These connections looked to provide an indication of the level of contribution an area could make to the regions future economy. This work highlights one area where the economy and reducing carbon emissions conflict, since greater travel, predominantly car-bourne, leads to greater carbon emissions.

The employment rate of working age people in Somerset has decreased in the year to June 2009, although it remains higher than the rates for both England and the South West. The latest unemployment rate for Somerset is 4.6% of the economically active 16+ population (SW: 5.4%, Eng: 6.9%). This is the second lowest rate in the region (excluding the Isles of Scilly). Evidence of reductions in sickness absenteeism among cycle commuters compared to non-cycling staff demonstrates that this mode provides a strong business case to employers to promote cycle commuting⁽⁶⁾

Somerset has a higher proportion of people employed in manufacturing (13%), wholesale and retail (20%) and public admin, education and health (28.8%) than both the England and regional averages for each sector⁽⁷⁾.

There are long term plans to build new homes in Somerset. The majority of these homes will be built in Taunton, Yeovil and Bridgwater. We know there is going to be a substantial increase in trips in these areas. Our car journeys have an impact on air quality as well as making it more difficult for people to walk and cycle about the towns due to the barriers created by roads. Our work also shows that the predominant means of travel to, within and between the towns in Somerset is by car. We need to find ways to support the growth of jobs and housing while keeping the transport network functional⁽⁸⁾ as well as making sure that people who do not drive can also get to jobs and services.

Three years ago Somerset had very poor internet connectivity; businesses and people in their homes struggled with long waits with dial-up, with files often taking hours to download. Somerset County Council stepped in when it became clear that commercial internet companies could not provide even a basic service to

- 6 Hendriksen, I., Simons, M., Galindo Garre, F., Hildebrandt, V. (2010) The association between commuter cycling and sickness absence, Preventive Medicine
- 7 Somerset Brief 18 March 10 produced by GOSW
- 8 Somerset County Council Taunton area and Yeovil Transport Reviews, 2009

⁴ South West RDA (2005) Intra-regional Connectivity Final Report

⁵ Connectivity Problems, Challenges and Issues for the Region – Unlocking Economic Potential via Improved Connectivity (2009) AECOM, Exeter.

Somerset's worst affected rural areas. The new wireless broadband infrastructure has given a much needed boost to the rural community who were often at a disadvantage to businesses in towns. However, we know we still have a long way to go to improve connections to the more remote parts of Somerset⁽⁹⁾.

Maintaining our transport network is key to supporting the economy. Damage resulting from two extreme winters in 2009 and 2010 have given rise to a large number of potholes requiring attention in the county. As well as potholes, we have annual programmes of resurfacing and other maintenance to carry out. Left unchecked, potholes and other defects would cause damage to vehicles, impact on road safety and restrict the movement of all users of our network.

Equality of Opportunity

1.6 The *promotion of equality of opportunity* is important to ensure that as a nation, the gap between economic growth rates for different English regions is reduced. Stakeholders should also focus on enhancing social inclusion and the regeneration of deprived or remote areas by enabling disadvantaged people to connect with employment opportunities, key local services, social networks and goods through improving accessibility, availability, affordability and acceptability.

What's Inclusion got to do with Somerset?

18% of household in Somerset do not have access to a car. This figure is highest at 19.2% in West Somerset and Taunton Deane and lowest in South Somerset at $16\%^{(10)}$.

7.0% of the workforce of Somerset has no qualifications, a higher proportion than the South West (6.4%) but lower than England (8.5%).

The proportion of workers qualified to NVQ 4 (degree & equivalent) & above (26.1%) is lower than the South West (31%) and England (32%) rates. Our discussions with our partners suggest that young people living in more rural areas cannot afford to travel to the towns to access education and employment. In many instances, there journeys take too long by any other mode than private car. In addition, the reduction in children walking and cycling can impact upon self-confidence and the lack of physical exercise can impact upon concentration and academic performance.⁽¹¹⁾

⁹ www.connectingsomerset.co.uk

¹⁰ Census, 2001

¹¹ Sibley, B. Etnier, J. 2003 The relationship between physical activity and cognition in children: A meta-analysis, Pediatric Exercise Science, 15: 243-256.

Between 5% and 17% of people with learning disabilities in Somerset are in some form of $work^{(12)}$.

Over 85% of parishes in Somerset have access to demand responsive transport schemes, such as Slinky, Nippy Bus or Dial-a-ride⁽¹³⁾.

Safety, Security and Health

1.7 The goal to *contribute to better safety, security and health* aims to look at reducing the level and frequency of transport accidents, as well as the social and economic costs of transport to public health. It also looks to encourage more physically active travel as well as helping to address issues of crime, fear of crime and anti-social behaviour on the transport network.

What's Safety and Health got to do with Somerset?

In 2008 there were 1560 collisions on Somerset roads resulting in 2228 casualties. Of these 29 were fatal, 245 serious and 1954 slight injuries. 2008 saw the lowest figures since records have been kept. Fatalities were 26% lower than those in 2007. Child casualties decreased in 2008 by 71% compared to 2007 and there were no child fatalities in 2007 or 2008. Children injured as passengers rose by 20% in 2008 but there were 25% fewer cycle accidents involving children in 2008 compared to 2007.

Most vehicle related injuries in Somerset in 2008 resulted from collisions on roads with speed limits of 60mph and 30mph and 51% of all casualties in 2008 were on A class roads⁽¹⁴⁾. Although pedestrians and cyclists are disproportionately involved in road collisions (compared to the proportion who travel by those modes) it is likely to be a reflection of the lack of safety in the dominant mode of transport, the car, which accounts for this.

- 12 Somerset Brief 18 March 10 produced by GOSW
- 13 Somerset County Council Local Transport Plan Data. Slinky, Nippy Bus and Dial-a-Ride are forms of Demand Responsive Transport, allowing people to book a seat on one of these buses to take them to various towns in Somerset
- 14 Somerset Road Safety Partnership Casualty Review 2006-2008

The most significant effect of road transport on human health is its influence on physical activity. In the UK, car ownership has increased since the 1960s. The decrease in physical activity among adults and children in England is a key concern for public health professionals. Although there are other factors involved (fewer manual jobs and the physically active elements of housework, shopping etc), changes in travel behaviour are a significant factor.

In Somerset 45.9% of men and 32.9% of women are overweight and a further 19.1% of men and 19.5% women are obese. Obesity levels are rising in children and young people. Estimated figures for Somerset suggest that for children aged 2 to 19 years, 24.9% of boys and 29.9% of girls are overweight and a further 6.8% and 8.6% respectively are obese⁽¹⁵⁾. We know this means that these people will be more susceptible to cancer, diabetes and heart disease as a result.

Air quality management areas have been declared in Taunton town centre, Henlade and in Yeovil. Road transport is the chief source of the emissions responsible for respiratory related deaths in England. Reducing particulate emissions from motor vehicles could significantly reduce the number of such deaths⁽¹⁶⁾. In humans, poor air quality can aggravate asthma, bronchitis, lung and heart diseases and respiratory allergies.

Quality of Life and the Natural Environment

1.8 The final goal is to *improve quality of life and a healthy natural environment*. This is looking at reducing transport-related noise, minimising the impacts of transport on the natural environment, heritage and landscape as well as improving the experience of end-to-end journeys for transport users, which includes enabling people to enjoy access to the goods, services, people and places that they want.

What's Quality of Life got to do with Somerset?

Transport is most often a means to an end. It can have positive and negative impacts on people and the environment. Some people will face barriers in terms of mobility impairments, age, and impediments due to the transport choices of others. If we can't get to the places we need to go to, our quality of life is lower.

We need to recognise that during the lifetime of this strategy up to 2026, there are likely to be many challenges to our quality of life from new technology and changing lifestyles to the potential impact of climate change and peak oil⁽¹⁷⁾.

15 Children & Young People's Scrutiny Sub Committee - 22 January 2009

- 16 Knox, E. 2008 Atmospheric pollution and mortalities in English local authority areas, *Journal of Epidemiology and Community Health*, 62: 442-447
- 17 This is the point in time when the maximum rate of global petroleum extraction is reached, after which the rate of production enters terminal decline

Freight transport can have a significant impact on the lives of Somerset residents. Public satisfaction with the routes chosen by Heavy Goods Vehicles is lower than average in Somerset, at only 40 per cent in 2004 (results range from 32 to 51 per cent nationally). During 2009, DEFRA⁽¹⁸⁾ consulted local authorities on a Draft Noise Action Plan for major roads carrying greater than 6 million vehicles per year outside towns or cities in excess of 250,000 inhabitants. A total of 36 locations on small stretches of our strategic network⁽¹⁹⁾ were identified by DEFRA that were likely to generate noise exposure of 76dB⁽²⁰⁾ or more.

The link between transport and the built environment also needs to be recognised. This is particularly relevant in more urban or village settings where new or existing transport infrastructure needs to blend with existing architecture or within a conservation area. The role that the historic environment plays as a tourism attractor is also important as this inevitably increases levels of traffic to these area.

Some parts of Somerset have a special importance to the quality of life in the county. For instance, Exmoor National Park has been designated to protect and enhance what makes the area special. Plans for doing this are set out in the Exmoor National Park Management Plan (2007-2012)

Quality of life can also mean an impact on the environment. The potential ecological impacts of transport and its infrastructure can include:

- Disturbance of species
- Habitat Loss
- Habitat Fragmentation
- Habitat Isolation
- Barrier Effects
- Air Pollution
- Hydrological Changes
- Soil Changes
- Introduction of New Habitats

Our Local Goals

1.9 The goals and challenges presented at a local level often reflect the national transport goals discussed above. The remainder of this Section looks at the how local and national goals and challenges tie in with each other and where they are different.

- 18 Department for Environment, Food and Rural Affairs
- 19 M5, A37, A38, A39, A3088, A358 and A303
- 20 DEFRA's agreed maximum noise limits for roads www.defra.gov.uk

1.10 The Sustainable Community Strategy (SCS) for Somerset was prepared by the Somerset Strategic Partnership and is an important starting point to establish the more local goals and challenges for Somerset over the lifetime of our strategy. The SCS has brought together the views of its people and local organisations, so represents a strong community-led focus on the issues that matter to Somerset. As mentioned in 'Policy Context', the SCS has six core aims, which are:

- Making a positive contribution;
- Living sustainably;
- Ensuring economic wellbeing;
- Enjoying and achieving;
- Staying safe; and
- Being healthy.

1.11 Clearly, there is a close correlation between the SCS, LAA and the five government goals. This shows that priorities both locally and nationally are closely linked and gives a good foundation on which to base more locally identified goals for Somerset. For the purpose of our strategy, we will use the 6 goals identified through the SCS as our local goals.

1.12 Another important area of Council priority is our County Plan (2010-2013). This document outlines our promises across the county for the next three years around the topic themes of People, Place and Prosperity. The Table 1.1shows the promises that relate to transport and what this means for us in terms of achieving them.

Theme	County Plan Promises relating to Transport	Transport Challenges arising from the County Plan
People	Do-lt-Online – Making life easier for our residents providing easily accessible information online.	Providing transport information online. Helping people to reduce the need to travel.
	Reduce inequalities – in health, wellbeing, access and education	Improving transport accessibility. Improving air quality where it has been identified as a problem.
Place	Improve Somerset's roads with an aim to raise the road quality to one of the best in the country.	Maintaining the road network.
	Remove unnecessary road signs.	Ensuring people are given clear information and it is not conflicting, confusing or causing a distraction.

Theme	County Plan Promises relating to Transport	Transport Challenges arising from the County Plan
	Improve help for people	Maintaining the road network.
	inving at tisk from hooding.	Managing the conflicts between transport and the environment.
	Ensure broadband connectivity for more homes and businesses.	Providing transport information online. Helping people to reduce the need to travel.
	Work with partners to provide more decent affordable homes for our residents.	Ensuring that the transport requirements of these homes are met, including installing appropriate infrastructure in homes to reduce the need to travel or reduce carbon emissions ⁽²¹⁾ .
	Increase participation in volunteering.	Helping people help themselves.
	Reduce the size of the Council's own carbon footprint.	Working to address the transportation impact of our carbon emissions.
Prosperity	Expand energy sources to boost the economy and provide new jobs.	Helping people access transport which are more efficient or that use new energy sources or technology.
	Raise the levels of educational attainment and improve outcomes.	Helping people access education.
	Increase the number of businesses relocating to Somerset.	Making sure transport is a positive reason for businesses to relocate.
	Improve the infrastructure needed to support economic growth.	Helping to reduce congestion and improve accessibility to jobs and services.

Table 1.1 County Plan Promises

²¹ This could include broadband connectivity or making provision for new technologies.

1.13 Finally, in developing our challenges, we need to look to the issues that are affecting our District partners as they develop their Development Plan Documents (also known as Core Strategies) as part of their Local Development Framework (LDF). This work outlines the land use planning likely to take place over the same time scale as our strategy and so is important for us to take into consideration. Figure 1.1 shows the LDF process.

The Development Plan Document (DPD) Process



Picture 1.1 Summary of the Development Plan process for Core Strategies The preparation of DPD's is a constantly changing process. However, at the time of writing, West Somerset and Mendip were in the process of preparing Preferred Options prior to consultation, while Sedgemoor, South Somerset and Taunton Deane were preparing their draft DPD's. This information is subject to change.

Developing Our Challenges

1.14 Throughout the development of our strategies, we have spoken to different groups of people as well as looking at our statutory duties to see where identified local challenges tie in with our local goals. As a result of this, 5 areas of research have been defined:

- Existing Transport Data and Evidence Collected
- Elected Member Priorities;
- Capturing Local Parish Issues;
- Public Issues and Opinion; and
- Other priorities, such as flooding, air quality, aspirations of our partners, traffic management, asset management and climate change.

1.15 <u>Elected County Council Members</u> were invited to a workshop to gain an idea of their priorities for transport. The attendees were given a number of different transport priorities to rank. The top three priorities were maintaining the existing highway network, addressing road safety issues and seeking measures to improve community and public transport. More detail about this is in 'Somerset County Council Transport Policies: Consultation and Assessment'.

1.16 The <u>Parish and Town Councils</u> were contacted over their local issues to ensure that the sub-District level priorities were captured. We have outlined this information in more detail in 'Somerset County Council Transport Policies: Consultation and Assessment' but the top 5 parish issues were identified as:

- 1. Improve frequency, value and information of public transport
- 2. Traffic calming in villages
- 3. Better parking control and enforcement
- 4. More footpaths in rural areas
- 5. Freight/HGV routing

1.17 Over 1100 <u>On-Street Surveys</u> with the public were undertaken across a number of towns in Somerset. Surveys were undertaken in Wells, Crewkerne, Glastonbury, Yeovil, Frome, Bridgwater, Taunton, Minehead, Dulverton, Burnham on Sea, Wellington and Williton. People were asked to rank the five National Transport Goals listed earlier in this Section and the following represents respondents that ranked each goal their top priority:

- 1. Contribute to better safety, security and health 39.1%
- 2. Improve quality of life and a healthy natural environment 21.2%
- 3. Reduce carbon emissions 16.0%
- 4. Support the economy 14.9%
- 5. Promote equality of opportunity 8.9%

1.18 Respondents were also shown a range of initiatives and asked whether they thought they would help address the goals. The initiatives receiving the most support were:

- Improved Public Transport
- Maintenance of the Highway network
- Provision of better walking and cycling routes.

There was also strong support for the need to promote walking, cycling, carsharing and public transport if the Council wanted more people to use these modes. These surveys supported the findings of public focus groups held in Taunton, Bridgwater and Yeovil, where issues and priorities were discussed in greater depth than in the On-Street Surveys. More detail about this is in 'Somerset County Council Transport Policies: Consultation and Assessment'.



1.19 Finally, other priorities, such as <u>flooding</u>, <u>air quality</u>, <u>aspirations of our partners</u>, <u>traffic management</u>, <u>asset management and climate change</u> have also been considered during the development of the goals and challenges. In many instances, SCC has a statutory duty to ensure that these priorities are addressed.

1.20 As a result of all of this work, a number of challenges for the next 15 years have been identified in Table 1.2.

Challenge	Reason for Challenge	Links to Somerset Sustainable Transport Strategy Goals	Links to National Transport Goals
To share and attract resources through partnerships and other external sources to achieve our	We know that funding from Government is likely to be significantly reduced, particularly in the short to medium term. It will be important for us to work with others to get value for	Making a Positive Contribution	Support Economic Growth
goals.	thoriey for services we all deliver. This means working with other agencies such as the NHS, the Police and Fire Services, to deliver on common goals. We will also look to secure funding through developers and other external sources that may be available.		Improve Quality of Life and a Healthy Natural Environment
To ensure that the transport network is maintained.	Allowing Somerset's transport networks (and our assets) to deteriorate is a false economy and maintaining them to an acceptable standard will continue to be a challenge going forward. Maintaining the transport network helps to deliver on all of the goals we have identified. Maintenance can also have cost savings in other service areas. For example, resurfacing of a road would also have benefits to road safety, quality of life and health as well as supporting the economy.	Ensuring Economic Wellbeing	Support Economic Growth
To keep the level of casualties on our road to a minimum and continue towards achieving our long-term road safety targets.	We have made significant progress on reducing casualties on our roads but we need to maintain this progress and ensure that future generations have the skills to be competent road users.	Staying Safe	Contribute to Better Safety, Security and Health

Challenge	Reason for Challenge	Links to Somerset Sustainable Transport Strategy Goals	Links to National Transport Goals
To seek innovative ways of making jobs, services and tourism more accessible to,	One of our main challenges in a rural area is ensuring people are able to access services they require. While many people choose to travel to places where they can do this, we need	Living Sustainably	Support Economic Growth
Irom and for fural areas.	to consider now services can be delivered locally to minimise the need for travel, or by encouraging access to services remotely via the internet where possible.	Enjoying and Achieving	Promote Equality of Opportunity
To minimise the adverse impact of transport on quality of life and the natural environment.	We need to address existing problems in our settlements such as noise caused by traffic and the routing of heavy goods vehicles. We also need to make sure that new transport activities and projects, such as building new infrastructure, do not have a negative impact on our communities.	Living Sustainably	Improve Quality of Life and a Healthy Natural Environment
To minimise the growth of traffic in our more urban settlements to address congestion issues.	We have identified congestion issues in and around Taunton, Bridgwater and Yeovil. In order to cater for the growth in housing and employment that is planned in these areas, we need to make sure we have a plan to address this. There will also be a need to consider how we can best ensure timely delivery of the infrastructure required to service new developments	Ensuring Economic Wellbeing	Support Economic Growth

Challenge	Reason for Challenge	Links to Somerset Sustainable Transport Strategy Goals	Links to National Transport Goals
To help to address the negative impacts of transport on health, such as air quality and obesity.	We know that obesity is an issue in Somerset and it has a knock-on effect on many of the services that the public purse funds. We also have air quality issues caused by traffic in Taunton Town Centre, Henlade and Yeovil, which we need to address in order to prevent people suffering the negative health effects of this.	Being Healthy	Contribute to Better Safety, Security and Health
To encourage local communities to meet their individual transport needs.	We need to provide opportunities and support for communities to meet their own aspirations, either by taking over services themselves or looking to us to give them the information they need to make informed choices about transport.	Making a Positive Contribution	Promote Equality of Opportunity
To maximise the potential for use of technology to support our goals.	Over the coming years there will inevitably be a whole raft of new technological tools that can assist in the delivery of transport aims. This might be about improving broadband	Living Sustainably	Reduce Carbon Emissions
	vehicles to address transport issues or to help address the vehicles to address transport issues or to help address the other challenges. It might also include improving or maximising the effectiveness of existing technology such as automatic number plate recognition software, bus priority systems or real time information provision.	Ensuring Economic Wellbeing	Support Economic Growth

Challenge	Reason for Challenge	Links to Somerset Sustainable Transport Strategy Goals	Links to National Transport Goals
To seek opportunities through transport to reduce carbon emissions and strengthen our ability to adapt to climate change, particularly where it supports or enhances the success of the other challenges.	We know that this is a major challenge and we also know that we are still learning about what climate change might mean for Somerset in the future. There is a particular risk to Somerset in terms of flooding, and ensuring our transport networks are resilient to extreme events will be an ongoing challenge.	Living Sustainably	Reduce Carbon Emissions

Table 1.2 Our Transport Challenges for Somerset

Selecting the Preferred Approach

2.1 In order to develop an effective strategy and decide priorities for implementation, we followed the plan development process recommended by the Eddington Transport Study (2006), which is to:

- 1. Clarify goals for Somerset;
- 2. Specify the problems or challenges we want to address;
- 3. Generate options to resolve our challenges;
- 4. Compare these options with our goals and predict their effects to see which ones will work best;
- Select options that perform best and decide which priorities are most important; and
- 6. Deliver our strategy through Implementation Plans.

2.2 Throughout our plan, we have followed these steps to ensure that options developed as part of the Strategy have been clearly assessed to see whether they will deliver on the goals and priorities that we have identified.





2.3 To help us write our strategies, we developed a number of strategies for different modes and transport issues, such as motorcycling, public transport and freight, along with the various plans that we have also considered and incorporated into our policies.

These are outlined in Figure 2.1, which also shows how all of these strategies and documents tie in with the FTP. In order to make sure the suggestions in these strategies help us meet the challenges and goals of the overall strategy we developed a tool to help us test them. This tool is known as the Modal Strategy Appraisal Tool or MSAT.

The task

2.4 To make sure the modal and issue specific strategies suggest policies that will help us meet our goals, the options contained within them need to be tested against the goals and challenges described in 'Goals and Challenges'. This is an important step to make sure that we recommend the best solutions and improvements needed to tackle the challenges. We used MSAT to make sure this was done in the same way for each strategy.

2.5 As well as the Goals and Challenges, guidance from the Department for Transport recommends options are also measured against a number of other factors, such as cost and scale of impact (see the 'More information' section). MSAT aims to measure all of these factors and describe the impact of each scheme. This had to be done in a way that allows us to easily decide which options would provide the best way of fulfilling our goals.

The tool

2.6 The tool combines 36 separate measures of each option's ability to contribute to our goals in a spreadsheet. Factors that are easily measured and quantified are given a score to represent how much an option meets the criteria described above. Others, which are more difficult to measure, are described briefly and given a red, amber or green traffic light style indicator to help flag up important issues.

2.7 To make the results easier to understand all of the scores given to an option are combined into a single overall score. This score is then used, along with the results of the qualitative factors to decide which options best meet our objectives.

2.8 The results of this process are included in our strategy in 'Strategic Approach'.

Aligning the strategy with the goals

2.9 Through using MSAT, the technical work that has been carried out to produce our modal strategies should align with our 6 SCS goals. The following diagram shows the links between our goals and our strategies, as well a showing where strategies overlap and achieve more than one goal.

More information

More details on the MSAT process and the recommendations it has helped us to make can be found in the mode and issues specific strategies available on our website or by contacting TransportPolicy@Somerset.gov.uk



Reviewing the plan

2.10 Many of the issues discussed above (and much of the evidence in Annex A below) are likely to continue evolving during the plan period. In particular, the publication of core strategies and developments in funding for transport are likely to change the needs and opportunities our transport policies have to tackle. This means we will need to refresh our transport policies to reflect this changing context and keep them relevant.

Annex A - Data and Evidence

In this Annex, we provide a deeper analysis of the evidence we have presented earlier in this document. Furthermore, much of the information presented in 'Somerset County Council Transport Policies - Public Consultation and Assessment' has also be used to inform the development of our strategy.

Climate Change

There is wide consensus that we need to reduce carbon dioxide emissions to at most 50% of 1990 levels by 2050 if we are to have even a 50% chance of preventing temperature rises above 2 °Celsius of pre-industrial levels - potentially this is the tipping point for catastrophic and irreversible climate change.

A core concept in the transition to a low carbon travel economy is the local production and consumption of goods, and hence local travel for both freight and people. This can also contribute to the local economy, maintain employment, and enable people to appreciate their local environment; less distance travelled and less motorised travel does not need to mean a lower quality of life.

We know that as a rural county, Somerset will have higher levels of CO_2 than more built up areas, simply because the more miles covered leads to more CO_2 being produced. We also know that the speed a vehicle is travelling will affect how much CO_2 it emits. The following graph represents this trend.



Graph showing variations in CO2 levels dependent on average vehilce speed (Adapted from WSP presentation 'Cambridge and the Carbon Challenge', SWCouncils Workshop 'Climate Change, Transport and LTP3, May 2010).

In Somerset, the greatest challenge is an increase in flooding – not only from rivers, but also from the sea, as levels rise. Somerset has always had to cope with flooding, particularly on the Levels, but now the risk is much greater⁽²²⁾.

Somerset has about 235 square miles at, or a few metres above, sea-level. Sea-levels are expected to rise in the South West by between 20cm and 80cm by the year 2080, meaning this land is at risk of flooding⁽²³⁾.

At the moment, there is about a 1 in 200 risk of the M5 in Somerset flooding from the sea. If we continue to burn fossil fuels at the current rate, the risk will be 1 in 17 by the year $2060^{(24)}$.

4.9 million tonnes of end user carbon dioxide (CO_2) emissions were released in Somerset in 2007. Of these emissions, 30% (1.5 million tonnes) came from road transport. A total of 10 tonnes of CO_2 were released per person in Somerset in 2007, 3 tonnes of this came from transport. In Somerset, we produce 25% more CO_2 than the South West average.

- 22 www.risingtothechallenge.org.uk
- 23 UK Climate Impacts Programme
- 24 Environment Agency and Met Office

All local authorities in Somerset showed little change in their total emissions between 2005 and 2007 with approximately 1% increases seen in Sedgemoor and West Somerset and decreases in the other Districts. With our high emissions rate and our high risk of flooding, we need to cut back. Since 2006, we have reduced the proportion of children being driven to school alone by car from 29.2% to 25.3% and reduced the proportion of people driving to work alone by car from 54% to 51%.

Economic Growth

Research commissioned by the South West Regional Development Agency suggests that connectivity to other regions is more important to economic growth in the South West than links within it⁽²⁵⁾. In terms of inter-regional connections, a later study⁽²⁶⁾ highlighted the importance of the West of England as a hub connecting most parts of the region, including Somerset. These connections looked to provide an indication of the level of contribution an area could make to the regions future economy. The figure below shows how Somerset relates to the South West Region in terms of projected growth over the lifetime of our strategies. This work highlights one area where the economy and reducing carbon emissions conflict, since greater travel, predominantly car-bourne, leads to greater carbon emissions.

²⁵ South West RDA (2005) Intra-regional Connectivity Final Report

²⁶ Connectivity Problems, Challenges and Issues for the Region – Unlocking Economic Potential via Improved Connectivity (2009) AECOM, Exeter.



The forecast economic importance of the main settlements in the South West in 2026 (AECOM, 2009).

The employment rate of working age people in Somerset has decreased in the year to June 2009, although it remains higher than the rates for both England and the South West. The latest unemployment rate for Somerset is 4.6% of the economically active 16+ population (SW: 5.4%, Eng: 6.9%). This is the second lowest rate in the region (excluding the Isles of Scilly). Evidence of reductions in sickness absenteeism among cycle commuters compared to non-cycling staff demonstrates that this mode provides a strong business case to employers to promote cycle commuting⁽²⁷⁾

Somerset has a higher proportion of people employed in manufacturing (13%), wholesale and retail (20%) and public admin, education and health (28.8%) than both the England and regional averages for each sector⁽²⁸⁾.

There are long term plans to build new homes in Somerset. The majority of these homes will be built in Taunton, Yeovil and Bridgwater. We know there is going to be a substantial increase in trips in these areas. Our car journeys have an impact on air quality as well as making it more difficult for people to walk and cycle about the

- 27 Hendriksen, I., Simons, M., Galindo Garre, F., Hildebrandt, V. (in press) The association between commuter cycling and sickness absence, Preventive Medicine
- 28 Somerset Brief 18 March 10 produced by GOSW

towns due to the barriers created by roads. Our work also shows that the predominant means of travel to, within and between the towns in Somerset is by car. We need to find ways to support the growth of jobs and housing while keeping the transport network functional⁽²⁹⁾ as well as making sure that people who do not drive can also get to jobs and services.

Three years ago Somerset had very poor internet connectivity; businesses and people in their homes struggled with long waits with dial-up, with files often taking hours to download. Somerset County Council stepped in when it became clear that commercial internet companies could not provide even a basic service to Somerset's worst affected rural areas. The new wireless broadband infrastructure has given a much needed boost to the rural community who were often at a disadvantage to businesses in towns. However, we know we still have a long way to go to improve connections to the more remote parts of Somerset⁽³⁰⁾.

Maintaining our transport network is key to supporting the economy. Damage resulting from two extreme winters in 2009 and 2010 have given rise to a large number of potholes requiring attention in the county. As well as potholes, we have annual programmes of resurfacing and other maintenance to carry out. Left unchecked, potholes and other defects would cause damage to vehicles, impact on road safety and restrict the movement of all users of our network.

Equality of Opportunity

Our accessibility planning analysis indicate that acute hospitals, adult evening learning and Jobcentre Plus are the least accessible services in Somerset. West Somerset, Frome, Bridgwater and Castle Cary are among the areas have the lowest level of accessibility. Some of these areas are currently covered by Demand Responsive Transport and Community Transport. However, 18% of households in Somerset do not have access to a car. This figure is highest at 19.2% in West Somerset and Taunton Deane and lowest in South Somerset at 16%⁽³¹⁾.

7.0% of the workforce of Somerset has no qualifications, a higher proportion than the South West (6.4%) but lower than England (8.5%).

The proportion of workers qualified to NVQ 4 (degree & equivalent) & above (26.1%) is lower than the South West (31%) and England (32%) rates. Our discussions with our partners suggest that young people living in more rural areas cannot afford to travel to the towns to access education and employment. In many instances, there journeys take too long by any other mode than private car. In addition, the reduction in children walking and cycling can impact upon self-confidence and the lack of physical exercise can impact upon concentration and academic performance.⁽³²⁾

30 www.connectingsomerset.co.uk

²⁹ Somerset County Council Taunton area and Yeovil Transport Reviews, 2009

³¹ Census, 2001

³² Sibley, B. Etnier, J. 2003 The relationship between physical activity and cognition in children: A meta-analysis, Pediatric Exercise Science, 15: 243-256.

Between 5% and 17% of people with learning disabilities in Somerset are in some form of work⁽³³⁾.

Over 85% of parishes in Somerset have access to demand responsive transport schemes, such as Slinky, Nippy Bus or Dial-a-ride⁽³⁴⁾. Just over 9.5 million public transport journeys (including demand responsive and community transport) were made in 2009/10. This figure has increased by 1.8 million since 2006/07.

Safety, Security and Health

Safety

In 2008 there were 1560 collisions on Somerset roads resulting in 2228 casualties. Of these 29 were fatal, 245 serious and 1954 slight injuries. 2008 saw the lowest figures since records have been kept. Fatalities were 26% lower than those in 2007. Child casualties decreased in 2008 by 71% compared to 2007 and there were no child fatalities in 2007 or 2008. Children injured as passengers rose by 20% in 2008 but there were 25% fewer cycle accidents involving children in 2008 compared to 2007.

Most vehicle related injuries in Somerset in 2008 resulted from collisions on roads with speed limits of 60mph and 30mph and 51% of all casualties in 2008 were on A class roads⁽³⁵⁾. Although pedestrians and cyclists are disproportionately involved in road collisions (compared to the proportion who travel by those modes) it is likely to be a reflection of the lack of safety in the dominant mode of transport, the car, which accounts for this.

With regard to motorcycles, In Somerset in 2008 motorcycling represented only 1% of all road traffic but accounted for over a quarter of deaths and serious injuries⁽³⁶⁾.

Security

Crime at on transport or at transport facilities is low in Somerset⁽³⁷⁾. However, individual surveys suggests passengers can feel insecure while waiting for public transport at bus stops or railway stations; also, some car parks can be perceived as dangerous whilst people have concerns about using foot- and cycle-paths in some locations. Evidence suggests that the presence of pavements or footpaths that are

- 35 Somerset Road Safety Partnership Casualty Review 2006-2008
- 36 Somerset Road Safety Partnership Three Year Plan 2008-2010
- 37 pers.comm, Avon and Somerset Police

³³ Somerset Brief 18 March 10 produced by GOSW

³⁴ Somerset County Council Local Transport Plan Data. Slinky, Nippy Bus and Dial-a-Ride are forms of Demand Responsive Transport, allowing people to book a seat on one of these buses to take them to various towns in Somerset

well maintained with good surfaces, cycle paths, and street lighting increase the number of walking and cycling trips⁽³⁸⁾. Additionally, the speed of traffic is the top anti-social behaviour in communities, according to the British Crime Survey⁽³⁹⁾.

Health

The most significant effect of road transport on human health is its influence on physical activity. In the UK, car ownership has increased since the 1960s. The decrease in physical activity among adults and children in England is a key concern for public health professionals. Although there are other factors involved (fewer manual jobs and the physically active elements of housework, shopping etc), changes in travel behaviour are a significant factor.

In Somerset 24.5% of adults are obese⁽⁴⁰⁾. Obesity levels are rising in children and young people. Estimated figures for Somerset suggest that for children aged 2 to 19 years, 24.9% of boys and 29.9% of girls are overweight and a further 6.8% and 8.6% respectively are obese⁽⁴¹⁾. We know this means that these people will be more susceptible to cancer, diabetes and heart disease as a result. Physical activity can help this. For example, each additional kilometre walked per day is associated with a 4.8% reduction in the likelihood of obesity, whereas each additional hour spent in a car per day is associated with a 6% increase in the likelihood of obesity⁽⁴²⁾. We have undertaken analysis to identify which schools have high numbers of children being driven to school that live within a reasonable distance to walk to school⁽⁴³⁾. For Somerset, this is 12.53%, although some individual schools have much higher numbers of children falling into this category. In some instances, factors such as school location or the nature of the school will have a bearing on this trend.

Air quality management areas have been declared in Taunton town centre, Henlade and in Yeovil. Road transport is the chief source of the emissions responsible for respiratory related deaths in England. Reducing particulate emissions from motor vehicles could significantly reduce the number of such deaths⁽⁴⁴⁾. In humans, poor air quality can aggravate asthma, bronchitis, lung and heart diseases and respiratory allergies.

- 38 Cochrane, et al. 2009 Small Area and Individual Level Predictors of Physical Activity in Urban Communities: A Multi-Level Study in Stoke on Trent, England. International Journal of Environment Research and Public Health, 6, 654-677.
- 39 Poulter, D., McKenna, F. 2007 Is speeding a "real" antisocial behaviour? A comparison with other antisocial behaviours, Accident Analysis and Prevention, 39: 384-389.
- 40 http://www.apho.org.uk/default.aspx?QN=P_HEALTH_PROFILES
- 41 Children & Young People's Scrutiny Sub Committee 22 January 2009
- 42 Frank, L., Andersen, M., Schmid, T. (2004) Obesity relationships with community design, physical activity, and time spent in cars, American Journal of Preventive Medicine, 27(2), pp. 87-96
- 43 For Primary Schools, a walk to school threshold is 800 metres (half a mile). For Secondary Schools, this is 2 km (1.2 miles).
- 44 Knox, E. 2008 Atmospheric pollution and mortalities in English local authority areas, *Journal of Epidemiology and Community Health*, 62: 442-447

Quality of Life

People

Transport is most often a means to an end. It can have positive and negative impacts on people and the environment. Some people will face barriers in terms of mobility impairments, age, and impediments due to the transport choices of others. If we can't get to the places we need to go to, our quality of life is lower. While deprivation levels are low in Somerset compared to England, there are over 20,400 people living in poverty⁽⁴⁵⁾. It is these people that need to be able to access the transport to reach jobs and services that they want to improve their lifestyles.

We also need to recognise that during the lifetime of this strategy up to 2026, there are likely to be many challenges to our quality of life from new technology and changing lifestyles to the potential impact of climate change and peak oil⁽⁴⁶⁾.

Freight transport can have a significant impact on the lives of Somerset residents. Public satisfaction with the routes chosen by Heavy Goods Vehicles is lower than average in Somerset, at only 40 per cent in 2004 (results range from 32 to 51 per cent nationally). During 2009, DEFRA⁽⁴⁷⁾consulted local authorities on a Draft Noise Action Plan for major roads carrying greater than 6 million vehicles per year outside towns or cities in excess of 250,000 inhabitants. A total of 36 locations on small stretches of our strategic network⁽⁴⁸⁾ were identified by DEFRA that were likely to generate noise exposure of 76dB⁽⁴⁹⁾or more.

Quality of life is often about public perception and satisfaction. The annual National Highways and Transport Survey gives us a clear picture about where the public think we need to improve our services. The figure below shows an overview of Somerset transport services.

45 www.healthprofiles.info

- 47 Department for Environment, Food and Rural Affairs
- 48 M5, A37, A38, A39, A3088, A358 and A303
- 49 DEFRA's agreed maximum noise limits for roads www.defra.gov.uk

⁴⁶ This is the point in time when the maximum rate of global petroleum extraction is reached, after which the rate of production enters terminal decline



Environment

This section considers the potential ecological impacts of transport and its infrastructure and the distances from them that environmental affects are likely to occur. The affects considered are:

- Disturbance
- Habitat Loss
- Habitat Fragmentation
- Habitat Isolation
- Barrier Effects
- Air Pollution
- Hydrological Changes
- Soil Changes
- Introduction of New Habitats

Disturbance

Changes in patterns of human activity and associated disturbance or damage can disturb species and effect ecosystems. Such disturbance includes increased public access to sensitive sites. The presence of vehicles and/or humans can cause visual disturbance to some species, for example to wading birds⁽⁵⁰⁾,⁽⁵¹⁾.

The introduction or increase in human activity in an area can affect sensitive species by reducing the amount of time spent on essential activity such as feeding or rearing young, and can lead to displacement, declines in populations or even local extinction. Where there is an open aspect, such as on the Somerset Levels and Moors human activity may cause disturbance affecting behaviour of sensitive birds. For example, shorebirds can be disturbed at distances of 400 metres by the presence of humans⁽⁵²⁾.

Another example is otters. Anecdotal evidence suggests that otters are not seriously affected by disturbance from anglers, walkers and dogs. Otters do not appear to avoid houses, industry, roads and campsites Although individual otters do not appear to be influenced by short periods of disturbance there is a lack of information on how sustained levels of disturbance influences female otters with young⁽⁵³⁾.

- 51 Evink, G. L. 2002. Interaction Between Roadways and Wildlife Ecology: A Synthesis of Highway Practice. Washington D. C.: Transportation Research Board.
- 52 Goss-Custard, J. D. 2005. National Cycle Network Exe Estuary Proposals:Assessment of the Anticipated Effects on the Exe Estuary Special Protection Area. Exeter: Devon County Council.
- 53 McCafferty, D. J. (n/d): Ecology and Conservation of Otters (Lutra lutra) in Loch Lomond and the Trossachs National Park. Department of Continuing Education, University of Glasgow

⁵⁰ Treweek, J. 1999. Ecological Impact Assessment. Oxford: Blackwell Science UK.

Traffic noise has been shown to affect the behaviour of species, e.g. bird densities decline where noise is over 50 dbA. Dutch and Swedish research⁽⁵⁴⁾,⁽⁵⁵⁾ into breeding bird populations has shown an increased shift away from roads according to the amount and speed of traffic.

Street lighting is known to effect wildlife by altering nocturnal conditions. Street lighting can disturb the diurnal rhythm of species. Many of the species, including otters and bats are sensitive to artificial lighting. Indeed, the introduction of street lighting can have significant effects on their behaviour, cause loss of access to feeding areas and resting areas, and hence affect the viability of populations⁽⁵⁶⁾,⁽⁵⁷⁾.

Habitat Loss

Habitat loss is a major threat to species. In some cases it is directly linked to mortality, and in other cases survival depends on the ability of displaced species to locate alternative habitat. Species require minimum habitat to maintain their populations and it is difficult to assess the impacts of any single scheme. Size of habitat left after loss is also important for species diversity, as there is a threshold for many species that makes smaller patches unviable. The spatial placement of habitat is also important⁽⁵⁰⁾,⁽⁵¹⁾.

The effects may be local or on a larger geographic scale. Delayed effects of habitat loss are probably common but rarely analysed in ecological impact assessments. Species are not only threatened by habitat loss but also by reorganisation of land use and by reduction in size of habitat patches⁽⁵⁰⁾.

Habitat Fragmentation

Fragmentation is the breaking down of habitat units into smaller units of habitat. It is linked to changes in quality and quantity. These could include increase in edge effects, reduction in size of habitat and changes in species composition⁽⁵⁰⁾.

A key issue in a fragmented landscape is the ability of species populations to survive in and move between small isolated habitat patches scattered within an urban and agricultural landscape. Research has shown that habitat size and wildlife corridors are of vital importance to nature conservation, and to a thriving and diverse

- 54 Reijnen, M. J. S. M., Veenbaas, G. & Foppen, R. P. B. 1995. Predicting the Effects of Motorway Traffic on Breeding Bird Populations. Delft: Road and Hydraulic Engineering Division and DLO-Institute for Forestry and Nature research.
- 55 Helldin, J. O. & Seiler, A. 2003. Effects of roads on the abundance of birds in Swedish forest and farmland. Riddarhyttan: Swedish University of Agricultural Science.
- 56 Outen, A. R. 2002. The ecological effects of road lighting: in Sherwood, B., Cutler D. & Burton J. (eds.) 2002. Wildlife and Roads: The Ecological Impact.299pp. London: Imperial College Press.
- 57 Stone, E. 2009. The impact of street lighting on lesser horseshoe bats: PhD, University of Bristol. Presented at the South West Bat Conservation Trust Conference, 25 April, 2009.

wildlife⁽⁵¹⁾, ⁽⁵⁸⁾, ⁽⁵⁹⁾. The value of a large area of semi natural habitat outweighs its division into smaller areas where alterations, for example to light, hydrology and levels of disturbance can have a radical effect on species survival. Fragmentation into smaller areas can lead to extinction of predators, larger species and habitat specialists as well effecting pollination in flora – for example Bluebells produce less seed in smaller areas. Road construction and widening would increase fragmentation effects⁽⁵⁰⁾, ⁽⁵¹⁾.

The reduction in habitat area would be less able to support a level of population prior to the land use change and may result in inbreeding to genetic problems and eventual local extinction⁽⁵⁰⁾.

Barrier Effects

Linear development, such as new roads and even cycleways, can form barriers, which prevent the movement of wildlife through the landscape.

This is a particular problem for migrating species. Many amphibians use different habitat at different seasons of the year. Barriers can cause traffic casualties or reluctance in a species to cross it. Small mammals will not cross roads of 20 to 25 metres wide. Traffic density also forms part of the ability of species to cross roads⁽⁵⁰⁾.

Wild flowers, invertebrates, amphibians, reptiles and small mammals will be affected by the presence of a road. Those species, which are unable or reluctant to cross roads, will become isolated and hence loose genetic diversity. This isolation could also lead to in the long term the local extinction of some species, which in turn may affect others up the food chain. The creation of barriers or other obstacles affecting the movement of animals may be caused by cumulative development, be it roads and/or housing, within a species range. Road casualties are a significant cause of fauna mortality. In Somerset, Otters are increasingly becoming victims of vehicle collision. Road mortality continues for decades after construction⁽⁵⁰⁾,⁽⁵¹⁾ and numbers of casualties counted are often under estimated⁽⁶⁰⁾.

Habitat Isolation

Habitat Isolation is the combined effect of habitat loss, fragmentation and isolation. It affects the genetics of a population if it cannot interact with populations elsewhere which can have a long-term effect on viability.

In general, consequences are:

- 58 English Nature. 1996. Research Report No.178: The significance of secondary effects from roads and road transport on nature conservationPeterborough: English Nature
- 59 Dufek, J. 2001. Effects of Infrastructure on Nature: in How to avoid habitat fragmentation caused by transport infrastructure [COST 341]. Brussels:European Co-operation in the Field of Scientific and Technical Research.
- 60 Slater, E. M. 2002. An assessment of wildlife road casualties the potential discrepancy between numbers counted and numbers killed: in Web Ecology3:33: pp 33-42

- Loss of key species (species on which the ecology of other species depend); Reduction or extinction of species at newly formed edges, increased vulnerability to external influences such as disturbance, increased likelihood of invasion by uncharacteristic species;
- Inbreeding;
- Loss of characteristic species; and
- Increased vulnerability to stochastic events, e.g. climate change⁽⁵⁰⁾.

Limitations on genetic exchange and response to climate change may have on effect on the population of the species maintained.

Changes in numbers of predators and/or prey

Direct loss or change of habitat due to road building will affect the numbers and types of prey available. The increased numbers and speed of road traffic will affect airborne invertebrate and small bird populations. Small mammals may eventually increase in the road verge but this would then attract predators, such as Barn Owls, resulting in increased death to these species from traffic collisions⁽⁵⁰⁾.

Street lamps can also have an effect on prey availability to bats⁽⁵⁶⁾,⁽⁶¹⁾. Whereas they do not sustain insect populations per se but attract insects from the surrounding natural environment. Therefore, as a consequence of attracting the insects deplete prey availability for light sensitive bats in surrounding zones.

Mortality

Some animals attempt to cross roads. This can arise out of fragmentation caused by new building. This includes many rare species such as bats, otters and amphibians trying to reach breeding ponds. Mortality affects animals of all sizes from insects up to deer⁽⁵⁸⁾. National statistics suggest that 47,000 badgers (25% of the population) and between thirty and seventy million birds are killed annually on UK roads for example⁽⁵⁸⁾. In Somerset around 25 to 30% of the otter population has been killed on roads in one year⁽⁶²⁾. Apart from numerous wildlife casualties, collisions with wildlife are also a cause of road traffic accidents. In Somerset there are on average 10.9 injury accidents per annum involving wild species⁽⁶³⁾.

Air Pollution

Road transport is the source of a number of airborne pollutants. The impacts of nitrogen and nitrogen oxides deposition on vegetation growth are of particular concern. Transport produces other pollutants including sulphur dioxide, ozone and particulates. Air pollution has been linked to ill health amongst trees, particularly over mature specimens, and also a failure to regenerate, either from coppice, pollard or seed. In grassland nitrogen loving species will suppress sensitive flora. Lichens and bryophytes are particularly sensitive.

- 61 pers. comm. Emma Stone, University of Bristol
- 62 pers. comm., Somerset Otter Group
- 63 Somerset Highways, accident data

The Habitat Regulations Assessment of the draft Regional Spatial

Strategy for the South West (2006) considered 200 metres as the outer distance from a road where nitrogen deposition is expected to occur.

Bignall et al⁽⁶⁴⁾ consider that 150 metres air quality returns to background levels. The greater distance is used, as a precautionary approach is required.

Hydrological changes

Changes in hard surface runoff may leads to changes in flow patterns in watercourses (storm water surges), and increased nutrient and sediment levels in watercourses. River, rhyne and ditch, and floodplain habitats such as alluvial forests would be especially vulnerable.

Surface water run-off from development can result in changed conditions in water environments. The amount of new paved surface may significantly affect local hydrology. The amount and quality of water available determines which flora and invertebrates can survive and indeed the type of habitat ⁽⁵⁰⁾,⁽⁵¹⁾.

Soil changes

Materials used in construction, road spray, vehicle emissions, dust, and other particulates including that which can be deposited on the land or by precipitation can change soil pH and structure which in turn effects which plants can grow, those invertebrates that can survive and so on up the food chain⁽⁵⁰⁾.

Introduction of New Habitats

As a result of road building, new habitats may be introduced as part of the landscaping the verges and adjacent landform to the scheme. This may include inappropriate non-native species or an imbalance of local species, which in turn may affect the surrounding ecosystem. Roads are also known to disperse seed from 'foreign' sources⁽⁵⁰⁾, ⁽⁶⁵⁾.

64 Bignal, K., Ashmore, M. & Power, S. 2004. The ecological effects of diffuse air pollution from road transport. English Nature Research Report No. 580.Peterborough: English Nature.

⁶⁵ White, P. A. & Ernst, M. 2003. Second Nature: Improving Transportation Without Putting Nature Second. Defenders of Wildlife/Surface TransportationPolicy Project, USA.



