



West of England

STRATEGIC ENVIRONMENTAL ASSESSMENT

Joint Local Transport Plan 4



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STRATEGIC ENVIRONMENTAL ASSESSMENT

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Joint Local Transport Plan 4

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ABBREVIATIONS

ABBREVIATION	Meaning
AA	appropriate assessment
AONB	areas of outstanding natural beauty
AQMA	Air Quality Management Area
B&NES	Bath and North East Somerset
BAP	Biodiversity Action Plan
BCC	Bristol City Council
CEMP	Construction Environmental Management Plan
CIRIA	construction industry research and information association
CO ₂	carbon dioxide
cSAC	candidate Special Area of Conservation
EIA	Environmental Impact Assessment
EqIA	Equality Impact Assessment
FRA	Flood Risk Assessment
GI	Green Infrastructure
HIA	Health Impact Assessment
HRA	Habitats Regulations Assessment
JLTP	Joint Local Transport Plan
JSP	Joint Spatial Plan
JTS	Joint Transport Study
JWCS	Joint Waste Core Strategy
LNR	Local Nature Reserve



NO ₂	nitrogen dioxide
NPPF	National Planning Policy Framework
NSC	North Somerset Council
PM	Particulate matter
pSAC	possible Special Area of Conservation
pSPA	potential Special Protection Area
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SEAO	SEA objective
SNCI	Site of Nature Conservation Interest
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
WECA	West of England Combined Authority
WENP	West of England Nature Partnership
WFD	Water Framework Directive
WoE	West of England

NON-TECHNICAL SUMMARY

INTRODUCTION

The West of England comprises the unitary authority areas of Bath & North-East Somerset, Bristol City, North Somerset and South Gloucestershire. Under the Local Transport Act 2008, the West of England are currently updating their joint local transport plan (JLTP) into what is known as the “JLTP4”. The objectives of JLTP4 are:

- Support sustainable economic growth;
- Enable equality and improve accessibility;
- Address poor air quality and take action against climate change;
- Contribute to better health, wellbeing, safety and security; and
- Create better places.

The aim is to provide a well-connected sustainable transport network that offers greater, realistic travel choice and makes walking, cycling and public transport the natural way to travel. Policies and interventions under the new JLTP are structured around improving connectivity at four levels:

- Beyond the West of England – strategic road and rail, port and airport;
- Within the West of England – between the urban areas, longer than 10km;
- Local – up to 10km; and
- Neighbourhood – journeys within local communities.

Central to this is the major schemes programme based around the West of England’s Joint Transport Study. The JTS was developed as part of the supporting technical work to the West of England Joint Spatial Plan.

The JLTP4 and the JSP are therefore intrinsically linked, with the former providing the transport schemes and infrastructure needed to address current transport challenges as well as to enable the sustainable delivery of new housing and employment growth to be delivered through the JSP and Local Plans.

METHODOLOGY

This Strategic Environmental Assessment (SEA) is being prepared alongside the JLTP4. SEA is a process required by law for certain types of plan or programme, such as a local transport plan. The overall aim of the SEA process is to ensure better protection for the environment, population and human health by making decision-makers aware at an early stage of the likely effects of the plan on the environment and by seeking to introduce measures that can be undertaken either to avoid adverse effects or to help improve the environment.

The SEA process is undertaken in five key stages which are:

- Stage A – Scoping: Setting the context and objectives, establishing the baseline and deciding on the scope;
- Stage B – Environmental Assessment: Developing and refining alternatives and assessing effects;
- Stage C – Reporting: Preparing the SEA Environmental Report;
- Stage D – Consultation: Consulting on the draft programme and the SEA Environmental Report; and

- Stage E – Monitoring: Monitor the significant effects of implementing the plan or programme on the environment.

ENVIRONMENTAL BASELINE

The SEA Directive and associated UK Regulations state that the SEA must consider the following topic areas:

- Biodiversity;
- Population;
- Human health;
- Flora and Fauna;
- Soil;
- Water;
- Air;
- Climatic factors;
- Material assets;
- Cultural heritage, including archaeological and architectural heritage;
- Landscape; and
- The interrelationship between these factors.

Population

The population of the West of England has been growing and if trends continue, is predicted to increase from 938,070 in 2018 to 1,071,102 in 2036 (14%) and 1,101,496 in 2041 (17%). In addition, the population is ageing, meaning it will be necessary to provide for the needs of more elderly population. The West of England has a high urban population but Bath & North East Somerset and North Somerset also have considerable rural populations.

The Joint Spatial Plan will provide a framework to deliver up to 105,000 net additional new homes between 2016 and 2036, including the committed growth within the four Core Strategies.

The West of England supports high numbers of tourists, placing seasonal pressures on the transport system. Although in general the West of England supports a more prosperous economy than average for the South West and the UK, there are particular areas of Bristol, Bath and Weston-super-Mare where communities fall within the 10% most deprived areas of the UK.

Air Quality

Air pollution levels in parts of Bristol, Bath & North East Somerset and South Gloucestershire continue to exceed government standards for nitrogen dioxide. Poor air quality, related to transport emissions, is a significant problem in Bristol and Bath. To improve air quality, the Government has requested 29 councils across England – including Bath & North East Somerset Council and Bristol City Council – to achieve compliance with nitrogen dioxide limits ‘in the shortest possible time’.

Climate Change

Within the West of England, transport emissions contribute approximately 29% of total carbon emissions in the West of England¹. The climate of the South West is changing. Projections show that the South West of England could see an average summer temperature rise of 5°C by the 2080s². Several locations in the West of England are vulnerable to flooding from the sea (storm surges) and/or rivers and surface water. The effect of climate change and sea level rise is a major concern for Weston-super-Mare, areas of Bristol, Avonmouth and the tidal River Severn.

Issues related to the predicted climate change include risks to transport associated with increased incidents of flooding, storms and increased incidents of fatigue due to heat waves.

Biodiversity

The unitary authorities of the West of England have action plans to protect and promote certain habitats, plants and animals in the interest of improving overall biodiversity. There are several legally protected sites within the West of England, including European Sites. Transport has the potential to damage and fragment habitats, however transport can also help improve biodiversity, for example roadside verges and railway embankments can support many species of nature conservation value.

Human Health

The health of people in Bath & North East Somerset, North Somerset and South Gloucestershire is generally better than average for England although some health inequalities within these areas have been identified.

The West of England has made significant progress in improving options for travel by active modes, bus and rail, with substantial growth in the numbers of trips made by cycling, bus and rail during the last decade (60% by rail, 30% by bus and 50% by cycling between 2008/09 and 2015/16)³.

Soil

Soil erosion and field run-off linked to agricultural land management is currently one of the biggest issues for the region. It is leading to impacts on water quality, aquatic wildlife and bathing waters as well as the cause of a large proportion of surface water flooding incidents. The pressure for growth in the West of England is likely to increase pressure on land, including greenfield land. In turn this is likely to contribute to incremental loss of soils as well as compaction, organic matter decline and erosion.

¹ 2014 data, includes industrial, commercial, domestic and surface transport sources (excluding motorways). Source: UK local authority and regional carbon dioxide emissions national statistics: 2005-2014, National Statistics

² https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69257/pb13274-uk-climate-projections-090617.pdf

³ Source: Joint Local Transport Plan monitoring, West of England Office.

Water

The quality of water in rivers, streams, rhynes and ditches can be affected by the construction of transport infrastructure as well as its operation. Pollution of watercourses can occur through the organic content of silt, other organic substances such as engine oil and rubber, de-icing salt, metals (mainly as a result of vehicle corrosion), and fertilisers and pesticides from roadside verge maintenance. In addition, there is the risk of occasional spillages of pollutants in the event of an accident. Pollutants can particularly accumulate during long dry spells and lead to highly polluting surface water run-off when it rains.

Material Assets

Material assets relate to the consumption of natural resources, the generation of waste and the state of existing transport infrastructure. The Ecological Footprint for the South West shows that if everyone on the planet consumed natural resources and energy like the average South West resident, it would take three planets to support us.

Within the West of England approximately half of all municipal, commercial and industrial waste was sent to landfill each year, much of this transported outside of the sub-region.

Cultural Heritage

The West of England is rich in cultural heritage assets such as listed buildings, scheduled monuments and archaeological remains. The City of Bath is a World Heritage Site and therefore internationally valued. Another key issue is how the JLTP4 responds to the likely increased demands on transport from a growing population whilst not compromising the local distinctiveness of the historic environment and assets.

Landscape and Townscape

The West of England has a number of landscape designations including Greenbelt land, two Areas of Outstanding Natural Beauty (the Cotswolds and the Mendips), and a Community Forest (the Forest of Avon). New transport infrastructure can have significant effects on the natural landscape, Therefore the potential impact of the transport plan on landscape character, built environment and areas of tranquillity will be considered as part of the SEA.

STRATEGIC ENVIRONMENTAL ASSESSMENT

SEA OBJECTIVES AND KEY FINDINGS

The Scoping Stage, which included statutory consultation with Natural England, Historic England and the Environment Agency, provided the baseline information on the topics listed above and identified the SEA Objectives listed in Table A below. SEA Objectives are a way of strategically assessing whether the LTP has an effect on environmental and social aspects.

The policies and interventions (interventions comprise activities and new schemes) within JLTP4 were assessed against the SEA Objectives. The key findings of this assessment in terms of potential significant are summarised in Table A below.

The SEA Regulations require that mitigation measures are considered to prevent, reduce or offset any significant adverse effects on the environment of implementing the plan. The measures are known as 'mitigation' measures. Table A also sets out the key mitigation measures proposed for adverse and uncertain impacts.

Table A JLTP4 SEA Objectives, potential significant effects and mitigation

SEA OBJECTIVE (SEAO)	POTENTIAL SIGNIFICANT EFFECTS	MITIGATION
SEAO 1: 'Improve accessibility for a growing and aging population'	<p>Most of the policies and interventions included in the JLTP4 aim at improving accessibility which aligns with this SEA Objective resulting in likely long term major beneficial effects.</p>	<p>There is a need to ensure that services and employment or education opportunities are accessible by those with limited mobility. Charging should not result in creating a barrier to employment or education opportunities, particularly for those who are unemployed or on low income.</p> <p>Strategic and major schemes will be delivered through the appropriate consenting process and will need to be subject to assessments including health and equalities assessments. Detailed mitigation and enhancement opportunities will be developed as part of the design and consenting process.</p>
SEAO 2: Reduce transport related air pollution'	<p>Many of the policies and interventions within JLTP4 have the potential to reduce traffic congestion and associated air pollution. Major long-term beneficial health effects on urban population are therefore expected from policies and interventions which encourage modal shift away from private car use and those that promote active travel.</p> <p>Minor adverse health effects for population near strategic road network, and those close to new proposed road links are expected from policies promoting additional road links or upgrading local and strategic road network.</p> <p>Future cleaner technologies may play a key role in reducing the amount of air pollution from transport in the longer term.</p>	<p>Public transport vehicles should be of high modern standards to utilise alternative fuels where possible and minimise emissions.</p> <p>Where schemes / initiatives are time limited, subsequent schemes should be implemented to ensure benefits over time.</p> <p>Promoting exposure reduction and ensure that any new road links are isolated from vulnerable receptors, would reduce the harmful effects of the policies promoting additional road links or upgrading local and strategic road network.</p> <p>Strategic and major schemes will be delivered through the appropriate consenting process and will need to be subject to Environmental Impact Assessment and other relevant environmental legislation. Detailed mitigation and enhancement opportunities will be developed as part of the design and consenting process at the scheme level.</p>
SEAO 3: 'Reduce transport related carbon emissions in line with national targets'	<p>Numerous policies within the LTP4 will have a minor or potential major positive effect on this SEA objective. However, there is significant uncertainty in the assessment. Most of the policies require a modal shift away from private car use, to more sustainable mode of transports (e.g. bus, rail, tram, cycling).</p> <p>Success of the policies in the long term will depend upon whether traffic growth can be curbed and whether the required behavioural change associated with a shift towards sustainable travel modes takes place.</p>	<p>Public transport vehicles should be of high modern standards.</p> <p>Where schemes / initiatives are time limited, subsequent schemes should be implemented to ensure benefits over time.</p> <p>Strategic and major schemes will be delivered through the appropriate consenting process and will need to be subject to Environmental Impact Assessment and other relevant environmental legislation. Detailed mitigation and enhancement opportunities will be developed as part of the design and consenting process at the scheme level.</p>
SEAO 4: 'Adapt transport network'	<p>It is expected that new transport infrastructure will be designed to be more resilient to climate</p>	<p>Strategic and major transport infrastructure schemes will have to be designed to take</p>

<p>to effects of climate change and minimise the vulnerability of transport network to flood risk'</p>	<p>change than existing transport infrastructure. However, the low-lying nature of much of the region, and its coastal and tidal location, mean flood risk is likely to be an increasing concern.</p> <p>The potential effects of climate change and sea level rise are of particular relevance in the areas most affected by flooding. The potential effect of policies and interventions involving new major infrastructure has been identified as uncertain at a strategic policy/ plan level.</p>	<p>into the effects of climate change in line with national policy and best practice design.</p> <p>Additionally, all strategic and major schemes will be delivered through the appropriate consenting process and will be subject to Flood Risk Assessment and Environmental Impact Assessment. Detailed mitigation and enhancement opportunities will be developed as part of the design and consenting process at the scheme level.</p> <p>Use of information regarding weather conditions and impact on travel can benefit transport users.</p>
<p>SEAO 5: 'Protect and enhance biodiversity and ecological networks'</p>	<p>Policies and interventions involving strategic and major transport infrastructure schemes have been identified as having adverse effects on this SEA Objective, some of them potentially major adverse.</p> <p>European designated sites are particularly sensitive receptors. A 'Screening exercise' which is undertaken under the 'Habitats Regulations' has identified some likely significant effects of major schemes on European sites and therefore further assessment will be required.</p> <p>The assessment of the effects on this SEA objective are therefore preliminary and will need to be informed by the findings of the further assessment.</p>	<p>The West of England (WoE) Joint Spatial Plan commits the authorities to develop a WoE Green Infrastructure Plan and to delivering a 'net gain' for the environment.</p> <p>The Green Infrastructure Plan, currently under preparation, will identify the strategic measures and mechanisms to support, guide and implement the delivery of environmental commitments set within the Joint Spatial Plan and Local Plans, including mitigation for protected sites. Further development of GI Plans at an authority level should also reflect schemes within this JLTP.</p> <p>All strategic and major schemes will be delivered through the appropriate consenting process and will be subject to Environmental Impact Assessment and relevant environmental mitigation. Detailed mitigation and monitoring measures will be developed as part of the Environmental Impact Assessment process. it is recommended that major schemes have a Construction Environmental Management Plan.</p> <p>Further assessment under the 'Habitats Regulations' provides further information with regards to mitigation associated with potential significant effects on European sites.</p>
<p>SEAO6: 'Promote human health'</p>	<p>Most of the policies and interventions included in the Draft JLTP4 have as key objective promoting more sustainable and active modes of travel which would result in likely long-term benefits on human health.</p> <p>Encouraging more journeys to be made by active travel modes improves physical and mental health, quality of life and the environment. Direct beneficial effects on human health would result from increased physical activity whilst indirect effects may derive from less congested roads as well as improved access to services and opportunities which may tackle some of the inequality issues which may also underlain health issues.</p> <p>Beneficial effects might be offset by increased noise, air pollution and / or severance resulting</p>	<p>All strategic and major schemes will be delivered through the appropriate consenting process and will be subject to Environmental Impact Assessment which includes assessment of health. Detailed mitigation and monitoring measures to minimise potential adverse effects will be developed as part of the Environmental Impact Assessment process.</p> <p>Enhancement opportunities should also be considered as part of the development and consenting process of the larger schemes.</p> <p>Any charging scheme should consider exemptions for drivers with specific need, those on low income or unemployed seeking access to employment or education opportunities.</p>

	from some of the proposed strategic road and rail improvements.	
SEAO7: Improve road safety, particularly for vulnerable users, and to reduce road casualties'	The majority of policies will have a positive impact on improving road safety. Particularly, Policy W2 (which improves the road safety for motorcyclists), Policy L1 (through providing education for cyclists) and Policy L2 (using education and implementation of cycle lanes etc.) will all have a long-term major positive impact on the SEA objective.	<p>Where schemes / initiatives are time limited, new replacement measures need to be implemented to maximise the opportunity for benefits over time.</p> <p>Road safety camera enforcement provides opportunity for driver education. Targeting road safety campaigns at motorcyclist safety. Motorcyclists are disproportionately represented in road accident statistics.</p> <p>New projects should be subject to safety audit checks and aim to improve road safety through design.</p>
SEAO8: Minimise adverse effects on soils such as loss, compaction, erosion and pollution from transport-related activities'	<p>Policies and interventions involving major transport infrastructure schemes have been identified as having adverse effects on this SEA Objective. Strategic and major road and rail infrastructure schemes would result in direct adverse effects on soils in terms of loss and compaction where these are to be delivered on undeveloped land. Operational effects may result in pollution, erosion and increased run-off.</p> <p>Due to the relative permanence and irreversibility of soil loss, the potential effect should be regarded as significant. Transport schemes to be delivered on previously developed land would result in beneficial effects through the remediation of contaminated soils.</p>	<p>As noted under SEAO 5 above, further development of GI Plans at an authority level should also reflect schemes within this JLTP.</p> <p>All strategic and major schemes will be delivered through the appropriate consenting process and it is recommended that major schemes have a Construction Environmental Management Plan. This would include mitigation and monitoring measures to avoid and minimise the degradation of soil resources.</p>
SEAO9: 'Protect, and where possible improve, water quality'	<p>Policies and interventions involving major transport infrastructure schemes have been identified as having potential to result in adverse effects on this SEA Objective.</p> <p>The quality of water in rivers, streams, rhynes and ditches can be affected by the construction of transport infrastructure as well because of its operation through pollution and accidental spillages. It is expected, however, that new transport infrastructure will be designed following current best practice guidance and hence should include mitigation measures inherent to the scheme design.</p> <p>Overall, the potential effect on this SEA objective has been assessed as being uncertain for those policies involving major infrastructure works. There is the potential for adverse effects but also opportunities for beneficial effects through improved drainage design.</p>	<p>Detailed design should follow best practice guidance such as that provided within CIRIA Report C753 <i>The SuDS Manual</i>. The guidance covers the planning, design, construction and maintenance of Sustainable Drainage Systems to assist with their effective implementation within both new and existing developments. It looks at how to maximise amenity and biodiversity benefits, and deliver the key objectives of managing flood risk and water quality.</p> <p>As noted under SEAO 5 above, further development of GI Plans at an authority level should also reflect schemes within this JLTP.</p> <p>All strategic and major schemes will be delivered through the appropriate consenting process and will be subject to Environmental Impact Assessment and relevant environmental mitigation. Detailed mitigation and monitoring measures will be developed as part of the Environmental Impact Assessment process. It is recommended that major schemes have a Construction Environmental Management Plan.</p>

<p>SEAO10: 'Minimise waste produced and resources consumed by transport infrastructure and operation of transport services'</p>	<p>Generally, policies and interventions under consideration seek to make good use of existing infrastructure whilst new schemes would be designed in line with relevant policy and legislation aimed at minimising the production of waste and making sustainable use of resources. However, JLTP 4 comprises major new transport infrastructure which will result in significant use of materials such as aggregates and generation of waste. Interventions aimed at promoting alternative modes to private car would reduce reliance on fossil fuels. The overall effect on this SEA objective is likely to be adverse.</p>	<p>Seek to make best use of existing infrastructure to minimise resource consumption and waste generation before constructing new facilities.</p> <p>Ensure scheme design incorporates sustainable use of materials as well as measures to minimise future maintenance requirements.</p> <p>For construction projects, a Site Waste Management Plan should be implemented. New development can be designed to increase the potential for recycling waste.</p> <p>New transport modes should use sustainable fuels (electric). There should also be modal shift to public transport and active travel from car use.</p>
<p>SEAO11: Protect and enhance the rich diversity of the historical and cultural environment, its heritage assets and their setting'</p>	<p>In the short and medium term, the construction of strategic and major schemes is likely to adversely affect heritage. However, some policies (W5 and W1) are likely to reduce pressure from traffic in the cities of Bath and Bristol and therefore reduce impacts on their cultural heritage assets. Due to the relative permanence and irreversibility of damage to heritage assets, the potential effects (both adverse and beneficial) should be regarded as significant.</p>	<p>The JLTP provides an opportunity to improve the setting and integrity of the WoEs historic places, and ensure future development is appropriately considered and designed to respond to local context.</p> <p>Good design (following best practice guidance such as <i>Highways England – the road to good design</i> (2018)), and cultural heritage assessments (as part of Environmental Impact Assessment where appropriate) should be required for all strategic and major schemes to minimise potential adverse impacts and maximise opportunities for benefits.</p>
<p>SEAO12: Maintain and enhance the quality and character of the built environment and landscape'</p>	<p>Noise and congestion from traffic can seriously degrade the quality of the urban environment. The policies which are likely to have the most positive on this SEA objective are those which limit opportunity for private car use within urban centres and free up space for other activities and improvements to the urban realm.</p> <p>Impacts from major schemes are likely to be on green belt land around the urban fringes. Introduction of new infrastructure would result in negative impacts on the landscape in terms of visual impacts and increased noise during construction and operation. Major development schemes also have the potential to have impacts on landscape setting.</p>	<p>Good design (following best practice guidance such as <i>Highways England – the road to good design</i> (2018)), and landscape/townscape and visual assessments (as part of Environmental Impact Assessment where appropriate) should be required in all strategic and major schemes to minimise potential adverse impacts and maximise opportunities for benefits.</p> <p>Design the proposed infrastructure sensitively to reduced visual impact and to include effective landscaping scheme to soften any major structures.</p> <p>It is recommended that signage and infrastructure for pedestrians and cyclists is designed to be sympathetic to the local distinctiveness whilst remaining clear, visible and informative.</p> <p>Further development of The West of England's GI Plans at an authority level should also reflect schemes within this JLTP. A modal shift away from car use is needed to maximise the potential beneficial impacts of JLTP4 on this SEA objective.</p> <p>Measures to discourage car use within urban centres should be pursued to maximise use of alternative modes</p>

		provided and to reduce traffic congestion and noise.
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Generally, the certainty of the assessment has been assessed as being low to medium. The main reasons for this are listed below:

- Despite the strong commitment to shift journeys into cleaner and more sustainable transport modes, there are various degrees of uncertainty with regards to planned actions, programme and funding of some of the interventions;
- There is uncertainty regarding whether improvements to the public transport system from the major schemes would be sufficient to counteract traffic growth and associated adverse environmental effects. The implications of removal of the Severn Crossing Toll are a key unknown;
- Advanced technologies are currently in early development stages;
- Uncertainty regarding the rate of climate change and the degree to which it will alter weather patterns in the medium and longer term;
- Information from the Habitats Regulations Assessment is required to better understand potential adverse effects on European designated sites;
- Effects are likely to be both variable across the region and dependent upon proximity of the sensitive receptors to the road network;
- There are also uncertainties about route alignments as well as specific design details such as use of material and siting; and
- The combined effect of the predicted growth in the region with the various transport infrastructure schemes that may go ahead are likely to adversely affect biodiversity, soils and potentially water quality. This is also the case for potential effects on cultural and built environment. Mitigation / enhancement measures included as part of the design and implementation of the specific schemes may offset some of the adverse effects.

ALTERNATIVES

The SEA Regulations require an assessment of the plan and its “reasonable alternatives”. In order to assess reasonable alternatives, different options for delivering strategic level transport across the West of England were developed and assessed against the established SEA objectives and environmental baseline.

The SEA considers the following alternatives;

- JLTP4 Scenario- This situation considers the development and eventual adoption of the policies contained in the JLTP4;
- Retention of JLTP3 - This scenario represents a continuation of existing policies planning principles and policies outlined in the JLTP3 document, with the accompanying Major Schemes programme and priorities packages with the plan period being extended to cover the period up until 2036;
- The “Without Plan” scenario - This scenario assumes that the JLTP3 is completed with no replacement LTP in place, so no transport planning principles, policies or interventions would be in place.

Generally, continuation of JLTP3 and JLTP4 perform equally in SEA Objectives 1, 2, 4, 7, 8, 9 and 12. JLTP4 performs better against SEA Objectives 3 and 6, whilst Continuation of JLTP3 performs better against SEA Objectives 5, 10 and 11. The “Without Plan” performs worst against all the SEA objectives.

CUMULATIVE EFFECTS

The SEA Regulations require that cumulative effects are considered when identifying likely significant effects. As noted above and also referred to in section 2.3 above, the JLTP4 is intrinsically linked to the JSP. The type of development involved in both plans will result in similar type of effects and in some locations, they will affect the same environmental and other assets. Cumulative effects are therefore expected from the implementation of these two plans. A coordinated and supportive approach to mitigation and enhancement between the plans will assist with minimising the likelihood and scale of adverse effects and maximising potential benefits. The development and implementation of the West of England’s GI Plan has been identified as the environmental strategic framework to facilitate this.

The cumulative effect between the JLTP4 and the Local Air Quality Strategies of the West of England’s and those of the neighbouring authorities have been assessed as being beneficial. A combination of both adverse and beneficial effects is expected as a result of the JLTP4 in combination with the West of England’s Adopted Joint Waste Core Strategy 2011 and the local transport plans of the neighbouring authorities. Scheme design and the relevant consenting processes will provide opportunities to mitigate adverse effects and promote enhancements.

EQUALITY IMPACT ASSESSMENT FINDINGS

Equality Impact Assessment considers the impact of a project or policy on persons or groups of persons who share characteristics which are protected under section 4 of the Equality Act 2010 (“protected characteristics”) and might also include others considered to be vulnerable within society such as low income groups. It is an information gathering tool which enables decision makers within public bodies to implement their equality duty under the Equality Act 2010. The Equality Impact Assessment concluded that the JLTP4 should have a positive impact on the general public that are living, working or visiting the West of England by providing a safer, resilient, sustainable and convenient transport opportunities for the region. Some of the most vulnerable groups will particularly benefit, specifically:

- People with limited or no access to cars;
- People with respiratory illnesses, and those more susceptible to poor air quality (children and young people and older people); and
- People that require access to employment, education, health and/ or other services.

Although positive, the Equality Impact Assessment concluded that there still possible adverse impacts that would be felt by people who are reliant on the use of a car (such as people with a disability), particularly if charging is introduced, or those with limited mobility who are unable to participate in active travel (such as older people or people with a disability).

HEALTH IMPACT ASSESSMENT FINDINGS

Health Impact Assessment is a systematic approach to identifying the differential health and wellbeing impacts, both positive and negative, of projects and plans.

The single greatest potential health outcome of the draft Joint Local Transport Plan has been assessed as the indirect health benefits from improved access to, and accessibility of, transport options. These benefits have been assessed as being of long-term, permanent, major benefit for all groups. In addition, the proposed development has been assessed as providing indirect health benefits as a consequence of improving air quality in urban areas, encouraging greater physical activity through active travel, and providing economic and employment benefits in the region.

In contrast to the beneficial impacts above, the draft Joint Local Plan has been assessed as potentially contributing to adverse health outcomes as a consequence of potential noise impacts. Potential moderate adverse health outcomes were predicted as a result of an unlikely reduction in traffic on transport networks despite improvements to the road networks and public transport provisions in the region. These potential adverse effects would be scheme and location specific and the implementation of mitigation measures associated with Policy N1 and / or the Environmental Impact Assessment process (where relevant) are likely to reduce their impact. These adverse health effects associated with noise are considered temporary, as improvements might be made through technological development.

MONITORING

The SEA Regulations require that monitoring is undertaken on a plan so that the significant effects of implementation can be identified and remedial action imposed. The purpose of the monitoring is to provide an important measure of the environmental outcome of the final JLTP4, and to measure the performance of the plan against environmental objectives and targets. Monitoring is also used to manage uncertainty, improve knowledge and enhance transparency and accountability.

A monitoring framework for the SEA will be developed following consultation on this SEA. A number of indicators have been identified as relevant to the potential impacts of the JLTP4 on the SEA objectives and may be considered for inclusion within the JLTP4 monitoring framework. Given the links between JLTP4 and the Joint Spatial Plan, a co-ordinated approach to monitoring of the plans will be considered.

NEXT STEPS

The SEA Environmental Report will be made available at the same time as the draft plan or programme, as an integral part of the consultation process. The SEA Environmental Report and a separate Non-Technical Summary will be made available on the travelwest website <https://travelwest.info>.

If you would like any further information or if you have any comments on the SEA of the draft Joint Local Transport Plan we would be grateful to receive them. Comments should be sent no later than 20th March 2019 and submitted to the West of England Combined Authority by post or e-mail: transport@westofengland.org.

The West of England Combined Authority

3 Rivergate

Temple Quay

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Comments received will be taken into account during the development of the final JLTP4. When the JLTP4 is adopted it will be accompanied by an SEA Statement.

1. INTRODUCTION

- 1.1.1. The West of England comprises the unitary authority areas of Bath & North-East Somerset, Bristol City, North Somerset and South Gloucestershire. As Local Transport Authorities, the West of England Authorities are required to produce a Local Transport Plan (LTP) under the Transport Act 2000, as amended by the Local Transport Act 2008.
- 1.1.2. The West of England are currently updating their LTP (the JLTP4). A Strategic Environmental Assessment (SEA) is being prepared alongside the LTP. This SEA represents the second stage of the SEA, following a Scoping Report which determined the issues to be included in the SEA.
- 1.1.3. SEA is used to describe the application of environmental assessment to plans and programmes, in accordance with European Council Directive 2001/42/EC⁴ The SEA Directive is enacted in England through the “Environmental Assessment of Plans and Programmes Regulations” (SI 2004/1633, known as the SEA Regulations)⁵. Article 1 of the European Directive states that its objective is “*to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development*”.
- 1.1.4. These Regulations place an obligation on local authorities to undertake SEA for certain plans and programmes, including the policies and implementation of all LTPs. Local transport authorities should ensure that the SEA is an integral part of developing, and later delivering, their LTP.

⁴ Directive 2001/42/EC <http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32001L0042> (Accessed October 2015)

⁵ SI 2004 No. 1633, The Environmental Assessment of Plans and Programmes Regulations 2004 [online] available at: http://www.legislation.gov.uk/ukSI/2004/1633/pdfs/ukSI_20041633_en.pdf (Accessed October 2015).

2. THE JOINT LOCAL TRANSPORT PLAN

2.1. BACKGROUND

- 2.1.1. The current JLTP (version 3) sets out the current 15-year Transport Vision for the period 2011 to 2026. This has delivered significant investment during the last seven years, including investment in improved cycling facilities in Bristol and multi-modal packages in Bath and Weston-super-Mare. The MetroBus programme is currently being delivered, with MetroWest proposed to introduce new and improved rail services across the area by the early 2020s.
- 2.1.2. The Local Transport Act 2008 provided local transport authorities with greater flexibility. Under the new Act, LTPs are no longer required to be replaced every five years. Instead the local transport authority may replace their plans as they see fit. In line with the terms set out in the West of England Devolution Agreement the four West of England authorities alongside the West of England Combined Authority (WECA) are in the process of producing the fourth JLTP for the West of England region.
- 2.1.3. WECA is co-ordinating the development of the JLTP4 alongside the four West of England unitary authorities (see Figure 1). The unitary authorities have responsibility for all adopted roads in the West of England except for the motorways and trunk roads, which are the responsibility of Highways England; plus Public Rights of Way. The authorities work with Network Rail and private sector public transport operators in respect of public transport services. Bristol International Airport and the Port of Bristol are outside of the West of England's direct responsibility.

2.2. VISION, OBJECTIVES AND POLICIES

- 2.2.1. The vision set out for the JLTP4 is as follows:
'Connecting people and places for a vibrant and inclusive West of England'
- 2.2.2. Five objectives have been identified, based on the aspirations of the West of England authorities and previous plans and policies prepared. There is no priority allocated to the objectives as they all have a role to play in achieving the vision for the West of England. The objectives, as follows, are in no particular order:
 - Support sustainable economic growth
 - Enable equality and improve accessibility
 - Address poor air quality and take action against climate change
 - Contribute to better health, wellbeing, safety and security
 - Create better places
- 2.2.3. The aim is to provide a well-connected sustainable transport network that offers greater, realistic travel choice and makes walking, cycling and public transport the natural way to travel. Trips into and within the West of England will be seamless, faster, cheaper, cleaner and safer. To this end, policies and interventions under the new JLTP are structured around improving connectivity at four levels:
 - Beyond the West of England – strategic road and rail, port and airport
 - Within the West of England – between the urban areas, longer than 10km
 - Local – up to 10km
 - Neighbourhood – journeys within local communities

- 2.2.4. Central to this is the major schemes programme based around the West of England's Joint Transport Study (JTS). The JTS was developed as part of the supporting technical work to the West of England Joint Spatial Plan (JSP) (submitted to the Planning Inspectorate in April 2018). It set out an ambitious £8.9 billion vision for transport to 2036, identifying a programme of transport packages that will transform the travel choices available to our residents and visitors, unlock the delivery of new homes and jobs, improve economic performance and competitiveness, tackle health and inequality challenges and support the delivery of ambitious carbon dioxide (CO₂) reduction targets.
- 2.2.5. The JLTP4 and the JSP are therefore intrinsically linked, with the former providing the transport schemes and infrastructure needed to address current transport challenges as well as to enable the sustainable delivery of new housing and employment growth to be delivered through the JSP and Local Plans.
- 2.2.6. The main vehicle for delivering the JSP objectives for the natural environment, is the West of England Green Infrastructure (GI) Plan. The GI Plan will identify the strategic measures and mechanisms to support, guide and implement the delivery of environmental commitments set within the JSP and Local Plans, including mitigation for protected sites.



Figure 1 West of England Joint Local Transport Plan area

- 2.2.7. Emerging from the JTS, the programme of JLTP4 major schemes (i.e. those costing over £10m) are grouped around those that are; transformational, transport requirements for growth, early investment schemes that are committed or under development and long term opportunities, as summarised in Table 1.

Table 1 Major Transport Schemes

JTS group	JLTP4 major schemes
Transformational	Including a mass transit network linking Bristol and Bath, the East and North Fringes, the Airport and within Bath.
Transport requirements for future growth	Including corridor scheme packages for South East Bristol and Whitchurch, Keynsham, Yate and Coalpit Heath, Nailsea and Backwell, Banwell and Churchill, Thornbury and Buckover and Charfield, Bristol Urban Area and Weston-super-Mare. Packages include schemes for MetroBus and local and strategic bus routes, Park & Ride, new highway links and junction improvements, enhanced and new railway stations and cycling and walking links.
Early investment schemes- Committed	Including MetroWest, M49 Avonmouth Junction, Hengrove and Lockleaze Transport Packages.
Early investment schemes- Schemes Under Development	Studies funded by the West of England including A38 corridor improvements, M5 Junction 19, east of Bath link, regional electric vehicle charging network, rail service and capacity improvements and new stations, interurban cycle routes, Weston-super-Mare cycling and walking network, Bath Cycle Network and City Centre Package, MetroBus extension to Clevedon, Nailsea, Cribbs Patchway New Neighbourhood, M5 Junction 20 Eastern Arm to Nailsea and Severnside and Park & Ride package for Bath.
Other long-term opportunities	Including strategic rail and road freight package, A46 to M4 route improvements, Greater Bath Bus Network Package and rail services to Henbury and Thornbury.

- 2.2.8. The West of England Transport Vision figure included as Appendix A of this report presents, in illustrative form the major schemes outlined above.
- 2.2.9. It should be noted that the region has made significant achievements during the first seven years of the current JLTP (2011 to 2026), spending over £500m on the delivery of transport projects, including a number of major schemes such as the Greater Bristol Bus Network, the launch of the first three metrobus routes, the completion of the Bath and Weston-super-Mare Transport Packages and the completion of the South Bristol Link Road. The remaining major schemes listed in JLTP3; MetroWest 1 & 2 – (delivery by 2021), ring of Park and Rides and new suburban railway stations are all currently being progressed.
- 2.2.10. The JLTP4 will also be supported by other regional strategies including the West of England Bus Strategy, the West of England Key Route Network, Local Cycling and Walking Infrastructure Plans (LCWIP), low emission/electric vehicle strategy and other individual unitary authority strategies, including Road Safety Strategies. The JLTP is fundamental in supporting the West of England Energy Strategy, along with local clean air strategies, as part of achieving carbon reduction. There are also associated documents such as the Joint Transport Asset Management Plan which will be reviewed during the JLTP4 plan period.

2.3. THE JLTP4 IN RELATION TO OTHER PLANS

- 2.3.1. The JLTP4 will be developed to take account of other relevant plans and policies. As noted above, it will be developed in line with the national transport policy. It will also need to respond to the spatial strategy set out in the draft JSP and the adopted Core Strategies for each of the unitary authorities. Figure 2 summarises the main influences on the JLTP4.

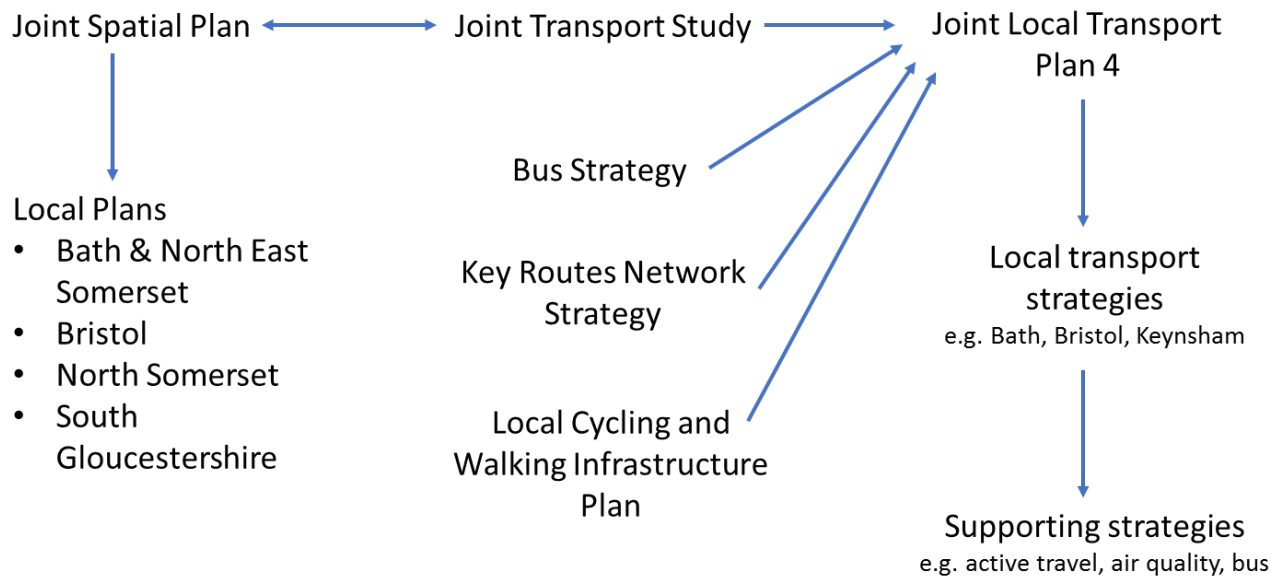


Figure 2 The Main Influences on JLTP4

3. SEA METHODOLOGY

3.1. INTRODUCTION

- 3.1.1. SEA is an iterative process of gathering data and evidence, assessment of environmental effects, developing mitigation measures and making recommendations to refine plans or programmes in view of the predicted environmental effects. The effects predicted at this stage will remain at a strategic level.
- 3.1.2. The approach adopted for the SEA of the JLTP follows that set out in the Practical Guide to SEA⁶ and the Planning Practice Guidance to SEA⁷. It involves the development of an assessment framework comprising a series of SEA objectives, assessment criteria and indicators. This framework is developed from an understanding of environmental problems and opportunities identified through a review of existing baseline information and a review of other plans, programmes and environmental protection objectives relevant to the plan area (i.e. WECA and its neighbours) and subject matter (transport).
- 3.1.3. The key stages of the SEA process are outlined below:
- Stage A Setting the context and objectives, establishing the baseline and deciding on the scope
 - Stage B Developing and refining alternatives and assessing effects
 - Stage C Preparing the Environmental Report
 - Stage D Consulting on the draft programme and the Environmental Report
 - Stage E Monitor the significant effects of implementing the plan or programme on the environment
- 3.1.4. Figure 3 below shows the key steps of the SEA process and the relationship with the LTP development process⁸. This report is the product of Stages B and C, selecting and assessing options and producing an Environmental Report for consultation.

⁶. Office of the Deputy Prime Minister (2005) A Practical Guide to the Strategic Environmental Assessment Directive [online] available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7657/practicalguidesea.pdf (Accessed December 2015).

⁷. Department for Communities and Local Government (2015) Strategic environmental assessment and sustainability appraisal [online] available at: <http://planningguidance.communities.gov.uk/blog/guidance/strategic-environmental-assessment-and-sustainability-appraisal/> (Accessed January 2016).

⁸. Department for Transport (2009) Guidance of Local Transport Plan [online] available at: <http://webarchive.nationalarchives.gov.uk/20110509101621/http://www.dft.gov.uk/adobepdf/165237/ltp-guidance.pdf> (Accessed December 2015).

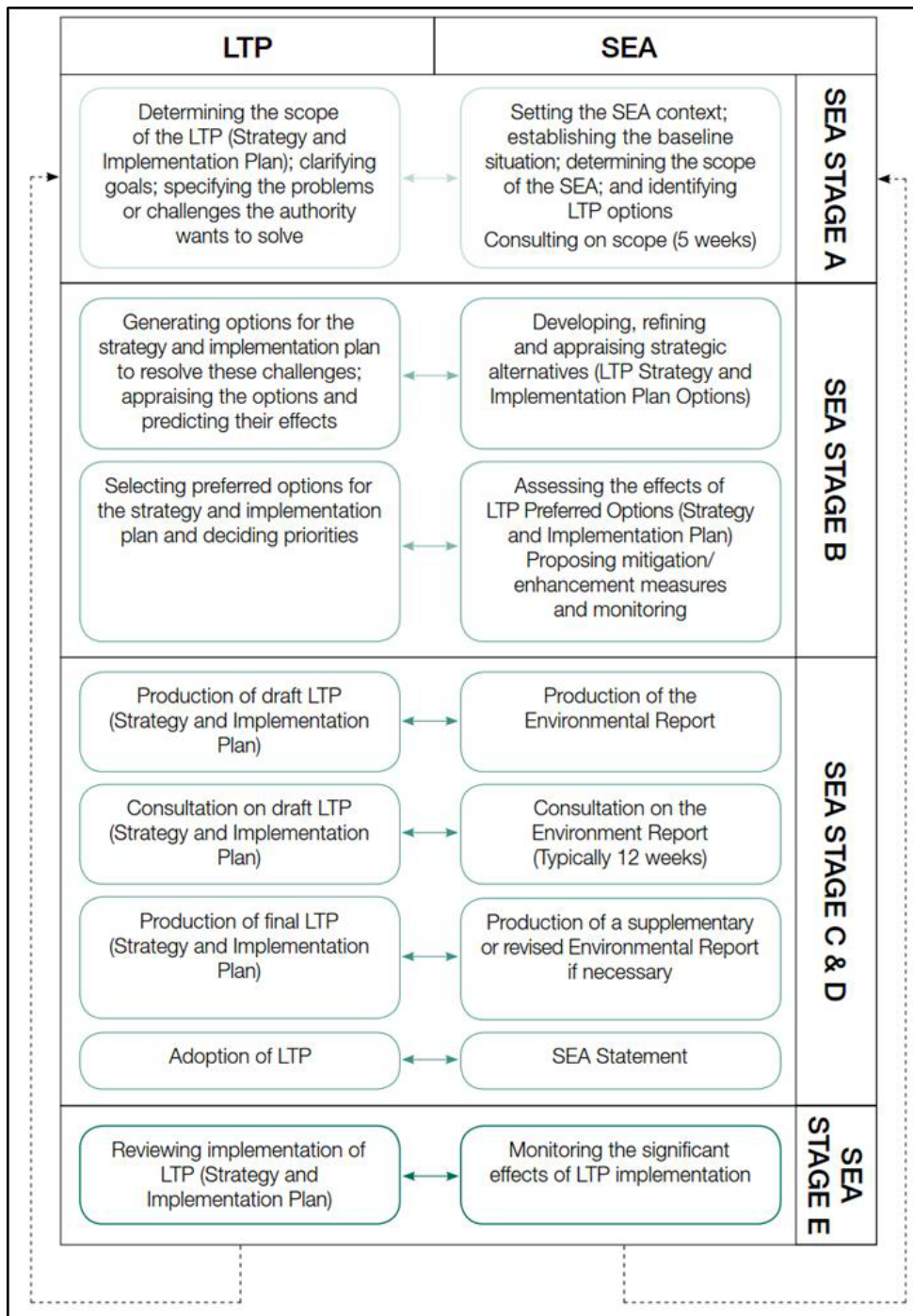


Figure 3 The LTP and SEA Process

STAGE A: SCOPING

- 3.1.5. At this stage the Responsible Authority compiles the background information needed for an SEA. The objective of Stage A of the SEA is setting the context and objectives, establishing the baseline and deciding on the scope of the SEA.
- 3.1.6. The scoping stage of the JLTP4 SEA involved:

- Setting the broad scope in terms of the topic areas to be addressed, the spatial boundaries and the time scale for the assessment
- Examining the relationship of the JLTP4 with other relevant policies, plans and programmes to identify environmental protection objectives which the JLTP4 should contribute to or at least avoid conflict with
- Assembling data on the current state of the environment and Future trends (baseline) in order to identify environmental problems and opportunities and to help to ensure that the JLTP4 addresses these issues where possible or at least does not contribute to making these problems worse; and, based on the above
- Formulating proposed SEA objectives that address the relevant environmental objectives identified in the review of other plans and programmes and the Key issues identified from the baseline review
- Consulting on the scope of the SEA.

3.1.7. Section 4 of this report provides the information with regards to the policy context, baseline conditions and SEA objectives.

3.1.8. A Scoping Report was produced and consulted on from the 14th September to 19th October 2018. The 'consultation bodies' for the purposes of the SEA Regulations – Historic England, Natural England and the Environment Agency – were consulted.

3.1.9. A summary of responses provided by statutory consultees is presented in Table 2 below. The full suite of responses is provided in Appendix B.

Table 2 Statutory Consultee Responses

Consultee	Date received	Summary of Comment	Action
Natural England	15 th October 2018	<p>Reference to the close links between the JSP and the JLTP4 and the benefits of having a coordinated and supportive approach to mitigation and enhancement.</p> <p>Reference to the role of the GI Plan as the vehicle for delivering JSP objectives.</p> <p>Would like to see clearer links to the contribution the JLTP4 will make to the WoE GI Plan and to achieving measurable net gains for biodiversity.</p> <p>Suggestions to strengthen the following SEA Objectives and Assessment Criteria:</p> <p><u>Biodiversity</u>: The (...) Suggested objective '<i>Protect and enhance biodiversity and ecological networks</i>'.</p> <p><u>Water</u>: (...) Water quality is screened out from the SEA on the basis that new infrastructure will be required to meet best practice drainage designs and mitigation. We acknowledge the relevance of flood risk to the SEA, but would also wish to see objectives for the protection and improvement of water quality across the plan area. Water quality will also be a particularly important consideration in relation to new road infrastructure associated with the North Somerset SDLs. This low lying area is bisected by complex drainage systems and pollution from surface</p>	<p>The close links between the JSP and JLTP4 have been referenced in the assessment matrices. The benefits of having a coordinated and supportive approach to mitigation and enhancement have been outlined in Section 5.7, Cumulative Effects. The role of the GI Plan and the links between the JLTP4 and this document have been mentioned throughout.</p> <p>Biodiversity: The biodiversity objective was changed to '<i>Protect and enhance biodiversity and ecological networks</i>'.</p> <p>Water: The previous SEA0 4 and 9 regarding were combined and a further objective, the new SEA09 was added: '<i>Protect, and where possible improve, water quality</i>'.</p> <p>Soils: The proposed criteria were added to SEA05 regarding biodiversity.</p> <p>Monitoring: proposals have been linked to the GI Plan.</p>

		<p>water run-off from Nailsea is having an adverse impact Tickenham, Nailsea & Kenn Moors SSSI.</p> <p><u>Soils:</u> (...) Reference of the importance of ecological networks, Suggestion adding “<i>Ensure current ecological networks are not compromised, and future improvements in habitat connectivity are not prejudiced</i>” to the assessment criteria.</p> <p>Comments with regards to monitoring and proposed indicators.</p>	
Historic England	15 th October 2018	<p>The SEA to refer to <i>Highways England – the road to good design (2018)</i> in line with the national drive for good design.</p> <p>Proposed amendments to the wording of the relevant SEA Objectives:</p> <p>Cultural Heritage</p> <p>Objective: <i>protect and enhance the rich diversity of the historical and cultural environment, <u>its heritage assets and their setting.</u> archaeological assets.</i></p> <p>Criteria</p> <p>Will the JLTP4 (in combination with other plans):</p> <p><u>Avoid harm to the significance of the West of England’s historic environment, heritage assets, historic places, streets and spaces.</u></p> <p><u>Enhance the significance of the West of England’s historic environment, heritage assets, historic places, streets and spaces.</u></p> <p>Landscape and townscape</p>	<p>Suggested amendments were made to the cultural heritage objective and criteria wording.</p> <p>SEAO 12 and 13 were combined to consider landscape and the built environment in the new SEAO 12 and the suggested amendments to the criteria were made.</p>

		<p><i>Objective: maintain and enhance the quality and character of the built environment and landscape.</i></p> <p><i>Criteria</i></p> <p>Will the JLTP4 (in combination with other plans):</p> <ul style="list-style-type: none"> • Cause <u>an adverse</u> visual intrusion in <u>notable</u> areas of <u>notable locally distinctive</u> landscape and townscape character, or alter the character of locations regarded as locally distinctive? • Relieve intrusion or noise disturbance of existing areas of high landscape or built environment value? 	
Environment Agency	29 th October 2018	<p>Section 3.3 Climatic Factors</p> <p>Answer to consultation questions 6 and 8</p> <p>It would be appropriate to refer to the UKCP09 climate change projections and UKCP18, which is due for publication imminently. Further information is available through the following link: http://ukclimateprojections.metoffice.gov.uk/24125</p>	<p>Text Added:</p> <p><i>“UKCP09 climate change projections predict changes in summer mean temperatures from 2.2°C (1961-1990 baseline) to 6.8°C (by the 2080s), an increase of 4.2°C in parts of southern England. UKCP18 predictions are due imminently at the time of writing but have not yet been published.”</i></p>
		<p>Section 3.7 Water</p> <p>See response to Section 3.3 above</p>	<p>Text Added:</p> <p><i>“The UKCP09 climate change projections predict the western side of the UK to experience the biggest changes in precipitation in winter in the UK, increases up to +33%(+9 to +70%).”</i></p>

		<p>Additionally, the Agency must recommend specific reference to the Defra 25-year plan:</p> <p>https://www.gov.uk/government/publications/25-year-environment-plan</p>	<p>Text Added:</p> <p>The Defra 25-Year Environment Plan aims to achieve clean and plentiful water by improving at least three quarters of UK waters to be close to their natural state as soon as is practicable by:</p> <ul style="list-style-type: none"> ■ reducing the damaging abstraction of water from rivers and groundwater, ensuring that by 2021 the proportion of water bodies with enough water to support environmental standards increases from 82% to 90% for surface water bodies and from 72% to 77% for groundwater bodies; ■ reaching or exceeding objectives for rivers, lakes, coastal and ground waters that are specially protected, whether for biodiversity or drinking water as per our River Basin Management Plans; ■ supporting OFWAT's ambitions on leakage, minimising the amount of water lost through leakage year on year, with water companies expected to reduce leakage by at least an average of 15% by 2025; and ■ minimising by 2030 the harmful bacteria in our designated bathing waters and continuing to improve the cleanliness of our waters; we will make sure that potential bathers are warned of any short-term pollution risks.
		<p>With regard to paragraph 5 on page 53, the Agency would recommend specific reference to</p>	<p>Text added:</p>

		the Avonmouth Severnside Enterprise Area (ASEA), in relation to realising the economic potential of the area.	<i>“South Gloucestershire Council, Bristol City Council and the Environment Agency are working together on the Avonmouth Severnside Enterprise Area (ASEA) Ecology Mitigation and Flood Defence Project to improve flood defences and create new habitats for wildlife in the Avonmouth Severnside area.”</i>
		With regard to paragraph 6 on page 53, when referring to the “significant tidal and fluvial flood risk management infrastructure in much of the West of England sub-region” consideration should be given to the inclusion of advisory text, explaining that the infrastructure is managed by several Risk Management Authorities, including: the Environment Agency, Lead local Flood Authorities, water companies and Network Rail.	The infrastructure is managed by several Risk Management Authorities, including the Environment Agency, Lead local Flood Authorities, water companies and Network Rail.
		There are various inaccuracies with the last paragraph on page 53. The Agency suggests the following text: The tidal flood defences, which reduce flood risk to Avonmouth and Severnside, provide a varying level of protection with some low spots and informal <i>de facto</i> defences, together with higher formal defences. An appraisal has been underway since 2016 to identify and agree a new scheme to reduce flood risk to a 1 in a 200-year standard, with an allowance for climate change for at least 60 years. While the area is currently protected from flooding by formal and informal flood defences, in addition to surface water from the development area. It is important to note that, notwithstanding the flood defences, there	Paragraph replaced.

		remains a residual risk of flooding in extreme events or as a result of defence failure.	
		<p>With regard to the second paragraph (second sentence) on page 54:</p> <p>“It is estimated that climate change and sea level rise will mean that severe tidal...”</p> <p>The Agency must advise that it not familiar with the stated estimate and would therefore recommend reference to the relevant climate change science to provide confidence.</p>	Paragraph deleted. Reference to precipitation increases with climate change have been added.
		<p>Finally, the Agency would advise that Section 3.7 would benefit from the inclusion of a specific reference to the Environment Agency’s approach to groundwater protection documentation, which is available through the following link:</p> <p>https://www.gov.uk/government/collections/groundwater-protection</p>	<p>Text added:</p> <p>Several documents have been produced by the Environment Agency and Defra to protect groundwater and prevent groundwater pollution. Environmental permits are required for certain activities to prevent groundwater pollution (reference in footnote).</p>

STAGE B: ENVIRONMENTAL ASSESSMENT

- 3.1.10. Stage B of the SEA involves developing and refining alternatives and assessing effects. At this stage, the Responsible Authority confirms the scope of the Environmental Report, what alternatives and types of effect to assess, and what level of detail to present, taking account of Consultation Bodies' advice. Where adverse effects are seen to be likely, possibilities for mitigation must be considered. Annex I of the SEA Directive states the following with regards to the assessment of effects in relation to the information to be included in the SEA report:
- “the likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors. These effects should include secondary, cumulative, synergistic, short, medium and long-term, permanent and temporary, positive and negative effects”* (Annex I (f) and footnote)
- 3.1.11. Each element of the JLTP 4 was assessed against each SEA objective, and a judgement was made with regards to the likely effect that the element would have on that objective. The assessment covered two key areas:
- The proposed policies and interventions as set out in the Draft JLTP4; and
 - The strategic alternatives considered in developing the revised LTP.
- 3.1.12. An assessment worksheet was developed and used to evaluate how the SEA objectives would be affected, positively or negatively, from the implementation of the plan, including alternatives. Effects of the JLTP4 and proposed alternatives were described in terms of their:
- (a) Nature: whether they are anticipated to be:
- Positive (+)
 - Neutral (N)
 - Negative (x) or
 - Uncertain (?)
- (b) Duration: the duration of potential effects is presented in terms of the timescale over which they are anticipated:
- Short term effects: effects expected in the next 1-5 years
 - Medium term effects: effects expected in the next 6-15 years
 - Long term effects: effects expected in the next 16+years
- (c) Permanence and Reversibility:
- A permanent effect is one which results from a physical change that is anticipated to last beyond the life of the JLTP.
 - A temporary effect is one which results from an operational change which could change if there is a change of policy, or a short term condition such as a construction phase related impact.
 - A reversible effect is an environmental effect that can be reversed, for example an incident of water pollution can be cleaned up over time.
 - An irreversible effect is an environmental effect that cannot be reversed such as the loss of a historic feature or the loss of agricultural soil due to permanent development.
- (d) Spatial Scale:

- Local: effect is restricted to the immediate location of the proposal or to a specific site or settlement within the sub-region (West of England)
- Regional: effect is anticipated to cover a significant proportion or all of the South West.
- National: effect covers the whole of England and/or the UK (also includes international).

3.1.13. The assessment (presented in section 5 of this report) is presented in a table format using the colour coding shown in Table 3 along with an accompanying narrative description of the assessment findings.

Table 3 Colour coding of effect significance

++ Major Positive	The option would be significantly beneficial to the SEA objective by resolving an existing environmental issue and/or maximising opportunities for environmental enhancement.
+ Minor Positive	The option would be partially beneficial to the SEA objective by contributing to resolving an existing environmental issue and/or offering opportunity for some environmental enhancement. This effect would not be considered to be of significance.
N Neutral	The option would have a neutral effect on the SEA objective.
? Uncertain	There is insufficient detail available on the option or the baseline situation in order to assess how significantly the SEA objective would be affected by the option.
x Minor Negative	The option would partly undermine the SEA objective by contributing to an environmental problem and/or partially undermine opportunities for environmental enhancement. This effect would not be considered to be of significance.
xx Major Negative	The option would severely undermine the SEA objective by contributing to an environmental problem and/or undermining opportunities for environmental enhancement. This would be considered to be a significant effect.

3.1.14. Following on from the findings of the assessment, section 5.8 of this report also includes a list of proposed mitigation and enhancement measures for any major negative or positive significant effects that have been predicted.

STAGES C AND D: REPORTING AND CONSULTATION

3.1.15. This report sets out the results of the SEA and constitutes the Environmental Report under the SEA Regulations.

3.1.16. The Environmental Report is a key output of SEA, presenting information on the effects of the “draft plan or programme”. The SEA Directive states the following:

“The environmental report shall include information that may reasonably be required taking into account current knowledge and methods of assessment, the contents and level of detail in the plan or programme, [and] its stage in the decision-making process and the extent to which certain matters are more appropriately assessed at different levels in that process in order to avoid duplication of the assessment” (Article 5.2).

- 3.1.17. Information to be provided in the Environmental Report is set out in Annex I of the Directive.
- 3.1.18. The Environmental Report must be made available at the same time as the draft plan or programme, as an integral part of the consultation process, and the relationship between the two documents clearly indicated.
- 3.1.19. A SEA Statement will be prepared following the consultation period to summarise how responses to consultation and the SEA has influenced the development of JLTP4 .

STAGE E: MONITORING

- 3.1.20. Under the SEA Directive there is a statutory requirement to monitor the environmental impacts of the implementation of the Plan. This SEA Environmental Report sets out recommendations for monitoring major adverse effects of implementing the JLTP4 in section 5.9 of this report.

LIMITATIONS AND ASSUMPTIONS

- 3.1.21. The SEA Regulations require that limitations and assumptions should be described.

The SEA covers the West of England which includes the unitary authority areas of Bath & North East Somerset, Bristol City, North Somerset and South Gloucestershire and will extend outside these administrative areas where it is appropriate to do so. This acknowledges the potential for the environmental effects of the JLTP4 to extend beyond the unitary authority boundaries.
- 3.1.22. The Draft JLTP4 covers all transport interventions and schemes being delivered in the unitary authorities and the level of information available for each scheme varies. Although this SEA draws from information where this exists, assessments are produced to the same level of detail to aid consistency.
- 3.1.23. Some of the Transport Schemes in the Implementation Plan are being delivered by other organisations, including Highways England and Network Rail. WECA and the West of England authorities will need to continue working in partnership with these other organisations for the development and delivery of these schemes. The policy framework for the delivery of these major schemes is the National Networks National Policy Statement⁹).
- 3.1.24. The JLTP4 will apply to the plan period 2019 to 2036. The assessment will focus on effects likely to occur during the plan period but will also seek to identify longer term effects that may occur beyond

⁹ DfT, 2014, National Policy Statement for National Networks

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/387222/npsnn-print.pdf

this period. It is acknowledged that longer term effects generally have a greater level of uncertainty than shorter-term, more immediate effects.

3.2. RELATIONSHIP WITH OTHER ASSESSMENT PROCESSES

HABITATS REGULATIONS ASSESSMENT

- 3.2.1. Under Article 6 (3) of the EU Habitats Directive as transposed into the UK law by the Habitats Regulations, an assessment (referred to as a Habitats Regulations Assessment (HRA)) needs to be undertaken in respect of any plan or project which:
- Either alone or in combination with other plans or projects would be likely to have a significant effect on a site designated within the Natura 2000 network – these are Special Areas of Conservation (SACs), candidate SACs (cSACs), and Special Protection Areas (SPAs). In addition, Ramsar sites (wetlands of international importance), potential SPAs (pSPA) and in England possible SACs (pSACs), are considered in this process as a matter of law or Government policy. [These sites are collectively termed ‘European sites’ in HRA]; and
 - Is not directly connected with, or necessary to, the management of the site.
- 3.2.2. Guidance on the Habitats Directive¹⁰ sets out four distinct stages for assessment under the Directive:
- **Stage 1:** Screening: the process which initially identifies the likely impacts upon a Natura 2000 site of a plan or project, either alone or in combination with other plans or projects, and considers whether these impacts are likely to be significant.
 - **Stage 2:** Appropriate Assessment: the detailed consideration of the impact on the integrity of the Natura 2000 sites of the plan or project, either alone or in combination with other plans or projects, with respect to the site’s conservation objectives and its structure and function. This is to determine whether there will be adverse effects on the integrity of the site.
 - **Stage 3:** Assessment of alternative solutions: the process which examines alternative ways of achieving the objectives of the plans or projects that avoid adverse impacts on the integrity of the Natura 2000 site.
 - **Stage 4:** Assessment where no alternative solutions exist and where adverse impacts remain: an assessment of whether the development is necessary for imperative reasons of overriding public interest (IROPI) and, if so, of the compensatory measures needed to maintain the overall coherence of the Natura 2000 network.
- 3.2.3. The first stage, of the HRA (screening) as well as subsequent stages where required, will be undertaken as the JLTP4 develops. Information from the HRA relating to Natura 2000 sites and

¹⁰ European Commission, 2001. Assessment of plans and projects significantly affecting Natura 2000 sites. http://ec.europa.eu/environment/nature/natura2000/management/docs/art6/natura_2000_assess_en.pdf

potential impacts on them can be used within the SEA. The findings of the HRA screening stage have identified a number of likely significant effects on European sites and therefore it is going to be necessary to advance to the appropriate assessment (AA) stage.

EQUALITIES ASSESSMENT

- 3.2.4. An Equality Impact Assessment (EqIA) has been undertaken for the JTLP4.
- 3.2.5. EqIA considers the impact of a project or policy on persons or groups of persons who share characteristics which are protected under section 4 of the Equality Act 2010 ("protected characteristics") and might also include others considered to be vulnerable within society such as low income groups. It is an information gathering tool which enables decision makers within public bodies to implement their equality duty under the Equality Act 2010.
- 3.2.6. An EqIA guides decision makers and designers to:
 - Consider the effects of existing and proposed policy or practice on people who share a "protected characteristic"; and
 - Identify opportunities to improve equality of opportunity and eliminate discrimination.
- 3.2.7. An EqIA should be carried out before making decisions, so as to inform and shape the outcomes. They should be updated throughout the decision-making process as necessary, as policy or practices are developed.
- 3.2.8. There are three stages to an EqIA; screening, full assessment and outcome monitoring. The screening stage determined which protected characteristics are likely to experience disproportionate impacts, and therefore require consideration within the EqIA. This takes into account the nature of the public function being exercised and available information on users and impacts.
- 3.2.9. The EqIA, a copy of which is included as Appendix C of this report, has informed the JTLP4 SEA process.

HEALTH IMPACT ASSESSMENT

- 3.2.10. One of the topics to be assessed within the SEA is human health. In considering the effects on human health, a Health Impact Assessment (HIA) has been undertaken to further consider the relationship between health and transport, and the likely significant effects of the draft JTLP4 on human health.
- 3.2.11. HIA is a systematic approach to identifying the differential health and wellbeing impacts, both positive and negative, of projects and plans.
- 3.2.12. HIA uses both qualitative and quantitative evidence, including public and other stakeholders' perceptions and experiences, as well as public health knowledge. It is particularly concerned with the distribution of effects within a population, as different groups are likely to be affected in different ways, and therefore looks at how health and social inequalities might be reduced or increased by a proposed project or plan.
- 3.2.13. The aim of HIA is to support and add value to the decision-making process by providing a systematic analysis of the potential impacts, as well as recommending opportunities, where appropriate, to enhance positive impacts, mitigate negative impacts and reduce health inequalities.
- 3.2.14. A copy of the HIA is included as Appendix D of this report.

4. ENVIRONMENTAL CONTEXT AND SEA OBJECTIVES

4.1. INTRODUCTION

- 4.1.1. This section summarises and sets out the policy context; baseline and issues for the JLTP 4. It also includes the environmental assessment framework, against which the JLTP 4 is assessed.

4.2. POLICY CONTEXT

- 4.2.1. A number of international, national, regional and local policies, plans and programmes were reviewed at the Scoping stage to gain an understanding of the Policy context and environmental protection objectives. This review was included as Appendix A of the Scoping Report and it is included here as Appendix E.
- 4.2.2. Policy and legislative instrument of key relevance to the SEA process are also noted in the description of the baseline conditions where appropriate.

4.3. OVERVIEW OF BASELINE

- 4.3.1. The following section provides an overview of the baseline, taken from the SEA Scoping Report.

POPULATION

- 4.3.2. The West of England is a dynamic city region, with a population of more than 1 million people. Since 2011 the population of the West of England (including North Somerset) has increased by 83,633 (7.8%). The City of Bristol has seen the highest percentage increase at 8.9%, and North Somerset the least at 6.2%. The population percentage increase in England between 2011 and 2018 (based on population projections) is 5.7% - growth in the West of England has been at a faster rate than across England as a whole.

Policy Context

- 4.3.3. The National Planning Policy Framework (NPPF) (2018) sets out the Government's planning policies for England and provides a framework within which locally-prepared plans for housing and other development can be produced. Plans should be prepared with the objective to contributing to the achievement of sustainable development.
- 4.3.4. The West of England JSP¹¹ is a strategic Development Plan Document that will provide the strategic overarching development framework to guide housing, employment and infrastructure requirements to 2036 in the West of England.
- 4.3.5. As explained in Section 2.2 above, the main vehicle for delivering the JSP objectives for the natural environment, is the West of England GI Plan. The GI Plan will identify the strategic measures and

¹¹ West of England Joint Spatial Plan Publication Document, November 2017.

<http://westofenglandlep.co.uk/jsp>

mechanisms to support, guide and implement the delivery of environmental commitments set within the JSP and Local Plans, including mitigation for protected sites.

Population density

- 4.3.6. The total population distribution across each of the four authorities is quite varied, reflecting the urban and rural extremes of the sub-region. Bristol City Council (BCC) has the highest population and a very high population density (41.4 persons per hectare) due to the smaller size of the area, while Bath & North East Somerset (B&NES), North Somerset Council (NSC) and South Gloucestershire Council all have average densities of just over 5 persons per hectare reflecting the more rural nature of those authority areas.

Age Profile

- 4.3.7. Based on the 2011 census data, the West of England of England consists of roughly equal numbers of children (aged 0-15) (18%) and older people (aged 65 and over) (16%). Across the four unitary authorities, the percentage of children is largely consistent (between 17% and 19%). However, North Somerset has a higher percentage of older people, accounting for 21% of the total population, compared to only 13% in Bristol City. Bristol City also has the highest percentage of working age people – 69% compared to 65% in B&NES, 64% in South Gloucestershire and 61% in North Somerset.

Wealth and Inequalities

- 4.3.8. The West of England is a highly productive economy with over 43,000 businesses and an economy worth over £31 billion a year. Gross Value Added per capita is higher than the national average and the city region is one of the few areas of the UK that is a net contributor to the Treasury. The area is home to world-leading businesses, a growing visitor economy and a rising population attracted by the high quality of life on offer. However, the has a number of areas which fall within the 10% most deprived nationally equating to some 83,916 people or 7.8% of the West of England population. These areas are focused primarily in Bristol and Weston-super-Mare.
- 4.3.9. Recent economic growth has been driven by a diverse sectoral base with strengths in aerospace, creative and environmental industries, IT and microelectronics, finance and tourism. A high proportion of local employment is, therefore, in high-value knowledge intensive industries. The area is also home to four universities producing cutting-edge research. Economic growth over the last decade has been driven by these sector strengths and the availability of high quality business space with good access to the transport networks, particularly in the North Fringe area close to the M4 and M5. There has also been rapid growth recently seen in Bristol city centre as businesses are attracted by the large skilled workforce, dynamic local business community and availability of appropriate workspaces.

Tourism

- 4.3.10. Tourism has an important role in the West of England's economy. The West of England has important tourist and visitor destinations that attract both national and international visitors. The high number of tourists place seasonal pressures on the transport system.
- 4.3.11. Bristol Airport plays a critical role in the competitiveness of the region not only supporting inbound tourism but also enabling businesses to connect with clients and partners in major cities across Europe.

Future trends

- 4.3.12. The West of England population is projected to increase significantly by 2036. It is predicted to increase from 938,070 in 2018 to 1,071,102 in 2036 (14%) and 1,101,496 in 2041 (17%). This growth is expected to be predominantly urban based with 90% of the current population living in urban areas.
- 4.3.13. Although England as a whole has an aging population, this trend is predicted to be less accentuated in the West of England, with much of the growth coming from the lower age groups.
- 4.3.14. However, it is assumed that much of the population growth associated with the South West in general is partly due to aspirations for rural lifestyles and for retirement in coastal areas. There is therefore a lack of clear evidence upon which to predict how the main population growth would be distributed across the sub-region in the future.

Key areas of concern for the SEA

- 4.3.15. One key area of concern is the predicted rate of population growth for the West of England and its potential effect on traffic volumes and increased demand on existing infrastructure and services including transport. It is likely to exacerbate existing problems such as traffic congestion and associated poor air quality. Provision for population growth should also take into the likely seasonal influxes of people associated with the tourism industry.
- 4.3.16. A second area of concern is the ageing population which brings with it specific considerations in terms of accessibility requirements. Based on the above two areas of concern it is assumed that access to public transport, walking and cycling are likely to become more important both to counteract potential increased incidents of traffic congestion (and associated environmental issues) and to cater for a potentially increased proportion of population without access to cars.
- 4.3.17. Further information on the socio-economic characteristics and health of the JLTP4 area is provided in the EqIA and HIA included as Appendix C and D respectively.

AIR QUALITY

- 4.3.18. Clean air is a basic requirement for health and wellbeing. Road transport is the primary source of urban air pollution. In addition to nitrogen dioxide (NO₂) emissions, road traffic is one of the most important sources of CO₂ emissions, which are contributing to climate change. Transport produces 29% of total carbon emissions in the West of England or around 1,408 kilotonnes per year (kt/yr). There has been an 8% reduction in transport emissions between 2005 and 2014 which closely reflects national progress. This reflects mode shift to cycling and public transport and improved fuel efficiency. However, with more people living and working in the area, leading to significant increases in traffic, it will become progressively more challenging to reduce the overall carbon footprint.
- 4.3.19. A number of different airborne particulates are antagonistic to the sensitive lining of airways and act as irritants, causing difficulties and discomfort. In particular, this can exacerbate conditions of people with pre-existing respiratory diseases, such as asthma. The incidence of asthma has been increasing, particularly among children, but the reasons for this are unclear. There is a clear association between long-term exposure to particulate air pollution and a reduction in life-expectancy caused by cardiovascular disease. The interaction between particulates, (NO₂) and ozone can aggravate these issues.

- 4.3.20. There are parts of the West of England, particularly the central urbanised areas, where on average over the course of a year air quality is unlikely to achieve national objectives. Nitrogen oxides like nitric oxide (NO) and NO₂ can react in the air to produce ozone and other harmful pollutants that lead to smog. Nitrogen dioxide emissions can also be further oxidised in air to acid gases, which contribute to the production of acid rain.
- 4.3.21. Particulate matter (PM), especially very fine particles, is thought to have a very large impact on Human health and is one of the major problems facing environmental professionals. PM₁₀₁ particles and even smaller fractions (PM_{2.5}) can reach deep into our lungs and can cause severe respiratory problems.
- 4.3.22. The indicators used for reporting air quality have been selected to reflect the pollutants of most concern (NO₂ and PM₁₀) and to use the metrics that are also employed to describe the local authority's performance in managing air quality in the Local Air Quality Management regime.

Policy Context

- 4.3.23. To improve air quality, the Government has requested 28 councils across England – including B&NES and BCCs – to achieve compliance with NO₂ limits 'in the shortest possible time'. This is part of the Government's National Air Quality Action Plan ¹².
- 4.3.24. The local authorities are responsible for developing innovative Clean Air Plans that will achieve statutory NO₂ limit values in a way that best meets the needs of their communities and local businesses. Feasibility studies in Bristol and Bath are exploring options – including charging Clean Air Zones – to improve air quality in the shortest possible time (to reach legal levels by 2021 at the latest).

Bristol City

- 4.3.25. Bristol declared an Air Quality Management Area (AQMA) across the city centre and monitors air quality exceedances in this area. The monitoring sites selected are from BCCs network of analysers and from the Defra AURN site in St. Pauls. An AQMA is declared for both PM₁₀ and NO₂.
- 4.3.26. The trends in nitrogen appear to be moving slightly downwards from 1998 to 2015 at the majority of sites. These trends reflect monitoring at the roadside across the city using diffusion tubes. It is now understood that increased penetration of diesel vehicles in the fleet and the under-performance of vehicles in relation to their type approval under the EURO test cycles have led to concentrations of NO₂ and PM₁₀ in the UK remaining broadly stable for the last ten years or so.

B&NES

- 4.3.27. Air Quality in Bath City Centre has been poor mainly due to emissions from vehicular traffic. In conjunction with this, the city's topography restricts dispersion and results in higher pollutant concentrations.
- 4.3.28. There are currently five AQMAs identified in the district in the following locations:

¹² Air quality plan for nitrogen dioxide (NO₂) in UK (2017).

- Bath Air Quality Management Area;
- Keynsham Air Quality Management Area;
- Saltford Air Quality Management;
- Temple Cloud (A37); and
- Farrington Gurney (A37).

4.3.29. Each of these AQMAs are related to exceedance of NO₂.

North Somerset

4.3.30. There is no AQMAs in North Somerset. However, the council has a duty to monitor and manage air quality within the District. The main pollutant of concern locally is NO₂, which originates primarily from road traffic emissions. Data from non-automatic monitoring sites operating around the district indicates that NO₂ remains well below the national annual mean objective.

South Gloucestershire

4.3.31. . Air quality in South Gloucestershire is generally good, although, there are some areas in the district where it does not meet the national air quality objective for NO₂. This is mostly due to the combination of busy, congested roads and the close proximity of people to these roads.

4.3.32. Consequently, AQMAs have been declared at:

- Cribbs Causeway – adjacent to the M5 Junction 17 roundabout;
- Kingswood – Warmley – from the Bristol/ South Gloucestershire boundary in Kingswood along the A420 to the junction with Goldney Avenue in Warmley; and
- Staple Hill – in the centre around the Broad Street/ High Street/ Soundwell Road/ Victoria Street crossroads.

4.3.33. An Air Quality Action Plan is now in place aimed at improving air quality in these locations.

Future trends

4.3.34. There is a trend towards generally cleaner vehicles since newer vehicles have higher European emissions standards. However, the forecast growth in travel demand will result in more cars, vans and goods traffic using the road network in the West of England. The JTS identifies that relative traffic growth is forecast to be slightly lower than the increase in overall travel due to more people using buses and trains following the completion of the current MetroBus and MetroWest programmes.

4.3.35. Over the longer term, changes resulting from driverless vehicles, connected vehicles and Mobility as a Service could result in efficiencies in the operation of the road network. However, the introduction of driverless vehicles could result more vehicles on the network and the management of streets will need to consider the needs of pedestrians and cyclists, who do not conform to automated systems. There is, therefore, no guarantee that congestion will be reduced with new technologies.

4.3.36. Additionally, the removal of tolls on the Severn Crossings from the end of 2018 is forecast to result in a large increase in traffic using the crossings due to increased economic activity and greater commuting between the two sides of the estuary.

Key areas of concern for the SEA

- 4.3.37. Since transport is the main source of air pollution in the West of England, it is proposed that the SEA focuses on predicted changes in traffic as an indication of potential effect on air quality. It is proposed that a predicted change of 10% in traffic flows or more will indicate a potentially significant effect.
- 4.3.38. The effects of the JLTP4 will be considered in combination with other potential influences, for example the expected growth in population, the economy and tourism. This will allow an assessment of secondary, cumulative and synergistic effects with JLTP4, which is a requirement of the SEA Directive to assess.

CLIMATE CHANGE

- 4.3.39. Evidence indicates that climate change is occurring in the South West. Our climate is getting warmer. The annual average daily temperature in the South West region has increased by 0.75°C from 9.80°C in 1961 to 10.55°C in 2018. Figures show that 2017 was the fifth warmest year on record with an average temperature of 9.6°C. Nine of the UK's ten warmest years have been since 2002. UKCP09 climate change projections predict changes in summer mean temperatures from 2.2°C (1961-1990 baseline) to 6.8°C (by the 2080s), an increase of 4.2°C in parts of southern England¹³. UKCP18 predictions are due imminently at the time of writing but have not yet been published. It is predicted that in the West of England, as in the rest of the UK, climate change will lead to an increase in average temperatures with greater seasonal variations and an increased risk of flooding and droughts.
- 4.3.40. The key impacts are likely to be an increased likelihood of coastal flooding, more heat related deaths in the summer, increased problems relating to ozone in urban areas in summer and, in the short term, an increase in fuel prices which could lead to fuel poverty and the health risks associated with poorly heated homes. It is important to have in place an energy strategy that reduces dependence on fossil fuels by replacing with cleaner and renewable forms of energy generation in order to ensure that there is no shortage of energy in the future.
- 4.3.41. There is very strong evidence that significant global warming can't be explained by natural causes alone. Humans are changing the climate by their actions, especially through emissions of greenhouse gases, like CO₂, which artificially warm the atmosphere of the earth.
- 4.3.42. There are two main aspects to policy in relation to climate change:
- reducing greenhouse gas emissions to tackle climate change
 - adapting to climate change
- 4.3.43. Key to reducing transport's contribution to climate change is through reducing the need to travel and ensuring good accessibility to public and other sustainable modes of transport.
- 4.3.44. Whilst walking, cycling and use of public transport have been the most promoted forms of sustainable travel, the Government is also looking at promoting ultra-low carbon technology and

¹³ <http://ukclimateprojections.metoffice.gov.uk/media.jsp?mediaid=87867&filetype=pdf>

encouraging the increased coverage of electric vehicle charging infrastructure enabling wider use of ultra-low carbon vehicles.

- 4.3.45. In relation to adapting to climate change, planners should be considering aspects such as guiding strategic development to more accessible locations ensuring new and existing infrastructure is more resilient to climate change impacts.

Policy Context

- 4.3.46. The UK Climate Change Risk Assessment (Defra 2012) shows that flooding as a result of climate change is likely to pose an increasing threat to critical infrastructure. This includes increased risk to transport networks, as well as energy supplies, hospital and schools. There is a high risk of confidence in the 'significant likelihood of flooding' risk posed to roads and a medium level of confidence in relation to power stations, hospitals and schools.
- 4.3.47. At the Paris climate conference in December 2015, 195 countries adopted the first-ever universal, legally binding global climate deal. The agreement sets out a global action plan to put the world on track to avoid dangerous climate change by limiting global warming to well below 2°C.

CO₂ from transport

- 4.3.48. Road transport is one of the largest sources of CO₂ emissions, which are contributing to climate change. Although progress has been made in reducing emissions since the last JLTP was prepared, further action is needed to meet the combined West of England CO₂ reduction target for 2035, which is to reduce absolute CO₂ emissions by 50% from a 2014 baseline. Transport is responsible for 29% of CO₂ emissions in the West of England, compared to 26% nationally.

Future trends

- 4.3.49. Projections show that the South West of England could see an average summer temperature rise of 5°C by the 2080s.¹⁴ In the future the South West is predicted to have warmer, drier summers and warmer wetter winters.
- 4.3.50. The Fifth Assessment Report by the Intergovernmental Panel on Climate Change (IPCC) (2014) provides a comprehensive assessment of sea level rise, and its causes, over the past few decades. It also estimates cumulative CO₂ emissions since pre-industrial times and provides a CO₂ budget for future emissions to limit warming to less than 2 °C. About half of this maximum amount was already emitted by 2011. The report highlighted the following:
- From 1880 to 2012, the average global temperature increased by 0.85 °C;
 - Oceans have warmed, the amounts of snow and ice have diminished and the sea level has risen. From 1901 to 2010, the global average sea level rose by 19 cm as oceans expanded due to

¹⁴https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69257/pb13274-uk-climate-projections-090617.pdf

warming and ice melted. The sea ice extent in the Arctic has shrunk in every successive decade since 1979, with 1.07×10^6 km² of ice loss per decade; and

- Given current concentrations and ongoing emissions of greenhouse gases, it is likely that the end of this century will see a 1–2° C increase in global mean temperature above the 1990 level (about 1.5–2.5° C above the pre-industrial level). The world's oceans will warm and ice melt will continue. Average sea level rise is predicted to be 24–30 cm by 2065 and 40–63 cm by 2100 relative to the reference period of 1986–2005. Most aspects of climate change will persist for many centuries, even if emissions are stopped.

- 4.3.51. On Earth Day, 22 April 2016, 175 world leaders signed the Paris Agreement at United Nations Headquarters in New York. The Paris Agreement's central aim is to strengthen the global response to the threat of climate change by keeping the global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.
- 4.3.52. Without intervention, CO₂ emissions in the sub-region are likely to increase as the population grows. The proposed JLTP4 is designed to help reduce the need to travel by car and therefore reduce transport related emissions. However, this in itself will not guarantee the behavioural change required to reduce greenhouse gas emissions.

Key areas of concern for SEA

- 4.3.53. The most significant potential impact that the JLTP4 could have in relation to climate change is to help alter travel patterns and emissions of CO₂ from transport which may contribute to climate change when considered cumulatively with other sources of greenhouse gas emissions, both natural and human-induced.
- 4.3.54. Another key area of concern is the requirement to adapt to climate change. Of particular concern is the prediction that there will be an increase in flood events. This is addressed in more detail in the section on Water later on in this report. Other impacts expected due to climate change may also have profound impacts on transport in the region; for example, increased storminess, increased peak temperatures or prolonged high temperatures. There is also speculation that the predicted warmer, drier summers may encourage more tourism within the UK with fewer people holidaying abroad. Additional leisure related travel requirements could increase pressure in the transport infrastructure.

BIODIVERSITY, FLORA AND FLORA

- 4.3.55. Biodiversity refers to the diversity of living things. It includes all species of plants and animals (flora and fauna), the genetic variation amongst them, and the complex ecosystems in which they live. Biodiversity is often used as a measure of the health of biological systems.
- 4.3.56. Roadside and railway verges have significant wildlife potential. Natural England and local wildlife groups can advise on the potential for improving biodiversity as well as the threat of biodiversity loss.

Policy Context

- 4.3.57. Within the West of England there are a number of internationally designated sites (i.e. Nature 2000 or European Sites), important for habitats and species. The potential effect of the JLTP4 on these sites will be considered in detailed as part of the assessments carried under the Conservation of Habitats and Species Regulations 2017.

- 4.3.58. The West of England Nature Partnership (WENP) was set up to create and coordinate a plan for the restoration of the natural environment in the West of England area. The West of England (WoE) JSP commits the authorities to develop a WoE GI Plan (Policy 6) and to deliver a 'net gain' for the environment. The GI Plan, currently under preparation, will identify the strategic measures and mechanisms to support, guide and implement the delivery of environmental commitments set within the JSP and Local Plans, including mitigation for protected sites
- 4.3.59. Additionally, the unitary authorities of the West of England have action plans to protect and promote certain habitats, plants and animals in the interest of improving overall biodiversity. There are several legally protected sites within the West of England which are further described below.

Bristol City

- 4.3.60. Bristol City Council's Bristol Biodiversity Action Plan (BAP) provides the framework for habitat and species conservation in Bristol. It also recognises the benefits of wildlife to people and helps to identify ways to better promote, and engage people in, biodiversity conservation in the city. It was produced by the Bristol Biodiversity Partnership and is aimed at organisations, businesses, groups and individuals, which are either working to protect and enhance biodiversity in the city, or who may impact on it in some way. The BAP contains the following Habitat and Species Action Plans¹⁵:
- 4.3.61. Bristol Habitat Action Plans:
- Species rich grassland;
 - Woodland;
 - Ponds and open water;
 - Reedbeds and sedgebeds;
 - Estuarine habitats;
 - Scrub;
 - Open mosaic habitats on previously developed land; and
 - Rivers and rhines.
- 4.3.62. Bristol Species Action Plans:
- Water vole;
 - Otter;
 - House sparrow; and
 - Hedgehog.
- 4.3.63. Bristol has 1564 ha of publicly accessible parks and green spaces (only including areas of Ashton Court / Stoke Park / Frenchay Park Road that lie within the local authority boundary). There are currently 85 Sites of Nature Conservation Interest within Bristol and this remains largely unchanged since 2010. No new Site of Nature Conservation Interest (SNCI) sites have been designated since the adoption of the Site Allocation and Development Management Policies Document in 2014, although there has been a marginal loss of some SNCI land.

¹⁵ <https://www.bristol.gov.uk/policies-plans-strategies/the-bristol-biodiversity-action-plan>

4.3.64. There is also a rich biodiversity with 2 internationally important Natura 2000 sites (partly in Bristol City), the Severn Estuary and the Avon Gorge Woodlands; 4 Site of Special Scientific Interest (SSSI) covering 182 h and; 1501 ha of corridors in the Wildlife Network. There are also 12 designated Local Nature Reserves (LNR), an increase from 7 in 2005.

B&NES

4.3.65. As part of the B&NES BAP, the following are designated as Priority Habitats and Priority Species¹⁶:

4.3.66. Priority Habitats:

- Ancient and/or Species-rich Hedgerows;
- Broadleaf Woodlands;
- Post-industrial Sites;
- Species-rich Arable Farmland; and
- Species-rich Grassland.

4.3.67. Further, B&NES supports a number of European Protected Species and locally important priority species including:

4.3.68. All bat species:

- Bath Asparagus-*Ornithogalum pyrenaicum*;
- Bee-fly *Villa-cingulata* (Meigen);
- Blue Carpenter Bee-*Xylocopa Caerulea*;
- Chalk Hill Blue butterfly-*Polyommatus coridon*;
- Dormouse-*Muscardinus avellanarius*;
- Great Crested Newt-*Triturus cristatus*;
- Red Hemp-nettle-*Galeopsis angustifolia*;
- Skylark-*Alauda arvensis*;
- Water Vole-*Arvicola amphibious*; and
- White-clawed Crayfish-*Austropotamobius pallipes*.

4.3.69. B&NES is notable for its ancient woodlands and networks of ancient hedgerows. It hosts nationally important calcareous and neutral grasslands, and supports horseshoe bat populations of international importance. The main rivers support otters, kingfishers and some important migratory fish. The post-industrial landscape support rich mosaics of habitat supporting notable botanical and invertebrate interests. Areas of farmland and domestic gardens support important bird life.

4.3.70. B&NES includes the Chew Valley Lake which is designated as a SSSI, a SPA, and is one of Britain's most important sites for wintering wildfowl including the Shoveler (*Anas clypeata*).

¹⁶ http://www.bathnes.gov.uk/sites/default/files/sitedocuments/Environment/Ecology-and-Biodiversity/short_list_of_priority_species_and_habitats_2014.pdf

- 4.3.71. In addition to the Chew Valley Lake SPA, there are two Special Areas of Conservation (SAC), the Combe Down and Bathampton Mines SAC and Brown's Folly. The Bathampton Mines and Combe Down SAC and Browns Folly.
- 4.3.72. There are also 24 Sites of Special Scientific Interest (SSSI) and several strategic nature areas in B&NES including large woodland areas north and south of Bath (particularly around Combe Down and Dunkerton) and large areas of neutral grassland in the Chew Valley area.

North Somerset

- 4.3.73. As part of NSC's Core Strategy, policy *CS4: Nature Conservation* includes that the biodiversity of North Somerset will be maintained and enhanced by:
- seeking to meet local and national BAP targets taking account of climate change and the need for habitats and species to adapt to it;
 - seeking to ensure that new development is designed to maximise benefits to biodiversity, incorporating, safeguarding and enhancing natural habitats and features and adding to them where possible, particularly networks of habitats. A net loss of biodiversity interest should be avoided, and a net gain achieved where possible;
 - seeking to protect, connect and enhance important habitats, particularly designated sites, ancient woodlands and veteran trees;
 - promoting the enhancement of existing and provision of new green infrastructure of value to wildlife; and
 - promoting native tree planting and well targeted woodland creation, and encouraging retention of trees, with a view to enhancing biodiversity¹⁷.
- 4.3.74. North Somerset contains outstanding wildlife habitats and species. These include limestone grasslands, traditional orchards, wetlands, rhynes, commons, hedgerows, ancient woodlands and the Severn Estuary. Key species include rare horseshoe bats, otters, wildfowl and wading birds, slow-worms and water voles.
- 4.3.75. The 204 Local Wildlife Sites in North Somerset cover an area of 8509.39 hectares. The condition of Local Sites is largely unknown as the majority are privately owned. Local Sites are non-statutory sites so there is no obligation on owners to protect or report on the features for which the site was designated; or for them to allow their landholdings to be surveyed (unless the designation happens to overlap with that of a SSSI). Therefore, designated Local Wildlife Sites may include habitats that have been damaged or destroyed through inappropriate management or neglect.
- 4.3.76. SSSI condition is assessed by Natural England. 77.2% of North Somerset SSSIs are in favourable condition. This greatly exceeds the national target of 50% of SSSIs in favourable condition by 2020 set within 'Biodiversity 2020'.
- 4.3.77. Thirteen LNRs cover a total of 291.424 hectares across the district. The 2015 mid-year population estimates from the Office for National Statistics gives the population of North Somerset as 209,900.

¹⁷ <https://www.n-somerset.gov.uk/wp-content/uploads/2015/12/SD-46-biodiversity-and-trees-supplementary-planning-document.pdf>

This provides a ratio of 1 hectare of LNR per 720 head of population, which is well within Natural England's access to natural green space target of 1 hectare of LNR per 1,000 head of population.

South Gloucestershire

- 4.3.78. The revised South Gloucestershire BAP (2016 - 2026) has adopted a spatial ecosystem services approach to biodiversity action planning to reflect the changes in national policy and should be read in conjunction with the previous South Gloucestershire BAP (2006 - 2015), which still contains relevant information on the biodiversity of the area.
- 4.3.79. The species and habitats listed in the (2006 - 2015) BAP (see below) when read alongside the Council's Core Strategy Policy CS9 and Policies, Sites and Places Policy PSP19, act as material consideration in the planning process¹⁸:
- 4.3.80. Local Priority Habitats:
- Arable farmland;
 - Broadleaf woodland;
 - Hedges, dry stone walls and field margins;
 - Old meadows and pastures;
 - Orchards;
 - Ponds, rhines, rivers and water bodies; and
 - Saltmarsh/coastal grazing floodplain.
- 4.3.81. Priority species:
- Bullfinch;
 - Dormouse;
 - Great crested newt;
 - Hedgehog;
 - Song thrush;
 - Tassel stonewort;
 - White clawed crayfish; and
 - Lesser horseshoe bat.
- 4.3.82. Local Priority Species:
- Adders tongue spearwort;
 - Barn owl;
 - Bath asparagus;
 - Bithynian vetch;
 - Glow worm;
 - Slow worm; and
 - Wild service tree.

¹⁸ <http://www.southglos.gov.uk/documents/Biodiversity-Action-Plan-2016-26.pdf>

- 4.3.83. The South Gloucestershire BAP (2016 - 2026) utilises the WENP Ecosystem Service Mapping to provide a strategic overview to help direct 'on the ground' delivery through a parish and community based approach.
- 4.3.84. South Gloucestershire has nine LNRs, with one pending, covering a total of over 109 hectares, and 22 SSSIs covering 553 hectares. The South Gloucestershire shoreline between Chittening Warth near Avonmouth and the UA boundary with Gloucestershire forms part of the Severn Estuary and is subject to a series of additional over-lapping nature conservation designations. The Estuary is notified as a SSSI, covering a total of 4,104 hectares. It is also designated as a SPA, SAC and RAMSAR site.
- 4.3.85. South Gloucestershire also contains a rich array of wildlife and geology outside these legally protected sites. In reflection of this, there are some 269 SNCIs and 53 Regionally Important Geological/Geomorphological Sites, both non-statutory designations and of critical importance for local biodiversity. The Forest of Avon covers 57,300 hectares and is home to an array of habitats, forming an important contribution to biodiversity. The Forest of Avon Trust continues to promote this project through various funding sources, including the Woodland Grant Schemes available from the Forestry Commission. South Gloucestershire Council will continue to be one of the many land-owners that work with the Trust.

Future trends

- 4.3.86. Many of the protected sites are vulnerable to development. Transport has the potential to cause habitat decline due to fragmentation of habitats by linear infrastructure and air pollution. The construction of new roads or an increase in traffic volume could also bring more people into wildlife sites and subsequently lead to recreation pressures on some habitats and species. If there was no co-ordinated transport plan on a strategic level it is possible that new transport schemes or plans could have an adverse impact on wildlife at a local and strategic level.
- 4.3.87. Transport planning also has significant potential to improve biodiversity. In particular, roadside and railway verges have important biodiversity value. Highways Maintenance BAPs are becoming more common in the UK. Although the West of England authorities do not have such plans, neighbouring Gloucestershire County Council and Somerset County Councils have BAPs for highways maintenance.

Key areas of concern for SEA

- 4.3.88. As noted in the SEA Scoping Report, the SEA focuses on the potential effects of the JLTP4 on habitat connectivity and habitat types. This includes potential effects on designated sites. As explained earlier in the report, a HRA is currently underway which will identify likely significant effects on Natura 2000 sites.

HUMAN HEALTH

- 4.3.89. The South West has relatively good health compared to other English regions; nevertheless, many people in the South West suffer from health inequalities that must be tackled. These are related to a number of factors including where people live, opportunities for education and employment, and scope for physical activity.

Policy Context

- 4.3.90. Health Impact Assessment is not a statutory requirement for local transport plans; however, the consideration of human health is required in SEA and therefore this SEA integrates HIA into the overall SEA process.

Bristol City

- 4.3.91. The Joint Strategic Needs Assessment¹⁹ highlights that, generally, the population of Bristol is healthy with 82% who feel in good health, similar to national average, and people are living longer. However, there are health and wellbeing inequalities across the city. Life expectancy has a persistent gap between the most and least deprived areas (an estimated gap of 8.9 years for men and 6.6 years for women, 2011-13). People spend years living in poor health, and there are worse health outcomes in deprived areas, and even when the trend for Bristol is improving, this may not be the case in all areas.
- 4.3.92. Life expectancy for women is 82.8 years (below national average of 83.1 but highest of English Core Cities) and for men 78.2 years (significantly below national average of 79.4, mid-rank of Core Cities). Bristol's Healthy life expectancy (years living in good health) is women 62.6 years and men 63 years (similar to national and highest of Core Cities for both gender). On average women in Bristol spend only 76% of life in good health, and men 81%.
- 4.3.93. Many issues mirror national challenges, including mental health issues. Cancer is the biggest killer (under 75) followed by Cardiovascular Disease (heart related). Diabetes is rising. Early deaths due to Cancer are falling but remain significantly worse than national.
- 4.3.94. Over half (59%) people in Bristol are overweight or obese. For children, this is 23% of 4-5yr olds and 35% for 10-11yr olds (2013/14, similar to national).

B&NES

- 4.3.95. In 2015, the health of people in B&NES is generally better than the England average. Life expectancy at birth in B&NES is 81.3 years for males and 84.7 years for females (2012-14). For males, this was higher than the South West (80.2 years) and England (79.6 years) averages, while for females, this was higher than the South West (83.9 years) and England (83.2) averages. Life expectancy is 8.6 years lower for men and 4.7 years lower for women in the most deprived areas of Bath and B&NES than in the least deprived areas.
- 4.3.96. In Year 6, 15.8% (245) of children are classified as obese, better than the average for England. Furthermore, levels of teenage pregnancy, GCSE attainment, breastfeeding and smoking at time of delivery are better than the England average.
- 4.3.97. Deprivation is lower than average, however about 12.0% (3,400) children live in poverty.

¹⁹ Bristol Joint Strategic Needs Assessment 2017 <https://www.bristol.gov.uk/policies-plans-strategies/joint-strategic-needs-assessment>

North Somerset

- 4.3.98. The average female life expectancy in North Somerset is 83.4 years and the average male life expectancy is 80.1 years. In England and Wales, the average life expectancies are currently 83.1 years for females and 79.4 years for males.
- 4.3.99. The 2011 Census data indicates that 38,740 people in North Somerset describe themselves as having a limiting long term illness of some form, 19.2% of the population. This is an increase from the 18.5% ten years ago. The national average has decreased, from 18.2% in 2001 to 17.9% in 2011.
- 4.3.100. More generally, 81.1% of people consider themselves to be in good or very good health, and a further 13.7% describe their general health as fair. This accounts for 94.8% of the total population, higher than the 91.4% that described their health as fair or better ten years ago. 4.1% of our residents consider themselves to be in bad health, and a further 1.2% think they are in very bad health. Our current proportions are similar to the up to date national averages.

South Gloucestershire

- 4.3.101. In general, residents of South Gloucestershire are healthier than the national average. Results from the 2011 census show that 84% of the population (220,816 residents) described themselves as being in “good” or “very good” health, this is above the national average of 81.2%. There are however, differences in health between different groups with those living in deprived areas experiencing poorer health. Men in the 10% most deprived areas in South Gloucestershire live on average 6.3 years fewer than those in the 10% least deprived, and in women the gap is 5.1 years (2011/13). The conditions that contribute most to the gap in life expectancy are cancer in men (27%) and respiratory disease in women (28%). Health outcomes are consistently worse in deprived areas, with premature mortality and lung cancer rates almost twice as high in the 20% least affluent areas compared to the 20% most affluent.
- 4.3.102. Overall, life expectancy has increased in South Gloucestershire over the last 12 years. Based on the most up to date data, life expectancy at birth has increased by 3.2 years for men, reaching 81.5 years, and 2.6 years for women rising to 84.8 years. Life expectancy in South Gloucestershire remains significantly higher than the national average. Healthy life expectancy (years spent in good health) is 67.8 for men and 66.8 for women, higher than the England average.

Road traffic accidents

- 4.3.103. The number of people killed or seriously injured on the West of England’s roads every year has fallen since 2004 although the rate of has been lower than the national average. Between 2012 and 2016 there was a downward trend in the number of people injured on the road, but the number of people killed has remained consistent.

Key areas of concern for SEA

- 4.3.104. Without investment in sustainable transport measures the road network will become increasingly congested with significant associated health costs. Congestion detracts from the quality of life for local people by creating noise, pollution, road safety and health problems and creates barriers for more vulnerable travellers, such as cyclists, pedestrians and the disabled.

SOIL

4.3.105. Soil is a finite resource which serves several vital, interlinked functions that are essential to life. These functions include:

- Production of biomass including food and timber crops;
- Decomposition of plant and animal remains and organic wastes to recycle nutrients and carbon;
- Storage, filtration and release of rainwater to groundwater and to rivers; and
- A habitat for diverse, species-rich plant and animal communities including soil organisms.

4.3.106. Soil takes many years to develop but can be quickly lost or degraded. Climate change has the potential to increase erosion rates with hotter, drier conditions that make soils more susceptible to wind erosion, alongside heavy rain that can wash soil away.

Policy Context

4.3.107. The NPPF²⁰ states the following with regards to soil:

- *protecting and enhancing soils taking into account the value of best and most versatile agricultural land;*
- *preventing new or existing development from being 'adversely affected' by the presence of 'unacceptable levels' of soil pollution or land instability and be willing to remediate and mitigate 'despoiled, degraded, derelict, contaminated and unstable land, where appropriate'; and*
- *'encouraging the effective use of land' through the reuse of land which has been previously developed, 'provided that this is not of high environmental value'.*

Baseline Conditions

4.3.108. The West of England has a varied and diverse range of soil types, from brown earths on Limestone outcrops to poorly draining gleys on clays, which reflects the underlying influence of the complex geology.

4.3.109. Although the urban area covering the West of England is significant at over 21 per cent, much of the surrounding rural landscape is farmed. Agriculture is predominantly livestock rearing, with arable in the flatter land to the north-east, with larger field sizes and infrequent hedgerow trees. Valleys and steeper slopes in the south-east tend to have irregular fields and overgrown, species-rich hedges.

4.3.110. Rivers such as the Chew and Avon have carved gorges in the older, more resistant rocks, while those such as the Frome have formed wide, shallow valleys in the softer, younger ones. The rivers have been heavily modified in urban areas. The limestone-derived soils are predominantly brown rankers and argillic brown

4.3.111. earths. On the clays, poorly draining gleys are common, whereas the Coal Measure soils are more acidic. This variability in soil type is a result of the complex underlying geology and is reflected in the range of habitats that have developed and the opportunities for human land use.²¹ Maize fields are

²⁰ National Planning Policy Framework (2018), MHCLG

²¹ <http://www.mendiphillsaonb.org.uk/wp-content/uploads/2010/11/118-Bristol-AVR-final.pdf>

particularly prone to soil compaction and erosion. Compaction reduces rain infiltration that increases water run-off, and eroded soil contributes to sediment in river and drainage channels. In South-West England, where serious flooding has occurred in recent years, maize cultivation has increased, 75% of maize sites suffer from soil compaction, and up to half of river sediment may be soil eroded from maize fields.²²

B&NES

- 4.3.112. The main soils within the area are described below by reference to the main geological formations from which they are derived.
- 4.3.113. The main soil type derived from drift deposits of the Quaternary period is clayey with a high organic content. It typically results in poorly drained land and is traditionally under permanent grass used for summer grazing and hay. Within the West of England it is found mostly immediately south of Chew Valley Lake and around Hollow Marsh. It also occurs along parts of the Avon Valley.
- 4.3.114. There are two soil types particularly characteristic of the Jurassic formations. The first are shallow, well drained calcareous soils found on the Lias and Oolitic Limestone plateaux. They are used for cereals and grassland for dairy and stock rearing. The second are slowly permeable calcareous clayey soils. They are found on the slopes and often on locally irregular terrain. They are used for grassland for dairy and stock rearing and for winter cereals.
- 4.3.115. There are likewise two particularly characteristic soils on the Triassic formations. The first are the reddish loamy soils found in the area north of the Chew Valley Lake. The soils are used for cereal growing as well as potatoes and sugar beet and grassland. They include much of the highest grade agricultural land in B&NES. The second are the seasonally waterlogged fine loam clayey soils which are also reddish in colour and are found to the south-west of the Chew Valley Lake. The land is used for grassland for dairying and stock rearing as well as for winter cereals.
- 4.3.116. The two most characteristic soils on the Carboniferous formations are slowly permeable clayey soils and, on the Pennant Sandstone, well drained fine loamy soils such as at Temple Cloud²³.

North Somerset

- 4.3.117. Soils types and condition reflect the underlying geology of the area, and the effects of hydrology such as seasonal water logging. The soil type affects land use type and intensity, in particular the use of the land for different forms of agriculture at various periods in human history. In turn the interaction between the soil and land use affects the ability of the area to support different assemblages of natural vegetation.
- 4.3.118. There are four basic soil groups which cover most of North Somerset and these relate loosely to the underlying geology:

²² Committee on Climate Change, 2015, *Progress in Preparing for Climate Change - Report to Parliament*.

²³ <http://www.bathnes.gov.uk/sites/default/files/sitedocuments/Planning-and-Building-Control/Planning-Policy/Evidence-Base/Urban-Design-Landscape-and-Heritage/RuralLandscapesComplete.pdf>

- 4.3.119. *Lithomorphic soils*: these are found on the Carboniferous Limestone uplands and plateaus throughout the District including Broadfield Down, Bleadon Hill, Middle Hope and Worlebury Hill in the form of brown rankers, very shallow, loamy soils which are mostly humose and sometimes calcareous. While at Dundry Hill, where the underlying geology is Jurassic Lias and Oolite, there are brown rendzinas, shallow well drained brashy calcareous clayey soils. These soils are mainly given a grade 3 or 4 agricultural land classification and in North Somerset are used mainly for pastoral grassland and broadleaf woodland, with some arable at Dundry.
- 4.3.120. *Brown soils*: these soils are found over much of the land at intermediate height in the District, in the river valleys (away from the flood plain) and the lower slopes of the Limestone Ridges. On the Carboniferous Pennant Sandstone south of Nailsea and Old Red Sandstone around Failand there are typical brown earths, non-alluvial well drained loamy soils. Most of the river valleys and the lower slopes of the ridges have stagnogleyic argillic brown earths, reddish fine loamy over clayey soils with permeable subsoils and slight seasonal waterlogging. Around Felton there are typical paleo argillic brown earths, well drained fine silty soils over clayey soils. These soils are generally classified grade 1 or 2 with some areas of grade 3 in the agricultural land classification and are used primarily for pasture.
- 4.3.121. *Ground-water gley soils*: these soils are found throughout the level lowland moors areas to the west of the District and in the floodplains of the Rivers Lox Yeo, Yeo and Kenn. Soils over the moors are peaty-calcareous alluvial gley soils, deep stoneless mainly calcareous clayey soils while the floodplains have more mostly stoneless reddish clayey soils. These soils are affected by periodic waterlogging by a fluctuating groundwater table which is controlled to some extent by drainage ditches and pumps. These areas are predominantly grade 3 in the agricultural land classification and are generally permanent grasslands used mainly for cattle pasture.
- 4.3.122. *Peat soils*: these are found on the inland areas of the moors particularly Nailsea and Kenn Moor and in the southern end of the Gordano Valley. These organic soils are derived from partially decomposed plant remains accumulated under waterlogged conditions and the ones found in North Somerset area deep peat soils with earthy topsoil. The groundwater is controlled by ditches and pumps. These soils are generally classified grade 2, 3 or 4 in the agricultural land classification and are used primarily for pasture with some woodland in the Gordano Valley²⁴.
- Future trends
- 4.3.123. The pressure for growth in the West of England is likely to increase pressure on land, including greenfield land. In turn this is likely to contribute to incremental loss of soils as well as compaction, organic matter decline and erosion.

Key areas of concern for SEA

- 4.3.124. Transport can impact soil in the following ways:

- Pollution of soils from road run-off (e.g. de-icing salts, motor oil, metals from exhaust fumes);

²⁴ <https://www.n-somerset.gov.uk/wp-content/uploads/2017/02/ED17-North-Somerset-Landscape-Character-Assessment-supplementary-planning-document.pdf>

- Compaction and loss of productive soils from new transport-related infrastructure;
- Areas of hard-surfacing leading to increased surface water run-off causing erosion.
- Agricultural practices and new development is likely to have the greatest effect on the West of England's soil resource.

4.3.125. The Key areas of concern are likely to be locations which are under pressure from development as well as the areas of best and most versatile agricultural land and areas of lowland peat deposits which may be present in North Somerset. However, transport infrastructure which is built to support new development may have a notable cumulative impact in combination with other land use change. Due to the relative permanence and irreversibility of soil loss, the potential effect should be regarded as significant. It is therefore proposed to include an objective to guard against soil degradation.

WATER AND FLOODING

4.3.126. The quality of water in rivers, streams, rhynes and ditches can be affected by the construction of transport infrastructure as well as the use of transport. Pollution of watercourses can occur through the organic content of silt, other organic substances such as engine oil and rubber, de-icing salt, metals (mainly as a result of vehicle corrosion), and fertilisers and pesticides from roadside verge maintenance. In addition, there is the risk of occasional spillages of pollutants in the event of an accident. Pollutants can particularly accumulate during long dry spells and lead to highly polluting surface water run-off when it rains.

4.3.127. Transport infrastructure also has the potential to affect existing drainage patterns of water. For example, road construction and maintenance may affect water flows due to culverting of streams and ditches, gradient changes, bridges and embankments and watercourse diversion. Cuttings can cause dewatering through drawdown and there is increased road runoff from impermeable surfaces.

4.3.128. A further issue related to water and transport is the potential impact of flooding on transport infrastructure and vice versa. Floods can cause severance in low lying areas where they cut-off transport routes. The impermeable nature of road and car park surfaces increases the rate of water run-off to receiving watercourses and therefore would contribute to flooding high rainfall events.

4.3.129. Sustainable Drainage Systems (SuDS) aim to control surface water runoff as close to its origin as possible, before it is discharged to run over the surface, into a watercourse or sewer. This involves moving away from traditional piped drainage systems towards softer engineering solutions which seek to mimic natural drainage regimes.

Policy Context

4.3.130. The Water Environment (Water Framework Directive – WFD) (England and Wales) Regulations, which came into force in 2017, establishes a legislative framework for the protection of surface waters (including rivers, lakes, transitional waters and coastal waters) and groundwater. In addition, the NPPF (2018) aims to prevent new development from contributing to, or being put at unacceptable risk from water pollution.

4.3.131. The Defra 25-Year Environment Plan aims to achieve clean and plentiful water by improving at least three quarters of UK waters to be close to their natural state as soon as is practicable by:

reducing the damaging abstraction of water from rivers and groundwater, ensuring that by 2021 the proportion of water bodies with enough water to support environmental standards increases from 82% to 90% for surface water bodies and from 72% to 77% for groundwater bodies;

reaching or exceeding objectives for rivers, lakes, coastal and ground waters that are specially protected, whether for biodiversity or drinking water as per our River Basin Management Plans; supporting OFWAT's ambitions on leakage, minimising the amount of water lost through leakage year on year, with water companies expected to reduce leakage by at least an average of 15% by 2025; and

minimising by 2030 the harmful bacteria in our designated bathing waters and continuing to improve the cleanliness of our waters; we will make sure that potential bathers are warned of any short-term pollution risks.

- 4.3.132. Several documents have been produced by the Environment Agency and Defra to protect groundwater and prevent groundwater pollution. Environmental permits are required for certain activities to prevent groundwater pollution²⁵.

Baseline Conditions

- 4.3.133. Wessex Water identifies in its Water Resources Management Plan (June 2010) two unused abstraction licences at Newton Meadows and Monkton Combe that may be invested in, in the future. They are implementing sustainable reduction in abstractions in the Malmesbury area and on the Hampshire Avon, outside of this catchment abstraction management strategy area but used to supply water into this catchment.
- 4.3.134. The South West had the most ambitious improvement targets in the country, which was to get 43% of our 1,100 waterbodies into good ecological status by 2015 (*Environment Agency, 2012*). In addition to this, the Severn River Basin District RBMP (River Basin Management Plan) was prepared in compliance with the WFD (England and Wales) Regulations.
- 4.3.135. The South West Regional Flood Risk Appraisal (2007) provides an overview of the baseline flood risk, including for the West of England.
- 4.3.136. The West of England is the focus of substantial growth. Significant and growing population centres such as Weston-super-Mare lie within the coastal floodplain and many people already live within defended areas subject to residual flood risks. Land allocations in this area must be sited and designed to avoid, and if this is not possible, minimise these risks. As sea levels rise investment in existing infrastructure will be necessary to maintain existing levels of protection from flooding.
- 4.3.137. Substantial coastal flood risks are a characteristic of this sub region. Avonmouth, Severnside and Royal Portbury Docks are highlighted as requiring investment in coastal defences in order to realise the economic potential of these areas. South Gloucestershire Council, Bristol City Council and the Environment Agency are working together on the Avonmouth Severnside Enterprise Area (ASEA) Ecology Mitigation and Flood Defence Project to improve flood defences and create new habitats for wildlife in the Avonmouth Severnside area.
- 4.3.138. There are significant flood risks in Weston-super-Mare, Bristol and Avonmouth, where property is at risk from tidal and fluvial flooding. Surface water drainage is also affected by tide locking at high

²⁵ <https://www.gov.uk/government/collections/groundwater-protection>

tides. There is however significant tidal and fluvial flood risk management infrastructure in much of the West of England sub-region²⁶. The infrastructure is managed by several Risk Management Authorities, including the Environment Agency, Lead local Flood Authorities, water companies and Network Rail.

- 4.3.139. The existing fluvial flood risk to Weston-super-Mare was quantified through a partnership flood study (the Weston Vision), which identified existing flood risk and the necessary mitigation, forming part of the new development strategy. The study addressed the necessary flood risk management infrastructure requirement for the Weston regeneration scheme being delivered through the Weston Vision. All new flood risk management infrastructure will be provided by the new development, particularly at Weston town centre and the Weston Villages developments.
- 4.3.140. There are major flood management issues associated with redevelopment opportunities along the tidal reaches of the River Avon and within Bristol's Floating Harbour. There are also major proposals to develop areas within the city of Bath adjacent to the River Avon. These sites will need substantial fluvial flood mitigation measures in order to bring them forward for development. Further mixed-use development has been proposed in the River Avon corridor as a consequence of limited development opportunities elsewhere in the city.
- 4.3.141. As informed by the Environment Agency (see consultation response to the SEA Scoping Report in Appendix B), the tidal flood defences, which reduce flood risk to Avonmouth and Severnside, provide a varying level of protection with some low spots and informal de facto defences, together with higher formal defences. An appraisal has been underway since 2016 to identify and agree a new scheme to reduce flood risk to a 1 in a 200-year standard, with an allowance for climate change for at least 60 years. While the area is currently protected from flooding by formal and informal flood defences, in addition to surface water drainage infrastructure, the ongoing development of the ASEA is dependent on the improvement of tidal flood defences and effective drainage from the development area. It is important to note that, notwithstanding the flood defences, there remains a residual risk of flooding in extreme events or as a result of defence failure. Flood incident management is provided in the form of flood warnings to properties in Bristol, Weston-super-Mare, Severn Beach and Area of Search F to the East of Weston-super-Mare. There are Major Incident Plans containing 23 specific arrangements for warning the public in areas particularly susceptible to flooding in Bath, areas of Bristol, Weston-super-Mare and Uphill.
- 4.3.142. The UKCP09 climate change projections predict the western side of the UK to experience the biggest changes in precipitation in winter in the UK, increases up to +33%(+9 to +70%)²⁷.

²⁶ http://www.southwest-ra.gov.uk/media/SWRA/RSS%20Documents/Technical%20Documents/Technical%20Work/Flood%20Risk/Final_Regional_Flood_Risk_Appraisal.pdf

²⁷ <http://ukclimateprojections.metoffice.gov.uk/media.jsp?mediaid=87867&filetype=pdf>

4.3.143. More information (including flood risk mapping) is available in the South West Regional Flood Risk Appraisal²⁸.

Additional information - Bristol City

4.3.144. The indicators reflect general water quality which can deteriorate significantly after rainfall and may be inferior in some places where there are problems with drainage or historical landfill. Measurements are taken monthly and the findings are reported using the past three years' data. This process generally takes place at the beginning of the calendar year.

4.3.145. Bristol's classification tool is a locally derived quality assessment based on the WFD's classification system. Local water framework directive classifications derived using council data at sample sites within Bristol show 100% of water courses in the city to be of moderate quality and 24% of the Bristol Avon catchment is classified as having 'good ecological status'.²⁹ The classifications are a measure of general ecological water quality along the length of the river.

Additional information - B&NES

4.3.146. The River Avon enters the district at Dundas Aqueduct to the east of Bath and leaves west of Keynsham. B&NES has a large number of water courses and tributaries, including the Bybrook, the Frome, the Mells, the Somer, The Chew, The Boyd, the Newton and the Sistor.

4.3.147. Further, the City of Bath is located directly above three natural hot springs which have been, and continue to be, at the centre of economic, social and cultural developments in the City.

Key areas of concern for SEA

4.3.148. The quality of water in rivers, streams, rhynes and ditches can be affected by the construction of transport infrastructure as well as its operation. Pollution of watercourses can occur through the organic content of silt, other organic substances such as engine oil and rubber, de-icing salt, metals (mainly as a result of vehicle corrosion), and fertilisers and pesticides from roadside verge maintenance. In addition, there is the risk of occasional spillages of pollutants in the event of an accident. Pollutants can particularly accumulate during long dry spells and lead to highly polluting surface water run-off when it rains. Through their Scoping Consultation response, Natural England noted that: *"Water quality will also be a particularly important consideration in relation to new road infrastructure associated with the North Somerset SDLs. This low lying area is bisected by complex drainage systems and pollution from surface water run-off from Nailsea is having an adverse impact Tickenham, Nailsea & Kenn Moors SSSI".*

4.3.149. The predicted increase in flooding events, related to climate change, is however an area of significant concern. Although it is assumed that any new infrastructure proposed as part of the

²⁸ http://www.southwest-ra.gov.uk/media/SWRA/RSS%20Documents/Technical%20Documents/Technical%20Work/Flood%20Risk/Final_Regional_Flood_Risk_Appraisal.pdf

²⁹ Bristol Avon Catchment Plan 2016 <https://www.wessexwater.co.uk/bristolavon/>

JLTP4 will be required to include best practice drainage designs and mitigation to ensure that pollution from transport is controlled and run-off rates from the infrastructure are managed to avoid increased risk of flooding, potential effects on water quality and the potential effect of increased flood incidents on the transport network within the JLTP4's influence are considered in the SEA.

MATERIAL ASSETS

4.3.150. The term “material assets” is not defined in the SEA Directive. For the purposes of this SEA the term is being used in relation to the consumption of natural resources and the generation of waste. Waste is included as it is an indicator of the inefficient use of resources.

Policy Context

4.3.151. The aim of European, national and regional policy is to move waste management practices away from landfill by reducing waste production and adopting waste management methods which focus on resource recovery, together with a requirement to manage and dispose of waste near to its point of origin.

4.3.152. The four authorities in the West of England worked together to produce a Joint Waste Core Strategy (JWCS) to set out policies, which will help planners make decisions about where major waste facilities should be located.

4.3.153. The vision of the JWCS is as follows:

“By 2026 the West of England will be resource efficient with waste generation minimised, in line with the waste hierarchy, and operating a waste management infrastructure, with sufficient capacity to deal with the amount of waste generated in the West of England. The needs of the West of England to enable sustainable economic growth will be met, whilst ensuring the protection of the natural, and historic environment which are its most distinctive and unique assets.”

Baseline Conditions

4.3.154. The Ecological Footprint, as reported in the South West Observatory's “State of the South West”³⁰ shows that if everyone on the planet consumed natural resources and energy like the average South West resident, it would take three planets to support us. This clearly shows that we are living beyond environmental limits. The South West eco-footprint is 5.24 global hectares (gha), well-above the world average of 2.2 gha and our 'fair share' of 1.8 gha. Travel is listed as being responsible for 17% of our ecofootprint which is currently above the national average.

4.3.155. The JWCS identified that within the West of England approximately half of all municipal, commercial and industrial waste was sent to landfill each year, much of this transported outside of the sub-region. Existing sites within the plan area have only a limited capacity and life time; based on recent rates of landfill, capacity would be exhausted by 2014.

4.3.156. The West of England generates about 540,000 tonnes of municipal waste each year. In 2014/15 53% of this waste was recycled and composted. The remaining 47% was sent to landfill for disposal,

³⁰ State of the South West 2009, South West Observatory

principally exported to facilities in the neighbouring counties of Gloucestershire and Somerset. Some municipal waste has historically travelled by train to landfills in Buckinghamshire.

Future trends

- 4.3.157. The increasing cost of landfill due to European legislation (and associated fines) is likely to mean rates of recovery and recycling will increase. There is an increased trend towards using recycled materials in construction and construction waste is becoming better managed through the use of Site Waste Management Plans.
- 4.3.158. However, the projected population growth for the sub-region is likely to result in increased rates of building (potentially generating greater volumes of construction waste) as well as generating greater amounts of municipal waste that would require treatment.
- 4.3.159. The locational policies with the Core Strategies seek to direct population growth and services to the Strategically Significant Cities and Towns in order to reduce travel requirements for employment and services. However, there is no clear evidence of behavioural change on the part of individuals that would indicate a reduction in resource consumption.

Key areas of concern for SEA

- 4.3.160. The JLTP4 will need to consider how it can help to minimise waste production and resource consumption. Since the location of waste treatment facilities is to be linked to the requirements of the JWCS it is assumed that they will be easily accessible. Therefore, it is proposed that the scope of assessment focuses on how prudently the JLTP4 makes use of resources. The need to adapt the transport network to climate change may require additional construction activities and therefore increase consumption of resources.
- 4.3.161. The evidence that the ecological footprint due to travel in the South West is greater than the national average is a key area of concern. This is linked to the fact that in general the South West is quite rural in nature. Within the West of England, there is of course a significant urban concentration but it also has its rural locations which will need to be considered in terms of resource efficient transport.

CULTURAL HERITAGE

- 4.3.162. The term 'cultural heritage' covers buried archaeological remains, scheduled monuments, historic parks and gardens, the historic landscape including hedgerows and other land boundaries, buildings of historical significance and towns and villages and industrial features.
- 4.3.163. Pressures on the historic environment vary enormously. In the countryside, areas might be affected by falling farm incomes, changes in the nature of Government and European funding regimes, or massive demand for new housing and tourism. Some towns and cities have suffered long-term decline and now face major re-development pressures to adapt to changes in Britain's economy. Former industrial areas that might be of considerable historic interest are often being identified as brown-field sites ideal for new housing or mixed used development. Churches (the largest single group of listed buildings) and other places of worship often struggle with the consequences of falling congregations. Some become redundant and face demolition or new use.

4.3.164. There are various ways in which transport and its associated infrastructure can impact on cultural heritage. English Heritage's 'Streets for All'³¹ report has specific guidelines intended to minimise harmful impacts and improve positive impacts. These relate to ground surfaces, street furniture, environmental improvements and street management.

4.3.165. The West of England is rich in archaeological sites, monuments and historic landscapes. Its archaeological features span all periods of human activity from earliest prehistoric times to the present day.

Policy Context

4.3.166. Key messages from the NPPF (2018) include:

- Heritage assets should be recognised as an 'irreplaceable resource' that should be conserved in a 'manner appropriate to their significance', taking account of 'the wider social, cultural, economic and environmental benefits' of conservation, whilst also recognising the positive contribution new development can make to local character and distinctiveness;
- Set out a 'positive strategy' for the 'conservation and enjoyment of the historic environment', including those heritage assets that are most at risk; and
- Contain a clear strategy for enhancing the built and historic environment.

Bristol City

4.3.167. Bristol has a fine and historically rich built environment, including:

- 33 conservation areas;
- Over 90 historic parks and gardens; and
- 4,137 listed buildings.

4.3.168. There are 9 listed buildings within the administrative boundary of BCC on the Historic England heritage at risk register. In addition, there are 4 places of worship, 4 archaeology entries and 1 conservation area. Whilst the Historic England list is concerned with buildings and sites of clearly national significance, the council has a local list that provides the opportunity to identify those features of the local scene that are particularly valued by communities as distinctive elements of the local historic environment.

4.3.169. Both the risk registers now refer to 'heritage at risk' which also includes Scheduled Ancient Monuments and Conservation Areas. This increases the number to 50 heritage assets on the Bristol 'at risk' register.

4.3.170. A review of the City's conservation areas has taken place through the production of character appraisals and a set of management proposals for each area. Seventeen character appraisals have been adopted, with an eighteenth close to adoption. Conservation area enhancement statements exist for the remaining areas.

³¹ English Heritage (2018) Streets for All: Advice for Highway and Public Realm Works in Historic Places

B&NES

4.3.171. Bath was designated as a World Heritage site in 1987, there are also 37 Conservation Areas, 11 Historic Parks and Gardens, 84 scheduled Ancient Monuments and approximately 6,400 listed buildings and structures in B&NES (of which 5,000 lie within the City of Bath). Of the heritage assets in the district, there are 3 conservation areas, 8 Scheduled Monuments, grade I / II* listed buildings entries on the national heritage at risk register.

4.3.172. The area which was formerly part of the Somerset coalfield retains a rich industrial heritage and there is significant historical value at the nationally important nearby Roman settlement of Traiectus. Considerable archaeological potential within the town and on the former Abbey lands, while the town centre of Keynsham has many historic buildings but many of the old shops were replaced with modern units in the 1960s and 1970s and the High Street lacks vibrancy and coherence as a result.

North Somerset

4.3.173. North Somerset has:

- 36 Conservation Areas;
- 1,074 Listed Buildings;
- 66 Scheduled Monuments;
- 8 Registered parks and gardens; and
- 58 Unregistered parks and gardens.

4.3.174. Eleven sites within the district are on the Heritage at Risk Register 2016. Four of these sites are Conservation Areas, five are Listed Buildings and two sites are Scheduled Monuments.

4.3.175. The built heritage and historic landscapes of North Somerset range from palaeoenvironmental deposits to prehistoric hillforts, Roman, Saxon and medieval settlement and the industrial archaeology of Nailsea.

South Gloucestershire

4.3.176. South Gloucestershire possesses a diverse heritage, ranging from the lowland waterlogged landscapes of the Severn Levels, through the coalfields of north Bristol to the prominent and often exposed archaeology of the Cotswolds, interspersed by areas of rural, semirural/ urban and urban settlement. Its archaeology ranges from palaeoenvironmental deposits to prehistoric hillforts, Roman towns, Saxon burial grounds, medieval planned settlement and nationally significant historic mining.

4.3.177. Assets include:

- 37 Scheduled Ancient Monuments;
- 8 Registered Historic Parks and Gardens;
- 1 Registered Battlefields (part);
- c. 2,000 Listed buildings; and
- 30 Conservation Areas.

Key areas of concern for SEA

4.3.178. The protection of Bath as an internationally valued site is a key area of concern. The World Heritage Site Management Plan, which was issued in 2004, aims to help coordinate management of the site to ensure that the heritage is protected for future generations and works in harmony with the dynamic modern city of Bath. The plan sets out a number of issues concerning management of the

site and lists objectives and actions to guide the work of those managing the site. The plan includes a section on access and states that access is “one of the most challenging areas in the Management Plan and one of the most difficult to resolve”. The management plan states that “At present traffic intrudes on the enjoyment of the World Heritage Site, inhibits free movement of pedestrians throughout the city and causes air and noise pollution.

- 4.3.179. Air pollution and the weight and vibration of the vehicles are all threats to the historic buildings, townscape and landscape”. B&NES Council produced a Bath Public Realm & Movement Strategy³² in 2010. This supplementary planning document seeks to deal with the issue of access within the World Heritage city. The JLP4 should complement the strategy. Balancing the access requirements within Bath whilst not causing unacceptable detriment to other locations will be a key issue for the JLP4. As well as the physical impacts of traffic and the impacts of air pollution, ground surfaces and the appropriate level of ‘street furniture’ will also be a key consideration for minimising negative impacts and enhancing positive ones.
- 4.3.180. Another key issue is how the JLP4 responds to the likely increased demands on transport from a growing population whilst not compromising the local distinctiveness of the historic environment and assets that make the West of England attractive for residents and tourists alike

LANDSCAPE AND TOWNSCAPE/BUILT ENVIRONMENT

- 4.3.181. The JLP4 has significant potential to impact on the landscape and townscape of the West of England. This could happen through:
- road or railway improvements and direct land take, leading to visual and/or biodiversity impacts infrastructure construction works affecting the water table and overall appearance and biodiversity value of the landscape;
 - impacts of air pollution on historic buildings; and
 - increased light pollution from transport infrastructure.
- 4.3.182. Even if JLP4 schemes and measures as a whole are not expected to have any significant effects on landscape or townscape, subsequent infrastructure maintenance practices can have an effect, for example through:
- maintaining historic road surfaces such as cobbles in towns; and
 - verge maintenance and hedge trimming regimes can have an impact on ecosystems, such as flower-rich grassland and ancient hedgerows and veteran trees.

Policy Context

- 4.3.183. Key messages from the NPPF (2018) include:
- protect and enhance valued landscapes;
 - considerable weight should be given to conserving landscape and scenic beauty in AONB, which have the highest status of protection in relation to landscape and scenic beauty;⁷⁰ and

³² Bath Public Realm and Movement Strategy 2010 <http://www.bathnes.gov.uk/services/planning-and-building-control/major-projects/public-realm-and-movement/public-realm-movement>

- consider the effects of climate change in the long term, including in terms of landscape and adopt 'proactive strategies' to manage risks including well planned green infrastructure.

Baseline Conditions

- 4.3.184. The West of England has a number of statutory and non-statutory landscape designations for the West of England, including Green Belt, AONBs, Bath World Heritage Site and the Forest of Avon.
- 4.3.185. The West of England has a significant area designated as Green Belt land. The Bristol/Bath Green Belt was designated in 1966 in the Gloucestershire and Somerset County Development Plans. The former Avon area includes 60,760 hectares of designated Green Belt land, over 57% of the total Green Belt designated for the whole South West. 21,440 hectares of this is within the B&NES area (61 % of the B&NES area).

Bristol City

- 4.3.186. Bristol contains a range of urban landscape features, Prominent Green Hillside, Gorges, Step Sided Valleys, Ridges, Severnside Rhines and Promontories. These will be considered in the assessment process. Overarching policy BCS9 sets out a strategy for protection and enhancement of green assets with landscape value. Policy DM17 'Development Involving Existing Green Infrastructure' sets out the approach to Bristol's 'Urban Landscapes'.

B&NES

- 4.3.187. Bath & North East Somerset has a rich and diverse range of landscapes. Some landscapes in the district, like the Cotswolds and Mendip Hills, are recognised as being of national importance and are granted the status of AONB.
- 4.3.188. The City of Bath World Heritage Setting recognises the importance of the distinctive landscape setting of Bath in a bowl formed by the River Avon valley as it cuts through the Cotswolds.
- 4.3.189. Each landscape is closely related to the evolution of agriculture, communications, industry and settlement. Although some landscapes are defined by physical appearance and activities occurring within them, others are valued for their levels of tranquillity. All are living working landscapes and as such they change and develop according to the demands placed upon them.
- 4.3.190. Bath has a distinctive townscape in the way that buildings respond to the distinct topography. Many buildings and terraces follow contours, often overlooking open ground and panoramic views. The character of Keynsham, Norton-Radstock and the villages are enriched and partly defined by the landscapes which surround and in some cases penetrate the built up areas.
- 4.3.191. There are two (AONBs, the Mendip Hills and Cotswolds AONBs; two significant waterways, the River Avon and the Kennet and Avon Canal; the Chew Valley and Blagdon Lakes are important landscape features and resources for recreational uses; while the Chew Valley Lake is also an important landscape feature and wildlife habitat within the Mendip Hills AONB.

North Somerset

- 4.3.192. North Somerset has a highly varied landscape. The North Somerset Landscape Character Assessment, adopted in 2005, indicates that the District contains sections of four National Character Areas: Bristol, Avon Valleys and Ridges, Severn and Avon Vales, Mendip Hills and Somerset Levels and Moors.

- 4.3.193. These labels provide a broad indication of the landscapes of the District which range from the carboniferous limestone uplands of the Mendips to the level, wet pasturelands of the levels and moors. The significance of the landscape of the Mendip Hills is acknowledged by their designation as an Area of Outstanding Natural Beauty.
- 4.3.194. The North Somerset Landscape Character Assessment states that the District is characterised by a diversity of landscapes and these variations and differences are represented by 11 landscape types; e.g. Moors, and River Flood Plain. These have a distinct character with similar physical and cultural attributes, including geology, landform, land cover and historical evolution. The landscape types are further sub-divided into component landscape character areas; e.g. Clapton Moor and Lox Yeo River Flood Plain. The assessment identifies the characteristics of the landscape character areas and the forces for change affecting them.

South Gloucestershire

- 4.3.195. The South Gloucestershire area has a predominantly rural and agricultural landscape, greatly influenced by large-scale scarp, ridges, vales, levels and estuary landforms, overlain by a variety of land cover, in places comprising unique natural or historic features. The landscapes of South Gloucestershire have many contrasts, ranging from the Cotswolds Area of Outstanding Natural Beauty (which covers 11,828 hectares or 22% of the land area in South Gloucestershire), to the urban landscape within the edge of Bristol. Here the landscape is undergoing significant change, with large areas of new residential and commercial development, such as Cribbs/Patchway, Harry Stoke, and Emersons Green, as well as the large retail and commercial development at Cribbs Causeway.
- 4.3.196. The Council published the South Gloucestershire Landscape Character Area Supplementary Planning Document in 2005. This provides a statement of the existing character of the landscapes of the district and their distinctive attributes and features, subdividing the district into eight character types and 21 landscape areas. It also contains an assessment of the present condition of the landscape, recent and potential future changes including land use/management and built development and the sensitivity of the landscape to future change. This SPD was refreshed in 2013 and the revised document was adopted in November 2014.

Future trends

- 4.3.197. In the West of England the following trends have been observed with regards to landscape and townscape:
- there has been a gradual decline in tranquillity and increase in light pollution; and
 - air pollution has steadily increased in Bath and could continue to threaten historic buildings in the city. Air pollution could also threaten historic buildings in Bristol.
- 4.3.198. These trends are projected to continue as predicted population growth is expected to put further development pressure on the landscapes and townscapes of the West of England.

Key areas of concern for SEA

- 4.3.199. As discussed in the Cultural Heritage section of this report, the historic landscape, including historic listed buildings, is under threat from air pollution from vehicles.
- 4.3.200. Any new transport infrastructure or expansion of existing infrastructure could have significant effects on the natural landscape, either through land take, visual intrusion or through light pollution and loss

or tranquillity. Transport infrastructure can also incorporate inappropriate signage, lighting columns, road surfaces and other harmful impacts on the landscape if not carefully managed.

- 4.3.201. The AONBs are particularly sensitive to such impacts and the impacts of development and transport infrastructure is listed as a central theme in the Cotswolds AONB Management Plan. According to the Management Plan this is due to increasing prosperity for some, leading to increased air travel and outdoor leisure pursuits, increased demand for improved journey times and development in the area; 'the towns and cities of Swindon, Bath, Keynsham, Yate, Gloucester, Cheltenham, Evesham, Banbury, Oxford and Chippenham which surround the AONB are all expected to accommodate significant housing and employment development in the next 20 years.' For other AONBs, such as the Chilterns AONB, there are targeted guidelines for managing highways to reduce harmful landscape impacts.
- 4.3.202. Transport can play an important part in improving the general public's access to areas of high landscape and biodiversity value. If managed correctly this can improve health via increased participation in cycling and walking.

4.4. ENVIRONMENTAL ASSESSMENT FRAMEWORK

- 4.4.1. This section sets out the Environmental Assessment Framework which will be used in the assessment process.
- 4.4.2. While not specifically required by the SEA Regulations, sustainability objectives are a recognised way of considering the environmental effects of a plan or programme and comparing the effects of alternatives. The objectives are developed using the sustainability issues identified in a review of the policy context and baseline during the scoping stage.
- 4.4.3. Table 4 below sets out the SEA objectives and assessment criteria identified through the scoping exercise. Possible interactions were identified using a * symbol. In the SEA, these interactions are further assessed using the methodology outlined in section 5.

Table 4 Proposed SEA Objectives and Assessment Criteria

SEA objective	SEA Topic	Draft JLTP4 Objectives (abridged)					Criteria to consider
		Support sustainable economic growth	Enable equality and improve accessibility	Address poor air quality and climate change	Contribute to better health, wellbeing, safety and	Create better places	
1. Improve accessibility for a growing and ageing population	Human health, population	*	*		*	*	Will the JLTP4 in combination with other plans result in changed overall provision of public and community transport? Are population growth points linked to services and employment centres via sustainable transport?
2. Reduce transport related air pollution	Human health, air quality, climatic factors, soil, biodiversity, water	*		*	*	*	Will the JLTP4 in combination with other plans result in changes of traffic flow or the composition of traffic (such as increases in heavy goods vehicles) which would indicate increases or decreases in air quality? Would the JLTP4 result in freer flowing traffic and reduced incidents of congestion?
3. Reduce transport related carbon emissions in line with national targets	Climatic factors, human health, air quality			*	*	*	Will the JLTP4 in combination with other plans result in changes to the predicted CO ₂ emissions from transport through changes in traffic volumes, a shift to low carbon transport modes or more efficient travel options?

4. Adapt transport network to effects of climate change and minimise the vulnerability of transport network to flood risk	Material assets, Climatic factors	*	*	*	*		<p>Does the JLTP4 promote infrastructure and transport systems that are adaptable to flooding?</p> <p>Would the JLTP4 result in key infrastructure in locations associated with predicted increased flood risk?</p>
5. Protect and enhance biodiversity and ecological networks'	Biodiversity, flora and fauna			*	*	*	<p>Would the JLTP4 in combination with other plans result in damage to, fragmentation or loss of existing designated wildlife sites, wildlife corridors (such as hedgerows) and habitats?</p> <p>Would the JLTP4 ensure current ecological networks are not compromised, and future improvements in habitat connectivity are not prejudiced?</p> <p>Would the JLTP4 in combination with other plans result in changes in the levels of road kill?</p>
6. Promote Human health	Human health, population, air quality, climatic factors	*	*	*	*	*	<p>Does the JLTP4, in combination with other plans, provide alternatives to the car and actively promote the benefits of these modes to encourage more physically active travel?</p>
7. Improve road safety, particularly for vulnerable users, and to reduce road casualties	Human health, population	*			*	*	<p>Does the JLTP4, in combination with other plans, serve to reduce the likelihood of accidents?</p>

8. Minimise adverse effects on soils such as loss, compaction, erosion and pollution from transport-related activities.	Soil, biodiversity, water, landscape	*		*	*	*	<p>Would the JLTP4 in combination with other plans require or encourage new infrastructure development on previously undeveloped or greenfield land? This could indicate loss of agriculturally productive soils, and/or soils acting as a carbon store.</p> <p>Require or encourage new infrastructure development on previously developed land? This could indicate prudent use of land and remediation of soils.</p>
9. Protect, and where possible improve, water quality'	Water	*			*	*	<p>Would the JLTP4 (in combination with other plans):</p> <ul style="list-style-type: none"> Promote infrastructure and systems that may adversely affect water quality? Promote infrastructure and systems that may provide opportunities to improve water quality?
10. Minimise waste produced and resources consumed by transport infrastructure and operation of transport services	Material assets, Climatic factors	*		*			<p>Does the JLTP4 make prudent use of natural resources?</p> <p>Would the JLTP4 in combination with other plans result in significant demolition of existing assets?</p>
11. Protect and where appropriate, enhance the rich diversity of the historical and cultural environment, its heritage assets and their settings	Cultural heritage, landscape, soil	*			*	*	<p>Would the JLTP4 (in combination with other plans) avoid harm to the significance of the West of England's historic environment, heritage assets, historic places, streets and spaces?</p>

12. Maintain and enhance the quality of the built environment and landscape	Cultural heritage, landscape/ townscape	*			*	*	<p>Would the JLTP4 in combination with other plans:</p> <ul style="list-style-type: none"> • Reduce pressure from congestion in key areas of built heritage and cultural interest? • Enable sustainable access to key areas of built heritage and cultural interest? • Cause adverse visual intrusion in notable areas of locally distinctive landscape and townscape? • Relieve intrusion or noise disturbance from existing areas of high landscape value?
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5. STRATEGIC ENVIRONMENTAL ASSESSMENT

5.1. INTRODUCTION

5.1.1. This section presents the findings of the assessment covering two key areas:

- The strategic alternatives considered in developing the JLTP4; and
- The policies and interventions proposed in the JLTP4.

5.1.2. Mitigation and enhancement measures for negative or positive significant effects are set out below in section 5.8.

5.2. ALTERNATIVES

5.2.1. The SEA Regulations require an assessment of the plan and its “reasonable alternatives”. In order to assess reasonable alternatives, different options for delivering strategic level transport across the West of England were developed and assessed against the established SEA objectives and environmental baseline.

JLTP4 SCENARIO

5.2.2. This situation considers the development and eventual adoption of the policies contained in the JLTP4. Further information is provided in section 2 above.

RETENTION OF JLTP3 SCENARIO

5.2.3. This scenario represents a continuation of existing policies planning principles and policies outlined in the JLTP3 document, with the accompanying Major Schemes programme and priorities packages with the plan period being extended to cover the period up until 2036. JLTP3 is based around the following key themes:

- Reducing carbon emissions
- Supporting economic growth
- Improving accessibility for all
- Safety, health and security; and
- Quality of life and the natural environment.

5.2.4. The following provides a summary of the key differences between the JLTP4 and JLTP3:

- JLTP4 comprises a more ambitious Major Schemes programme (i.e. investment of £8.9 billion up to 2036 compared to JLTP3 Major Scheme programme’s value of £600m up to 2026);
- Acknowledgement of the need to introduce charging mechanisms to manage network demand in the main urban areas (this could be workplace parking levy, road congestion charging, council tax increase, business rates increase);
- Strong focus on the need to embrace and develop cleaner technological advancements to improve air quality, e.g. electric vehicles, autonomous vehicles;
- Stronger emphasis on the importance and need to improve digital connectivity, particularly for rural/remote areas;
- JLTP4 draft document is split into levels of connectivity instead (Beyond West of England, Within West of England, Local connectivity, Neighbourhood connectivity) – JLTP3 split into delivery against five key goals and was mode based; and

- Although economic austerity and local government financial cutbacks are still a significant issue, the JLTP4 is being developed in a time where central Government are investing far more heavily in strategic transport bidding opportunities than in the JLTP3 plan development period (2010) when economic austerity was just beginning.

THE “WITHOUT PLAN” SCENARIO

- 5.2.5. This scenario assumes that the JLTP3 is completed with no replacement LTP in place, so no transport planning principles, policies or interventions would be in place. According to guidance³³ the “without the plan” scenario for a transport plan should be developed in line with the following principles:
- It is based on current Government policies;
 - It should assume that other adopted plans and programmes will deliver as planned;
 - It should assume the continued implementation of strategies and measures in earlier adopted versions of the plan;
 - It should not assume any new strategies or measures even if these appear to be essential in the light of current Government policies or of other plans and programmes.
- 5.2.6. The following are to be assumed for the “without the plan” scenario:
- JLTP 3 ceases to be in place. All policies no longer apply.
 - No strategic direction for transport or for promoting sustainable transport.
 - No new major scheme programme.
 - Bids for funding to the Department for Transport undermined with no overall transport strategy or programme.
 - Majority of the major schemes in JLTP4 do not happen.
 - Only major schemes mitigating JSP strategic development locations will happen if they can be funded but with no overall plan or programme
 - New major schemes will only emerge on an ad hoc basis as and when funding is available.
 - Individual council Local Plans and local transport plans e.g. Bath Transport Strategy and Bristol Transport Strategy will continue to exist with both including some transport elements.
 - Small scale local traffic management, cycling/pedestrian and road safety schemes will continue.
 - Substantially reduced funding for transport overall.
 - Increased car use.
 - Business case for bus services undermined by increased car use and fewer incentives to travel by bus with fewer major schemes for public transport.
- 5.2.7. The anticipated outcome of this scenario was outlined as follows in the JTS (2017) if no action is taken by 2036:
- Congestion costs of £800m;
 - Delays up 40%;

³³ DfT, April 2009, Strategic Environmental Assessment for Transport Plans and Programmes TAG Unit 2.11 “In draft guidance” p12.

- Vehicle trips up 26%;
- Time spent queuing up 74%;
- Journey time up 9%; and
- CO₂ emissions up 22%.

5.3. EQUALITY IMPACT ASSESSMENT FINDINGS

- 5.3.1. The EqIA (Appendix C) concluded that, overall, the JLTP4 should have a positive impact on the general public that are living, working or visiting the West of England by providing a safer, resilient, sustainable and convenient transport opportunities for the region. Some of the most vulnerable groups will particularly benefit, specifically:
- People with limited or no access to cars;
 - People with respiratory illnesses, and those more susceptible to poor air quality (children and young people and older people); and
 - People that require access to employment, education, health and/ or other services.
- 5.3.2. Although positive, the EqIA concluded that there still possible adverse impacts that would be felt by people who are reliant on the use of a car (such as people with a disability), particularly if charging is introduced, or those with limited mobility who are unable to participate in active travel (such as older people of people with a disability).

5.4. HEALTH IMPACT ASSESSMENT FINDINGS

Health Impact Assessment is a systematic approach to identifying the differential health and wellbeing impacts, both positive and negative, of projects and plans.

- 5.4.1. The following summarises the findings of the Health Impact Assessment (Appendix D). The single greatest potential health outcome of the draft Joint Local Transport Plan has been assessed as the indirect health benefits from improved access to, and accessibility of, transport options. These benefits have been assessed as being of long-term, permanent, major benefit for all groups. In addition, the proposed development has been assessed as providing indirect health benefits as a consequence of improving air quality in urban areas, encouraging greater physical activity through active travel, and providing economic and employment benefits in the region.
- 5.4.2. In contrast to the beneficial impacts above, the draft Joint Local Plan has been assessed as potentially contributing to adverse health outcomes as a consequence of potential noise impacts. Potential moderate adverse health outcomes were predicted as a result of an unlikely reduction in traffic on transport networks despite improvements to the road networks and public transport provisions in the region. These potential adverse effects would be scheme and location specific and the implementation of mitigation measures associated with Policy N1 and / or the Environmental Impact Assessment process (where relevant) are likely to reduce their impact. These adverse health effects associated with noise are considered temporary, as improvements might be made through technological development.

5.5. ASSESSMENT OF JLTP4 POLICIES AND INTERVENTIONS

- 5.5.1. Appendix F comprises the matrices reporting the assessment of the JLTP4 policies and interventions against the SEA objectives set out in Table 4 above.

- 5.5.2. Generally, the certainty of the assessment has been assessed as being low to medium. The main reasons for this are listed below:
- Despite the strong commitment to shift journeys into cleaner and more sustainable transport modes, there are various degrees of uncertainty with regards to planned actions, programme and funding of some of the interventions;
 - There is uncertainty regarding whether improvements to the public transport system from the major schemes would be sufficient to counteract traffic growth and associated adverse environmental effects. The implications of removal of the Severn Crossing Toll are a key unknown;
 - Advanced technologies are currently in early development stages;
 - Uncertainty regarding the rate of climate change and the degree to which it will alter weather patterns in the medium and longer term;
 - Information from the HRA is required to better understand potential adverse effects on European designated sites;
 - Effects are likely to be both variable across the region and dependent upon proximity of the sensitive receptors to the road network; and
 - There are also uncertainties about route alignments as well as specific design details such as use of material and siting.
- 5.5.3. The combined effect of the predicted growth in the region with the various transport infrastructure schemes that may go ahead are likely to adversely affect biodiversity, soils and potentially water quality. This is also the case for potential effects on cultural and built environment. Mitigation / enhancement measures included as part of the design and implementation of the specific schemes may offset some of the adverse effects.

5.6. ASSESSMENT OF ALTERNATIVES

- 5.6.1. Appendix G comprises the Assessment of Alternatives against the SEA objectives set out in Table 4 above.
- 5.6.2. Generally, the continuation of JLTP3 scenario and JLTP4 scenario perform equally in SEA Objectives 1, 2, 4, 7, 8, 9 and 12. JLTP4 performs better against SEA Objectives 3 and 6, whilst Continuation of JLTP3 performs better against SEA Objectives 5, 10 and 11. The “Without Plan” performs worst against all the SEA objectives.

5.7. CUMULATIVE EFFECTS

- 5.7.1. The SEA Regulations require that cumulative effects are considered when identifying likely significant effects. Cumulative effects arise, for instance:
- Where several individual policies have a combined effect on an objective; or
 - Where several plans each have insignificant effects but together have a significant effect.
- 5.7.2. Cumulative effects within the JLTP4 are summarised in Table 5 by reporting the combined effects of all the proposed policies and interventions against each SEA Objective. Table 5. The assessment matrices located in Appendix AF have considered how the different elements of JLTP4 combine to affect the various environmental, social and economic elements identified in the sustainability objectives.

- 5.7.3. Being a JLTP being developed by four local authorities, the environmental assessment of the JLTP4 has an inherent cumulative aspect. Other plans considered of key relevance due to the potential for cumulative effects with JLTP4 are the West of England JSP; West of England Adopted Joint Waste Core Strategy 2011; the Local Air Quality Strategies; and the local transport plans and air quality strategies of neighbouring authorities.

Table 5 JLTP4 SEA Cumulative Effects with other Plans

Plan	Cumulative Impacts with JLTP4
West of England Joint Spatial Plan 2017	<p>The JLTP4 is intrinsically linked to the JSP. It includes a number of major transport schemes and infrastructure needed to support new development being brought forward by the JSP. The type of development involved in both plans will result in similar type of effects and in some locations, they will affect the same environmental and other assets. Cumulative effects are therefore expected from the implementation of these two plans.</p> <p>The JSP outlines that new development should be in locations which maximise the potential to reduce the need to travel, and maximise the opportunities to travel by sustainable, non-car modes, especially walking and cycling. This policy, along with the JLTP4 policy to encourage more sustainable transport modes will have a positive cumulative impact on reducing climate change impacts, as well as on improving accessibility for a growing and aging population and promoting human health. Climate change resilience will also be a key design consideration of all new development. This will also be the same for new transport infrastructure which may result in beneficial cumulative effects on this objective. New housing and employment developments outlined in the JSP, as well as transport improvements outlined in the JLTP4 may have a cumulative negative impact on biodiversity on cultural heritage, landscape and built environment.</p> <p>Although scheme design and the relevant consenting processes will provide opportunities to mitigate adverse effects and promote enhancements. Potential adverse effects and beneficial opportunities should be pursued through a coordinated and supportive approach between both Joint Plans.</p>
West of England Adopted Joint Waste Core Strategy 2011 (JWCS)	<p>A key objective of the JWCS is to reduce Greenhouse Gas emissions. For example, promoting the waste hierarchy can help reduce greenhouse gas emissions. This, coupled with policies within the JLTP4 to reduce carbon emissions (e.g increasing sustainable transport modes of transport), there may be a cumulative positive impact on reducing carbon emissions across the West of England. Additionally, objectives (within the JWCS) to increase energy efficacy will have a positive cumulative impact with the JLTP4 in reducing carbon emissions.</p> <p>The JWCS sees to ensure waste facilities are located with minimal impact on the strategic road network, encouraging waste</p>

	<p>to be managed as close to the point of origin as possible. This may have a positive cumulative impact on reducing congestion.</p> <p>The planned housing and economic growth in the sub region are likely to lead to increased road travel. The JLTP4 includes a number of measures to tackle this predicted increase, such as promotion of public transport. The JWCS is likely to reduce the need for waste transport, so making a positive contribution in the face of increasing road transport.</p> <p>There is the potential for a cumulative negative impact of these plans on biodiversity. New waste facilities can have negative impacts on biodiversity, mainly due to habitat fragmentation. New highways improvements can also have the same negative impact on biodiversity. Impacts of new waste facilities on biodiversity depend on site locations, however.</p> <p>Scheme design and the relevant consenting processes will provide opportunities to mitigate adverse effects and promote enhancements.</p>
Local Air Quality Strategies	<p>Bristol City Council and B&NES are currently developing “Clean Air Plans” in compliance with the Government’s National Air Quality Action Plan (2017). The plans are aimed at achieving NO₂ limits “in the shortest possible time” (by 2021 at the latest). The local authorities are responsible for developing innovative Clean Air Plans that will achieve statutory NO₂ limits in a way that best meets the need for their communities and local businesses. There is potential for beneficial cumulative effects between the JLPT4 and the local air quality strategies.</p>
Air Quality Strategies: Somerset Air Quality Strategy, 2018 Swindon Air Quality Needs Assessment, 2017 Air Quality Strategy for Wiltshire, 2011-2015	<p>The aims and objectives contained within these various air quality strategies, should have an overall positive cumulative impact on improving air quality. Strategic objectives within these strategies include improving existing air quality in AQMA’s, as well as reducing car journeys and promoting more sustainable modes of transport, such as cycling and walking.</p>
Gloucestershire’s Local Transport Plan 2015- 2031 Somerset’s Future Transport Plan 2011- 2026 Wiltshire Local Transport Plan 2011- 2026 Swindon Local Transport Plan 4	<p>The majority of the strategic aims within these Transport Plans align with those outlined in the JLTP4. These include the need to maintain and manage the highway network, deliver sustainable growth, enhance strategic connections, reduce emissions, improve road safety and improve accessibility.</p> <p>For example, a number of policies, across these four plans aim to reduce carbon emissions, and support a reduction in solo car use. There is a priority within all of these transport plans to increase the use of sustainable transport modes, such as walking, cycling and public transport, which will, cumulatively with the JLTP4, have a positive impact on reducing carbon emissions. A more integrated public transport network will also have a positive cumulative impact on reducing carbon emissions.</p>

	<p>Additionally, other local transport plans contain objectives to improve community health and wellbeing by providing better safety, security and health by reducing the risk of death, injury or illness arising from transport. This will result in a positive cumulative impact with the JLTP4 Policy to reduce the number and severity of casualties for all road users. A focus within all of the plans surrounding walking and cycling will have a cumulative positive impact on encouraging healthier lifestyles.</p> <p>Improvements to the existing network within Gloucestershire, Somerset, Wiltshire and Swindon can have a positive cumulative impact on transport efficiency, associability and connectivity.</p> <p>However, planned major transport schemes across Gloucestershire, Swindon, Wiltshire and Somerset may have a cumulative negative impact on biodiversity and cultural heritage assets. New road infrastructure could have negative impacts on biodiversity through loss and fragmentation of habitats. There may be negative impact on the historic environment through loss of unknown or undesignated assets as well as due to changes in setting of designated sites and historic landscapes.</p>
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- 5.7.4. As noted above and also referred to in section 2.3 above, the JLTP4 is intrinsically linked to the JSP. The type of development involved in both plans will result in similar type of effects and in some locations, they will affect the same environmental and other assets. Cumulative effects are therefore expected from the implementation of these two plans. A coordinated and supportive approach to mitigation and enhancement between the plans will assist with minimising the likelihood and scale of adverse effects and maximising potential benefits. The development and implementation of the WoE GI Plan has been identified as the environmental strategic framework to facilitate this.
- 5.7.5. The cumulative effect between the JLTP4 and the Local Air Quality Strategies of the WoE and those of the neighbouring authorities have been assessed as being beneficial. A combination of both adverse and beneficial effects is expected as a result of the JLTP4 in combination with the WoE Adopted JWCS 2011 and the local transport plans of the neighbouring authorities. Scheme design and the relevant consenting processes will provide opportunities to mitigate adverse effects and promote enhancements.
- 5.7.6. Further information on mitigation is provided in section 5.8 below.

5.8. MITIGATION

- 5.8.1. The SEA Regulations require that mitigation measures are considered to prevent, reduce or offset any significant adverse effects on the environment of implementing the plan. The measures are known as 'mitigation' measures.
- 5.8.2. The guidance states that mitigation measures include both proactive avoidance of adverse effects and actions taken after potential effects are identified. Table 6 below provides a summary of the potential significant effects identified through the SEA process and proposed mitigation measures.

Table 6 JLTP SEA Potential Significant Effects and Proposed Mitigation

SEA OBJECTIVE (SEAO)	POTENTIAL SIGNIFICANT EFFECTS	MITIGATION
SEAO 1: 'Improve accessibility for a growing and aging population'	Most of the policies and interventions included in the JLTP4 aim at improving accessibility which aligns with this SEA Objective resulting in likely long term major beneficial effects.	<p>There is a need to ensure that services and employment or education opportunities are accessible by those with limited mobility. Charging should not result in creating a barrier to employment or education opportunities, particularly for those who are unemployed or on low income.</p> <p>Strategic and major schemes will be delivered through the appropriate consenting process and will need to be subject to assessments including health and equalities assessments. Detailed mitigation and enhancement opportunities will be developed as part of the design and consenting process.</p>
SEAO 2: Reduce transport related air pollution'	<p>Many of the policies and interventions within JLTP4 have the potential to reduce traffic congestion and associated air pollution. Major long-term beneficial health effects on urban population are therefore expected from policies and interventions which encourage modal shift away from private car use and those that promote active travel.</p> <p>Minor adverse health effects for population near strategic road network, and those close to new proposed road links are expected from policies promoting additional road links or upgrading local and strategic road network.</p> <p>Future cleaner technologies may play a key role in reducing the amount of air pollution from transport in the longer term.</p>	<p>Public transport vehicles should be of high modern standards to utilise alternative fuels where possible and minimise emissions.</p> <p>Where schemes / initiatives are time limited, subsequent schemes need to be implemented to maximise the opportunity for benefits over time.</p> <p>Promoting exposure reduction and ensure that any new road links are isolated from vulnerable receptors, would reduce the harmful effects of the policies promoting additional road links or upgrading local and strategic road network.</p> <p>Strategic and major schemes will be delivered through the appropriate consenting process and will need to be subject to Environmental Impact Assessment (EIA) and other relevant environmental legislation. Detailed mitigation and enhancement opportunities will be developed as part of the design and consenting process at the scheme level.</p>

<p>SEAO 3: 'Reduce transport related carbon emissions in line with national targets'</p>	<p>Numerous policies within the LTP4 will have a minor or potential major positive effect on this SEA objective. However, there is significant uncertainty in the assessment. Most of the policies require a modal shift away from private car use, to more sustainable mode of transports (e.g. bus, rail, tram, cycling).</p> <p>Success of the policies in the long term will depend upon whether traffic growth can be curbed and whether the required behavioural change associated with a shift towards sustainable travel modes takes place.</p>	<p>Public transport vehicles should be of high modern standards.</p> <p>Where schemes / initiatives are time limited, new replacement measures need to be implemented to maximise the opportunity for benefits over time.</p> <p>Strategic and major schemes will be delivered through the appropriate consenting process and will need to be subject to EIA and other relevant environmental legislation. Detailed mitigation and enhancement opportunities will be developed as part of the design and consenting process at the scheme level.</p>
<p>SEAO 4: 'Adapt transport network to effects of climate change and minimise the vulnerability of transport network to flood risk'</p>	<p>It is expected that new transport infrastructure will be designed to be more resilient to climate change than existing transport infrastructure. However, the low-lying nature of much of the region, and its coastal and tidal location, mean flood risk is likely to be an increasing concern.</p> <p>The potential effects of climate change and sea level rise are of particular relevance in the areas of the region most affected by flooding. The potential effect of policies and interventions involving new major infrastructure has been identified as uncertain at this SEA level.</p>	<p>Strategic and major transport infrastructure schemes will have to be designed to take into the effects of climate change in line with national policy and best practice design such as CIRIA Report C753 The SuDS Manual.</p> <p>Additionally, all strategic and major schemes will be delivered through the appropriate consenting process and will be subject to Flood Risk Assessment (FRA) and EIA. Detailed mitigation and enhancement opportunities will be developed as part of the design and consenting process at the scheme level.</p> <p>Use of information regarding weather conditions and impact on travel can benefit transport users.</p>
<p>SEAO 5: 'Protect and enhance biodiversity and ecological networks'</p>	<p>Policies and interventions involving strategic and major transport infrastructure schemes have been identified as having adverse effects on this SEA Objective, some of them potentially major adverse. European designated sites are particularly sensitive receptors. The Habitats Regulations Screening exercise has identified some likely significant effects of major schemes on European sites and therefore it is going to be necessary to advance to the AA stage of HRA. The assessment of the effects on this SEA objective are preliminary and will need to be informed by the findings of the HRA AA. Please refer to the Habitats Regulations Screening Stage</p>	<p>The WoE JSP commits the authorities to develop a WoE GI Plan and to delivering a 'net gain' for the environment. The GI Plan, currently under preparation, will identify the strategic measures and mechanisms to support, guide and implement the delivery of environmental commitments set within the JSP and Local Plans, including mitigation for protected sites. Further development of GI Plans at an authority level should also reflect schemes within this JLTP.</p> <p>All strategic and major schemes will be delivered through the appropriate consenting process and will be subject to EIA and relevant environmental mitigation. Detailed mitigation and monitoring measures will be developed as part of the EIA process. it is recommended that major schemes have a</p>

	Summary prepared by ClearLead for further information.	Construction Environmental Management Plan (CEMP). Further assessment under the Habitats Regulation provides further information with regards to mitigation associated with potential significant effects on European sites.
SEAO6: 'Promote human health'	Most of the policies and interventions included in the Draft JLTP4 have as key objective promoting more sustainable and active modes of travel which would result in likely long-term benefits on human health. Encouraging more journeys to be made by active travel modes improves physical and mental health, quality of life and the environment. Direct beneficial effects on human health would result from increased physical activity whilst indirect effects may derive from less congested roads as well as improved access to services and opportunities which may tackle some of the inequality issues which may also underlain health issues. Beneficial effects might be offset by increased noise, air pollution and / or severance resulting from some of the proposed strategic road and rail improvements.	All strategic and major schemes will be delivered through the appropriate consenting process and will be subject to EIA which includes assessment of health. Detailed mitigation and monitoring measures to minimise potential adverse effects will be developed as part of the EIA process. Enhancement opportunities should also be considered as part of the development and consenting process of the larger schemes. Any charging scheme should consider exemptions for drivers with specific need, those on low income or unemployed seeking access to employment or education opportunities.
SEAO7: Improve road safety, particularly for vulnerable users, and to reduce road casualties'	The majority of policies will have a positive impact on improving road safety. Particularly, Policy W2 (which improves the road safety for motorcyclists), Policy L1 (through providing education for cyclists) and Policy L2 (using education and implementation of cycle lanes etc.) will all have a long-term major positive impact on the SEA objective.	Where schemes / initiatives are time limited, new replacement measures need to be implemented to maximise the opportunity for benefits over time. Road safety camera enforcement provides opportunity for driver education. Targeting road safety campaigns at motorcyclists safety. Motorcyclists are disproportionately represented in road accident statistics. New projects should be subject to safety audit checks and aim to improve road safety through design.
SEAO8: Minimise adverse effects on soils such as loss, compaction, erosion and pollution from transport-related activities'	Policies and interventions involving major transport infrastructure schemes have been identified as having adverse effects on this SEA Objective. Strategic and major road and rail infrastructure schemes would result in direct adverse effects on soils in terms of loss and compaction where these are to be delivered on undeveloped land. Operational effects may result in pollution, erosion and increased run-off.	As noted under SEAO 5 above, further development of GI Plans at an authority level should also reflect schemes within this JLTP. All strategic and major schemes will be delivered through the appropriate consenting process and it is recommended that major schemes have a CEMP. This would include mitigation and monitoring measures to avoid and minimise the degradation of soil resources.

	Due to the relative permanence and irreversibility of soil loss, the potential effect should be regarded as significant. Transport schemes to be delivered on previously developed land would result in beneficial effects through the remediation of contaminated soils.	
SEAO9: 'Protect, and where possible improve, water quality'	Policies and interventions involving major transport infrastructure schemes have been identified as having potential to result in adverse effects on this SEA Objective. The quality of water in rivers, streams, rhynes and ditches can be affected by the construction of transport infrastructure as well because of its operation through pollution and accidental spillages. It is expected, however, that new transport infrastructure will be designed following current best practice guidance and hence should include mitigation measures inherent to the scheme design. Overall, the potential effect on this SEA objective has been assessed as being uncertain for those policies involving major infrastructure works. There is the potential for adverse effects but also opportunities for beneficial effects through improved drainage design.	<p>Detailed design should follow best practice guidance such as that provided within CIRIA Report C753 <i>The SuDS Manual</i>. The guidance covers the planning, design, construction and maintenance of Sustainable Drainage Systems (SuDS) to assist with their effective implementation within both new and existing developments. It looks at how to maximise amenity and biodiversity benefits, and deliver the key objectives of managing flood risk and water quality.</p> <p>As noted under SEAO 5 above, further development of GI Plans at an authority level should also reflect schemes within this JLTP.</p> <p>All strategic and major schemes will be delivered through the appropriate consenting process and will be subject to EIA and relevant environmental mitigation. Detailed mitigation and monitoring measures will be developed as part of the EIA process. It is recommended that major schemes have a CEMP.</p>
SEAO10: 'Minimise waste produced and resources consumed by transport infrastructure and operation of transport services'	Generally, policies and interventions under consideration seek to make good use of existing infrastructure whilst new schemes would be designed in line with relevant policy and legislation aimed at minimising the production of waste and making sustainable use of resources. However, JLTP 4 comprises major new transport infrastructure which will result in significant use of materials such as aggregates and generation of waste. Interventions aimed at promoting alternative modes to private car would reduce reliance on fossil fuels. The overall effect on this SEA objective is likely to be adverse.	<p>Seek to make best use of existing infrastructure to minimise resource consumption and waste generation before constructing new facilities.</p> <p>Ensure scheme design incorporates sustainable use of materials as well as measures to minimise future maintenance requirements.</p> <p>For construction projects, a Site Waste Management Plan should be implemented. New development can be designed to increase the potential for recycling waste.</p> <p>New transport modes should use sustainable fuels (electric). There should also be modal shift to public transport and active travel from car use.</p>
SEAO11: Protect and enhance the rich diversity of	In the short and medium term, the construction of strategic and major schemes is likely to adversely affect	The JLTP provides an opportunity to improve the setting and integrity of the WoEs historic places, and ensure future development is

<p>the historical and cultural environment, its heritage assets and their setting'</p>	<p>heritage. However, some policies (W5 and W1) are likely to reduce pressure from traffic in the cities of Bath and Bristol and therefore reduce impacts on their cultural heritage assets. Due to the relative permanence and irreversibility of damage to heritage assets, the potential effects (both adverse and beneficial) should be regarded as significant.</p>	<p>appropriately considered and designed to respond to local context.</p> <p>Good design (following best practice guidance such as <i>Highways England – the road to good design</i> (2018)), and cultural heritage assessments (as part of EIA where appropriate) should be required for all strategic and major schemes to minimise potential adverse impacts and maximise opportunities for benefits.</p>
<p>SEA012: Maintain and enhance the quality and character of the built environment and landscape'</p>	<p>Noise and congestion from traffic can seriously degrade the quality of the urban environment. The policies which are likely to have the most positive on this SEA objective are those which limit opportunity for private car use within urban centres and free up space for other activities and improvements to the urban realm.</p> <p>Impacts from major schemes are likely to be on green belt land around the urban fringes. Introduction of new infrastructure would result in negative impacts on the landscape in terms of visual impacts and increased noise during construction and operation. Major development schemes also have the potential to have impacts on landscape setting.</p>	<p>Good design (following best practice guidance such as <i>Highways England – the road to good design</i> (2018)), and landscape/townscape and visual assessments (as part of EIA where appropriate) should be required in all strategic and major schemes to minimise potential adverse impacts and maximise opportunities for benefits.</p> <p>Design the proposed infrastructure sensitively to reduced visual impact and to include effective landscaping scheme to soften any major structures.</p> <p>It is recommended that signage and infrastructure for pedestrians and cyclists is designed to be sympathetic to the local distinctiveness whilst remaining clear, visible and informative.</p> <p>Further development of The West of England's GI Plans at an authority level should also reflect schemes within this JLTP.</p> <p>A modal shift away from car use is needed to maximise the potential beneficial impacts of JLTP4 on this SEA objective.</p> <p>Measures to discourage car use within urban centres should be pursued to maximise use of alternative modes provided and to reduce traffic congestion and noise.</p>

5.9. MONITORING

- 5.9.1. The SEA Regulations require that monitoring is undertaken on a plan so that the significant effects of implementation can be identified and remedial action imposed. The purpose of the monitoring is to provide an important measure of the environmental outcome of the final LTP, and to measure the performance of the plan against environmental objectives and targets. Monitoring is also used to manage uncertainty, improve knowledge, enhance transparency and accountability, and to manage environmental information.
- 5.9.2. A monitoring framework related to the environmental effects of the JLTP4 will be developed following consultation on this SEA. Both potential significant adverse and beneficial effects should be monitored to assess the actual performance of JLTP4 against the SEA Objectives. Once agreed, it is proposed that the SEA monitoring targets and indicators are incorporated as part of the JLTP4 indicators, targets and monitoring proposals. Given the links between JLTP4 and the JSP, a co-ordinated approach to monitoring of the plans will be considered.
- 5.9.3. Table 7 below outlines a number of indicators identified as relevant to the potential impacts of the JLTP4 on the SEA objectives and that may be considered for inclusion within the JLTP4 monitoring framework. Against the indicators a note has been made in relation to the relevance and limitations of using the proposed indicator in relation to the JLTP4's potential influence on the environment and human health.

Table 7 Possible SEA Indicators

SEA Topic	Indicators	Relevance/limitations
Population, Human Health	People killed or seriously injured in road traffic accidents.	Relevant to JLTP4 and to SEA objectives 6 and 7. Reductions in numbers of those killed or seriously injured could also be indicative of fewer people walking or cycling because of safety fears.
Population, human health	Access to services and facilities by public transport, walking and cycling	Relevant to JLTP4 and to SEA objective 1. Reductions in accessibility may be due to relocations of services to less accessible locations (and outside of JLTP4 influence).
Population, human health	Number of new and improved footways and cycleways.	Relevant to JLTP4 and to SEA objectives 1 and 6.
Human health, air quality, climatic factors	Per capita reduction in CO ₂ emissions in the WoE area.	Relevant to JLTP4 and to SEA objectives 2, 3 and 6. Target could indicate changes in travel behaviour to more (or

		less) efficient forms of travel. However, other factors such as population growth, new housing development and industry would also influence target.
Human health, air quality, climatic factors	Measurement of Nitrogen Dioxide (NO ₂) and / or Particulate Matter (PM ₁₀) as relevant, in AQMAs and Clean Plan Areas	Relevant to JLTP4 and to SEA objectives 2, 3 and 6. Target could indicate changes in travel behaviour to more (or less) efficient forms of travel. However, other factors such as population growth, new housing development and industry would also influence target.
Climatic Factors, water	Proportion of schemes with SUDs or other flood mitigation measures Length of green infrastructure network	Relevant to JLTP4 4 and 9.
Population, human health	Number of cycling trips	Relevant to JLTP4 and to SEA objectives 1, 3 and 6.
Population, human health	Rail passenger numbers (boarders) Number of passengers (boardings) on park and ride services	Relevant to JLTP4 and to SEA objectives 1, 2 and 3.
Population, human health	Mode share journey to work Journeys to school made by walking / cycling	Relevant to JLTP4 and to SEA objectives 1, 2, 3 and 6.
Biodiversity, soils, water	Number of schemes generating significant adverse impacts on sites of acknowledged biodiversity importance	Relevant to SEA objectives 5, 8 and 9.
Biodiversity, soils, water	Number of schemes generating overall biodiversity enhancement.	Relevant to SEA objectives 5, 8 and 9.

Soils	Loss of greenfield or previously undeveloped land Use of previously developed land	Relevant to SEA objective 8.
Water	Percentage of waterbodies assessed as being of good ecological status.	Relevant to SEA objective 9 and 5.
Cultural Heritage, Landscape, Townscape	Number of schemes generating significant adverse impacts on historic environment, heritage assets, historic places, streets and spaces.	Relevant to SEA objectives 11 and 12.
Landscape	Number of schemes adversely affecting the Mendip Hills and Cotswolds AONBs and the Green Belt.	Relevant to SEA objectives 11 and 12.

6. NEXT STEPS

6.1. CONSULTATION ON THE DRAFT JLTP4 AND THE SEA

- 6.1.1. The SEA Regulations set specific requirements for consultation with the Consultation Bodies, the public and other interested parties (these could include non-governmental organisations and community groups), and require that the Environmental Report is made available for consultation alongside the consultation draft JLTP4.
- 6.1.2. This SEA and a separate Non-Technical Summary will be made available on the travelwest website <https://travelwest.info>.
- 6.1.3. If you would like any further information or if you have any comments on the SEA of the draft JLTP we would be grateful to receive them. Comments should be sent no later than 20th March 2019 and submitted to the West of England Combined Authority by post or e-mail: transport@westofengland.org.

The West of England Combined Authority
3 Rivergate
Temple Quay
Bristol
BS1 6GD

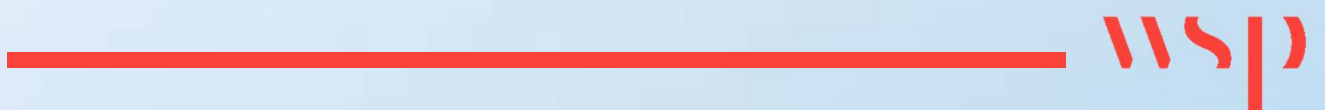
- 6.1.4. Comments received will be taken into account during the development of the final JLTP4.

6.2. SEA STATEMENT

- 6.2.1. When the JLTP4 is adopted it will be accompanied by an SEA Statement. In line with the SEA Regulations, the SEA Statement will provide the following information:
- How environmental considerations have been integrated into the plan;
 - How the Environmental Report has been taken into account;
 - How opinions expressed in relation to the consultations on the plan/ programme and Environmental Report have been taken into account;
 - The reasons for choosing the plan or programme as adopted, in the light of the other reasonable alternatives dealt with; and
 - The measures that are to be taken to monitor the significant environmental effects of the implementation of the plan or programme.

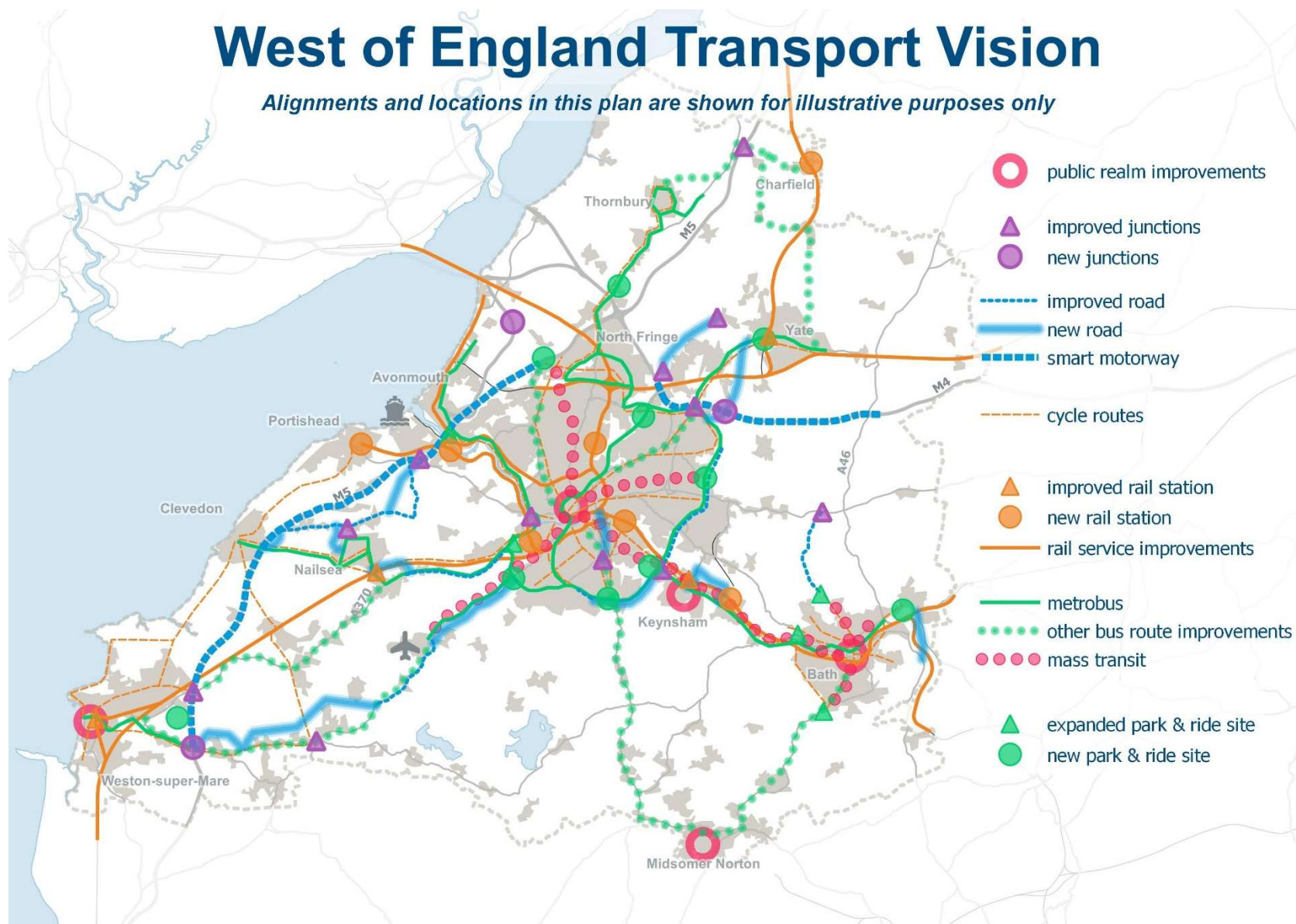
Appendix A

WEST OF ENGLAND TRANSPORT VISION



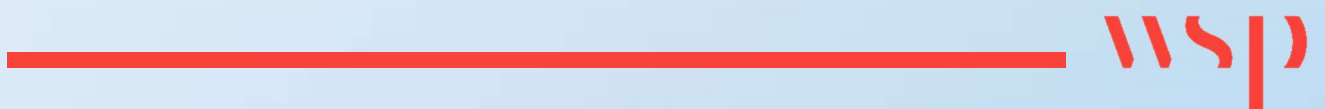
West of England Transport Vision

Alignments and locations in this plan are shown for illustrative purposes only



Appendix B

SCOPING REPORT CONSULTATION RESPONSES



SCOPING REPORT – CONSULTATION RESPONSE FROM HISTORIC ENGLAND

Subject: RE: West of England Joint Local Transport Plan - Scoping Report consultation - Historic England

Dear (name removed), thank you for consulting Historic England on the JLTP SEA Scoping Report.

Sections 3.9 **Cultural Heritage** and 3.10 **Landscape and townscape** are of particular interest and I will focus my comments accordingly.

Both sections refer to many of the issues and challenges faced by the WoE's historic environment and there are clearly ways in which the JLTP can positively respond to these.

We assume they have been informed by your colleagues in the 4 LA's?

Consultation question 19: Have we identified the most important issues relating to this topic to be covered in the ongoing SEA?

Could I emphasise the importance of referring to the issue of the potential affect (harm) to the setting of historic places, spaces, streets and individual heritage assets from potentially 'insensitive' transport related development. The LTP provides an opportunity to actually improve the setting and integrity of the WoEs historic places, and ensure future development is appropriately considered and designed to respond to local context.

This is a topical matter, mindful of the national drive for good design, and it may be helpful for the SEA to refer to *Highways England – the road to good design (2018)* which emphasises that to ensure a quality aesthetic experience for the user and the wider community will require:

- a restrained and environmentally sustainable transport design in fitting with the context,
- development to respond to place and enhance both environmental and economic outcomes, and is
- sensitive to the landscape and heritage
-

To ensure the SEA Objectives and associated criteria align themselves with national policy and are, perhaps, more clearly defined could I suggest the following adjustments.

Cultural Heritage

Objective: *protect and enhance the rich diversity of the historical and cultural environment, its heritage assets and their setting. ~~archaeological assets.~~*

Criteria

Will the JLTP4 (in combination with other plans):

Avoid harm to the significance of the West of England's historic environment, heritage assets, historic places, streets and spaces.



Enhance the significance of the West of England's historic environment, heritage assets, historic places, streets and spaces.

- Reduce pressure from congestion in key areas of built heritage and cultural interest?
- Enable sustainable access to key areas of built heritage and cultural interest?
- Cause disturbance to potential archaeological remains and intrusion into historic landscapes?

Landscape and townscape

Objective: *maintain and enhance the quality and character of the built environment and landscape*

Criteria

Will the JLTP4 (in combination with other plans):

- Cause an adverse visual intrusion in notable areas of notable locally distinctive landscape and townscape character, or alter the character of locations regarded as locally distinctive?
- Relieve intrusion or noise disturbance of existing areas of high landscape or built environment value?

Q 20 and 22 ask to define the more important historic assets, landscapes. This is clearly a sensitive issue and we would tend to avoid inserting a top 10 of WoE assets. However you may wish to refer to NPPF para 184 and the Glossary re Heritage Assets. Bath WHS would be No.1.

Sincere regards

(name removed)

South West Historic Places Principal

Historic Environment Planning Adviser South West/West Midlands

Planning Group

Historic England

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SCOPING REPORT – CONSULTATION RESPONSE FROM NATURAL ENGLAND

Date: 15 October 2018

Our ref: 259350

Your ref: -

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James White

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Dear Mr White

Planning consultation: Joint Local Transport Plan – Scoping Report consultation

Thank you for your consultation on the above dated 13 September 2018 which was received by Natural England on the same date.

The SEA Directive sets out the topics that a SA/SEA must cover in its assessment. Natural England is an identified consultation body for biodiversity including flora, fauna, human health, soil (including waste and contaminated land issues), water (water quality and resources), air, climatic factors (including strategic flood risks), material assets (including geological interests and infrastructure), cultural heritage and Landscape. We are the lead authority for biodiversity and landscape and identified as a source of information for soils, material assets and cultural heritage.

We have considered the Scoping Report and are generally satisfied that it meets the requirements for EU Strategic Environmental Assessment Directive. The baseline information and key issues that have been identified in the Scoping Report appear reasonably comprehensive for this stage of the assessment process and to demonstrate an understanding of the plan area in terms of its biodiversity, landscape and public access interests.

We would however like to offer the following comments:

Green infrastructure and net gain

The details of the emerging JLTP4 provided in the Scoping Report include a vision, objectives and Major Schemes programme. Based on the limited information available, the JLTP4 appears to be intrinsically linked to the JSP and will include a number of major transport schemes and infrastructure needed to support proposed new development. Indeed it is likely that in some places the JLTP4 and JSP will affect the same environmental and other assets. A coordinated approach to the environmental assessments for these plans will therefore be needed to ensure a robust and mutually supportive approach is taken to the protection and enhancement of the natural environment and the essential services it provides for people and society. Doing this will provide opportunities to focus the assessment on key issues, consider alternatives and cumulative effects, and coordinate the identification of avoidance and mitigation measures.

The main vehicle for delivering JSP objectives for the natural environment, including 'net gain', is the WoE GI Plan. The JSP includes a policy commitment to develop a strategic approach to mitigating effects on designated nature conservation sites and protected landscapes and the GI Plan will provide the framework for that approach.

While we are pleased to note the WoE GI Strategy has been identified as a relevant plan in the Scoping Report, we would like to see clearer links to the contribution the JLTP4 will make to the WoE GI Plan and to achieving measurable net gains for biodiversity, which should be positively reflected in relevant social, economic and environmental Sustainability Objectives and criteria.

This would support the JSP strategic objective 4 to protect and enhance the sub-region's diverse and high quality natural, built and historic environment and secure a net gain in biodiversity, and is consistent with the recently updated National Planning Policy Framework:

102. "Transport issues should be considered from the earliest stages of plan making and development proposals so that d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account-including appropriate opportunities for avoiding and mitigating any adverse effects and for net environmental gains"

118. Planning policies and decisions should: a) encourage multiple benefits from both urban and rural land, including through mixed use schemes and taking opportunities to achieve net environmental gains-such as developments that would enable habitat creation or improve public access to the countryside"

170 d). Planning policies and decisions should contribute to and enhance the natural and local environment by "minimising impacts on and providing net gains for biodiversity...."

174 b) Plans should"...identify and pursue opportunities for securing measurable net gains for biodiversity"

174 b). "promote the conservation, restoration and re-creation of priority habitats, ecological networks and the protection and recovery of priority species..."

174 a). "Identify, map and safeguard components of local wildlife rich habitats and wider ecological networks, including the hierarchy of international, national and locally designated sites of importance for biodiversity; wildlife corridors and stepping stones that connect them; and areas identified by national and local partnerships for habitat management, enhancement, restoration or creation"

175 d)".... While opportunities to incorporate biodiversity improvements in and around developments should be encouraged, especially where this can secure measurable net gains for biodiversity".

We also suggest the following SEA Objectives and Assessment Criteria could be strengthened:

Biodiversity: The objective to promote biodiversity is broadly welcome, but the criteria should include consideration of biodiversity gains and enhancements, as well as damage, fragmentation and losses. We suggest an objective of 'Protect and enhance biodiversity and ecological networks'.

Water: The Scoping Report identifies flood risk and water quality issues within the Plan area, for example noting that only 24% of the Bristol Avon catchment is classified as having 'good ecological status', which is below the WFD targets. However only flood risk has been scoped into the SEA, with relevant objectives in relation to vulnerability of the transport network and climate change adaptation. Water quality is screened out from the SEA on the basis that new infrastructure will be required to meet best practice drainage designs and mitigation.

We acknowledge the relevance of flood risk to the SEA, but would also wish to see objectives for the protection and improvement of water quality across the plan area. Water quality will also be a particularly important consideration in relation to new road infrastructure associated with the North Somerset SDLs. This low lying area is bisected by complex drainage systems and pollution from surface water run-off from Nailsea is having an adverse impact Tickenham, Nailsea & Kenn Moors SSSI.

Soils: The objective to minimise adverse effects on soils such as loss, compaction, erosion and pollution from transport-related activities is welcome. In some situations development on land of limited agricultural (or biodiversity) value in its own right can lead to the creation of islands of biodiversity, permanently severed from other areas. We suggest adding "Ensure current ecological networks are not compromised, and future improvements in habitat connectivity are not prejudiced" to the assessment criteria.

Monitoring

As set out in Planning Practice Guidance, significant environmental effects of implementing the current local plan should be monitored. This should include indicators for monitoring the effects of the plan on biodiversity. It is important that any monitoring indicators relate to the effects of the plan itself, not wider changes. Bespoke indicators should be chosen relating to the outcomes of development management decisions.

Whilst it is not Natural England's role to prescribe what indicators should be adopted, the following indicators may be appropriate:

Biodiversity:

- Number of planning approvals that generated any adverse impacts on sites of acknowledged biodiversity importance.
- Percentage of major developments generating overall biodiversity enhancement.
- Hectares of biodiversity habitat delivered through strategic site allocations.
- Landscape:
- Amount of new development affecting the Mendip Hills and Cotswolds AONBs We would be pleased to discuss the scope of the SEA further, but in the meantime if you have any queries relating to the advice in this letter please contact me on 07900 608311.

Yours sincerely

(name removed)



Somerset, Avon & Wiltshire Area Team

SCOPING REPORT – CONSULTATION RESPONSE FROM ENVIRONMENT AGENCY

Dear Sir,

Thank you for your consultation regarding the above.

As discussed, the original consultation was not forwarded to the correct Agency contact, which resulted in a delay in assessing the plan. For information, future correspondence regarding the JLTP should be forwarded to the undersigned.

The Agency is essentially satisfied in respect of the general scope of the plan, however the following observations should be noted:

Section 3.3 Climatic Factors

Answer to consultation questions 6 and 8

It would be appropriate to refer to the UKCP09 climate change projections and UKCP18, which is due for publication imminently. Further information is available through the following link:

<http://ukclimateprojections.metoffice.gov.uk/24125>

Section 3.7 Water

See response to Section 3.3 above

Additionally, the Agency must recommend specific reference to the Defra 25-year plan:

<https://www.gov.uk/government/publications/25-year-environment-plan>

With regard to paragraph 5 on page 53, the Agency would recommend specific reference to the Avonmouth Severnside Enterprise Area (ASEA), in relation to realising the economic potential of the area.

With regard to paragraph 6 on page 53, when referring to the “significant tidal and fluvial flood risk management infrastructure in much of the West of England sub-region” consideration should be given to the inclusion of advisory text, explaining that the infrastructure is managed by several Risk Management Authorities, including: the Environment Agency, Lead local Flood Authorities, water companies and Network Rail.

There are various inaccuracies with the last paragraph on page 53. The Agency suggests the following text:

The tidal flood defences, which reduce flood risk to Avonmouth and Severnside, provide a varying level of protection with some low spots and informal *de facto* defences, together with higher formal defences. An appraisal has been underway since 2016 to identify and agree a new scheme to reduce flood risk to a 1 in a 200-year standard, with an allowance for climate change for at least 60 years. While the area is currently protected from flooding by formal and informal flood defences, in addition to surface water from the development area. It is important to note that, notwithstanding the flood defences, there remains a residual risk of flooding in extreme events or as a result of defence failure.

With regard to the second paragraph (second sentence) on page 54:

“It is estimated that climate change and sea level rise will mean that severe tidal....”



The Agency must advise that it not familiar with the stated estimate and would therefore recommend reference to the relevant climate change science to provide confidence.

Finally, the Agency would advise that Section 3.7 would benefit from the inclusion of a specific reference to the Environment Agency's approach to groundwater protection documentation, which is available through the following link:

<https://www.gov.uk/government/collections/groundwater-protection>

Appendix C

WSP
EQUALITIES IMPACT ASSESSMENT



West of England

EQUALITIES IMPACT ASSESSMENT

Joint Local Transport Plan 4





West of England

EQUALITIES IMPACT ASSESSMENT

Joint Local Transport Plan 4

TYPE OF DOCUMENT (VERSION) PUBLIC





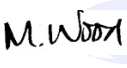
PROJECT NO. 70050609

OUR REF. NO. EQIA

DATE: OCTOBER 2018

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QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	Table text	Table text	Table text	Table text
Date	October 2018	25th October	Table text	
Prepared by	Claire Beard	Table text	Table text	
Signature	 <small>Digitally signed by Beard, Claire DN: cn=Beard, Claire, ou=Exeter (The Forum), email=Claire.Bead@wsp.com Reason: I am the author of this document Date: 2018.10.29 10:03:18 Z</small>	 <small>Digitally signed by Beard, Claire DN: cn=Beard, Claire, ou=Exeter (The Forum), email=Claire.Bead@wsp.com Reason: I am the author of this document Date: 2018.10.29 10:03:44 Z</small>		
Checked by	Mabel Munoz-Devesa	Mabel Munoz-Devesa	Table text	Table text
Signature	 <small>Digitally signed by Munoz-Devesa, Mabel DN: cn=Munoz-Devesa, Mabel, ou=Bristol (Kings Orchard), email=Mabel.Munoz-Devesa@wsp.com Reason: I have reviewed this document Date: 2018.10.29 13:51:01</small>	 <small>Digitally signed by Munoz-Devesa, Mabel DN: cn=Munoz-Devesa, Mabel, ou=Bristol (Kings Orchard), email=Mabel.Munoz-Devesa@wsp.com Reason: I have reviewed this document Date: 2018.10.29 13:51:34</small>		
Authorised by	Ursula Stevenson	Marcus Wood	Table text	Table text
Signature		 <small>Digitally signed by Wood, Marcus DN: cn=Wood, Marcus, ou=Exeter (The Forum), email=Marcus.Wood@wsp.com Date: 2018.10.29 10:24:36</small>		
Project number	70050609	7005069	Table text	Table text

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1 INTRODUCTION

1.1 BACKGROUND AND CONTEXT

- 1.1.1. The West of England Combined Authority (WECA) is co-ordinating the development of the Joint Local Transport Plan 4 (JLTP4) alongside the four West of England unitary authorities; Bath and North East Somerset, Bristol, North Somerset and South Gloucestershire. The unitary authorities have responsibility for all adopted roads in the West of England except for the motorways and trunk roads, which are the responsibility of Highways England; plus Public Rights of Way. The authorities work with Network Rail, the Train Operating Companies, and other private sector public transport operators in respect of public transport services. Bristol International Airport and the Port of Bristol are outside of the West of England's direct responsibility.
- 1.1.2. The vision set out for the JLTP4 is as follows:
'Connecting people and places for a vibrant and inclusive West of England'
- 1.1.3. Five objectives have been identified, based on the aspirations of the West of England authorities and previous plans and policies prepared. There is no priority allocated to the objectives as they all have a role to play in achieving the vision for the West of England. The objectives, as follows, are in no particular order:
- i Support sustainable economic growth
 - i Enable equality and improve accessibility
 - i Address poor air quality and take action against climate change
 - i Contribute to better health, wellbeing, safety and security
 - i Create better places
- 1.1.4. The aim is to provide a well-connected sustainable transport network that offers greater, realistic travel choice and makes walking, cycling and public transport the natural way to travel. Trips into and within the West of England will be seamless, faster, cheaper, cleaner and safer. To this end the new JLTP is structured around improving connectivity at four levels:
- i Beyond the West of England – strategic road and rail, port and airport
 - i Within the West of England – between the urban areas, longer than 10km
 - i Local – up to 10km
 - i Neighbourhood – journeys within local communities.
- 1.1.5. This Equality Impact Assessment will assess the draft JLTP4 from an equality perspective, and will seek to identify whether the policies within the Plan might have an adverse impact on equality of opportunity.

2 LEGISLATION

- 2.1.1. The Equality Act 2010 came into force on 1 October 2010 and brought together over 116 separate pieces of legislation into a single Act. The Act provides a legal framework to protect the rights of individuals that share defined "protected characteristics" and advance equality of opportunity.
- 2.1.2. Those "protected characteristics" which identify the vulnerable groups who may be disproportionately impacted upon or discriminated against are outlined in Table 1. Protection extends to those who are perceived to have these characteristics or who suffer discrimination because they are associated with someone who has that characteristic, e.g. cares for someone with a disability.

Table 2-1 - Protected Characteristics covered with an Equality Impact Assessment

Protected Characteristics	People and Aspects Included
Gender	Men, women, married and single people; parenting, caring, flexible working and equal pay concerns.
Religion or belief	People who have a religious belief; people who are atheist or agnostic; people who have a philosophical belief which affects their view of the world or the way they live.
Age	Children (0-16), young people (17-25), working age people (15-64) and elderly people (65 and over).
Disability	People with physical, mental, sensory, visible or hidden impairment (e.g. cancer, HIV, dyslexia).
Race	People from various ethnic groups, as for the Census categories, e.g. White British, Chinese, British Asians, Travellers, Gypsies, Roma, those who are of Caribbean origin, people of mixed heritage, White Irish communities, and people of other nationalities who reside in Britain.
Sexual orientation	Heterosexual and bisexual men and women, gay men and lesbians.
Gender reassignment (transgender/transsexual)	Anyone who is proposing to undergo, are undergoing or have undergone a process for the purpose of reassigning their sex.
Pregnancy and Maternity	Pregnant women and new mothers – protection against maternity discrimination (including as a result of breast feeding).
Marriage and civil partnership	People who are married or are civil partners.

- 2.1.3. Section 149 of the Act provides for a Public Sector Equality Duty. This requires that public bodies such as the West of England Combined Authority, in the exercise of their functions, give "due regard to the need to":
- i Eliminate discrimination, harassment, victimisation and any other conduct that is prohibited by or under the Act;
 - i Advance equality of opportunity between people who share a protected characteristic and those who do not. This includes:
 - Removing or minimising disadvantages suffered by people due to protected characteristics;
 - Taking steps to meet the needs of people with protected characteristics where these are different from the needs of other people; and
 - Encouraging people with protected characteristics to participate in public life or in other activities where their participation is disproportionately low.

- | Foster good relations between people who share protected characteristic and those who do not. This includes:

- Tackling prejudice;
 - Promoting understanding; and
 - Eliminating unlawful discrimination, harassment and victimisation.

2.1.4. The duty also applies to private sector companies when carrying out functions or services on behalf of public sector bodies.

BATH AND NORTH EAST SOMERSET

2.1.5. Bath and North East Somerset Council have an Equality policy commitment¹ (updated in Sept 2015) which is supported by the following Equality Objectives for 2017-2020².

- | To ensure that services are designed to meet the needs of the community;
- | To improve access to services and outcomes across protected characteristics;
- | To ensure that equality monitoring data is used to inform and influence the delivery of fair services to all;
- | To recognise and celebrate the growing diverse communities of Bath & North East Somerset;
- | To ensure that the Council has fair employment practices.

BRISTOL

2.1.6. Bristol City Council (BCC) have an Equality and Community Cohesion Policy³ (2014) which is supported by an Equality Action Plan 2018-2022⁴ which sets out what BCC *“will do to eliminate discrimination, advance equality of opportunity and foster good relations in all areas of our work so that diverse people can participate, exercise voice and influence, and benefit from our work.”*

NORTH SOMERSET

2.1.7. North Somerset Council have an Equality Policy⁵ (2017) which is supported by the following Equality Objectives⁶;

- | Services and information we provide are accessible and meet the diverse needs of all our customers.
- | Where we know that there is a difference in outcomes for equality groups, we will work to reduce it.
- | The council and its partners will work to provide and enable employment opportunities for people from equalities groups.
- | We will ensure that all who work for and with us support our commitment to promoting equality and diversity and tackling inequality and social exclusion wherever it occurs.

SOUTH GLOUCESTERSHIRE

2.1.8. South Gloucestershire Council have a Corporate Equality and Diversity Policy⁷ (2010) with an Equality Plan⁸ (2015-2019) setting out the core objectives that the Council aims to meet. These four key objectives are as follows;

- | To ensure a consistently high and effective approach to managing equalities.
- | To ensure fair treatment for all by council services.
- | To reduce any gaps in service use, take-up and outcomes.
- | To continuously improve equality of opportunity for our employees and job applicants, leading to a diverse workforce at all levels of the organisation.

¹ <http://www.bathnes.gov.uk/services/your-council-and-democracy/equality-and-diversity>

² <http://www.bathnes.gov.uk/services/your-council-and-democracy/equality-and-diversity/equality-objectives>

³ <https://www.bristol.gov.uk/documents/20182/32815/PP%20Equality%20Community%20Cohesion%20wef%203%2011%2014.pdf/7db046b8-480a-4780-99da-f1f01ec19fbb>

⁴ <https://democracy.bristol.gov.uk/documents/s18400/A1vi%20-%20Equality%20Action%20Plan%202018-22.pdf>

⁵ <https://www.n-somerset.gov.uk/wp-content/uploads/2017/02/equality-policy.pdf>

⁶ <https://www.n-somerset.gov.uk/wp-content/uploads/2017/02/equality-objectives.pdf>

⁷ <http://www.southglos.gov.uk/documents/Corporate-Equality-and-Diversity-Policy.pdf>

⁸ <http://edocs.southglos.gov.uk/equalityplan2015/>

3 EQUALITY IMPACT ASSESSMENT

3.1 WHAT IS EQIA

- 3.1.1. An Equality Impact Assessment (EqIA) considers the impact of a project or policy on persons or groups of persons who share characteristics which are protected under section 4 of the Equality Act 2010 ("protected characteristics") and might also include others considered to be vulnerable within society such as low income groups. It is an information gathering tool which enables decision makers within public bodies to implement their equality duty under the Equality Act 2010.
- 3.1.2. An EqIA guides decision makers and designers to:
- i Consider the effects of existing and proposed policy or practice on people who share a "protected characteristic"; and
 - i Identify opportunities to improve equality of opportunity and eliminate discrimination.
- 3.1.3. An EqIA should be carried out before making decisions, so as to inform and shape the outcomes. They should be updated throughout the decision-making process as necessary, as policy or practices are developed.
- 3.1.4. There are three stages to an EqIA; screening, full assessment and outcome monitoring. The screening stage determined which protected characteristics are likely to experience disproportionate impacts, and therefore require consideration within the EqIA. This takes into account the nature of the public function being exercised and available information on users and impacts. This document represents the assessment on those groups identified.

4 LOCAL SOCIAL PROFILE

- 4.1.1. A local social profile has been compiled from publicly available data to provide context for the assessment. This comprises information protected characteristic groups and the local communities likely to be impacted by this Plan.

4.2 PROTECTED CHARACTERISTIC PROFILE

- 4.2.1. Data from the Office of National Statistics (ONS) has been gathered on the following protected characteristics from Section 4 of the Equality Act 2010:

- Gender
- Religion
- Age
- Disability
- Race

- 4.2.2. Certain protected characteristics, including sexual orientation, gender reassignment, pregnancy and maternity, and marriage and civil partnerships have not been included in the assessment due to a lack of publicly available data at the time of writing. Although not a protected characteristic under the Equality Act 2010, the social profile also includes data on deprivation as it provides a measure of a combination of social-economic metrics.

4.3 GENDER

- 4.3.1. The gender split in each of the local authorities is similar to the national average, with Bristol having a slightly larger proportion of males (50.1% compared to the Great Britain average 49.3%), and North Somerset having a slightly larger proportion of females (51.3% compared to the Great Britain average 50.7%).

Table 4-2: West of England Gender Profile (2017)

	Male	Female
Bath and North East Somerset	93,100 (49.3%)	95,500 (50.7%)
City of Bristol	230,000 (50.1%)	229,300 (49.9%)
North Somerset	103,600 (48.7%)	109,200 (51.3%)
South Gloucestershire	138,400 (49.6%)	140,600 (50.4%)
South West	2,734,200 (49.2%)	2,825,100 (50.8%)
Great Britain	31,661,600 (49.3%)	32,507,800 (50.7%)

4.4 RELIGION

- 4.4.1. Christianity is the predominant religion across the region, with “no religion” and “religion not stated” being the second and third most chosen responses in the 2011 Census. Muslim is the second most prevalent religion in each unitary authority apart from North Somerset which was “other religion”.

Table 4-3: Faith Composition (2011)⁹

	Bath and North East Somerset	City of Bristol	North Somerset	South Gloucestershire	South West	England
Christian	56.51	46.76	60.99	59.56	60.39	59.38

⁹ QS208EW – Religion, 2011 Census (Nomis.com)

	Bath and North East Somerset	City of Bristol	North Somerset	South Gloucestershire	South West	England
Buddhist	0.53	0.60	0.27	0.27	0.37	0.45
Hindu	0.30	0.63	0.17	0.64	0.31	1.52
Jewish	0.14	0.18	0.08	0.06	0.12	0.49
Muslim	0.67	5.14	0.43	0.83	0.97	5.02
Sikh	0.08	0.50	0.05	0.24	0.11	0.79
Other religion	0.53	0.65	0.46	0.34	0.55	0.43
No religion	32.74	37.41	30.05	30.68	29.29	24.74
Religion not stated	8.49	8.12	7.50	7.40	7.88	7.18

4.5 POPULATION AND AGE

- 4.5.1. According to the 2017 mid-year population estimates¹⁰ the City of Bristol is the largest of the four local authorities covered by the JLTP, with a population of 459,252. This is followed by South Gloucestershire (279,027), North Somerset (212,834) and Bath and North East Somerset (188,678). The total population of the South West is estimated at 5,559,316.
- 4.5.2. The age profile of the populations in the local authorities are largely reflective of the national age profile, apart from North Somerset which has a larger proportion of population aged 65 and older.

Table 4-4 Population by age group (2015)¹¹

	Bath and North East Somerset	City of Bristol	North Somerset	South Gloucestershire	England
Aged under 16	16.6	18.6	18.1	18.6	19.0
Aged 16-24	16.9	15.7	8.9	11.1	11.3
Aged 25-64	47.6	52.5	49.8	51.9	52.0
Aged 65-84	16.1	11.2	19.9	16.1	15.4
Aged 85 and over	2.8	2.0	3.3	2.3	2.4

4.6 DISABILITY

- 4.6.1. The proportion of the population whose day to day activities are limited by a long-term health problem or disability is slightly less than the England average in all local authorities apart from North Somerset. Perhaps reflecting the older population in North Somerset, 19.2% of the population are limited in their day to day activities by a long-term health problem or disability, compared to the England average of 17.6%.

¹⁰

<https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/datasets/populationestimatesforukenglandandwalesscotlandandnorthernireland> (Accessed 24/09/18)

¹¹ www.localhealth.org.uk Local Authority Local Health Profile, 2016. Accessed 24/09/18

Table 4-5 Long-term health problem or disability (2011)¹²

	Bath and North East Somerset	City of Bristol	North Somerset	South Gloucestershire	South West	England
Day-to-Day activities limited a lot	7.0	8.1	8.6	6.8	8.3	8.3
Day-to-day activities limited a little	9.1	8.7	10.6	8.8	10.2	9.3
Day-to-day activities not limited	83.9	83.3	80.9	84.4	81.6	82.4

4.7 RACE

- 4.7.1. The diversity of different ethnicities is relatively low in the region, with all authorities apart from Bristol having a higher proportion of individuals identifying as “White” than the England average. While its population is still predominantly White, Bristol has larger groups of ethnic minorities, with the largest being Black/African/Caribbean/Black British, making up 6.0% of the population, followed by Asian/Asian British making up 5.5%.

Table 4-6: West of England Ethnic breakdown (2011)¹³

	Bath and North East Somerset	City of Bristol	North Somerset	South Gloucestershire	South West	England
White	94.5	83.9	97.2	94.9	95.3	85.3
Gypsy/Traveller/Irish Traveller	0.0	0.1	0.1	0.1	0.1	0.1
Mixed/Multiple Ethnic Groups	1.6	3.6	1.0	1.4	1.4	2.3
Asian/Asian British	2.6	5.5	1.2	2.5	1.9	7.7
Black/African/Caribbean/Black British	0.8	6.0	0.3	0.8	0.9	3.5
Other Ethnic Group	0.4	0.9	0.2	0.3	0.3	1.0

4.8 UNEMPLOYMENT AND INCOME

- 4.8.1. Unemployment in the South West is lower than the national average, with each local authority also following this pattern. Income in North Somerset is higher than the national average, however it is lower than the national average in each of the other local authorities. The percentage of workless households is lower than the national average in all four local authorities.

¹² Table QS303UK 2011 Census: Long-term health problem or disability, local authorities in the United Kingdom

¹³ Table KS201UK 2011 Census: Ethnic group, local authorities in the United Kingdom

Table 4-7 Economic Profile

	Bath and North East Somerset	City of Bristol	North Somerset	South Gloucestershire	South West	Great Britain
Economically Active: Unemployed (%) (Apr 2017-Mar 2018)	3.7	3.8	3.2	3.3	3.3	4.3
Gross Weekly Pay: Full-time Workers (£) (2017)	545.50	539.90	566.30	527.6	527.0	552.70
Percentage of Households that are Workless (Jan-Dec 2017)	12.5	11.3	9.5	7.6	11.3	14.5

- 4.8.2. The English Indices of Deprivation 2015¹⁴ are a collection of several separate indices (covering Income, Employment, Health Deprivation and Disability, Education Skills and Training, Barriers to Housing and Services, Crime and Living Environment) measuring deprivation within all local authorities in England. Below are the rankings given to each of the four local authorities, out of 326 local authorities, where 1 is the most deprived. These show that Bristol has the highest levels of deprivation out of the four local authorities, and South Gloucestershire the least.

	IMD 2015 Rank of Average Score
Bath and North East Somerset	263
City of Bristol	62
North Somerset	196
South Gloucestershire	273

4.9 BASELINE SUMMARY

- 4.9.1. From the profile above, it can be concluded that the region covered by the JLTP4 is generally economically prosperous, with high levels of income, low unemployment and relatively low levels of deprivation. There are, however areas within the region which do experience higher levels of deprivation, with pockets of vulnerable communities, such as those on low income or in poor health. Bristol, in particular, faces greater socio-economic challenges as an urban centre in the region.

¹⁴ <https://www.gov.uk/government/statistics/english-indices-of-deprivation-2015>

5 IMPACT ASSESSMENT

- 5.1.1. The Joint Local Transport Plan 4 aims to improve transport in the West of England by;
- i supporting sustainable economic growth;
 - i enable equality and improve accessibility;
 - i addressing poor air quality and taking action against climate change;
 - i contributing to better health, wellbeing, safety and security; and
 - i creating better places.
- 5.1.2. It is also essential to ensure that no groups with protected characteristics (see Table 2-1 above) are adversely impacted by the transport plan. Certain equality groups are unlikely to be impacted specifically as a result of this transport plan and have been scoped out of this assessment. These include:
- i Sexual orientation
 - i Gender re-assignment
 - i Pregnancy & Maternity
 - i Marriage
- 5.1.3. As there are pockets of deprivation in the region (related to income and employment), this topic has been included in the equality assessment to capture the impacts likely to be felt by those that are vulnerable due to their economic position.

5.2 ASSESSMENT METHODOLOGY

- 5.2.1. The JLTP3 Equality Impact Assessment (EqIA) was completed in 2010 highlighting the initial equalities opportunities and gaps of the previous strategy. This report is reassessing the equality impact based on the latest strategy set out in the JLTP4.
- 5.2.2. Table 5.8 below provides an explanation of the assessment.

Table 5-8 Assessment key

Symbol	Impact
+	Positive
0	Neutral
-	Negative

5.3 ASSESSMENT SUMMARY

- 5.3.1. Overall, the proposed plan should have a positive impact on the general public that are living, working or visiting the West of England by providing a safer, resilient, sustainable and convenient transport opportunities for the region. Some of the most vulnerable groups will particularly benefit, specifically:
- i People with limited or no access to cars;
 - i People with respiratory illnesses, and those more susceptible to poor air quality (children and young people and older people); and
 - i People that require access to employment, education, health and/ or other services.
- 5.3.2. Although positive, there are still possible adverse impacts that would be felt by people who are reliant on the use of a car (such as people with a disability), particularly if charging is introduced, or those with limited mobility who are unable to participate in active travel (such as older people of people with a disability).
- 5.3.3. The matrix below summarises the policy, intervention, equality impacts and recommendation where adverse impacts have been identified. In the following, equality impact refers to the impacts the proposed plan is likely to have on one or more of the five equality group.

Policy	Intervention	Impact (positive (+) negative (-) or neutral (0))						Reasons	Mitigation Measures/recommendations
		Gender	Religion	Age	Disability	Race	Deprivation		
Connectivity beyond the West of England	B1: Enhance competitiveness of major gateways and improve connectivity to international markets						+	Supporting the role of Bristol Airport as the main gateway for air travel, and Bristol Port as the main cruise ships terminal in the South West, could improve opportunities for tourism and trade in the region. Hence, generating or improving economic prospects for the region which could lead to more employment or business opportunities.	None (positive impact)
	B2: Improve strategic resilience of the network for all trips			+	+		+	<p>Greater resilience in the transport network through improvements to the strategic road and rail networks will help all transport users including those using private cars which are likely to experience more reliable car journeys, and less likely to be impacted by major events.</p> <p>Rail users will also benefit from more capacity and potentially faster train times, leading to greater journey reliability.</p> <p>Supporting the role of coaches in the areas could support tourism opportunities in the region, providing possible economic benefits through employment.</p>	None (positive impact)

Policy	Intervention	Impact (positive (+) negative (-) or neutral (0))						Reasons	Mitigation Measures/recommendations
		Gender	Religion	Age	Disability	Race	Deprivation		
								Strategic improvements are likely to have a benefit impact on people using networks to access education, employment and/or health services, particularly those beyond their local neighbourhood, particularly younger and older people, people with disabilities, as well as the unemployed.	
Connectivity within the West of England	W1: Provide more public transport options and improve service quality			+	+		+	Improved availability and accessibility of public transport in the region will benefit those without a personal car (this includes the poor and unemployed), or who may be unable to drive a car due to their age or poor health. Improved quality and service of public transport may attract more users, potentially, reducing private car use. This would have knock on benefits of a cleaner environment by reducing air pollution, particularly for people with respiratory illnesses, younger and older people.	None (positive impact)
	W2: Provide for journeys where public transport is not an option			+	-		+	The provision of Park and Ride facilities could improve mobility in the region and accessibility to employment, education and / or health services for people who live outside urban areas	The proposed plan should incorporate easy access for people with disabilities at the Park and Ride sites and public

Policy	Intervention	Impact (positive (+) negative (-) or neutral (0))						Reasons	Mitigation Measures/recommendations
		Gender	Religion	Age	Disability	Race	Deprivation		
								<p>or who cannot make door-to-door trips by public transport.</p> <p>Car sharing schemes could also benefit people who do not have a personal car, who are unable to drive (including the poor, unemployed, young and elderly), or who are unable to access public transport locally.</p> <p>Supporting the use of motorcycles and moped would benefit those who are unable to afford a car, and unable to use public transport (i.e. shift workers or people who work unsociable hours).</p> <p>A reduction of single occupancy cars would result in locally improved air quality, benefiting residents living in areas currently experiencing poor air quality, especially people with respiratory illnesses the young and elderly.</p>	transport interchanges for onward journeys.
	W3: Use, as appropriate, technological advances and charging measures to optimise and			+/ -	-		-	<p>Improving congestion through technology and providing automated travel options could potentially improve air quality through a reduction in air pollution. This will benefit residents in the region, particularly people with respiratory illnesses, the young and elderly.</p> <p>The charging measures for vehicles will adversely impact people who are reliant on</p>	People with disabilities who are car reliant would be affected by charging measures. Travelling costs to major areas (for employment, education or health services) would be increased where alternative options are

Policy	Intervention	Impact (positive (+) negative (-) or neutral (0))						Reasons	Mitigation Measures/recommendations
		Gender	Religion	Age	Disability	Race	Deprivation		
	better manage demand							<p>private vehicles for transport, such as those with disabilities or those whose employment is reliant on vehicle use (i.e. delivery driver).</p> <p>The use of technology might adversely impact older people who are less familiar with, or trusting of, technology or the means through which information is shared (such as a smart phone).</p>	<p>unavailable for this equality group. The proposed plan should consider exemptions for private car drivers with specific needs.</p> <p>Care should be made to ensure groups unable, or unwilling, to use technology are not excluded from receiving information about their planned journeys.</p>
	W4: Improve resilience of the network, providing increased reliability			+	+		+	<p>This policy will increase accessibility and mobility of users with access to a car, who are likely to experience greater journey reliability.</p> <p>Users of public transport who make use of the Key Route network (KRN) and Major Route network (MRN) may also experience benefits through more reliable journey times.</p> <p>This will encourage the use of public transport due to the improved reliability and services on the Major Road Network (MRN) and new development sites.</p> <p>This will benefit all groups of people, especially those that are more reliant on public transport.</p>	

Policy	Intervention	Impact (positive (+) negative (-) or neutral (0))						Reasons	Mitigation Measures/recommendations
		Gender	Religion	Age	Disability	Race	Deprivation		
								For example, the poor, unemployed, young and elderly.	
	W5: Enable business clustering and the efficient movement of freight			+			+	<p>The delivery of Enterprise Zones and / or business clustering could attract businesses and customers. This could reduce trips required to access services and / or employment sites, which may benefit the economy.</p> <p>By providing alternative options to freight transportation, including rail, water, air and automated methods, will reduce road congestion. This may also have knock-on effect of improving local air quality with a reduction in freight vehicles on the road network.</p>	None (positive impact)
Local Connectivity	L1: Enable walking and cycling “active modes of travel”, to be the natural choice for shorter journeys			+	-			<p>The provision of cycling and walking infrastructure could encourage the public to opt for a sustainable travel option instead of vehicle reliant services. This could lead to improved air quality in the urban area, which would benefit people with respiratory illnesses, the young and elderly.</p> <p>The modal shift from private cars to active travel will provide health benefits to those who choose this option, however, the proposed plan could</p>	The plan should ensure that alternative travel means for people with disabilities are considered and that the promotion of active travel does not limit their travel options.

Policy	Intervention	Impact (positive (+) negative (-) or neutral (0))						Reasons	Mitigation Measures/recommendations
		Gender	Religion	Age	Disability	Race	Deprivation		
								<p>isolate people with mobility issues who are unable to travel in this manner.</p> <p>This may affect people with disabilities that are more car reliant as private car users are not encouraged for onward journey</p>	
	L2: Reduce the number and severity of casualties for all road users	+	+	+	+	+	+	Incorporating the needs and safety of all road users especially those with sight, hearing or mobility impairments in scheme design will be directly beneficial to all people and people with disabilities.	None (positive impact)
	L3: Encourage residents and employees to make more sustainable and healthier travel choices			0	-		0	<p>The promotion of travel planning and sustainable travel choices including walking, cycling and car sharing will have a knock-on effect of a cleaner environment, as less vehicles will be used, and less emission will be generated. Improved air quality will benefit all groups of people, particularly those affected by respiratory illnesses, the young and the elderly.</p> <p>However, people with limited mobility (such as the disabled and elderly) are unlikely to experience the benefits from active travel (walking and cycling).</p>	The plan may consider improving or increasing services of public transport which are likely to be utilised by the elderly and people with mobility issues.

Policy	Intervention	Impact (positive (+) negative (-) or neutral (0))						Reasons	Mitigation Measures/recommendations
		Gender	Religion	Age	Disability	Race	Deprivation		
	L4: Support opportunities for all sectors of the population to access the services they require, wherever they live.		+	+	+		+	Supporting people without access to private cars to use taxis, private hire vehicles and the demand response and community transport will benefit people who cannot drive due to health reasons or their age as well as those that do not own their own car. The provision of community transport will particularly benefit the unemployed and poor who live in areas of deprivation, as well as socially isolated individuals needing access to community services and facilities.	None (positive impact)
	L5: Support the identification and implementation of measures that will improve air quality.	+	+	+	+	+	+	By improving air quality, all groups of people will be benefited, particularly those affected by respiratory illnesses, the young and the elderly.	None (positive impact)
Neighbourhood connectivity	N1: Use master planning and local design to create better places			-	-		+	Improving the quality of streets and public realm, wayfinding signage will benefit all groups of people. Integrating walking and cycling into new development will provide health benefit by	Developments should cater for all levels of mobility so as not to exclude people who are unable to participate in active travel.

Policy	Intervention	Impact (positive (+) negative (-) or neutral (0))						Reasons	Mitigation Measures/recommendations
		Gender	Religion	Age	Disability	Race	Deprivation		
								<p>increasing likelihood of residents to choose an active mode of travel for short journeys. However, this will not benefit people with restricted mobility who are unable to participate in active travel.</p> <p>Integrating public transport into new development will benefit all groups of people, particularly those who do not have access to their own car including the poor, unemployed, young and elderly.</p>	Public realm should be designed for the needs of all users.
	N2: Facilitate the use of active modes for all short trips, including the first and last mile of longer journeys		-		-	-		<p>The provision of safe crossings and the reduction of neighbourhood car journeys will benefit the health profile of the general public due to the promotion of active travel. However, this will affect people that are car reliant due to health reasons and those with mobility issues which prevent them from choosing a more active mode of travel, even for a short distance.</p> <p>The provision of security measures including CCTV and lighting will likely deter general crimes, but may not influence crimes that are race or faith orientated.</p>	Plans should consider to the needs of people with limited mobility and ensure that neighbourhood facilities are accessible to all users, as well as acknowledge the potential for localised racial or faith based hate crime.

Appendix D

HEALTH IMPACT ASSESSMENT 



West of England

HEALTH IMPACT ASSESSMENT

Joint Local Transport Plan 4





West of England

HEALTH IMPACT ASSESSMENT

Joint Local Transport Plan 4

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HEALTH IMPACT ASSESSMENT

Joint Local Transport Plan 4

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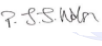
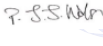
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1. INTRODUCTION

- 1.1.1. The West of England includes the unitary authority areas of Bath & North East Somerset, Bristol City, North Somerset and South Gloucestershire. As Local Transport Authorities, the West of England Authorities are required to produce a Local Transport Plan (LTP) under the Transport Act 2000, as amended by the Local Transport Act 2008.
- 1.1.2. The West of England are currently updating their Joint LTP (JLTP). A Strategic Environmental Assessment (SEA) is being prepared alongside the JLTP. This SEA represents the second stage of the SEA, following a Scoping Report which determined the issues to be included in the SEA.
- 1.1.3. One of the topics assessed within the SEA is human health, and the impacts the JLTP is likely to have on the health of people in the West of England.
- 1.1.4. In considering the effects on human health, a health impact assessment has been undertaken to further consider the relationship between health and transport, and the likely significant effects of the draft JLTP on human health.
- 1.1.5. The outcomes of this assessment have informed the SEA.

2. SCOPE AND METHODOLOGY

2.1.1. A rapid desktop HIA was undertaken during September and October 2018.

2.1.2. The key tasks for this HIA were to:

- à Develop a summary health and wellbeing baseline and profile of the West of England authorities;
- à Identify relevant scientific evidence from literature;
- à Assess the potential health and wellbeing impacts of the JLTP, and the nature and likelihood of such impacts;
- à Develop recommendations for minimising potential negative, and maximising potential positive, health and wellbeing impacts; and
- à Suggest health and wellbeing indicators that can be used to monitor the JLTP.

2.2. SCOPE

STUDY AREA

2.2.1. This is a rapid desk-based health impact assessment of the direct and indirect effects on local communities resulting from the proposed policies of the Joint Local Transport Plan 4 (JLTP4). The geographic scope of this HIA is therefore the local authorities which comprise the West of England.

Figure 1 The West of England authorities



STUDY POPULATION

2.2.2. The population scope of this HIA includes residents within the West of England:

- § Bath and North East Somerset
- § City of Bristol
- § North Somerset
- § South Gloucestershire

2.2.3. The main vulnerable groups within population that were considered were:

- § Children and young people
- § Older people
- § People with disabilities, and mobility impairment
- § People with existing health conditions
- § Unemployed and low-income groups
- § Socially excluded or isolated groups

DETERMINANTS OF HEALTH

2.2.4. The key determinants of health and wellbeing that were considered were:

- § Air Quality
- § Noise
- § Physical Activity
- § Road safety
- § Economy and employment
- § Access and accessibility

BASELINE ASSESSMENT, COMMUNITY HEALTH PROFILE AND EVIDENCE

2.2.5. The baseline assessment, community profile and evidence base were developed from existing publicly available data including:

- § The West of England Joint Local Transport Plan 3
- § Bath and North East Somerset Joint Strategic Needs Assessment¹
- § Bristol Joint Strategic Needs Assessment²
- § North Somerset Joint Strategic Needs Assessment³
- § South Gloucestershire Joint Strategic Needs Assessment⁴

¹ <http://www.bathnes.gov.uk/services/your-council-and-democracy/local-research-and-statistics>

² <https://www.bristol.gov.uk/policies-plans-strategies/joint-strategic-needs-assessment>

³ <http://www.n-somerset.gov.uk/my-council/statistics-data/jsna/joint-strategic-needs-assessment/>

⁴ <http://www.southglos.gov.uk/community-and-living/stronger-communities/community-strategy/joint-strategic-needs-assessment-jsna/>

§ Public Health England Local Authority Health Profiles⁵

§ Office for National Statistics Labour Market Profiles⁶

§ Public Health England “Local Health”⁷

APPRAISAL OF IMPACTS

- 2.2.6. The Plan was assessed against each of the determinants of health, looking first at the baseline conditions of the determinant category within the study area, evidence of how each determinant impacts on human health and then the effect that the Plan has on the health of the target population (short-term, temporary and permanent) via the determinant category.
- 2.2.7. A seven-point assessment scale that classifies the significance of the identified impacts (Table 1) is used to categorise the effects for the assessment. This approach has been adapted from that used by the Institute of Occupational Medicine (IOM), for the North Staffordshire ‘Streetcar’ Bus Rapid Transport Scheme Health Impact Assessment, IOM, 2009. Significance incorporates the intensity of the impact and its potential duration, shown in Table 1 below.

Table 1 Assessment Scale and Definition of Significance⁸

Significance of Impact	Definition	Intensity [+/-]	Duration (SML) (TIP)
Major Adverse	Health effects are categorised as a major negative if they could lead directly to deaths, acute or chronic diseases or mental ill health. They can affect either or both physical and mental health either directly or through the wider determinants of health and wellbeing. These effects can be important local, district, regional and national considerations. Mitigation measures and detailed design work can reduce the level of negative effect though residual effects are likely to remain.	The exposures tend to be of high intensity. Over a large geographical area or affect a large number of people or impact vulnerable groups. (- - - / + + +)	Long term duration (L) Intermittent (I) Temporary (T) or Permanent (P) in nature
Major beneficial	Health effects are categorised as a major positive if they prevent deaths/prolong lives, reduce/prevent the occurrence of acute or chronic diseases or significantly enhance mental wellbeing would be a major positive.		
Moderate Adverse	Health effects are categorised as a moderate negative if the effects are long term nuisance impacts, e.g. odours and noise, or may lead to exacerbations of existing illness. The negative impacts may be nuisance/quality of life impacts which may affect physical and mental health either directly or through the wider determinants	The exposures tend to be of moderate intensity and/or over a relatively localised area and/or likely to affect a moderate-large number of people e.g. between 100-500	Medium term duration (M) Intermittent (I) Temporary (T) or

⁵ <https://fingertips.phe.org.uk/profile/health-profiles>

⁶ <https://www.nomisweb.co.uk/reports/lmp/la/contents.aspx>

⁷ www.localhealth.org.uk

Significance of Impact	Definition	Intensity [+/-]	Duration (SML) (TIP)
	of health. The cumulative effect of a set of moderate effects can lead to a major effect. These effects can be important local, district and regional considerations. Mitigation measures and detailed design work can reduce and in some/many cases remove the negative and enhance the positive effects though residual effects are likely to remain	and/or sensitive groups (- - / + +)	permanent (P) in nature.
Moderate Beneficial	Health effects are categorised as a moderate positive if they enhance mental wellbeing significantly and/or reduce exacerbations to existing illness and reduce the occurrence of acute or chronic diseases.		
Minor Adverse	Health effects are categorised as minor positive or negative, if they are generally lower level quality of life or wellbeing impacts. Increases or reductions in noise, odour, visual amenity, etc. are examples of such effects. These effects can be important local considerations. Mitigation measures and detailed design work can reduce the negative and enhance the positive effects such that there are only some residual effects remaining.	The exposures tend to be of low intensity and/or over a small area and/or affect a small number of people e.g. less than 100 (- / +)	Short term duration (S) Intermittent (I) Temporary (T) or permanent (P) in nature.
Minor Beneficial			
Neutral/No	No health effect or effects within the bounds of normal/accepted variation.	N/A	N/A

RECOMMENDATIONS

- 2.2.8. A set of mitigation and enhancement measures were identified to reduce the potential negative, and enhance the potential positive, health and wellbeing impacts of the JLTP4.

2.3. ASSUMPTIONS AND LIMITATIONS

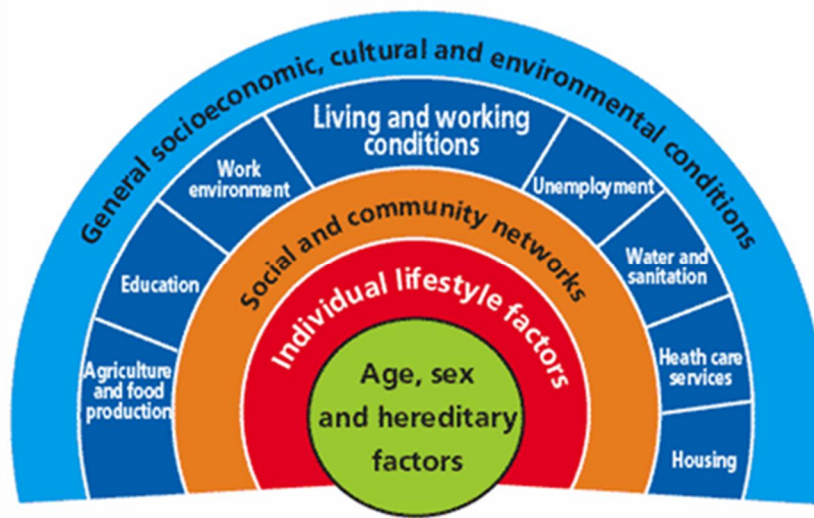
- 2.3.1. At this stage it is difficult to assess the specific localised populations (e.g. at Ward level) who are more or less likely to benefit from the proposed initiatives in the different policies.
- 2.3.2. Specific mitigation measures relating to health for each JLTP policy have been made within the SEA Environmental Report and were informed by this health impact assessment. Health and wellbeing indicators that can be used to monitor the JLTP4 are reported in the SEA Environmental Report.

3. HEALTH IMPACT ASSESSMENT

- 3.1.1. HIA is a systematic approach to identifying the differential health and wellbeing impacts, both positive and negative, of projects and plans.
- 3.1.2. HIA uses both qualitative and quantitative evidence, including public and other stakeholders' perceptions and experiences, as well as public health knowledge. It is particularly concerned with the distribution of effects within a population, as different groups are likely to be affected in different ways, and therefore looks at how health and social inequalities might be reduced or increased by a proposed project or plan.
- 3.1.3. The aim of a HIA is to support and add value to the decision-making process by providing a systematic analysis of the potential impacts, as well as recommending opportunities, where appropriate, to enhance positive impacts, mitigate negative impacts and reduce health inequalities.
- 3.1.4. HIA has been defined as⁹;
"...a combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population".
- 3.1.5. In this context, 'health' is defined by the World Health Organisation as;
"...a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity".
- 3.1.6. Health determinants are the personal, social, cultural, economic and environmental factors that influence the health of individuals or populations. These include a range of factors such as income, employment, education and social support.
- 3.1.7. Health Inequality can be defined as the difference in either health status, or the distribution of health determinants, between different population groups. Some health inequalities are unavoidable, others are not so and may well be unjust and unfair.
- 3.1.8. HIA's apply the below model of health and well-being (Figure 2). The Socio-Environmental Model of Well Being considers that health and well-being are a result of external influences, where an individual or family experiences a combination of adverse external factors which could result in health inequality.
- 3.1.9. The overall aim of this HIA will be to identify the aspects of the JLTP4 policies which have the potential to affect people's health, both directly and indirectly. Some effects may be positive, others could be negative. This HIA will include recommendations which will remove or mitigate as far as possible any potential negative impacts on people's health. It will also identify opportunities to maximise the potential benefits to people's health.

⁹ WHO-Euro, 1999. *Gothenburg Consensus Paper on Health Impact Assessment*, European Centre for Health Policy, Brussels.

Figure 2 Socio-Economic Model of Well Being¹⁰



¹⁰ Dahlgren, G. and Whitehead, M., 1991. *Rainbow model of health* in Dahlgren, G., 1995. *European Health Policy Conference: Opportunities for the Future*. Vol 11 – Inter-sectoral Action for Health.

4. COMMUNITY PROFILE

- 4.1.1. Amongst the communities living in, and directly affected by any changes brought about by the policies of the Joint Local Transport Plan, the proportion and profile of vulnerable groups, identified in section 2.2 above, have been described below using publicly available data.
- 4.1.2. Community profile data has been used to express the status of vulnerable groups with respect to their vulnerable health status and / or derivation. In some cases Health Profile Indicators are implicit rather than explicit, where direct Health Profile Indicators were not available.

4.2. PUBLIC HEALTH PROFILE¹¹

BATH AND NORTH EAST SOMERSET

- 4.2.1. The health of people in Bath and North East Somerset is generally better than the England average. Bath and North East Somerset is one of the 20% least deprived authorities in England, however approximately 11% of children live in low income families. Life expectancy for men and women is higher than the England average.

BRISTOL

- 4.2.2. The health of people in Bristol is varied compared to the England average. Bristol is one of the 20% most deprived authorities in England and approximately 20% of children live in low income families. Life expectancy for men is lower than the England average, though it is statistically similar to the England average for women.

NORTH SOMERSET

- 4.2.3. The health of people in North Somerset is varied compared to the England average. About 12% of children live in low income families. Life expectancy for both men and women is similar to the England averages.

SOUTH GLOUCESTERSHIRE

- 4.2.4. The health of people in South Gloucestershire is generally better than the England average. South Gloucestershire is one of the 20% least deprived authorities in England, however approximately 10% of children live in low income families. Life expectancy for both men and women is higher than the England average.
- 4.2.5. The following tables provide details of specific indicators from the local authority Public Health Profiles which related to the policies of the draft JLTP.
- 4.2.6. According to the specific indicator in the most recent Public Health Profile, all four Local Authorities perform significantly better than the England average in terms of people who are killed and seriously injured on roads.

¹¹ Public Health England Local Authority Health Profiles, 2018 <https://fingertips.phe.org.uk/profile/health-profiles> Accessed on 04/10/18

Table 2 Killed and seriously injured on roads (2014-16) (per 100,000 population)¹²

Area	England	Bath and NE Somerset	Bristol	North Somerset	South Gloucestershire
Value	39.7	26.1	26.2	23.2	19.2

- 4.2.7. The proportion of adults who are physically active is significantly higher in all four West of England local authorities when compared to the England average.

Table 3 Physically active adults aged 19+ (2016 – 17) (%)¹³

Area	England	Bath and NE Somerset	Bristol	North Somerset	South Gloucestershire
Value	66.0	72.4	74.3	73.3	70.2

- 4.2.8. The proportion of obese children is significantly better than the England average in all local authorities apart from Bristol, where it is not significantly different from the national average.

Table 4 Obese children (aged 10-11) (2016 – 17) (%)¹⁴

Area	England	Bath and NE Somerset	Bristol	North Somerset	South Gloucestershire
Value	20.0	13.5	19.8	14.7	14.1

4.3. LOCAL POPULATION INDICATORS

- 4.3.1. Office of National Statistics local profile data for the four local authorities was analysed to determine how the region performs across a number of indicators which are related to the JLTP. These were:

- § Population Age Profile
- § General Health
- § Deprivation
- § Economic Activity

¹² Public Health England Local Authority Health Profiles, 2018 <https://fingertips.phe.org.uk/profile/health-profiles> Accessed on 04/10/18

¹³ Public Health England Local Authority Health Profiles, 2018 <https://fingertips.phe.org.uk/profile/health-profiles> Accessed on 04/10/18

¹⁴ Public Health England Local Authority Health Profiles, 2018 <https://fingertips.phe.org.uk/profile/health-profiles> Accessed on 04/10/18

- 4.3.2. The following information provides further details about the population and economic profile of the local authorities that comprise the West of England, these populations will be most sensitive to the policies proposed within the JLTP.
- 4.3.3. The age distribution of the population across the West of England region (Table 5) is generally similar to the England averages, apart from North Somerset which has a larger proportion of residents over 65. Despite having a smaller proportion of the population over 65 than the England average (and any other West of England authority), Bristol has a larger proportion of pensioners living alone.

Table 5 Age Distribution of the Population ¹⁵

	Pop under 16 (%)	Pop aged between 16-24 (%)	Pop aged between 25-64 (%)	Pop aged between 65-84 (%)	Pop aged between 85 and over (%)	Pensioners living alone (%)	Pensioners living alone: Difference to the England Avg
Year of Data collation	2015	2015	2015	2015	2015	2011	2011
Avg for England	19	11.3	52	15.4	2.4	31.5	
Bath and NE Somerset	16.6	16.9	47.6	16.1	2.8	31.4	Not significantly different
City of Bristol	18.6	15.7	52.5	11.2	2	36.3	Significantly worse
N Somerset	18.1	8.9	49.8	19.9	3.3	29.4	Significantly better
S Gloucestershire	18.6	11.1	51.9	16.1	2.3	27.7	Significantly better

- 4.3.4. The rate of limiting long-term illness or disability is significantly worse in North Somerset when compared to the England average, but significantly better in each of the other three local authorities of the West of England. However, the general health of the population of the study area is significantly better than the England average, apart from Bristol where it is not significantly different (Table 6).

¹⁵ Local Authority Local Health Profile, 2016. www.localhealth.org.uk Accessed on 24/09/18

Table 6 Population Health Profiles¹⁶

	Life expectancy at birth for males (years)	Life expectancy at birth for females (years)	Emergency hospital admissions for COPD (Standardised Admission Ratios)	Respiratory Disease as Cause of death (Standardised Mortality ratio)	Limiting long term illness or disability (%)	Limiting long term illness or disability: Difference to the England Avg	General health bad or very bad (%)	General health bad or very bad: Difference to the England Avg
Period of Data Collation	2014- 16	2014- 16	2011/12 to 2015/16	2011- 2015	2011	2011	2011	2011
Avg for England	79.5	83.1	100	100	17.6		5.5	
Bath and NE Somerset	80.7	84.5	61.1	76.7	16.1	Significantly better	4.2	Significantly better
City of Bristol	78.8	82.8	128.9	105.8	16.7	Significantly better	5.5	Not significantly different
N Somerset	79.9	83.6	65.9	90.2	19.1	Significantly worse	5.3	Significantly better
S Gloucestershire	81.3	85.0	74.5	81.7	15.6	Significantly better	4.2	Significantly better

- 4.3.5. Income deprivation and child poverty are both significantly lower, with less deprivation and child poverty in Bath and North East Somerset, North Somerset and South Gloucestershire when compared to the England average. In Bristol, both indicators are significantly higher than the England average, with a greater level of deprivation and child poverty.

¹⁶ Local Authority Local Health Profile, 2016. www.localhealth.org.uk Accessed on 24/09/18

Table 7 Income Deprivation and Child Poverty (2015)¹⁷

	Income deprivation (%)	Income deprivation: Difference to Avg for England	Child Poverty (%)	Child Poverty: Difference to Avg for England
Average for England	14.6		19.9	
Bath and NE Somerset	9.1	Significantly better	12.1	Significantly better
City of Bristol	16.7	Significantly worse	24.6	Significantly worse
N Somerset	11.6	Significantly better	14.8	Significantly better
S Gloucestershire	8.7	Significantly better	12.4	Significantly better

¹⁷ Local Authority Local Health Profile, 2016. www.localhealth.org.uk Accessed on 24/09/18

5. ASSESSMENT OF EFFECTS

5.1.1. The analysis of health impact has focussed on the determinants identified above in section 2.2 which fall into the following categories:

- § Air Quality
- § Noise
- § Physical Activity
- § Road safety
- § Economy and employment
- § Access and accessibility

5.1.2. The JLTP has been assessed against each of the above, looking first at the baseline conditions of the determinant category within the study areas, evidence of how each determinant affects health, and then the effect that the development has on the health of the study area population (short-term, temporary and permanent) via the determinant category.

5.2. AIR QUALITY

EVIDENCE

- 5.2.1. The association between health effects and exposure to air pollutants is now well established, with distinct health risks associated with exposure to particulates available at a local level.^{18 19}
- 5.2.2. The impact of long term human exposure to particulate matter (PM) anthropogenic pollution is estimated to have an effect on mortality equivalent to nearly 29,000 deaths in the UK²⁰. There is no known threshold concentration below which NO₂ or PM₁₀ have no effect on a population's health.
- 5.2.3. Many of the sources of PM are also sources of NO₂. Links between the occurrence of NO₂ and health effects has strengthened substantially in recent years, though some of these are co-incident with PM, as noted by the Committee on the Medical Effects of Air Pollutants²¹, some could be attributed to other co-existing pollutants, such as Poly Aromatic Hydrocarbons (PAH) and Volatile Organic Compounds (VOC).
- 5.2.4. Defra have estimated that the effect of NO₂ on mortality is equivalent to 23,500 deaths in the UK annually, though this estimate has not been endorsed by COMEAP²². Any increases in mortality are

¹⁸ COMEAP 2010 The Mortality Effects of Long-Term Exposure to Particulate Air Pollution in the United Kingdom. A report prepared by the Committee on the Medical Effects of Air Pollutants. Available at: <http://www.comeap.org.uk/>

¹⁹ COMEAP 2012 Statement on Estimating the Mortality Burden of Particulate Air Pollution at a Local Level. Available at: <http://www.comeap.org.uk/>

²⁰ The Mortality Effects of Long-Term Exposure to Particulate Air Pollution in the United Kingdom, COMEAP, 2010

²¹ Committee on the Medical Effects of Air Pollutants, Statement on the Evidence of the Effects of Nitrogen Dioxide on Health, COMEAP, March 2015

²² Defra analysis using interim recommendations from COMEAP's working group on NO

likely to be either as a result of cardiovascular and/or respiratory mortality, particularly with regards to an elevated short-term exposure to NO₂²³.

- 5.2.5. Due to the correlation between differing airborne pollutants and similar health effects, one pollutant can often mask the effects of another and it is not always possible to discreetly isolate the health effects of a single pollutant. The causal mechanism, primarily cardiovascular and respiratory, leading to increased mortality with increased exposure to particulate matter is well-founded, though processes behind NO₂ contributing to cardiovascular damage, respiratory disease or cancer are less understood.
- 5.2.6. Studies have reported statistically significant associations between long-term exposure to NO₂ and lung function in children, respiratory infections in early childhood and effects on adult lung function. Though mortality, lung cancer, and cardiovascular and cerebrovascular effects in adults are predominately weighted towards PM mass and not NO₂ (studies cited in COMEAP/2014/06 Annex B²⁴). Similar rates of mortality per 10 µg/m³ of PM_{2.5} and NO₂ have been found in some studies²⁵. Though a greater effect of NO₂ (6%) than PM_{2.5} (3%) was found on total mortality when the broader range of NO₂ concentrations over PM_{2.5} concentrations were taken into account. The US Environmental Protection Agency²⁶ found that there was consistent evidence in single-city studies in diverse locations but inconsistent evidence among other large cohorts of multiple US locations.
- 5.2.7. A meta-analysis of available long-term studies on NO₂ data by Faustini et al²⁵ concluded that the magnitude of the effect of long-term exposure to NO₂ on mortality is at least as important as that of PM_{2.5}.

BASELINE

- 5.2.8. Air pollution has been estimated to affect local health, with a similar proportion of the population's mortality attributed to air pollution as the England average.

Table 8 Fraction of mortality attributable to particulate air pollution (%)²⁷

	2014	2015	2016
England	5.1	4.7	5.3
South West	4.3	4.3	4.5

²³ Quantitative systematic review of the associations between short-term exposure to nitrogen dioxide and mortality and hospital admissions. BMJ Open 2015;5:e006946 doi:10.1136/bmjopen-2014-006946

²⁴ COMEAP/2014/06 Working paper: Evidence for the effects of NO₂ on health Visit <https://www.gov.uk/government/groups/committee-on-the-medical-effects-of-air-pollutants-comeap> and click on COMEAP discussion papers [Accessed Jan 2018]

²⁵ Faustini A, Rapp R, Forastiere F 2014 Nitrogen dioxide and mortality: review and meta-analysis of long-term studies. Eur Respir J 44(3): 744-753

²⁶ US EPA, Integrated Science Assessment for Oxides of Nitrogen – Health Criteria (First External Review Draft). United States Environmental Protection Agency, 2013. <http://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=259167>

²⁷ Public Health England, Public Health Outcomes Framework, Indicator 3.01 <https://fingertips.phe.org.uk/profile/public-health-outcomes-framework/data#page/9/gid/1000043/pat/6/par/E12000009/ati/102/are/E06000022>

	2014	2015	2016
Bath and North East Somerset	4.5	4.1	4.7
Bristol	5.1	4.4	5.3
N Somerset	4.2	4.0	4.4
S Gloucestershire	5.1	4.7	5.2

- 5.2.9. Admissions for Chronic Obstructive Pulmonary Disease (COPD) is better in each of the clinical commissioning groups (CCGs) within the study area than the England average, and the trend is either remaining unchanged (Bath and North East Somerset and South Gloucestershire) or improving (Bristol and North Somerset).

Table 9 Chronic Obstructive Pulmonary Disease (COPD) data, 2012/13²⁸

	Total COPD admissions per 1,000 population	Recent Trend
England	2.15	Increasing and getting worse
South West Region	1.68	Increasing and getting worse
NHS Bath and North East Somerset CCG	1.35	No significant change
NHS Bristol CCG	1.76	Decreasing and getting better
NHS North Somerset CCG	1.67	Decreasing and getting better
NHS South Gloucestershire CCG	1.53	No significant change

- 5.2.10. Admissions for children (aged under 19) with asthmas in the four CCGs in the study area are similar or better than the England Average, however the trend in both Bristol and South Gloucestershire is that hospital admissions are on the rise.

²⁸ Public Health England, INHALE – Interactive Health Atlas of Lung conditions in England. <https://fingertips.phe.org.uk/profile/inhale>
Accessed on 08/10/18.

Table 10 Childhood asthma data (CCG level), 2016/17²⁹

	Hospital admissions for asthma (under 19 years), per 100,000	Recent Trend
England	199.7	Decreasing and getting better
South West Region	145.7	No significant change
NHS Bath and North East Somerset CCG	65.9	Decreasing and getting better
NHS Bristol CCG	184.3	Increasing and getting worse
NHS North Somerset CCG	155.5	No significant change
NHS South Gloucestershire CCG	165.2	Increasing and getting worse

- 5.2.11. There are a number of Air Quality Management Areas in Bath and North East Somerset, Bristol and South Gloucestershire in city centres and main traffic routes. Whilst there have been localised improvements in air quality in some of these areas, they tend to fluctuate on an annual basis. The trend in the urban areas of Bath and Bristol is that there has been no significant improvement.³⁰

ASSESSMENT

- 5.2.12. The Joint Local Transport Plan policies promoting active travel opportunities, (specifically L1 and N2), such as walking and cycling, are likely to indirectly result in a reduction in road congestion, through providing more attractive and reliable active travel options than the default private motor car journeys, thereby persuading people to either not drive, or drive less, resulting in reducing numbers of private cars on the road. For shorter journeys this would have a localised direct benefit to neighbourhood air quality in particular. These proposals also fulfil policies L1 and N2.
- 5.2.13. Policies and the subsequent transport proposals which seek to improve public transport (Policy W1) and connectivity of transport options in the region could also lead to a reduction in car use.
- 5.2.14. The aim of the JLTP is to maintain the level of car use at current levels up to 2036 and focus on facilitating additional network capacity by increasing the proportion of trips that are undertaken by sustainable transport modes. This can only be achieved, however, if all of the JLTP4 programme of major schemes are delivered. Both active travel and public transport will not be suitable for all journeys, as policies B2, W2, W3, W4 and W5 have the potential to result in either sustained or additional journeys by motorised transport. These policies and the subsequent transport proposals which seek to upgrade or add to the local or strategic road network are likely to result in additional emissions to air, from both freight and other traffic, and have a negative impact on health through degraded air quality. These potential impacts would be felt by populations located near the existing

²⁹ Public Health England, Child Health Overview. <http://fingertips.phe.org.uk/profile/child-health-overview> Accessed on 08/10/18.

³⁰ WECA Scrutiny Committee Report: Air Quality, January 2018 [[online](#)]

road network, though proposals leading to improvements in congestion will contribute to a beneficial impact. However, health gains through improved access and accessibility as well as improvements in economy and employment are anticipated outcomes.

- 5.2.15. Air quality improvements are likely to be seen in more urban areas such as Bath or Bristol where cycle networks, movements strategy or mass transits proposals could be more likely to result in a modal shift to active travel, whereas improvements to the road network are unlikely to discourage private and commercial users unless combined with demand management measures.
- 5.2.16. It is anticipated that those policies and associated transport proposals which encourage modal shift away from private car use (W1, L4) and those that promote active travel (L1, L3, N1, N2), will have a **major long-term beneficial permanent effect on health outcomes** due to a reduction in the adverse health effects from poor air quality. This is likely to result in a reduction in symptoms and health outcomes previously outlined in the evidence section above. These benefits are, however, likely to be both variable across the region and dependent upon proximity of the vulnerable receptor to the road network from where modal shift is likely to be most influential, and local active travel interventions.
- 5.2.17. Policies and associated transport proposals within the draft JLTP include promoting additional road links and promoting upgrading of local and strategic road network (B2 and W4). These policies and proposals are likely to result in additional vehicle movements which could have a **moderate medium-term adverse permanent effect on health outcomes** due to increases in the health effects from poor air quality. These potential adverse effects are likely to be variable across the region and dependent upon proximity of the vulnerable receptor to the road network from where modal shift is likely to be most influential, and local active travel interventions. Additional mitigation measures which promote exposure reduction and ensure that any new road links are isolated from vulnerable receptors, would reduce the harmful effects of these policies.

5.3. NOISE

EVIDENCE

- 5.3.1. The health impacts of environmental noise are widely acknowledged. A number of reviews of impacts have been published (for example, WHO 2011³¹) which highlight potential impacts on cardio-vascular disease, cognitive impairment and sleep disturbance and annoyance.
- 5.3.2. WHO consider the health burden of environmental noise in terms of Disability-Adjusted Life Years (DALYs). One DALY can be thought of as one lost year of "healthy" life. The sum of these DALYs across the population, or the burden of disease, can be thought of as a measurement of the gap between current health status and an ideal health situation where the entire population lives to an advanced age, free of disease and disability.

³¹ WHO, 2011. Burden of disease from environmental noise: Quantification of healthy life years lost in Europe. [online]

- 5.3.3. Therefore any noise impacts resulting in one DALY lost can be thought of as one lost year of 'healthy life'. DALYs considers life expectancy and the incidence of disease, weighted by the severity of the disease (from zero to 1, where 0 is perfect health and 1 is year of life lost).
- 5.3.4. Years Lost due to Disability (YLD) are calculated by multiplying the incident cases by duration and disability weight for the condition. The assessment of health effects is based on the existing monetisation analysis³², which includes an assumed range of values for the 'disability weighting'³³ for annoyance, sleep disturbance and AML effects, reflecting the expected uncertainty with regards to population health outcomes. The disability weighting values used for sleep disturbance were 0.04 (low), 0.07 (mid) and 0.1 (high). The weightings applied for annoyance were 0.01 (low), 0.02 (mid) and 0.12 (high). The weighting used for AML was 0.405.
- 5.3.5. WHO estimate that, in EU Member States and other western European countries, DALYs lost are 61,000 years for ischaemic heart disease, 45,000 years for cognitive impairment of children, 903,000 years for sleep disturbance and 654,000 years for annoyance. Swift³⁴ provided a review of impacts (specifically relating to airports), focussing on sleep disturbance and stress as pathways leading to poor cardiovascular health and the potential mis-attribution of certain conditions, e.g. obesity and diabetes, as confounding factors whereas these conditions themselves may have resulted from sleep disturbance.
- 5.3.6. Children are vulnerable to a range of health outcomes associated with environmental noise, including road traffic noise³⁵. This includes demonstrating annoyance responses to noise as well as stress along with increased levels of adrenaline and noradrenaline. Though noise does not cause more serious mental health problems, but there is growing evidence for an association with increased hyperactivity symptoms. Increased levels of noise have been associated with changes in cardiovascular functioning, as well as an effect on low birth weight^{36,37}. Clear evidence exists on the

³² Jacobs, 2014. 5. *Noise: Local Assessment*. (https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/372488/noise--local-assessment.pdf) Accessed 21/12/2015.

³³ World Health Organisation, 2011. *Burden of disease from environmental noise*. (http://www.euro.who.int/__data/assets/pdf_file/0008/136466/e94888.pdf) Accessed 03/05/2016.

³⁴ *A Review of the Literature Related to Potential Health Effects of Aircraft Noise*, Hales Swift, Purdue University, 2010.

³⁵ van Kamp I, Davies H. Noise and health invulnerable groups: a review. *Noise Health*. 2013;15:153–9.

³⁶ Ristovska G, Laszlo HE, Hansell AL. Reproductive outcomes associated with noise exposure—a systematic review of the literature. *Int J Environ Res Public Health*. 2014;11(8):7931–52.

³⁷ Hohmann C, Grabenhenrich L, de Kluizenaar Y, et al. Health effects of chronic noise exposure in pregnancy and childhood: a systematic review initiated by ENRIECO. *Int J Hyg Environ Health*. 2013;216:217–29.

links between the effect of school noise exposure on children's cognitive skills such as reading and memory^{38,39,40}, as well as test scores^{41,42}.

- 5.3.7. Long term noise exposure is believed to have an influence on psychological health, although, with the exception of annoyance, there is not as strong a link as for other health outcomes.
- 5.3.8. Studies from adults suggest that repeated elevation of blood pressure in relation to noise exposure might have pathological effects on health in the long term.⁴³

BASELINE

- 5.3.9. The noise effects of motorised traffic are particularly acute in the more urban areas of Bath, Bristol, and parts of Weston-super-Mare. The tranquillity of areas such as the Cotswolds and Mendip Hills Areas of Outstanding Natural Beauty (AONB) is affected by traffic in some places (such as the area to the north of Bath and in parts of North Somerset). In addition to noise resulting from road transport, other sources in the region include the main rail stations in Bristol (Bristol Parkway and Bristol Temple Meads) and Bath (Bath Spa).

ASSESSMENT

- 5.3.10. Transport policies and associated transport proposals which promote a shift to active travel modes such as walking and cycling (L1, L3, N1, N2) are likely to lead to a reduction in road transport generated noise. However new sources of road transport noise is likely to occur as a consequence of promoting public transport improvements and use of new road transport links.
- 5.3.11. Transport policies and associated proposals involving additional rail movements (B2, W1 and W5) and new road links (B2) are at risk of increasing noise impacts upon sensitive receptors. Such impacts would be detrimental to health and permanent, though easily abated through noise barriers and bunding, and there is a commitment to work in partnership with Highways England and the rail industry to identify appropriate such mitigation measures.
- 5.3.12. Through creating clusters for business (as per Policy W5) the movement of freight may be concentrated, thereby potentially reducing noise impacts on resident populations though this is unlikely to reduce freight and commercial traffic.
- 5.3.13. Changes and additions to the road network (particularly as per Policies B2, W3 and W5) are likely to result in additional vehicle movements, reducing the tranquillity of rural and remote areas. However, there is a commitment to work with DEFRA (Policy N1) to protect the quietness of open spaces and

³⁸ Evans GW, Hyge S, Bullinger M. Chronic noise and psychological stress. *Psychol Sci.* 1995;6:333–8

³⁹ Evans GW, Bullinger M, Hygge S. Chronic noise exposure and physiological response: a prospective study of children living under environmental stress. *Psychol Sci.* 1998;9:75–7

⁴⁰ Hygge S, Evans GW, Bullinger M. A prospective study of some effects of aircraft noise on cognitive performance in schoolchildren. *Psychol Sci.* 2002;13:469–74

⁴¹ Stansfeld, S., Clark, C. 'Health Effects of Noise Exposure in Children'. *Curr Envir Health Rpt* (2015) 2:171–178

⁴² Kuh D, Ben-Shlomo Y. A lifecourse approach to chronic disease epidemiology. Oxford: Oxford University Press; 2004.

⁴³ Munzel T, Gori T, Babisch W, et al. Cardiovascular effects of environmental noise exposure. *Eur Heart J.* 2014;356:829–36.

ensure noise management measures such as noise barriers, speed limits and the renewal of carriageways are used appropriately.

- 5.3.14. At this stage it is unclear what the overall impact the JLTP will have on health outcomes as a consequence of transport related noise effects. Any health outcomes as a consequence of noise effects can only be reliably assessed on a local scale, as noise impacts are entirely dependent on the final individual scheme design. However, there are transport policies that are potentially adverse for health outcomes as a consequence of vulnerable receptors being exposed to new transport noise source, and the additional population likely to be affected. This will result in a **medium-term moderate adverse health outcome**, though this is likely to be temporary in nature due to likely improvement in technology such as the increased use of electric vehicles.

5.4. PHYSICAL ACTIVITY

EVIDENCE

- 5.4.1. Being physically active plays an essential role in ensuring health and well-being. It is known that physical activity benefits many parts of the body; the heart, skeletal muscles, bones, blood (for example, cholesterol levels), the immune system and the nervous system. Exercise and physical activity can reduce some of the risk factors for non-communicable diseases (NCDs), including reducing blood pressure, improving blood cholesterol levels, and lowering body mass index (BMI)⁴⁴ (Table 11).

Table 11 Relationship between physical activity and health⁴⁵

Health Topic	Evidence of the effect of physical activity
Overall death rate	Approximately 30% risk reduction for the most active compared with the least active
Cardiovascular health	20% to 35% lower risk of cardiovascular disease, coronary heart disease and stroke
Metabolic health	30% to 40% lower risk of type 2 diabetes in at least moderately active people compared with those who are sedentary
Musculo-skeletal health	36% to 68% risk reduction of hip fracture at the highest level of physical activity
Falls	Older adults who participate in regular physical activity have an approximately 30% lower risk of falls

⁴⁴ 'Global Health Risks: Selected figures and tables'

:www.who.int/entity/healthinfo/global_burden_disease/global_health_risks_report_figures.ppt

⁴⁵ Start active, Stay Active: A report on physical activity for health from the four home countries' Chief Medical Officers.

<http://www.ssehsactive.org.uk/userfiles/Documents/startactvestayactive.pdf> Access on 9/10/19.

Health Topic	Evidence of the effect of physical activity
Cancer	Approximately 30% lower risk of colon cancer and 20% lower risk of breast cancer for adults participating in daily physical activity
Mental health	Approximately 20% to 30% lower risk for depression and dementia for adults participating in daily physical activity.

- 5.4.2. Physical activity plays an important part in a number of diseases, such as type 2 diabetes, heart disease and some cancers. The World Health Organization (WHO) estimates that physical inactivity is the fourth leading risk factor for global mortality⁴⁶ and physical inactivity is responsible for 6% of deaths globally – around 3.2 million deaths per year, including 2.6 million in low and middle-income countries, and 670,000 of these deaths are premature.⁴⁷ Symptoms of depression in adolescents have also been linked to higher BMI and low levels of physical activity,⁴⁸ particularly among young women.⁴⁹
- 5.4.3. It has been stated that the impact of physical inactivity on mortality could even rival tobacco use as a cause of death.⁵⁰
- 5.4.4. Walkable environments assist a population to achieve their physical activity targets, compared with less walkable area residents. Populations meet physical activity targets where safe places to walk exist within ten minutes of home. The presence or absence of walkable streets is related to longevity, even after adjustment for demographic and socioeconomic factors and baseline health status.⁵¹
- 5.4.5. Switching journeys from cars to walking, cycling and public transport not only has a large beneficial impact on the individual's health, but a wider benefit to the population health as there are corresponding decreases in overall air pollution levels.

⁴⁶ 'Global Health Risks: Selected figures and tables'
:www.who.int/entity/healthinfo/global_burden_disease/global_health_risks_report_figures.ppt'

⁴⁷World Health Organization, Global Recommendations on Physical Activity for Health (WHO, 2011):
http://whqlibdoc.who.int/publications/2010/9789241599979_eng.pdf

⁴⁸ Hill AJ, Draper E, Stack J. A weight on children's minds: body shape dissatisfactions at 9-years old. International Journal of Obesity 1994;18:383-389.

⁴⁹Ball K, Burton NW, Brown WJ. A prospective study of overweight, physical activity, and depressive symptoms in young women. Obesity 2009;1791:66-71.

⁵⁰ I.-M. Lee et al., 'Effect of physical activity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy', The Lancet (2012) 380: 219: http://press.thelancet.com/physicalactivity.pdf, p. 227.

⁵¹Takano T, Nakamura H, Watanabe N. Urban residential environments and senior citizens' longevity in megacity areas: the importance of walkable green spaces. J Epidem Community Health. 2002;56(12):913-918. doi: 10.1136/jech.56.12.913.

- 5.4.6. Increasing levels of cycling and walking can reduce the risk of diseases such as cardiovascular disease, diabetes and dementia. Those that are most inactive will benefit the most.
- 5.4.7. Countries with the highest levels of active travel generally have the lowest obesity rates.

BASELINE

- 5.4.8. As shown above in the Public Health Profile indicators (Table 3), the proportion of adults who are physically active in the region is significantly higher than the England average.⁵²
- 5.4.9. Table 12 below shows proportions of adults undertaking specific activities compared to the England average. Bath and North East Somerset is the only local authority which is significantly better than the national average in terms of adults who walk at least once a week, the remaining three local authorities are all not statistically different.
- 5.4.10. Bristol is the only local authority which is significantly better than the national average in terms of adults who cycle at least once a month, the remaining three local authorities are all not statistically different.

Table 12 Physical Activity Levels Across the Study Area⁵³

	England	Bath and NE Somerset	Bristol	N Somerset	S Gloucestershire
Adults who do any walking, at least once per week (%) (2014/15)	80.6	85.3	80.2	81.8	80.8
Adults who do any cycling, at least once per month (%) (2014/15)	14.7	17.1	19.3	15.7	17.4

ASSESSMENT

- 5.4.11. The greater reliance on active travel modes and improved connectivity of transportation within the region, within the transport proposals could lead to an increase in physical activity.
- 5.4.12. While physical activity levels are high amongst the current population, the proportion of activity within the population is likely to increase as a result of more people gaining access to additional transport options (including those living in more rural locations).

⁵² Public Health England, Local Authority Health Profiles <https://fingertips.phe.org.uk/profile/health-profiles>

⁵³ Public Health England, Physical Activity Tool <https://fingertips.phe.org.uk/profile/physical-activity>

- 5.4.13. The transport policies and associated proposals promoting active travel (W1, L1, L3, and N2) and those that promote improvements to public transport (W1) and improved connectivity of transportation within the region, could lead to an increase in physical activity amongst the region's population.
- 5.4.14. As summarised in the evidence section above, where a population experiences an increase in physical activity and exercise it can have a benefit to both mental and physical health.
- 5.4.15. The transport policies and associated proposals within the draft JLTP are likely to have a **long term major beneficial permanent impact** on health outcomes due to the health benefits as a consequence of schemes containing both walking and cycling initiatives, both of which the West of England are strongly committed to supporting in the region.

5.5. ROAD SAFETY

EVIDENCE

- 5.5.1. Traffic collision casualty rates tend to decline as public transit travel increases in an area. Residents of public transport-oriented communities have only about a quarter of the per capita traffic fatality rate as residents of sprawled, private car-dependent communities.⁵⁴
- 5.5.2. British roads are now among the safest in the world, but cyclists and pedestrians remain particularly vulnerable road users. Aside from the effect that casualties have on individuals and their families, pedestrian and cyclist casualties are a significant burden on local health services. Furthermore, safety concerns are often cited as a reason why people do not cycle or, for example, allow children to walk to school meaning that they are missing the opportunity to do more physical activity and improve their health.⁵⁵
- 5.5.3. Whether children actively commute to school may be determined by parents' perception of safety of the mode of transport, lack of time in the morning and social factors such as no other children to walk with.⁵⁶
- 5.5.4. The most common cause of death for children aged 5-14 years is being hit by a vehicle, and 35% of all pedestrian fatalities are people over the age of 70.⁵⁷

⁵⁴ Evaluating Public Transportation Health Benefits 14 June 2010 Todd Litman Victoria Transport Policy Institute For The American Public Transportation Association (http://www.apta.com/resources/reportsandpublications/Documents/APTA_Health_Benefits_Litman.pdf)

⁵⁵ Cambridgeshire County Council, 2015. *Transport and Health JSNA – Active Travel*. [[online](#)] Accessed 15/01/2018

⁵⁶ J Salmon, Salmon L., Crawford D., Hume C., and A Timperio, 2007. *Associations Among Individual, Social, and Environmental Barriers and Children's Walking or Cycling to School*. American Journal of Health Promotion, November/December 2007, Vol. 22, No. 2, pp. 107-113.

⁵⁷ Sustainable Development Commissions, 2011. *Fairness in a Car Dependant Society* [[online](#)] Accessed on 11/10/18

BASELINE

- 5.5.5. As shown in the Public Health Profile indicators above (Table 2), the proportion of people killed or seriously injured on roads (per 100,000) is significantly better in all four local authorities than the England average⁵⁸.
- 5.5.6. In Bristol City Council's Road Safety Review 2015, a steady decline in the number of car occupants and pedestrians injured over the previous nine years was observed, though the number of cyclists injured seems to fluctuate from year to year.⁵⁹
- 5.5.7. The Joint Local Transport Plan 3 has a target of achieving a 30% reduction in the number of people Killed and Seriously injured across the West of England by 2020 (based on the average between 2005-09). The 2015/16 JLTP3 Progress Report shows positive progress towards this target.

ASSESSMENT

- 5.5.8. Improving road safety for motorcyclists and supporting education for cyclists, along with the use of cycle lanes will have a **long-term major beneficial permanent impact on health outcomes** in terms of road safety. In particular, seeking to reduce the number and severity of casualties (Policy L2) will have a beneficial impact on those most likely to be injured (children and older people).
- 5.5.9. There is an assumption that any improvements to the wider road network (such as Policies B2 and W4) will also lead to improvements to road safety through design.

5.6. ECONOMY AND EMPLOYMENT

EVIDENCE

- 5.6.1. In general, motorised road transport better serves those who are already more advantaged, with the richest 10% of the population receiving almost four times as much public spending on their transport needs as the poorest 10%, due to their overall higher level of travelling and greater use of cars and trains instead of buses.⁶⁰
- 5.6.2. Residents in deprived communities tend to travel less, but feel the impacts from travel, such as poorer air quality, higher noise levels and higher collision rates, due to having a higher density of main roads in their area.⁶¹

⁵⁸ <https://fingertips.phe.org.uk/profile/health-profiles>

⁵⁹ <https://www.bristol.gov.uk/documents/20182/34140/Road+casualty+review+2015/deab40a2-ccc7-1536-4afa-f7b1fd2787af>

⁶⁰ Sustainable Development Commissions, 2011. Fairness in a Car Dependant Society [[online](#)] Accessed on 11/10/18

⁶¹ Faculty of Public Health Transport and Health Briefing Statement

- 5.6.3. Employment is an important determinant of health; having a job or an occupation provides a vital link between an individual and society, and enables people to contribute to society and achieve personal fulfilment.^{62 63}
- 5.6.4. The WHO identifies a number of ways in which employment benefits mental health.⁶⁴ These include the provision of structured time, social contact and satisfaction arising from involvement in a collective effort. Therefore the loss of a job or the threat of losing a job is considered detrimental to health.⁶⁵
- 5.6.5. Income is a key factor through which employment status affects health and wellbeing. The Department of Work and Pensions study found that:
*“employment is generally the most important means of obtaining adequate economic resources, which are essential for material well-being and full participation in today’s society ... employment and socio-economic status are the main drivers of social gradients in physical and mental health and mortality”.*⁶⁶
- 5.6.6. Children, particularly from low-income families, are more sensitive than adults to air pollution, noise and other environmental factors. Pregnant women in poverty and deprivation can lead to adverse health effects on unborn babies’.⁶⁷
- 5.6.7. The Marmot Review was commissioned by the Department of Health to look into health inequalities in England. The Review identifies six policy objectives for reducing health inequalities, one of which is to ‘Create fair employment and good work for all’. The Review identifies the importance of work for health: ‘being in good employment is protective of health. Conversely, unemployment contributes to poor health’.⁶⁸
- 5.6.8. The London Health Commission’s report Health in London: Review of the London Health Strategy High Level Indicators describes unemployment as: ‘a significant risk factor for poor physical and mental health and a major determinant of health inequalities. It is associated with morbidity, injuries

⁶² Doyle C, Kavanagh P, Metcalfe O, and T Lavin. 2005. *Health Impacts of Employment: A Review*. The Institute of Public Health in Ireland. [\[online\]](#)

⁶³ Sustainable Development Commissions, 2011. Fairness in a Car Dependant Society [\[online\]](#) Accessed on 11/10/18

⁶⁴ World Health Organisation. Mental Health. Available at: <http://www.who.int/mentalhealth/en>.

⁶⁵ Marmot M, Wilkinson R, editors. *The solid facts*. 2nd ed. Geneva: World Health Organisation; 2003

⁶⁶ Waddell, G., Burton, A. K., 2007. Is work good for your health and well-being? The Stationery Office.

⁶⁷ Xu Xiaohui; Sharma Ravi K.; Talbott Evelyn O.; et al. (2011) PM₁₀ air pollution exposure during pregnancy and term low birth weight in Allegheny County, PA, 1994-2000 INTERNATIONAL ARCHIVES OF OCCUPATIONAL AND ENVIRONMENTAL HEALTH Volume: 84 Issue: 3 Pages: 251-257

⁶⁸ Marmot, M., Allen, J., Goldblatt, P., Boyce, T., McNeish D., Grady, M. and Geddes, I., 2010, Fair society, healthy lives: Strategic review of health inequalities in England post-2010, The Marmot Review. Page 26, para 1.

and premature mortality, especially through increased risk of coronary heart disease. It is also related to depression, anxiety, self-harm and suicide'.⁶⁹

- 5.6.9. The type of job a person has and the working conditions he or she is exposed to will also affect health. It is also important to consider the impact that employment has on other aspects of people's lives that are important for health – for example, family life, social life and caring responsibilities for family members.

BASELINE

- 5.6.10. As shown below in Table 8, the level of unemployment in all four local authorities is below the national average, with North Somerset showing the lowest rate. Bath and North East Somerset and Bristol are similar to the national average for proportion of workless households, while North Somerset and South Gloucestershire had smaller proportions.
- 5.6.11. In terms of employment by occupation, each local authority had a greater proportion of the population employed as Managers, Directors, Senior Officials, Professionals, Associate Professionals and Technical than the England average. Correspondingly, each local authority has a smaller proportion of their population employed as Process Plant & Machine Operatives and in Elementary Occupations compared to the national averages.

Table 13 Economic Data (2017)⁷⁰

	Economically Active: Unemployed (%)	Economically inactive Households (%)	Managers and Professionals (Soc 2010 Major Group 1-3) (%)	Administrative and Skilled Trades (Soc 2010 Major Group 4-5) (%)	Caring, Leisure, Sales and customer service (Soc 2010 Major Group 6-7) (%)	Plant & Machine Operatives and Elementary Occupations (Soc 2010 Major Group 8- 9)
Great Britain	4.3	21.6	45.8	20.6	16.7	16.9
Bath and NE Somerset	3.7	20.7	54.6	17.5	14.4	13.5
City of Bristol	3.8	18.8	56.9	13.6	15.3	14.2
N Somerset	3.2	9.5	47.8	22.4	15.9	13.9
S Gloucestershire	3.3	7.6	47.9	23.8	14.2	14.0

⁶⁹ Greater London Authority, 2005, Health in London: Review of the London Health Strategy High Level Indicators, London Health Commission

⁷⁰ Official Labour Market Statistics, 2017 <https://www.nomisweb.co.uk/reports/lmp/la/contents.aspx>

ASSESSMENT

- 5.6.12. It is anticipated that the JLTP will have a **long-term moderate beneficial permanent** impact on health outcomes in terms of economy and employment, particularly for those on low income or unemployed. Although not under the responsibility or control of the West of England authorities, improved transport networks alongside improvements to Bristol Airport and Bristol Port should help economic stability and growth within the region by enhancing competitiveness, improve connectivity, and provide greater resilience across the transport network.
- 5.6.13. Enabling goods and services to move freely around the region as a result of network improvements (Policies B1, B2, W3, W4, and W5) should contribute to the strength of the local economy, and in turn provide employment opportunities in the region.
- 5.6.14. Improving the ability of people to move around the region (Policies W1, W2 and L4) by road, public transport and other methods, will not only assist existing residents (particularly those without access to a car) to access employment and training opportunities, but also support the regions tourism industry.

5.7. ACCESS AND ACCESSIBILITY

EVIDENCE

- 5.7.1. Transportation and access are known to promote social inclusion, as social exclusion can occur as a result of a community not being able to easily access transport options, amongst other things.
- 5.7.2. The Social Exclusion Unit states that ‘participation in social, cultural and leisure activities is very important to people’s quality of life and can play a major part in meeting policy goals like improving health, reducing crime and building cohesive communities’. Problems with transport and the location and delivery of services contribute to social exclusion by preventing people from participating in work or learning and from accessing healthcare, food shopping and other local activities. People in deprived communities also suffer the worst effects of road traffic through pollution and pedestrian accidents.⁷¹
- 5.7.3. According to the Department for Transport, ‘over the course of a year over 1.4 million people miss, turn down or simply choose not to seek healthcare because of transport problems’⁷². Capacity to reach healthcare services is affected by the accessibility of transport modes, availability of financial support for those on low incomes and the location of healthcare services⁷³. Groups impacted by

⁷¹ Social Exclusion Unit, 2003. Making the connections: Final report of Transport and Social Exclusion. [[online](#)]

⁷² Social Exclusion Unit, 2003, Making the Connections: Final Report on Transport and Social Exclusion

⁷³ Randall, C., 2012, Measuring National Well-being - Where we Live – 2012, Office for National Statistics

disability and of certain ages may experience even greater barriers to health and social care services.⁷⁴

- 5.7.4. Community severance is separation of different areas within a community by the flow of traffic.⁷⁵ Social networks are susceptible to severance by physical barriers, such as roads and traffic, which can create both real and perceived barriers to social contact. For example, children may not be allowed to visit friends unaccompanied because of parental concern over road traffic accidents.
- 5.7.5. A study illustrating the effect of traffic on social contacts in three streets was performed in San Francisco.⁷⁶ It was found that people living on the street with lightest traffic had twice as many acquaintances and three times as many friends as those people who lived on the street with the heaviest traffic.
- 5.7.6. Social capital was measured across different neighbourhoods and it was found that people in “car-dependent” localities were less likely to know and trust their neighbours and to participate in local organizations than people who lived in “walkable”, pedestrian orientated localities with less traffic and congestion⁷⁷.
- 5.7.7. A similar study in Bristol also demonstrated that the volume and speed of motorised traffic can reduce opportunities for positive interactions between residents in a neighbourhood and can contribute to increased social isolation.⁷⁸

BASELINE

- 5.7.8. The proportion of people who travelled to work by car (either driving or as a passenger) and by public transport in the four West of England authorities is shown below in Table 14. In North Somerset and South Gloucestershire, as in many rural communities, accessibility of jobs by public transport, cycling or walking is relatively low.

Table 14 Method of Travel to Work (%)⁷⁹

	England	Bath and NE Somerset	Bristol	North Somerset	South Gloucestershire
Work mainly at or from home	3.47	4.99	2.98	4.42	3.37

⁷⁴ Hamer, L., 2004, Improving patient access to health services: a national review and case studies of current approaches, Health Development Agency

⁷⁵ McCarthy M. Transport and health. In: Marmot M, Wilkinson RG, editors. Social determinants of health. Oxford; New York: Oxford University Press; 1999.

⁷⁶ Appleyard D, Lintell M. The environmental quality of city streets: the resident's viewpoint. Am Instit Planners J 1972; 38:84-101.

⁷⁷ Leyden KM. Social capital and the built environment: the importance of walkable neighbourhoods. Am J Public Health 2003; 93:1546-51.

⁷⁸ Hart, J & Parkhurst, G (2011) Driven to excess: Impacts of motor vehicles on the quality of life of residents of three streets in Bristol UK. World Transport Policy & Practice, 17 (2). pp 12-30.

⁷⁹ Office for National Statistics, 2011. <https://www.nomisweb.co.uk/census/2011/qs701ew> Accessed on 15/10/18

	England	Bath and NE Somerset	Bristol	North Somerset	South Gloucestershire
Underground, metro, light rail, tram	2.64	0.09	0.09	0.07	0.05
Train	3.46	2.34	1.29	1.61	0.90
Bus, minibus or coach	4.85	4.19	6.29	2.02	3.5
Taxi	0.34	0.17	0.19	0.25	0.14
Motorcycle, scooter or moped	0.53	0.68	0.74	0.67	0.99
Driving a car or van	36.90	36.04	32.57	45.98	49.49
Passenger in a car or van	3.25	2.98	3.18	3.52	3.61
Bicycle	1.91	1.94	5.04	1.85	2.78
On foot	6.95	11.17	12.59	6.36	5.79
Other method of travel to work	0.42	0.41	0.35	0.37	0.31
Not in employment	35.28	35.0	34.68	32.88	29.06

- 5.7.9. The average distance travelled to work in North Somerset is the highest of the four local authorities, at 17.9km and contrasts with the average for Bristol which was 12.0. The averages for Bath and North East Somerset and South Gloucestershire are similar to the England average (14.9km) at 14.4km and 14.6km respectively.⁸⁰
- 5.7.10. The proportion of households with a car or van is highest in North Somerset (82.83%) and South Gloucestershire (86.94%), with Bath and North East Somerset also having a high proportion when compared to the England average (78.02% and 74.20% respectively). The proportion of households with a car or van in Bristol is lower than the England average at 71.1%, which likely reflects Bristol's urban environment.⁸¹

⁸⁰ Office for National Statistics, 2011 <https://www.nomisweb.co.uk/census/2011/qs702ew> Access on 15/10/18

⁸¹ Office for National Statistics, 2011 <https://www.nomisweb.co.uk/census/2011/qs416ew> Accessed on 15/10/18

ASSESSMENT

- 5.7.11. It is anticipated that the draft JLTP will have a **long term major beneficial permanent impact** on health outcomes in terms of access and accessibility for all population groups. A more resilient transport network should lead to improved and more reliable journeys, particularly for freight and commercial transport, but also for the local population, especially those with access to cars.
- 5.7.12. Better public transport provision (Policy W1), increased transport options (Policies W2 and L1), particularly for those with reduced mobility, and connectivity between transport options will improve access to local facilities including employment and educational opportunities, as well as enable better access to local services and facilities, including health care. Those without access to a car are likely to see the greatest benefit, particularly if they live more rurally and are at greater risk of isolation.

6. CONCLUSIONS

6.1. SUMMARY

6.1.1. A summary of health impacts has been brought together in Table 15 below.

Table 15 Summary of WECA JLTP4 Health Impacts

	Children & Young People	Older People	People with Disabilities	People with existing health conditions	Unemployed and low-income groups	Socially excluded or isolated groups	Commentary
Air Quality	L+++ P	L+++ P	L+++ P	L+++ P	L+++ P	L+++ P	Major beneficial health outcome for urban population, as more likely to benefit from a modal shift to active travel, and specific policy to identify improvement opportunities.
	M-- P	M-- P	M-- P	M-- P	M-- P	M-- P	Moderate adverse health outcome for population in close proximity to strategic road network, and those close to new proposed road links, due to health effects from degradation in air quality
Noise	M-- T	M-- T	M-- T	M-- T	M-- T	M-- T	Improvements to the road network and public transport likely to produce moderate adverse health outcomes as a consequence of road derived noise effects. Longer term improvements in technology could

	Children & Young People	Older People	People with Disabilities	People with existing health conditions	Unemployed and low-income groups	Socially excluded or isolated groups	Commentary
							see a reduction in noise impacts. Policy N1 recognises the need to work with DEFRA, Highways England and the rail industry in tackling noise and protecting the tranquillity of open spaces.
Physical Activity	L+++ P	L+++ P	L+++ P	L+++ P	L+++ P	L+++ P	Major beneficial health outcomes for urban population, as a result of increased levels of physical activity from active travel opportunities.
Road Safety	L+++ P	L+++ P	L+++ P	L+++ P	L+++ P	L+++ P	Major beneficial health outcome as a result of targeted specific policy to reduce road user casualties.
Economy and Employment	L++ P	Neutral	L++ P	L++ P	L++ P	L++ P	Moderate long term beneficial health outcome as a result of enhanced competitiveness and connectivity of the region, and potential employment opportunities resulting from a strong local economy.
Access and Accessibility	L+++P	L+++P	L+++P	L+++P	L+++P	L+++P	Major beneficial impact across all

	Children & Young People	Older People	People with Disabilities	People with existing health conditions	Unemployed and low-income groups	Socially excluded or isolated groups	Commentary
							populations with improvements to transport networks and a wider variety of travel options available to suit different needs.

- 6.1.2. A rapid assessment of the health impact of the draft Joint Local Transport Plan for the West of England has been undertaken. Key health issues identified were direct and indirect effects of the proposed policies on the populations of Bath and North East Somerset, Bristol, North Somerset and South Gloucestershire. These include air quality, noise, physical activity, road safety, economy and employment, and access and accessibility.
- 6.1.3. As assessment of health, population, environment and deprivation was undertaken, focussing on the health outcomes upon selected vulnerable groups.

6.2. LIMITATIONS

- 6.2.1. Many of the policies proposed within the Joint Local Transport Plan 4 have a degree of uncertainty attached to them which means their assessment has been limited to a strategic level. Details relating to the specific planned activities or actions, timescales of implementation, location or funding of the proposed policies are not available at this time. Specific schemes are subject to the relevant consenting processes as well as environmental legislation, including Environmental Impact Assessment which will take into account scheme impacts upon Population and Human Health, proposing mitigations where adverse impacts arise.

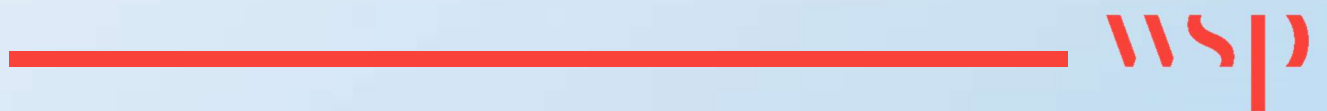
6.3. CONCLUSIONS

- 6.3.1. The single greatest potential health outcome of the draft Joint Local Transport Plan has been assessed as the indirect health benefits from improved access to, and accessibility of, transport options. These benefits have been assessed as being of long-term, permanent, major benefit for all groups.
- 6.3.2. In addition, the proposed development has been assessed as providing indirect health benefits as a consequence of improving air quality in urban areas, encouraging greater physical activity through active travel, and providing economic and employment benefits in the region.
- 6.3.3. In contrast to the beneficial impacts above, the policy has been assessed as potentially contributing to adverse health outcomes as a consequence of potential noise impacts. Moderate adverse health outcomes were predicted as a result of an unlikely reduction in traffic on transport networks despite improvements to the road networks and public transport provisions in the region. These potential adverse effects would be scheme and location specific and the implementation of mitigation

measures associated with Policy N1 and / or the Environmental Impact Assessment process (where relevant) are likely to reduce their impact. These adverse health effects associated with noise are considered temporary, as improvements might be made through technological development.

Appendix E

POLICIES, PLANS AND PROGRAMMES REVIEW



Appendix E Policies, Plans and Programmes Review

OWNER	POLICY, PLAN, PROGRAMME OR LEGISLATION	OBJECTIVE OR REQUIREMENTS OF THE POLICY, PLAN, PROGRAMME OR LEGISLATION	HOW THE OBJECTIVES OR REQUIREMENTS HAVE BEEN TAKEN ON BOARD
ARCHIVED. Replaced by Securing the future - delivering UK sustainable development strategy (see below)	The Future of Transport White Paper 2004: A network for 2030	Ensure we can benefit from mobility and access while minimising the impact on other people and the environment, now and in the future. Get the best out of our transport system without damaging our overall quality of life. Develop strategies that recognise that demand for travel will increase in the future. 20% reduction in CO ₂ emissions by 2010 and 60% reduction by 2050. Transport is currently responsible for about a quarter of total emissions.	Ensure policies provide for an increase in demand for travel whilst minimising impact on the environment and promote public transport use rather than increasing reliance on the car.
Bath and North East Somerset	Bath and North East Somerset Core Strategy 2016 - 2036 (under consultation)	Sets out the requirements for new housing and employment to 2036.	Ensure policies support planned housing and employment growth, provide for an increase in demand for travel whilst minimising the impact on the environment and promoting public transport, cycling and walking.
Bath and North East Somerset	Valuing people, place and nature: a green infrastructure strategy for Bath and North East Somerset (2013)	Developing networks of natural spaces and corridors. Benefits include supporting healthy lifestyles, providing active access to the outdoors, enhancing landscape character and built heritage, enhancing biodiversity, supporting healthy ecosystems and invigorating the local economy.	Ensure policies provide for an increase in demand for travel whilst minimising the impact on the environment and promoting public transport, cycling and walking.

Bristol City Council	Bristol Core Strategy: adopted June 2011 (2011 - 2026)	Sets out the requirements for new housing and employment to 2026.	Ensure policies support planned housing and employment growth, provide for an increase in demand for travel whilst minimising the impact on the environment and promoting public transport, cycling and walking.
Bristol City Council	Health and Wellbeing Strategy (2013)	<p>Strategy identifies four themes to make Bristol a place:</p> <ul style="list-style-type: none"> filled with healthy, safe and sustainable communities and places. where health and wellbeing are improving. where health inequalities are reducing. where people get access to quality support when and where they need it. 	Ensure policies support and promote public transport, cycling and walking.
Bath and North East Somerset	Bath and North East Somerset Health and Wellbeing Strategy (2015-2019)	<p>The strategy identifies three themes and eleven priorities set the framework for action:</p> <ul style="list-style-type: none"> Theme 1 Preventing ill health by helping people to stay healthy; Theme 2 Improving the quality of people's lives; and Theme 3 Tackling health inequality by creating fairer life chances. 	Ensure policies take account of the wellbeing strategy.
Bath and North East Somerset	Bath and North East Somerset Clinical Commissioning Group Operation Plan: 2017-19	<p>BaNES strategic objectives</p> <ul style="list-style-type: none"> Improving quality, safety and individuals' experience of care Improving consistency of care and reducing variability of outcomes Providing proactive care to help people to age well and to support people with complex care needs 	Ensure policies take account of the operation plan.

		<ul style="list-style-type: none"> ▪ Creating a sustainable health system within a wider health and social care partnership ▪ Empowering and encouraging people to take personal responsibility for their health and wellbeing ▪ Reducing inequalities and social exclusion and supporting our most vulnerable groups ▪ Improving the mental health and wellbeing of our population 	
North Somerset Council	North Somerset's People and Communities Strategy 2017-2020	Priorities to enable North Somerset residents to improve their health and well-being throughout the life course, and to increase community safety and cohesion	Ensure policies support individuals & communities to promote independence & self-care approaches & maximise opportunities for digital communications to enhance access to information
Bristol City Council	Public Health Bristol: Vision and Priorities 2017 to 2019	Bristol Public Health Vision and Priorities shows priorities and core values for 2017 to 2019.	Ensure health and equity is integrated into all policies.
Council of Europe	European Landscape Convention (Florence, 2002)	The convention promotes landscape protection, management and planning.	Ensure policies take account of the Convention and include sustainability objectives to protect the archaeological heritage.
Council of Europe	European Convention on the Protection of the Archaeological Heritage (Valletta, 1992) Revision of the 1985 Granada	Protection of the archaeological heritage, including any physical evidence of the human past that can be investigated archaeologically both on land and underwater. Creation of archaeological reserves and conservation of excavated sites.	Ensure policies take account of the Convention and include sustainability objectives to protect the archaeological heritage.

	Convention and the 1969 London Convention		
DECC	DECC (2009) The UK Renewable Energy Strategy	Build the UK's low-carbon economy and promote energy security by increasing the use of renewable electricity, heat and transport. This would help to tackle climate change.	Encourage developments that would support renewable energy provision including transport. The UK Government suggests that 10% of transport energy could be from renewables, up from the current level of 2.6% of road transport consumption. Overall, 15% of energy should be from renewable sources by 2020 and the UK CO ₂ emissions should be reducing by 750 million tonnes by 2030.
DEFRA	Natural Environment White Paper (2011) The Natural Choice: securing the value of nature	Protecting and improving our natural environment; Growing a green economy; and Reconnecting people and nature.	Protect the intrinsic value of nature, recognise the multiple benefits it could have for communities and identify sustainability objectives relating to the enhancement of the natural environment.

DEFRA	Defra (2011) Biodiversity 2020: A strategy for England's wildlife and ecosystem services	The strategy aims to guide conservation efforts in England up to 2020. Its mission is to move from a net biodiversity loss to gain, support healthy well-functioning ecosystems and establish coherent ecological networks.	Ensure the goals of the strategy for 2020 and 2050, based on Aichi Targets set at the Nagoya UN Biodiversity Summit (2010), are supported and promoted by enhancing conservation and biodiversity.
DEFRA	Defra (2011) Securing the Future: Delivering UK Sustainable Development Strategy	Enable all people throughout the world to satisfy their basic needs and enjoy a better quality of life without compromising the quality of life for future generations. There are four shared priorities: <ul style="list-style-type: none"> ▪ sustainable consumption and production; ▪ climate change and energy; natural resource protection and ▪ environmental enhancement; and ▪ sustainable communities. 	Sets out indicators to give an overview of sustainable development and priority areas in the UK. Policies should meet the aims of the Sustainable Development Strategy.
DEFRA	Defra (2018/19) Air Quality: draft Clean Air Strategy 2018	Currently under consultation	Clean Air Strategy requirements will need to be incorporated in future land use and transport plans.
DEFRA	The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (2007) To be replaced by the draft Clean Air Strategy (see above).	Make sure that everyone can enjoy a level of ambient air quality in public spaces, which poses no significant risk to health or quality of life. Render polluting emissions harmless. Sets air quality standards for 13 air pollutants.	Ensure sustainability objectives to protect and improve air quality are promoted and develop policies that aim to meet the air quality standards.

DEFRA	Safeguarding our Soils (2009) A Strategy for England	<p>Vision: By 2030, all England's soils will be managed sustainably and degradation threats tackled successfully. This will improve the quality of England's soils and safeguard their ability to provide essential services for future generations. Objectives include:</p> <ul style="list-style-type: none"> ▪ agricultural soils will be better managed and threats to them will be addressed; ▪ soils will play a greater role in the fight against climate change and in helping us to manage its impacts; ▪ soils in urban areas will be valued during development, and construction practices will ensure vital soil functions can be maintained; and ▪ pollution of our soils is prevented, and our historic legacy of contaminated land is being dealt with 	Support the actions of this strategy to protect and enhance soil resources which may be damaged through transport infrastructure development.
Department for Transport	Strategic Framework for Road Safety (2011)	Sets out the DfT's approach to continuing to reduce killed and seriously injured casualties on Britain's roads. The focus is on increasing the range of educational options for the drivers who make genuine mistakes and can be helped to improve while improving enforcement against the most dangerous and deliberate offenders. At the local level to increase the road safety information that is available to local citizens.	Ensure local road safety policies continue to reduce casualties for all road users on the local road network.
Environment Agency	South West river basin district flood risk management plan 2015 - 2021	Under the Flood Risk Regulations (2009) Incorporate Flood Risk flood risk management plans have to be Management Plans. produced and published by December 2015. Lead local flood authorities will produce flood risk management plans for Flood Risk Areas. Flood Risk Areas have been identified through a Preliminary Flood Risk Assessment published in December 2011.	Incorporate Flood Risk Management Plans

Environment Agency	Severn river basin district river basin management plan		
EU	EU Health Program 2014-2020	<p>The EU Health Programme outlines the strategy for ensuring good health and healthcare. It feeds into the overall Europe 2020 strategy which aims to make the EU a smart, sustainable and inclusive economy promoting growth for all – one prerequisite for which is good health. The Programme is focusing on major Commission priorities, such as:</p> <ul style="list-style-type: none"> ▪ Jobs, growth and investment (health of population and health care services as a productive factor for growth and jobs) ▪ Internal market (for pharmaceuticals, medical devices, cross-border health care directive, and Health Technology Assessment) ▪ Single digital market (including eHealth) ▪ Justice and fundamental rights (fighting against health inequalities) ▪ Migration policy ▪ Security (preparedness and management of serious cross border health threats). 	Ensure policies take account of the health program.
EU	SEA Directive 2001 Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment	Provide for a high level of protection of the environment and contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development.	Requirements of the Directive must be met in SEAs.

EU	The Birds Directive 2009 Directive 2009/147/EC of the European Parliament and of the Council of 30 November 2009 on the conservation of wild birds (this is the codified version of Directive 79/409/EEC as amended)	Creates a comprehensive scheme of protection for all wild bird species naturally occurring in the EU and places great emphasis on the protection of habitats for endangered as well as migratory species.	Include objectives for the protection of birds.
EU	The Floods Directive 2007 Directive 2007/60/EC on the assessment and management of flood risks	Establish a framework for the assessment and management of flood risks, aiming at the reduction of the adverse consequences for Human health, the environment, cultural heritage and economic activity associated with floods.	Ensure policies take account of the Directive and include sustainability objectives that relate to flood management and reduction of risk.
EU	The Water Framework Directive 2000 Directive 2000/60/EC establishing a framework for community action in the field of water policy	Established to regulate water bodies in all EU member states to develop a framework to protect and prevent deterioration of Europe's water bodies, which should all achieve 'good' water quality status by 2015.	Ensure policies take account of the Directive and include sustainability objectives to protect and minimise the impact on water quality. Regulation 17 states that each public body has a duty in exercising their functions so far as affecting a river basin district, to have regard to River Basin Management Plans (RBMPs). The RBMPs contain the status and objectives for all water bodies, and the actions that

			will be taken to achieve these outcomes.
EU	Directive 2008/50/EC on ambient air quality and cleaner air for Europe	<p>Designed to avoid, prevent or reduce harmful effects on Human health and the environment as a whole, setting out measures for the assessment of ambient air quality and obtaining information on ambient air quality in order to help combat air pollution and nuisance. It includes the following key elements:</p> <ul style="list-style-type: none"> ▪ The merging of existing legislation (except for the fourth daughter directive) with no change to existing air quality objectives ▪ New air quality objectives for PM2.5 including the limit value and exposure related objectives ▪ The possibility to discount natural sources of pollution when assessing compliance ▪ The possibility for time extensions of three years (PM10) or up to five years (NO2, benzene) for complying with limit values 	Local plans should support this Directive by ensuring the air pollution is managed and possible steps are taken to alleviate air quality problems.
EU	Directive 2002/49/EC The European Noise Directive	<p>Environmental Noise Directive (END) - concerns noise from road, rail and air traffic and from industry. It requires:</p> <ul style="list-style-type: none"> ▪ the determination of exposure to environmental noise, through noise mapping; ▪ provision of information on environmental noise and its effects on the public; 	Local plans should support this Directive by ensuring that noise concerns are managed and action taken.

		<ul style="list-style-type: none"> ▪ adoption of action plans, based upon noise mapping results, which should be ▪ designed to manage noise issues and effects, including noise reduction if necessary; ▪ preservation by the member states of environmental noise quality where it is good. 	
EU	The Habitats Directive 1992 Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora	Promoted the maintenance of biodiversity by requiring Member States to define a common framework for the conservation of habitats and wild species listed on the Annexes to the Directive at a favourable conservation status, introducing robust protection for those habitats and species of European importance.	Ensure policies take account of the Directive and include sustainability objectives to protect and maintain the natural environment and important landscape features.
EU	Transport White Paper (2011) Towards a competitive and resource efficient transport system	<p>Aims to increase mobility, remove major barriers in key areas, fuel growth and employment, while dramatically reducing Europe's dependence on imported oil and cut carbon emissions in transport by 60% by 2050. By 2050, key goals will include:</p> <ul style="list-style-type: none"> ▪ No more conventionally-fuelled cars in cities. ▪ 40% use of sustainable low carbon fuels in aviation; at least 40% cut in shipping emissions. ▪ 50% shift of medium distance intercity passenger and freight journeys from road to rail and waterborne transport. ▪ All of which will contribute to a 60% cut in transport emissions by the middle of the century. 	Promote the aims of the White Paper through minimising impact on the environment as a result of transport use and promote more sustainable modes of transport.
Historic England	Historic England Good Practice Advice Note 1, 2 and 3.	Provide information to assist local authorities, planning and other consultants, owners, applicants and other interested parties in implementing historic environment policy in the National Planning Policy Framework (NPPF)	Should seek to protect and enhance the historic environment.

		and the related guidance given in the National Planning Practice Guide (PPG).	
Ministry of Housing, Communities and Local Government	National Planning Policy Framework (2018)	<p>Presumption in favour of sustainable development. Delivering sustainable development by:</p> <ul style="list-style-type: none"> ▪ Building a strong, competitive economy ▪ Ensuring vitality of town centres ▪ Promoting sustainable transport ▪ Requiring good design ▪ Protecting Green Belt Land ▪ Meeting the challenge of climate change, flooding, and coastal change ▪ Conserving and enhancing the natural environment ▪ Conserving and enhancing the historic environment 	Development plans have a statutory status as the starting point for decision making. Sustainability appraisal should be an integral part of the plan preparation process, and should consider all the likely significant effects on the environment, economic and social factors. This should include sustainability objectives relating to the key methods to deliver sustainable development.
North Somerset Council	North Somerset Council Core Strategy: amended January 2017 (2011 - 2026)	Sets out the requirements for new housing and employment to 2026.	Ensure policies support planned housing and employment growth, provide for an increase in demand for travel whilst minimising the impact on the environment and promoting public transport, cycling and walking.
Office for Low Emission Vehicles	Driving the future today (2013) A strategy for	Sets out the DfT's programme for ultra-low emission vehicles in the UK and ensure motoring is an	Ensure policies support the use and introduction of ultra-low emission vehicles.

	ultra-low emission vehicles in the UK	environmentally sustainable and affordable mode of transport for the long-term.	
South Gloucestershire Council	South Gloucestershire Council Core Strategy 2006 - 2027. Adopted 2013.	Sets out the requirements for new housing and employment to 2027.	Ensure policies support planned housing and employment growth, provide for an increase in demand for travel whilst minimising the impact on the environment and promoting public transport, cycling and walking.
South Gloucestershire Council	Joint Health and Wellbeing Strategy (2017 -2021)	The Strategy's aim is to improve the health and wellbeing of people in South Gloucestershire focusing including advice to local organisations and communities about what they can do.	Ensure policies provide for an increase in demand for travel whilst minimising the impact on the environment and promoting public transport, cycling and walking.
UK Government	Climate Change Act (2008)	<p>This legislation introduces the world's first long term legally binding framework to tackle the causes and consequences of climate change. Requirements include:</p> <ul style="list-style-type: none"> ▪ An aim to improve carbon management and help the transition towards a low carbon economy in the UK; <ul style="list-style-type: none"> - Legally binding targets: Reductions in CO₂ emissions of at least 26% by 2020, against a 1990 baseline. The 2020 target will be reviewed to reflect the move to all greenhouse gases and the increase in the 2050 target to 80%; ▪ On adaptation the Government must report at least every five years on the risks to the UK of climate change, and publish a programme setting out how 	Ensure policies provide for an increase in demand for travel whilst taking action against climate changes, minimising the impact on the environment and promoting public transport, cycling and walking.

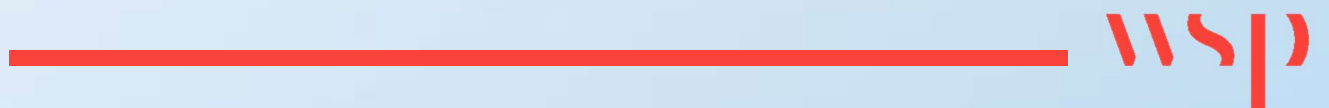
		these impacts will be addressed. The Act also introduces powers for Government to require public bodies and statutory undertakers to carry out their own risk assessment and make plans to address those risks.	
UK Government	Ancient Monuments and Archaeological Areas Act (1979) (amended)	Law passed by the government to protect the archaeological heritage of Great Britain. Section 61(12) defines sites that warrant protection due to their being of national importance as 'ancient monuments'. These can be either Scheduled Ancient Monuments or "any other monument which in the opinion of the Secretary of State is of public interest by reason of the historic, architectural, traditional, artistic or archaeological interest attaching to it". The Act (in Part II) also introduced the concept of Areas of Archaeological Importance, city centres of historic significance which receive limited further protection by forcing developers to permit archaeological access prior to building work starting.	Should seek to protect and enhance the historic environment, including designated historic assets while developing transport infrastructure
UK Government	Planning (Listed Building and Conservation Areas) Act 1990 (as amended in 2009)	Is an Act of the UK Parliament that altered the laws on granting of planning permission for building works, notably including those of the listed building system in England and Wales. The Planning (Listed Buildings and Conservation Areas) (Amendment No. 2) (England) Regulations 2009 came into force on 2 November 2009. They amend The Planning (Listed Buildings and Conservation Areas) (England) Regulations 1990 by substituting Schedule 4 of the 1990 Regulations (notices	Should seek to protect and enhance the historic environment, including listed building and conservation areas while developing transport infrastructure

		that a building has become listed or that a building has ceased to be listed), to reflect the fact that English Heritage now compiles lists of buildings of special architectural or historic interest and the Secretary of State is responsible for approving them.	
UK Government	The Flood and Water Management Act (2010)	Provides for better, more comprehensive management of flood risk for people, homes and businesses, helps safeguard community groups from unaffordable rises in surface water drainage charges, and protects water supplies to the consumer. Highway Authorities are responsible for providing and managing highway drainage and roadside ditches, and must ensure that road projects do not increase flood risk.	Project based aspects will need to consider future flood risk.
United Nations	Johannesburg Declaration on Sustainable Development (2002)	Commitment to building a humane, equitable and caring global society aware of the need for human dignity for all. Renewable energy and energy efficiency. Accelerate shift towards sustainable consumption and production.	Ensure policies take account of the Declaration and include sustainability objectives to enhance the natural environment, increase resource and energy efficiency, and promote renewable energy technology.
United Nations Economic Commission for Europe	Aarhus Convention (1998)	Established a number of rights of the public with regard to the environment. Local authorities should provide for: <ul style="list-style-type: none"> ▪ The right of everyone to receive environmental information ▪ The right to participate from an early stage in environmental decision making 	Ensure policies take account of the Convention and that the public are involved and consulted at all relevant stages.

		<ul style="list-style-type: none"> The right to challenge in a court of law public decisions that have been made without respecting the rights above or environmental law in general. 	
West of England	Joint Local Transport Plan 3: 2016 Progress report	Reports progress against five targets and five indicators used to measure the impact of the JLTP4.	Ensure progress is being made on promoting public transport, cycling and walking, reducing congestion and improving air quality.
West of England Combined Authority	Green Infrastructure strategy (forthcoming)	Under development.	Ensure policies provide for an increase in demand for travel whilst minimising the impact on the environment and promoting public transport, cycling and walking.
West of England Partnership	Joint Local Transport Plan 3: 2011 - 2026	High level strategy for transport policies and schemes across the West of England including targets and monitoring.	Ensure lessons learned and successful policies from JLTP3 continue in to the next JLTP.

Appendix F

ASSESSMENT MATRICES



WEST OF ENGLAND JOINT LOCAL TRANSPORT PLAN 4 (JLTP 4) – DRAFT STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) MATRICES – SEA OBJECTIVE 1

JLTP4’s Policies and Interventions assessed

Connectivity beyond the West of England -

Beyond West of England policies and interventions:

- B1. Enhance competitiveness of major gateways and improve connectivity to international markets
- B2. Improve strategic resilience of the network for all trips

Connectivity within the West of England -

Within West of England policies and interventions:

- W1. Provide more public transport options and improve service quality
- W2. Provide for journeys where public transport is not an option
- W3. Use, as appropriate, technological advances and charging measures to optimise and better manage demand
- W4. Improve resilience of the network, providing increased reliability
- W5. Enable business clustering and the efficient movement of freight

Local connectivity -

Local policies and interventions:

- L1. Enable walking and cycling, ‘active modes of travel’, to be the natural choice for shorter journeys
- L2. Reduce the number and severity of casualties for all road users
- L3. Encourage residents and employees to make more sustainable and healthier travel choices
- L4. Support opportunities for all sectors of the population to access the services they require, wherever they live
- L5. Support the identification and implementation of measures that will improve air quality

Neighbourhood connectivity -

Neighbourhood policies and interventions:

- N1. Use master planning and local design to create better places
- N2. Facilitate the use of active modes for all short trips, including the first and last mile of longer journeys

SEA Assessment Criteria - Effects of the JLTP4 and proposed alternatives will be described in terms of their:

Nature: whether they are anticipated to be:

- Positive (+)
- Neutral (N)
- Negative (x) or
- Uncertain (?)

++ Major Positive	The option would be significantly beneficial to the SEA objective by resolving an existing environmental issue and/or maximising opportunities for environmental enhancement.
+ Minor Positive	The option would be partially beneficial to the SEA objective by contributing to resolving an existing environmental issue and/or offering opportunity for some environmental enhancement. This effect would not be considered to be of significance.
N Neutral	The option would have a neutral effect on the SEA objective.
? Uncertain	There is insufficient detail available on the option or the baseline situation in order to assess how significantly the SEA objective would be affected by the option.
x Minor Negative	The option would partly undermine the SEA objective by contributing to an environmental problem and/or partially undermine opportunities for environmental enhancement. This effect would not be considered to be of significance.
xx Major Negative	The option would severely undermine the SEA objective by contributing to an environmental problem and/or undermining opportunities for environmental enhancement. This would be considered to be a significant effect.

Duration: the duration of potential effects are presented in terms of the timescale over which they are anticipated:

- Short term effects: effects expected in the next 1-5 years;
- Medium term effects: effects expected in the next 6-15 years; and
- Long term effects: effects expected in the next 16+years.

Permanence and Reversibility:

- A permanent effect is one which results from a physical change that is anticipated to last beyond the life of the Joint Local Transport Plan.
- A temporary effect is one which results from an operational change which could change if there is a change of policy, or a short term condition such as a construction phase related impact.
- A reversible effect is an environmental effect that can be reversed, for example an incident of water pollution can be cleaned up over time.
- An irreversible effect is an environmental effect that cannot be reversed such as the loss of a historic feature or the loss of agricultural soil due to permanent development.

Spatial Scale:

- Local: effect is restricted to the immediate location of the proposal or to a specific site or settlement within the sub-region (West of England)
- Regional: effect is anticipated to cover a significant proportion or all of the South West.
- National: effect covers the whole of England and/or the UK (also includes international).

<p>SEA Objective 1. Improve accessibility for a growing and aging population.</p> <p>SEA Topic: Human health; population.</p> <p>Criteria to Consider:</p> <ul style="list-style-type: none"> • Will the JLTP4 in combination with other plans result in changed overall provision of public and community transport? • Are population growth points linked to services and employment centres via sustainable transport?
<p>Description of the value and vulnerability of the area likely to be affected:</p> <p>The population of the West of England has been growing and if trends continue, is predicted to increase from 938,070 in 2018 to 1,071,102 in 2036 (14%) and 1,101,496 in 2041 (17%). In addition, the population is ageing, meaning it will be necessary to provide for the needs of more elderly population. The West of England has a high urban population but Bath & North East Somerset and North Somerset also have considerable rural populations. The Joint Spatial Plan will provide a framework to deliver up to 105,000 net additional new homes between 2016 and 2036, including the committed growth within the four Core Strategies.</p> <p>The West of England supports high numbers of tourists, placing seasonal pressures on the transport system. Although in general the West of England supports a more prosperous economy than average for the South West and the UK, there are particular areas of Bristol, Bath and Weston-super-Mare where communities fall within the 10% most deprived areas of the UK.</p> <p>The SRN roads through the West of England suffer from high levels of congestion, delays and challenges with resilience, all of which resulting in knock-on effects. The regional strategic rail network faces challenges with regards to network capacity, resilience and operational issues. Technical transport work has identified the need for a mass transit public transport mode along four core corridors across the Bristol and Bath urban area with higher potential trip demand, to bring additional capacity and attractive, reliable journey times. The ambition is for new forms of mass transit (e.g. light rail, light metro or trams) where the potential is greatest for high passenger flows. A portion of the population in the region do not have easy access to public transport near where they live.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
<p>B1. Enhance competitiveness of major gateways and improve connectivity to international markets.</p> <ul style="list-style-type: none"> • Support Bristol Airport as the main gateway for air travel in the South West. • Support the role of Bristol Port. 	<p>Bristol Airport's <i>Airport Surface Access Strategy</i>, would have a positive effect on accessibility and mobility. The Strategy will include options aimed to public transport improvement to the airport to improve journey time reliability, and exploring the improvement of existing bus routes to penetrate as many local towns and villages as viable.</p> <p>Bristol Port now accommodates a range of tourist cruise liner services, improving the region's offer for both outgoing and incoming tourists.</p>	+	+	?	N	T/R	<p>Medium/ Low certainty –</p> <p>Bristol's <i>Airport Surface Access Strategy</i> is currently under preparation and not yet available for review. There is certain level of uncertainty about what options / schemes will be implemented and to what extent.</p> <p>There are not sufficient details regarding planned actions that may improve accessibility to the Bristol Cruise Terminal.</p>	<p>As noted in the JLTP 4, further significant accessibility improvements are needed, such as mass transit to/from Bristol City Centre, to unlock the additional growth being proposed at Bristol Airport.</p> <p>Similarly, the JLTP 4 notes that there is an opportunity to maximise the developing tourist offer from the Bristol Cruise Terminal, by providing more seamless connections across multiple travel mode choices.</p>	<p>The judgement was based on the assumption that Bristol Airport will continue working towards their aim to deliver a low carbon, accessible, integrated, efficient and reliable transport network for travel to and from Bristol Airport for staff and passengers.</p> <p>It is also assumed that the JLTP4 interventions relating to supporting Bristol Airport and Bristol Port would be implemented and that further developments in Bristol Airport and Port will be delivered in line with the relevant <i>National Policy Statements</i>.</p>
<p>B2. Improve strategic resilience of the network for all trips.</p> <ul style="list-style-type: none"> • Maximise opportunities arising from improvements to the strategic road and rail network, and identify and support delivery of further changes. <ul style="list-style-type: none"> ◦ Strategic Road Network (SRN) ◦ Strategic Rail • Identify opportunities to manage the impact of Severn Bridge tolls removal. 	<p>Access and mobility would be improved in the region through the implementation of the following improvements on the strategic road and rail network: East of Bath Link; new and upgraded junctions on the M4 (new Junction 18a) and M5 (Junctions 14/19/new 21a); new sections of Smart Motorway; Park & Ride on the M32; redevelopment of Bristol Temple Meads into a regional interchange which will promote sustainable transport choices for trips to and from the station and surrounding area.</p>	+	+	?	N	T/R	<p>Medium / Low certainty -</p> <p>The only committed HE scheme included in the current Route Investment Strategy (RIS) delivery plan is the new M49 Avonmouth junction, with works expected to commence in 2019. The government is currently preparing a revised RIS2 to cover the period from 2020 to 2025, which will include a vision for the SRN to 2040 and beyond. There is uncertainty with regards to the level of investment that will be committed in the</p>	<p>The JLTP 4 explains the need for the RIS2 to include substantial investment in the SRN across the region. Direct improvements on the SRN itself should, however, include measures to benefit non-car modes.</p> <p>The full electrification of the Great Western Main Line to Bristol Temple Meads, via Bath Spa and Bristol Parkway, remains an aspiration, as does extension from Birmingham to Bristol. Further improvements schemes in the strategic rail network, as those identified in the JLTP 4 are needed.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that development consent for nationally significant infrastructure projects on the road and rail networks and strategic rail freight interchanges will be delivered in line with the provisions of the <i>National networks national policy statement</i>.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
<ul style="list-style-type: none"> Support the role of coaches for residents and visitors. Manage and mitigate the impact of regular and infrequent events on the transport network. 	<p>Measures aiming to support coaches, which provide inclusive mobility, and the provision of travel information at major hubs, such as airports and rail stations, on travel options into the West of England, would also be beneficial in terms of improving accessibility and mobility.</p> <p>The removal of the Severn Bridge Toll may improve accessibility to Wales, having a positive impact on this SEA objective. It will, however, result in an increase of road trips across the bridges resulting in further pressures on the SRN.</p>						<p>SRN across the region.</p> <p>Funding remains the key challenge and uncertainty. As stated in the JLTP 4, the Government has made a commitment to increase the proportion of national GDP spent on economic infrastructure to prepare the country for the future. The West of England is the most productive part of the South West and is one of the UK's best performing city regions. However, there has been historic under investment that has contributed towards current transport challenges. There is, therefore, a strong case for increased investment to support the continued growth of the area.</p> <p>Similar funding uncertainty applies to strategic rail improvements.</p> <p>However, B&NES continue to work in partnership with Wiltshire Council and Dorset County Council to ask the DfT to mandate Highways England to carry out strategic study into north/south connectivity for the south west as part of the RIS2.</p>		
<p>W1. Provide more public transport options and improve service quality.</p> <ul style="list-style-type: none"> Provide high quality and reliable mass and bus rapid transit. Support and enhance existing public transport services. <ul style="list-style-type: none"> Bus Strategy Rail Improve the availability and accessibility of accurate travel information and ticketing. 	<p>Mass and rapid transit public transport, with an emphasis on segregation from general traffic, can support the existing provision of the public transport network, and provide increased capacity and frequency, making public transport a more attractive option than private car use. This will therefore provide a beneficial effect in terms of accessibility and mobility.</p> <p>Enhancing existing public transport services by continuing to improve local bus and rail networks, completion and expansion of the MetroBus network, delivery of the MetroWest programme, and improved opportunities to access stops and stations by active modes would also result in beneficial effects.</p> <p>However, catering for rural and off-peak journeys is challenging and less likely to cater for an ageing population.</p>	+	+	++	R	T/R	<p>Medium certainty –</p> <p>There is a very strong commitment from the West of England to deliver high quality and reliable mass transit network across the Greater Bristol and Bath urban areas and along key routes radiating from Bristol as well as complete and expand MetroBus and deliver MetroWest. There is also a strong commitment to partnership working with bus operators in the West of England.</p> <p>There is uncertainty around funding needed to deliver some of the schemes under this policy. Limited revenue funding means it is a challenge to operate bus services which are not commercially viable.</p>	<p>As explained in the JLTP 4, mass transit will, wherever possible, be configured to complement MetroBus routes and to integrate with the existing passenger rail network. A future challenge is the need to manage the integration of any mass transit and MetroBus with the local bus network.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>Additionally, it was based on the assumption that schemes under these interventions would incorporate opportunities to enhance accessibility and mobility and would be delivered through the appropriate consenting processes.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
W2. Provide for journeys where public transport is not an option. <ul style="list-style-type: none"> Provide P&R and sharing schemes to minimise the impact of single occupancy vehicles. Recognise the needs of motorcycles and mopeds. 	<p>P&R provides the opportunity for people who do not have easy access to public transport near to where they live, or cannot make door-to-door trips by public transport, to transfer from private car to public transport for onward journeys into urban areas.</p> <p>Motorcycles and mopeds can offer an affordable means of transport for trips where public transport is limited and walking and cycling unrealistic.</p> <p>Supporting the delivery of P&Rs and ensuring facilities for motorcycles and mopeds are provided and clearly identified in appropriate locations would result in beneficial effects in terms of improving accessibility and mobility.</p>	+	?	?	R	T/R	<p>Medium / Low certainty –</p> <p>There is some uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>	Specific schemes will be subject to the relevant consenting processes and relevant environmental legislation.	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>Additionally, it was based on the assumption that schemes under these interventions would incorporate opportunities to enhance accessibility and mobility and would be delivered through the appropriate consenting processes.</p>
W3. Use, as appropriate, technological advances and charging measures to optimise and better manage demand. <ul style="list-style-type: none"> Use technology to keep traffic moving. Embrace technology to improve cleaner travel option. Use, as appropriate, charging measures to influence and manage the demand of private car use. 	<p>Use of technology to keep traffic moving and to improve cleaner travel option, together with charging measures aimed to influence and manage the demand of private car use, would have a neutral effect on this SEA objective in the short-term. It could, however, result in beneficial effects in the medium and long term as their implementation would assist in improving the efficiency of the transport network which would in turn benefit public transport.</p>	N	+	+	R	T/R	<p>Low certainty –</p> <p>Advanced technologies are currently in early development stages. Timescales and extent of implementation are unknown, particularly where significant legislation is required (i.e. CAVs).</p> <p>Charging measures might prove unpopular and challenging to implement.</p>	<p>Advances in technology can be particularly challenging for aging populations. There may be the need for additional training and support for members of the public to ensure advances in technology are understood.</p> <p>Any further consideration of a road user charging scheme would involve working with partners within and beyond the West of England, including Highways England, to address any unintended consequences for the remainder of the highway network, including the SRN. Charging should not result in creating a barrier to employment or education opportunities, particularly for those who are unemployed or on low income.</p>	Based on current information available from JLTP4.
W4. Improve resilience of the network, providing increased reliability <ul style="list-style-type: none"> Define, manage and maintain the Key Route Network (KRN). Effectively manage the Major Road Network (MRN). Effectively accommodate development sites and associated trips. 	<p>In the medium term, these interventions would increase mobility and accessibility for those with access to a car. In the long term this beneficial effect may, however, be offset by the portion of ageing population who may not have access to a car or able to drive.</p> <p>Measures aimed at improving wider connectivity, resilience and support public transport should result in beneficial effects on accessibility and mobility in the medium and long term.</p>	N	+	?	N	T/R	<p>Medium / Low certainty –</p> <p>The KRN and its associated Joint Transport Asset Management Plan, and Major Road Network proposed by DfT are at inception stages. Timescales and details of implementation are unknown.</p> <p>There will be additional budgeting and funding requirements which may limit the implementation of some of the measures.</p>	<p>Proposals under these interventions should include provisions to cater for those who do not have access to a car.</p> <p>Specific schemes will be subject to the relevant consenting processes and relevant environmental legislation. New schemes should incorporate opportunities to enhance accessibility and mobility.</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented. Additionally, it was based on the assumption that schemes under these interventions would be delivered through the appropriate consenting processes.
W5. Enable business clustering and the efficient movement of freight.	Interventions aimed at enabling business clustering and the efficient movement of freight would have a neutral effect on this	N	?	?	R	T/R	<p>Medium certainty -</p> <p>The West of England actively promotes</p>	Specific schemes will be subject to the relevant consenting processes and relevant environmental legislation. New schemes	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
<ul style="list-style-type: none"> Support the delivery of Enterprise Zones / Business clustering. Balance the requirement for distributing goods, with mitigating the adverse impact of vehicles. <ul style="list-style-type: none"> Routing, management and information Rail and water Loading and parking Consolidation Embracing innovation Planning conditions 	SEA objective in the short-term. It could, however, result in beneficial effects in the medium and long term as their implementation would assist in improving the efficiency of the transport network which may in turn benefit public transport.						designated Enterprise Areas (EA) or Enterprise Zones (EZ) across the region, which have potential opportunities in terms of improving accessibility and mobility. There is some uncertainty with regards to planned actions, programme (medium and long-term impacts) and funding associated with these interventions.	should incorporate opportunities to enhance accessibility and mobility.	be implemented. Additionally, it was assumed that schemes under these interventions would incorporate opportunities to enhance accessibility and mobility and would be delivered through the appropriate consenting processes.
L1. Enable walking and cycling, 'active modes of travel', to be the natural choice for shorter journeys. <ul style="list-style-type: none"> Provide an attractive, safe and usable network. Provide schemes to support the uptake of cycling. 	<p>These interventions would increase mobility and accessibility by means of walking and cycling. By introducing a safe and useable network, people have the option to choose alternative sustainable modes of transport.</p> <p>Providing a conducive environment which people can walk and cycle will contribute to prolonged activity, and help people be more mobile for longer.</p>	+	+	?	L	T/R	<p>Medium certainty –</p> <p>There is a strong commitment from the West of England to encourage walking and cycling.</p> <p>Several projects/ programmes/ schemes are in place to encourage people to cycle, moving towards sustainable transport with more to be delivered through the development and implementation of the Local Cycling and Walking Infrastructure Plans.</p>	<p>Where schemes / initiatives are time limited, new replacement schemes need to be implemented to maximise the opportunity for benefits over time.</p> <p>Ensure services and employment or education opportunities are accessible by those with limited mobility who are unable to participate in active travel modes.</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L2. Reduce the number and severity of casualties for all road users. <ul style="list-style-type: none"> Consider the needs of all road users in the design of transport and highway schemes, particularly vulnerable road users. Deliver road safety education and skills training to equip people with the knowledge and skills to travel in a safe and sustainable way. Work in partnership to build safer communities. 	Interventions aimed at reducing the number and severity of casualties would have a neutral effect on this SEA objective in the short-term. It could, however, result in beneficial effects in the medium and long term as their implementation would assist in delivering safer communities and safer modes of travel.	N	?	?	L	T/R	<p>Low certainty –</p> <p>There is uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>	Where schemes / initiatives are time limited, new replacement schemes need to be implemented to maximise the opportunity for benefits over time.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L3. Encourage residents and employees to make more sustainable and healthier travel options. <ul style="list-style-type: none"> Support travel planning with developers, education providers and individuals. 	Interventions aimed at encouraging residents and employees to make more sustainable and healthier travel options would have a neutral effect on this SEA objective in the short-term. It could, however, result in beneficial effects in the medium and long term as their	N	?	?	L	T/R	<p>Medium / Low certainty –</p> <p>There is uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>	Where schemes / initiatives are time limited, new replacement schemes need to be implemented to maximise the opportunity for benefits over time.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
<ul style="list-style-type: none"> Support travel planning with businesses and employment sites. Encourage mode shift through grants, incentives and rewards. Maximise awareness of sustainable and active travel choices and the benefits these bring. 	implementation would assist in delivering better travel planning across new developments, education providers, employees and individuals.								
L4. Support opportunities for all sectors of the population to access services they require, wherever they live. <ul style="list-style-type: none"> Support those without a private car, who need to travel, in accessing the services they require. Promote the role of technology in accessing services and employment. Support the role of taxis and private hire vehicles. Support the role of demand responsive and community transport. 	These interventions are specifically aimed at improving accessibility and mobility for all, including people with limited access to services including young and elderly people in rural areas, low-income families, parents without a car, people out of work, the long term ill, careers and people with mental health issues. The implementation of these measures would therefore be significantly beneficial to this SEA Objective.	++	++	++	L/R	T/R	Medium/ low certainty - There is uncertainty with regards to planned actions, programme and funding associated to these interventions. There is also uncertainty surrounding future technological advances, and how they can be used to achieve this objective.	Where schemes / initiatives are time limited, new replacement schemes need to be implemented to maximise the opportunity for benefits over time.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L5. Support the identification and implementation of measures that will improve air quality. <ul style="list-style-type: none"> Support ongoing work to manage the impact of transport on air quality and climate change. Support ongoing work on Clear Air Zones. Support work on Zero and Low Emission Vehicles. 	The interventions aimed at supporting the identification and implementation of measures that will improve air quality would, overall, would have a neutral effect on this SEA objective.	N	N	N	L	T/R	Medium/ low certainty - The West of England support the preparation of Air Quality Action Plans and the delivery of specific measures to improve air quality. Considerable support and commitment to encouraging the use of electric vehicles. Uncertainty over long term funding and timescales of some of the interventions as well as potential policy and / or legislative changes at national level.	Where schemes / initiatives are time limited, new replacement schemes need to be implemented to maximise the opportunity for benefits over time.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
N1. Use master planning and local design to create better places. <ul style="list-style-type: none"> Improve the quality of streets and public realm. Integrate walking, cycling and public transport into new developments. Provide clear wayfinding and signage. Support and maintain Public Rights of Way. 	High quality public streets and spaces, allow people to move more seamlessly, connect places with one another and, encourage safer more sustainable active modes. Measures and schemes such as development and implementation of Neighbourhood Plans; local design guides; integration of walking, cycling and public transport into new developments would result in beneficial effects in terms of improving accessibility and mobility. In the long term this beneficial effect may,	+	+	?	L	T/R	Medium certainty – Some initiatives are already in place and the West of England is committed to continue using master planning and local design to create better places. There is uncertainty with regards to planned actions, programme and funding associated with some of these interventions.	Where schemes / initiatives are time limited, new replacement schemes need to be implemented to maximise the opportunity for benefits over time. The needs of elderly people and those with limiting health conditions will need to be considered.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented. Additionally, it was based on the assumption that schemes under these interventions would be delivered through the appropriate consenting processes.

[illegible]

WEST OF ENGLAND JOINT LOCAL TRANSPORT PLAN 4 (JLTP 4) – DRAFT STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) MATRICES – SEA OBJECTIVE 2

JLTP4’s Policies and Interventions assessed

Connectivity beyond the West of England -

Beyond West of England policies and interventions:

- B1. Enhance competitiveness of major gateways and improve connectivity to international markets
- B2. Improve strategic resilience of the network for all trips

Connectivity within the West of England -

Within West of England policies and interventions:

- W1. Provide more public transport options and improve service quality
- W2. Provide for journeys where public transport is not an option
- W3. Use, as appropriate, technological advances and charging measures to optimise and better manage demand
- W4. Improve resilience of the network, providing increased reliability
- W5. Enable business clustering and the efficient movement of freight

Local connectivity -

Local policies and interventions:

- L1. Enable walking and cycling, ‘active modes of travel’, to be the natural choice for shorter journeys
- L2. Reduce the number and severity of casualties for all road users
- L3. Encourage residents and employees to make more sustainable and healthier travel choices
- L4. Support opportunities for all sectors of the population to access the services they require, wherever they live
- L5. Support the identification and implementation of measures that will improve air quality

Neighbourhood connectivity -

Neighbourhood policies and interventions:

- N1. Use master planning and local design to create better places
- N2. Facilitate the use of active modes for all short trips, including the first and last mile of longer journeys

SEA Assessment Criteria - Effects of the JLTP4 and proposed alternatives will be described in terms of their:

Nature: whether they are anticipated to be:

- Positive (+)
- Neutral (N)
- Negative (x) or
- Uncertain (?)

++ Major Positive	The option would be significantly beneficial to the SEA objective by resolving an existing environmental issue and/or maximising opportunities for environmental enhancement.
+ Minor Positive	The option would be partially beneficial to the SEA objective by contributing to resolving an existing environmental issue and/or offering opportunity for some environmental enhancement. This effect would not be considered to be of significance.
N Neutral	The option would have a neutral effect on the SEA objective.
? Uncertain	There is insufficient detail available on the option or the baseline situation in order to assess how significantly the SEA objective would be affected by the option.
x Minor Negative	The option would partly undermine the SEA objective by contributing to an environmental problem and/or partially undermine opportunities for environmental enhancement. This effect would not be considered to be of significance.
xx Major Negative	The option would severely undermine the SEA objective by contributing to an environmental problem and/or undermining opportunities for environmental enhancement. This would be considered to be a significant effect.

Duration: the duration of potential effects are presented in terms of the timescale over which they are anticipated:

- Short term effects: effects expected in the next 1-5 years;
- Medium term effects: effects expected in the next 6-15 years; and
- Long term effects: effects expected in the next 16+years.

Permanence and Reversibility:

- A permanent effect is one which results from a physical change that is anticipated to last beyond the life of the Joint Local Transport Plan.
- A temporary effect is one which results from an operational change which could change if there is a change of policy, or a short term condition such as a construction phase related impact.
- A reversible effect is an environmental effect that can be reversed, for example an incident of water pollution can be cleaned up over time.
- An irreversible effect is an environmental effect that cannot be reversed such as the loss of a historic feature or the loss of agricultural soil due to permanent development.

Spatial Scale:

- Local: effect is restricted to the immediate location of the proposal or to a specific site or settlement within the sub-region (West of England)
- Regional: effect is anticipated to cover a significant proportion or all of the South West.
- National: effect covers the whole of England and/or the UK (also includes international).

SEA Objective 2. Reduce transport related air pollution.					
SEA Topic: Human health, air quality, climatic factors, soil, biodiversity, water.					
Criteria to Consider: <ul style="list-style-type: none"> Will the JLTP4 in combination with other plans result in changes of traffic flow or the composition of traffic (such as increases in heavy goods vehicles) which would indicate increases or decreases in air quality? Would the JLTP4 result in freer flowing traffic and reduced incidents of congestion? 					
Description of the value and vulnerability of the area likely to be affected: <p>Residents in Bristol, Bath, Kingswood, Staple Hill and near M5 junction 17 (Cribb Causeway), particularly those declared Air Quality Management Areas (AQMA's), as well as locations in Keynsham. AQMAs have also recently been declared at Temple Cloud and Farrington Gurney on the A37. Air pollution levels in parts of Bristol, B&NES and South Gloucestershire continue to exceed government standards for NO₂ (European limit of 40 µg/m³). Central Bath, Keynsham, Saltford, central Bristol, Kingswood and Staple Hill have active Air Quality Action Plans. The regional strategic rail network faces challenges with regards to network capacity, resilience and operational issues.</p>					

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
B1. Enhance competitiveness of major gateways and improve connectivity to international markets. <ul style="list-style-type: none"> Support Bristol Airport as the main gateway for air travel in the South West. Support the role of Bristol Port. 	<p>There are numerous interventions under this policy which support improving air quality. These include the provision of infrastructure to cater for technological advances and autonomous vehicles, identifying infrastructure that prioritises lower emissions vehicles, as well as providing private hire companies fleets that embrace technological advances.</p> <p>The West of England will also work with Bristol Cruise Terminal to ensure onward travel options include emerging technologies such as electric vehicles.</p> <p>Bristol Airport's <i>Airport Surface Access Strategy 2012- 2016</i> aims to reduce congestion and air quality impacts of traffic travelling to and from Bristol Airport.</p> <p>However, the expansion of the airport and port will likely contribute to increased greenhouse gas emission and particulates which also contribute to air pollution, so impact in the medium and long term are assessed as uncertain.</p>	+	?	?	N	T/R	<p>Medium/ Low certainty – Bristol's <i>Airport Surface Access Strategy 2012-2016</i> is currently under preparation not yet available for review. There is certain level of uncertainty about what options / schemes will be implemented and to what extent.</p> <p>There needs to be a modal shift to public transport from car use.</p>	<p>Improved traffic management or lower speed limits may help reduce air pollution. Interventions need to be carefully considered as an increase in congestion may cause further air pollution.</p> <p>Public transport vehicles should be of high modern standards to minimise emissions.</p>	<p>The judgement was based on the assumption that Bristol Airport will continue working towards their aim to deliver a low carbon, accessible, integrated, efficient and reliable transport network for travel to and from Bristol Airport for staff and passengers.</p> <p>It is also assumed that the JLTP4 interventions relating to supporting Bristol Airport and Bristol Port would be implemented and that further developments in Bristol Airport and Port will be delivered in line with the relevant <i>National Policy Statements</i>.</p>
B2. Improve strategic resilience of the network for all trips. <ul style="list-style-type: none"> Maximise opportunities arising from improvements to the strategic road and rail network, and identify and support 	<p>The Strategic Road Network (SRN) across the West of England (e.g London to Wales M4, M32, M48 and M49), Birmingham to Exeter (M5) and South West Peninsula (A36/A46 south for the M4) suffer from high levels of congestion</p>	+	+	?	N	T/R	<p>Low / Medium certainty- There is a level of uncertainty regarding funding/ investment to improve the SRN across the region.</p>	<p>Public transport vehicles should be of high modern standards to minimise emissions. Continue to work with Highways England to ensure RIS2 (Route Investment Strategy) delivery plan includes a requirement for HE to carry out a strategic study into north south</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that development consent for nationally significant infrastructure projects</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
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<p>delivery of further changes.</p> <ul style="list-style-type: none"> ○ Strategic Road Network (SRN) ○ Strategic Rail • Identify opportunities to manage the impact of Severn Bridge tolls removal. • Support the role of coaches for residents and visitors. • Manage and mitigate the impact of regular and infrequent events on the transport network. 	<p>and delay, contributing to poor air quality. Improvements across the SRN would reduce congestion and improve air quality. It is noted, however, that the removal of the Severn Bridge Toll charge, may make congestion worse in the short term. There is the potential for minor adverse health effects for population in close proximity to strategic road network at a project / scheme level.</p> <p>Coaches can reduce dependence on private vehicles to help improve air quality and reduce congestion. There is a need to improve coach management, including embracing new technologies to ensure efficiency. Work will continue with Bristol Airport to promote coaches as a sustainable way to access the site.</p>						<p>Similar funding uncertainty applies to the strategic rail network.</p> <p>There needs to be a modal shift to public transport from car use. There is some uncertainty whether this can be facilitated through improving private vehicle journey times.</p>	<p>connectivity improvements including the East of Bath Link, and new and upgraded junction on the M4 and M5, new sections of Smart Motorways and P&R on the M32.</p> <p>Exposure reduction measure and ensure that any new road links are isolated from vulnerable receptors, would reduce the harmful effects of the interventions promoting additional road links or upgrading local and strategic road network.</p> <p>The full electrification of the Great Western Main Line to Bristol Temple Meads, via Bath Spa and Bristol Parkway, remains an aspiration, as does extension from Birmingham to Bristol. Further improvements schemes in the strategic rail network, as those identified in the JLTP 4 are needed.</p>	<p>on the road and rail networks and strategic rail freight interchanges will be delivered in line with the provisions of the <i>National networks national policy statement</i>.</p>
<p>W1. Provide more public transport options and improve service quality.</p> <ul style="list-style-type: none"> • Provide high quality and reliable mass and bus rapid transit. • Support and enhance existing public transport services. <ul style="list-style-type: none"> ○ Bus Strategy ○ Rail • Improve the availability and accessibility of accurate travel information and ticketing. 	<p>Emerging Bus Rapid Transit Network (MetroBus)- current delivery of a 50km MetroBus network that provides for trips up to 10km in length. The network will also link to walking and cycling routes. The result of this network will be improved journey times, and reduced congestion for cars, improving air quality within and between cities and key destinations. The JTS recommended substantial extensions to the MetroBus network, to be delivered up to 2036, which is supported by the JLTP4.</p> <p>Over £12m to date has been invested by West of England in MetroWest (rail priority to provide better services across the region). The West of England have been working with bus operators in order to invest in the network to deliver improved journey times and frequency.</p> <p>Improving running information and fares for buses and trains will encourage more people to use these services, reducing car use and improving air quality.</p> <p>The combination of interventions is likely to have a major beneficial impact on reducing air quality and encouraging a modal shift away from car travel.</p>	++	++	+	R	T/R	<p>Medium certainty-</p> <p>There is a very strong commitment from the West of England to deliver high quality and reliable mass transit network across the Greater Bristol and Bath urban areas and those key routes radiating out from Bristol (complete and expand MetroBus and deliver MetroWest).</p> <p>Additionally, rail based mass transit will be considered to accommodate future demand and to maximise mode shift from car-based trips. A feasibility study is underway to explore all options for the greater Bristol area, both above and below ground, to deliver a mass transit network.</p> <p>There is however a degree of uncertainty with regards to funding.</p>	<p>There needs to be a modal shift to sustainable transport modes to improve air quality.</p> <p>Further measures should also be implemented to reduce car use within the city centers of Bath and Bristol (which can include detailed appraisals of air quality impacts to improve understanding of current conditions).</p>	<p>The judgement was based on the level of information available and the assumption that the relevant intentions in the JLTP4 would be implemented.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
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W2. Provide for journeys where public transport is not an option. <ul style="list-style-type: none"> Provide P&R and sharing schemes to minimise the impact of single occupancy vehicles. Recognise the needs of motorcycles and mopeds. 	<p>Park & Ride releases capacity in central areas to enable transfer of road space to walking, cycling and public transport. The JLTP4 supports the concept of Park & Ride locations around urban areas to tackle air quality problems in central areas.</p> <p>A site identified at the M32 would intercept the largest number of trips into the city and have the most beneficial impact on reducing poor air quality. Several other sites are also being considered for Park & Ride expansion. New and expanded Park & Ride sites will be served by bus, MetroBus and rail.</p> <p>Opportunities to increase car sharing (through technology and social media) will be explored to reduce car use.</p>	+	?	?	R	T/R	<p>Medium / Low certainty –</p> <p>There is some uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>	<p>Once implemented, Park & Ride public transport vehicles should be of high modern standards to minimise emissions to reduce air quality impacts.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p>
W3. Use, as appropriate, technological advances and charging measures to optimize and better manage demand. <ul style="list-style-type: none"> Use technology to keep traffic moving. Embrace technology to improve cleaner travel option. Use, as appropriate, charging measures to influence and manage the demand of private car use. 	<p>Parking controls (e.g further management of parking provision and cost and road user charging, such as charging to drive into or through specific areas) can encourage trips within urban areas to transfer to active modes or public transport. This, in turn, should reduce congestion and air quality issues within city centers.</p> <p>Feasibility studies are being carried out to investigate the impacts of charging Clean Air Zones in Bath and Bristol. This would introduce charges for the most polluting vehicles entering these areas. A reduction of private cars would also be seen. Complementary measures could include better bus priority, bus stop facilities and live information, more secure cycle parking, electric bike hire³, and improved cycling and walking routes.</p> <p>Technological advances (such as the implementation of CAVs and MaaS) have the potential to result in opportunities or issues. CAVs are likely to come in a variety of forms (small delivery robots, campus style pods, cars, taxis, or larger communal transport and lorry platoons). A strategy will be produced on CAVs and MaaS that clearly states how West of England can harness technology to deliver objectives.</p>	?	+	+	R	T/R	<p>Low certainty-</p> <p>Advanced technologies are currently in early development stages, and impact on improving air quality are uncertain.</p> <p>Studies carried out to investigate the impacts of charging Clean Air Zones are also in the preliminary phase, although are expected to be beneficial in reducing air quality impacts.</p> <p>Limited implementation – interventions in preliminary stages of development, short term benefits are uncertain due to timing of technological advances, yet long term benefits are likely (if implemented)</p>	<p>Advances to technology need to be understood by the general public for appropriate use e.g use of traffic apps.</p> <p>Careful consideration needs to be undertaken to understand the impact on air quality of advancing technologies, before they are implemented across the region.</p>	<p>Based on current information available from JLTP4.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
W4. Improve resilience of the network, providing increased reliability <ul style="list-style-type: none"> Define, manage and maintain the Key Route Network. Effectively manage the Major Road Network. Effectively accommodate development sites and associated trips. 	<p>There is the need to define and consult on a Key Route Network (KRN) (JLTP4 suggests this will take place in late 2018). This will provide an opportunity for a fresh approach and take into account issues associated with scheme design (importantly impacts on air quality and routes within AQMA's).</p> <p>Poor maintenance of the highway network can deter people from using active modes of transport (cycling and walking) due to safety fears. This will increase car use and result in poor air quality, particularly in cities. A Joint Transport Asset Management Plan (JTASP) to deliver sustainable maintenance has been recommended. Maintenance works can also create the opportunity to look at reallocation of road space to sustainable modes as appropriate through lining changes.</p> <p>The Department for Transport is proposing to create a Major Road Network (MRN) to sit between the Strategic Road Network (SRN) and the local road network. Public transport will be a key principle for the MRN, reducing demand for cars, and tackling air quality issues within cities.</p> <p>Investment in the road network will support the ambitions for changing people's travel behavior, through enabling reallocation of road space to walking, cycling and public transport on congested urban corridors and directing traffic to more appropriate corridors.</p>	+	+	+	R	T/R	<p>Medium certainty-</p> <p>There will be additional MRN capital infrastructure and this will have an impact upon maintenance budgets and requirements.</p> <p>West of England will work with Highways England to deliver numerous schemes. These include a new junction 21A on the M5 motorway south of the existing J21, improvements to Junction 14 of the M5 and bypasses for the villages of Banwell, Sandford and Churchhill. Additionally, improvements to the A38 between Langford and South Bristol will improved the resilience of the Strategic Road Network.</p>	<p>Ensure scheme design incorporates aspects which improve air quality.</p> <p>Maintenance works can include additional landscaping (e.g planting along cycleways and footways to encourage use).</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented. Additionally, it was based on the assumption that development schemes would incorporate opportunities to enhance air quality.
W5. Enable business clustering and the efficient movement of freight. <ul style="list-style-type: none"> Support the delivery of Enterprise Zones / Business clustering. Balance the requirement for distributing goods, with mitigating the adverse impact of vehicles. <ul style="list-style-type: none"> Routing, management and information Rail and water Loading and parking 	<p>Reduced travel between businesses result in lower demand for trips on the transport network. The potential lower demand on the transport network can, in turn, improve connectivity by improving journey times, congestion and air quality. Schemes to improve walking and cycling access are also more effective when linking to employment clusters.</p> <p>The West of England will progress an ambitious programme to improve the efficiency of freight movements. This includes encouraging a shift from a</p>	+	?	?	R	T/R	<p>Medium certainty-</p> <p>West of England actively promotes designated Enterprise Areas (EA) or Enterprise Zones (EZ) across the region, which have many potential benefits in terms of improving air quality.</p> <p>There is some uncertainty with regards to planned actions, programme (medium and long-term impacts) and funding associated with these interventions. Interventions will need to be implemented over a number of</p>	<p>Careful consideration needs to be undertaken to understand the impact on air quality of advancing technologies, before they are implemented across the region.</p>	The judgment has been reached from the assumption that the interventions mentioned in the JLTP4 would be implemented.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
<ul style="list-style-type: none"> Consolidation Embracing innovation Planning conditions 	<p>partially filled, heavily polluting road vehicles to fewer, fuller, cleaner vehicles and seek to transfer road freight to alternative methods such as rail and water. Additionally, there are incentives to encourage business fleets to use electric vehicles and pool bikes (including e-bikes).</p> <p>To improve air quality in urban areas, West of England will seek to restrict through traffic movement for heavy vehicles, including through measures in any forthcoming Clean Air Zones.</p> <p>Seeking to enhance the freight consolidation, through micro consolidation centers, using electric cargo bikes, small electric vans and other appropriate sustainable modes to serve narrow streets in Bristol and Bath. These are more appropriate to the environment than larger vehicles, and will help improve air quality in urban areas. There will also be support for emerging technologies, improving the efficiency of freight movement, including planning and managing for the impact of connected and autonomous vehicles and drones. There is also the opportunity to provide for walking, cycling and public transport.</p>						years, in order to ensure a reduction in air quality.		
<p>L1. Enable walking and cycling, 'active modes of travel', to be the natural choice for shorter journeys.</p> <ul style="list-style-type: none"> Provide an attractive, safe and usable network. Provide schemes to support the uptake of cycling. 	<p>Local Cycling and Walking Infrastructure Plans will outline a programme of cycling and or walking infrastructure improvements. These will also be reviewed on a regular basis. The West of England will work with partners to deliver opportunities that support all abilities into cycling. Measures can include a focus on more secure storage, improved access to green spaces by bikes and providing training/ engagement programmes to increase confidence. Additionally, linkages from Clevedon to the strategic cycle network, through the long-standing ambition to reopen the Strawberry Line to connect to Yatton and onwards segregated cycle linkages to Wells in Somerset are in progress. There are other opportunities to deliver improvements as part of all other public realm improvements.</p>	+	+	?	L	T/R	<p>Medium certainty -</p> <p>There is a commitment from West of England to encourage walking and cycling. Several projects/ programmes/ schemes in place to encourage people to cycle, moving towards sustainable transport with more to be delivered through the development and implementation of the Local Cycling and Walking Infrastructure Plans.</p>	<p>A modal shift towards sustainable transport modes is needed.</p> <p>Continued monitoring and air quality management reports may be required to determine impact of increase cyclists in the long run.</p> <p>Where schemes / initiatives are time limited, new replacement schemes need to be implemented to maximise the opportunity for benefits over time.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
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	Cycle hire schemes are becoming increasingly important to facilitate and encourage cycling. Funding will be continued to cover secure cycle parking facilities. The REPLICATE project – looking at how smart technology could be used to enable greater sustainable mobility – is trialing a connected network of electric bicycles with electric cars in Bristol, following the introduction of a similar scheme in Exeter. All interventions to encourage people to cycle will help reduce car use and improve air quality.								
L2. Reduce the number and severity of casualties for all road users. <ul style="list-style-type: none"> Consider the needs of all road users in the design of transport and highway schemes, particularly vulnerable road users. Deliver road safety education and skills training to equip people with the knowledge and skills to travel in a safe and sustainable way. Work in partnership to build safer communities. 	<p>Promoting campaigns that focus on cycle safety will encourage more people to use this sustainable mode of transport, reducing congestion on the roads.</p> <p>The West of England recognise that making the road network safer can increase the likelihood of people using more sustainable modes of transport, which in turn contributes to an improvement of air quality. Road safety audits of schemes will be undertaken at the design stage.</p>	+	?	?	L	T/R	<p>Low certainty -</p> <p>There is some uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>	The improvement to air quality by making people feel safer on the roads is uncertain/ lack of data available. Suggest air quality management plans assess the likelihood of people using more sustainable transport mode, the safer they feel.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L3. Encourage residents and employees to make more sustainable and healthier travel options. <ul style="list-style-type: none"> Support travel planning with developers, education providers and individuals. Support travel planning with businesses and employment sites. Encourage mode shift through grants, incentives and rewards. Maximise awareness of sustainable and active travel choices and the benefits these bring. 	<p>The provision of infrastructure to support walking and cycling is required when new facilities are opened. The West of England will target travel planning engagement with citizens who have just moved to a new housing development, to make new travel habits (e.g walking and cycling to work). Travel Plan S106 contributions are a regular feature of a very high proportion of approved development sites.</p> <p>Engagement with schools to promote active travel also encourages young people to walk or cycle (e.g the Access Fund is being used to work with schools from March 2017 until March 2020, focusing on increasing pupil walking rates by 10%). There is also engagement with over 600 business to deliver a range of incentives that encourage sustainable commuting. Grants, incentives and awards have been implemented to encourage the use of non-car modes of travel.</p>	++	+	?	L	T/R	<p>Medium certainty –</p> <p>Uncertainty over the long term, as grants, incentives and rewards have the potential to be temporary. Some uncertainty over funding associated with these interventions.</p>	A modal shift towards sustainable transport modes is needed. Some incentives/ initiatives (e.g the Access Fund) are for a limited time. Need to ensure other initiatives are implemented in replacement, to ensure encouragement to use sustainable transport is long term.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
	Interventions under this policy have the potential to decrease car use within the West of England, helping to improve air quality.								
L4. Support opportunities for all sectors of the population to access services they require, wherever they live. <ul style="list-style-type: none"> Support those without a private car, who need to travel, in accessing the services they require. Promote the role of technology in accessing services and employment. Support the role of taxis and private hire vehicles. Support the role of demand responsive and community transport. 	<p>Transport can act as a barrier for young people or the elderly, and lead to social isolation. There is a need to retain public transport services in rural areas to reduce social isolation. The West of England will work with partners to retain accessibility to key services (e.g the support of Wheels to Work in the West of England who encourage people to cycle through the provision of loan bikes and discounted bike sales).</p> <p>Through working with internet service providers and encouraging them to increase investment in broadband, more people can have the opportunity to work from home. This will have benefits in reducing car travel to the city centers, reducing air quality issues.</p> <p>The support of shared use taxi services that support the local bus network will reduce car travel and improve air quality within city centers.</p>	+	?	?	L	T/R	<p>Medium/ low certainty -</p> <p>Uncertainty with regards to planned actions, programme and funding associated to these interventions, and their impact for improving air quality in the long term. In particular, there is uncertainty with regard to levels of revenue funding to support community transport.</p> <p>If rural travel schemes are added without an overall reduction in traffic, there may be a decline in air quality.</p>	<p>Sustainable public transport within rural areas should be of high modern standards to reduce emissions.</p> <p>Where schemes / initiatives are time limited, new replacement schemes need to be implemented to maximise the opportunity for benefits over time.</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L5. Support the identification and implementation of measures that will improve air quality. <ul style="list-style-type: none"> Support ongoing work to manage the impact of transport on air quality and climate change. Support ongoing work on Clean Air Zones. Support work on Zero and Low Emission Vehicles. 	<p>The West of England supports the preparation of Air Quality Action Plans and the delivery of specific measures identified to improve air quality. Further action is needed to meet the combined West of England CO₂ reduction target for 2035, which is to reduce absolute CO₂ emissions by 50% from and 2014 baseline.</p> <p>Future uptake of low emission including electric vehicles will be critical in helping to deliver reductions in harmful emissions.</p> <p>The West of England has placed significant investment in Ultra Low Emission Vehicles (ULEVs) through the Local Sustainable Transport Fund and Rapid Charging Points scheme, including the 'Source West' project that promotes the introduction of electric vehicles into South West England.</p> <p>Feasibility studies for Clean Air Zones within cities is being undertaken. These are being assessed separately to the JLTP4, on completion of the business cases at the end of 2018.</p>	++	+	+	L	T/R	<p>Medium certainty -</p> <p>Considerable support and commitment to encouraging the use of electric vehicles e.g. increasing the number of charging points, deliver more EV-capable car club bays and building 4 rapid charging hubs at high profile locations.</p> <p>Uncertainty over long term funding and timescales of several of the interventions where Clean Air Zones will be located.</p>	<p>Ensure the mitigation and monitoring contained within the Air Quality Management Plans is implemented.</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

[illegible]

WEST OF ENGLAND JOINT LOCAL TRANSPORT PLAN 4 (JLTP 4) – DRAFT STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) MATRICES – SEA OBJECTIVE 3

JLTP4’s Policies and Interventions assessed

Connectivity beyond the West of England -

Beyond West of England policies and interventions:

- B1. Enhance competitiveness of major gateways and improve connectivity to international markets
- B2. Improve strategic resilience of the network for all trips

Connectivity within the West of England -

Within West of England policies and interventions:

- W1. Provide more public transport options and improve service quality
- W2. Provide for journeys where public transport is not an option
- W3. Use, as appropriate, technological advances and charging measures to optimise and better manage demand
- W4. Improve resilience of the network, providing increased reliability
- W5. Enable business clustering and the efficient movement of freight

Local connectivity -

Local policies and interventions:

- L1. Enable walking and cycling, ‘active modes of travel’, to be the natural choice for shorter journeys
- L2. Reduce the number and severity of casualties for all road users
- L3. Encourage residents and employees to make more sustainable and healthier travel choices
- L4. Support opportunities for all sectors of the population to access the services they require, wherever they live
- L5. Support the identification and implementation of measures that will improve air quality

Neighbourhood connectivity -

Neighbourhood policies and interventions:

- N1. Use master planning and local design to create better places
- N2. Facilitate the use of active modes for all short trips, including the first and last mile of longer journeys

SEA Assessment Criteria - Effects of the JLTP4 and proposed alternatives will be described in terms of their:

Nature: whether they are anticipated to be:

- Positive (+)
- Neutral (N)
- Negative (x) or
- Uncertain (?)

++ Major Positive	The option would be significantly beneficial to the SEA objective by resolving an existing environmental issue and/or maximising opportunities for environmental enhancement.
+ Minor Positive	The option would be partially beneficial to the SEA objective by contributing to resolving an existing environmental issue and/or offering opportunity for some environmental enhancement. This effect would not be considered to be of significance.
N Neutral	The option would have a neutral effect on the SEA objective.
? Uncertain	There is insufficient detail available on the option or the baseline situation in order to assess how significantly the SEA objective would be affected by the option.
x Minor Negative	The option would partly undermine the SEA objective by contributing to an environmental problem and/or partially undermine opportunities for environmental enhancement. This effect would not be considered to be of significance.
xx Major Negative	The option would severely undermine the SEA objective by contributing to an environmental problem and/or undermining opportunities for environmental enhancement. This would be considered to be a significant effect.

Duration: the duration of potential effects are presented in terms of the timescale over which they are anticipated:

- Short term effects: effects expected in the next 1-5 years;
- Medium term effects: effects expected in the next 6-15 years; and
- Long term effects: effects expected in the next 16+years.

Permanence and Reversibility:

- A permanent effect is one which results from a physical change that is anticipated to last beyond the life of the Joint Local Transport Plan.
- A temporary effect is one which results from an operational change which could change if there is a change of policy, or a short term condition such as a construction phase related impact.
- A reversible effect is an environmental effect that can be reversed, for example an incident of water pollution can be cleaned up over time.
- An irreversible effect is an environmental effect that cannot be reversed such as the loss of a historic feature or the loss of agricultural soil due to permanent development.

Spatial Scale:

- Local: effect is restricted to the immediate location of the proposal or to a specific site or settlement within the sub-region (West of England)
- Regional: effect is anticipated to cover a significant proportion or all of the South West.
- National: effect covers the whole of England and/or the UK (also includes international).

SEA Objective 3. Reduce transport related carbon emissions in line with national targets.

SEA Topic: Climatic factors, soil, biodiversity, water.

Criteria to Consider:

- Will the JLTP4 in combination with other plans result in changes to the predicted CO₂ emissions from transport through changes in traffic volumes, a shift to low carbon transport modes or more efficient travel options?

Description of the value and vulnerability of the area likely to be affected:

Transport is the largest contributor to carbon dioxide emissions in the West of England. Transport is responsible for 29% of carbon emissions (CO₂) in the West of England, compared to 26% nationally. The medium term combined West of England carbon reduction target is to achieve a 50% in absolute CO₂ emissions by 2035 and by 83% by 2050 from 2014 levels. However, with more people living and working in the area, leading to significant increases in traffic, it will become progressively more challenging to reduce the overall carbon footprint.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
B1. Enhance competitiveness of major gateways and improve connectivity to international markets. <ul style="list-style-type: none"> • Support Bristol Airport as the main gateway for air travel in the South West. • Support the role of Bristol Port. 	<p>The Bristol Airport Surface Access Strategy (2012- 2016) aims to reduce congestion and the carbon impact of traffic travelling to and from Bristol Airport. The primary focus in the future will be on improving public transport connectivity to accommodate growth at the airport.</p> <p>Within the Bristol Airport's Master Plan, 'Towards 2050' their target is to be carbon neutral by 2030. To achieve this, staff are encouraged to use car sharing, public transport and cycling and the airport are identifying further measures that will influence mode choice. The West of England will work with Bristol Airport to define a low carbon transport network (through managing demand for driving to the airport and the provision of infrastructure to cater for technological advances in electric and autonomous vehicles. However, it should be noted that expansion at Bristol Airport and Bristol Port may contribute to increased greenhouse gas emissions (aviation in in particular), so long term impacts of this SEA objective are uncertain.</p> <p>A commitment to improving the M5 Junction 19 to reduce congestion will reduce the carbon emissions associated with travel to Bristol Port.</p>	+	+	?	N	T/R	<p>Medium/ Low-</p> <p>Bristol's <i>Airport Surface Access Strategy</i> is currently under preparation not yet available for review. There is a vision to support their target to become carbon neutral by 2030 but a certain level of uncertainty about what options / schemes will be implemented and to what extent.</p> <p>Bristol Airport's new Masterplan 'Towards 2050' is under consultation.</p>	<p>Further measures may be required to ensure successful modal shift for regular journeys and use of cleaner cars. This will ensure carbon emissions are reduced in the long term.</p>	<p>The judgement was based on the assumption that Bristol Airport will continue working towards their aim to deliver a low carbon transport network.</p> <p>It is also assumed that the JLTP4 interventions relating to supporting Bristol Airport and Bristol Port would be implemented and that further developments in Bristol Airport and Port will be delivered in line with the relevant <i>National Policy Statements</i>.</p>
B2. Improve strategic resilience of the network for all trips.	<p>Working closely with Highways England, neighbouring authorities and other partners to ensure the RIS2 delivery plan includes the East of Bath Link, new and upgraded junctions on</p>	+	?	?	N	T/R	<p>Medium certainty-</p> <p>There is a level of uncertainty regarding funding/ investment to improve the SRN across</p>	<p>Public transport vehicles should be of high modern standards to minimise emissions.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
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<ul style="list-style-type: none"> Maximise opportunities arising from improvements to the strategic road and rail network, and identify and support delivery of further changes. <ul style="list-style-type: none"> Strategic Road Network (SRN) Strategic Rail Identify opportunities to manage the impact of Severn Bridge tolls removal. Support the role of coaches for residents and visitors. Manage and mitigate the impact of regular and infrequent events on the transport network. 	<p>the M4 and M5, new sections of Smart Motorway and a Park & Ride on the M32 will contribute to reduced congestion, a modal shift towards more sustainable transport, and therefore a reduction in carbon emissions.</p> <p>Emerging technologies will enable further use of cleaner vehicles for freight travel. A move to improve coach management will reduce dependency on car travel. The redevelopment of Bristol Temple Meads Station will promote sustainable transport choices and facilitate multi modal trips such as cycling and walking.</p> <p>However, highways development can lead to increased traffic flows, accommodating for the predicted increase in car on the network. In particular, the removal of the Severn Bridge Toll may increase congestion as it is likely to encourage more people to travel on the SRN in the short term. A higher number of cars on the network will lead to an increase in carbon emissions.</p> <p>Overall, interventions that include upgrades to public transport will aid in reducing carbon emissions. This beneficial effect may, however be offset in the medium and long term as improvements in the highway may result in increased traffic flows.</p>						<p>the region.</p> <p>Similar funding uncertainty applies to the strategic rail network.</p> <p>There needs to be a modal shift to public transport from car use.</p>	<p>Continue to work with Highways England to ensure RIS2 (Route Investment Strategy) delivery plan includes a requirement for HE to carry out a strategic study into north south connectivity improvements including the East of Bath Link, and new and upgraded junction on the M4 and M5, new sections of Smart Motorways and P&R on the M32.</p> <p>The full electrification of the Great Western Main Line to Bristol Temple Meads, via Bath Spa and Bristol Parkway, remains an aspiration, as does extension from Birmingham to Bristol. Further improvements schemes in the strategic rail network, as well as those identified in the JLTP 4 are needed.</p>	be implemented.
<p>W1. Provide more public transport options and improve service quality.</p> <ul style="list-style-type: none"> Provide high quality and reliable mass and bus rapid transit. Support and enhance existing public transport services. <ul style="list-style-type: none"> Bus Strategy Rail Improve the availability and accessibility of accurate travel information and ticketing. 	<p>There are several emerging mass and rapid transport systems within the West of England (MetroBus). The ambition is for new forms of mass transport (e.g. light rail, light metro or trams) where the potential is greatest for high passenger flows. The influx of alternative transport modes will decrease reliability of car travel, and help reduce carbon emissions.</p> <p>In addition, the Bus Strategy Overview Document will support the JLTP4. This outlines the West of England's ambitions regarding bus travel. In particular, schemes such as Greater Bristol Bus Network aim to improve passenger experience, reduce congestion and reduce emissions. The West of England has strong partnerships with local bus operators. An accessible and attractive bus network will discourage car use; helping to reduce carbon emissions.</p> <p>The MetroWest rail programme will deliver by 2012/2022 a range of rail improvements, encouraging more reliable travel.</p> <p>The combination of interventions is likely to have a major beneficial impact on reducing carbon emissions and encouraging a modal shift away</p>	++	++	+	R	T/R	<p>Medium certainty-</p> <p>There is a very strong commitment from the West of England to deliver high quality and reliable mass transit network across the Greater Bristol and Bath urban areas; complete and expand MetroBus and deliver MetroWest.</p> <p>There is however a degree of uncertainty with regards to funding.</p>	<p>There needs to be a modal shift to sustainable transport modes to reduce carbon emissions.</p> <p>Long term investment of schemes will be required to ensure carbon emissions are reduced in the long term.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant intentions in the JLTP4 would be implemented.</p> <p>In addition, schemes and programs will have to be delivered through the relevant consenting process.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
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	from car travel.								
W2. Provide for journeys where public transport is not an option. <ul style="list-style-type: none"> Provide P&R and sharing schemes to minimise the impact of single occupancy vehicles. Recognise the needs to motorcycles and mopeds. 	<p>Park & Ride releases capacity in central areas to enable transfer of road space for walking, cycling and public transport. The JLTP4 supports the concept of Park & Ride locations around urban areas to encourage less car use within city centers. There is also the support to explore new Park & Ride sites linked to mass transit routes, acting as transport hubs.</p> <p>Opportunities to increase car sharing (through technology and social media) will be explored to reduce car use. There is the support from the West of England for the expansion of a car club network of low emission vehicles, which remove petrol and diesel cars from the network.</p>	+	?	?	R	T/R	<p>Medium / Low certainty –</p> <p>Although there is support for several Park & Ride locations around cities, there is some uncertainty with regards to planned actions, programme and funding associated to these interventions in the long term.</p>	<p>Further measures may be required to ensure successful modal shift for regular journeys and use of cleaner vehicles. Improved public transport or other incentives may reduce the need for a number of highways schemes currently under consideration.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant intentions in the JLTP4 would be implemented.</p> <p>In addition, Park & Ride schemes and programs will have to be delivered through the relevant consenting process.</p>
W3. Use, as appropriate, technological advances and charging measures to optimize and better manage demand. <ul style="list-style-type: none"> Use technology to keep traffic moving. Embrace technology to improve cleaner travel option. Use, as appropriate, charging measures to influence and manage the demand of private car use. 	<p>Connected and Autonomous Vehicles (CAVs) and Mobility as a Service (MaaS), including pay as you go travel) are currently in the early stages of development and the West of England are not sure how they should be responding. A strategy will be produced regarding how these can be used to achieve carbon objectives.</p> <p>Parking controls (e.g further management of parking provision and cost and road user charging, such as charging to drive into or through specific areas) can encourage trips within urban areas to transfer to active modes or public transport. This, in turn, should reduce congestion and carbon emissions within and between city centers.</p> <p>Feasibility studies are being carried out to investigate the impacts and extend of charging Clean Air Zones in Bath and Bristol. This could introduce charges for the most polluting vehicles entering these areas, which would discourage people to drive into city centers.</p> <p>Combined interventions have the potential to reduce car use and contribute to a reduction in carbon emissions.</p>	+	+	?	R	T/R	<p>Low certainty –</p> <p>Although there is support for several technological advancements to reduce car use and reduce carbon emissions, there is some uncertainty with regards to planned actions, programme and funding associated to these interventions.</p> <p>Many technological advances are in preliminary designs, and therefore there is limited potential to reduce carbon emissions in the short term. Uncertain impacts of this policy on carbon emissions can be seen, due to lack of available data regarding the effectiveness of new technologies that encourage people to use the car less. Additionally, charging measures might prove unpopular and challenging to implement.</p>	<p>Careful consideration needs to be undertaken to understand the impact of reducing carbon emissions of advancing technologies, before they are implemented across the West of England.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant intentions in the JLTP4 would be implemented.</p>
W4. Improve resilience of the network, providing increased reliability <ul style="list-style-type: none"> Define, manage and maintain the Key Route Network. Effectively manage the 	<p>There is the need to define and consult on a Key Route Network (KRN). The major scheme programme includes improvements network efficiency, in turn, reducing congestion and carbon emissions.</p> <p>Poor network maintenance can deter people from choosing active modes of travel such as cycling and walking, therefore increasing levels of</p>	+	?	?	R	T/R	<p>Medium certainty-</p> <p>There will be additional MRN capital infrastructure and this will have an impact upon maintenance budgets and requirements.</p> <p>The West of England will work with Highways England to deliver numerous schemes. These include a new junction 21A on the M5 motorway south of the existing J21,</p>	<p>Public transport vehicles should be of high modern standards to minimise emissions.</p> <p>Success of interventions are reliant on a shift in the public's behavior towards using more sustainable transport modes. Proposals under these</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
<p>Major Road Network.</p> <ul style="list-style-type: none"> Effectively accommodate development sites and associated trips. 	<p>congestion, which can be detrimental in reducing carbon emissions.</p> <p>Public transport will be one on of the key principles for the Major Roads Network, as these roads carry large numbers of people on buses and other modes. Additionally, this recognises that public transport schemes are generally more effective in the long term at reducing congestion than road widening schemes, and therefore reducing car use and carbon emissions.</p> <p>A focus of the JLTP4 is on achieving a substantial shift to more sustainable modes, that carry people more efficiently. Investment will be required to unlock new developments, including strategic employment locations that may encourage new home owners to use sustainable travel modes to get to work, reducing overall car use.</p>						<p>improvements to Junction 14 of the M5 and bypasses for the villages of Banwell, Sandford and Churchill. Additionally, improvements to the A38 between Langford and South Bristol will improved the resilience of the Strategic Road Network. Such schemes all aim to improve reliability of the network, reduce congestion and, in the long run, reduce carbon emissions.</p>	<p>interventions should include provisions to cater for those who do not have access to a car.</p>	
<p>W5. Enable business clustering and the efficient movement of freight.</p> <ul style="list-style-type: none"> Support the delivery of Enterprise Zones / Business clustering. Balance the requirement for distributing goods, with mitigating the adverse impact of vehicles. <ul style="list-style-type: none"> Routing, management and information Rail and water Loading and parking Consolidation Embracing innovation Planning conditions 	<p>Reduced car travel between businesses result in lower demand for trips on the transport network. The potential lower demand on the transport network can, in turn, reduce congestion and contribute to reducing carbon emissions.</p> <p>There is the support from the West of England to effectively manage the movement of freight, encouraging a shift from partially filled, heavily polluting road vehicles to fewer, fuller and cleaner vehicles. Freight travel will be shifted from road to rail and water. This will contribute to carbon emissions targets.</p> <p>Heavy good vehicles will also be managed in the central areas of Bristol and Bath. This can reduce carbon emissions within cities. Additionally, Clean Air Zones within cities are being investigated to manage all traffic. Pedestrian movements, cycle lanes, and public transport reliability can impact the ability to efficiently deliver freight. Consolidation with micro consolidation centers using electric cargo bikes, small electric vans and other appropriate sustainable modes can be explored, all with the potential to reduce carbon emissions.</p> <p>There will also be support for emerging technologies, improving the efficiency of freight movement, including planning and managing for the impact of connected and autonomous vehicles and drones. Further measures to work with and encourage business fleets to switch to low emissions vehicles and e-bikes need to ensure electricity sources are also low carbon.</p> <p>A combination of measures to move away from</p>	+	+	?	R	T/R	<p>Medium certainty-</p> <p>There is some uncertainty with regards to planned actions, programme (medium and long-term impacts) and funding associated with these interventions. Business grants can be temporary/ uncertain as well. Interventions will need to be implemented over a number of years, in order to ensure a reduction of carbon emissions.</p>	<p>Implement public transport measures to reduce the risk of businesses relocating.</p> <p>Further measures may be required to ensure successful modal shift for regular journeys.</p>	<p>The judgment has been reached from the assumption that the interventions mentioned in the JLTP4 would be implemented.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
	the transport of freight from HGVs on roads would result in a reduction in carbon emissions.								
L1. Enable walking and cycling, 'active modes of travel', to be the natural choice for shorter journeys. <ul style="list-style-type: none"> Provide an attractive, safe and usable network. Provide schemes to support the uptake of cycling. 	<p>Over 80% of respondents supported cycle schemes and improvements to public realm to encourage more active travel and to help reduce carbon emission (feedback to Joint Transport Strategy Vision).</p> <p>Cycling and walking can reduce negative impacts of road congestion, helping to reduce carbon emissions. However, there is the requirement for good physical infrastructure connecting key destinations. Local Cycling and Walking Infrastructure Plans (LCWIP) will set out a programme of cycling and/or walking infrastructure improvements and the scale of investment that would be required to bring preferred routes up to a suitable standard.</p> <p>Opportunities to reallocate road space to improve conditions for walking and provide safe, direct routes for cycling will be taken (e.g. the Cycling Ambition Fund scheme has provided a straight through crossing of the A4174 Ring Road for cycle traffic. This crossing is separate from the adjacent provisions for pedestrians, reducing delays for cyclists). Projects such as this, as well as the REPLICATE project (trailing a connected network of electric bikes in Bristol) are key to encouraging more people to switch from car use, ultimately reducing carbon emissions.</p> <p>A combination of interventions will have a beneficial impact on reducing carbon emissions.</p>	+	+	?	L	T/R	<p>Medium certainty-</p> <p>There is a commitment from the West of England to encourage walking and cycling.</p> <p>Several projects/ programmes/ schemes in place to encourage people to cycle, moving towards sustainable transport with more to be delivered through the development and implementation of the Local Cycling and Walking Infrastructure Plans.</p>	<p>A modal shift towards sustainable transport modes is needed to ensure carbon emissions are reduced long term.</p> <p>Where schemes / initiatives are time limited, new replacement schemes need to be implemented to maximise the opportunity for benefits over time.</p>	The judgment has been reached from the assumption that the interventions mentioned in the JLTP4 would be implemented.
L2. Reduce the number and severity of casualties for all road users. <ul style="list-style-type: none"> Consider the needs of all road users in the design of transport and highway schemes, particularly vulnerable road users. Deliver road safety education and skills training to equip people with the knowledge and skills to travel in a safe and sustainable way. Work in partnership to build safer 	<p>Promoting campaigns that focus on cycle and pedestrian safety should encourage more people to use this sustainable mode of transport, reducing congestion on the roads, having a positive impact on reducing carbon emissions.</p>	+	?	?	L	T/R	<p>Low certainty –</p> <p>There is uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>	<p>Requires a modal shift to more sustainable transport modes. The reduction in carbon emissions by making people feel safer on the roads is uncertain/ lack of data available.</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
communities.									
L3. Encourage residents and employees to make more substantial and healthier travel options. <ul style="list-style-type: none"> Support travel planning with developers, education providers and individuals. Support travel planning with businesses and employment sites. Encourage mode shift through grants, incentives and rewards. Maximise awareness of sustainable and active travel choices and the benefits these bring. 	<p>With the level of growth planned in the West of England, engaging with residents when they move into a new home is seen as an opportunity to impact on future travel behavior.</p> <p>Interventions would assist in delivering better travel planning across new developments, education providers, employees and individuals. There is also engagement with over 600 business to deliver a range of incentives that encourage sustainable commuting. Grants, incentives and awards have been implemented to encourage the use of non-car modes of travel, which would reduce carbon emissions.</p> <p>Interventions under this policy have the potential to decrease car use within the West of England, helping to reduce carbon emissions.</p>	+	?	?	L	T/R	<p>Medium certainty -</p> <p>Uncertainty over the long term, as grants, incentives and rewards have the potential to be temporary. Some uncertainty over funding associated with these interventions.</p>	<p>A modal shift towards sustainable transport modes is needed. Some incentives/ initiatives (e.g the Access Fund) is for a limited time. Need to ensure other initiatives are implemented in replacement, to ensure encouragement to use sustainable transport is long term.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p>
L4. Support opportunities for all sectors of the population to access services they require, wherever they live. <ul style="list-style-type: none"> Support those without a private car, who need to travel, in accessing the services they require. Promote the role of technology in accessing services and employment. Support the role of taxis and private hire vehicles. Support the role of demand responsive and community transport. 	<p>For some households, the costs associated with owning and running a car are prohibitively high, making them dependent on public transport. The provision of more bus services within rural areas (to increase accessibility to city centers), could contribute to carbon emissions.</p> <p>Working with broadband service providers to help better connect rural areas will encourage people to work from home, reducing the need for car travel, helping reduce carbon emissions.</p> <p>The support of shared use taxi services that support the local bus network will reduce car travel and reduce emissions within city centers.</p> <p>Electric vehicles (advancing technology) still require energy, which if not green energy can still contribute to carbon emissions. There will be a dependency on the energy sector to help achieve this SEA objective.</p> <p>Overall, these policy interventions would have an uncertain impact on the reduction in carbon emissions.</p>	?	?	?	L	T/R	<p>Medium/ low certainty-</p> <p>Uncertainty with regards to planned actions, programme and funding associated to these interventions, and their impact for improving air quality in the long term.</p> <p>If rural travel schemes are added without an overall reduction in traffic, there may be limited reduction in carbon emissions.</p>	<p>Sustainable public transport within rural areas should be of high modern standards to reduce emissions.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p>
L5. Support the identification and implementation of measures that will improve air quality. <ul style="list-style-type: none"> Support ongoing work to manage the impact of transport on air quality and climate change. Support ongoing work 	<p>Although the average emission per vehicle is much higher for heavy goods vehicles and buses, the high number of diesel light passenger and commercial vehicles on the road means that these are the biggest contributors to overall pollution. In addition to NO₂ emissions, road transport is one of the largest source of CO₂ emissions, contributing to climate change.</p> <p>The West of England is committed to working with tour companies to develop an upgrade plan</p>	++	+	+	L/R	T/R	<p>Medium certainty-</p> <p>Timescales of several of the interventions where Clean Air Zones will be located.</p> <p>Considerable support and commitment to encouraging the use of electric vehicles e.g increasing the number of charging points, deliver more EV-capable car club bays and building 4 rapid charging hubs at high profile</p>	<p>Ensure the mitigation and monitoring contained within the Air Quality Management Plans and Local Authority Plans is implemented.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
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<ul style="list-style-type: none"> on Clean Air Zones. Support work on Zero and Low Emission Vehicles. 	<p>to operate ultra-low or zero emissions vehicles in city centers. There are hotspots in the Bath and Bristol built-up areas where concentrations of NO₂ (caused by vehicle emissions) exceed the acceptable national and European limit of 40 µg/m³. As such, local authorities are responsible for developing innovative Clean Air Plans to combat the issue.</p> <p>Feasibility studies for Clean Air Zones within cities are being undertaken. These are being assessed separately to the JLTP4, on completion of the business cases at the end of 2018. These will have a major beneficial impact on reducing carbon emissions. Additionally, future uptake of electric vehicles will be critical in helping to deliver reductions in harmful emissions.</p> <p>Overall, interventions are likely to have a major benefit on reducing carbon emissions in the short term. Depending on reductions in the short and term, long term implications are uncertain.</p>						locations.		
<p>N1. Use master planning and local design to create better places.</p> <ul style="list-style-type: none"> Improve the quality of streets and public realm. Integrate walking, cycling and public transport into new developments. Provide clear wayfinding and signage. Support and maintain Public Rights of Way. 	<p>Improved opportunities to travel by active modes will enable people to access shops and businesses, reducing reliance on car travel. There is a commitment to invest in public places in favor of pedestrians, cyclists and public transport users.</p> <p>The West of England will work with town and parish councils to identify improvements that could encourage pedestrian and cycling within local neighborhoods. Improving the street environment for all road users will ensure urban areas become more attractive, with more people choosing to walk and cycle, contributing to a reduction in carbon emissions.</p> <p>Combined interventions have the potential to aid in the reduction of carbon emissions in the short term, medium term.</p>	+	+	?	L	T/R	<p>High/ medium certainty-</p> <p>Support of several local design guides such as the Bristol Draft City Centre Framework and the Bath Public Realm and Movement Strategy which improve streets and places. The JLTP4 also identifies the need to develop active travel routes where possible.</p> <p>Minor uncertainty with regards to planned actions, programme and funding associated to these interventions, especially in the long term.</p>	<p>Ensure air quality information and mitigation is incorporated into local Neighborhood Plans.</p> <p>Ensure mitigation outlined in Air Quality Management Plans is also adopted.</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
<p>N2. Facilitate the use of active modes for all short trips, including the first and last mile of longer journeys.</p> <ul style="list-style-type: none"> Work with residents and communities to identify barriers to accessibility. Support the provision of safe crossings and speed reduction in appropriate locations. Improve actual and perceived personal security. 	<p>Journeys within neighborhoods are short, and for pedestrians, most neighborhoods already have an extensive network of footways and Public Rights of Way. Because of this, the West of England promote opportunities for first and last mile trips being made by non-car modes.</p> <p>The provision of safe crossings and speed reduction measures (e.g 20mph zones) can also slow down cars and reduce emissions.</p>	+	?	?	L	T/R	<p>Medium certainty-</p> <p>There is some uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>	<p>Ensure effective communication with residents and communities in order to achieve interventions.</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

[illegible]

WEST OF ENGLAND JOINT LOCAL TRANSPORT PLAN 4 (JLTP 4) – DRAFT STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) MATRICES – SEA OBJECTIVE 4

JLTP4’s Policies and Interventions assessed

Connectivity beyond the West of England -

Beyond West of England policies and interventions:

- B1. Enhance competitiveness of major gateways and improve connectivity to international markets
- B2. Improve strategic resilience of the network for all trips

Connectivity within the West of England -

Within West of England policies and interventions:

- W1. Provide more public transport options and improve service quality
- W2. Provide for journeys where public transport is not an option
- W3. Use, as appropriate, technological advances and charging measures to optimise and better manage demand
- W4. Improve resilience of the network, providing increased reliability
- W5. Enable business clustering and the efficient movement of freight

Local connectivity -

Local policies and interventions:

- L1. Enable walking and cycling, ‘active modes of travel’, to be the natural choice for shorter journeys
- L2. Reduce the number and severity of casualties for all road users
- L3. Encourage residents and employees to make more sustainable and healthier travel choices
- L4. Support opportunities for all sectors of the population to access the services they require, wherever they live
- L5. Support the identification and implementation of measures that will improve air quality

Neighbourhood connectivity -

Neighbourhood policies and interventions:

- N1. Use master planning and local design to create better places
- N2. Facilitate the use of active modes for all short trips, including the first and last mile of longer journeys

SEA Assessment Criteria - Effects of the JLTP4 and proposed alternatives will be described in terms of their:

Nature: whether they are anticipated to be:

- Positive (+)
- Neutral (N)
- Negative (x) or
- Uncertain (?)

++ Major Positive	The option would be significantly beneficial to the SEA objective by resolving an existing environmental issue and/or maximising opportunities for environmental enhancement.
+ Minor Positive	The option would be partially beneficial to the SEA objective by contributing to resolving an existing environmental issue and/or offering opportunity for some environmental enhancement. This effect would not be considered to be of significance.
N Neutral	The option would have a neutral effect on the SEA objective.
? Uncertain	There is insufficient detail available on the option or the baseline situation in order to assess how significantly the SEA objective would be affected by the option.
x Minor Negative	The option would partly undermine the SEA objective by contributing to an environmental problem and/or partially undermine opportunities for environmental enhancement. This effect would not be considered to be of significance.
xx Major Negative	The option would severely undermine the SEA objective by contributing to an environmental problem and/or undermining opportunities for environmental enhancement. This would be considered to be a significant effect.

Duration: the duration of potential effects are presented in terms of the timescale over which they are anticipated:

- Short term effects: effects expected in the next 1-5 years;
- Medium term effects: effects expected in the next 6-15 years; and
- Long term effects: effects expected in the next 16+years.

Permanence and Reversibility:

- A permanent effect is one which results from a physical change that is anticipated to last beyond the life of the Joint Local Transport Plan.
- A temporary effect is one which results from an operational change which could change if there is a change of policy, or a short term condition such as a construction phase related impact.
- A reversible effect is an environmental effect that can be reversed, for example an incident of water pollution can be cleaned up over time.
- An irreversible effect is an environmental effect that cannot be reversed such as the loss of a historic feature or the loss of agricultural soil due to permanent development.

Spatial Scale:

- Local: effect is restricted to the immediate location of the proposal or to a specific site or settlement within the sub-region (West of England)
- Regional: effect is anticipated to cover a significant proportion or all of the South West.
- National: effect covers the whole of England and/or the UK (also includes international).

SEA Objective 4. Adapt transport network to effects of climate change and minimise the vulnerability of transport network to flood risk

SEA Topic: Water, assets, climatic factors

Criteria to Consider: Will the JLTP4 (in combination with other plans):

- Promote infrastructure and systems that are adaptable to flooding?
- Result in key infrastructure in locations associated with predicted increased flood risk?

Description of the value and vulnerability of the area likely to be affected:

Impacts from climate change might include increases in flooding, temperature, drought and extreme weather events. These could create risks and opportunities such as: impacts to transport infrastructure from melting roads or buckling rails and increases in tourism. In addition, climate change impacts on the resilience and standard of the transport network, include issues such as flooding, landslides, potholes, heat damage to roads and rail buckling. The climate of the South West is changing, the annual average daily temperature in the South West region has increased 0.75°C from 9.80°C in 1961 to 10.55°C in 2018.

Areas throughout the West of England are susceptible to different forms of flooding. There are significant flood risks in Weston-super-Mare, Bristol, Avonmouth and Severnside, where property is at risk from tidal and fluvial flooding. Surface water drainage is also affected by high tides. There is significant tidal and fluvial flood risk management infrastructure in much of the sub-region. There are major flood management issues associated with redevelopment opportunities along the tidal reaches of the River Avon and within Bristol's Floating Harbour. There are also major proposals to develop areas within the city of Bath adjacent to the River Avon. These sites will need substantial fluvial flood mitigation measures in order to bring them forward for development.

The effect of climate change and sea level rise is a major concern for Weston-super-Mare, areas of Bristol, Avonmouth and the tidal River Severn.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
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B1. Enhance competitiveness of major gateways and improve connectivity to international markets. <ul style="list-style-type: none">Support Bristol Airport as the main gateway for air travel in the South West.Support the role of Bristol Port.	<p>Bristol Port is located in an area at significant risk from flooding and hence it is particularly vulnerable to potential climate change effects such as increased frequency of flood events and sea level rise. Flood defense infrastructure is already in place in the area. Future development will need to comply with national policy on flood risk and will incorporate appropriate mitigation measures.</p> <p>Bristol airport is not located in an area of significant flood risk.</p> <p>The effect is described as neutral in the short term but uncertain in the medium and long term due to the high risk to flooding of the Bristol Port Area.</p>	N	?	?	N	T/R	<p>Medium certainty –</p> <p>There is scientific consensus that climate change is taking place. The location of Bristol Port in an area particularly susceptible to flooding means that vulnerability of the transport network to flood risk in the area is an existing condition which may worsen due to climate change.</p>	<p>New road infrastructure in and around the Port will have to be designed to take into account flood risk and the effects of climate change in line with national policy.</p> <p>Specific schemes will be subject to the relevant consenting schemes and relevant environmental legislation. Schemes will be subject to Flood Risk Assessment (FRA) and Environmental Impact Assessment (EIA) (where applicable).</p> <p>Detailed design should follow best practice guidance such as that provided within CIRIA Report C753 <i>The SuDS Manual</i>. The guidance covers the planning, design, construction and maintenance of Sustainable Drainage Systems (SuDS) to assist with their effective implementation within both new and existing developments. It looks at how to maximise amenity and biodiversity benefits, and deliver the key objectives of managing flood risk and water quality.</p>	<p>The judgement was based on the assumption that the JLTP4 interventions relating to supporting Bristol Airport and Bristol Port would be implemented and that further developments in Bristol Airport and Port will be delivered in line with the relevant <i>National Policy Statements</i>, planning consents and environmental legislation.</p>
B2. Improve strategic resilience of the network for all trips.	Improvements on the strategic road and rail network identified in the JLTP 4 include: East of Bath Link; new and	N	+	?	N	T/R	<p>Medium certainty –</p>	<p>Strategic road and rail network improvements will have to be designed to take into account flood risk and the effects</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
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<ul style="list-style-type: none"> Maximise opportunities arising from improvements to the strategic road and rail network, and identify and support delivery of further changes. <ul style="list-style-type: none"> Strategic Road Network (SRN) Strategic Rail Identify opportunities to manage the impact of Severn Bridge tolls removal. Support the role of coaches for residents and visitors. Manage and mitigate the impact of regular and infrequent events on the transport network. 	<p>upgraded junctions on the M4 (new Junction 18a) and M5 (Junctions 14/19/new 21a); new sections of Smart Motorway; Park & Ride on the M32; redevelopment of Bristol Temple Meads into a regional interchange.</p> <p>Increase of hardstanding areas would increase run-off rates which in turn would increase flood risk. This is of particular relevance in the areas of the sub-region most affected by flooding i.e. Weston-super-Mare; Avonmouth / Severnside; tidal reaches of the River Avon and Bristol's Floating Harbour. The investment in strategic highway and rail network improvements would, however, provide opportunities to address drainage at highways and rail networks currently at risk of severance due to flooding.</p> <p>The effect of this policy is assessed as neutral in the short-term and uncertain in the long term. It is however acknowledged that there are opportunities for beneficial effects in the medium term.</p>						<p>There is scientific consensus that climate change is taking place. Whilst new transport infrastructure may be designed to take into account climate change, the scale and nature of extreme weather events may overwhelm transport infrastructure. The location of sections of the strategic road and rail network in areas particularly susceptible to flooding means that vulnerability of the transport network to flood risk in the area is an existing condition which may worsen due to climate change.</p> <p>There is some uncertainty with regards to programme and funding of some of the schemes.</p>	<p>of climate change in line with national policy. For example, train services suffer from short term resilience (there was a closure of the line west of Exeter following severe weather damage to the seas wall in the Dawlish Warren area).</p> <p>Specific schemes will be subject to the relevant consenting schemes and relevant environmental legislation. Schemes will be subject to Flood Risk Assessment (FRA) and Environmental Impact Assessment (EIA) (where applicable).</p> <p>Detailed design should follow best practice guidance such as that provided within CIRIA Report C753 <i>The SuDS Manual</i>.</p> <p>The use of SuDs and temperature resilient surfaces for new networks would help to meet this SEA objective.</p>	<p>be implemented.</p> <p>It is also assumed that schemes design will follow best practice and that development consent for nationally significant infrastructure projects on the road and rail networks and strategic rail freight interchanges will be delivered in line with the provisions of the <i>National Networks National Policy Statement</i>.</p>
<p>W1. Provide more public transport options and improve service quality.</p> <ul style="list-style-type: none"> Provide high quality and reliable mass and bus rapid transit. Support and enhance existing public transport services. <ul style="list-style-type: none"> Bus Strategy Rail Improve the availability and accessibility of accurate travel information and ticketing. 	<p>There are several emerging mass and rapid transport systems within the West of England (MetroBus and MetroWest Rail. Scheme design will need to be able to adapt to changes in climate.</p> <p>The effect of this policy is assessed as neutral in the short-term and uncertain in the medium and long term. Increase of hardstanding areas associated with some of the interventions under this policy would increase run-off rates which in turn would increase flood risk. This is of particular relevance in the areas of the sub-region most affected by flooding i.e. Weston-super-Mare; Avonmouth / Severnside; tidal reaches of the River Avon and Bristol's Floating Harbour.</p> <p>The investment in public transport improvements would, however, provide opportunities to address drainage at highways and rail networks currently at risk of severance due to flooding. By supporting and enhancing public transport services, there is the potential to make them more resilient to climate change impacts. More and better public transport could help to provide alternative means of access in flood</p>	N	+	?	R	T/R	<p>Medium certainty –</p> <p>There is scientific consensus that climate change is taking place. The location of sections of the strategic road and rail network in areas particularly susceptible to flooding means that vulnerability of the transport network to flood risk in the area is an existing condition which may worsen due to climate change.</p> <p>Although there is a very strong commitment to deliver high quality and reliable mass transit network across the Greater Bristol and Bath urban areas; complete and expand MetroBus and deliver MetroWest, there is some uncertainty with regards to programme and funding. There is limited information regarding scheme design and actions the West of England are taking to ensure scheme can adapt to the future projected changes to the climate.</p> <p>Longer term effects of climate change on transport infrastructure is becoming increasingly unpredictable.</p>	<p>Major transport infrastructure schemes will have to be designed to take into account flood risk and the effects of climate change in line with national policy.</p> <p>Specific schemes will be subject to the relevant consenting schemes and relevant environmental legislation. Schemes will be subject to Flood Risk Assessment (FRA) and Environmental Impact Assessment (EIA) (where applicable).</p> <p>Detailed design should follow best practice guidance such as that provided within CIRIA Report C753 <i>The SuDS Manual</i>.</p> <p>Public transport interchanges should be designed to provide sufficient shade and as well as protection from adverse weather. Infrastructure should be resilient to extremes of temperature.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that schemes under this policy would be designed following best practice and that would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
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	events.								
W2. Provide for journeys where public transport is not an option. <ul style="list-style-type: none"> Provide P&R and sharing schemes to minimise the impact of single occupancy vehicles. Recognise the needs of motorcycles and mopeds. 	<p>The delivery of new or expanded P&Rs may result in increased flood risk in certain locations. Investment in public transport improvements would, however, provide opportunities to address drainage at highways and rail networks currently at risk of severance due to flooding. More and better public transport could also help to provide alternative means of access in flood events.</p> <p>New Park & Ride infrastructure will need to be designed to be able to adapt to changes eg extreme heat causing melting of roads and also design to prevent flood risk from run-off.</p>	N	?	?	R	T/R	<p>Low/ Medium certainty –</p> <p>There is scientific consensus that climate change is taking place. The location of sections of the strategic road and rail network in areas particularly susceptible to flooding means that vulnerability of the transport network to flood risk in the area is an existing condition which may worsen due to climate change.</p> <p>There is some uncertainty with regards to programme and funding of some of the proposed schemes. Longer term effects of climate change on transport infrastructure is becoming increasingly unpredictable.</p>	<p>Specific schemes will be subject to the relevant consenting schemes and relevant environmental legislation.</p> <p>New road infrastructure will have to be designed to take into account the effects of climate change, by improving drainage systems, providing SuDs and planting trees to help mitigate effects of heat waves.</p> <p>Detailed design should follow best practice guidance such as that provided within CIRIA Report C753 <i>The SuDS Manual</i>.</p> <p>Locations of Park & Ride facilities will have to be carefully managed to avoid flood plain areas.</p> <p>Public transport interchanges should be designed to provide sufficient shade and as well as protection from adverse weather. Infrastructure should be resilient to extremes of temperature</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that schemes under this policy would be designed following best practice and that would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>
W3. Use, as appropriate, technological advances and charging measures to optimize and better manage demand. <ul style="list-style-type: none"> Use technology to keep traffic moving. Embrace technology to improve cleaner travel option. Use, as appropriate, charging measures to influence and manage the demand of private car use. 	<p>The use of technology to keep traffic moving and to improve cleaner travel option, together with charging measures aimed to influence and manage the demand of private car use, would have a neutral effect on this SEA objective in the short and medium term.</p> <p>Potential long term effects would depend on the on the type and implementation extent of future technological advances.</p>	N	N	?	R	T/R	<p>Medium / Low certainty –</p> <p>Advanced technologies are currently in early development stages. Timescales and extent of implementation are unknown.</p>	<p>Promoting the use of technology to provide information on weather conditions and impact on travel.</p>	Based on information available from JLTP4.
W4. Improve resilience of the network, providing increased reliability <ul style="list-style-type: none"> Define, manage and maintain the Key Route Network (KRN). Effectively manage the Major Road Network (MRN). Effectively accommodate development sites and associated trips. 	<p>The Joint Transport Asset Management Plan (JTAMP) will set out a framework for the delivery of sustainable maintenance, which can include measures to ensure the transport network is more resilient to changes in climate.</p> <p>Working with developers in the early planning process to ensure they design their sites to match the priorities of the local planning authorities can be key in ensuring factors to combat climate change are included.</p>	+	+	?	R	T/R	<p>Medium / Low certainty –</p> <p>The KRN and its associated Joint Transport Asset Management Plan, and Major Road Network proposed by DfT are at inception stages. Timescales and details of implementation are unknown.</p> <p>There will be additional budgeting and funding requirements which may limit the implementation of some of the measures.</p> <p>Longer term effects of climate change on transport infrastructure is becoming increasingly unpredictable. Whilst new transport infrastructure may be designed to take into account climate change, the scale</p>	<p>Specific schemes will be subject to the relevant consenting schemes and relevant environmental legislation. New schemes will have to be designed to take into account flood risk and the effects of climate change in line with national policy.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that schemes under this policy would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
							and nature of extreme weather events may overwhelm transport infrastructure.		
W5. Enable business clustering and the efficient movement of freight. <ul style="list-style-type: none"> Support the delivery of Enterprise Zones (EZs) / Business clustering. Balance the requirement for distributing goods, with mitigating the adverse impact of vehicles. <ul style="list-style-type: none"> Routing, management and information Rail and water Loading and parking Consolidation Embracing innovation Planning conditions 	The effect of this policy is assessed as neutral in the short-term and uncertain in the medium and long term. Increase of hardstanding areas associated with some of the interventions under this policy would increase run-off rates which in turn would increase flood risk. Some of the EZs within the sub-region are located in areas at high risk flooding i.e. Weston-super-Mare; Avonmouth / Severnside; tidal reaches of the River Avon and Bristol's Floating Harbour. The investment in transport improvements would, however, provide opportunities to address drainage at highways and rail networks currently at risk of severance due to flooding.	N	?	?	R	T/R	Medium certainty- Although there is some uncertainty with regards to programme and funding of some of the proposed interventions, the West of England actively promotes designated Enterprise Areas (EA) or Enterprise Zones (EZ) across the region. There is scientific consensus that climate change is taking place. The location of EZs in areas particularly susceptible to flooding means that vulnerability of the transport network to flood risk in the area is an existing condition which may worsen due to climate change.	<p>Specific schemes will be subject to the relevant consenting schemes and relevant environmental legislation. New schemes will have to be designed to take into account flood risk and the effects of climate change in line with national policy.</p> <p>Further measure may be required to ensure successful modal shift for regular journeys.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that schemes under this policy would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>
L1. Enable walking and cycling, 'active modes of travel', to be the natural choice for shorter journeys. <ul style="list-style-type: none"> Provide an attractive, safe and usable network. Provide schemes to support the uptake of cycling. 	<p>There is the requirement for good physical infrastructure connecting key destinations. The JLTP4 identifies the need for walking and cycling infrastructure to be maintained to a high standard (including addressing issues such as potholes). Additionally, consistent surfacing will be more appealing to those who may use active modes. The maintenance works associated with cycling infrastructure creates the opportunity to include design measures allowing infrastructure to be resilient changes in climate.</p> <p>In terms of flooding, although the provision of new foot and cycle paths may increase areas of hardstanding, the scale and type of the infrastructure required is not deemed to result in adverse effects of sufficient significance at this SEA level.</p>	+	+	?	L	T/R	Medium certainty – There is a commitment from the West of England to encourage walking and cycling. Several projects/ programmes/ schemes are in place to encourage people to cycle, moving towards sustainable transport with more to be delivered through the development and implementation of the Local Cycling and Walking Infrastructure Plans. These proposed interventions do not involve significant infrastructural development and are therefore unlikely to result in significant impacts in terms of transport vulnerability to flooding. Longer term effects of climate change on transport infrastructure is becoming increasingly unpredictable. Whilst new transport infrastructure may be designed to take into account climate change, the scale and nature of extreme weather events may overwhelm transport infrastructure	<p>New cycling and walking infrastructure will have to be designed to take into account the effects of climate change, by improving drainage systems, providing SuDs and planting trees to help mitigate effects of heat waves.</p> <p>The use of SuDs and temperature resilient surfaces for new networks would help to meet this SEA objective</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L2. Reduce the number and severity of casualties for all road users. <ul style="list-style-type: none"> Consider the needs of all 	There is the requirement for good physical infrastructure connecting key destinations. The JLTP4 identifies the need for walking and cycling infrastructure to be maintained	N	N	N	L	T/R	Medium / Low certainty – These proposed interventions do not involve significant infrastructural	New cycling and walking infrastructure will have to be designed to take into account the effects of climate change, by improving drainage systems, providing SuDs and	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
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<p>road users in the design of transport and highway schemes, particularly vulnerable road users.</p> <ul style="list-style-type: none"> Deliver road safety education and skills training to equip people with the knowledge and skills to travel in a safe and sustainable way. Work in partnership to build safer communities. 	<p>to a high standard (including addressing issues such as potholes). Additionally, consistent surfacing will be more appealing to those who may use active modes. The maintenance works associated with cycling infrastructure creates the opportunity to include design measures allowing infrastructure to be resilient changes in climate.</p> <p>Promoting campaigns that focus on cycle safety will encourage more people to use this sustainable mode of transport, reducing congestion on the roads and having a positive impact on reducing carbon emissions and helping to achieve climate change objectives. The West of England are committed to being involved with the design process of transport and highways schemes. This will ensure climate change adaptation measure will be included in the early stages of development</p> <p>Interventions aimed at reducing the number and severity of casualties for all road users would have a neutral effect on this SEA objective.</p>						<p>development and are therefore unlikely to result in significant impacts in terms of transport vulnerability to flooding.</p> <p>There is some uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>	<p>planting trees to help mitigate effects of heat waves.</p> <p>The use of SuDs and temperature resilient surfaces for new networks would help to meet this SEA objective.</p>	
<p>L3. Encourage residents and employees to make more substantial and healthier travel options.</p> <ul style="list-style-type: none"> Support travel planning with developers, education providers and individuals. Support travel planning with businesses and employment sites. Encourage mode shift through grants, incentives and rewards. Maximise awareness of sustainable and active travel choices and the benefits these bring. 	<p>Promoting campaigns that focus on cycle safety will encourage more people to use this sustainable mode of transport, reducing congestion on the roads and having a positive impact on reducing carbon emissions. A reduction in carbon emissions will help the West of England meet climate change objectives.</p> <p>Interventions under this policy have the potential to decrease car use within the West of England, helping to reduce carbon emissions. A reduction in carbon emissions will help the West of England meet climate change objectives.</p> <p>Interventions under this policy have limited capacity to have an impact on this SEA objective, as it doesn't not regard infrastructure design or development.</p>	N	N	N	L	T/R	<p>Medium / Low certainty –</p> <p>These proposed interventions do not involve significant infrastructural development and are therefore unlikely to result in significant impacts in terms of transport vulnerability to flooding.</p> <p>There is some uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>	<p>Need to ensure other initiatives are implemented in replacement, to ensure encouragement to use sustainable transport is long term.</p> <p>A modal shift towards sustainable transport modes is needed.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
L4. Support opportunities for all sectors of the population to access services they require, wherever they live. <ul style="list-style-type: none"> Support those without a private car, who need to travel, in accessing the services they require. Promote the role of technology in accessing services and employment. Support the role of taxis and private hire vehicles. Support the role of demand responsive and community transport. 	<p>Interventions aimed at supporting opportunities for all sectors of the population to access services they require, wherever they live would have a neutral effect on this SEA objective.</p> <p>No interventions under this policy relate to improving transport infrastructure.</p>	N	N	N	L	T/R	<p>Medium / Low certainty –</p> <p>These proposed interventions do not involve significant infrastructural development and are therefore unlikely to result in significant impacts in terms of transport vulnerability to flooding.</p> <p>There is some uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>	Sustainable public transport within rural areas should be of high modern standards to reduce emissions.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L5. Support the identification and implementation of measures that will improve air quality. <ul style="list-style-type: none"> Support ongoing work to manage the impact of transport on air quality and climate change. Support ongoing work on Clean Air Zones. Support work on Zero and Low Emission Vehicles. 	<p>Interventions aimed at supporting the identification and implementation of measures that will improve air quality would, overall, have a neutral effect on this SEA objective.</p>	N	N	N	L	T/R	<p>Medium / Low certainty –</p> <p>The West of England support the preparation of Air Quality Action Plans and the delivery of specific measures to improve air quality. Considerable support and commitment to encouraging the use of electric vehicles.</p> <p>Uncertainty over long term funding and timescales of some of the interventions.</p>		The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
N1. Use master planning and local design to create better places. <ul style="list-style-type: none"> Improve the quality of streets and public realm. Integrate walking, cycling and public transport into new developments. Provide clear wayfinding and signage. Support and maintain Public Rights of Way. 	<p>The West of England will identify improvement that could encourage pedestrian and cycle activity and provide safer, more sustainable neighborhood journeys. These can include improved footways, cycleways, crossing points and improved bus stop infrastructure. The design of this infrastructure can be crucial in its ability to adapt to future climate change.</p> <p>Interventions under this policy encourage people to use more sustainable modes of transport which will decrease carbon emissions. This, in turn, will help the West of England achieve its climate change objectives.</p> <p>In terms of flooding, an increase of hardstanding areas associated with some of the interventions under this policy</p>	+	+	?	L	T/R	<p>Medium / low certainty –</p> <p>Some initiatives are already in place and the West of England is committed to continue using master planning and local design to create better places.</p> <p>There is uncertainty with regards to planned actions, programme and funding associated with some of these interventions.</p> <p>Longer term effects of climate change on transport infrastructure is becoming increasingly unpredictable. Whilst new transport infrastructure may be designed to take into account climate change, the scale and nature of extreme weather events may overwhelm transport infrastructure.</p>	<p>Specific schemes will be subject to the relevant consenting schemes and relevant environmental legislation. New schemes will have to be designed to take into account flood risk and the effects of climate change in line with national policy.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p>

[illegible]

WEST OF ENGLAND JOINT LOCAL TRANSPORT PLAN 4 (JLTP 4) – DRAFT STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) MATRICES – SEA OBJECTIVE 5

JLTP4’s Policies and Interventions assessed

Connectivity beyond the West of England -

Beyond West of England policies and interventions:

- B1. Enhance competitiveness of major gateways and improve connectivity to international markets
- B2. Improve strategic resilience of the network for all trips

Connectivity within the West of England -

Within West of England policies and interventions:

- W1. Provide more public transport options and improve service quality
- W2. Provide for journeys where public transport is not an option
- W3. Use, as appropriate, technological advances and charging measures to optimise and better manage demand
- W4. Improve resilience of the network, providing increased reliability
- W5. Enable business clustering and the efficient movement of freight

Local connectivity -

Local policies and interventions:

- L1. Enable walking and cycling, ‘active modes of travel’, to be the natural choice for shorter journeys
- L2. Reduce the number and severity of casualties for all road users
- L3. Encourage residents and employees to make more sustainable and healthier travel choices
- L4. Support opportunities for all sectors of the population to access the services they require, wherever they live
- L5. Support the identification and implementation of measures that will improve air quality

Neighbourhood connectivity -

Neighbourhood policies and interventions:

- N1. Use master planning and local design to create better places
- N2. Facilitate the use of active modes for all short trips, including the first and last mile of longer journeys

SEA Assessment Criteria - Effects of the JLTP4 and proposed alternatives will be described in terms of their:

Nature: whether they are anticipated to be:

- Positive (+)
- Neutral (N)
- Negative (x) or
- Uncertain (?)

++ Major Positive	The option would be significantly beneficial to the SEA objective by resolving an existing environmental issue and/or maximising opportunities for environmental enhancement.
+ Minor Positive	The option would be partially beneficial to the SEA objective by contributing to resolving an existing environmental issue and/or offering opportunity for some environmental enhancement. This effect would not be considered to be of significance.
N Neutral	The option would have a neutral effect on the SEA objective.
? Uncertain	There is insufficient detail available on the option or the baseline situation in order to assess how significantly the SEA objective would be affected by the option.
x Minor Negative	The option would partly undermine the SEA objective by contributing to an environmental problem and/or partially undermine opportunities for environmental enhancement. This effect would not be considered to be of significance.
xx Major Negative	The option would severely undermine the SEA objective by contributing to an environmental problem and/or undermining opportunities for environmental enhancement. This would be considered to be a significant effect.

Duration: the duration of potential effects are presented in terms of the timescale over which they are anticipated:

- Short term effects: effects expected in the next 1-5 years;
- Medium term effects: effects expected in the next 6-15 years; and
- Long term effects: effects expected in the next 16+years.

Permanence and Reversibility:

- A permanent effect is one which results from a physical change that is anticipated to last beyond the life of the Joint Local Transport Plan.
- A temporary effect is one which results from an operational change which could change if there is a change of policy, or a short term condition such as a construction phase related impact.
- A reversible effect is an environmental effect that can be reversed, for example an incident of water pollution can be cleaned up over time.
- An irreversible effect is an environmental effect that cannot be reversed such as the loss of a historic feature or the loss of agricultural soil due to permanent development.

Spatial Scale:

- Local: effect is restricted to the immediate location of the proposal or to a specific site or settlement within the sub-region (West of England)
- Regional: effect is anticipated to cover a significant proportion or all of the South West.
- National: effect covers the whole of England and/or the UK (also includes international).

SEA Objective 5. Protect and enhance biodiversity and ecological networks.

SEA Topic: Biodiversity; flora and fauna.

Criteria to Consider:

- **Would the JLTP4 in combination with other plans result in damage to, fragmentation or loss of existing designated wildlife sites, wildlife corridors (such as hedgerows) and habitats?**
- **Would the JLTP4 ensure that current ecological networks are not compromised, and future improvements in habitat connectivity are not prejudiced**
- **Would the JLTP4 in combination with other plans result changes in the levels of road kill?**

Description of the value and vulnerability of the area likely to be affected:

There are eight internationally designated nature conservation sites within the West of England including Natura 2000 Habitats. There are several Site of Special Scientific Interest (SSSIs), Local Nature Reserves (LNRs) and numerous locally designated wildlife sites. Habitats within the region support a wide array of species including legally protected and Priority species.

The West of England Nature Partnership (WENP) was set up to create and coordinate for the restoration of the natural environment in the West of England area. Three ecological networks (grassland, woodland and wetland) have been identified across the West of England through WENP's Ecosystem Service Mapping. These networks are supported by biodiversity opportunity maps which identify the best areas for habitat restoration and creation. Additionally, the West of England's Strategic Green Infrastructure Framework provides context for green infrastructure delivery and supports local Green Infrastructure Strategies. The four West of England unitary authorities have Biodiversity Action Plans (BAPs).

In accordance with the Conservation of Habitats and Species Regulations (HRA) 2017, an Appropriate Assessment is being undertaken to establish whether the JLTP4 and proposals within it, (either alone or in combination with other plans and projects) are likely to significantly affect Natura 2000 sites or its designated species. The HRA Screening exercise has identified some likely significant effects of major schemes on European sites and therefore it is going to be necessary to advance to the appropriate assessment (AA) stage of HRA.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
B1. Enhance competitiveness of major gateways and improve connectivity to international markets. <ul style="list-style-type: none">• Support Bristol Airport (BIA) as the main gateway for air travel in the South West.• Support the role of Bristol Port.	<p>Biodiversity is vulnerable to transport operation and development. Potential effects include habitat loss and fragmentation; impacts on protected or priority species; pollution (air, water, soils); and disturbance.</p> <p>A number of SSSIs are located near Bristol International Airport (BIA). Two of these sites are also a component of the North Somerset and Mendip Bat Special Area of Conservation (SAC). A number of legally protected species have been recorded within a 2km radius of BIA. Bristol Port operates on the Severn Estuary which is a SAC and Ramsar site, and comprises a Special Protection Area (SPA).</p> <p>There is potential for combined effects of the operation and future development of both BIA and Bristol Port resulting in adverse effects on biodiversity, including both terrestrial and marine habitats and birds. Both BIA and Bristol Port have developed</p>	X?	X?	X?	N	P / I	<p>Low certainty –</p> <p>The findings of the AA will inform the assessment against this SEA Objective. Although there is some uncertainty with regards to programme and details of other land use developments, planned investments and development plans for both BIA and Bristol Port are likely to go ahead. Design and mitigation of operations and during any development will influence the result of the assessment.</p> <p>In accordance with the Conservation of Habitats and Species Regulations 2017, an Appropriate Assessment is being undertaken to establish whether the JLTP4 and proposals within it, (either alone or in combination with other plans and projects) are likely to significantly affect Natura 2000 sites or its designated species.</p>	<p>Ensure a strategic approach to protecting biodiversity through the work of The West of England Nature Partnership (WENP) and the West of England (WoE) Green Infrastructure (GI) Plan. The GI Plan will identify the strategic measures and mechanisms to support, guide and implement the delivery of environmental commitments set within the JSP and Local Plans, including mitigation for protected sites. Further development of GI Plans at an authority level should also reflect schemes within this JLTP.</p> <p>BIA and Bristol Port to continue working with the West of England and other partners to minimise adverse effects on biodiversity and maximise opportunities to promote biodiversity.</p> <p>The long term vision for BIA is set up in the "Bristol International Master Plan 2006 to 2030". The next version of the Master Plan is under preparation. BIA operates a Nature Conservation Management Plan, the aim of which is to safeguard the wildlife and nature conservation value of the land in its</p>	<p>The judgement was based on the assumption that Bristol Airport will continue working towards their aim to deliver a low carbon, accessible, integrated, efficient and reliable transport network for travel to and from Bristol Airport for staff and passengers.</p> <p>It is also assumed that the JLTP4 interventions relating to supporting Bristol Airport and Bristol Port would be implemented and that further developments in Bristol Airport and Port will be delivered in line with the relevant <i>National Policy Statements</i> and environmental legislation.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
	<p>biodiversity / conservation schemes (see Suggested mitigation and implementation for more information).</p> <p>Mitigation / enhancement measures included as part of the design and implementation of the specific schemes may offset some of the adverse effects in the long term.</p>							<p>stewardship.</p> <p>Bristol's Port operates an ongoing programme of conservation projects. An environmental management plan is implemented for the Port estate and The Bristol Port Company works with interested parties to ensure, where practicable, the preservation and enhancement of habitats and the associated wildlife. This conservation programme will continue to evolve in the future.</p> <p>Specific schemes will be subject to the relevant consenting schemes and relevant environmental legislation. New schemes should incorporate detailed mitigation and enhancements aiming to improve biodiversity.</p> <p>It is recommended that major schemes have a Construction Environmental Management Plan (CEMP) to minimise adverse effects during construction.</p>	
<p>B2. Improve strategic resilience of the network for all trips.</p> <ul style="list-style-type: none"> Maximise opportunities arising from improvements to the strategic road and rail network, and identify and support delivery of further changes. <ul style="list-style-type: none"> Strategic Road Network (SRN) Strategic Rail Identify opportunities to manage the impact of Severn Bridge tolls removal. Support the role of coaches for residents and visitors. Manage and mitigate the impact of regular and infrequent events on the transport network. 	<p>Biodiversity is vulnerable to transport operation and development. Potential effects include habitat loss and fragmentation; impacts on protected or priority species; pollution (air, water, soils); and disturbance.</p> <p>Improvements on the strategic road and rail network identified in the JLTP 4 include: East of Bath Link; new and upgraded junctions on the M4 (new Junction 18a) and M5 (Junctions 14/19/new 21a); new sections of Smart Motorway; Park & Ride on the M32; redevelopment of Bristol Temple Meads into a regional interchange.</p> <p>Strategic road and rail network improvements involving landtake may result in major adverse effects in terms of loss habitat and fragmentation, effects on protected or priority species and indirect effects associated with potential pollution in the short term.</p> <p>Mitigation / enhancement measures included as part of the design and implementation of the specific schemes may offset some of the adverse effects in the medium and long term.</p>	X?	X?	?	N	P/I	<p>Low certainty –</p> <p>The findings of the AA will inform the assessment against this SEA Objective.</p> <p>Although there is some uncertainty with regards to programme and funding of some of the strategic road and rail schemes, the combined effect of the predicted growth in the region with the various transport infrastructure schemes that may go ahead are likely to adversely affect biodiversity in the short term.</p> <p>Mitigation / enhancement measures included as part of the design and implementation of the specific schemes may offset some of the adverse effects in the medium and long term.</p>	<p>Ensure a strategic approach to protecting biodiversity through the work of The West of England Nature Partnership (WENP) and the WoE GI Plan. The GI Plan will identify the strategic measures and mechanisms to support, guide and implement the delivery of environmental commitments set within the JSP and Local Plans, including mitigation for protected sites. Further development of GI Plans at an authority level should also reflect schemes within this JLTP.</p> <p>Specific schemes will be subject to the relevant consenting processes and relevant environmental legislation. New schemes should incorporate detailed mitigation and enhancements aiming to improve biodiversity.</p> <p>It is recommended that major schemes have a Construction Environmental Management Plan (CEMP) to minimise adverse effects during construction</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that development consent for nationally significant infrastructure projects on the road and rail networks and strategic rail freight interchanges will be delivered in line with the provisions of the <i>National networks national policy statement</i> and relevant environmental legislation.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
W1. Provide more public transport options and improve service quality. <ul style="list-style-type: none"> Provide high quality and reliable mass and bus rapid transit. Support and enhance existing public transport services. <ul style="list-style-type: none"> Bus Strategy Rail Improve the availability and accessibility of accurate travel information and ticketing. 	<p>Biodiversity is vulnerable to transport operation and development. Potential effects include habitat loss and fragmentation; impacts on protected or priority species; pollution (air, water, soils); and disturbance.</p> <p>Transport infrastructure improvements involving landtake may result in direct adverse effects in terms of loss habitat and fragmentation, effects on protected or priority species and indirect effects associated with potential pollution in the short term.</p> <p>Mitigation / enhancement measures included as part of the design and implementation of the specific schemes may offset some of the adverse effects in the medium and long term.</p>	X?	X?	?	R	P/R	<p>Low certainty –</p> <p>The findings of the AA will inform the assessment against this SEA Objective. Transport infrastructure improvements identified in the JLTP are very likely to result in adverse effects on biodiversity, flora and fauna in the short term.</p> <p>Although there is some uncertainty with regards to programme and funding of some of the strategic road and rail schemes, the combined effect of the predicted growth in the region with the various transport infrastructure schemes that may go ahead are likely to adversely affect biodiversity.</p> <p>Mitigation / enhancement measures included as part of the design and implementation of the specific schemes may offset some of the adverse effects in the medium and long term.</p>	<p>Ensure a strategic approach to protecting biodiversity through the work of The West of England Nature Partnership (WENP) and the WoE GI Plan. The GI Plan will identify the strategic measures and mechanisms to support, guide and implement the delivery of environmental commitments set within the JSP and Local Plans, including mitigation for protected sites. Further development of GI Plans at an authority level should also reflect schemes within this JLTP.</p> <p>Specific schemes will be subject to the relevant consenting processes and relevant environmental legislation. New schemes should incorporate detailed mitigation and enhancements aiming to improve biodiversity.</p> <p>It is recommended that major schemes have a Construction Environmental Management Plan (CEMP) to minimise adverse effects during construction.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that schemes under this policy and interventions would incorporate opportunities to promote biodiversity and would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>
W2. Provide for journeys where public transport is not an option. <ul style="list-style-type: none"> Provide P&R and sharing schemes to minimise the impact of single occupancy vehicles. Recognise the needs of motorcycles and mopeds. 	<p>Biodiversity is vulnerable to transport operation and development. Potential effects include habitat loss and fragmentation; impacts on protected or priority species; pollution (air, water, soils); and disturbance.</p> <p>The delivery of new or expanded P&Rs may result in direct adverse effects in terms of loss habitat and fragmentation, effects on protected or priority species and indirect effects associated with potential pollution in the short term.</p> <p>Mitigation / enhancement measures included as part of the design and implementation of the specific schemes may offset some of the adverse effects in the medium and long term.</p>	X	?	?	R	P/R	<p>Medium certainty –</p> <p>Transport infrastructure improvements identified in the JLTP are very likely to result in adverse effects on biodiversity, flora and fauna in the short term.</p> <p>Mitigation / enhancement measures included as part of the design and implementation of the specific schemes may offset some of the adverse effects in the medium and long term.</p>	<p>Ensure a strategic approach to protecting biodiversity through the work of The West of England Nature Partnership (WENP) and the WoE GI Plan. The GI Plan will identify the strategic measures and mechanisms to support, guide and implement the delivery of environmental commitments set within the JSP and Local Plans, including mitigation for protected sites. Further development of GI Plans at an authority level should also reflect schemes within this JLTP.</p> <p>Specific schemes will be subject to the relevant consenting processes and relevant environmental legislation. New schemes should incorporate detailed mitigation and enhancements aiming to improve biodiversity.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that schemes under this policy and interventions would incorporate opportunities to promote biodiversity and would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>
W3. Use, as appropriate, technological advances and charging measures to optimize and better manage demand. <ul style="list-style-type: none"> Use technology to keep traffic moving. Embrace technology to improve cleaner travel option. Use, as appropriate, charging 	<p>Use of technology to keep traffic moving and to improve cleaner travel option, together with charging measures aimed to influence and manage the demand of private car use, would have a neutral effect on this SEA objective in the short and medium term. In the long term, there might be opportunities for beneficial effects depending on the type and</p>	N	N	?	R	T/R	<p>Low certainty –</p> <p>Advanced technologies are currently in early development stages. Timescales and extent of implementation are unknown, although this is unlikely to affect biodiversity.</p>	<p>Where relevant, ensure a strategic approach to protecting biodiversity through the work of The West of England Nature Partnership (WENP) and the WoE GI Plan. The GI Plan will identify the strategic measures and mechanisms to support, guide and implement the delivery of environmental commitments set within the JSP and Local Plans, including mitigation for protected sites. Further development of GI Plans at an authority level</p>	<p>Based on information available from JLTP4.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
measures to influence and manage the demand of private car use.	implementation extent of future technological advances.							should also reflect schemes within this JLTP.	
W4. Improve resilience of the network, providing increased reliability <ul style="list-style-type: none"> Define, manage and maintain the Key Route Network (KRN). Effectively manage the Major Road Network (MRN). Effectively accommodate development sites and associated trips. 	Although biodiversity is vulnerable to activities associated with transport networks maintenance, overall, interventions aimed at improving resilience of the network and providing increased reliability would have a neutral effect on this SEA objective. This is because the scale and type of the activities involved are not deemed to result in adverse effects of sufficient significance at this SEA level.	N	N	N	R	P/R	Medium / Low certainty – The KRN and its associated Joint Transport Asset Management Plan, and Major Road Network proposed by DfT are at inception stages. Timescales and details of implementation are unknown. Mitigation / enhancement measures included as part of the design and implementation of the specific schemes may offset some of the adverse effects in the medium and long term. There will be additional budgeting and funding requirements which may limit the implementation of some of the measures.	Ensure a strategic approach to protecting biodiversity through the work of The West of England Nature Partnership (WENP) and the WoE GI Plan when developing and implementing maintenance programmes and plans.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented. It is also assumed that schemes under this policy and interventions would incorporate opportunities to promote biodiversity and would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.
W5. Enable business clustering and the efficient movement of freight. <ul style="list-style-type: none"> Support the delivery of Enterprise Zones / Business clustering. Balance the requirement for distributing goods, with mitigating the adverse impact of vehicles. <ul style="list-style-type: none"> Routing, management and information Rail and water Loading and parking Consolidation Embracing innovation Planning conditions 	Biodiversity is vulnerable to changes in freight movements. Potential effects include habitat fragmentation; impacts on protected or priority species; pollution (air, water, soils); and disturbance, e.g. through vehicle movement, noise or lighting. Although this policy would reduce impacts of freight movement in some areas, clusters may have a greater impact on biodiversity in other areas. Mitigation / enhancement measures, particularly those that manage indirect impacts on air, noise, lighting and water may reduce some of the adverse effects in the long term.	X	X	?	R	?	Medium certainty- The West of England actively promotes designated Enterprise Areas (EA) or Enterprise Zones (EZ) across the region, which have potential opportunities in terms of improving accessibility and mobility. Mitigation / enhancement measures included as part of the design and implementation of the specific schemes may offset some of the adverse effects in the medium and long term. There is some uncertainty with regards to planned actions, programme (medium and long-term impacts) and funding associated with these interventions.	Ensure a strategic approach to protecting biodiversity through the work of The West of England Nature Partnership (WENP) and the WoE GI Plan. The GI Plan will identify the strategic measures and mechanisms to support, guide and implement the delivery of environmental commitments set within the JSP and Local Plans, including mitigation for protected sites. Further development of GI Plans at an authority level should also reflect schemes within this JLTP. Specific schemes will be subject to the relevant consenting processes and relevant environmental legislation. New schemes should incorporate detailed mitigation and enhancements aiming to improve biodiversity. It is recommended that major schemes have a Construction Environmental Management Plan (CEMP) to minimise adverse effects during construction.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented. Additionally, it was based on the assumption that schemes under these interventions would incorporate opportunities to promote biodiversity and would be delivered through the appropriate consenting processes.
L1. Enable walking and cycling, 'active modes of travel', to be the natural choice for shorter journeys. <ul style="list-style-type: none"> Provide an attractive, safe and usable network. Provide schemes to support the uptake of cycling. 	Although the provision of new foot and cycle paths has the potential, in some instances, adversely affect biodiversity (e.g. if they introduced disturbance in sensitive areas), overall, interventions aimed at enabling walking and cycling, 'active modes of travel', to be the natural choice for shorter journeys would have a neutral effect on this SEA objective in the short term. This is because the scale and type of the infrastructure required is not deemed	N	?	?	L	T/R	Medium certainty – There is a commitment from the West of England to encourage walking and cycling. Several projects/ programmes/ schemes are in place to encourage people to cycle, moving towards sustainable transport with more to be delivered through the development and implementation of the Local Cycling and Walking Infrastructure Plans.	Ensure a strategic approach to protecting biodiversity through the work of The West of England Nature Partnership (WENP) and the WoE GI Plan. The GI Plan will identify the strategic measures and mechanisms to support, guide and implement the delivery of environmental commitments set within the JSP and Local Plans, including mitigation for protected sites. Further development of GI Plans at an authority level should also reflect schemes within this JLTP. New schemes should incorporate detailed	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
	to result in adverse effects of sufficient significance at this SEA level. Mitigation / enhancement measures included as part of the design and implementation of the specific schemes may result in beneficial effects in the medium and long term associated with the reduction of private car use and / or habitat creation and/or enhancement measures.						These proposed interventions do not involve significant infrastructural development and is therefore unlikely to result in significant impacts on biodiversity. Mitigation / enhancement measures included as part of the design and implementation of the specific schemes may offset some of the adverse effects in the medium and long term.	mitigation and enhancements aiming to improve biodiversity.	
L2. Reduce the number and severity of casualties for all road users. <ul style="list-style-type: none"> Consider the needs of all road users in the design of transport and highway schemes, particularly vulnerable road users. Deliver road safety education and skills training to equip people with the knowledge and skills to travel in a safe and sustainable way. Work in partnership to build safer communities. 	Interventions aimed at reducing the number and severity of casualties for all road users would have a neutral effect on this SEA objective.	N	N	N	L	T/R	Low certainty – There is some uncertainty with regards to planned actions, programme and funding associated to these interventions.		The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L3. Encourage residents and employees to make more sustainable and healthier travel options. <ul style="list-style-type: none"> Support travel planning with developers, education providers and individuals. Support travel planning with businesses and employment sites. Encourage mode shift through grants, incentives and rewards. Maximise awareness of sustainable and active travel choices and the benefits these bring. 	Interventions aimed at encouraging residents and employees to make more sustainable and healthier travel options would have a neutral effect on this SEA objective in the short term.	N	?	?	L	T/R	Medium / Low certainty – These proposed interventions do not involve significant infrastructural development and is therefore unlikely to result in significant impacts on biodiversity. There is uncertainty with regards to planned actions, programme and funding associated to these interventions.		The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L4. Support opportunities for all sectors of the population to access services they require, wherever they live. <ul style="list-style-type: none"> Support those without a private car, who need to travel, in accessing the services they require. Promote the role of technology 	Interventions aimed at supporting opportunities for all sectors of the population to access services they require, wherever they live would have a neutral effect on this SEA objective in the short term.	N	N	N	L	T/R	Medium/ low certainty - These proposed interventions do not involve significant infrastructural development and is therefore unlikely to result in significant impacts on biodiversity. There is uncertainty with regards to planned actions, programme and funding associated to these interventions.		The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

[illegible]

WEST OF ENGLAND JOINT LOCAL TRANSPORT PLAN 4 (JLTP 4) – DRAFT STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) MATRICES – SEA OBJECTIVE 6

JLTP4’s Policies and Interventions assessed

Connectivity beyond the West of England -

Beyond West of England policies and interventions:

- B1. Enhance competitiveness of major gateways and improve connectivity to international markets
- B2. Improve strategic resilience of the network for all trips

Connectivity within the West of England -

Within West of England policies and interventions:

- W1. Provide more public transport options and improve service quality
- W2. Provide for journeys where public transport is not an option
- W3. Use, as appropriate, technological advances and charging measures to optimise and better manage demand
- W4. Improve resilience of the network, providing increased reliability
- W5. Enable business clustering and the efficient movement of freight

Local connectivity -

Local policies and interventions:

- L1. Enable walking and cycling, ‘active modes of travel’, to be the natural choice for shorter journeys
- L2. Reduce the number and severity of casualties for all road users
- L3. Encourage residents and employees to make more sustainable and healthier travel choices
- L4. Support opportunities for all sectors of the population to access the services they require, wherever they live
- L5. Support the identification and implementation of measures that will improve air quality

Neighbourhood connectivity -

Neighbourhood policies and interventions:

- N1. Use master planning and local design to create better places
- N2. Facilitate the use of active modes for all short trips, including the first and last mile of longer journeys

SEA Assessment Criteria - Effects of the JLTP4 and proposed alternatives will be described in terms of their:

Nature: whether they are anticipated to be:

- Positive (+)
- Neutral (N)
- Negative (x) or
- Uncertain (?)

++ Major Positive	The option would be significantly beneficial to the SEA objective by resolving an existing environmental issue and/or maximising opportunities for environmental enhancement.
+ Minor Positive	The option would be partially beneficial to the SEA objective by contributing to resolving an existing environmental issue and/or offering opportunity for some environmental enhancement. This effect would not be considered to be of significance.
N Neutral	The option would have a neutral effect on the SEA objective.
? Uncertain	There is insufficient detail available on the option or the baseline situation in order to assess how significantly the SEA objective would be affected by the option.
x Minor Negative	The option would partly undermine the SEA objective by contributing to an environmental problem and/or partially undermine opportunities for environmental enhancement. This effect would not be considered to be of significance.
xx Major Negative	The option would severely undermine the SEA objective by contributing to an environmental problem and/or undermining opportunities for environmental enhancement. This would be considered to be a significant effect.

Duration: the duration of potential effects are presented in terms of the timescale over which they are anticipated:

- Short term effects: effects expected in the next 1-5 years;
- Medium term effects: effects expected in the next 6-15 years; and
- Long term effects: effects expected in the next 16+years.

Permanence and Reversibility:

- A permanent effect is one which results from a physical change that is anticipated to last beyond the life of the Joint Local Transport Plan.
- A temporary effect is one which results from an operational change which could change if there is a change of policy, or a short term condition such as a construction phase related impact.
- A reversible effect is an environmental effect that can be reversed, for example an incident of water pollution can be cleaned up over time.
- An irreversible effect is an environmental effect that cannot be reversed such as the loss of a historic feature or the loss of agricultural soil due to permanent development.

Spatial Scale:

- Local: effect is restricted to the immediate location of the proposal or to a specific site or settlement within the sub-region (West of England)
- Regional: effect is anticipated to cover a significant proportion or all of the South West.
- National: effect covers the whole of England and/or the UK (also includes international).

SEA Objective 6. To promote human health.

SEA Topic: Human health, air quality, climatic factors.

Criteria to Consider:

- Does the JLTP4, in combination with other plans, provide alternatives to the car and actively promote the benefits of these modes to encourage more physically active travel?

Description of the value and vulnerability of the area likely to be affected:

The health of people in Bath & NE Somerset and South Gloucestershire is generally better than average for England, while the health of people in Bristol and North Somerset is varied when compared to the England average. The proportion of adults who are physically active in all four authorities is significantly better than the England Average, as is the proportion of adults with excess weight (apart from South Gloucestershire where excess weight in adults is statistically similar to the England average). Similarly, the proportion of obese children (ages 10-11) is significantly better in all local authorities apart from Bristol, where it is similar to the England average.

However, there are pockets of health inequalities within the region, particularly in the urban environment of Bristol which is one of the 20% most deprived authorities in England. The proportion of the population in North Somerset with a limiting or long term illness or disability is significantly worse than the England Average, which likely reflects the larger than average proportion of the population who are over 65.

The West of England has made significant progress in improving options for travel by active modes, bus and rail, with substantial growth in the numbers of trips made by cycling, bus and rail during the last decade (60% by rail, 30% by bus and 50% by cycling between 2008/09 and 2015/16). Encouraging more journeys to be made by active travel modes improves physical and mental health, quality of life and the environment.

Without investment in sustainable transport measures the road network will become increasingly congested with significant associated health costs. Congestion detracts from the quality of life for local people by creating noise, pollution, road safety and health problems and creates barriers for more vulnerable travellers, such as cyclists, pedestrians and the disabled.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
B1. Enhance competitiveness of major gateways and improve connectivity to international markets. <ul style="list-style-type: none">Support Bristol Airport as the main gateway for air travel in the South West.Support the role of Bristol Port.	<p>Bristol Airport's new <i>Airport Surface Access Strategy</i>, currently under preparation, would have a positive effect on accessibility and mobility, which in turn would bring benefits in terms of human health. The Strategy will include options aimed at public transport improvement to the airport which would promote more active and less polluting modes of transport than use of private car, as well as improve access to employment opportunities. Within the Bristol Airport Master Plan, '<i>Towards 2050</i>' their target is to be carbon neutral by 2030.</p> <p>Bristol Port now accommodates a range of tourist cruise liner services, improving the region's offer for both outgoing and incoming tourists. Wider access to international destinations could be considered as beneficial in terms of quality of life. An increase in incoming tourists could lead to an increase in local employment opportunities.</p> <p>The potential effects have therefore been identified as being uncertain at this SEA level (see level of uncertainty column for more information).</p>	?	?	?	N	T/R	<p>Medium/ Low certainty –</p> <p>Bristol's airport new <i>Airport Surface Access Strategy</i> and Master Plan are currently under preparation and not yet available for review. There is certain level of uncertainty about what options / schemes will be implemented and to what extent. There is also uncertainty with regards the potential effects these would bring with regards to health effects due to the challenge of minimising greenhouse emissions and noise impacts.</p> <p>There are not sufficient details regarding potential human health effects associated with the expansion of Bristol International Airport and Bristol's Port.</p>	<p>Additional growth at both Bristol Airport and Bristol Port needs to be supported by an integrated public transport network to ensure increased passenger number to not result in an increase in private cars. Public transport provision should also be made for employees who work shift patterns to maximise employment opportunities for all (including those without access to a car).</p>	<p>The judgement was based on the assumption that Bristol Airport will continue working towards their aim to deliver a low carbon, accessible, integrated, efficient and reliable transport network for travel to and from Bristol Airport for staff and passengers.</p> <p>It is also assumed that the JLTP4 interventions relating to supporting Bristol Airport and Bristol Port would be implemented and that further developments in Bristol Airport and Port will be delivered in line with the relevant <i>National Policy Statements</i>.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
B2. Improve strategic resilience of the network for all trips. <ul style="list-style-type: none"> Maximise opportunities arising from improvements to the strategic road and rail network, and identify and support delivery of further changes. <ul style="list-style-type: none"> Strategic Road Network (SRN) Strategic Rail Identify opportunities to manage the impact of Severn Bridge tolls removal. Support the role of coaches for residents and visitors. Manage and mitigate the impact of regular and infrequent events on the transport network. 	<p>Access and mobility would be improved in the region through the implementation of the following improvements on the strategic road and rail network: East of Bath Link; new and upgraded junctions on the M4 (new Junction 18a) and M5 (Junctions 14/19/new 21a); new sections of Smart Motorway; Park & Ride on the M32; redevelopment of Bristol Temple Meads into a regional interchange which will promote sustainable transport choices for trips to and from the station and surrounding area. Measures aiming to support coaches would also be beneficial in terms of improving accessibility and mobility. Enhanced access, and more reliable journey times, to employment and education opportunities may result in beneficial effects in terms of human health by reducing inequalities that adversely affect human health.</p> <p>This potential beneficial effect may however be offset by increased noise, air pollution and / or severance resulting from some of the proposed strategic road and rail improvements.</p> <p>The potential effects have therefore been identified as being uncertain at this SEA level.</p>	?	?	?	N	T/R	<p>Medium / Low certainty -</p> <p>The only committed HE scheme included in the current Route Investment Strategy (RIS) delivery plan is the new M49 Avonmouth junction, with works expected to commence in 2019. The government is currently preparing a revised RIS2 to cover the period from 2020 to 2025, which will include a vision for the SRN to 2040 and beyond. There is uncertainty with regards to the level of investment that will be committed in the SRN across the region.</p> <p>As stated in the JLTP 4, the Government has made a commitment to increase the proportion of national GDP spent on economic infrastructure to prepare the country for the future. The West of England is the most productive part of the South West and is one of the UK's best performing city regions. However, there has been historic under investment that has contributed towards current transport challenges. There is, therefore, a strong case for increased investment to support the continued growth of the area.</p> <p>Similar funding uncertainty applies to strategic rail improvements.</p>	<p>The JLTP 4 explains the need for the RIS2 to include substantial investment in the SRN across the region. Direct improvements on the SRN itself should, however, include measures to benefit non-car modes as well as promote more active ways of travel.</p> <p>The full electrification of the Great Western Main Line to Bristol Temple Meads, via Bath Spa and Bristol Parkway, remains an aspiration, as does extension from Birmingham to Bristol.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that development consent for nationally significant infrastructure projects on the road and rail networks and strategic rail freight interchanges will be delivered in line with the provisions of the <i>National networks national policy statement</i>.</p>
W1. Provide more public transport options and improve service quality. <ul style="list-style-type: none"> Provide high quality and reliable mass and bus rapid transit. Support and enhance existing public transport services. <ul style="list-style-type: none"> Bus Strategy Rail Improve the availability and accessibility of accurate travel information and ticketing. 	<p>Mass and rapid transit public transport, with an emphasis on segregation from general traffic, can efficiently provide public transport trips that are less well covered by local bus or rail networks.</p> <p>Enhancing existing public transport services by continuing to improve local bus and rail networks, completion and expansion of the MetroBus network, delivery of the MetroWest programme, and improved opportunities to access stops and stations by active modes would also result in beneficial effects on human health by promoting more active and less polluting modes of transport than the use of private car, as well as improving access to education and employment opportunities and health facilities.</p>	+	++	++	R	T/R	<p>High / Medium certainty –</p> <p>There is a very strong commitment from the West of England to deliver high quality and reliable mass transit network across the Greater Bristol and Bath urban areas; complete and expand MetroBus and deliver MetroWest.</p> <p>Funding remains the key challenge and uncertainty.</p>	<p>As explained in the JLTP 4, mass transit will, wherever possible, be configured to complement MetroBus routes and to integrate with the existing passenger rail network. A future challenge is the need to manage the integration of any mass transit and MetroBus with the local bus network.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be delivered through the appropriate consenting process.</p>
W2. Provide for journeys where public transport is not an option. <ul style="list-style-type: none"> Provide P&R and sharing 	<p>P&R provides the opportunity for people who do not have easy access to public transport near to where they live to transfer from private car to public</p>	+	+	+	R	T/R	<p>Medium / Low certainty –</p> <p>There is some uncertainty with regards to</p>	<p>Specific schemes will be subject to the relevant consenting processes and relevant environmental legislation.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be delivered through the appropriate</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
<p>schemes to minimise the impact of single occupancy vehicles.</p> <ul style="list-style-type: none"> Recognise the needs of motorcycles and mopeds. 	<p>transport for onward journeys into urban areas. This type of intervention would contribute to the promotion of more active and less polluting modes of transport for parts of journeys which would otherwise be undertaken solely by private car.</p> <p>Supporting the delivery of P&Rs and ensuring facilities for motorcycles and mopeds are provided and clearly identified in appropriate locations would result in beneficial effects in terms of improving accessibility to employment opportunities.</p>						planned actions, programme and funding associated to these interventions.		consenting process.
<p>W3. Use, as appropriate, technological advances and charging measures to optimize and better manage demand.</p> <ul style="list-style-type: none"> Use technology to keep traffic moving. Embrace technology to improve cleaner travel option. Use, as appropriate, charging measures to influence and manage the demand of private car use. 	<p>Use of technology to keep traffic moving and to improve cleaner travel option, together with charging measures aimed to influence and manage the demand of private car use, would have a neutral effect on this SEA objective in the short-term. It could, however, result in beneficial effects in the medium and long term as their implementation would assist in improving the efficiency of the transport network and promoting cleaner travel options with resulting improvements to air quality and potentially noise levels.</p> <p>Charging measures could negatively impact those on a low income or unemployed seeking access to employment or education opportunities, as well as people with limited mobility who are unable to use public transport or active travel options.</p>	N	+	+	R	T/R	<p>Low certainty –</p> <p>Advanced technologies are currently in early development stages. Timescales and extent of implementation are unknown. Charging measures might prove unpopular and challenging to implement.</p>	<p>Advances to technology need to be understood by the general public for appropriate use.</p> <p>Any charging scheme should consider exemptions for drivers with specific needs.</p>	Based on current information available from JLTP4.
<p>W4. Improve resilience of the network, providing increased reliability</p> <ul style="list-style-type: none"> Define, manage and maintain the Key Route Network (KRN). Effectively manage the Major Road Network (MRN). Effectively accommodate development sites and associated trips. 	<p>In the short term, these interventions would increase mobility and accessibility for those with access to a car. Measures aimed at improving wider connectivity, resilience and support public transport should result in beneficial effects on accessibility and mobility in the medium and long term. Enhanced access to employment opportunities may result in beneficial effects in terms of human health by reducing inequalities that adversely affect human health.</p> <p>This potential beneficial effect may however be offset by increased noise, air pollution and / or severance resulting from some of the schemes that might be delivered through these interventions. The potential effects have therefore been identified as being uncertain at this</p>	N	N	N	R	T/R	<p>Medium / Low certainty –</p> <p>The KRN and its associated Joint Transport Asset Management Plan, and Major Road Network proposed by DfT are at inception stages. Timescales and details of implementation are unknown.</p> <p>There will be additional budgeting and funding requirements which may limit the implementation of some of the measures.</p>	<p>Proposals under these interventions should include provisions to cater for those who do not have access to a car.</p> <p>Specific schemes will be subject to the relevant consenting processes and relevant environmental legislation. New schemes should incorporate opportunities to enhance accessibility and mobility by active modes.</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented. Additionally, it was based on the assumption that schemes under these interventions would be delivered through the appropriate consenting processes.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
	SEA level.								
W5. Enable business clustering and the efficient movement of freight. <ul style="list-style-type: none"> Support the delivery of Enterprise Zones / Business clustering. Balance the requirement for distributing goods, with mitigating the adverse impact of vehicles. <ul style="list-style-type: none"> Routing, management and information Rail and water Loading and parking Consolidation Embracing innovation Planning conditions 	Interventions aimed at enabling business clustering and the efficient movement of freight would have a neutral effect on this SEA objective in the short-term. It could, however, result in beneficial effects in the medium and long term as their implementation would assist in improving the efficiency of the transport network which may in turn benefit public transport and active modes of travel.	N	?	?	R	T/R	Medium certainty- The West of England actively promotes designated Enterprise Areas (EA) or Enterprise Zones (EZ) across the region, which have potential opportunities in terms of improving accessibility and mobility to employment opportunities. There is some uncertainty with regards to planned actions, programme (medium and long-term impacts) and funding associated with these interventions.	Specific schemes will be subject to the relevant consenting processes and relevant environmental legislation. New schemes should incorporate opportunities to enhance accessibility and mobility by active modes.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented. Additionally, it was assumed that schemes under these interventions would be delivered through the appropriate consenting processes.
L1. Enable walking and cycling, 'active modes of travel', to be the natural choice for shorter journeys. <ul style="list-style-type: none"> Provide an attractive, safe and usable network. Provide schemes to support the uptake of cycling. 	These interventions would promote active modes of travel by improving cycling and walking facilities. Direct beneficial effects on human health would result from increased physical activity whilst indirect effects may derive from less congested roads, particularly in urban areas with air quality issues. The scale of the benefit would be incremental with time assuming that uptake of cycling and walking is also incremental.	+	++	++	L	T/R	Medium certainty – There is a strong commitment from the West of England to encourage walking and cycling. Several projects/ programmes/ schemes are in place to encourage people to cycle, moving towards sustainable transport with more to be delivered through the development and implementation of the Local Cycling and Walking Infrastructure Plans.	Where schemes / initiatives are time limited, new replacement measures need to be implemented to maximise the opportunity for benefits over time. Care should be taken so that those with reduced mobility, and therefore unable to participate in all active travel methods, are not prevented from accessing local facilities or community activities.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L2. Reduce the number and severity of casualties for all road users. <ul style="list-style-type: none"> Consider the needs of all road users in the design of transport and highway schemes, particularly vulnerable road users. Deliver road safety education and skills training to equip people with the knowledge and skills to travel in a safe and sustainable way. Work in partnership to build safer communities. 	Interventions aimed at reducing the number and severity of casualties would have a major beneficial effect on this SEA objective.	++	++	++	L	T/R	Low certainty – There is uncertainty with regards to planned actions, programme and funding associated to these interventions.	Where schemes / initiatives are time limited, new replacement measures need to be implemented to maximise the opportunity for benefits over time.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L3. Encourage residents and employees to make more substantial and healthier travel options.	Interventions aimed at encouraging residents and employees to make more sustainable and healthier travel options	+	++	++	L	R/T	Medium / Low certainty – There is uncertainty with regards to planned actions, programme and funding associated	Where schemes / initiatives are time limited, new replacement measures need to be implemented to maximise the opportunity for	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
<ul style="list-style-type: none"> Support travel planning with developers, education providers and individuals. Support travel planning with businesses and employment sites. Encourage mode shift through grants, incentives and rewards. Maximise awareness of sustainable and active travel choices and the benefits these bring. 	would have a beneficial effect on human health. Direct beneficial effects would result from increased physical activity whilst indirect effects may derive from less congested roads, particularly in urban areas with air quality issues. The scale of the benefit would be incremental with time assuming that uptake of more sustainable and healthier travel options is also incremental.						to these interventions.	benefits over time.	be implemented.
L4. Support opportunities for all sectors of the population to access services they require, wherever they live. <ul style="list-style-type: none"> Support those without a private car, who need to travel, in accessing the services they require. Promote the role of technology in accessing services and employment. Support the role of taxis and private hire vehicles. Support the role of demand responsive and community transport. 	These interventions are specifically aimed at improving accessibility and mobility for all, including people with limited access to services including young and elderly people in rural areas, low-income families, parents without a car, people out of work, the long term ill, careers and people with mental health issues. Improving access to services and opportunities would in turn bring benefits on human health. The implementation of these measures would therefore be beneficial to this SEA Objective.	+	+	+	L	T/R	Medium/ low certainty – There is uncertainty with regards to planned actions, programme and funding associated to these interventions.	Where schemes / initiatives are time limited, new replacement measures need to be implemented to maximise the opportunity for benefits over time.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L5. Support the identification and implementation of measures that will improve air quality. <ul style="list-style-type: none"> Support ongoing work to manage the impact of transport on air quality and climate change. Support ongoing work on Clean Air Zones. Support work on Zero and Low Emission Vehicles. 	The interventions aimed at supporting the identification and implementation of measures that will improve air quality would have a beneficial effect on human health.	+	++	++	L	T/R	Medium/ low certainty – The West of England support the preparation of Air Quality Action Plans and the delivery of specific measures to improve air quality. Considerable support and commitment to encouraging the use of electric vehicles. Uncertainty over long term funding and timescales of some of the interventions as well as potential policy and / or legislative changes at national level.	Where schemes / initiatives are time limited, new replacement measures need to be implemented to maximise the opportunity for benefits over time.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
N1. Use master planning and local design to create better places. <ul style="list-style-type: none"> Improve the quality of streets and public realm. Integrate walking, cycling and public transport into new developments. 	High quality public streets and spaces, allow people to move more seamlessly, connect places with one another and, encourage safer more sustainable active modes. Measures and schemes such as development and implementation of Neighbourhood Plans; local design guides; integration of walking, cycling and	+	++	++	L	T/R	Medium certainty – Some initiatives are already in place and The West of England is committed to continue using master planning and local design to create better places. There is uncertainty with regards to planned	Where schemes / initiatives are time limited, new replacement measures need to be implemented to maximise the opportunity for benefits over time. The needs of elderly people and those with limiting health conditions will need to be	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented. Additionally, it was assumed that schemes under these interventions would be delivered through the appropriate consenting processes.

[illegible]

WEST OF ENGLAND JOINT LOCAL TRANSPORT PLAN 4 (JLTP 4) – DRAFT STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) MATRICES – SEA OBJECTIVE 7

JLTP4’s Policies and Interventions assessed

Connectivity beyond the West of England -

Beyond West of England policies and interventions:

- B1. Enhance competitiveness of major gateways and improve connectivity to international markets
- B2. Improve strategic resilience of the network for all trips

Connectivity within the West of England -

Within West of England policies and interventions:

- W1. Provide more public transport options and improve service quality
- W2. Provide for journeys where public transport is not an option
- W3. Use, as appropriate, technological advances and charging measures to optimise and better manage demand
- W4. Improve resilience of the network, providing increased reliability
- W5. Enable business clustering and the efficient movement of freight

Local connectivity -

Local policies and interventions:

- L1. Enable walking and cycling, ‘active modes of travel’, to be the natural choice for shorter journeys
- L2. Reduce the number and severity of casualties for all road users
- L3. Encourage residents and employees to make more sustainable and healthier travel choices
- L4. Support opportunities for all sectors of the population to access the services they require, wherever they live
- L5. Support the identification and implementation of measures that will improve air quality

Neighbourhood connectivity -

Neighbourhood policies and interventions:

- N1. Use master planning and local design to create better places
- N2. Facilitate the use of active modes for all short trips, including the first and last mile of longer journeys

SEA Assessment Criteria - Effects of the JLTP4 and proposed alternatives will be described in terms of their:

Nature: whether they are anticipated to be:

- Positive (+)
- Neutral (N)
- Negative (x) or
- Uncertain (?)

++ Major Positive	The option would be significantly beneficial to the SEA objective by resolving an existing environmental issue and/or maximising opportunities for environmental enhancement.
+ Minor Positive	The option would be partially beneficial to the SEA objective by contributing to resolving an existing environmental issue and/or offering opportunity for some environmental enhancement. This effect would not be considered to be of significance.
N Neutral	The option would have a neutral effect on the SEA objective.
? Uncertain	There is insufficient detail available on the option or the baseline situation in order to assess how significantly the SEA objective would be affected by the option.
x Minor Negative	The option would partly undermine the SEA objective by contributing to an environmental problem and/or partially undermine opportunities for environmental enhancement. This effect would not be considered to be of significance.
xx Major Negative	The option would severely undermine the SEA objective by contributing to an environmental problem and/or undermining opportunities for environmental enhancement. This would be considered to be a significant effect.

Duration: the duration of potential effects are presented in terms of the timescale over which they are anticipated:

- Short term effects: effects expected in the next 1-5 years;
- Medium term effects: effects expected in the next 6-15 years; and
- Long term effects: effects expected in the next 16+years.

Permanence and Reversibility:

- A permanent effect is one which results from a physical change that is anticipated to last beyond the life of the Joint Local Transport Plan.
- A temporary effect is one which results from an operational change which could change if there is a change of policy, or a short term condition such as a construction phase related impact.
- A reversible effect is an environmental effect that can be reversed, for example an incident of water pollution can be cleaned up over time.
- An irreversible effect is an environmental effect that cannot be reversed such as the loss of a historic feature or the loss of agricultural soil due to permanent development.

Spatial Scale:

- Local: effect is restricted to the immediate location of the proposal or to a specific site or settlement within the sub-region (West of England)
- Regional: effect is anticipated to cover a significant proportion or all of the South West.
- National: effect covers the whole of England and/or the UK (also includes international).

<p>SEA Objective 7. To improve road safety, particularly for vulnerable users and to reduce road casualties.</p> <p>SEA Topic: Human health, population</p> <p>Criteria to Consider:</p> <ul style="list-style-type: none"> Does the JLTP4, in combination with other plans, serve to reduce the likelihood of accidents?
<p>Description of the value and vulnerability of the area likely to be affected:</p> <p>National target to reduce number of killed and seriously injured road casualties by 33% by 2020. Amongst vulnerable road users – motorcyclists, pedestrians (especially elderly and children), and cyclists are disproportionately represented in accident statistics in relation to either the volume of traffic they represent or the distance travelled by mode. Many people perceive roads to be dangerous places and feel intimidated by traffic. Many streets are perceived to have safety or security issues, including high numbers of heavy vehicles.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
<p>B1. Enhance competitiveness of major gateways and improve connectivity to international markets.</p> <ul style="list-style-type: none"> Support Bristol Airport as the main gateway for air travel in the South West. Support the role of Bristol Port. 	<p>Improvements to connectivity across all transport modes, such as highway junction improvements on the nearby transport network and exploring the improvement of existing bus routes can help reduce road congestion.</p> <p>For example, the West of England are working with Highways England to improve M5 Junction 19 to enhance access between the motorway network and the Royal Portbury Dock. Southbound traffic leaving the motorway queues back in the nearside lane over the Avonmouth Bridge, which causes both a safety hazard and impacts the operation of the main carriageway. A comprehensive solution will be needed to address the long-term needs of this junction.</p> <p>A reduction in congestion can reduce the chance of accidents on the highway network. This policy would see an increase in the overall provisions of public transport which is a safer form of travel.</p> <p>Through supporting the expansion of both Bristol Airport and Bristol Port through increasing the provision of public transport, these policy's and interventions are likely to have a beneficial impact on improving road safety.</p>	+	+	+	N	T/R	<p>Medium certainty-</p> <p>There is certain level of uncertainty about what options / schemes will be implemented and to what extent.</p>	<p>New projects should be subject to safety audit checks.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>Additionally, it was based on the assumption that schemes under these interventions would incorporate opportunities to enhance road safety would be delivered through the appropriate consenting processes.</p>
<p>B2. Improve strategic resilience of the network for all trips.</p> <ul style="list-style-type: none"> Maximise opportunities arising from 	<p>Investment in the transport network is funded by the Road Investment Strategy (RIS) and set out in the Route Strategies, three of which include SRN roads passing through the West of England: London to</p>	+	+	+	N	T/R	<p>Medium / Low certainty –</p> <p>There is some uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>	<p>New projects should be subject to safety audit checks.</p> <p>Improvements to safety features within cars may help improve safety. Road safety camera enforcement provides opportunity for driver</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that development consent for</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
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<p>improvements to the strategic road and rail network, and identify and support delivery of further changes.</p> <ul style="list-style-type: none"> ○ Strategic Road Network (SRN) ○ Strategic Rail • Identify opportunities to manage the impact of Severn Bridge tolls removal. • Support the role of coaches for residents and visitors. • Manage and mitigate the impact of regular and infrequent events on the transport network. 	<p>Wales (M4, M32, M48 and M49), Birmingham to Exeter (M5) and South West Peninsular (A36/A46 south of the M4). These routes frequently suffer from high levels of congestion and delays, with high volumes of traffic increasing driver stress and resulting in accidents. The West of England are committed to working with Highways England and neighboring authorities to ensure improvements are made along these key routes.</p> <p>The lower transport costs and opportunities for increased agglomeration of economies either side of the Severn Bridge is anticipated to increase trip across the bridge. This may result in increased delays on already congested sections and junctions on the M4 Junction 19 to 20 leading to diversion of trips onto other routes (increasing the chance of accidents). A number of interventions (new or improved mass transit, Metro Bus, Park & Ride, bus and cycle routes and junction improvements) can be implemented to reduce the impact of the tolls removal.</p> <p>Additionally, strategic improvements to the rail and bus network will encourage more travel on public transport, which is safer than private car travel.</p> <p>Working with coach companies and Bristol Airport to promote the use of coach travel will have a positive impact on this SEA objective as public transport is seen as a safer way to travel.</p> <p>Several interventions under this policy will result in an improvement to road safety.</p>						<p>The only committed HE scheme included in the current Route Investment Strategy (RIS) delivery plan is the new M49 Avonmouth junction, with works expected to commence in 2019. The government is currently preparing a revised RIS2 to cover the period from 2020 to 2025, which will include a vision for the SRN to 2040 and beyond. There is uncertainty with regards to the level of investment that will be committed in the SRN across the region.</p> <p>Similar funding uncertainty applies to strategic rail improvements.</p>	education.	<p>nationally significant infrastructure projects on the road and rail networks and strategic rail freight interchanges will be delivered in line with the provisions of the <i>National networks national policy statement</i>.</p> <p>There is an assumption that any improvements to the wider road network will also lead to improvements to road safety through design.</p>
<p>W1. Provide more public transport options and improve service quality.</p> <ul style="list-style-type: none"> • Provide high quality and reliable mass and bus rapid transit. • Support and enhance existing public transport services. <ul style="list-style-type: none"> ○ Bus Strategy ○ Rail • Improve the availability and accessibility of accurate travel information and ticketing. 	<p>Improvements to public transport can reduce the need for private car travel. Public transport is seen as a safer way to travel.</p> <p>Enhancing existing public transport services by continuing to improve local bus and rail networks, completion and expansion of the MetroBus network, delivery of the MetroWest programme, and improved opportunities to access stops and stations by active modes would also result in beneficial effects in terms of improving road safety.</p> <p>Interventions under this policy will have a positive impact on this SEA objective. The more people using public transport modes, reducing use of private car travel and</p>	+	+	+	R	T/R	<p>High / Medium certainty -</p> <p>There is a very strong commitment from the West of England to deliver high quality and reliable mass transit network across the Bristol and Bath urban areas; complete and expand MetroBus and deliver MetroWest.</p> <p>Funding remains the key challenge and uncertainty.</p>	<p>New projects should be subject to safety audit checks.</p> <p>Accessibility to safer travel modes needs to be considered including physical access to bus stops and train station.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that development consent for nationally significant infrastructure projects on the road and rail networks and strategic rail freight interchanges will be delivered in line with the provisions of the <i>National networks national policy statement</i>.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
	therefore accidents.								
W2. Provide for journeys where public transport is not an option. <ul style="list-style-type: none"> Provide P&R and sharing schemes to minimise the impact of single occupancy vehicles. Recognise the needs to motorcycles and mopeds. 	<p>Park & Ride facilities allow people living outside urban areas who do not have access to public transport near them, to transfer from private car to public transport for onward journeys into urban areas. In the short to medium term, the new and expanded Park & Ride sites will be served by bus, MetroBus and rail. However, as these sites become more popular, additional people coming in from rural areas via car can contribute to congestion surrounding cities.</p> <p>A M32 Park & Ride site would intercept the largest number of trips into the city and have the most benefit in terms of road safety and congestion. Improved signage and variable Message Signs on the approaches to Park & Ride sites will increase awareness and usage of sites, whilst ensuring drivers are aware of where they are going, reducing stress and chance of accidents.</p> <p>Park & Ride sites are also being considered as overnight lorry and coach parking areas, which reduces the risk of accidents from tired long-distance drivers.</p> <p>People on motorcycle and mopeds can be particularly susceptible to accidents on the road network. The West of England have a commitment to support the role of motorcycles and mopeds. This includes ensuring their needs are considered during design of new schemes and infrastructure. The use of bus lane to provide diversion from congested areas will continue to be permitted. These interventions will have a positive impact on reducing motorcycle accidents.</p>	++	+	+	R	T/R	<p>Medium certainty-</p> <p>There is some uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>	<p>New projects should be subject to safety audit checks.</p> <p>Improvements to safety features within cars may help improve safety. Road safety camera enforcement provides opportunity for driver education.</p> <p>Targeting road safety campaigns at motorcyclists, who are disproportionately represents in road accident statistics.</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
W3. Use, as appropriate, technological advances and charging measures to optimize and better manage demand. <ul style="list-style-type: none"> Use technology to keep traffic moving. Embrace technology to improve cleaner travel option. Use, as appropriate, charging measures to influence and manage the demand of private 	<p>The role of technology is likely to become increasing important to help keep traffic moving. For example, Intelligent Transport Systems (ITS) are used to inform road users of disruptions, and maximise the efficiency of traffic signals to keep the highway network operating as efficiently and safely as possible.</p> <p>Funds raised through charging schemes (charging people to drive within certain areas) can be reinvested in transport measure across the West of England, to improve the provision of realistic alternatives to the use of motorized vehicles. Charging can result in less congestion, reducing the risk of accidents. There may also be an increase in people using public transport modes which is</p>	+	+	?	R	T/R	<p>Medium certainty-</p> <p>Advanced technologies are currently in early development stages. Timescales and extent of implementation are unknown. Charging measures might prove unpopular and challenging to implement.</p>	<p>Improvements to safety features within cars may help improve safety. Road safety camera enforcement provides opportunity for driver education.</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
car use.	safer than private car use. Parking controls can encourage trips within urban areas to transfer to active modes or public transport. Interventions under this policy are likely to result in more people using public transport, reducing congestion within urban areas, resulting in a reduction of road accidents.								
W4. Improve resilience of the network, providing increased reliability <ul style="list-style-type: none"> Define, manage and maintain the Key Route Network. Effectively manage the Major Road Network. Effectively accommodate development sites and associated trips. 	<p>There is the need to define and consult on a Key Route Network (KRN). The KRN represents an opportunity for a fresh approach to the designation of corridors, and takes into account road safety implications, particularly for vulnerable road users (e.g. 20mph zones).</p> <p>There is public concern about the need to invest adequately and effectively in highways maintenance and the implications for safety. Poor network maintenance can deter people from choosing active modes of travel such as cycling and walking, therefore increasing levels of congestion, which can increase the likelihood of accident occurring. The West of England are keen to adapt the network through engineering schemes and measures to ease congestion, improve safety and encourage sustainable transport modes.</p> <p>Public transport will be one on of the key principles for the Major Roads Network, as these roads carry large numbers of people on buses and other modes. Additionally, this recognises that public transport schemes are generally more effective in the long term at reducing congestion than road widening schemes, and therefore reducing car use and the chance of accidents occurring.</p> <p>Interventions under this policy are likely to have a positive effect on this SEA objective.</p>	+	+	?	R	T/R	<p>Medium certainty-</p> <p>There will be additional MRN capital infrastructure and this will have an impact upon maintenance budgets and requirements; resulting in uncertainty in the long run.</p>	<p>Improvements to safety features within cars may help improve safety. Road safety camera enforcement provides opportunity for driver education.</p> <p>New projects should be subject to safety audit checks.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that development consent for nationally significant infrastructure projects on the road and rail networks and strategic rail freight interchanges will be delivered in line with the provisions of the <i>National networks national policy statement</i>.</p>
W5. Enable business clustering and the efficient movement of freight. <ul style="list-style-type: none"> Support the delivery of Enterprise Zones / Business clustering. Balance the requirement for distributing goods, with mitigating the adverse impact of vehicles. <ul style="list-style-type: none"> Routing, management and 	<p>The West of England will progress an ambitious programme to improve the efficiency of fright movements. This includes working to encourage a shift for a range of goods from road to rail and water, which are safer forms of transport.</p> <p>Interventions under this policy focus on reducing the number of freight vehicles on the network. Additionally, reduced travel between business, result in lower demand for trips on the network, reducing the potential for accidents.</p>	+	?	?	R	T/R	<p>Low certainty-</p> <p>There is some uncertainty with regards to planned actions, programme (medium and long-term impacts) and funding associated with these interventions.</p> <p>Uncertainty regarding the reduction in cars on the network how this will impact on the safety of the network.</p>	<p>Improvements to safety features within cars may help improve safety. Road safety camera enforcement provides opportunity for driver education.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p>

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<ul style="list-style-type: none"> information ○ Rail and water ○ Loading and parking ○ Consolidation ○ Embracing innovation ○ Planning conditions 	Interventions under this policy have the potential to have a positive impact on this objective.								
<p>L1. Enable walking and cycling, 'active modes of travel', to be the natural choice for shorter journeys.</p> <ul style="list-style-type: none"> Provide an attractive, safe and usable network. Provide schemes to support the uptake of cycling. 	<p>Perceptions of danger are a major factor in attitudes to cycling, with many people hesitant to cycle because of the fear of cycling in heavy traffic. Similarly, how children commute to school may be determined by their parents' perception of the safety of their mode of transport.</p> <p>The priorities of walking and cycling infrastructure for the West of England will be defined by the Local Cycling and Walking Infrastructure Plans (LCWIP). To increase the uptake of cycling, road safety should be a priority, with protected, but direct routes available. Infrastructure needs to be maintained (addressing issues such as potholes) to ensure cycling and pedestrian ways are safe for use.</p> <p>Improving and increasing cycle education and training for road users can reduce cyclists fears of being injured (e.g. the Bristol Family Cycling Centre provides training for all ages and abilities; there were 12,355 attendances in 2017-2018).</p> <p>Interventions under this policy will have a beneficial impact on reducing road casualties.</p>	++	+	+	L	T/R	<p>Medium certainty-</p> <p>There is a commitment from the West of England to encourage walking and cycling.</p> <p>Several projects/ programmes/ schemes in place to encourage people to cycle, moving towards sustainable transport with more to be delivered through the development and implementation of the Local Cycling and Walking Infrastructure Plans.</p>	Where schemes / initiatives are time limited, new replacement measures need to be implemented to maximise the opportunity for benefits over time.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
<p>L2. Reduce the number and severity of casualties for all road users.</p> <ul style="list-style-type: none"> Consider the needs of all road users in the design of transport and highway schemes, particularly vulnerable road users. Deliver road safety education and skills training to equip people 	<p>There needs to be a focus on the needs of pedestrians, cyclists and motorcyclists who are most likely to be killed or seriously injured in collisions. This means road safety should be considered at all stages of the design process, from concept to construction.</p> <p>The West of England are committed to carrying out road safety audits of schemes with the most up to date policies. Road safety education has been identified in the JLTP4 as an important way to improve safety on the road network. A review of the programme of</p>	++	++	+	L	P/R	<p>High/ Medium certainty-</p> <p>The West of England are committed to implementing several measures to improve road safety. Interventions will need to continue in the long run to ensure a reduction in accidents over in the long run.</p> <p>There is some uncertainty over long term funding for interventions.</p>	<p>Where schemes / initiatives are time limited, new replacement measures need to be implemented to maximise the opportunity for benefits over time.</p> <p>Improvements to safety features within cars may help improve safety. Road safety camera enforcement provides opportunity for driver education.</p> <p>Targeting road safety campaigns at</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
<p>with the knowledge and skills to travel in a safe and sustainable way.</p> <ul style="list-style-type: none"> Work in partnership to build safer communities. 	<p>road safety education delivery will be undertaken and the West of England will work with road safety initiatives to reduce personal injury collisions by promoting campaigns which focus on cycle safety, child car seat safety, young drivers, motorcycle training and older road users.</p> <p>The West of England will also work with Avon and Somerset Police, Avon Fire and Rescue and other partners to deliver speed management systems e.g. interactive speed reminder signs, community speed watch and mobile speed enforcement.</p> <p>Interventions under this policy will have a major beneficial impact on reducing the number of casualties.</p>							motorcyclists, who are disproportionately represents in road accident statistics.	
<p>L3. Encourage residents and employees to make more substantial and healthier travel options.</p> <ul style="list-style-type: none"> Support travel planning with developers, education providers and individuals. Support travel planning with businesses and employment sites. Encourage mode shift through grants, incentives and rewards. Maximise awareness of sustainable and active travel choices and the benefits these bring. 	<p>Education and training for school aged children will make active travel safer and teach the benefits of walking, cycling and scooting. Engagement at a school age will promote road safety and active travel in the long term, into adulthood.</p> <p>Encouraging more cycling and walking without adequate infrastructure (e.g. cycle lanes) could cause an increase in accidents due to an increase in cyclists and pedestrians on the road.</p> <p>Interventions under this policy will have a positive impact on reducing cyclist casualties.</p>	+	+	?	L	T/R	<p>Medium certainty -</p> <p>Uncertainty over the long term, as grants, incentives and rewards have the potential to be temporary. Some uncertainty over funding associated with these interventions.</p>	<p>Where schemes / initiatives are time limited, new replacement measures need to be implemented to maximise the opportunity for benefits over time.</p> <p>Improvements to safety features within cars may help improve safety. Road safety camera enforcement provides opportunity for driver education.</p> <p>Targeting road safety campaigns at motorcyclists, who are disproportionately represents in road accident statistics</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
<p>L4. Support opportunities for all sectors of the population to access services they require, wherever they live.</p> <ul style="list-style-type: none"> Support those without a private car, who need to travel, in accessing the services they require. Promote the role of technology in accessing services and employment. Support the role of taxis and private hire vehicles. Support the role of demand responsive and community transport. 	<p>By providing public transport services to rural areas, there may be a decrease in car trips.</p> <p>Taxis play a critical role in supporting the night-time economy and ensuring safe mobility, particularly when other public transport options are not available. The West of England supports the provision of adequate and safe taxi waiting and drop off facilities in the cities and town centers.</p> <p>Interventions under this policy will have a neutral impact on road safety. Taxis can provide a safe alternative to driving (e.g. avoidance in alcohol related incidents), yet will not decrease the number of cars on the road.</p>	N	N	N			<p>Low certainty-</p> <p>There is uncertainty with regards to planned actions, programme and funding associated to these interventions</p>	<p>Where schemes / initiatives are time limited, new replacement measures need to be implemented to maximise the opportunity for benefits over time.</p> <p>Improvements to safety features within cars may help improve safety. Road safety camera enforcement provides opportunity for driver education.</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
L5. Support the identification and implementation of measures that will improve air quality. <ul style="list-style-type: none"> Support ongoing work to manage the impact of transport on air quality and climate change. Support ongoing work on Clean Air Zones. Support work on Zero and Low Emission Vehicles. 	<p>This policy will most likely have a neutral impact on this SEA objective. Interventions under this policy focus on switching to low emission vehicles, which will have little impact on road safety. In fact, there may be the potential for negative impacts with increase road collisions, because of the quite nature of autonomous vehicles.</p> <p>Advances in technology and the development of autonomous vehicles may enhance road safety but these are in early stages of development, with uncertain impacts relating to road safety.</p>	N	?	?	L	T/R	<p>Low certainty -</p> <p>There is some uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>	Improvements to safety features within cars may help improve safety. Road safety camera enforcement provides opportunity for driver education.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
N1. Use master planning and local design to create better places. <ul style="list-style-type: none"> Improve the quality of streets and public realm. Integrate walking, cycling and public transport into new developments. Provide clear wayfinding and signage. Support and maintain Public Rights of Way. 	<p>The development and support of neighborhood plans will ensure new housing estates are better quality places, where people feel safe. For example, implementing new footways and cycle paths to encourage a reduction in cars, will reduce the number of traffic incidents.</p> <p>The West of England are committed to working with developers to ensure high quality walking and cycling infrastructure is integrated into the wider cycling and walking network, providing safe routes for everyone. Additionally, introduced signage will be adopted for PRoWs, which will reduce the chance of people getting lost and feeling unsafe.</p> <p>Interventions under this policy are likely to be beneficial to this objective through reducing the need for car travel and ensuring pedestrians and cyclists have safe passage.</p>	+	+	+	L	T/R	<p>High/ medium certainty -</p> <p>High commitment from the West of England are working with local authorities to provide safer neighborhoods.</p> <p>Minor uncertainty with regards to planned actions, programme and funding associated to these interventions in the long run.</p>	<p>To be effective, there needs to be a modal shift to sustainable transport modes (e.g. cycling and walking) to reduce the number of cars on the road.</p> <p>Improvements to safety features within cars may help improve safety. Road safety camera enforcement provides opportunity for driver education.</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
N2. Facilitate the use of active modes for all short trips, including the first and last mile of longer journeys. <ul style="list-style-type: none"> Work with residents and communities to identify barriers to accessibility. Support the provision of safe crossings and speed reduction in appropriate locations. Improve actual and perceived personal security. 	<p>The JLTP4 identifies numerous measures to improve the safety of the road network. This includes identifying those roads with the highest risk, and prioritizing schemes to manage speed and traffic volumes where there is evidence of safety problems.</p> <p>A key commitment is to design and maintain the highway network to reduce the risk of collisions occurring.</p> <p>The introduction of 20mph zones in Bristol have led to promising improvements in road safety. These are being explored further to identify additional locations which may benefit from reduced speed limits.</p> <p>Interventions under this policy will have a major beneficial impact on this objective.</p>	++	+	?	L	R/T	<p>Medium certainty -</p> <p>There is some uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>	<p>Ensure effective communication with residents and communities in order to achieve interventions.</p> <p>Where schemes / initiatives are time limited, new replacement measures need to be implemented to maximise the opportunity for benefits over time.</p> <p>Improvements to safety features within cars may help improve safety. Road safety camera enforcement provides opportunity for driver education.</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

[illegible]

WEST OF ENGLAND JOINT LOCAL TRANSPORT PLAN 4 (JLTP 4) – DRAFT STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) MATRICES – SEA OBJECTIVE 8

JLTP4’s Policies and Interventions assessed

Connectivity beyond the West of England -

Beyond West of England policies and interventions:

- B1. Enhance competitiveness of major gateways and improve connectivity to international markets
- B2. Improve strategic resilience of the network for all trips

Connectivity within the West of England -

Within West of England policies and interventions:

- W1. Provide more public transport options and improve service quality
- W2. Provide for journeys where public transport is not an option
- W3. Use, as appropriate, technological advances and charging measures to optimise and better manage demand
- W4. Improve resilience of the network, providing increased reliability
- W5. Enable business clustering and the efficient movement of freight

Local connectivity -

Local policies and interventions:

- L1. Enable walking and cycling, ‘active modes of travel’, to be the natural choice for shorter journeys
- L2. Reduce the number and severity of casualties for all road users
- L3. Encourage residents and employees to make more sustainable and healthier travel choices
- L4. Support opportunities for all sectors of the population to access the services they require, wherever they live
- L5. Support the identification and implementation of measures that will improve air quality

Neighbourhood connectivity -

Neighbourhood policies and interventions:

- N1. Use master planning and local design to create better places
- N2. Facilitate the use of active modes for all short trips, including the first and last mile of longer journeys

SEA Assessment Criteria - Effects of the JLTP4 and proposed alternatives will be described in terms of their:

Nature: whether they are anticipated to be:

- Positive (+)
- Neutral (N)
- Negative (x) or
- Uncertain (?)

++ Major Positive	The option would be significantly beneficial to the SEA objective by resolving an existing environmental issue and/or maximising opportunities for environmental enhancement.
+ Minor Positive	The option would be partially beneficial to the SEA objective by contributing to resolving an existing environmental issue and/or offering opportunity for some environmental enhancement. This effect would not be considered to be of significance.
N Neutral	The option would have a neutral effect on the SEA objective.
? Uncertain	There is insufficient detail available on the option or the baseline situation in order to assess how significantly the SEA objective would be affected by the option.
x Minor Negative	The option would partly undermine the SEA objective by contributing to an environmental problem and/or partially undermine opportunities for environmental enhancement. This effect would not be considered to be of significance.
xx Major Negative	The option would severely undermine the SEA objective by contributing to an environmental problem and/or undermining opportunities for environmental enhancement. This would be considered to be a significant effect.

Duration: the duration of potential effects are presented in terms of the timescale over which they are anticipated:

- Short term effects: effects expected in the next 1-5 years;
- Medium term effects: effects expected in the next 6-15 years; and
- Long term effects: effects expected in the next 16+years.

Permanence and Reversibility:

- A permanent effect is one which results from a physical change that is anticipated to last beyond the life of the Joint Local Transport Plan.
- A temporary effect is one which results from an operational change which could change if there is a change of policy, or a short term condition such as a construction phase related impact.
- A reversible effect is an environmental effect that can be reversed, for example an incident of water pollution can be cleaned up over time.
- An irreversible effect is an environmental effect that cannot be reversed such as the loss of a historic feature or the loss of agricultural soil due to permanent development.

Spatial Scale:

- Local: effect is restricted to the immediate location of the proposal or to a specific site or settlement within the sub-region (West of England)
- Regional: effect is anticipated to cover a significant proportion or all of the South West.
- National: effect covers the whole of England and/or the UK (also includes international).

SEA Objective 8. Minimise adverse effects on soils, such as loss, compaction, erosion and pollution from transport related activities.

SEA Topic: Soil, biodiversity, water, landscape

Criteria to Consider:

- **Would the JLTP4 in combination with other plans require or encourage new infrastructure development on previously undeveloped or greenfield land? This could indicate loss of agriculturally productive soils, and/or soils acting as a carbon store.**
- **Require or encourage new infrastructure development on previously developed land? This could indicate prudent use of land and remediation of soils.**

Description of the value and vulnerability of the area likely to be affected:

The West of England has a varied and diverse range of soil types. Although the urban area covering the West of England is significant at over 21 per cent, much of the surrounding rural landscape is farmed. Agriculture is mainly livestock rearing, with arable in the flatter land to the north-east. Valleys and steeper slopes in the south-east tend to have irregular fields and overgrown, species-rich hedges.

Soil erosion and field run-off linked to agricultural land management is currently one of the biggest issues for the region. It is leading to impacts on water quality, aquatic wildlife and bathing waters as well as on landscape. The pressure for growth in the region is likely to increase pressure on land. This is likely to contribute to incremental loss of soils as well as compaction, organic matter decline and erosion. Climate change has the potential to increase erosion rates with hotter, drier conditions that make soils more susceptible to wind erosion, alongside heavy rain that can wash soil away.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
B1. Enhance competitiveness of major gateways and improve connectivity to international markets. <ul style="list-style-type: none"> • Support Bristol Airport as the main gateway for air travel in the South West. • Support the role of Bristol Port. 	<p>Transport can impact soil in the following ways:</p> <ul style="list-style-type: none"> • Pollution of soils from road run-off; • Compaction and loss from new transport-related infrastructure; • Areas of hard-surfacing leading to increased surface water run-off causing erosion. <p>Due to the relative permanence and irreversibility of soil loss, the potential effect should be regarded as significant. Operational effects may result in pollution, compaction and erosion.</p> <p>Development plans are in place and being prepared for both Bristol International Airport (BIA) and Bristol Port which would result in loss of soils as well as on impacts on soils resources as a result of their operation.</p> <p>Both BIA and Bristol Port have developed biodiversity / conservation schemes (see Suggested mitigation and implementation for more information), which would also benefit soils. Mitigation / enhancement measures included as</p>	X	X	X	R	P/I	<p>High / Medium certainty –</p> <p>Although there is some uncertainty with regards to programme and details of other land use developments, planned investments and development plans for both BIA and Bristol Port are likely to go ahead. The combined effect of the predicted growth in the region with the various transport infrastructure schemes that may go ahead is likely to increase pressure on land and hence adversely affect soils.</p>	<p>Ensure a strategic approach to protecting soil resources through the work of The West of England Nature Partnership (WENP). The WENP exists to create and coordinate a plan for the restoration of the natural environment and integrate that plan into regional strategies for economic development, spatial planning and public health.</p> <p>BIA and Bristol Port to continue working with the West of England and other partners to minimise adverse effects on the natural environment. Measures aimed to protect terrestrial habitats will also protect the soils that sustain them.</p> <p>Specific schemes will be subject to the relevant consenting schemes and relevant environmental legislation. New schemes should incorporate detailed mitigation and enhancements aiming to minimise the degradation of this resource.</p> <p>It is recommended that major schemes have a Construction Environmental Management Plan (CEMP) to minimise adverse effects during construction.</p>	<p>The judgement was based on the assumption that Bristol Airport will continue working towards their aim to deliver a low carbon, accessible, integrated, efficient and reliable transport network for travel to and from Bristol Airport for staff and passengers.</p> <p>It is also assumed that the JLTP4 interventions relating to supporting Bristol Airport and Bristol Port would be implemented and that further developments in Bristol Airport and Port will be delivered in line with the relevant <i>National Policy Statements</i> and environmental legislation.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
	part of the design and implementation of the specific schemes may offset some of the adverse effects in the long term.								
B2. Improve strategic resilience of the network for all trips. <ul style="list-style-type: none"> Maximise opportunities arising from improvements to the strategic road and rail network, and identify and support delivery of further changes. <ul style="list-style-type: none"> Strategic Road Network (SRN) Strategic Rail Identify opportunities to manage the impact of Severn Bridge tolls removal. Support the role of coaches for residents and visitors. Manage and mitigate the impact of regular and infrequent events on the transport network. 	<p>As noted above, soils are vulnerable to transport operation and development. Potential effects include potential pollution from road run-off; loss and compaction; areas of hard-surfacing leading to increased surface water run-off causing erosion.</p> <p>Improvements on the strategic road and rail network identified in the JLTP 4 include: East of Bath Link; new and upgraded junctions on the M4 (new Junction 18a) and M5 (Junctions 14/19/new 21a); new sections of Smart Motorway; Park & Ride on the M32; redevelopment of Bristol Temple Meads into a regional interchange.</p> <p>Strategic road and rail network improvements involving landtake would result in direct adverse effects on soils in terms of loss. Operational effects may result in pollution, compaction and erosion.</p> <p>Due to the relative permanence and irreversibility of soil loss, the potential effect should be regarded as significant.</p>	X	X	X	R	P/I	<p>High / Medium certainty –</p> <p>Although there is some uncertainty with regards to programme and funding of some of the strategic road and rail schemes, the combined effect of the infrastructure schemes that may go ahead are likely to increase pressure on land and hence adversely affect soils.</p>	<p>Ensure a strategic approach to protecting soil resources through the work of The West of England Nature Partnership (WENP) and the West of England (WoE) Green Infrastructure (GI) Plan. The GI Plan will identify the strategic measures and mechanisms to support, guide and implement the delivery of environmental commitments set within the JSP and Local Plans, including mitigation for protected sites. Further development of GI Plans at an authority level should also reflect schemes within this JLTP.</p> <p>Specific schemes will be subject to the relevant consenting schemes and relevant environmental legislation. New schemes should incorporate detailed mitigation and enhancements aiming to minimise the degradation of this resource.</p> <p>It is recommended that major schemes have a Construction Environmental Management Plan (CEMP) to minimise adverse effects during construction.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented and would have a cumulative effect on soils in associated with wider land use planning strategies.</p> <p>It is also assumed that development consent for nationally significant infrastructure projects on the road and rail networks and strategic rail freight interchanges will be delivered in line with the provisions of the <i>National networks national policy statement</i>.</p>
W1. Provide more public transport options and improve service quality. <ul style="list-style-type: none"> Provide high quality and reliable mass and bus rapid transit. Support and enhance existing public transport services. <ul style="list-style-type: none"> Bus Strategy Rail Improve the availability and accessibility of accurate travel information and ticketing. 	<p>Soils are vulnerable to transport operation and development. Potential effects include potential pollution from road run-off; loss and compaction; areas of hard-surfacing leading to increased surface water run-off causing erosion.</p> <p>Transport infrastructure improvements involving landtake would result in direct adverse effects on soils in terms of loss. Operational effects may result in pollution, compaction and erosion.</p> <p>Due to the relative permanence and irreversibility of soil loss, the potential effect should be regarded as significant.</p>	X	X	X	R	P/I	<p>High / Medium certainty –</p> <p>Although there is some uncertainty with regards to programme and funding of some of the proposed improvements, the combined effect of the various transport infrastructure schemes that may go ahead are likely to increase pressure on land and hence adversely affect soils.</p>	<p>Ensure a strategic approach to protecting soil resources through the work of The West of England Nature Partnership (WENP) and the West of England (WoE) Green Infrastructure (GI) Plan. The GI Plan will identify the strategic measures and mechanisms to support, guide and implement the delivery of environmental commitments set within the JSP and Local Plans, including mitigation for protected sites. Further development of GI Plans at an authority level should also reflect schemes within this JLTP.</p> <p>Specific schemes will be subject to the relevant consenting schemes and relevant environmental legislation. New schemes should incorporate detailed mitigation and enhancements aiming to minimise the degradation of this resource.</p> <p>It is recommended that major schemes have a Construction Environmental Management Plan (CEMP) to minimise adverse effects</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented and would have a cumulative effect on soils in associated with wider land use planning strategies.</p> <p>It is also assumed that schemes under this policy would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
								during construction.	
W2. Provide for journeys where public transport is not an option. <ul style="list-style-type: none"> Provide P&R and sharing schemes to minimise the impact of single occupancy vehicles. Recognise the needs of motorcycles and mopeds. 	<p>Soils are vulnerable to transport operation and development. Potential effects include potential pollution from road run-off; loss and compaction; areas of hard-surfacing leading to increased surface water run-off causing erosion.</p> <p>The delivery of new or expanded P&Rs would result in direct adverse effects on soils in terms of loss. Operational effects may result in pollution, compaction and erosion.</p> <p>Due to the relative permanence and irreversibility of soil loss, the potential effect should be regarded as significant.</p>	X	X	X	R	P/I	<p>High / Medium certainty –</p> <p>Although there is some uncertainty with regards to programme and funding of some of the proposed improvements, the combined effect of the various transport infrastructure schemes that may go ahead are likely to increase pressure on land and hence adversely affect soils.</p>	<p>Ensure a strategic approach to protecting soil resources through the work of The West of England Nature Partnership (WENP) and the West of England (WoE) Green Infrastructure (GI) Plan. The GI Plan will identify the strategic measures and mechanisms to support, guide and implement the delivery of environmental commitments set within the JSP and Local Plans. Further development of GI Plans at an authority level should also reflect schemes within this JLTP.</p> <p>Specific schemes will be subject to the relevant consenting schemes and relevant environmental legislation. New schemes should incorporate detailed mitigation and enhancements aiming to minimise the degradation of this resource.</p> <p>It is recommended that major schemes have a Construction Environmental Management Plan (CEMP) to minimise adverse effects during construction.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented and would have a cumulative effect on soils in associated with wider land use planning strategies.</p> <p>It is also assumed that schemes under this policy would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>
W3. Use, as appropriate, technological advances and charging measures to optimize and better manage demand. <ul style="list-style-type: none"> Use technology to keep traffic moving. Embrace technology to improve cleaner travel option. Use, as appropriate, charging measures to influence and manage the demand of private car use. 	<p>The use of technology to keep traffic moving and to improve cleaner travel option, together with charging measures aimed to influence and manage the demand of private car use, would have a neutral effect on this SEA objective in the short and medium term. In the long term, there might be opportunities for beneficial effects depending on the type and implementation extent of future technological advances.</p> <p>Potential long term effects would depend on the on the type and implementation extent of future technological advances.</p>	N	N	?	R	P/R	<p>Medium / Low certainty –</p> <p>This policy and proposed interventions do not involve significant infrastructural development and are therefore unlikely to involve direct impacts on soils.</p> <p>Advanced technologies are currently in early development stages. Timescales and extent of implementation are unknown.</p>	<p>Consideration needs to be undertaken to understand the impact on soils of advancing technologies, before they are implemented across the region.</p> <p>Where relevant, ensure a strategic approach to protecting soil resources through the work of The West of England Nature Partnership (WENP) and the West of England (WoE) Green Infrastructure (GI) Plan.</p>	Based on information available from JLTP4.
W4. Improve resilience of the network, providing increased reliability. <ul style="list-style-type: none"> Define, manage and maintain the Key Route Network (KRN). Effectively manage the Major Road Network (MRN). Effectively accommodate development sites and 	<p>Although soils are vulnerable to activities associated with transport networks maintenance, overall, interventions aimed at improving resilience of the network and providing increased reliability would have a neutral effect on this SEA objective. This is because the scale and type of the activities involved are not deemed to result in adverse effects of sufficient significance at this SEA level.</p>	N	N	N	R	P/I	<p>Medium / Low certainty –</p> <p>The KRN and its associated Joint Transport Asset Management Plan, and Major Road Network proposed by DfT are at inception stages. Timescales and details of implementation are unknown.</p> <p>There will be additional budgeting and funding requirements which may limit the implementation of some of the measures.</p>	<p>Ensure a strategic approach to protecting soil resources through the work of The West of England Nature Partnership (WENP) and the West of England (WoE) Green Infrastructure (GI) Plan.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented and would have a cumulative effect on soils in associated with wider land use planning strategies.</p> <p>It is also assumed that schemes under this policy would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
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associated trips.									
W5. Enable business clustering and the efficient movement of freight. <ul style="list-style-type: none"> Support the delivery of Enterprise Zones / Business clustering. Balance the requirement for distributing goods, with mitigating the adverse impact of vehicles. <ul style="list-style-type: none"> Routing, management and information Rail and water Loading and parking Consolidation Embracing innovation Planning conditions 	Soils are vulnerable to transport operation and development. Potential effects include potential pollution from road run-off; loss and compaction; areas of hard-surfacing leading to increased surface water run-off causing erosion. Delivery of some of the schemes under these interventions would result in direct adverse effects on soils in terms of loss. Operational effects may result in pollution, compaction and erosion. Due to the relative permanence and irreversibility of soil loss, the potential effect should be regarded as significant	X	X	X	R	P/I	Medium certainty- The West of England actively promotes designated Enterprise Areas (EA) or Enterprise Zones (EZ) across the region, which have potential opportunities in terms of improving accessibility and mobility. Mitigation / enhancement measures included as part of the design and implementation of the specific schemes may offset some of the adverse effects in the medium and long term. Although there is some uncertainty with regards to programme and funding of some of the proposed improvements, the combined effect of the predicted growth in the region with the infrastructure schemes that may go ahead are likely to increase pressure on land and hence adversely affect soils.	Ensure a strategic approach to protecting soil resources through the work of The West of England Nature Partnership (WENP) and the West of England (WoE) Green Infrastructure (GI) Plan. Specific schemes will be subject to the relevant consenting processes and relevant environmental legislation. New schemes should incorporate detailed mitigation and enhancements aiming to minimise the degradation of this resource. It is recommended that major schemes have a Construction Environmental Management Plan (CEMP) to minimise adverse effects during construction.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented. Additionally, it was based on the assumption that schemes under these interventions would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.
L1. Enable walking and cycling, 'active modes of travel', to be the natural choice for shorter journeys. <ul style="list-style-type: none"> Provide an attractive, safe and usable network. Provide schemes to support the uptake of cycling. 	Overall, interventions aimed at enabling walking and cycling, 'active modes of travel', to be the natural choice for shorter journeys would have a neutral effect on this SEA objective. Although the provision of new foot and cycle paths would affect soils through loss, compaction, erosion and potential pollution, the scale and type of the infrastructure required is not deemed to result in adverse effects of sufficient significance at this SEA level.	N	N	N	L	P/R	Medium certainty – There is a commitment from the West of England to encourage walking and cycling. Several projects/ programmes/ schemes are in place to encourage people to cycle, moving towards sustainable transport with more to be delivered through the development and implementation of the Local Cycling and Walking Infrastructure Plans. These proposed interventions do not involve significant infrastructural development and are therefore unlikely to result in significant impacts on soils.	Ensure a strategic approach to protecting soil resources through the work of The West of England Nature Partnership (WENP) and the West of England (WoE) Green Infrastructure (GI) Plan	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L2. Reduce the number and severity of casualties for all road users. <ul style="list-style-type: none"> Consider the needs of all road users in the design of transport and highway schemes, particularly vulnerable road users. Deliver road safety education and skills training to equip 	Interventions aimed at reducing the number and severity of casualties for all road users would have a neutral effect on this SEA objective.	N	N	N	R	P/R	Medium / Low certainty – These proposed interventions do not involve significant infrastructural development and are therefore unlikely to result in significant impacts on soils. There is some uncertainty with regards to planned actions, programme and funding associated to these interventions.		The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
people with the knowledge and skills to travel in a safe and sustainable way. <ul style="list-style-type: none"> Work in partnership to build safer communities. 									
L3. Encourage residents and employees to make more sustainable and healthier travel options. <ul style="list-style-type: none"> Support travel planning with developers, education providers and individuals. Support travel planning with businesses and employment sites. Encourage mode shift through grants, incentives and rewards. Maximise awareness of sustainable and active travel choices and the benefits these bring. 	Overall, interventions aimed at encouraging residents and employees to make more sustainable and healthier travel options would have a neutral effect on this SEA objective.	N	N	N	L	P/R	Medium / Low certainty – These proposed interventions do not involve significant infrastructural development and are therefore unlikely to result in significant impacts on soils. There is some uncertainty with regards to planned actions, programme and funding associated to these interventions.		The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L4. Support opportunities for all sectors of the population to access services they require, wherever they live. <ul style="list-style-type: none"> Support those without a private car, who need to travel, in accessing the services they require. Promote the role of technology in accessing services and employment. Support the role of taxis and private hire vehicles. Support the role of demand responsive and community transport. 	Interventions aimed at supporting opportunities for all sectors of the population to access services they require, wherever they live would have a neutral effect on this SEA objective.	N	N	N	L	P/R	Medium / Low certainty – These proposed interventions do not involve significant infrastructural development and are therefore unlikely to result in significant impacts on soils. There is some uncertainty with regards to planned actions, programme and funding associated to these interventions.		The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L5. Support the identification and implementation of measures that will improve air quality. <ul style="list-style-type: none"> Support ongoing work to manage the impact of transport on air quality and climate change. Support ongoing work on Clean Air Zones. Support work on Zero and Low Emission Vehicles. 	Interventions aimed at supporting the identification and implementation of measures that will improve air quality would, overall, have a beneficial effect on the environment including soils.	+	+	+	L	T/R	Medium / Low certainty – The West of England support the preparation of Air Quality Action Plans and the delivery of specific measures to improve air quality. Considerable support and commitment to encouraging the use of electric vehicles. Uncertainty over long term funding and timescales of some of the interventions.	Measures to consider potential implications on soils at scheme level.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
N1. Use master planning and local design to create better places.	Interventions aimed at creating better places such as Neighbourhood Plans,	+	+	+	L	P/I	Medium / low certainty –	Ensure a strategic approach to protecting soil resources. This could be achieved through the	The judgement was based on the level of information available and the assumption

[illegible]

WEST OF ENGLAND JOINT LOCAL TRANSPORT PLAN 4 (JLTP 4) – DRAFT STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) MATRICES – SEA OBJECTIVE 9

JLTP4’s Policies and Interventions assessed

Connectivity beyond the West of England -

Beyond West of England policies and interventions:

- B1. Enhance competitiveness of major gateways and improve connectivity to international markets
- B2. Improve strategic resilience of the network for all trips

Connectivity within the West of England -

Within West of England policies and interventions:

- W1. Provide more public transport options and improve service quality
- W2. Provide for journeys where public transport is not an option
- W3. Use, as appropriate, technological advances and charging measures to optimise and better manage demand
- W4. Improve resilience of the network, providing increased reliability
- W5. Enable business clustering and the efficient movement of freight

Local connectivity -

Local policies and interventions:

- L1. Enable walking and cycling, ‘active modes of travel’, to be the natural choice for shorter journeys
- L2. Reduce the number and severity of casualties for all road users
- L3. Encourage residents and employees to make more sustainable and healthier travel choices
- L4. Support opportunities for all sectors of the population to access the services they require, wherever they live
- L5. Support the identification and implementation of measures that will improve air quality

Neighbourhood connectivity -

Neighbourhood policies and interventions:

- N1. Use master planning and local design to create better places
- N2. Facilitate the use of active modes for all short trips, including the first and last mile of longer journeys

SEA Assessment Criteria - Effects of the JLTP4 and proposed alternatives will be described in terms of their:

Nature: whether they are anticipated to be:

- Positive (+)
- Neutral (N)
- Negative (x) or
- Uncertain (?)

++ Major Positive	The option would be significantly beneficial to the SEA objective by resolving an existing environmental issue and/or maximising opportunities for environmental enhancement.
+ Minor Positive	The option would be partially beneficial to the SEA objective by contributing to resolving an existing environmental issue and/or offering opportunity for some environmental enhancement. This effect would not be considered to be of significance.
N Neutral	The option would have a neutral effect on the SEA objective.
? Uncertain	There is insufficient detail available on the option or the baseline situation in order to assess how significantly the SEA objective would be affected by the option.
x Minor Negative	The option would partly undermine the SEA objective by contributing to an environmental problem and/or partially undermine opportunities for environmental enhancement. This effect would not be considered to be of significance.
xx Major Negative	The option would severely undermine the SEA objective by contributing to an environmental problem and/or undermining opportunities for environmental enhancement. This would be considered to be a significant effect.

Duration: the duration of potential effects are presented in terms of the timescale over which they are anticipated:

- Short term effects: effects expected in the next 1-5 years;
- Medium term effects: effects expected in the next 6-15 years; and
- Long term effects: effects expected in the next 16+years.

Permanence and Reversibility:

- A permanent effect is one which results from a physical change that is anticipated to last beyond the life of the Joint Local Transport Plan.
- A temporary effect is one which results from an operational change which could change if there is a change of policy, or a short term condition such as a construction phase related impact.
- A reversible effect is an environmental effect that can be reversed, for example an incident of water pollution can be cleaned up over time.
- An irreversible effect is an environmental effect that cannot be reversed such as the loss of a historic feature or the loss of agricultural soil due to permanent development.

Spatial Scale:

- Local: effect is restricted to the immediate location of the proposal or to a specific site or settlement within the sub-region (West of England)
- Regional: effect is anticipated to cover a significant proportion or all of the South West.
- National: effect covers the whole of England and/or the UK (also includes international).

SEA Objective 9. To protect, and where possible improve, water quality.

SEA Topic: Water

Criteria to Consider: Would the JLTP4 (in combination with other plans):

- Promote infrastructure and systems that may adversely affect water quality?
- Promote infrastructure and systems that may provide opportunities to improve water quality?

Description of the value and vulnerability of the area likely to be affected:

The South West has the most ambitious improvement targets in the country, which is to get 43% of the 1,100 waterbodies into good ecological status by 2015 (Environment Agency, 2012). In addition to this, the Severn River Basin District RBMP (River Basin Management Plan) was prepared in compliance with the Water Environment (Water Framework Directive) (England and Wales) Regulations. The indicators for Bristol City reflect general water quality which can deteriorate significantly after rainfall and may be inferior in some places where there are problems with drainage or historical landfill. Bristol's classification tool is a locally derived quality assessment based on the Water Framework Directive's (WFD's) classification system. Local water framework directive classifications derived using council data at sample sites within Bristol show 100% of water courses in the city to be of moderate quality and only 24% of the Bristol Avon catchment is classified as having 'good ecological status'. The River Avon enters the district at Dundas Aqueduct to the east of Bath and leaves west of Keynsham. B&NES has a large number of water courses and tributaries, including the Bybrook, the Frome, the Mells, the Somer, The Chew, The Boyd, the Newton and the Sistor. Further, the City of Bath is located directly above three natural hot springs which have been, and continue to be, at the centre of economic, social and cultural developments in the City.

The quality of water in rivers, streams, rhynes and ditches can be affected by the construction of transport infrastructure as well as the use of transport. Pollution of watercourses can occur through the organic content of silt, other organic substances such as engine oil and rubber, de-icing salt, metals (mainly as a result of vehicle corrosion), and fertilisers and pesticides from roadside verge maintenance. In addition, there is the risk of occasional spillages of pollutants in the event of an accident. Pollutants can particularly accumulate during long dry spells and lead to highly polluting surface water run-off when it rains.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
B1. Enhance competitiveness of major gateways and improve connectivity to international markets. <ul style="list-style-type: none">• Support Bristol Airport as the main gateway for air travel in the South West.• Support the role of Bristol Port.	<p>Within Bristol International Airport Master Plan 2006-2030, the Environmental Appraisal considered the hydrogeology and surface water features of the airport site and assessed the potential effect on water resources and quality as a result of the Airports proposed development. It concluded that it should be possible to avoid contamination of ground water through appropriate design and management of drainage and pollution prevention measures. The new development would also include Sustainable Drainage Systems (SuDS) and the opportunity for increased water efficiency.</p> <p>Bristol's Port is located in a particularly sensitive environmentally tidal area.</p> <p>Although it is expected that all new development will follow best design guidance and will comply with relevant environmental legislation, the potential effects on this objective at this SEA level have been assessed as being uncertain</p>	?	?	?	N	T/R	<p>Low/ Medium certainty -</p> <p>There is certain level of uncertainty about what options / schemes will be implemented and to what extent.</p> <p>The potential effects are location and scheme design dependent.</p>	<p>Ensure a strategic approach to protecting water resources through the work of The West of England Nature Partnership (WENP) and the West of England (WoE) Green Infrastructure (GI) Plan. The GI Plan, which includes both green and "blue" spaces, will identify the strategic measures and mechanisms to support, guide and implement the delivery of environmental commitments set within the JSP and Local Plans, including mitigation for protected sites. Further development of GI Plans at an authority level should also reflect schemes within this JLTP.</p> <p>Any new infrastructure proposed as part of the JLTP4 will be required to include best practice mitigation to ensure that pollution from transport and rainwater run off rates from the infrastructure are carefully managed to avoid pollution and increased risk of flooding. Specific schemes will be subject to the relevant consenting schemes and relevant environmental legislation.</p> <p>Detailed design should follow best practice guidance such as that provided within CIRIA Report C753 <i>The SuDS Manual</i>. The</p>	<p>The judgement was based on the assumption that the JLTP4 interventions relating to supporting Bristol Airport and Bristol Port would be implemented and that further developments in Bristol Airport and Port will be delivered in line with the relevant <i>National Policy Statements</i>, planning consents and environmental legislation.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
	although recognising the potential for water quality improvements.							guidance covers the planning, design, construction and maintenance of Sustainable Drainage Systems (SuDS) to assist with their effective implementation within both new and existing developments. It looks at how to maximise amenity and biodiversity benefits, and deliver the key objectives of managing flood risk and water quality. It is recommended that major schemes have a Construction Environmental Management Plan (CEMP) to minimise adverse effects during construction.	
B2. Improve strategic resilience of the network for all trips. <ul style="list-style-type: none"> Maximise opportunities arising from improvements to the strategic road and rail network, and identify and support delivery of further changes. <ul style="list-style-type: none"> Strategic Road Network (SRN) Strategic Rail Identify opportunities to manage the impact of Severn Bridge tolls removal. Support the role of coaches for residents and visitors. Manage and mitigate the impact of regular and infrequent events on the transport network. 	<p>Improvements on the strategic road and rail network identified in the JLTP 4 include: East of Bath Link; new and upgraded junctions on the M4 (new Junction 18a) and M5 (Junctions 14/19/new 21a); new sections of Smart Motorway; Park & Ride on the M32; redevelopment of Bristol Temple Meads into a regional interchange.</p> <p>Improvements on the strategic road network have the potential to have negative impacts on the water environment, during construction and operation. This will be scheme specific, however. A potential impact is that areas of hard surfacing can lead to increased surface water runoff, into local watercourse. Road infrastructure also has the potential to affect existing drainage patterns of water.</p> <p>Improvements on existing infrastructure, however, provide opportunities to improve existing drainage which may result in improvements in water quality.</p> <p>Although it is expected that all new development will follow best design guidance and will comply with relevant environmental legislation, the potential effects on this objective at this SEA level have been assessed as being uncertain although recognising the potential for water quality improvements.</p>	?	+	+	N	T/R	<p>Low/ Medium certainty –</p> <p>There is some uncertainty with regards to programme and funding of some of the schemes.</p> <p>The potential effects are location and scheme design dependent.</p>	<p>Ensure a strategic approach to protecting water resources through the work of The West of England Nature Partnership (WENP) and the West of England (WoE) Green Infrastructure (GI) Plan. Further development of GI Plans at an authority level should also reflect schemes within this JLTP.</p> <p>Specific schemes will be subject to the relevant consenting schemes and relevant environmental legislation. Any new infrastructure proposed as part of the JLTP4 will be required to include best practice mitigation to ensure that pollution from transport and rainwater run off rates from the infrastructure are carefully managed to avoid pollution and increased risk of flooding.</p> <p>Detailed design should follow best practice guidance such as that provided within CIRIA Report C753 <i>The SuDS Manual</i>. The guidance covers the planning, design, construction and maintenance of Sustainable Drainage Systems (SuDS) to assist with their effective implementation within both new and existing developments. It looks at how to maximise amenity and biodiversity benefits, and deliver the key objectives of managing flood risk and water quality.</p> <p>It is recommended that major schemes have a Construction Environmental Management Plan (CEMP) to minimise adverse effects during construction.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that development consent for nationally significant infrastructure projects on the road and rail networks and strategic rail freight interchanges will be delivered in line with the provisions of the <i>National Networks National Policy Statement</i>.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
W1. Provide more public transport options and improve service quality. <ul style="list-style-type: none"> Provide high quality and reliable mass and bus rapid transit. Support and enhance existing public transport services. <ul style="list-style-type: none"> Bus Strategy Rail Improve the availability and accessibility of accurate travel information and ticketing. 	<p>Potential adverse effects on water quality may take place during the construction and operation phases of some of the interventions under this policy. These adverse effects may in turn result in indirect effects on protected habitats depending on the location.</p> <p>Increase of hardstanding areas associated with some of the interventions under this policy would increase run-off rates, potentially into watercourses.</p> <p>Improvements on existing infrastructure, however, provide opportunities to improve existing drainage which may result in improvements in water quality.</p> <p>Although it is expected that all new development will follow best design guidance and will comply with relevant environmental legislation, the potential effects on this objective at this SEA level have been assessed as being uncertain although recognising the potential for water quality improvements.</p>	?	+	+	R	T/R	<p>Low/ Medium certainty –</p> <p>There is some uncertainty with regards to programme and funding of some of the proposed schemes.</p> <p>The potential effects are location and scheme design dependent.</p>	<p>Ensure a strategic approach to protecting water resources through the work of The West of England Nature Partnership (WENP) and the West of England (WoE) Green Infrastructure (GI) Plan. Further development of GI Plans at an authority level should also reflect schemes within this JLTP.</p> <p>Specific schemes will be subject to the relevant consenting schemes and relevant environmental legislation. Any new infrastructure proposed as part of the JLTP4 will be required to include best practice mitigation to ensure that pollution from transport and rainwater run off rates from the infrastructure are carefully managed to avoid pollution and increased risk of flooding.</p> <p>Detailed design should follow best practice guidance such as that provided within CIRIA Report C753 <i>The SuDS Manual</i>. The guidance covers the planning, design, construction and maintenance of Sustainable Drainage Systems (SuDS) to assist with their effective implementation within both new and existing developments. It looks at how to maximise amenity and biodiversity benefits, and deliver the key objectives of managing flood risk and water quality.</p> <p>It is recommended that major schemes have a Construction Environmental Management Plan (CEMP) to minimise adverse effects during construction.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that schemes under this policy would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>
W2. Provide for journeys where public transport is not an option. <ul style="list-style-type: none"> Provide P&R and sharing schemes to minimise the impact of single occupancy vehicles. Recognise the needs of motorcycles and mopeds. 	<p>The delivery of new or expanded P&Rs may result in decreased water quality in certain locations. Investment in public transport improvements would, however, provide opportunities to address drainage issues. Similarly, improvements on existing infrastructure, however, provide opportunities to improve existing drainage which may result in improvements in water quality.</p> <p>Potential effects are assessed as being neutral in the short term and uncertain in the medium and long term.</p>	N	?	?	R	T/R	<p>Medium certainty –</p> <p>There is some uncertainty with regards to programme and funding of some of the proposed schemes. There is uncertainty regarding where a new P&R would be located in the region.</p>	<p>Specific schemes will be subject to the relevant consenting schemes and relevant environmental legislation.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that schemes under this policy would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
W3. Use, as appropriate, technological advances and charging measures to optimize and better manage demand. <ul style="list-style-type: none"> Use technology to keep traffic moving. Embrace technology to improve cleaner travel option. Use, as appropriate, charging measures to influence and manage the demand of private car use. 	<p>The use of technology to keep traffic moving and to improve cleaner travel option, together with charging measures aimed to influence and manage the demand of private car use, would have a neutral effect on this SEA objective in the short and medium term.</p> <p>Potential long-term effects would depend on the on the type and implementation extent of future technological advances.</p>	N	N	?	R	T/R	<p>Medium / Low certainty –</p> <p>Advanced technologies are currently in early development stages. Timescales and extent of implementation are unknown.</p>		The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
W4. Improve resilience of the network, providing increased reliability <ul style="list-style-type: none"> Define, manage and maintain the Key Route Network (KRN). Effectively manage the Major Road Network (MRN). Effectively accommodate development sites and associated trips. 	<p>Overall, it is considered that interventions under this policy would have a neutral impact on this SEA objective.</p>	N	N	N	R	T/R	<p>Medium / Low certainty –</p> <p>The KRN and its associated Joint Transport Asset Management Plan, and Major Road Network proposed by DfT are at inception stages. Timescales and details of implementation are unknown.</p> <p>There will be additional budgeting and funding requirements which may limit the implementation of some of the measures.</p>	<p>Specific schemes will be subject to the relevant consenting schemes and relevant environmental legislation.</p> <p>It is assumed that all maintenance activities will be carried following best practice with regards to protection of water quality.</p> <p>Where relevant, opportunities for enhancing local water quality should be considered.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that schemes under this policy would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>
W5. Enable business clustering and the efficient movement of freight. <ul style="list-style-type: none"> Support the delivery of Enterprise Zones (EZs) / Business clustering. Balance the requirement for distributing goods, with mitigating the adverse impact of vehicles. <ul style="list-style-type: none"> Routing, management and information Rail and water Loading and parking Consolidation Embracing innovation Planning conditions 	<p>Interventions aimed at enabling business clustering and the efficient movement of freight may result in decreased water quality in certain locations. Improvements on existing infrastructure, however, provide opportunities to improve existing drainage which may result in improvements in water quality.</p> <p>Although it is expected that all new development will follow best design guidance and will comply with relevant environmental legislation, the potential effects on this objective at this SEA level have been assessed as being uncertain</p> <p>Potential effects are assessed as being neutral in the short term and uncertain in the medium and long term.</p>	N	?	?	R	T/R	<p>Medium certainty-</p> <p>There is some uncertainty with regards to programme and funding of some of the proposed interventions.</p> <p>The potential effects are location and scheme design dependent.</p>	<p>Specific schemes will be subject to the relevant consenting schemes and relevant environmental legislation.</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L1. Enable walking and cycling, 'active modes of travel', to be the natural choice for shorter journeys. <ul style="list-style-type: none"> Provide an attractive, safe 	<p>Overall, interventions aimed at enabling walking and cycling, 'active modes of travel', to be the natural choice for shorter journeys would have a neutral effect on this SEA objective. Although</p>	N	N	N	L	T/R	<p>Medium certainty –</p> <p>There is a commitment from the West of England to encourage walking and cycling.</p> <p>Several projects/ programmes/ schemes</p>		The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
and usable network. <ul style="list-style-type: none"> Provide schemes to support the uptake of cycling. 	the provision of new foot and cycle paths may increase areas of hardstanding, the scale and type of the infrastructure required is not deemed to result in adverse effects of sufficient significance at this SEA level.						are in place to encourage people to cycle, moving towards sustainable transport with more to be delivered through the development and implementation of the Local Cycling and Walking Infrastructure Plans. These proposed interventions do not involve significant infrastructural development and are therefore unlikely to result in significant impacts in terms of water quality.		
L2. Reduce the number and severity of casualties for all road users. <ul style="list-style-type: none"> Consider the needs of all road users in the design of transport and highway schemes, particularly vulnerable road users. Deliver road safety education and skills training to equip people with the knowledge and skills to travel in a safe and sustainable way. Work in partnership to build safer communities. 	Interventions aimed at reducing the number and severity of casualties for all road users would have a neutral effect on this SEA objective.	N	N	N	L	T/R	Medium / Low certainty – These proposed interventions do not involve significant infrastructural development and are therefore unlikely to result in significant impacts in terms water quality. There is some uncertainty with regards to planned actions, programme and funding associated to these interventions.		The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L3. Encourage residents and employees to make more substantial and healthier travel options. <ul style="list-style-type: none"> Support travel planning with developers, education providers and individuals. Support travel planning with businesses and employment sites. Encourage mode shift through grants, incentives and rewards. Maximise awareness of sustainable and active travel choices and the benefits these bring. 	Overall, interventions aimed at encouraging residents and employees to make more sustainable and healthier travel options would have a neutral effect on this SEA objective.	N	N	N	L	T/R	Medium / Low certainty – These proposed interventions do not involve significant infrastructural development and are therefore unlikely to result in significant impacts in terms of water quality. There is some uncertainty with regards to planned actions, programme and funding associated to these interventions.		The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L4. Support opportunities for all sectors of the population to access services they require, wherever they live. <ul style="list-style-type: none"> Support those without a private car, who need to travel, in 	Interventions aimed at supporting opportunities for all sectors of the population to access services they require, wherever they live would have a neutral effect on this SEA objective.	N	N	N	L	T/R	Medium / Low certainty – These proposed interventions do not involve significant infrastructural development and are therefore unlikely to result in significant impacts in terms of		The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
<p>accessing the services they require.</p> <ul style="list-style-type: none"> Promote the role of technology in accessing services and employment. Support the role of taxis and private hire vehicles. Support the role of demand responsive and community transport. 							<p>water quality.</p> <p>There is some uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>		
<p>L5. Support the identification and implementation of measures that will improve air quality.</p> <ul style="list-style-type: none"> Support ongoing work to manage the impact of transport on air quality and climate change. Support ongoing work on Clean Air Zones. Support work on Zero and Low Emission Vehicles. 	<p>Interventions aimed at supporting the identification and implementation of measures that will improve air quality would, overall, have a neutral effect on this SEA objective.</p> <p>There may be the potential for positive impacts on water quality, due to improved air quality. However, this would not be a significant improvement. More importantly, water quality has the potential to improve due to legal requirements related to recent European legislation. For example, due to the introduction of the Water Framework Directive and its stringent requirements, water quality may be expected to improve.</p>	N	N	N	L	T/R	<p>Medium / Low certainty –</p> <p>Uncertainty over long term funding and timescales of some of the interventions.</p>		The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
<p>N1. Use master planning and local design to create better places.</p> <ul style="list-style-type: none"> Improve the quality of streets and public realm. Integrate walking, cycling and public transport into new developments. Provide clear wayfinding and signage. Support and maintain Public Rights of Way. 	<p>Increase of hardstanding areas associated with some of the interventions under this policy would increase run-off rates (of pollution) into watercourses.</p>	N	?	?	L	T/R	<p>Medium / low certainty –</p> <p>Some initiatives are already in place and the West of England is committed to continue using master planning and local design to create better places.</p> <p>There is uncertainty with regards to planned actions, programme and funding associated with some of these interventions.</p>	<p>Specific schemes will be subject to the relevant consenting schemes and relevant environmental legislation. New schemes will have to be designed to take into account flood risk and the effects of climate change in line with national policy.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p>
<p>N2. Facilitate the use of active modes for all short trips, including the first and last mile of longer journeys.</p> <ul style="list-style-type: none"> Work with residents and communities to identify barriers to accessibility. Support the provision of safe crossings and speed reduction in appropriate locations. Improve actual and perceived 	<p>Interventions aimed at facilitating the use of active modes for all short trips, including the first and last mile of longer journeys would overall, have a neutral effect on this SEA objective.</p>	N	N	N	L	T/R	<p>Medium / Low certainty –</p> <p>These proposed interventions do not involve significant infrastructural development and are therefore unlikely to result in significant impacts in terms of water quality.</p> <p>There is some uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>		The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

[illegible]

WEST OF ENGLAND JOINT LOCAL TRANSPORT PLAN 4 (JLTP 4) – DRAFT STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) MATRICES – SEA OBJECTIVE 10

JLTP4’s Policies and Interventions assessed

Connectivity beyond the West of England -

Beyond West of England policies and interventions:

- B1. Enhance competitiveness of major gateways and improve connectivity to international markets
- B2. Improve strategic resilience of the network for all trips

Connectivity within the West of England -

Within West of England policies and interventions:

- W1. Provide more public transport options and improve service quality
- W2. Provide for journeys where public transport is not an option
- W3. Use, as appropriate, technological advances and charging measures to optimise and better manage demand
- W4. Improve resilience of the network, providing increased reliability
- W5. Enable business clustering and the efficient movement of freight

Local connectivity -

Local policies and interventions:

- L1. Enable walking and cycling, ‘active modes of travel’, to be the natural choice for shorter journeys
- L2. Reduce the number and severity of casualties for all road users
- L3. Encourage residents and employees to make more sustainable and healthier travel choices
- L4. Support opportunities for all sectors of the population to access the services they require, wherever they live
- L5. Support the identification and implementation of measures that will improve air quality

Neighbourhood connectivity -

Neighbourhood policies and interventions:

- N1. Use master planning and local design to create better places
- N2. Facilitate the use of active modes for all short trips, including the first and last mile of longer journeys

SEA Assessment Criteria - Effects of the JLTP4 and proposed alternatives will be described in terms of their:

Nature: whether they are anticipated to be:

- Positive (+)
- Neutral (N)
- Negative (x) or
- Uncertain (?)

++ Major Positive	The option would be significantly beneficial to the SEA objective by resolving an existing environmental issue and/or maximising opportunities for environmental enhancement.
+ Minor Positive	The option would be partially beneficial to the SEA objective by contributing to resolving an existing environmental issue and/or offering opportunity for some environmental enhancement. This effect would not be considered to be of significance.
N Neutral	The option would have a neutral effect on the SEA objective.
? Uncertain	There is insufficient detail available on the option or the baseline situation in order to assess how significantly the SEA objective would be affected by the option.
x Minor Negative	The option would partly undermine the SEA objective by contributing to an environmental problem and/or partially undermine opportunities for environmental enhancement. This effect would not be considered to be of significance.
xx Major Negative	The option would severely undermine the SEA objective by contributing to an environmental problem and/or undermining opportunities for environmental enhancement. This would be considered to be a significant effect.

Duration: the duration of potential effects are presented in terms of the timescale over which they are anticipated:

- Short term effects: effects expected in the next 1-5 years;
- Medium term effects: effects expected in the next 6-15 years; and
- Long term effects: effects expected in the next 16+years.

Permanence and Reversibility:

- A permanent effect is one which results from a physical change that is anticipated to last beyond the life of the Joint Local Transport Plan.
- A temporary effect is one which results from an operational change which could change if there is a change of policy, or a short term condition such as a construction phase related impact.
- A reversible effect is an environmental effect that can be reversed, for example an incident of water pollution can be cleaned up over time.
- An irreversible effect is an environmental effect that cannot be reversed such as the loss of a historic feature or the loss of agricultural soil due to permanent development.

Spatial Scale:

- Local: effect is restricted to the immediate location of the proposal or to a specific site or settlement within the sub-region (West of England)
- Regional: effect is anticipated to cover a significant proportion or all of the South West.
- National: effect covers the whole of England and/or the UK (also includes international).

<p>SEA Objective 10. Minimise waste produced and resources consumed by transport and operation of transport services</p> <p>SEA Topic: Materials assets, climatic factors</p> <p>Criteria to Consider:</p> <ul style="list-style-type: none"> Does the JLTP make prudent use of natural resources? Would the JLTP in combination with other plans result in significant demolition of existing assets?
<p>Description of the value and vulnerability of the area likely to be affected:</p> <p>The construction industry is a major source of waste in England. Of English local authority expenditure on construction and renovation, 22% was spent on transport. Dominant transport modes depend upon fossil fuels which are a finite resource.</p> <p>The Adopted Joint Waste Core Strategy (2011), outlines the ambition that by 2026, the West of England will be resource efficient with waste generation minimised, in line with the waste hierarchy, and operating a waste management infrastructure, with sufficient capacity to deal with the amount of waste generated in the West of England. The Ecological Footprint, as reported in the South West Observatory's "State of the South West" shows that if everyone on the planet consumed natural resources and energy like the average South West resident, it would take three planets to support us. This clearly shows that we are living beyond environmental limits. The South West eco-footprint is 5.24 global hectares (gha), well-above the world average of 2.2 gha and our 'fair share' of 1.8 gha. Travel is listed as being responsible for 17% of our ecofootprint which is currently above the national average. The evidence that the ecological footprint due to travel in the South West is greater than the national average is a key area of concern.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
<p>B1. Enhance competitiveness of major gateways and improve connectivity to international markets.</p> <ul style="list-style-type: none"> Support Bristol Airport as the main gateway for air travel in the South West. Support the role of Bristol Port. 	<p>Through the increase in public transport modes, there is the opportunity to use more energy efficient vehicles, reducing the consumption of finite resources.</p> <p>Several highways developments are being proposed to reduce congestion and provide better access to Bristol Port. The construction of these schemes will involve the use of construction materials and will result in the production of waste. Work is being done with Bristol Cruise Terminal to explore emerging technologies such as electric vehicles, which would reduce the use of petrol cars.</p> <p>The potential for increased use of public transport and electric car would help reduce the use of finite fossil fuels. However, this potential long term benefit would be offset by an increased use of resources and waste generation required in the short and medium term.</p>	X	X	?	N	T/R	<p>Medium/ Low certainty-</p> <p>There is certain level of uncertainty about what options / schemes will be implemented and to what extent.</p> <p>Long term effects would depend on future transport policies beyond the life of the JLTP 4.</p>	<p>Seek to make best use of existing infrastructure to minimise resource consumption and waste generation should be pursued before constructing new facilities.</p> <p>Ensure scheme design incorporates measures to minimise future maintenance requirements.</p> <p>For construction projects, a Site Waste Management Plan (SWMP) should be implemented. New development can be designed to increase the potential for recycling waste.</p> <p>New transport modes should use sustainable fuels (electric). There should also be modal shift to public transport from car use.</p>	<p>The judgement was based on the assumption that Bristol Airport will continue working towards their aim to deliver a low carbon, accessible, integrated, efficient and reliable transport network for travel to and from Bristol Airport for staff and passengers.</p> <p>It is also assumed that the JLTP4 interventions relating to supporting Bristol Airport and Bristol Port would be implemented and that further developments in Bristol Airport and Port will be delivered in line with the relevant <i>National Policy Statements</i>.</p>
<p>B2. Improve strategic resilience of the network for all trips.</p> <ul style="list-style-type: none"> Maximise opportunities arising from improvements to the strategic road and rail network, and identify and support delivery of further changes. 	<p>Highways England are committed to the new M49 Avonmouth junction, for example, with works due to commence in 2019.</p> <p>Other interventions under this policy include: the East of Bath Link; new and upgraded junctions on the M4</p>	X	X	?	N	T/R	<p>Medium / low certainty-</p> <p>There is a level of uncertainty regarding funding/ investment to improve the SRN across the region.</p>	<p>Seek to make best use of existing infrastructure to minimise resource consumption and waste generation should be pursued before constructing new facilities.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that development consent for nationally significant infrastructure projects on the road and rail networks and strategic rail</p>

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<ul style="list-style-type: none"> Strategic Road Network (SRN) Strategic Rail Identify opportunities to manage the impact of Severn Bridge tolls removal. Support the role of coaches for residents and visitors. Manage and mitigate the impact of regular and infrequent events on the transport network. 	<p>(new Junction 18a) and M5 (Junctions 14/19/new 21a); new sections of Smart Motorway; Park & Ride on the M32; redevelopment of Bristol Temple Meads into a regional interchange which will promote sustainable transport choices for trips to and from the station and surrounding area.</p> <p>All these potential upgrades to the Strategic road and rail network will require considerable construction activity which will in turn result in adverse effects in terms of resource consumption and waste production.</p>						<p>Similar funding uncertainty applies to the strategic rail network.</p> <p>Long term effects would depend on future transport policies beyond the life of the JLTP 4.</p>	<p>Ensure scheme design incorporates measures to minimise future maintenance requirements.</p> <p>For construction projects, a SWMP should be implemented.</p> <p>New transport modes should use sustainable fuels (electric). There should also be modal shift to public transport from car use.</p>	freight interchanges will be delivered in line with the provisions of the <i>National Networks National Policy Statement</i> .
<p>W1. Provide more public transport options and improve service quality.</p> <ul style="list-style-type: none"> Provide high quality and reliable mass and bus rapid transit. Support and enhance existing public transport services. <ul style="list-style-type: none"> Bus Strategy Rail Improve the availability and accessibility of accurate travel information and ticketing. 	<p>There is an ambition for mass and bus transit, where there is a greatest potential for high passenger flows.</p> <p>JLTP 4 includes for progressing the work on mass transit options leading to delivery of services along four corridors linking Bristol Airport, the north and east fringes, A4 Bath corridor and Bristol City Centre.</p> <p>The 2017 Joint Transport Study (JTS) recommended substantial extensions to the MetroBus network, to be delivered up to 2036, which is supported by the JLTP4. This has a strong link with the proposed Strategic Development Locations in the Joint Spatial Plan (JSP).</p> <p>Interventions associated with the mass transit schemes and with improvements to existing public transport services involving major construction activities would result in adverse effects in terms of resource consumption and waste generation in the short and medium term.</p>	X	X	?	R	T/R	<p>Medium certainty-</p> <p>There is a very strong commitment from the West of England to deliver high quality and reliable mass transit network across the Greater Bristol and Bath urban areas (complete and expand MetroBus and deliver MetroWest).</p> <p>Additionally, rail based mass transit will be considered to accommodate future demand and to maximise mode shift from car-based trips. A feasibility study is underway to explore all options for the greater Bristol area, both above and below ground, to deliver a mass transit network.</p> <p>There is however a degree of uncertainty with regards to funding.</p> <p>Long term effects would depend on future transport policies beyond the life of the JLTP 4.</p>	<p>Specific schemes will be subject to the relevant consenting processes and relevant environmental legislation. New schemes should incorporate detailed mitigation and enhancements aiming to use resources sustainably. This can include implementing Site Waste Management Plans.</p> <p>Ensure scheme design incorporates measures to minimise future maintenance requirements.</p> <p>Seek to make best use of existing infrastructure to minimise resource consumption and waste generation should be pursued before constructing new facilities.</p> <p>New transport modes should use sustainable fuels (electric). There should also be modal shift to public transport from car use.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that development consent for nationally significant infrastructure projects on the road and rail networks and strategic rail freight interchanges will be delivered in line with the provisions of the <i>National Networks National Policy Statement</i></p>
<p>W2. Provide for journeys where public transport is not an option.</p> <ul style="list-style-type: none"> Provide P&R and sharing schemes to minimise the impact of single occupancy vehicles. Recognise the needs of motorcycles and mopeds. 	<p>The delivery of Park & Ride sites (e.g M32 Park & Ride Site plus other potential sites and locations as identified in the JLTP4) may result in direct adverse effects in terms of resource use and waste generation.</p>	X	X	?	R	P/I	<p>Medium certainty-</p> <p>Infrastructure improvements identified in the JLTP are likely to result in resource use. Increased use of public transport is likely to result in reduced reliance on private car use.</p>	<p>Seek to make best use of existing infrastructure to minimise resource consumption and waste generation should be pursued before constructing new facilities.</p> <p>Ensure scheme design incorporates measures to minimise future maintenance requirements.</p> <p>New schemes should incorporate detailed mitigation and enhancements aiming to use</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
								resources sustainably. This can include implementing SWMPs.	
W3. Use, as appropriate, technological advances and charging measures to optimise and better manage demand. <ul style="list-style-type: none"> Use technology to keep traffic moving. Embrace technology to improve cleaner travel option. Use, as appropriate, charging measures to influence and manage the demand of private car use. 	<p>Use of technology to keep traffic moving and to improve cleaner travel option, together with charging measures aimed to influence and manage the demand of private car use, would have a neutral effect on this SEA objective in the short-term.</p> <p>Potential effects in the medium and long term have been assessed as uncertain.</p>	N	?	?	R	T/R	Low certainty – Advanced technologies are currently in early development stages. Timescales and extent of implementation are unknown.	New schemes should incorporate detailed mitigation and enhancements aiming to use resources sustainably.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
W4. Improve resilience of the network, providing increased reliability <ul style="list-style-type: none"> Define, manage and maintain the Key Route Network (KRN). Effectively manage the Major Road Network (MRN). Effectively accommodate development sites and associated trips. 	<p>A significant proportion of budget spend on transport improvements is allocated to managing and maintain transport assets. This includes maintaining carriageways, footways, cycle paths, fences and barriers, verges, lighting, traffic signals ect. This requires the consumption of raw materials and resources and results in the generation of waste.</p> <p>It is assumed that mitigation/enhancement measure included as part of scheme design and implementation of the specific schemes may offset some of the adverse effects.</p> <p>Similarly, it is considered that by engaging with developers at an early stage in the planning process, design can be tailored to adhere to the waste hierarchy model and make sustainable use of resources.</p> <p>Overall, it is considered that increasing the resilience of the network will have a positive impact on consumption of new material resources to provide alternative infrastructure and reduce waste generation in the medium term. Long term effects have been assessed as being uncertain.</p>	N	+	?	R	P/I	<p>Medium / Low certainty-</p> <p>The KRN and its associated Joint Transport Asset Management Plan, and Major Road Network proposed by DfT are at inception stages. Timescales and details of implementation are unknown.</p> <p>There will be additional MRN capital infrastructure and this will have an impact upon maintenance budgets and requirements.</p>	<p>Seek to make best use of existing infrastructure to minimise resource consumption and waste generation should be pursued before constructing new facilities.</p> <p>New schemes and developments should incorporate detailed mitigation and enhancements aiming to use resources sustainably. This can include implementing Site Waste Management Plans.</p> <p>Ensure scheme design incorporates measures to minimise future maintenance requirements.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>Additionally, it was based on the assumption that schemes under these interventions would be delivered through the appropriate consenting processes.</p>
W5. Enable business clustering and the efficient movement of freight. <ul style="list-style-type: none"> Support the delivery of Enterprise Zones / Business clustering. Balance the requirement for 	<p>Reducing the travel distances between business will result in a lower demand for trips on the transport network for both freight and delivery journeys; reducing the pressure on fuel resources. Additionally, it can also boost higher public transport services</p>	+	+	?	R	T/R	<p>Medium certainty-</p> <p>There is some uncertainty with regards to planned actions, programme (medium and long-term impacts) and funding associated with these interventions. Interventions will need to be implemented over a number of</p>	<p>New freight vehicles should use sustainable fuels (electric). There should also be modal shift to public transport from car use to further reduce demand for fuel.</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
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distributing goods, with mitigating the adverse impact of vehicles. <ul style="list-style-type: none"> • Routing, management and information • Rail and water • Loading and parking • Consolidation • Embracing innovation • Planning conditions 	and encourage people to walk and cycle, having similar impacts on reducing the need for private car use. <p>There is potential to improve the efficient of road freight movements by consolidating, enabling fewer and cleaner vehicles to make the most appropriate routes.</p> <p>Business clustering also has the potential to concentrate infrastructure delivery to maximise the benefits for freight, and overall reduce use of raw materials building at a number of different sites.</p> <p>Overall, interventions under this policy are likely to have a positive impact on ensuring the prudent use of natural resources, mainly car fuel.</p>						years. Additionally, advanced technologies are currently in early development stages. Timescales and extent of implementation are unknown.		
L1. Enable walking and cycling, 'active modes of travel', to be the natural choice for shorter journeys. <ul style="list-style-type: none"> • Provide an attractive, safe and usable network. • Provide schemes to support the uptake of cycling. 	<p>In order to encourage more people to switch to more sustainable transport modes, the Local Cycling and Walking Infrastructure Plans (LCWIP) outlines a number of infrastructure improvements. Any infrastructure improvements (including maintenance e.g. potholes) may require the use of materials, and produce associated construction waste.</p> <p>Encouraging more people to walk and cycle, may reduce the number of cars on the road, which could reduce demand for finite fuels. Electric bikes will also encourage more people to cycle.</p> <p>Overall, if implemented, interventions would have a neutral impact on this SEA objective.</p>	N	N	?	L	T/R	Medium certainty- <p>There is a commitment from the West of England to encourage walking and cycling. Several projects/ programmes/ schemes in place to encourage people to cycle, moving towards sustainable transport with more to be delivered through the development and implementation of the Local Cycling and Walking Infrastructure Plans.</p>	<p>Ensure new cycleways and footway scheme design incorporates measures to minimise future maintenance requirements.</p> <p>Seek to make best use of existing infrastructure to minimised resource consumption and waste generation should be pursued before constructing new facilities.</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L2. Reduce the number and severity of casualties for all road users. <ul style="list-style-type: none"> • Consider the needs of all road users in the design of transport and highway schemes, particularly vulnerable road users. • Deliver road safety education and skills training to equip 	<p>The West of England's involvement of scheme design ensures there is an opportunity to minimise waste generation and use sustainable materials. However, there will be a neutral impact on the SEA objective.</p>	N	?	?	L	T/R	Low certainty - <p>There is some uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>	<p>New schemes and developments should incorporate detailed mitigation and enhancements aiming to use resources sustainably. This can include implementing Site Waste Management Plans.</p> <p>Ensure scheme design incorporates measures to minimise future maintenance requirements.</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
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<p>people with the knowledge and skills to travel in a safe and sustainable way.</p> <ul style="list-style-type: none"> Work in partnership to build safer communities. 									
<p>L3. Encourage residents and employees to make more sustainable and healthier travel options.</p> <ul style="list-style-type: none"> Support travel planning with developers, education providers and individuals. Support travel planning with businesses and employment sites. Encourage mode shift through grants, incentives and rewards. Maximise awareness of sustainable and active travel choices and the benefits these bring. 	<p>New developments require the provisions of infrastructure to support cycling and walking e.g bike park stations. These facilities will require construction materials, as well as generate waste. New developments are to be located in locations where public transport is a priority, therefore reducing the need for car travel.</p> <p>By supporting and promoting flexible working, people can have the option to work from home, reducing fuel consumption and general car use. Engagement with local businesses to have a travel plan can increase car sharing between employees.</p> <p>Interventions under this policy may have a beneficial impact on this SEA objective as the reduction in car use and encouraging more sustainable modes of transport will encourage more prudent use of natural resources, potentially reducing the need for road building.</p>	+	?	?	L	T/R	<p>Medium certainty -</p> <p>Uncertainty over the long term, as grants, incentives and rewards have the potential to be temporary. Some uncertainty over funding associated with these interventions.</p>	<p>To be successful, there needs to be a modal shift to sustainable modes of transport, to reduce car use. Public transport can be electric, to reduce reliance on fuel. Ensure new developments</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p>
<p>L4. Support opportunities for all sectors of the population to access services they require, wherever they live.</p> <ul style="list-style-type: none"> Support those without a private car, who need to travel, in accessing the services they require. Promote the role of technology in accessing services and employment. Support the role of taxis and private hire vehicles. Support the role of demand responsive and community transport. 	<p>By increasing public bus services in rural areas, there could be a reduced need for car travel. Additionally, through working with broadband providers will encourage more people to work from home, further reducing the need for car travel and fuel consumption.</p> <p>Sharing taxi services can help take traffic off the roads and reduce congestion. The West of England support the introduction of shared taxi schemes that support the local bus service and provide an alternative to those who would drive.</p> <p>Interventions under this policy may have a positive impact on the SEA objective mainly through reducing the need for car travel. As there is no infrastructure improvements, there will be an overall</p>	N	N	?	L	T/R	<p>Medium/ low certainty-</p> <p>Uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>	<p>There needs to be a modal shift away from car use for this policy to be successful in reducing resources consumed in the long run.</p> <p>New taxis needs to ensure they are more efficient than other cars on the road. An increase in the number of taxis, but no decrease in car use will not result in a reduction of resources use.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
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	neutral impact.								
L5. Support the identification and implementation of measures that will improve air quality. <ul style="list-style-type: none"> Support ongoing work to manage the impact of transport on air quality and climate change. Support ongoing work on Clean Air Zones. Support work on Zero and Low Emission Vehicles. 	<p>Interventions to improve air quality include the uptake of electric vehicles, the introduction of Clean Air Zones and the delivery of Air Quality Action Plans.</p> <p>There has been significant investment in Ultra Low Emission Vehicles (ULEVs) which encourages the uptake of electric vehicles into South West England. This means there will be the need to install new charging points across the West of England, consuming resources. However, the shift to electric vehicles reduces the need for fuel consuming vehicles.</p> <p>This policy could have a positive impact on this SEA objective in the long run, if there is a shift away from petrol cars, yet this is highly uncertain.</p>	N	N	?			<p>Medium certainty -</p> <p>Considerable support and commitment to encouraging the use of electric vehicles e.g increasing the number of charging points, deliver more EV-capable car club bays and building 4 rapid charging hubs at high profile locations.</p>	<p>There needs to be a modal shift away from car use for this policy to be successful in reducing resources consumed in the long run.</p> <p>New charging point developments should incorporate detailed mitigation and enhancements aiming to use resources sustainably.</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
N1. Use master planning and local design to create better places. <ul style="list-style-type: none"> Improve the quality of streets and public realm. Integrate walking, cycling and public transport into new developments. Provide clear wayfinding and signage. Support and maintain Public Rights of Way. 	<p>Developing new housing estates can use resources during construction. There is a ambition to include open spaces, allotments, sports pitches, play areas and parks and gardens which will all require construction materials, and generate waste. Improving cycling and walking infrastructure (including maintaining PRow and implementing new neighborhood signage) will also use resources.</p> <p>New public transport developments, however, can reduce car use for short journeys, reducing fuel consumption.</p> <p>If all adequate Site Waste Management Plans are implemented, there is likely to be a neutral impact from this policy on the SEA objective.</p>	N	?	?	L	T/R	<p>Medium certainty-</p> <p>Minor uncertainty with regards to planned actions, programme and funding associated to these interventions</p>	<p>New schemes and developments should incorporate detailed mitigation and enhancements aiming to use resources sustainably. This can include implementing Site Waste Management Plans.</p> <p>Ensure scheme design incorporates measures to minimise future maintenance requirements.</p> <p>New developments will go through the relevant consenting processes.</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
N2. Facilitate the use of active modes for all short trips, including the first and last mile of longer journeys. <ul style="list-style-type: none"> Work with residents and communities to identify barriers to accessibility. Support the provision of safe 	<p>Interventions under this policy aim to reduce the number of neighborhood car journeys, which can reduce the demand for fuel sources.</p> <p>Public transport will also be supported in neighborhood areas, which is more fuel efficient.</p>	N	?	?	L	T/R	<p>Medium certainty -</p> <p>There is some uncertainty with regards to planned actions, programme and funding associated to these interventions</p>	<p>New schemes and developments should incorporate detailed mitigation and enhancements aiming to use resources sustainably. This can include implementing Site Waste Management Plans.</p> <p>Ensure scheme design incorporates measures to minimise future maintenance</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

WEST OF ENGLAND JOINT LOCAL TRANSPORT PLAN 4 (JLTP 4) – DRAFT STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) MATRICES – SEA OBJECTIVE 11

JLTP4’s Policies and Interventions assessed

Connectivity beyond the West of England -

Beyond West of England policies and interventions:

- B1. Enhance competitiveness of major gateways and improve connectivity to international markets
- B2. Improve strategic resilience of the network for all trips

Connectivity within the West of England -

Within West of England policies and interventions:

- W1. Provide more public transport options and improve service quality
- W2. Provide for journeys where public transport is not an option
- W3. Use, as appropriate, technological advances and charging measures to optimise and better manage demand
- W4. Improve resilience of the network, providing increased reliability
- W5. Enable business clustering and the efficient movement of freight

Local connectivity -

Local policies and interventions:

- L1. Enable walking and cycling, ‘active modes of travel’, to be the natural choice for shorter journeys
- L2. Reduce the number and severity of casualties for all road users
- L3. Encourage residents and employees to make more sustainable and healthier travel choices
- L4. Support opportunities for all sectors of the population to access the services they require, wherever they live
- L5. Support the identification and implementation of measures that will improve air quality

Neighbourhood connectivity -

Neighbourhood policies and interventions:

- N1. Use master planning and local design to create better places
- N2. Facilitate the use of active modes for all short trips, including the first and last mile of longer journeys

SEA Assessment Criteria - Effects of the JLTP4 and proposed alternatives will be described in terms of their:

Nature: whether they are anticipated to be:

- Positive (+)
- Neutral (N)
- Negative (x) or
- Uncertain (?)

++ Major Positive	The option would be significantly beneficial to the SEA objective by resolving an existing environmental issue and/or maximising opportunities for environmental enhancement.
+ Minor Positive	The option would be partially beneficial to the SEA objective by contributing to resolving an existing environmental issue and/or offering opportunity for some environmental enhancement. This effect would not be considered to be of significance.
N Neutral	The option would have a neutral effect on the SEA objective.
? Uncertain	There is insufficient detail available on the option or the baseline situation in order to assess how significantly the SEA objective would be affected by the option.
x Minor Negative	The option would partly undermine the SEA objective by contributing to an environmental problem and/or partially undermine opportunities for environmental enhancement. This effect would not be considered to be of significance.
xx Major Negative	The option would severely undermine the SEA objective by contributing to an environmental problem and/or undermining opportunities for environmental enhancement. This would be considered to be a significant effect.

Duration: the duration of potential effects are presented in terms of the timescale over which they are anticipated:

- Short term effects: effects expected in the next 1-5 years;
- Medium term effects: effects expected in the next 6-15 years; and
- Long term effects: effects expected in the next 16+years.

Permanence and Reversibility:

- A permanent effect is one which results from a physical change that is anticipated to last beyond the life of the Joint Local Transport Plan.
- A temporary effect is one which results from an operational change which could change if there is a change of policy, or a short term condition such as a construction phase related impact.
- A reversible effect is an environmental effect that can be reversed, for example an incident of water pollution can be cleaned up over time.
- An irreversible effect is an environmental effect that cannot be reversed such as the loss of a historic feature or the loss of agricultural soil due to permanent development.

Spatial Scale:

- Local: effect is restricted to the immediate location of the proposal or to a specific site or settlement within the sub-region (West of England)
- Regional: effect is anticipated to cover a significant proportion or all of the South West.
- National: effect covers the whole of England and/or the UK (also includes international).

SEA Objective 11. Protect and enhance the rich diversity of the historical and cultural environment, its heritage assets and their setting.

SEA Topic: Cultural heritage, landscape, soil

Criteria to Consider:

- Would the JLTP (in combination with other plans)
- Avoid harm to the significance of the West of England’s historic environment, heritage assets, historic places, streets and spaces.
 - Enhance the significance of the West of England’s historic environment, heritage assets, historic places, streets and spaces
 - Reduce pressure from congestion in key areas of built heritage and cultural interest?
 - Enable sustainable access to key areas of built heritage and cultural interest?
 - Cause disturbance to potential archaeological remains and intrusion into historic landscapes?

Description of the value and vulnerability of the area likely to be affected:

The West of England has diverse cultural assets from the World Heritage Site in Bath, industrial heritage in Bristol to culturally distinct boundaries and rhynes and known and potential archaeological remains. These assets have intrinsic and economic value (attracting tourism).

Particularly, Bristol had 33 Conservation Areas, over 90 historic parks and gardens and 4,137 listed buildings. Bath was designated as a World Heritage Site in 1987 and there are also 37 Conservation Areas, 11 historic parks and gardens, 84 Schedules Ancient Monuments and 6,400 listed buildings. North Somerset has 36 Conservation Areas, 8 historic parks and gardens, 66 Schedules Ancient Monuments and 1,074 listed buildings. South Gloucestershire has 30 Conservation Areas, 8 historic parks and gardens, 37 Schedules Ancient Monuments and c. 2,000 listed buildings. Key concerns to the historic environment are the protection of Bath as an internationally valued site as well as air pollution and the vibration of vehicles.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
B1. Enhance competitiveness of major gateways and improve connectivity to international markets. <ul style="list-style-type: none">• Support Bristol Airport as the main gateway for air travel in the South West.• Support the role of Bristol Port.	<p>Heritage assets are vulnerable to transport operation and development. The airport lies within an area known for its prehistoric activity (the modern airport and runway occupy the site of the former Lulsgate Airfield, which was used during World War II.</p> <p>The West of England support the development of Bristol Cruise Terminal. This includes improvements to the M5 Junction 19 to enhance access. Within 1km of this area are numerous listed buildings as well as Blaise Castle, Iron Age hillfort, Roman and medieval remains, and post-medieval garden Scheduled Ancient Monument.</p> <p>Potential effects on the historic environment include adverse impacts on the setting of assets, reduced air quality and vibration impacts from HGV’s. There is also the potential for further unrecorded archaeology.</p> <p>Overall, interventions under this policy are likely to have adverse impacts on the historic environment without mitigation.</p>	X	X	X	N	P/I	<p>Low certainty-</p> <p>Bristol’s Airport new Masterplan ‘Towards 2050’ is under consultation. There is certain level of uncertainty about what options / schemes will be implemented and to what extent.</p> <p>There are not sufficient details regarding planned actions that may improve accessibility to the Bristol Cruise Terminal.</p>	<p>It is recommended that all new schemes are subject to cultural heritage assessments (where relevant as part of Environmental Impact Assessment) in order to understand significance of heritage assets, address potential impacts on the cultural environment and archaeological assets and identify required mitigation.</p> <p>Designs should be sympathetic to the local distinctiveness. Good design guidance such as <i>Highways England – the road to good design</i> (2018)), should be followed.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that the JLTP4 interventions relating to supporting Bristol Airport and Bristol Port would be implemented and that further developments in Bristol Airport and Port will be delivered in line with the relevant <i>National Policy Statements</i>.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
B2. Improve strategic resilience of the network for all trips. <ul style="list-style-type: none"> Maximise opportunities arising from improvements to the strategic road and rail network, and identify and support delivery of further changes. <ul style="list-style-type: none"> Strategic Road Network (SRN) Strategic Rail Identify opportunities to manage the impact of Severn Bridge tolls removal. Support the role of coaches for residents and visitors. Manage and mitigate the impact of regular and infrequent events on the transport network. 	<p>Improvements on the strategic road and rail network identified in the JLTP 4 include: East of Bath Link; new and upgraded junctions on the M4 (new Junction 18a) and M5 (Junctions 14/19/new 21a); new sections of Smart Motorway; Park & Ride on the M32; redevelopment of Bristol Temple Meads into a regional interchange.</p> <p>Strategic road and rail improvements have the potential to have adverse impact on the historic environment. This can include changes to the setting of assets (Bristol Temple Meads Station is a Grade I Listed Building). However, improvements to the network aim to reduce car travel, which contributes to poor air quality (which can also have a negative impact on the historic environment).</p> <p>Listed building within Bath and Bristol can be impacted on due to vibration from coaches within the city centers. However, with the improvement of technologies and a more efficient coach management, impacts within cities on the historic environment can be reduced. This will especially be the case in Bath, there 11,000 coaches visit every year.</p> <p>Overall, interventions under this policy are likely to have adverse impacts on the historic environment without mitigation.</p>	X	X	X	N	P/I	<p>Medium / low certainty-</p> <p>Although there is some uncertainty with regards to programme and funding of some of the strategic road and rail schemes, the combined effect of the predicted growth in the region with the various transport infrastructure schemes that may go ahead are likely to adversely affect the historic environment.</p>	<p>It is recommended that all new schemes are subject to cultural heritage assessments (where relevant as part of Environmental Impact Assessment) in order to understand significance of heritage assets, address potential impacts on the cultural environment and archaeological assets and identify required mitigation.</p> <p>Designs should be sympathetic to the local distinctiveness. Good design guidance such as <i>Highways England – the road to good design</i> (2018)), should be followed,</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that development consent for nationally significant infrastructure projects on the road and rail networks and strategic rail freight interchanges will be delivered in line with the provisions of the <i>National networks national policy statement</i> and relevant environmental legislation.</p>
W1. Provide more public transport options and improve service quality. <ul style="list-style-type: none"> Provide high quality and reliable mass and bus rapid transit. Support and enhance existing public transport services. <ul style="list-style-type: none"> Bus Strategy Rail Improve the availability and accessibility of accurate travel information and ticketing. 	<p>The delivery of mass transport schemes such at MetroWest and MetroBus, may have negative impacts on the historic environment. This will mainly be due to infrastructure improvements and developments, which can impact on the setting of historic assets and reduce people's enjoyment of the historic environment (e.g Bath City Centre).</p> <p>However, interventions under this policy are designed to reduce car travel, which could improve air quality within the West of England. This will result in a positive impact on historic assets, particularly listed buildings, conservation areas and historic townscapes/ landscapes once construction schemes are complete.</p> <p>Potential impacts have therefore been identified as adverse in the short term and uncertain in the medium and long term due to the potential for beneficial impacts to offset some of the adverse effects.</p>	X	?	?	R	P/I	<p>Medium / Low certainty –</p> <p>There is a very strong commitment from the West of England to deliver high quality and reliable mass transit network across the Greater Bristol and Bath urban areas; complete and expand MetroBus and deliver MetroWest, There is come uncertainty regarding planned actions, programme and funding associated to these interventions in the long term.</p> <p>Design is also uncertain, and use of materials and siting will be important to avoid or minimise impacts on setting of heritage assets.</p> <p>Impacts on the historic environment in the medium and long term are uncertain, as impacts will depend on mitigation implemented at a scheme level.</p>	<p>It is recommended that all new schemes are subject to cultural heritage assessments (where relevant as part of Environmental Impact Assessment) in order to understand significance of heritage assets, address potential impacts on the cultural environment and archaeological assets and identify required mitigation.</p> <p>Designs should be sympathetic to the local distinctiveness.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that development consent for nationally significant infrastructure projects on the road and rail networks and strategic rail freight interchanges will be delivered in line with the provisions of the <i>National networks national policy statement</i> and relevant environmental legislation.</p>
W2. Provide for journeys where	The delivery and construction of new Park & Ride schemes could have negative impacts on the	X	?	?	R	T/R	Medium / Low certainty –	It is recommended that all new schemes are subject to cultural heritage assessments	The judgement was based on the level of

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
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public transport is not an option. <ul style="list-style-type: none"> Provide P&R and sharing schemes to minimise the impact of single occupancy vehicles. Recognise the needs of motorcycles and mopeds. 	<p>historic environment. For example, the West of England are investigating a potential new Park & Ride site to the east of Western Super Mare, located near the A370/A371 junction. Surrounding this area are several listed buildings as well as Motte and bailey castle and associated earthworks south of Locking Head Farm Scheduled Monument. However, Park & Ride sites will reduce car travel within city centers, improving air quality, which will have a positive impact on the historic environment.</p> <p>Potential impacts have therefore been identified as adverse in the short term and uncertain in the medium and long term due to the potential for beneficial impacts to offset some of the adverse effects.</p>						<p>Although there is support for several Park & Ride locations around cities, there is some uncertainty with regards to planned actions, programme and funding associated to these interventions in the long term.</p>	<p>(where relevant as part of Environmental Impact Assessment) in order to understand significance of heritage assets, address potential impacts on the cultural environment and archaeological assets and identify required mitigation.</p> <p>Designs should be sympathetic to the local distinctiveness.</p>	<p>information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that schemes under this policy would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>
W3. Use, as appropriate, technological advances and charging measures to optimise and better manage demand. <ul style="list-style-type: none"> Use technology to keep traffic moving. Embrace technology to improve cleaner travel option. Use, as appropriate, charging measures to influence and manage the demand of private car use. 	<p>By introducing measures to reduce congestion such as Intelligent Transport Systems (ITS) (which inform drivers of disruptions and maximise the efficacy of traffic signals) can reduce idling within the city centers and improving air quality. Better air quality would be beneficial to historic assets such as listed buildings. By embracing technology to improve cleaner travel options, will also have a beneficial impact on historic assets, in terms of improving air quality.</p>	+	+	+	R	T/R	<p>Low certainty –</p> <p>Although there is support for several technological advancements to reduce car use and reduce carbon emissions, there is some uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>	<p>There needs to be a modal shift away from cars, for this policy to be successful in improving air quality and improving the environment for historic assets.</p> <p>The introduction of charging users, may result in opposition from the public, which will need to be carefully managed.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant intentions in the JLTP4 would be implemented.</p> <p>It is assumed that technology will keep moving towards cleaner transport technology in the future.</p>
W4. Improve resilience of the network, providing increased reliability <ul style="list-style-type: none"> Define, manage and maintain the Key Route Network. Effectively manage the Major Road Network. Effectively accommodate development sites and associated trips. 	<p>Overall, interventions aimed at improving resilience of the network and providing increased reliability would have a neutral effect on this SEA objective. This is because the scale and type of the activities involved (mainly maintenance works) are not deemed to result in adverse effects of sufficient significance at this SEA level.</p>	N	N	N	R	T/R	<p>Medium / Low certainty –</p> <p>The KRN and its associated Joint Transport Asset Management Plan, and Major Road Network proposed by DfT are at inception stages. Timescales and details of implementation are unknown. There will be additional MRN capital infrastructure and this will have an impact upon maintenance budgets and requirements.</p>		<p>The judgement was based on the level of information available and the assumption that the relevant intentions in the JLTP4 would be implemented.</p> <p>It is also assumed that schemes under this policy would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>
W5. Enable business clustering and the efficient movement of freight. <ul style="list-style-type: none"> Support the delivery of Enterprise Zones / Business clustering. Balance the requirement for distributing goods, with mitigating the adverse impact 	<p>Reduced car travel between businesses result in lower demand for trips on the transport network. The potential lower demand on the transport network can, in turn, reduce congestion and improve air quality, which will have a positive impact on the historic environment.</p> <p>The West of England plan to improve the efficiency and reduce the impact of freight travel. Larger HGV's can have negative impacts on</p>	N	?	?	R	P/I	<p>Medium certainty-</p> <p>There is some uncertainty with regards to planned actions, programme (medium and long-term impacts) and funding associated with these interventions.</p>	<p>It is recommended that all new schemes are subject to cultural heritage assessments (where relevant as part of Environmental Impact Assessment) in order to understand significance of heritage assets, address potential impacts on the cultural environment and archaeological assets and identify required mitigation.</p> <p>There needs to be a modal shift away from</p>	<p>The judgement was based on the level of information available and the assumption that the relevant intentions in the JLTP4 would be implemented.</p> <p>It is also assumed that schemes under this policy would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
of vehicles. <ul style="list-style-type: none"> Routing, management and information Rail and water Loading and parking Consolidation Embracing innovation Planning conditions 	historic assets within city centers but contributing to both noise and air pollution. Ambitions to have fewer, fuller and cleaner vehicles will result in positive impact on the historic environment. Interventions under this policy have therefore the potential to have a positive impact on the historic environment in the medium and long term. There is, however, also the potential for adverse impacts associated with construction activities and so potential effects have been assessed as being uncertain at this SEA level.							cars, for this policy to be successful in improving air quality and improving the environment for historic assets.	
L1. Enable walking and cycling, 'active modes of travel', to be the natural choice for shorter journeys. <ul style="list-style-type: none"> Provide an attractive, safe and usable network. Provide schemes to support the uptake of cycling. 	Interventions under this policy aim to reduce car use, which can improve air quality. An improvement in air quality can be beneficial to historical assets. Although developing walking and cycling infrastructure can have potential adverse impacts on local heritage assets during the construction of the schemes, these proposed interventions do not involve significant infrastructural development and is therefore unlikely to result in significant adverse impacts on the historic environment. Increased access to heritage assets through cycling can increase tourism of sites, which pressures may have to be managed to minimise indirect impacts. Overall, it is considered that this policy would have a neutral effect on this SEA objective in the short term with the potential to provide beneficial effects in the medium term. Potential long term effects would depend on policies that go beyond the life of the JLTP4.	N	+	?	L	T/R	Medium certainty – There is a commitment from the West of England to encourage walking and cycling. Several projects/ programmes/ schemes are in place to encourage people to cycle, moving towards sustainable transport with more to be delivered through the development and implementation of the Local Cycling and Walking Infrastructure Plans.	Some of the specific schemes may have the potential for adverse effects so it is suggested that all schemes involving new development are screened for cultural heritage assessments. These assessments would help to understand significance of heritage assets, address potential impacts on the cultural environment and archaeological assets and identify required mitigation.	The judgement was based on the level of information available and the assumption that the relevant intentions in the JLTP4 would be implemented. It is also assumed that schemes under this policy would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.
L2. Reduce the number and severity of casualties for all road users. <ul style="list-style-type: none"> Consider the needs of all road users in the design of transport and highway schemes, particularly vulnerable road users. Deliver road safety education and skills training to equip people with the knowledge and skills to travel in a safe and sustainable way. Work in partnership to build safer communities. 	Interventions aimed at reducing the number and severity of casualties for all road users would have a neutral effect on this SEA objective.	N	N	N	L	P/R	Low certainty – There is some uncertainty with regards to planned actions, programme and funding associated to these interventions		This judgement has been based on the assumption that interventions will be implemented.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
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L3. Encourage residents and employees to make more sustainable and healthier travel options. <ul style="list-style-type: none"> Support travel planning with developers, education providers and individuals. Support travel planning with businesses and employment sites. Encourage mode shift through grants, incentives and rewards. Maximise awareness of sustainable and active travel choices and the benefits these bring. 	<p>Interventions under this policy aim to reduce car use and encourage sustainable transport. Reduced car travel can improve air quality, which can potentially provide beneficial impacts to listed buildings or other heritage assets.</p> <p>An overall neutral impact will be seen, if interventions are implemented.</p>	N	N	N	L	T/R	<p>Medium / Low certainty –</p> <p>These proposed interventions do not involve significant infrastructure development and is therefore unlikely to result in significant impacts on the historic environment.</p> <p>There is uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>	Schemes should consider opportunities to promote the protection of the historic environment.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L4. Support opportunities for all sectors of the population to access services they require, wherever they live. <ul style="list-style-type: none"> Support those without a private car, who need to travel, in accessing the services they require. Promote the role of technology in accessing services and employment. Support the role of taxis and private hire vehicles. Support the role of demand responsive and community transport. 	<p>Promoting more public transport in rural settings may have a slight negative impact on rural heritage assets. However, other measures to reduce car use (such as encouraging people to work from home because of improved broadband services) may result in positive impacts on the historic environment. The use of electric taxis and car shares will also contribute to removing cars from the road, improving air quality.</p> <p>Overall, interventions under this policy would result in a neutral impact on the historic environment.</p>	N	N	N	L	T/R	<p>Medium/ low certainty -</p> <p>These proposed interventions do not involve significant infrastructure development and is therefore unlikely to result in significant impacts on the historic environment.</p> <p>There is uncertainty with regards to planned actions, programme and funding associated to these interventions.</p>	Schemes should consider opportunities to promote the protection of the historic environment, where appropriate.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L5. Support the identification and implementation of measures that will improve air quality. <ul style="list-style-type: none"> Support ongoing work to manage the impact of transport on air quality and climate change. Support ongoing work on Clean Air Zones. Support work on Zero and Low Emission Vehicles. 	<p>Poor air quality can have negative impacts on historical assets. This can include physical damage from acid rain erosion as well as reducing visitor's enjoyment of assets (Parks and Gardens for example).</p> <p>The West of England is committed to working with tour companies to develop an upgrade plan to operate ultra-low or zero emissions vehicles in city centers. There are hotspots in the Bath and Bristol built-up areas where concentrations of NO₂ (caused by vehicle emissions) exceed the acceptable national and European limit of 40 µg/m³. As such, local authorities are responsible for developing innovative Clean Air Plans to combat the issue. This would be beneficial for Bath itself (as a World Heritage Site) as well as for other heritage assets within the Bath and Bristol city centers.</p>	+	+	+	L/R	T/R	<p>Medium / low certainty-</p> <p>Timescales of several of the interventions where Clean Air Zones will be located.</p> <p>Considerable support and commitment to encouraging the use of electric vehicles e.g. increasing the number of charging points, deliver more EV-capable car club bays and building 4 rapid charging hubs at high profile locations.</p>	Ensure the mitigation and monitoring contained within the Air Quality Management Plans and Local Authority Plans is followed and implemented.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

[illegible]

WEST OF ENGLAND JOINT LOCAL TRANSPORT PLAN 4 (JLTP 4) – DRAFT STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) MATRICES – SEA OBJECTIVE 12

JLTP4’s Policies and Interventions assessed

Connectivity beyond the West of England -

Beyond West of England policies and interventions:

- B1. Enhance competitiveness of major gateways and improve connectivity to international markets
- B2. Improve strategic resilience of the network for all trips

Connectivity within the West of England -

Within West of England policies and interventions:

- W1. Provide more public transport options and improve service quality
- W2. Provide for journeys where public transport is not an option
- W3. Use, as appropriate, technological advances and charging measures to optimise and better manage demand
- W4. Improve resilience of the network, providing increased reliability
- W5. Enable business clustering and the efficient movement of freight

Local connectivity -

Local policies and interventions:

- L1. Enable walking and cycling, ‘active modes of travel’, to be the natural choice for shorter journeys
- L2. Reduce the number and severity of casualties for all road users
- L3. Encourage residents and employees to make more sustainable and healthier travel choices
- L4. Support opportunities for all sectors of the population to access the services they require, wherever they live
- L5. Support the identification and implementation of measures that will improve air quality

Neighbourhood connectivity -

Neighbourhood policies and interventions:

- N1. Use master planning and local design to create better places
- N2. Facilitate the use of active modes for all short trips, including the first and last mile of longer journeys

SEA Assessment Criteria - Effects of the JLTP4 and proposed alternatives will be described in terms of their:

Nature: whether they are anticipated to be:

- Positive (+)
- Neutral (N)
- Negative (x) or
- Uncertain (?)

++ Major Positive	The option would be significantly beneficial to the SEA objective by resolving an existing environmental issue and/or maximising opportunities for environmental enhancement.
+ Minor Positive	The option would be partially beneficial to the SEA objective by contributing to resolving an existing environmental issue and/or offering opportunity for some environmental enhancement. This effect would not be considered to be of significance.
N Neutral	The option would have a neutral effect on the SEA objective.
? Uncertain	There is insufficient detail available on the option or the baseline situation in order to assess how significantly the SEA objective would be affected by the option.
x Minor Negative	The option would partly undermine the SEA objective by contributing to an environmental problem and/or partially undermine opportunities for environmental enhancement. This effect would not be considered to be of significance.
xx Major Negative	The option would severely undermine the SEA objective by contributing to an environmental problem and/or undermining opportunities for environmental enhancement. This would be considered to be a significant effect.

Duration: the duration of potential effects are presented in terms of the timescale over which they are anticipated:

- Short term effects: effects expected in the next 1-5 years;
- Medium term effects: effects expected in the next 6-15 years; and
- Long term effects: effects expected in the next 16+years.

Permanence and Reversibility:

- A permanent effect is one which results from a physical change that is anticipated to last beyond the life of the Joint Local Transport Plan.
- A temporary effect is one which results from an operational change which could change if there is a change of policy, or a short term condition such as a construction phase related impact.
- A reversible effect is an environmental effect that can be reversed, for example an incident of water pollution can be cleaned up over time.
- An irreversible effect is an environmental effect that cannot be reversed such as the loss of a historic feature or the loss of agricultural soil due to permanent development.

Spatial Scale:

- Local: effect is restricted to the immediate location of the proposal or to a specific site or settlement within the sub-region (West of England)
- Regional: effect is anticipated to cover a significant proportion or all of the South West.
- National: effect covers the whole of England and/or the UK (also includes international).

SEA Objective 12. Maintain and enhance the quality of the built environment and landscape.

SEA Topic: Cultural heritage, landscape/ townscape

Criteria to Consider:

Would the JLTP4 (in combination with other plans)

Reduce pressure from congestion in key areas of built heritage interest?

Enable sustainable access to key areas of built heritage and cultural interest?

Cause an adverse visual intrusion in notable of locally distinctive landscape and townscape character?

Relieve intrusion or noise disturbance from existing areas of high landscape or built environment value?

Description of the value and vulnerability of the area likely to be affected:

The cities of Bristol and Bath, as well as towns across the sub region are vulnerable to effects of traffic congestion and noise. Demand for parking space and other transport infrastructure limits availability of land use for leisure, retail or recreational uses. Good design is fundamental to achieving high-quality, attractive places that are socially, economically and environmentally sustainable.

The West of England also has a number of statutory and non-statutory landscape designation including Green Belt (the Bristol/Bath Green Belt was designated in 1966), Areas of Outstanding Natural Beauty (AONB's), Bath World Heritage Site and the Forest of Avon. The JLTP4 would potentially impact on local areas of public space or landscape with settlements or disused former transport corridors such as former railway lines which may have now become more naturalized into the general landscape. Impacts can include potential loss of landscape features (trees, hedgerows and local walls), increased in light pollution, loss of tranquility and new sources of noise. The Bristol, Avon Valleys and Ridge Landscape Character Area may be impacted by the schemes within the JLTP4. Transport infrastructure can also incorporate inappropriate signage, lighting columns, road surfaces and other harmful impacts on the landscape if not carefully managed.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
B1. Enhance competitiveness of major gateways and improve connectivity to international markets. <ul style="list-style-type: none">Support Bristol Airport as the main gateway for air travel in the South West.Support the role of Bristol Port.	<p>Improved access to Bristol Airport is a priority of the LTP4. This includes improving mass transit to the airport, through the introduction of public transport improvements. This also includes upgrading the highway network through schemes such as the M5 Junction 19 improvements. These improvements aim to reduce car travel, which will have a positive impact on the local built environment.</p> <p>Due to the Airports and Ports locations out of the city centers of Bristol and Bath, it is considered that this policy would have a neutral impact on the built environment within city centers.</p> <p>Development improvements to Bristol airport, have the potential to have negative impacts on the surrounding landscape, however. In particular, arrangements for the development of car parking can result in negative landscape and visual impacts.</p> <p>Redevelopment of the northside car parks would have a significant effect</p>	X	X	?	N	T/R	<p>Low certainty-</p> <p>Bristol's Airport new Masterplan 'Towards 2050' is under consultation. There is certain level of uncertainty about what options / schemes will be implemented and to what extent.</p> <p>There are not sufficient details regarding planned actions that may improve accessibility to the Bristol Cruise Terminal.</p>	<p>Good design should consider the built environment of the areas where future schemes might be located. Good design guidance such as <i>Highways England – the road to good design</i> (2018)), should be followed when designing highways infrastructure.</p> <p>Measures to discourage car use within urban centers should be pursued in order to maximise use of alternative modes provided and to reduce traffic congestion and noise.</p> <p>Development on the urban fringe should be sensitive to landscape character. Schemes associated with the expansion of Bristol's Airport and Port should be subject to landscape and visual assessment (as part of Environmental Impact Assessment where applicable) to ensure new proposals are integrated into the landscape and adverse visual impacts are minimised.</p> <p>Design the proposed infrastructure sensitively to reduced visual impact and to include effective landscaping scheme to</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that the JLTP4 interventions relating to supporting Bristol Airport and Bristol Port would be implemented and that further developments in Bristol Airport and Port will be delivered in line with the relevant <i>National Policy Statements</i>.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
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	<p>on views of the Airport from residential areas to the immediate north of the airport and show up as an additional intrusive impact on the landscape. Light pollution is also a key concern.</p> <p>The West of England will work with the airport to limit the increase of demand for additional parking provision, however (through improving public transport to the airport).</p> <p>Bristol Port's development also have the potential for adverse effects on landscape and townscape.</p> <p>Overall, this objective will have a minor significant adverse impact on this SEA objective in the short and medium term. Long term impacts will depend on mitigation at a scheme specific level.</p>							<p>soften any major structures.</p> <p>Mitigation included in the Bristol Airport Master Plan should be sought. This includes development that is concentrated in the north side of the airport where 'green roofs' will ensure that the most visible parts of the car parks will be screened from external view.</p> <p>All new lighting will be designed to reduce glare and light spill in line with dark skies guidance.</p>	
<p>B2. Improve strategic resilience of the network for all trips.</p> <ul style="list-style-type: none"> Maximise opportunities arising from improvements to the strategic road and rail network, and identify and support delivery of further changes. <ul style="list-style-type: none"> Strategic Road Network (SRN) Strategic Rail Identify opportunities to manage the impact of Severn Bridge tolls removal. Support the role of coaches for residents and visitors. Manage and mitigate the impact of regular and infrequent events on the transport network. 	<p>Improvements on the strategic road and rail network identified in the JLTP 4 include: East of Bath Link; new and upgraded junctions on the M4 (new Junction 18a) and M5 (Junctions 14/19/new 21a); new sections of Smart Motorway; Park & Ride on the M32; redevelopment of Bristol Temple Meads into a regional interchange.</p> <p>The proposed strategic road and rail improvements have the potential to have adverse impact on the built environment and have the potential to cause adverse landscape impacts. Additionally, new infrastructure can result in negative visual impacts.</p> <p>However, improvements to the network aim to reduce car travel and congestion, which will have a positive impact on the built environment. This positive effect may, however be partially offset by the adverse effects on traffic congestion that could result from the removal of Severn Bridge tolls removal.</p> <p>Potential effects on this SEA Objective have therefore been assessed as negative in the short and medium term, and uncertain in the long term.</p>	X	X	?	N	P/I	<p>Medium / low certainty-</p> <p>There is some uncertainty with regards to programme and funding of some of the strategic road and rail schemes.</p> <p>Design is also uncertain, and use of materials and siting will be important to avoid or minimise impacts on built environment.</p>	<p>Good design should consider the built environment of the areas where future schemes might be located. Good design guidance such as <i>Highways England – the road to good design</i> (2018)), should be followed when designing highways infrastructure.</p> <p>A modal shift away from car use is needed in order for this policy to be beneficial to the built environment.</p> <p>Development on the urban fringe should be sensitive to landscape character. All strategic and major schemes should be subject to landscape and visual assessment (as part of Environmental Impact Assessment where applicable) to ensure new proposals are integrated into the landscape and adverse visual impacts are minimised.</p> <p>Design the proposed infrastructure sensitively to reduced visual impact and to include effective landscaping scheme to soften any major structures.</p> <p>Design the proposed infrastructure sensitively to reduced visual impact and to include effective landscaping scheme to soften any major structures.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that development consent for nationally significant infrastructure projects on the road and rail networks and strategic rail freight interchanges will be delivered in line with the provisions of the <i>National networks national policy statement</i> and relevant environmental legislation.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
W1. Provide more public transport options and improve service quality. <ul style="list-style-type: none"> Provide high quality and reliable mass and bus rapid transit. Support and enhance existing public transport services. <ul style="list-style-type: none"> Bus Strategy Rail Improve the availability and accessibility of accurate travel information and ticketing. 	<p>There are several emerging mass and rapid transport systems within the West of England (MetroBus). The ambition is for new forms of mass transport (e.g. light rail, light metro or trams) where the potential is greatest for high passenger flows. The influx of alternative transport modes will decrease reliability of car travel, and improve the built environment. Additionally, this will reduce noise and air pollution, having a positive impact on landscape settings and features.</p> <p>Upgrades to city Centre transport hubs such as Bristol Temple Meads Station will reduce car travel. However, there may be negative impacts on the built environment during the scheme construction periods. New road and rail improvements will result in increases in light pollution, especially as there are plans for a new all-night bus. Additional bus lanes will also require additional signage.</p> <p>Buildings within Bath and Bristol can be impacted on due to vibration from coaches within the city centers. However, with the improvement of technologies and a more efficient coach management, impacts within cities on the built environment can be reduced. This will especially be the case in Bath, there 11,000 coaches visit every year.</p> <p>Overall, interventions under this policy are likely to provide beneficial impacts to the built environment in the long term. Interventions under this policy are likely to improve air quality, which will have a positive impact on public places such as parks and outdoor recreational facilities.</p> <p>There is, however the potential for adverse effects on built environment and landscape in the short and medium term due to the scale and extent of some of the interventions and pressures from other land uses.</p>	X	X	+	R	P/R	<p>Medium / low certainty-</p> <p>There is a very strong commitment from the West of England to deliver high quality and reliable mass transit network across the Greater Bristol and Bath urban areas; complete and expand MetroBus and deliver MetroWest,</p> <p>There is, however, some uncertainty regarding planned actions, programme and funding associated to these interventions in the long term.</p> <p>Design is also uncertain, and use of materials and siting will be important to avoid or minimise impacts on the built environment.</p>	<p>Good design should consider the built environment of the areas where future schemes might be located. Good design guidance such as <i>Highways England – the road to good design</i> (2018)), should be followed when designing highways infrastructure.</p> <p>There needs to be a modal shift to sustainable transport modes to reduce car travel, reducing congestion. Measures to discourage car use within urban centers should be pursued in order to maximise use of alternative modes provided and to reduce traffic congestion and noise.</p> <p>Development on the urban fringe should be sensitive to landscape character. All strategic and major schemes should be subject to landscape and visual assessment (as part of Environmental Impact Assessment where applicable) to ensure new proposals are integrated into the landscape and adverse visual impacts are minimised.</p> <p>Design the proposed infrastructure sensitively to reduced visual impact and to include effective landscaping scheme to soften any major structures.</p> <p>This policy could contribute to a beneficial impact on the AONBs and/or other designated landscapes by including improved access by public transport to beauty spots. This would help alleviate pressure from use of private cars.</p> <p>New public transport facilities such as bus stops and signage should be designed to be sympathetic to landscape character.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that development consent for nationally significant infrastructure projects on the road and rail networks and strategic rail freight interchanges will be delivered in line with the provisions of the <i>National networks national policy statement</i> and relevant environmental legislation.</p>
W2. Provide for journeys where public transport is not an option. <ul style="list-style-type: none"> Provide P&R and sharing schemes to minimise the 	<p>Park & Ride facilities require land take, which could potential be used to improve the built environment (creating open spaces, for example).</p> <p>Park & Ride facilities outside city centers</p>	N	+	?	R	P/I	<p>Medium / Low certainty –</p> <p>Although there is support for several Park & Ride locations around cities, there is some uncertainty with regards to planned actions, programme and funding associated to these</p>	<p>Measures to discourage car use within urban centers should be pursued in order to maximise use of alternative modes provided and to reduce traffic congestion and noise.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that schemes under this</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
<p>impact of single occupancy vehicles.</p> <ul style="list-style-type: none"> Recognize the needs of motorcycles and mopeds. 	<p>could be beneficial to the built environment. This is due to a reduction in congestion and an improvement in both noise and air pollution. This will also improve landscape setting.</p> <p>However, Park & Ride facilities will result in new infrastructure, which can have a negative impact on the surrounding landscape. There will also be new signage associated.</p>						<p>interventions in the long term.</p>	<p>Various locations should be considered for Park & Ride facilities. The best location will ensure the maximum benefits.</p> <p>Development on the urban fringe should be sensitive to landscape character. All major schemes should be subject to landscape and visual assessment (as part of Environmental Impact Assessment where applicable) to ensure new proposals are integrated into the landscape and adverse visual impacts are minimised.</p> <p>New Park & Ride should ensure that lighting is designed to minimise light pollution. Locations with high landscape sensitivity should be avoided.</p>	<p>policy would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>
<p>W3. Use, as appropriate, technological advances and charging measures to optimise and better manage demand.</p> <ul style="list-style-type: none"> Use technology to keep traffic moving. Embrace technology to improve cleaner travel option. Use, as appropriate, charging measures to influence and manage the demand of private car use. 	<p>The role of technology is likely to become increasingly important to help keep traffic moving and reduce congestion. For example, Intelligent Transport Systems (ITS) can be used to inform road users of disruptions and maximise the efficacy of traffic signals. This can also reduce idling within city centers and improve air quality, which will have a positive impact on the built environment and landscape setting within cities.</p> <p>Management of parking provisions and cost as well as road user charging within city centers can also have a positive impact on the built environment. The introduction of Clean Air Zones will also have a positive impact on both the built environment and surrounding landscape.</p>	+	+	+	R	T/R	<p>Low certainty-</p> <p>There is some uncertainty with regards to planned actions, programme (medium and long-term impacts) and funding associated with these interventions.</p>	<p>There needs to be a modal shift away from cars, for this policy to be successful in improving the built environment.</p> <p>The introduction of charging users, may result in opposition from the public, which will need to be carefully managed.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p>
<p>W4. Improve resilience of the network, providing increased reliability</p> <ul style="list-style-type: none"> Define, manage and maintain the Key Route Network (KRN). Effectively manage the Major Road Network (MRN). Effectively accommodate development sites and associated trips. 	<p>Maintenance works on the highway network, can enhance the built environment.</p> <p>Public transport will be one of the key principles for the Major Roads Network. There is a recognition that public transport schemes in the long term is better at reducing congestion compared with road widening schemes. A reduction in congestion will be beneficial for the built environment.</p> <p>The design of new and improved road infrastructure to support the needs of pedestrians and cyclist will improve the built environment for local people.</p>	N	+	?	R	T/R	<p>Medium / low certainty-</p> <p>The KRN and its associated Joint Transport Asset Management Plan, and Major Road Network proposed by DfT are at inception stages. Timescales and details of implementation are unknown. There will be additional MRN capital infrastructure and this will have an impact upon maintenance budgets and requirements.</p> <p>There will be additional MRN capital infrastructure and this will have an impact upon maintenance budgets and requirements.</p>	<p>There needs to be a modal shift away from cars, for this policy to be successful in improving the built environment.</p> <p>Maintenance works can include landscaping improvements.</p> <p>Where new development is to be considered under this policy, major schemes should be subject to landscape and visual assessment (as part of Environmental Impact Assessment where applicable) to minimise potential adverse impacts and maximise opportunities for benefits.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p>

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
	Overall, interventions under this policy will be beneficial to the built environment in the longer term, with neutral impacts in the short term.								
W5. Enable business clustering and the efficient movement of freight. <ul style="list-style-type: none"> Support the delivery of Enterprise Zones / Business clustering. Balance the requirement for distributing goods, with mitigating the adverse impact of vehicles. <ul style="list-style-type: none"> Routing, management and information Rail and water Loading and parking Consolidation Embracing innovation Planning conditions 	<p>HGV's play a role in distributing freight through the West of England.</p> <p>A restriction of through traffic movement of heavy vehicles through the centers of Bath and Bristol will be beneficial for the built environment. Freight consolidation will also help in reducing HGV's in city centers. This can reduce noise levels in sensitive landscape areas. Interventions aimed at improving the efficiency of freight will therefore have a positive impact on the built environment.</p> <p>Lower demand for trip on the network and car sharing will also help to reduce congestion. Potential long term effects would depend on policies that go beyond the life of the JLTP4.</p>	+	?	?	R	T/R	<p>Medium / low certainty-</p> <p>There is some uncertainty with regards to planned actions, programme (medium and long-term impacts) and funding associated with these interventions.</p>	<p>Good design should consider the built environment of the areas where future schemes might be located.</p> <p>Measures to discourage car use within urban centers should be pursued in order to maximise use of alternative modes provided and to reduce traffic congestion and noise.</p> <p>The support of freight companies is needed for this policy to be successful.</p> <p>New public transport facilities providing access to enterprise zones such as bus stops and signage should be designed to be sympathetic to landscape character.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that schemes under this policy would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>
L1. Enable walking and cycling, 'active modes of travel', to be the natural choice for shorter journeys. <ul style="list-style-type: none"> Provide an attractive, safe and usable network. Provide schemes to support the uptake of cycling. 	<p>The introduction and improvement of cycling and walking infrastructure aims to reduce car travel and congestion, which would be beneficial for the built environment. The West of England will work with future housing developers to ensure leisure sites and walking and cycling infrastructure is provided in the right place. Maintenance works (e.g pothole maintenance) has the potential to improve the built environment as well, in terms of improving aesthetic value. Construction impacts may adversely impact on the built environment. Construction works can also negatively impact on the surrounding landscape.</p> <p>The uptake of cycling within city centers will reduce congestion and provide beneficial impacts to the built environment.</p> <p>Overall, interventions under this policy will likely have a positive impact in the medium term on this SEA objective.</p>	N	+	?	L	T/R	<p>Medium certainty –</p> <p>There is a commitment from the West of England to encourage walking and cycling.</p> <p>Several projects/ programmes/ schemes are in place to encourage people to cycle, moving towards sustainable transport with more to be delivered through the development and implementation of the Local Cycling and Walking Infrastructure Plans.</p> <p>Pedestrian areas tend to enable more appreciation of the urban realm, architecture and allow more activities to take place.</p>	<p>Good design should consider the built environment of the areas where future schemes might be located.</p> <p>Measures to discourage car use within urban centers should be pursued in order to maximise use of alternative modes provided and to reduce traffic congestion and noise.</p> <p>Where new development is to be considered under this policy, major schemes should be subject to landscape and visual assessment (as part of Environmental Impact Assessment where applicable) to minimise potential adverse impacts and maximise opportunities for benefits.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that schemes under this policy would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>
L2. Reduce the number and severity of casualties for all road users. <ul style="list-style-type: none"> Consider the needs of all road users in the design of 	Interventions under this policy do not include any physical infrastructure development. Input into design can have the potential to improve the build environment, however, by providing	N	N	N	L	T/R	<p>Low certainty –</p> <p>There is some uncertainty with regards to planned actions, programme and funding</p>	<p>Any design of highway design should take into account the built environment.</p> <p>Measures to discourage car use within urban centers should be pursued in order to maximise use of alternative modes</p>	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
transport and highway schemes, particularly vulnerable road users. <ul style="list-style-type: none"> Deliver road safety education and skills training to equip people with the knowledge and skills to travel in a safe and sustainable way. Work in partnership to build safer communities. 	green spaces. Additionally, the introduction of safety measures such as speed limits can improve air quality, which will be beneficial for the built environment and surrounding landscape qualities. Overall, this policy is likely to have a neutral impact on this SEA objective.						associated to these interventions	provided and to reduce traffic congestion and noise.	
L3. Encourage residents and employees to make more sustainable and healthier travel options. <ul style="list-style-type: none"> Support travel planning with developers, education providers and individuals. Support travel planning with businesses and employment sites. Encourage mode shift through grants, incentives and rewards. Maximise awareness of sustainable and active travel choices and the benefits these bring. 	Interventions under this policy aim to reduce car use and encourage sustainable transport. Reduced car travel can improve air quality, which can potentially provide beneficial impacts to the built environment. An overall neutral impact will be seen, if interventions are implemented, as the potential positives are not considered significant.	N	N	N	L	T/R	Medium / Low certainty – These proposed interventions do not involve significant infrastructure development and is therefore unlikely to result in significant impacts on the historic environment. There is uncertainty with regards to planned actions, programme and funding associated to these interventions.	Schemes should consider opportunities to promote the protection of the built environment. Schemes should consider options to enhance landscape quality, where possible.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L4. Support opportunities for all sectors of the population to access services they require, wherever they live. <ul style="list-style-type: none"> Support those without a private car, who need to travel, in accessing the services they require. Promote the role of technology in accessing services and employment. Support the role of taxis and private hire vehicles. Support the role of demand responsive and community transport. 	Promoting more public transport in rural settings may have a slight negative impact on rural built assets. However, other measures to reduce car use (such as encouraging people to work from home because of improved broadband services) may result in positive impacts on the built environment. The use of electric taxis and car shares will also contribute to removing cars from the road, improving air quality. Overall, interventions under this policy would result in a neutral impact on the built environment, as well as surrounding landscape.	N	N	N	L	T/R	Medium/ low certainty - These proposed interventions do not involve significant infrastructural development and is therefore unlikely to result in significant impacts on the built environment. There is uncertainty with regards to planned actions, programme and funding associated to these interventions.	Measures to discourage car use within urban centers should be pursued in order to maximise use of alternative modes provided and to reduce traffic congestion and noise. Schemes should consider opportunities to promote the protection of the built environment.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.
L5. Support the identification and implementation of measures that will improve air quality. <ul style="list-style-type: none"> Support ongoing work to manage the impact of transport on air quality and climate change. 	Poor air quality can have adverse impact on the built environment, as well as the surrounding quality of the landscape. In particular, it can reduce people's enjoyment of outdoor recreational facilities.	+	+	+	L	T/R	Medium / low certainty- Timescales of several of the interventions where Clean Air Zones will be located. Considerable support and commitment to encouraging the use of electric vehicles e.g increasing the number of charging points,	Measures to discourage car use within urban centers should be pursued in order to maximise use of alternative modes provided and to reduce traffic congestion and noise. Ensure the mitigation and monitoring contained within the Air Quality Management Plans and Local Authority Plans is followed	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.

JLTP 4's Policies & Interventions	Description of effect	Nature of effect on environment					Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
		Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility			
<ul style="list-style-type: none"> Support ongoing work on Clean Air Zones. Support work on Zero and Low Emission Vehicles. 	<p>Upgrades to operate ultra-low emissions vehicle or zero emissions vehicles in city centers may significantly improve the public realm. For example, electric vehicles are much quieter than petrol vehicles. However, the introduction of charging ports may increase the need for parking within city centers, reducing the space for recreational facilities. The introduction of Clear Air Zones will also be beneficial to the environment.</p> <p>Coaches (particularly within Bath City Centre) can result in negative visual impacts, contributing to traffic and disturbance of landscape settings. Measure aimed at managing coach travel can enhance the landscape setting within city centers (noise levels and air emissions will also be reduced).</p> <p>Overall, this policy will have a positive impact on the built environment, as well as surrounding landscape.</p>						<p>deliver more EV-capable car club bays and building 4 rapid charging hubs at high profile locations.</p>	<p>and implemented.</p> <p>Ensure the mitigation and monitoring contained within the Air Quality Management Plans is followed and implemented to maximise the benefits to landscape quality</p>	
<p>N1. Use master planning and local design to create better places.</p> <ul style="list-style-type: none"> Improve the quality of streets and public realm. Integrate walking, cycling and public transport into new developments. Provide clear wayfinding and signage. Support and maintain Public Rights of Way. 	<p>There is a growing recognition that high levels of car use and congestion are not conducive to the creation of vibrant and attractive urban areas.</p> <p>This policy aims to improve and enhance the public realm, to provide better places for people to live. The creation of open spaces, reserves, allotments, sport pitches, play areas and parks and gardens will improve the built environment, providing beneficial impact to local people. Protecting important buildings, will also have a beneficial impact on this SEA objective. The implementation of local design guides to improve street and places will also enhance landscape quality</p> <p>Additionally, providing adequate parking for people to Park & Stride will reduce the number of cars within neighborhoods. By integrating walking and cycling facilities into new developments (e.g. signage), the West of England are introducing ways in which the built environment can be enhanced.</p> <p>However, new developments outside of existing settlements boundaries to</p>	+	+	?	L	T/R	<p>Medium / low certainty –</p> <p>Some initiatives are already in place and West of England is committed to continue using master planning and local design to create better places.</p> <p>There is uncertainty with regards to planned actions, programme and funding associated with some of these interventions, especially in the long term.</p>	<p>It is recommended that signage and infrastructure for pedestrians and cyclists is designed to be sympathetic to the local distinctiveness.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>It is also assumed that schemes under this policy would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>

Appendix G

ASSESSMENT OF ALTERNATIVES 

WEST OF ENGLAND JOINT LOCAL TRANSPORT PLAN 4 (JLTP4) – DRAFT ALTERNATIVES STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA) MATRICES

SEA Assessment Criteria - Effects of the JLTP4 and proposed alternatives will be described in terms of their:

Duration: the duration of potential effects are presented in terms of the timescale over which they are anticipated:

- Short term effects: effects expected in the next 1-5 years;
- Medium term effects: effects expected in the next 6-15 years; and
- Long term effects: effects expected in the next 16+years.

Permanence and Reversibility:

- A permanent effect is one which results from a physical change that is anticipated to last beyond the life of the Joint Local Transport Plan.
- A temporary effect is one which results from an operational change which could change if there is a change of policy, or a short term condition such as a construction phase related impact.
- A reversible effect is an environmental effect that can be reversed, for example an incident of water pollution can be cleaned up over time.
- An irreversible effect is an environmental effect that cannot be reversed such as the loss of a historic feature or the loss of agricultural soil due to permanent development.

Spatial Scale:

- Local: effect is restricted to the immediate location of the proposal or to a specific site or settlement within the sub-region (West of England)
- Regional: effect is anticipated to cover a significant proportion or all of the South West.
- National: effect covers the whole of England and/or the UK (also includes international).

Nature: whether they are anticipated to be:

- Positive (+)
- Neutral (N)
- Negative (x) or
- Uncertain (?)

++ Major Positive	The option would be significantly beneficial to the SEA objective by resolving an existing environmental issue and/or maximising opportunities for environmental enhancement.
+ Minor Positive	The option would be partially beneficial to the SEA objective by contributing to resolving an existing environmental issue and/or offering opportunity for some environmental enhancement. This effect would not be considered to be of significance.
N Neutral	The option would have a neutral effect on the SEA objective.
? Uncertain	There is insufficient detail available on the option or the baseline situation in order to assess how significantly the SEA objective would be affected by the option.
x Minor Negative	The option would partly undermine the SEA objective by contributing to an environmental problem and/or partially undermine opportunities for environmental enhancement. This effect would not be considered to be of significance.
xx Major Negative	The option would severely undermine the SEA objective by contributing to an environmental problem and/or undermining opportunities for environmental enhancement. This would be considered to be a significant effect.

SEA Objective 1: Improve accessibility and mobility for a growing and ageing population.

SEA Topic: Population, Human Health.

Description of the value and vulnerability of the area likely to be affected:

The population of the West of England has been growing and if trends continue, is predicted to increase from 938,070 in 2018 to 1,071,102 in 2036 (14%) and 1,101,496 in 2041 (17%). In addition, the population is ageing, meaning it will be necessary to provide for the needs of more elderly population. The West of England has a high urban population but Bath & North East Somerset and North Somerset also have considerable rural populations. A portion of the population in the region do not have easy access to public transport near where they live.

The West of England supports high numbers of tourists, placing seasonal pressures on the transport system. Although in general the region supports a more prosperous economy than average for the South West and the UK, there are particular areas of Bristol, Bath and Weston-super-Mare where communities fall within the 10% most deprived areas of the UK.

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
JLTP 4 Scenario	+	++	++	L	T/R	<p>Long term major beneficial effect.</p> <p>The majority of the policies and interventions included in the Draft JLTP4 improve accessibility which aligns with this SEA Objective. Many of the interventions have therefore been identified as being beneficial to this SEA Objective. There is a need to ensure that services and employment or education opportunities are accessible by those with limited mobility who are unable to participate in active travel modes..</p>	<p>Medium certainty.</p> <p>There is a strong commitment from the West of England to improve accessibility and mobility. There are, however, various degrees of uncertainty with regards to planned actions, programme and funding of the associated interventions.</p>	<p>Strategic and major schemes (including new development sites) will be delivered through the appropriate consenting process and will need to be subject to assessments including health and equalities assessments. Detailed mitigation and enhancement opportunities will be developed as part of the design and consenting process of these larger schemes.</p> <p>There is a need to ensure that services and employment or education opportunities are accessible by those with limited mobility who are unable to</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented. Additionally, it was assumed that schemes would incorporate opportunities to enhance accessibility and mobility and would be delivered through the appropriate consenting processes.</p>

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
								<p>participate in active travel modes.</p> <p>Where schemes / initiatives are time limited, new replacement measures need to be implemented to maximise the opportunity for benefits over time.</p> <p>Charging should not result in creating a barrier to employment or education opportunities, particularly for those who are unemployed or on low income</p>	
Retention of JLTP 3 (with period plan extended to cover the period up to 2036)	+	++	++	L	T/R	<p>New residential development would have a cumulative effect on traffic volume. However, the proposed major schemes may encourage more to choose alternative modes such as rapid transit.</p> <p>Furthermore, this option supports a range of alternative modes of transport.</p>	<p>Low certainty.</p> <p>The actual population growth predicted for the sub-region is uncertain as is the level of funding that may be available to deliver initiatives.</p>	<p>The accessibility around rural locations within the sub-region is not likely to be increased by this scenario and there is a risk that the non-car owning population, particularly the aged, may not be adequately catered for.</p> <p>Provision within the JLTP3 for rural areas is heavily dependant upon co-operation of third parties and therefore it is recommended that a suitable level of investment is directed to ensure this engagement with third parties is effective.</p>	<p>The judgement was made from a review of the projected population growth areas and an assumption that the major scheme bid proposals will go some way towards addressing current congestion and adding to public transport provision, as reported in the JLTP 3 SEA Environmental Report.</p> <p>The details outlined in the draft JLTP3 Rural Transport Supplementary Document were taken into account.</p>
The “without plan scenario”	+	x	x	R	T/R	<p>The accepted major schemes would have a positive effect on accessibility in the short</p>	<p>Medium certainty.</p> <p>It is very likely that the lack of</p>	<p>Strategic action would be needed to ensure that population is linked to services,</p>	<p>The judgement was made from a review of the projected population growth areas and an assumption</p>

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						term by increasing non-car based transport options. However, new residential development would have an additive effect on traffic, community severance and may have a cumulative effect by suppressing active travel modes.	strategic direction for transport and for promoting sustainable transport, which would in turn result in reduced funding for transport overall, results in adverse impacts on this SEA objective in the medium and long term.	including employment, education and health services, by accessible forms of transport. This should include provision for those not able to use cars, including the aged and those living in rural areas.	that the major scheme bid proposals will go some way towards addressing current congestion and adding to public transport provision in the short term as reported in the JLTP3 SEA Environmental Report.

SEA Objective 2: Reduce transport related air pollution

SEA Topic: Human Health, air quality, climatic factors, soil, biodiversity, water.

Description of the value and vulnerability of the area likely to be affected:

Residents in Bristol, Bath, Kingswood, Staple Hill and near M5 junction 17 (Cribb Causeway), particularly those declared Air Quality Management Areas (AQMA's), as well as locations in Keynsham. AQMAs have also been declared at Temple Cloud and Farrington Gurney on the A37.

Air pollution levels in parts of Bristol, B&NES and South Gloucestershire continue to exceed government standards for NO₂. Central Bath, Keynsham, Saltford, central Bristol, Kingswood and Staple Hill have active Air Quality Action Plans.

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
JLTP 4 Scenario	+	+	?	R/L	T/R	<p>Major long-term beneficial health effects on urban population are expected from policies and interventions which encourage modal shift away from private car use and those that promote active travel. Minor adverse health effects for population in close proximity to strategic road network, and those close to new proposed road links are expected at project / scheme level from policies promoting additional road links or upgrading local and strategic road network.</p> <p>The policies and interventions</p>	<p>Medium / Low certainty.</p> <p>There is a strong commitment from the West of England to shift journeys into cleaner and more sustainable transport modes.</p> <p>There are, however, various degrees of uncertainty with regards to planned actions, programme and funding of some of the interventions proposed.</p> <p>There is some uncertainty regarding whether improvements to the public transport system from the major schemes would be sufficient to counteract traffic growth.</p>	<p>Exposure reduction measure and ensure that any new road links are isolated from vulnerable receptors, would reduce the harmful effects of the policies promoting additional road links or upgrading local and strategic road network.</p> <p>Public transport vehicles should be of high modern standards to utilise alternative fuels where possible and minimise emissions.</p> <p>Where schemes / initiatives are time limited, new replacement schemes need</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>Additionally, it was based on the assumption that all schemes under these interventions would be delivered through the appropriate consenting processes and in line with relevant environmental legislation, including Environmental Impact Assessment (EIA).</p> <p>Detailed mitigation and</p>

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						<p>within JLTP4 have the potential to reduce traffic congestion and associated air pollution. The majority of policies and interventions would have a beneficial impact on improving air quality, yet many interventions are reliant on public shifts to more sustainable modes of transport.</p> <p>Potential effects are likely to be both variable across the region and dependent upon proximity of the vulnerable receptor to the road network.</p> <p>Future cleaner technologies may play a key role in reducing the amount of air pollution from transport in the longer term.</p>		to be implemented to maximise the opportunity for benefits over time.	enhancement opportunities will be developed as part of the design and consenting process at the scheme level.
Retention of JLTP 3 (with period plan extended to cover the period up to 2036)	?	+	+	L	T/R	<p>Once implemented and assuming successful modal shift, this option is likely to result in reduced traffic congestion along key routes within the urban areas and locations of likely residential development.</p>	<p>Low certainty.</p> <p>The success of this option depends upon achieving a modal shift away from car use. However, if the schemes are added without a reduction in overall traffic there may be a decline in air quality.</p>	Public transport vehicles should be of high modern standards to utilise alternative fuels where possible and minimise emissions.	This qualitative judgement was reached from a review of the major scheme business cases and an assumption about likely traffic growth as a result of population growth, as reported in the JLTP 3 SEA Environmental Report.

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						In the longer term it is possible that improvements to vehicle technology may reduce the amount of air pollution from transport.			
The “without plan scenario”	?	x	?	L	T/R	<p>The implementation of the major schemes would improve air quality if a corresponding modal shift from car to public transport was achieved. However, in the medium term the scale of the initial contribution of major schemes is unlikely to be sufficient to counteract a rise in traffic and therefore a decrease in air quality. In the longer term it is possible that improvements to vehicle technology may reduce the amount of air pollution from transport.</p>	<p>Medium certainty.</p> <p>The proposed schemes would lead to an improvement in air quality only if there is a general modal shift to public transport from car use. This shift to public transport is not likely without joint strategic direction promoting sustainable transport.</p>	<p>The major schemes would only be successful into the long term if measures are in place to decouple population growth and growth in car use. Without the JLTP4 this would have to be achieved through alternative policies or plans, such as planning restrictions.</p> <p>As with the other scenarios, public transport vehicles should be of high modern standards to utilise alternative fuels where possible and minimise emissions.</p>	<p>This qualitative judgement was reached from a review of the major scheme business cases and an assumption about likely traffic growth as a result of population growth as reported in the JLTP 3 SEA Environmental Report and the West of England Joint Transport Study (JTS) 2017. The JTS 2017, reports that the growth in numbers of people living and working in the area in the longer term to 2036 will result in a forecast 26% increase in trips between 2013 and 2036, with an increase in average delay of almost 40%.</p>

SEA Objective 3: Reduce transport related carbon emissions in line with national targets
SEA Topic: Human Health, air quality, climatic factors.
<p>Description of the value and vulnerability of the area likely to be affected:</p> <p>Transport is the largest contributor to carbon dioxide emissions in the West of England. Transport is responsible for 29% of CO₂ in the West of England, compared to 26% nationally. The medium term combined West of England carbon reduction target is to achieve a 50% in absolute CO₂ emissions by 2035 and by 83% by 2050 from 2014 levels. However, with more people living and working in the area, leading to significant increases in traffic, it will become progressively more challenging to reduce the overall carbon footprint.</p>

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
JLTP 4 Scenario	+	+	?	N	P/I	<p>Numerous policies within the LTP4 will have a minor positive or major positive on this SEA objective. However, there is significant uncertainty in the assessment. Most of the policies require a modal shift away from private car use, to more sustainable mode of transports (e.g bus, rail, tram, cycling).</p> <p>Success of the policies in the long term will depend upon whether traffic growth can be curbed and whether the required behavioural change associated with a shift towards sustainable travel modes takes place.</p> <p>Future cleaner technologies may play a key role in</p>	<p>Low certainty.</p> <p>There is a strong commitment from the West of England to shift journeys into cleaner and more sustainable transport modes.</p> <p>There are, however, various degrees of uncertainty with regards to planned actions, programme and funding of some of the interventions proposed.</p> <p>There is some uncertainty regarding whether improvements to the public transport system from the major schemes would be sufficient to counteract traffic growth.</p>	<p>Public transport vehicles should be of high modern standards to utilise alternative fuels where possible and minimise emissions.</p> <p>Where schemes / initiatives are time limited, new replacement schemes need to be implemented to maximise the opportunity for benefits over time.</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented, and on the assumption that all schemes under these interventions would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p> <p>It was also assumed that Bristol Airport will continue working towards their aim to deliver a low carbon, accessible, integrated, efficient and reliable transport network for travel to and from Bristol Airport for staff and passengers.</p>

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						reducing carbon emissions from transport in the longer term.			
Retention of JLTP 3 (with period plan extended to cover the period up to 2036)	x	+	+	N	P/I	<p>In the short term it is assumed that the trend towards increasing CO₂ levels would continue as proposed transport schemes would not be fully operational and the GBBN (which is almost complete) would not be enough in itself.</p> <p>However, assuming full implementation in the medium term, the programme of major public transport schemes may result in a reduction 5.5% reduction in CO₂ emissions and therefore make a minor positive contribution to the objective.</p>	<p>Medium / Low certainty.</p> <p>The reduction of 5.5% in CO₂ emissions assumes 4 schemes equivalent to the Hengrove North Fringe Package are implemented by 2020. The level of funding that may be available to deliver initiatives is uncertain.</p>	Further measures will be required to ensure successful modal shift for regular journeys and use of cleaner vehicles.	The judgement was made from a review of the JLTP 3 SEA Environmental Report.
The “without plan scenario”	x	xx	xx	N	P/I	Under the “Without Plan” scenario only a portion of the interventions identified in the draft JLTP 4 would be implemented. It is therefore assumed that the predicted reduction would not be	<p>High certainty.</p> <p>It is very likely that the lack of strategic direction for transport and for promoting sustainable transport would in adverse impacts on this SEA objective in the medium and long term. The west of England Joint Transport</p>	The major schemes would only be successful into the long term if measures are in place to decouple population growth and growth in car use. Without the JLTP4 this would have to be achieved through alternative policies or plans, such as	This judgement was reached from a review of the West of England Joint Transport Study which reports a 22% predicted increase from 2014 in CO ₂ transport emissions if no carbon reduction measures were introduced.

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						achieved and that in the longer term there would be a failure to reduce greenhouse gas emissions.	Study (JTS) reports a 22% predicted increase from 2014 in CO ₂ transport emissions if no carbon reduction measures were introduced.	planning restrictions.	

SEA Objective 4: Adapt transport network to effects of climate change and minimise the vulnerability of transport network to flood risk

SEA Topic: Material assets, climatic factors

Description of the value and vulnerability of the area likely to be affected:

Impacts from climate change might include increases in flooding, temperature, drought and extreme weather events. These could create risks and opportunities such as: impacts to transport infrastructure from melting roads or buckling rails and increases in tourism. In addition, climate change impacts on the resilience and standard of the transport network, include issues such as flooding, landslides, potholes, heat damage to roads and rail buckling.

The climate of the South West is changing, the annual average daily temperature in the South West region has increased 0.75°C from 9.80°C in 1961 to 10.55°C in 2018. Projections show that the South West of England could see an average summer temperature rise of 5°C by the 2080s.

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
JLTP 4 Scenario	N	+	?	All	P/R	It is expected that new transport infrastructure will be designed to be more resilient to climate change than existing transport infrastructure. Policies that improve strategic resilience, in particular, will have a positive impact on this SEA objective. However, the low-lying nature of much of the sub-region, and its coastal and tidal location, mean flood risk is likely to be an increasing concern. The effect of the JLPT on this SEA objective is assessed as neutral in the	Low / medium certainty. The main factors that contribute to the level of certainty are over the rate of climate change and the degree to which it will alter weather patterns in the medium and longer term. There is also lack of detail in relation to likely designs and locations of schemes in the LTP4.	Strategic and major transport infrastructure schemes will have to be designed to take into the effects of climate change in line with national policy. Detailed design should follow best practice guidance such as that provided within CIRIA Report C753 <i>The SuDS Manual</i> . The guidance covers the planning, design, construction and maintenance of Sustainable Drainage Systems (SuDS) to assist with their effective implementation within both new and existing developments. It looks at how to maximise amenity and	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented. In addition, schemes and programs will have to be delivered through the relevant consenting process and will be subject to Flood Risk Assessment (FRA) and EIA (where applicable).

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						short-term and uncertain in the long term. It is however acknowledged that there are opportunities for beneficial effects in the medium term.		biodiversity benefits, and deliver the key objectives of managing flood risk and water quality. Use of information regarding weather conditions and impact on travel can benefit transport users.	
Retention of JLTP 3 (with period plan extended to cover the period up to 2036)	N	+	?	R	P/R	<p>It is assumed that the programme of measures proposed under the draft JLTP3 would address requirements to withstand effects of climate change.</p> <p>For example, instability of earthworks and capacity of bridges, culverts and drainage systems to withstand wet/dry cycles and extreme flooding events</p>	<p>Low certainty.</p> <p>Whilst new transport projects may be designed to take into account climate change the scale and nature of extreme weather events may overwhelm transport infrastructure as seen in Gloucestershire and Cumbria.</p>	<p>New transport infrastructure to be designed to take into account the effects of climate change; by improving drainage systems, providing SuDS and planting trees to help mitigate effects of heat waves.</p> <p>Trees would create shade and have a cooling effect (Huang et al. 1987). Modelling work in Greater Manchester suggested that if we increase green cover in towns and cities by 10 per cent, we can keep surface temperatures at current levels despite climate change.</p>	<p>This judgement is a qualitative assessment and was reached from a review of the policies in relation to climate change adaptation in the emerging Core Strategies and a review of major scheme business cases for information on measures to address effects of climate change, as reported in the JLTP 3 SEA Environmental Report.</p> <p>Longer term the effects of climate change on transport infrastructure become increasingly unpredictable</p>
The “without plan scenario”	N	x	?	R	T/R	Without a medium to long term strategic programme of transport improvements it is assumed that the existing transport network would become increasingly	<p>Low certainty.</p> <p>Whilst new transport projects may be designed to take into account climate change the scale and nature of extreme</p>	New transport infrastructure to be designed to take into account the effects of climate change; by improving drainage systems, providing SuDS and	This judgement is a qualitative assessment and was reached from a review of the policies in relation to climate change adaptation in the emerging Core Strategies and a

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						vulnerable to predicted impacts of climate change. The long term effect is uncertain, for example a programme of measures may be implemented in the future to address issues arising relating to transport.	weather events may overwhelm transport infrastructure as seen in Gloucestershire and Cumbria.	planting trees to help mitigate effects of heat waves.	<p>review of major scheme business cases for information on measures to address effects of climate change, as reported in the JLTP 3 SEA Environmental Report.</p> <p>Longer term the effects of climate change on transport infrastructure become increasingly unpredictable</p>

SEA Objective 5: Protect and enhance biodiversity and ecological networks

SEA Topic: Biodiversity; flora and fauna.

Description of the value and vulnerability of the area likely to be affected:

There are eight internationally designated nature conservation sites within the West of England including Natura 2000 Habitats. There are several Site of Special Scientific Interest (SSSIs), Local Nature Reserves (LNRs) and numerous locally designated wildlife sites. Habitats within the region support a wide array of species including legally protected and Priority species.

The West of England Nature Partnership (WENP) was set up to create and coordinate for the restoration of the natural environment in the West of England area. Three ecological networks (grassland, woodland and wetland) have been identified across the West of England through WENP's Ecosystem Service Mapping. These networks are supported by biodiversity opportunity maps which identify the best areas for habitat restoration and creation. Additionally, the West of England's (WoE) Green Infrastructure (GI) Plan provides context for green infrastructure delivery and supports local Green Infrastructure Strategies. The Joint Spatial Plan commits the authorities to develop a WoE GI Plan and to delivering a 'net gain' for the environment. The GI Plan, currently under preparation, will identify the strategic measures and mechanisms to support, guide and implement the delivery of environmental commitments set within the JSP and Local Plans, including mitigation for protected sites. Further development of GI Plans at an authority level should also reflect schemes within this JLTP.

The four West of England unitary authorities have Biodiversity Action Plans (BAPs).

In accordance with the Conservation of Habitats and Species Regulations 2017, an Appropriate Assessment (AA) is being undertaken to establish whether the JLTP4 and proposals within it, (either alone or in combination with other plans and projects) are likely to significantly affect Natura 2000 sites or its designated species. The assessment provided here is preliminary pending on the findings of the AA.

Scenarios	Nature of effect on environment					Description of effect (Pending the results of the HRA AA)	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation (Pending the results of the HRA AA)	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
JLTP 4 Scenario	X?	X?	?			Policies and interventions involving strategic and major transport infrastructure schemes have been identified as having potentially adverse effects on this SEA Objective. Strategic and major road and rail infrastructure schemes	Low / medium certainty. Pending on the findings of the HRA AA. Although there is some uncertainty with regards to programme and funding of some of the strategic road and rail schemes, the combined effect of the predicted growth in the region with the various transport	Ensure a strategic approach to protecting biodiversity through the work of The West of England Nature Partnership (WENP) and the West of England (WoE) Green Infrastructure (GI) Plan. The GI Plan will identify the strategic measures and mechanisms to support, guide and implement the	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented. It is also assumed that schemes under this policy and interventions would incorporate opportunities to promote biodiversity and would be delivered through the appropriate

Scenarios	Nature of effect on environment					Description of effect (Pending the results of the HRA AA)	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation (Pending the results of the HRA AA)	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						<p>are likely to affect biodiversity in terms of habitat loss and fragmentation; impacts on protected or priority species; pollution (air, water, soils); and disturbance. European designated sites are particularly sensitive receptors. New networks may also lead to an increase in road kill.</p> <p>In accordance with the Conservation of Habitats and Species Regulations (HRA) 2017, an Appropriate Assessment is being undertaken. The HRA Screening exercise has identified some likely significant effects of major schemes on European sites and therefore it is going to be necessary to advance to the appropriate assessment (AA) stage of HRA. The assessment of the effects on this SEA objective are preliminary and will need to be informed by the findings of the HRA AA.</p>	<p>infrastructure schemes that may go ahead are likely to adversely affect biodiversity.</p> <p>Mitigation / enhancement measures included as part of the design and implementation of the specific schemes may offset some of the adverse effects.</p>	<p>delivery of environmental commitments set within the JSP and Local Plans, including mitigation for protected sites. Further development of GI Plans at an authority level should also reflect schemes within this JLTP.</p> <p>All strategic and major schemes will be delivered through the appropriate consenting process and will be subject to ecological assessment, and in compliance with relevant legislation for species protection. Detailed mitigation and monitoring measures will be developed as part of the assessment process.</p> <p>Schemes to be delivered through these interventions should also consider opportunities to promote biodiversity.</p> <p>It is recommended that major schemes have a Construction Environmental Management Plan (CEMP).</p> <p>The Habitats Regulation AA will provide the information with regards to mitigation associated with potential significant effects on European sites.</p>	consenting processes and in line with relevant environmental legislation.

Scenarios	Nature of effect on environment					Description of effect (Pending the results of the HRA AA)	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation (Pending the results of the HRA AA)	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
Retention of JLTP 3 (with period plan extended to cover the period up to 2036)	x	?	?	R	P/I	<p>This option generally makes use of existing infrastructure and therefore the effects are generally restricted to roadside habitats and species. Adjacent sites include some SSSIs as well as locally designated Wildlife Sites. Reductions in traffic may reduce road kill and improvements in air quality may benefit ecosystems. There may be opportunity to increase the biodiversity value of habitats adjacent to transport infrastructure through sensitive maintenance and management practices.</p>	<p>Medium certainty.</p> <p>Although this option in itself is unlikely to significantly affect the SEA objective, the overall planned growth for the region, including urban extensions onto greenfield sites is likely to have a cumulative adverse effect on the SEA objective. The planned growth for the region would involve incremental habitat loss although there is uncertainty as to how much growth would occur outside of the main settlements.</p>	<p>Detailed ecological assessment work should be undertaken for each development. It may be feasible to include roadside habitat enhancements as part of maintenance routines.</p>	<p>This judgement was reached from a review of the major scheme alignments, the major scheme bids and environmental reports as well as use of GIS data sets, as reported in the JLTP 3 SEA Environmental Report.</p>
The “without plan scenario”	x	x	x	R	P/I	<p>As per JLTP 3, option generally makes use of existing infrastructure and therefore the effects are generally restricted to roadside habitats and species. Adjacent sites include some SSSIs as well as locally designated</p>	<p>Medium certainty.</p> <p>The planned growth for the region would involve incremental habitat loss.</p>	<p>Detailed ecological assessment work should be undertaken for each development. It may be feasible to include roadside habitat enhancements as part of maintenance routines.</p>	<p>This judgement was reached from a review of the major scheme alignments, the major scheme bids and environmental reports as well as use of GIS data sets.</p>

Scenarios	Nature of effect on environment					Description of effect (Pending the results of the HRA AA)	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation (Pending the results of the HRA AA)	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						Wildlife Sites. Without strategic intervention towards a more sustainable transport shift, increased emissions and disturbance associated with the predicted traffic flows in this scenario would adversely affect this SEA objective.			

SEA Objective 6: Promote human health.**SEA Topic: Human health, air quality, climatic factors.****Description of the value and vulnerability of the area likely to be affected:**

The health of people in Bath & NE Somerset and South Gloucestershire is generally better than average for England, while the health of people in Bristol and North Somerset is varied when compared to the England average. The proportion of adults who are physically active in all four authorities is significantly better than the England Average, as is the proportion of adults with excess weight. Similarly, the proportion of obese children (ages 10-11) is significantly better in all local authorities apart from Bristol, where it is similar to the England average. There are pockets of health inequalities within the region, particularly in the urban environment of Bristol which is one of the 20% most deprived authorities in England. The proportion of the population in North Somerset with a limiting or long term illness or disability is significantly worse than the England Average, which likely reflects the larger than average proportion of the population who are over 65.

The West of England has made significant progress in improving options for travel by active modes, bus and rail, with substantial growth in the numbers of trips made by cycling, bus and rail during the last decade (60% by rail, 30% by bus and 50% by cycling between 2008/09 and 2015/16). Without investment in sustainable transport measures the road network will become increasingly congested with significant associated health costs. Congestion detracts from the quality of life for local people by creating noise, pollution, road safety and health problems and creates barriers for more vulnerable travellers, such as cyclists, pedestrians and the disabled.

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
JLTP 4 Scenario	+	++	++	R	T/R	The majority of the policies and interventions included in the Draft JLTP4 have as key objectives promoting more sustainable and active modes of travel which would result in benefits on human health. Encouraging more journeys to be made by active travel modes improves physical and mental health, quality of	Medium certainty. There is uncertainty with regards to the policies and interventions associated with strategic and major road and rail schemes. Whilst there is potential for major beneficial effects in terms of improving access and mobility, potential beneficial effects might be offset by increased noise, air pollution and / or severance resulting from some of the proposed strategic road and rail	All strategic and major schemes (including new development sites) will be delivered through the appropriate consenting process and will be subject to Environmental Impact Assessment (EIA) which includes assessment of health. Detailed mitigation and monitoring measures to minimise potential adverse effects (such as potential adverse noise effects) will be	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented. Additionally, it was assumed that schemes under these interventions would be delivered through the appropriate consenting processes.

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						life and the environment. Direct beneficial effects on human health would result from increased physical activity whilst indirect effects may derive from less congested roads as well as improved access to services and opportunities which may tackle some of the inequality issues which may also underlain health issues.	improvements at certain locations.	developed as part of the EIA process. Enhancement opportunities should also be considered as part of the development and consenting process of the larger schemes. Charging measures could negatively impact those on a low income or unemployed seeking access to employment or education opportunities, as well as people with limited mobility who are unable to use public transport or active travel options. Any charging scheme should consider exemptions for drivers with specific needs.	
Retention of JLTP 3 (with period plan extended to cover the period up to 2036)	+	+	?	R	T/R	The majority of listed potential schemes under this option would provide opportunity for active travel through the inclusion of pedestrian and cyclist facilities. Promoting active modes would result in beneficial effects on human health by promoting more active and less polluting modes of transport than the use of private car, as well as improving access to employment	Medium certainty. Although there is a growing trend towards car dependency, initiatives in the West of England to encourage cycling have resulted in a 50% growth between 2003/4 and 2008/9. Therefore, there is clear evidence that initiatives can be successful in encouraging active travel.	Anecdotal evidence from Directors of Public Health suggests that the uptake of cycling initiatives is higher in wealthier areas than the more deprived areas. The causes of this should be investigated in order to target any inequality in provision for active travel modes or education and promotions. Pedestrian and cycle routes should be well maintained. Suitable signage along pedestrian and cycle routes	This judgement was reached from a review of the success of the first two LTPs, a consideration of health inequalities and results of consultation with Directors of Public Health, as reported in the JLTP 3 SEA Environmental Report.

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						opportunities. It is not clear whether significant gains in active travel would persist beyond the life of the JLTP3 as it is dependent upon continued policies to promote alternative travel modes.		should be in place to help people navigate their way effectively.	
The “without plan scenario”	+	N	?	R	T/R	<p>Under the “Without Plan” scenario only a portion of the interventions identified in the draft JLTP 4 would be implemented. Although many of the schemes that may still go ahead in the short term would contribute to the objective to promote active travel through the inclusion of pedestrian and cycle facilities as well as encouraging walking as part of a journey via public transport. However, in the medium and long term, without further action, it is likely that traffic growth would further discourage active travel. Without investment in sustainable transport measures the</p>	<p>Medium certainty.</p> <p>There is a growing trend towards car dependency and a correlation between this trend and a trend towards obesity and other health effects related to sedentary lifestyles.</p>	Reduced speeds in residential areas are likely to lead to an increase in pedestrian and cycling activity.	This judgement was reached from a review of the success of the first two LTPs, a consideration of health inequalities and results of consultation with Directors of Public Health, as reported in the JLTP 3 SEA Environmental Report.

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						road network will become increasingly congested with significant associated health costs. Congestion detracts from the quality of life for local people by creating noise, pollution, road safety and health problems and creates barriers for more vulnerable travellers, such as cyclists, pedestrians and the disabled.			

SEA Objective 7: Improve road safety, particularly for vulnerable users, and to reduce road casualties

SEA Topic: Human health, population

Description of the value and vulnerability of the area likely to be affected:

National target to reduce number of killed and seriously injured road casualties by 33% by 2020. Amongst vulnerable road users – motorcyclists, pedestrians (especially elderly and children), and cyclists are disproportionately represented in accident statistics in relation to either the volume of traffic they represent or the distance travelled by mode. Many people perceive roads to be dangerous places and feel intimidated by traffic. Many streets are perceived to have safety or security issues, including high numbers of heavy vehicles.

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
JLTP 4 Scenario	+	++	++	R	P/I	The majority of policies will have a positive impact on improving road safety. Particularly, Policy W2 (which improves the road safety for motorcyclists), Policy L1 (through providing education for cyclists) and Policy L2 (using education and implementation of cycle lanes etc.) will all have a major positive impact on the SEA objective.	Medium certainty. There is some long-term uncertainty, regarding funding for schemes and raw data statistics on how specific schemes will reduce casualties.	Where schemes / initiatives are time limited, new replacement schemes need to be implemented to maximise the opportunity for benefits over time. Road safety camera enforcement provides opportunity for driver education. Targeting road safety campaigns at motorcyclist safety. Motorcyclists are disproportionately represented in road accident statistics. New projects should be subject to safety audit checks.	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented. There is an assumption that any improvements to the wider road network will also lead to improvements to road safety through design.
Retention of JLTP 3 (with period plan extended to cover the period	+	++	++	R	P/I	This option would increase overall provision of public transport which is a safer form of travel and would also promote	Medium certainty. Higher rates of walking and cycling are associated with safer conditions. However, an	For residents of deprived areas to benefit from improved safety, accessibility to safer travel modes needs to be considered including physical access (to	This assessment was reached following a review of the likely factors that contribute to the risk of accidents or high numbers of killed or seriously

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
up to 2036)						<p>walking and cycling. Places with higher rates of walking and cycling tend to be safer for all vulnerable road users.</p> <p>It is assumed that investment in road safety initiatives (as outlined in the draft JLTP3 Road Safety Supplementary Document) would support a continued decrease in casualty rates over the life of the JLTP3.</p>	<p>increase in cycling may result in greater numbers of collisions involving cyclists (although the risk per individual is likely to decrease).</p> <p>Furthermore, uptake of safer modes for people in deprived areas depends upon location of bus stops/train stations and prices of fares.</p> <p>Improvements to safety features within cars may help improve safety. Road safety camera enforcement provides opportunity for driver education.</p>	<p>bus stops and trains stations) as well as financial access (cost of fares).</p> <p>Anecdotal evidence from Directors of Public Health suggests that the uptake of cycling initiatives is higher in wealthier areas than more deprived areas. The causes of this should be investigated in order to target any inequality in provision for active travel modes or education and promotions.</p> <p>New projects are subject to safety audit checks.</p>	<p>injured, together with an assumption on whether those factors would be more or less significant under this scenario as reported in the JLTP 3 SEA Environmental Report.</p>
The “without plan scenario”	+	?	?	R	P/I	<p>The major schemes included within this scenario would help reduce congestion and provide a safer form of travel than car use. However, without longer term strategic action it is likely that the likely overall rise in car usage across the region (as a result of a growing population) as well as increasing population density within urban areas. Since more accidents occur in urban areas this scenario would likely see a rise in accidents associated with increased risk of road user conflict and manoeuvring</p>	<p>Low certainty.</p> <p>Improvements to safety features within cars may help improve safety.</p> <p>Road safety camera enforcement provides opportunity for driver education.</p>	<p>Lower speed limits (20mph) within residential areas are likely to improve safety in urban areas</p> <p>Targeting road safety campaigns at motorcyclist Safety. Motorcyclists are disproportionately represented in road accident statistics.</p> <p>New projects are subject to safety audit checks.</p>	<p>This assessment was reached following a review of the likely factors that contribute to the risk of accidents or high numbers of killed or seriously injured, together with an assumption on whether those factors would be more or less significant under this scenario.</p>

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						vehicles.			

SEA Objective 8: Minimise adverse effects on soils such as loss, compaction, erosion and pollution from transport related activities.

SEA Topic: Soil, biodiversity, water, landscape.

Description of the value and vulnerability of the area likely to be affected:

The West of England has a varied and diverse range of soil types. Although the urban area covering the West of England is significant at over 21 per cent, much of the surrounding rural landscape is farmed. Agriculture is mainly livestock rearing, with arable in the flatter land to the north-east. Valleys and steeper slopes in the south-east tend to have irregular fields and overgrown, species-rich hedges.

Soil erosion and field run-off linked to agricultural land management is currently one of the biggest issues for the region. It is leading to impacts on water quality, aquatic wildlife and bathing waters as well as on landscape. The pressure for growth in the region is likely to increase pressure on land. This is likely to contribute to incremental loss of soils as well as compaction, organic matter decline and erosion. Climate change has the potential to increase erosion rates with hotter, drier conditions that make soils more susceptible to wind erosion, alongside heavy rain that can wash soil away.

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
JLTP 4 Scenario	X	X	?	R	P/I	<p>Policies and interventions involving major transport infrastructure schemes have been identified as having adverse effects on this SEA Objective. Strategic and major road and rail infrastructure schemes would result in direct adverse effects on soils in terms of loss and compaction where these are to be delivered on undeveloped land. Operational effects may result in pollution, erosion</p>	<p>Medium certainty.</p> <p>Although there is some uncertainty with regards to programme and funding of some of the proposed improvements, the combined effect of the predicted growth in the region with the infrastructure schemes that may go ahead are likely to increase pressure on land and hence adversely affect soils.</p>	<p>Ensure a strategic approach to protecting biodiversity through the work of The West of England Nature Partnership (WENP) and the West of England (WoE) Green Infrastructure (GI) Plan. As noted under SEO 5 above, further development of the West of England's GI Plans at an authority level should also reflect schemes within this JLTP.</p> <p>All strategic and major schemes will be delivered</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>Additionally, it was based on the assumption that schemes under these interventions would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						<p>and increased run-off. Due to the relative permanence and irreversibility of soil loss, the potential effect should be regarded as significant.</p> <p>Transport schemes to be delivered on previously developed land would result in beneficial effects through the remediation of contaminated soils.</p>		through the appropriate consenting process and it is recommended that major schemes have a Construction Environmental Management Plan (CEMP). This would include mitigation and monitoring measures to avoid and minimise the degradation of soil resources.	
Retention of JLTP 3 (with period plan extended to cover the period up to 2036)	X	X	N	R	P/I	<p>The accepted major schemes would cause some permanent loss of greenfield locations in the short term.</p> <p>This is particularly the case for the proposed South Bristol Link. The inclusion of highway developments within this option in particular would continue to cause a cumulative loss of soils in association with wider policies for urban extensions to Bristol and associated alterations to the greenbelt.</p>	<p>Medium certainty.</p> <p>The Regional Spatial Strategy for the South West is not adopted and therefore there is uncertainty about its final content.</p> <p>Nevertheless, it is likely that there would be an impact upon agricultural land from spatial planning policies in the region.</p>	Any new infrastructure schemes that are likely to impact soils should be subject to detailed assessment work in order to seek alignments that minimise the degradation of this resource.	This judgement was reached from a review of emerging spatial planning policy, particularly the emerging core strategies, as reported in the JLTP 3 SEA Environmental Report.
The “without plan scenario”	X	X	X	R	P/I	The accepted major schemes that would still be delivered in this scenario would cause	<p>Medium certainty.</p> <p>The Regional Spatial</p>	In seeking to accommodate the sub-region’s housing and employment needs, local	This judgement was reached from a review of emerging spatial planning policy,

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						<p>some permanent loss of greenfield locations in the short term. This is particularly the case for the proposed South Bristol Link. The inclusion of highway developments within this option in particular would continue to cause a cumulative loss of soils in association with wider policies for urban extensions to Bristol and associated alterations to the greenbelt.</p>	<p>Strategy for the South West is not adopted and therefore there is uncertainty about its final content.</p> <p>Nevertheless, it is likely that there would be an impact upon agricultural land from spatial planning policies in the region.</p>	<p>authorities should continue to prioritise brown field locations for remediation and development before allowing a permanent loss of productive soils.</p>	<p>particularly the emerging core strategies, as reported in the JLTP 3 SEA Environmental Report.</p>

<p>SEA Objective 9: Protect, and where possible improve, water quality</p> <p>SEA Topic: Water, biodiversity, human health</p>
<p>Description of the value and vulnerability of the area likely to be affected:</p> <p>The South West has the most ambitious improvement targets in the country, which is to get 43% of the 1,100 waterbodies into good ecological status by 2015 (Environment Agency, 2012). In addition to this, the Severn River Basin District RBMP (River Basin Management Plan) was prepared in compliance with the Water Environment (Water Framework Directive) (England and Wales) Regulations.</p> <p>The quality of water in rivers, streams, rhynes and ditches can be affected by the construction of transport infrastructure as well as the use of transport. Pollution of watercourses can occur through the organic content of silt, other organic substances such as engine oil and rubber, de-icing salt, metals (mainly as a result of vehicle corrosion), and fertilisers and pesticides from roadside verge maintenance. In addition, there is the risk of occasional spillages of pollutants in the event of an accident. Pollutants can particularly accumulate during long dry spells and lead to highly polluting surface water run-off when it rains.</p>

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
JLTP 4 Scenario	?	+	+	R	T/R	<p>Policies and interventions involving major transport infrastructure schemes have been identified as having potential to result in adverse effects on this SEA Objective. It is expected, however, that new transport infrastructure will be designed following current best practice guidance and hence should include mitigation measures inherent to the scheme design. Overall, the potential effect on this SEA objective has been assessed as being</p>	<p>Low / Medium certainty – There is some uncertainty with regards to programme and funding of some of the schemes.</p> <p>The potential effects are location and scheme design dependent.</p>	<p>Detailed design should follow best practice guidance such as that provided within CIRIA Report C753 <i>The SuDS Manual</i>. The guidance covers the planning, design, construction and maintenance of Sustainable Drainage Systems (SuDS) to assist with their effective implementation within both new and existing developments. It looks at how to maximise amenity and biodiversity benefits, and deliver the key objectives of managing flood risk and</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>Additionally, it was based on the assumption that schemes proposed within JLTP4 would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						uncertain at this strategic level although recognising the potential for water quality improvements.. There is the potential for adverse effects but also opportunities for beneficial effects through improved drainage design.		<p>water quality. As noted under SEAO 5 above, further development of the West of England's GI Plans at an authority level should also reflect schemes within this JLTP. This strategic joint approach may assist in delivering opportunities for water quality improvements.</p> <p>All strategic and major schemes will be delivered through the appropriate consenting process and will be subject to EIA and relevant environmental mitigation. Detailed mitigation and monitoring measures will be developed as part of the EIA process.</p> <p>It is also recommended that major schemes have a CEMP to minimise adverse impacts during construction.</p>	
Retention of JLTP 3 (with period plan extended to cover the period up to 2036)	?	?	?	R	T/R	The accepted major schemes have the potential to result in adverse effects on this SEA Objective. It is expected, however, that new transport infrastructure will be designed following current best practice guidance and hence should	<p>Low / Medium certainty – There is some uncertainty with regards to programme and funding of some of the schemes.</p> <p>The potential effects are location and scheme design</p>	<p>Detailed design should follow best practice guidance such as that provided within CIRIA Report C753 <i>The SuDS Manual</i>.</p> <p>It is also recommended that major schemes have a CEMP to minimise adverse</p>	<p>The judgement was based on the level of information available in the JLTP3 SEA Environmental Report.</p> <p>Additionally, it was based on the assumption that schemes proposed within JLTP3 would</p>

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						include mitigation measures inherent to the scheme design. The potential effect on this SEA objective has been assessed as being uncertain.	dependent.	impacts during construction.	be delivered through the appropriate consenting processes and in line with relevant environmental legislation.
The “without plan scenario”	?	?	?	R	T/R	The accepted major schemes have the potential to result in adverse effects on this SEA Objective. It is expected, however, that new transport infrastructure will be designed following current best practice guidance and hence should include mitigation measures inherent to the scheme design. The potential effect on this SEA objective has been assessed as being uncertain.	Low / Medium certainty – There is some uncertainty with regards to programme and funding of some of the schemes. The potential effects are location and scheme design dependent.	Detailed design should follow best practice guidance such as that provided within CIRIA Report C753 <i>The SuDS Manual</i> . It is also recommended that major schemes have a CEMP to minimise adverse impacts during construction.	The judgement was based on the level of information available in the JLTP3 SEA Environmental Report. Additionally, it was based on the assumption that schemes proposed within JLPT3 would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.

SEA Objective 10: Minimise waste produced and resources consumed by transport and infrastructure and operation of transport services.					
SEA Topic: Material assets, climatic factors.					
<p>Description of the value and vulnerability of the area likely to be affected:</p> <p>The construction industry is a major source of waste in England. Of English local authority expenditure on construction and renovation, 22% was spent on transport. Dominant transport modes depend upon fossil fuels which are a finite resource.</p> <p>The Adopted Joint Waste Core Strategy (2011), outlines the ambition that by 2026, the West of England will be resource efficient with waste generation minimised, in line with the waste hierarchy, and operating a waste management infrastructure, with sufficient capacity to deal with the amount of waste generated in the West of England. The Ecological Footprint, as reported in the South West Observatory's "State of the South West" shows that if everyone on the planet consumed natural resources and energy like the average South West resident, it would take three planets to support us. Travel is listed as being responsible for 17% of our ecofootprint which is currently above the national average. The evidence that the ecological footprint due to travel in the South West is greater than the national average is a key area of concern.</p>					

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
JLTP 4 Scenario	X	X	?	N	T/R	Generally, policies and interventions under consideration seek to make good use of existing infrastructure whilst new schemes would be designed in line with relevant policy and legislation aimed at minimising the production of waste and making sustainable use of resources. However, JLTP 4 comprises major new transport infrastructure which will result in significant use of	Medium / Low certainty. There is a lot of uncertainty in the assessment due to uncertainty regarding specific schemes material and waste use.	New schemes and developments should incorporate detailed mitigation and enhancements aiming to use resources sustainably. This can include implementing Site Waste Management Plans. Ensure scheme design incorporates measures to minimise future maintenance requirements. Seek to make best use of	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented. It is also assumed that schemes under this policy would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						materials such as aggregates and generation of waste. Interventions aimed at promoting alternative modes to private car would reduce reliance on fossil fuels. The overall effect on this SEA objective has been assessed as likely to be adverse.		existing infrastructure to minimise resource consumption and waste generation should be pursued before constructing new facilities	
Retention of JLTP 3 (with period plan extended to cover the period up to 2036)	+	+	?	N	T/R	<p>Under this option it is anticipated that the major schemes would generate some waste but would also make efficient use of existing infrastructure where possible and therefore contribute to the SEA objective overall.</p> <p>Furthermore, there would be reduced reliance on fossil fuels for private cars. The longer-term effects are unclear as they depend upon transport policies beyond the life of the JLTP3.</p>	<p>Medium certainty.</p> <p>There is uncertainty about the actual design and route alignments of many of the potential schemes contained within the option.</p>	Clear targets for resource efficiency and use of recycled materials should be set out in Site Waste Management Plans for all new infrastructure as well as maintenance programmes.	This judgement was based on the assumption that overall the option would make more efficient use of existing infrastructure than it would require new infrastructure and demolition of existing facilities, as reported in the JLTP 3 SEA Environmental Report.
The “without plan scenario”	+	X	?	N	T/R	<p>Under this option it is anticipated that the major schemes would generate some waste but would also make efficient use of existing infrastructure where possible. However, in the longer term it is likely that piecemeal development takes place to</p>	<p>Low certainty.</p> <p>It is uncertain how patterns of development and population growth would impact upon existing transport infrastructure.</p> <p>However it is anticipated that without a long term transport</p>	<p>Options to make better use and management of existing infrastructure should be pursued before constructing new facilities.</p> <p>Clear targets for resource efficiency and use of recycled materials should be set out in</p>	This judgement was made based upon the assumption that opportunities for good planning and efficient operation or the transport network would be missed without the JLTP 4.

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						meet demand rather than the most effective use being made of existing facilities. Increasing congestion would lead to inefficient use of transport fuels.	strategy, demand for further road space would increase, resulting in further overall development.	Site Waste Management Plans for all new infrastructure as well as maintenance programmes.	

SEA Objective 11: Protect and enhance the rich diversity of the historical and cultural environment, its heritage assets and their setting.

SEA Topic: Cultural heritage, landscape and soils

Description of the value and vulnerability of the area likely to be affected

The West of England has diverse cultural assets from the World Heritage Site in Bath, industrial heritage in Bristol to culturally distinct boundaries and rhydes and known and potential archaeological remains. These assets have intrinsic and economic value (attracting tourism).

Particularly, Bristol had 33 Conservation Areas, over 90 historic parks and gardens and 4,137 listed buildings. Bath was designated as a World Heritage Site in 1987 and there are also 37 Conservation Areas, 11 historic parks and gardens, 84 Schedules Ancient Monuments and 6,400 listed buildings. North Somerset has 36 Conservation Areas, 8 historic parks and gardens, 66 Schedules Ancient Monuments and 1,074 listed buildings. South Gloucestershire has 30 Conservation Areas, 8 historic parks and gardens, 37 Schedules Ancient Monuments and c. 2,000 listed buildings. Key concerns to the historic environment are the protection of Bath as an internationally valued site as well as air pollution and the vibration of vehicles.

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
JLTP 4 Scenario	X	X	?	All	P/I	<p>The West of England has diverse cultural assets in both urban and rural locations.</p> <p>In the short and medium term, the construction of strategic and major schemes is likely to adversely affect heritage. However, in some policies (W5 and W1) are likely to reduce pressure from traffic in the cities of Bath and Bristol and therefore reduce impacts on their cultural heritage assets.</p> <p>Due to the relative</p>	<p>Medium certainty.</p> <p>Although there is some uncertainty with regards to programme and funding of some of the strategic road and rail schemes, the combined effect of the predicted growth in the region with the various transport infrastructure schemes that may go ahead are likely to adversely affect heritage.</p> <p>Mitigation / enhancement measures included as part of the design and implementation of</p>	<p>The JLTP provides an opportunity to improve the setting and integrity of the WoE's historic places, and ensure future development is appropriately considered and designed to respond to local context.</p> <p>Good design (following best practice guidance such as <i>Highways England – the road to good design</i> (2018)), and cultural heritage assessments (as part of Environmental</p>	<p>The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented.</p> <p>Additionally, it was based on the assumption that schemes under these interventions would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.</p>

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						permanence and irreversibility of damage to heritage assets, the potential effects (both adverse and beneficial) should be regarded as significant.	the specific schemes may offset some of the adverse effects.	Impact Assessments where appropriate) should be required for all strategic and major schemes to minimise potential adverse impacts and maximise opportunities for beneficial effects .	
Retention of JLTP 3 (with period plan extended to cover the period up to 2036)	X	+	?	L	P/I	<p>During construction there are likely to be adverse effects on cultural heritage.</p> <p>However, once implemented this option is likely to reduce pressure on heritage features within the urban environment whilst making little difference to the baseline without the plan outside of the key urban areas. Due to the high sensitivity of the features within Bath and Bristol, the benefits may outweigh the negative effects associated with the baseline.</p>	<p>Medium certainty.</p> <p>The Bath Package and combination of public transport interventions for Bristol are likely to continue to improve the overall urban environment and context of their heritage features.</p>	<p>It is recommended that all new schemes are subject to detailed archaeological appraisal (where relevant as part of Environmental Impact Assessment) in order to address potential impacts on the archaeological resource.</p> <p>Designs should be sympathetic to the local distinctiveness.</p>	Qualitative assessment based upon a review of the major scheme information and likely impact of regional spatial planning, as reported in the SEA Environmental Report.
The “without plan scenario”	X	X	?	L	P/I	The overall effect is assessed as being adverse due to the pressure for urban extensions to accommodate new housing, which is likely to impact boundary features and character (such as the	<p>Medium certainty.</p> <p>The sub-region has seen and is likely to continue to see widespread change in character from new development and a growing population</p>	It is recommended that all new schemes are subject to detailed archaeological appraisal (where relevant as part of Environmental Impact Assessment) in order to address potential impacts on	Qualitative assessment based upon a review of the major scheme information and likely impact of regional spatial planning.

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						context of village churches) as well as potential archaeological remains. However there are likely to be some localised benefits such as reduced pressure on the World Heritage Site from the Bath Package.		the archaeological resource.	

SEA Objective 12: Maintain and enhance the quality and character of the built environment and landscape

SEA Topic Cultural heritage, landscape / townscape

Description of the value and vulnerability of the area likely to be affected

The cities of Bristol and Bath, as well as towns across the sub region are vulnerable to effects of traffic congestion and noise. Demand for parking space and other transport infrastructure limits availability of land use for leisure, retail or recreational uses. Good design is fundamental to achieving high-quality, attractive places that are socially, economically and environmentally sustainable.

The West of England also has a number of statutory and non-statutory landscape designation including Green Belt (the Bristol/Bath Green Belt was designated in 1966), Areas of Outstanding Natural Beauty (AONB's), Bath World Heritage Site and the Forest of Avon. The JLTP4 would potentially impact on local areas of public space or landscape with settlements or disused former transport corridors such as former railway lines which may have now become more naturalized into the general landscape. Impacts can include potential loss of landscape features (trees, hedgerows and local walls), increased in light pollution, loss of tranquility and new sources of noise. The Bristol, Avon Valleys and Ridge Landscape Character Area may be impacted by the schemes within the JLTP4. Transport infrastructure can also incorporate inappropriate signage, lighting columns, road surfaces and other harmful impacts on the landscape if not carefully managed.

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
JLTP 4 Scenario	X	X	?	R	P?I	Noise and congestion from traffic can seriously degrade the quality of the urban environment. The policies which are likely to have the most positive on this SEA objective are those which limit opportunity for private car use within urban centers and free up space for other activities and improvements to the urban realm. Impacts from major schemes	Medium / low. There is some uncertainty with regards to programme and funding of some of the schemes. Design is also uncertain, and use of materials and siting will be important to avoid or minimise impacts on built environment.	Good design (following best practice guidance such as <i>Highways England – the road to good design</i> (2018)), and landscape/townscape and visual assessments (as part of EIA where appropriate) should be required in all strategic and major schemes to minimise potential adverse impacts and maximise opportunities for benefits. Design the proposed	The judgement was based on the level of information available and the assumption that the relevant interventions in the JLTP4 would be implemented. It is also assumed that schemes under this policy would be delivered through the appropriate consenting processes and in line with relevant environmental legislation.

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						<p>are, however, likely to be on green belt land around the urban fringes. Introduction of new infrastructure would result in negative impacts on the landscape in terms of visual impacts and increased noise during construction and operation. Major development schemes also have the potential to have impacts on landscape setting.</p> <p>Overall, this objective will have a minor significant adverse impact on this SEA objective in the short and medium term. Long term impacts will depend on mitigation at a scheme specific level.</p>		<p>infrastructure sensitively to reduced visual impact and to include effective landscaping scheme to soften any major structures.</p> <p>It is recommended that signage and infrastructure for pedestrians and cyclists is designed to be sympathetic to the local distinctiveness whilst remaining clear, visible and informative.</p> <p>Further development of The West of England's GI Plans at an authority level should also reflect schemes within this JLTP. Measures to discourage car use within urban centres should be pursued to maximise use of alternative modes provided and to reduce traffic congestion and noise.</p> <p>A modal shift away from car use is needed to maximise the potential beneficial impacts of JLTP4 on this SEA objective.</p>	
Retention of JLTP 3 (with period plan extended to cover the period	X	X	?	R	P/I	<p>The accepted major schemes would be likely to help reduce congestion and improve urban environments, particularly in Bath.</p>	<p>Low certainty.</p> <p>There is uncertainty over whether proposals to alter the greenbelt designation to allow</p>	<p>Development on the urban fringe should be sensitive to landscape character. All new development should be subject to landscape assessment and</p>	<p>This judgement was reached taking into account current trends in traffic growth and car use and the associated demands this makes for</p>

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
up to 2036)						<p>It is not anticipated that the Bath and Weston-super-Mare packages would significantly impact views from the AONBs since they would be set within the context of existing urban areas and of minor scale compared with proposals for urban extension. However, each of the major schemes will have a slight cumulative adverse effect on landscape, particularly through the loss of some landscape features, on a localised scale. In general, the pressure for urban extensions into existing greenbelt will have an overall negative effect on landscape, particularly the Bristol, Avon Valleys and Ridges Joint Character Area which is already neglected and the Somerset Levels and Moors JCA which is currently maintained but under pressure from development.</p> <p>The Yate package may have a minor additional impact, particularly the park and ride facility being considered for Nibley. However, this is likely to be localised and set against</p>	<p>for proposed urban extensions will go ahead. .</p> <p>Nevertheless, there is significant pressure around the urban fringes and along major transport routes that indicate landscape change identified by the Countryside Quality Counts data will continue into the long term.</p> <p>It is possible that the accepted schemes, together with other ongoing initiatives and land use planning would have a more significant effect on the SEA objective.</p>	<p>design to ensure new proposals are integrated into the landscape and adverse visual impacts are minimised.</p> <p>Measures to discourage car use within urban centres should be pursued in order to maximise use of alternative modes provided and to reduce traffic congestion and noise.</p>	space within urban centres.

Scenarios	Nature of effect on environment					Description of effect	Level of uncertainty (high / medium / low) and notes	Suggested mitigation and implementation	How the judgement was reached
	Short Term	Medium Term	Long Term	Scale	Permanence & Reversibility				
						the general context of urban growth.			
The “without plan scenario”	X	X	?	R	P/I	<p>The accepted major schemes are likely to help reduce congestion and improve urban environments, particularly in Bath. Without strategic action, car use is likely to increase and lack of planning for this increase could lead to piecemeal measures to cope with rising demand such as additional car parks on derelict city sites which undermine efforts to improve the quality of built environment.</p> <p>Adverse effects of the accepted major schemes would be as per the Retention of the JLTP3 scenario above.</p>	<p>Low certainty.</p> <p>There is uncertainty over whether proposals to alter the greenbelt designation to allow for proposed urban extensions will go ahead.</p> <p>Nevertheless, there is significant pressure around the urban fringes and along major transport routes that indicate landscape change identified by the Countryside Quality Counts data will continue into the long term.</p> <p>It is possible that the accepted schemes, together with other ongoing initiatives and land use planning would have a more significant effect on the SEA objective.</p>	<p>Development on the urban fringe should be sensitive to landscape character. All new development should be subject to landscape assessment and design to ensure new proposals are integrated into the landscape and adverse visual impacts are minimised.</p> <p>Measures to discourage car use within urban centres should be pursued in order to maximise use of alternative modes provided and to reduce traffic congestion and noise.</p>	<p>This judgement was reached taking into account current trends in traffic growth and car use and the associated demands this makes for space within urban centres as reported in the JLTP3 SEA Environmental Report .</p>



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