Chapter 6 Climatic Factors including greenhouse gases

Climatic Factors including greenhouse gases summary

Key messages of policy

- Importance of all agencies cutting down carbon emissions through reviewing vehicle fleets and managing commuter and business travel.
- LTP3 development should consider strengthening policy objectives around adaptation and resilience of the transport network to extreme weather events.

Environmental baseline

Environmental description	Baseline condition	Future trend without LTP3
Climate change	Winter and summer mean temperatures have been increasing.	Summer and winter mean temperatures predicted to increase further. Dryer summers and wetter winters predicted.
Transport CO_2 emissions by sector	Quarter of CO_2 emissions are caused by transport	Engine and fuel technology should reduce CO_2 emissions but traffic will grow which could mean this would remain moderate.
CO_2 emissions from Derbyshire County Council operations	Greatest proportion of CO_2 emissions is from energy requirements of buildings and streets	Energy reductions are being driven by cost savings and therefore a reduction in CO_2 emissions would be likely without LTP3
	Business mileage is greatest proportion of DCC travel CO_2 emissions	Engine and fuel technology should reduce CO_2 emissions.
Flooding	There have been recent incidences of flooding in the County.	Climate change predictions highlight that more extreme weather events, including flooding are more likely.

Environmental issues and opportunities

Description of issue	Implications/ opportunities for LTP3
Climate change	LTP3 should aim to adapt to climate change and to seek a reduction in CO_2 emissions
CO_2 emissions from transport in Derbyshire	LTP3 should aim to reduce CO_2 emissions from the transport sector in Derbyshire by encouraging more sustainable travel and to strive towards a low-carbon economy.
CO_2 emissions from Derbyshire County Council operations	LTP3 should aim to continue to reduce CO_2 emissions from its own operations relating to transport, particularly by reducing energy consumption, influencing business travel and vehicle and contracted services procurement.
Flooding	LTP3 should seek to minimise the risk of flooding

Data gaps

Description	Action
Information about increased rate of vegetation growth	Impractical to collect. We will monitor cutting rates in the future.
Lack of detail to how the transport sector contributes to CO_2 emissions	Develop a CO_2 emissions database for transport
No information about CO_2 emissions from DCC employee commuting to work and from contracted service vehicles	Develop a methodology for data collection and collect data
Historical information on flooding trends and flood risk assessments of transport infrastructure	Undertake flood risk assessments for the transport network

Draft objectives

SEA 8 Support sustainable tourism
SEA 10 Reduce transport's emissions of carbon dioxide and other greenhouse gases, with the desired outcome of tackling climate change
SEA 11 Enhance the network's resilience to climate change e.g. reduce the risk of flooding
SEA 12 Minimise energy usage and reduce dependency on non-renewable resources
SEA 13 Reduce the emission of air pollutants from transport in declared Air Quality Management Areas which relate to local traffic
SEA 14 Influence the location of development to make efficient use of existing physical infrastructure and to help reduce the need to travel.

6.1 Stage A1: Key messages of policy context analysis

6.1.1 Stage 1 of the SEA, see Annex 1, has identified the key relevant plans, programmes and environmental protection objectives relating to climatic factors including greenhouse gases. The key messages of policy context are:-

- Importance of all agencies cutting down carbon emissions through reviewing vehicle fleets and managing commuter and business travel.
- LTP3 development should consider strengthening policy objectives around adaptation and resilience of the transport network to extreme weather events.

6.2 Stage A2: Environmental baseline

Introduction

6.2.1 Human activities such as the burning of fossil fuels and deforestation have cumulatively caused the atmospheric concentrations of Carbon Dioxide (CO_2) to increase by about 35% since the beginning of the industrial revolution. This elevated level of CO_2 and other greenhouse gases has increased the global warming potential of the earth's atmosphere and is the cause of the climate change concerns that are facing us today. Carbon Dioxide emissions are of a national and global significance but also have an indirect local effect through changing weather patterns caused by climate change. There remains uncertainty regarding the reversibility or permanence of climate change; however, globally there is growing commitment to restricting and reducing current CO_2 emissions rates. In this section to examine the environmental baseline we have considered the following issues:-

- Climate change
- Carbon Dioxide emissions from transport
- Flooding

Climate Change

6.2.2 Rising global temperatures, caused by levels of CO_2 in the atmosphere, will cause changes in weather patterns around the world including rising sea levels and increased frequency and intensity of extreme weather.

6.2.3 The Met Office Hadley Centre is the UK's foremost climate change research centre, largely co-funded by the Department for Environment, Food and Rural Affairs (DEFRA), the Ministry of Defence and Department of Energy and Climate Change (DECC). One of their duties is to monitor global and national climate variability and change. Figure 6.1, provided by the Met Office Hadley Centre shows the global land surface, sea surface and combined sea-surface temperature. As can be seen by the graphs, the overall trend globally has been an increase since 1850 to the present.[1]

6.2.4 The Hadley Centre provides data regarding mean temperatures in the UK for Central England called the HadCET dataset, which is displayed in Figure 6.2. The area defined as Central England is a roughly triangular area enclosed by Lancashire, London and Bristol. The data series runs from 1772 to the present and is the longest available instrumental record of temperature in the world[2].

[1] http://www.metoffice.gov.uk/climatechange/science/hadleycentre/
[2] http://hadobs.metoffice.com/hadcet/

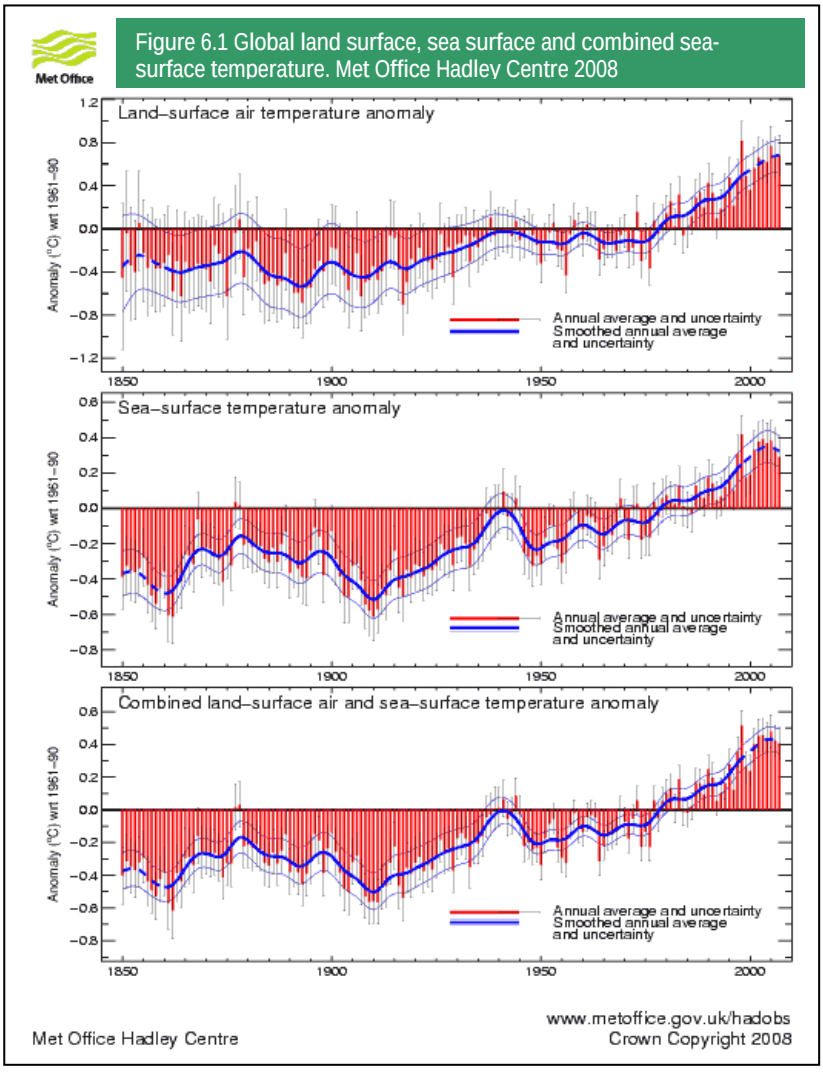


Figure 6.1 Global land surface, sea surface and combined sea-surface temperature. Met Office Hadley Centre 2008

The red bars show the global annual average near-surface temperature anomalies from 1850 to 2007 for land areas only (top), ocean areas only (middle) and combined land and ocean (bottom). The error bars show the 95% uncertainty range on the annual averages. The thick blue line shows the annual values after smoothing with a 21-point binomial filter. The thin blue lines show the 95% uncertainty on the smoothed curve. Data are from the HadCRUT3 data set.

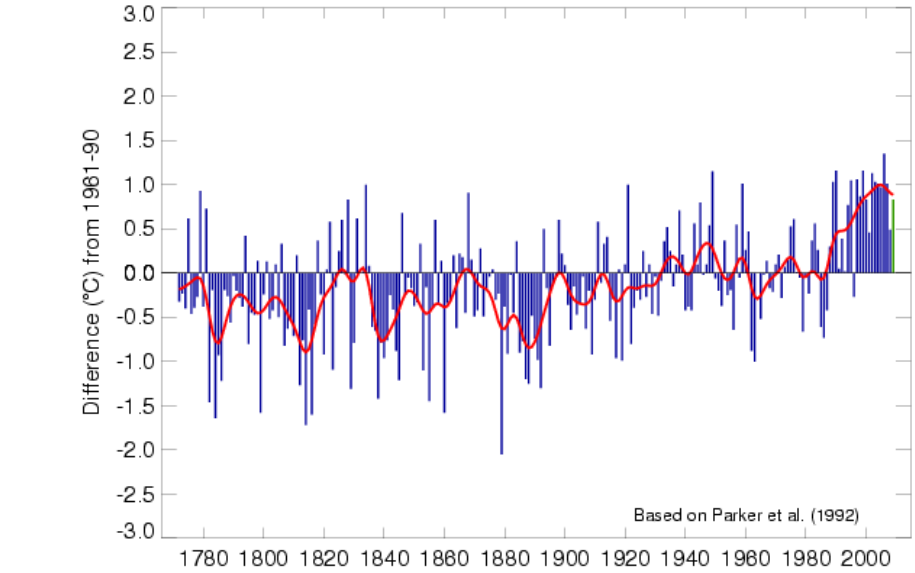


Figure 6.2 HadCET Mean Central England Temperature 1772 to 2009

The graph above shows annual anomalies relative to the 1961-1990 average and the red line is a 21 point binomial filter, which is equivalent to a 10 year running mean. 2006 was the warmest year on record for min HadCET and mean HadCET.

6.2.5 In order to more accurately predict the impact of climate change for the UK, the Government funded the UK Climate Impacts Programme (UKCIP) in 1997[3], to help co-ordinate scientific research into the impacts of climate change. UKCIP has produced climate projections for the UK based on the latest scientific understanding. Overall the climate in the UK is predicted to be warmer with drier summers and wetter winters, snowfall will reduce and the frequency of extreme weather events will increase.

6.2.6 UKCIP also provides more specific predictions for each administrative region in the UK. The likely predictions for the East Midlands, under a medium emissions scenario in 2080 are as follows:

- 3ºC increase in winter mean temperature
- 3.5ºC increase in summer mean temperature
- 18% increase in winter mean precipitation
- 20% decrease in summer mean precipitation

6.2.7 National Indicator 188 is a national indicator set by the Government which is designed to measure progress in preparedness in assessing and addressing the risks and opportunities of a changing climate. The aim of this indicator is to embed the management of climate risks and opportunities across the all levels of services, plans and estates. It is a process indicator which gauges progress of a local authority area to:

- assess the risks and opportunities comprehensively across a local authorities area
- take action in any identified priority areas;
- develop an adaptation strategy and action plan setting out the risk assessment, where the priority areas are – where necessary in consultation & exhibiting leadership of local partners - what action is being taken to address these, and how risks will be continually assessed and monitored in the future; and
- implement, assess and monitor the actions on an ongoing basis

6.2.8 In responding on NI188, the 3 Counties Alliance Partnership (3CAP) which covers Derbyshire, Leicestershire and Nottinghamshire, published a report in 2009 which assessed the impact of Climate Change on 3CAPs highway network policies and standards. It identified the effects that a changing climate will have on the highways network and developed an action plan to adapt to these changes and achieve level of 2 of NI 188. The predicted impacts on the network are summarised below:-

Drier, hotter summers

- Increased incidence of pavement deterioration and subsidence.
- Passenger discomfort in hot weather
- Increased growing season, leading to faster rates of growth and new species, implications for vegetation maintenance and related safety issues.
- Increased vegetation may also pose problems for drainage through blocked gully and erosion.

Wetter, warmer winters

- More frequent incidences of flooding and/or higher risk of landslides will impact on infrastructure performance.
- More storms and associated winds will have implications for structural and tree damage adjacent to the highways.
- Reduced snowfall leading to reduced requirement for gritting and snow and ice removal.

Flora and Fauna

6.2.9 One of the impacts of drier, hotter summers is the risk of increased water-stress on vegetation. Plants and crops differ in their response to water stress at a given stage in their development, so the timing of when water stress occurs can have differing impacts on different plants. However, prolonged water stress can lead to lower yields for both agriculture and grazing. In order to offset this possible impact there may be an associated increase in the use of irrigation systems and sprinklers, creating an additional drain on water resources in the summer months.

6.2.10 A warmer, drier climate will also influence the range and type of flora and fauna found in Derbyshire, with those species preferring a cooler climate either diminishing in number to those which can adapt to a warmer climate or re-establishing at higher altitudes or latitudes. For example Garlic mustard and cow parsley will benefit from a warmer environment, whereas the prevalence of crowberry may

3 http://ukcp09.defra.gov.uk/

decline. Similarly upland birds such as Golden Plover and Ring Ouzel may decline in numbers with warmer summers and it is likely that some mammals, such as the Arctic Hare, may extend their ranges northwards to cooler climates. Similarly flora and fauna more commonly seen further south in the country may begin to establish in Derbyshire and new species of migratory birds common on the Continent, such as the Cattle Egret, may be increasing prevalent in future years.

6.2.11 Another impact of drier, hotter summers as identified in this report is an increase in the growing season, which would affect the requirement for an increased rate of vegetation cutting in Derbyshire. There is growing anecdotal evidence that the vegetation growing season has extended over recent years, however, currently no further information is available.

Data Gap

The number of complaints regarding overgrown vegetation was investigated to establish whether this information could be used to indicate increasing vegetation growth. However, due to the way the complaints are logged when they are received, means information relating specifically to overgrown verges is currently not available. It would not be practical to undertake any specific monitoring relating to vegetation growth and that it is more likely to be shown by the requirement for increased cutting rates. The 3CAP report set the current requirements for cutting which will provide a baseline for to help assess trends in the future. The 3CAP report sets these out for both urban and rural areas, as detailed below:-

Urban Areas

- Visibility splays, traffic islands, raised roundabouts and grass adjoining highways in built-up areas with numerous accesses: cut 5 times per year on strategic and main distributor roads. 4 times per year on other roads
- Grass areas adjoining highways on all other roads: cut 2 swath widths 5 times per year on strategic and main distributor roads; 4 times per year on other roads
- Grass areas adjoining footways, horse riding and cycle tracks: cut a single swath 5 times per year on both sides on strategic and main distributor roads, 5 times per year on other roads
- Newly seeded areas: one full cut in the first season
- Areas with serious noxious (injurious) weeds: one cut to be arranged where necessary or chemical treatment as recommended

Rural areas

- At visibility splays; junctions; gaps in central reserves; inside of bends; where there is considerable pedestrian traffic e.g. schoolchildren; at Public Rights of Way; at laybys and at locations where there is restricted visibility causing an exceptional hazard to motorists or pedestrians: 4 cuts per year for strategic, main and secondary roads, 2 cuts per year for link and local roads
- At traffic signs and bollards to ensure adequate stopping sight distance: 3 cuts per year for strategic, main and secondary roads, 2 cuts per year for link and local roads
- Embankments and cutting slopes: not normally cut
- Areas incorporating access to ducts, drainage systems etc: not normally cut
- Adjacent to the carriageway and at sites other than those above: single swath 2 cuts per year for strategic, main and secondary roads, single swath 1 cut per year for link and local roads.

Adaption to climate change summary

6.2.12 It is clear that there is a likelihood that summer and winter mean temperatures will increase during the plan period. It is likely that summers will become dryer and winters wetter. Extreme weather events are more likely. During the lifetime of the plan we will need to adapt to these changes in the climate. It will also impact upon many of the other environmental topics we have considered in this Scoping Report and could be the single most important factor in relation to environment that we need to consider. Carbon dioxide and other greenhouse gases are contributing to the warming of the earth's atmosphere.

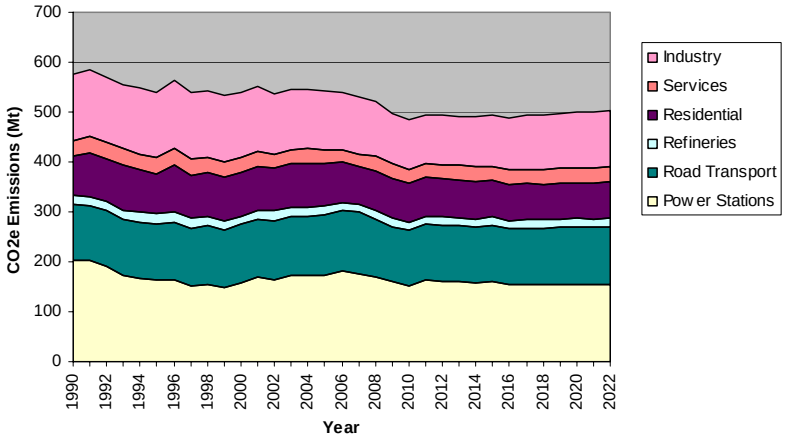
Carbon Dioxide (CO_2) Emissions from Transport

The National Picture

6.2.13 In 2008, the UK Government published a legally binding long-term framework to cut and adapt to carbon emissions through the Climate Change Act. The Climate Change Act 2008 established binding emissions targets and 5-yearly carbon budgets in legislation to reduce greenhouse gas emissions by at least 80% below 1990 levels by 2050[4]. In April 2009 the Government announced the level of the first three carbon budgets for the periods 2008-12, 2013-17 and 2018-22, representing respectively a 22%, 28% and 34% reduction in greenhouse gases compared to 1990 levels. In line with the Committee on Climate Change's advice the Act does not include international aviation and shipping emissions in the targets, but includes them amongst the matters Government has to have regard to when considering the 5-yearly carbon budgets.

6.2.14 Figure 6.3 provides an overall picture of the national UK CO_2 emissions split for each sector from 1990 and projecting to 2022. It shows that transport is currently responsible for approximately a quarter of all UK CO_2 emissions. The projections are based on assumption of future economic growth, fossil fuel prices, UK population and other key variables. They are consistent with the most recent UK budget announcements and include all firm and funded environmental policy measures. They show the CO_2 emissions are predicted to decrease and then level to 2022.[5]

Figure 6.3: UK Greenhouse Gas Emissions Projections (MtCO2e)



6.2.15 In order to achieve the carbon reduction targets as set out by the Climate Change Act, every sector in the UK must work to reduce their CO_2 emissions. In July 2009, the DfT published a carbon reduction strategy[6] for transport. This paper detailed how the various transport sectors in the UK can influence and contribute to reductions in CO_2 emissions and reinforced the role that local authorities have in reducing carbon emissions in their areas, two main influential directions were identified:

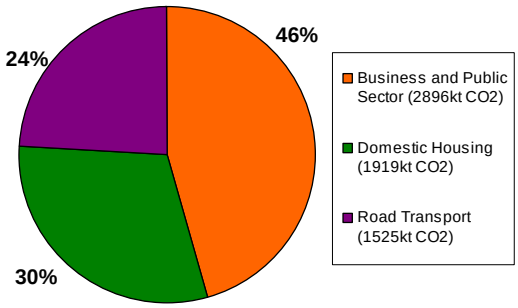
1. Using their considerable influence over the way people travel through direct delivery of transport services, through their decisions on strategic planning or the locations of businesses and homes.
2. As large employers, local authorities should take the lead in reducing emissions from their own estates and operations.

Derbyshire CO_2 Emissions from Transport

6.2.16 Government produced statistics provides information about each authority's end user CO_2 emissions split by[7]:-

- Business and public sector
- Domestic housing
- Road transport.

Figure 6.4: Derbyshire CO_2 emissions divided by sector (2005)



[4] http://www.dft.gov.uk/pgr/sustainable/climatechange/climatechangeandtransport?page=1#a1002

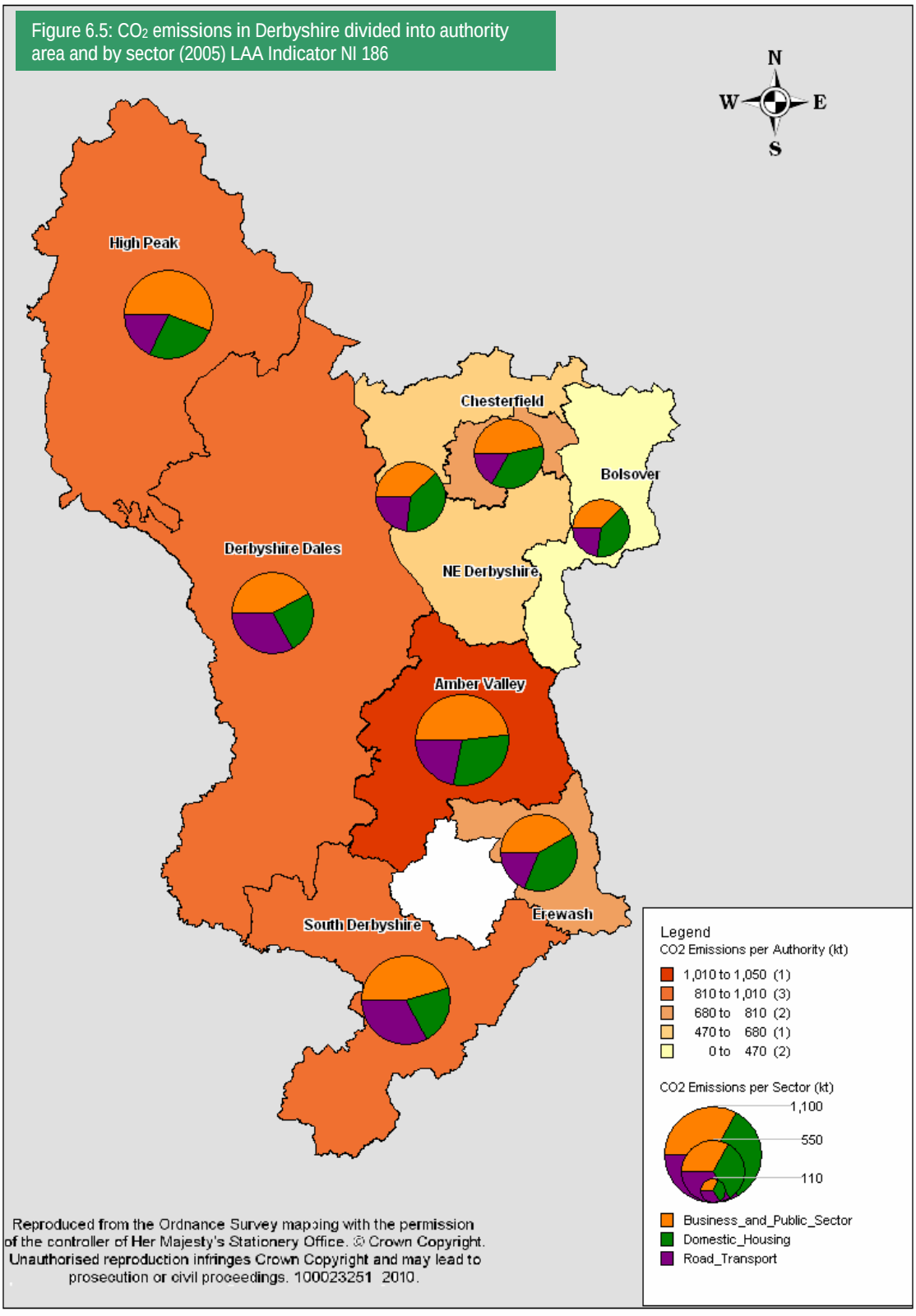
[5] Data obtained from National Atmospheric Emissions Inventory http://www.ghgi.org.uk/statistics.html

6 Low Carbon Transport: A Greener Future. A Carbon Reduction Strategy for Transport: DFT July 2009

[7] http://www.defra.gov.uk/corporate/about/what/localgovindicators/indicators.htm

6.2.17 Data for Derbyshire is available from 2005 to 2007[8]. Figure 6.4 shows the CO_2 emissions for Derbyshire obtained from National Indicator 186, which shows that business and public sector contribute the most to Derbyshire CO_2 emissions. The transport sector contributes the smallest but still a significant proportion of local CO_2 emissions, accounting for 24% of total emissions. Spatially Figure 6.5 shows that the more rural areas of Derbyshire have a greater proportion of CO_2 emitted by road transport. The exact CO_2 emission data can be found in the corresponding legend.

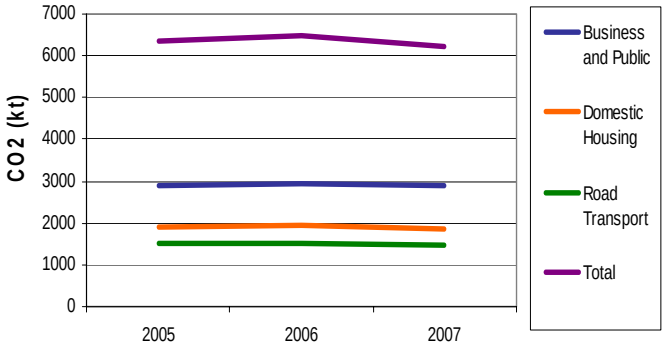
Figure 6.5: CO_2 emissions in Derbyshire divided into authority area and by sector (2005) LAA Indicator NI 186



8 *http://www.decc.gov.uk/en/content/cms/statistics/climate_change/climate_change.aspx

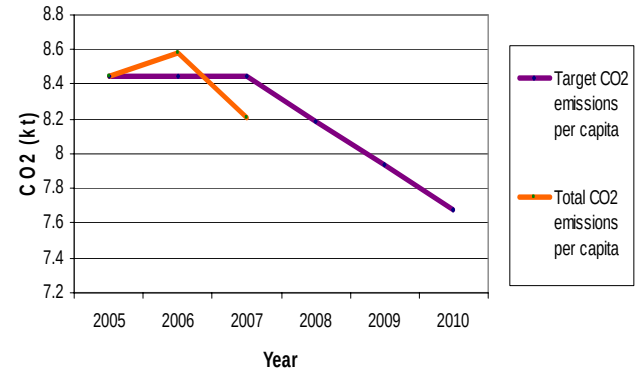
6.2.18 With only three-years of data it is difficult to establish any long term trends. Figure 6.6 shows that the proportion of CO_2 emissions has remained steady by sector.

Figure 6.6 Derbyshire CO_2 emissions per sector per year



6.2.19 National Indicator 186 has an associated target relating to the per capita emissions for each local authority area. Again this data is only available from 2005, but it shows that CO_2 emissions in Derbyshire have begun to reduce, see Figure 6.7. The future target for Derbyshire, using a baseline year of 2005, is an overall reduction in per capita emissions of 9.06% by 2010/2011.

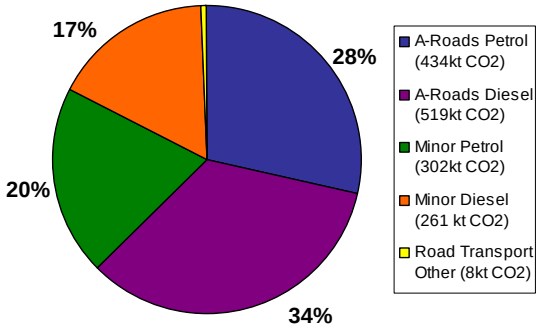
Figure 6.7 Derbyshire CO_2 emissions per capita



6.2.20 In terms of CO_2 emissions from road transport in Derbyshire, we have data by road user category, shown in figure 6.8. The largest contributor to local CO_2 emissions in Derbyshire is from diesel vehicles using A-roads.

6.2.21 Since the 1980's traffic and CO_2 emissions grew strongly. During the 1990s traffic growth continued, but CO_2 emissions to some extent de-linked from this same growth by growing at a slower rate, despite this increased traffic growth[9]. In 2009, traffic flows on Derbyshire's roads amounted to 4,742 million vehicle kilometres (mvk), which have shown a small reduction from 4,802 mvk in 2006. DfT road transport forecasts to 2025 show traffic continuing to grow, although at a slower rate than was seen prior to the 1990s and the stabilisation of CO_2 emissions reflecting further improvements in vehicle fuel economy and adoption of more environmentally friendly fuels.

Figure 6.8: Road transport CO_2 emissions in Derbyshire divided into road user category (2005)



6.2.22 The key drivers of transport demand are difficult to establish such as the development of the economy and fuel prices. It is therefore difficult to establish the influence the County Council has over traffic volumes and therefore CO_2 emissions. A potential data gap would be to quantify in more detail how the local transport sector contributes to CO_2 emissions.

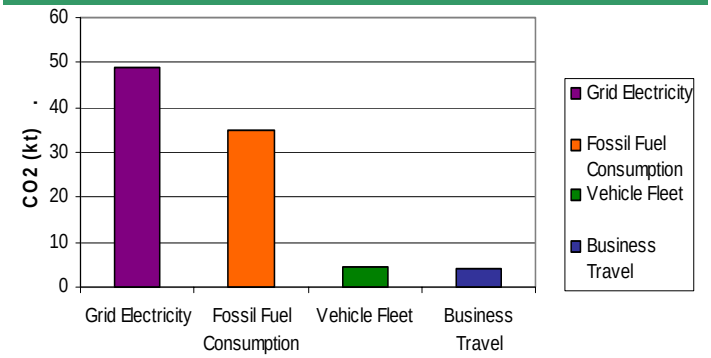
Data gap: To develop a CO_2 emissions database for the local transport sector. This tool could then be used to develop an associated carbon reduction strategy and inform decision making processes regarding CO_2 emissions from local transport.

[9] Department for Transport, Road Traffic Forecasts 2008

CO_2 emissions from Derbyshire County Council operations

6.2.23 DEFRA collates data about each authorities own operations, including energy use in buildings and transport. Figure 6.9 shows our CO_2 emissions in 2008/09[10]. The greatest proportion of our CO_2 emissions arise from the energy requirements of our buildings and lighting, including street lighting, with a lesser proportion arising from transport emissions.

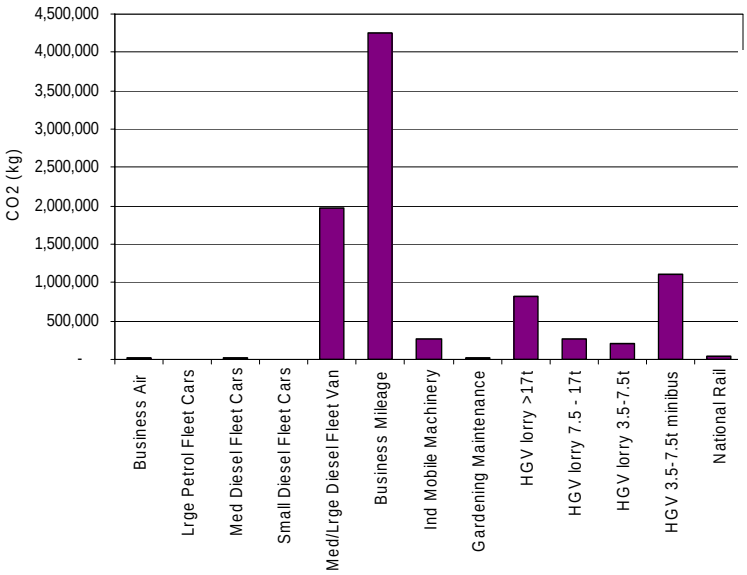
Figure 6.9 Derbyshire County Councils Estate CO_2 emissions



6.2.24 The County Council has adopted a 15% reduction in CO_2 emissions from its estate by 2010 through its Carbon Management Programme which was adopted on 23 March 2007. Staff business mileage and vehicle fleets procurement have been identified as key areas for reductions, as well as energy consumption from buildings, street lighting and waste generation.

Travel CO_2 emissions

Figure 6.10 2008/09 Derbyshire County Council CO_2 emissions proportion per vehicle type



6.2.25 The County Council undertakes many different journeys by different modes, including use of its own vehicle fleet. Figure 6.10 shows actual CO_2 emissions generated from each sector of the transport fleet. The largest source of CO_2 emissions from the transport fleet is business mileage and medium to large diesel vans.

6.2.26 The County Council has undertaken a green fleet review and it has begun to tackle CO_2 emissions by using more environmentally friendly pool cars for all journeys over 100 miles. It has also committed to using 5% biofuel in all its bunkered fuel[11]. Other initiatives such as electric vehicles are being trialled. Such initiatives including the replacement of older vehicles with more environmentally friendly engines will mean that CO_2 emissions will reduce over time.

Energy CO_2 emissions

6.2.27 In terms of grid electricity usage, the total use for street lighting and illuminated signs in Derbyshire is approximately 7.5 megawatts every night. Energy consumption is now at the level of 31 million kilowatts units per year for highway lighting – which is the equivalent of supplying 2,400 domestic properties with average consumption in one year[12]. An initiative is currently being examined by the Authority which is looking at reducing energy usage from lit transport infrastructure[13].

[10] National Indicator 185
[11] https://www.derbyshire.gov.uk/Images/content/DemocraticServices/Reports/2008-07-09%20Transport.pdf
[12] DCC Report regarding Invest to Save desktop study in relation to Street Lighting and Illuminated Highway Infrastructure March 2009
[13] DCC Report regarding Invest to Save desktop study in relation to Street Lighting and Illuminated Highway Infrastructure March 2009

CO_2 emissions from transport summary

6.2.28 CO_2 emissions are predicted to reduce over the plan period through a targeted approach across all sectors that contribute to CO_2 emissions. Much of this will be outside the remit of the LTP but as around a quarter of all CO_2 emissions relate to road transport it will need to play an important role in reducing CO_2 emissions. Key drivers of transport demand such as the economy and fuel prices are difficult to establish and control. However the county council through its own operations also can contribute to reducing transport CO_2 emissions. Further research will be required to identify and quantify to how the transport sector contributes to CO_2 emissions.

Further Data Gaps

Data collected for reporting on National Indicator 185 provides considerable useful baseline CO_2 emissions data, however, it does not require the accounting of CO_2 emissions from commuting and contracted service vehicles. The Derbyshire County Council's draft Climate Change Action Plan, currently being developed, considers a target to reduce CO_2 emitted by DCC employees commuting to and from work. The methodology and data collection is being developed with a view to collating baseline data in 2010.

The Strategic Environmental Assessment 2006-2011 identified an objective, which was further developed through the monitoring framework 2007/2008, to assess the proportion of contracted public transport services that are operated by vehicles that satisfy Euro IV emission standards. A survey was conducted in 2007, which collated information relating to the age, fuel type and engine standard of contracted vehicles. In order to calculate the CO_2 emissions from these vehicles, the mileage these vehicles undertake on council business per annum will need to be ascertained. The methodology to collect mileage data will need to be investigated and developed over 2010.

Flooding

6.2.29 Derbyshire water resources are explained in more detail in Chapter 7. We have identified above that weather conditions are likely to become wetter with more incidences of flooding. Over recent years across the Country, and in Derbyshire, significant flooding incidences appear to have been more prevalent. In Derbyshire the last significant floods were in June 2007. Flooding not only temporarily closes roads, but can damage their structure or lead to landslips etc.

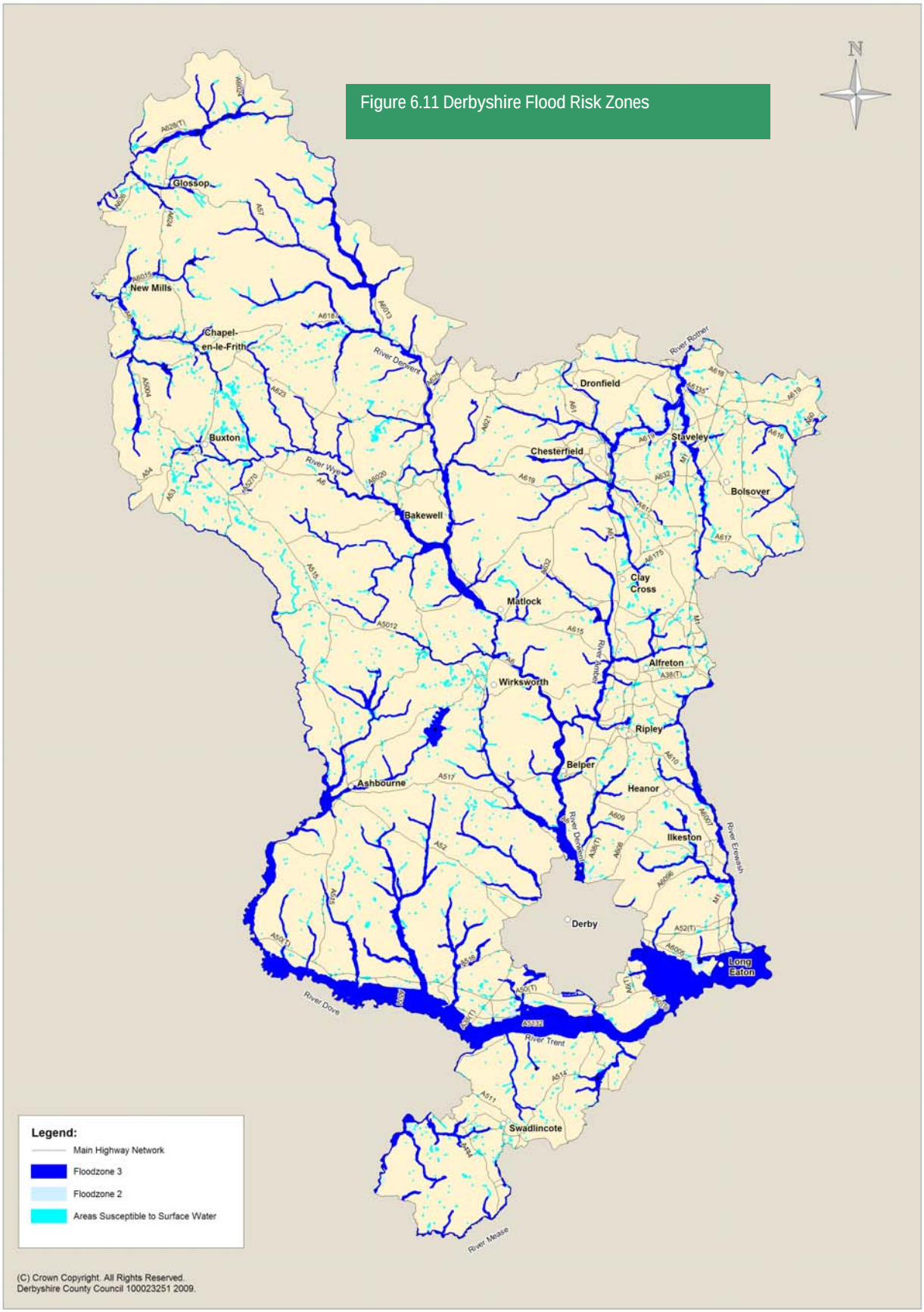
6.2.30 The areas of Derbyshire most susceptible to flooding are shown in Figure 6.11 which are produced by the Environment Agency. The Figure shows areas of flood risk zones 2 and 3. Areas within Zone 3 have an annual probability of 1% or more of being flooded. As can be seen, the areas at most risk to flooding are located towards the south of Derby, along the route of the lower Dove, Derwent and the River Trent corridor. Due to many transport networks being located at low-level in valleys or along floodplains there is always a risk that networks will be affected during severe flooding. The evidence base for LTP2 highlighted that 183km of A and B roads were located within the floodplain, although only 3km were roads carrying 25,000 or more vehicles a day. The last major floods in Derbyshire in 2007 caused a lot of damage, such as landslips, damage to walking and cycling routes, silting of water courses. Although no doubt some locations are more prone than others to flooding, it would appear that severe flooding is currently not that common. However, paragraphs above highlight that summers are likely to become warmer and wetter through climate change and with this, more frequent incidences of flooding and greater impact on transport infrastructure performance.

Data Gaps

We do not have any comprehensive data regarding historical flooding incidents over previous years to identify areas that have suffered. We do not know whether any transport infrastructure is contributing to any areas being at higher risk due to flooding.

The aforementioned 3CAP report 'The Effect of Climate Change on 3CAPs highway network policies and standards' identified more frequent incidences of flooding within recent years. In relation to the transport network, we have not undertaken any detailed flood risk assessments. However, in responding to National Indicator 188; Adaptation to Climate Change, we will be work with our Emergency Planning team to carry out flood studies of Derbyshire's transport network, including bridges, other structures and drainage, with work commencing in January 2010. This information can be included in future assessments once the information becomes available.

6.2.31 As part of the Local Development Framework process, our local planning authorities are undertaking Strategic Flood Risk Assessments. These will no doubt result in policies that seek to reduce the impact of flooding, and therefore the disruption to transport networks, through future land-use developments.



Flooding summary

6.2.32 It is clear that flooding is a relatively rare extreme weather event, but that when it occurs can cause significant disruption to the transport network due to many roads being located within flood risk zones. We have identified a data gap which should be filled following the flood risk studies being undertaken as part of National Indicator 188. Until these are complete we are unable to say to how our transport infrastructure and networks are contributing to flooding, flood alleviation or to which are most at risk to flooding. We are also aware that a draft Flood and Water Management Bill is currently being considered by Parliament which is likely to lead to the County Council leading flood risk management in Derbyshire. We are therefore retaining flood risk as a challenge to take forward until we have undertaken the flood studies of our transport network.

6.3 Stage A3: Environmental Problems and Opportunities

6.3.1 In this section we summarise the key issues or challenges for LTP3 that we have identified through the SEA stages A1 and A2 which have identified the key messages of policy and an assessment of the environmental baseline. In this section we also identify the key opportunities for LTP3.

Key Issue/ Challenge	Implication/ Opportunity for LTP3
Climate change	LTP3 should aim to adapt to climate change and to seek a reduction in CO_2 emissions
CO_2 emissions from transport in Derbyshire	LTP3 should aim to reduce CO_2 emissions from the transport sector in Derbyshire by encouraging more sustainable travel and to strive towards a low-carbon economy.
CO_2 emissions from Derbyshire County Council operations	LTP3 should aim to continue to reduce CO_2 emissions from its own operations relating to transport, particularly by reducing energy consumption, influencing business travel and vehicle and contracted services procurement.
Flooding	LTP3 should seek to minimise the risk of flooding

6.4 Stage A4: Developing SEA objectives

6.4.1 Emerging SEA objectives for climatic factors are as follows:

SEA 8 Support sustainable tourism

SEA 10 Reduce transport's emissions of carbon dioxide and other greenhouse gases, with the desired outcome of tackling climate change

SEA 11 Enhance the network's resilience to climate change e.g. reduce the risk of flooding

SEA 12 Minimise energy usage and reduce dependency on non-renewable resources

SEA 13 Reduce the emission of air pollutants from transport in declared Air Quality Management Areas which relate to local traffic

SEA 14 Influence the location of development to make efficient use of existing physical infrastructure and to help reduce the need to travel.