Worcestershire County Council

Worcestershire's Local Transport Plan 2018 – 2030

Strategic Environmental Assessment Report

Worcestershire Local Enterprise Partnership

worcestershire county council

Contents

Non-Technical Summary

What is Strategic Environmental Assessment?

A Strategic Environmental Assessment (SEA) has been carried out to inform the development of Worcestershire's Local Transport Plan 2018 – 2030. Local Transport Authorities such as Worcestershire County Council use SEA to assess Local Transport Plans against a set of environmental objectives developed in consultation with interested parties. The purpose of the assessment is to avoid adverse environmental and socio-economic effects, and identify opportunities to improve the environmental quality of Worcestershire and the quality of life of residents through the Local Transport Plan.

What is Worcestershire's Local Transport Plan 2018 – 2030?

Worcestershire's Local Transport Plan 2018 – 2030 (LTP4) sets out a transport plan for Worcestershire in the period to 2030. The LTP will update Worcestershire County Council's third Local Transport Plan, which was adopted in 2011.

The LTP4 sets out the issues and Worcestershire County Council's priorities for investment in transport infrastructure, technology and services to support travel by all relevant modes of transport, including walking, cycling, rail, highways (car, van, freight and motorcycles), bus and community transport. The approach recognises that the county's transport networks have a finite capacity. Recognising the financial constraints relating to increased capacity, Worcestershire County Council aims to target investment in three broad areas:

- Transport technology;
- Travel choice; and
- Capacity enhancement.

It is currently anticipated that the LTP4 will be adopted in 2018.

The key objectives for the LTP4 are as follows:

- To support Worcestershire's economic competitiveness and growth through delivering a safe, reliable and efficient transport network;
- To limit the impacts of transport in Worcestershire on the local environment, by supporting enhancements to the natural environment and biodiversity, investing in transport infrastructure to reduce flood risk and other environmental damage, and reducing transport-related emissions of nitrogen dioxide, particulate matter, greenhouse gases and noise pollution. This will support delivery of the desired outcomes of tackling climate change and reducing the impacts of transport on public health.
- To contribute towards better safety, security, health and longer life expectancy in Worcestershire, by reducing the risk of death, injury or illness arising from transport and promoting healthy modes of travel;
- To optimise equality of opportunity for all of Worcestershire's citizens with the desired outcome of creating a fairer society;
- To enhance the quality of life for Worcestershire's residents by promoting a healthy, natural environment, for people, wildlife and habitats, conserving our historic built environment and preserving our heritage assets.

To secure the broadest range of benefits from the LTP4, the transport schemes and initiatives proposed through the plan have been packaged up into three broad geographic areas within Worcestershire. These 'Delivery Areas' are as follows:

- North East Worcestershire;
- South Worcestershire; and
- Wyre Forest.

Purpose And Content Of This Environmental Report

This Environmental Report, which accompanies the public consultation version of the Strategic Delivery Programme for the LTP4, is the second document to be produced as part of the SEA process. The first document was the SEA Scoping Report [1], which includes information about Worcestershire's environment and communities and the 'framework' against which the LTP4 has been assessed.

The purpose of the Environmental Report is to:

- Identify, describe and evaluate the likely environmental effects of the preferred Strategic Delivery Programme for the LTP4 and alternatives; and
- Provide an opportunity for statutory consultees, interested parties and the public to offer views on the SEA process carried out to date.

The Environmental Report contains:

- An outline of the contents and main objectives of the LTP4 and its relationship with other relevant policies, plans and programmes;
- Relevant aspects of the current state of the environment and key environmental issues;
- The SEA Framework of objectives and assessment questions against which the Strategic Delivery Programme for the LTP4 has been assessed;
- An assessment of alternative approaches for the LTP4;
- The likely environmental effects of the LTP4;
- The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects as a result of the LTP4; and
- The next steps for the LTP4 and accompanying SEA process.

Assessment Of Alternative Approaches For The LTP4

A key requirement of the SEA Directive is to assess 'reasonable alternatives' for the LTP4. To address this requirement, two alternative approaches have been considered:

- Option 1: Focus on capacity enhancements – This option would focus the LTP4 on increasing the capacity of key transport networks in Worcestershire, including road networks; and
- Option 2: Focus on 'soft' transport measures and demand management measures – This option would focus the LTP4 on delivering initiatives aimed at influencing individual decision making processes to promote voluntary behavioural changes.

[1] AECOM (2016) Scoping Report – Strategic Environmental Assessment of the Worcestershire Local Transport Plan 4.

An assessment of Option 1 and Option 2 has been undertaken using the SEA Framework. To support the assessment findings, the two options have been ranked in terms of their environmental performance against each theme to provide an indication of their relative merits.

In light of the findings of the assessment, it was considered by the LTP4 development team that a blend of capacity enhancements, demand management and 'soft' measures would be appropriate to take forward for the purposes of the LTP4.

Whilst it was recognised that capacity enhancements have the potential to stimulate travel, and potentially lead to direct and indirect impacts on features, areas and networks of environmental sensitivity, it was considered that the implementation of appropriate 'soft' measures accompanying capacity enhancements would enable the potential benefits of such enhancements to be 'locked in'. Alongside this it was recognised that such capacity enhancements have the potential to offer benefits for the quality of the public realm and on biodiversity, the historic environment and landscape and townscape, if designed appropriately and mitigation and avoidance measures are integrated within scheme design.

In this context it was considered that a strategy which incorporates capacity enhancements, demand management and 'soft' measures would offer the widest range of benefits for accessibility, congestion and the quality of life of residents in the three Delivery Areas of Worcestershire. Economically it would also support the aims of the Worcestershire Local Enterprise Partnership and Worcestershire County Council's Corporate Plan, which seek to enhance the vitality of the county's economy.

Appraisal Of The Consultation Version Of The LTP

The SEA Framework of objectives and assessment questions, developed during the scoping stage, was used to assess the initiatives put forward for the three Delivery Areas:

- North East Worcestershire;
- South Worcestershire; and
- Wyre Forest.

This Environmental Report presents the findings across seven environmental themes, as follows:

- Air quality;
- Biodiversity;
- Climate change (incorporating mitigation and adaptation);
- Land, soil and water resources;
- Historic environment and landscape;
- Population and communities; and
- Health and well-being.

A summary is presented below.

Table NTS 1: Summary Of Assessment Findings – North East Worcestershire

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Air Quality	The four AQMAs in North East Worcestershire have been designated due to NO_2 emissions from road transport.	Positive	None
	There is a need to reduce emissions from road transport, especially in/around Redditch, Bromsgrove and Hagley.	Uncertain	Monitoring of local air quality and road use to ensure no negative effects from a release of 'induced demand' from new road schemes.
	There is a need to limit the effects of new development areas in North East Worcestershire on air quality.	Negative	Further modelling is recommended to provide further clarity on the in-combination effects of air quality from the Local Plan allocations proposed in North East Worcestershire and the LTP4 together during implementation.
	There is a need to encourage sustainable modes of transport such as walking, cycling and public transport use.	Positive	None
Biodiversity	Limiting the effects of new development areas on biodiversity in North East Worcestershire.	Negative	Careful design and layout of new developments to minimise effects on protected sites; avoiding the loss of key habitats (including BAP Habitats); and the incorporation of features which support ecological networks.
	Protecting the integrity of the significant areas of SSSI located in the Strategy Area.	Negative	Careful design and layout of new developments to minimise effects on SSSIs.
	Opportunities for enhancements for green infrastructure provision to deliver longer term biodiversity benefits.	Uncertain	Where practicable, all schemes should incorporate measures which support sub-regional green infrastructure networks.
	Opportunities for ecological connections across the Strategy Area to support species distribution in light of climate change impacts on biodiversity.	Uncertain	Where practicable, schemes should incorporate measures to enable and strengthen ecological connections.
	Protection of biodiversity through the Roadside Verge Nature Reserve (RVNR) project.	Uncertain	Where practicable, all schemes should protect and expand on the Roadside Verge Nature Reserve project.

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Climate Change	New housing and employment growth in North East Worcestershire has the potential to increase total GHG emissions from transport.	Negative	Initiatives which propose improvements to sustainable transport networks (including public transport and pedestrian and cycle links) should be designed to limit traffic growth resulting from in-combination effects of Local Plan allocations and highway capacity improvements.
	Per capita emissions in Redditch continue to be lower than the national average; these however have seen little reduction compared to surrounding areas.	Positive	None
	Per capita emissions in Bromsgrove continue to be higher than the national average, and the highest in the county.	Positive	None
	Climate change has the potential to increase the vulnerability of the Strategy Area's transport infrastructure to extreme weather events in the future.	Uncertain	Climate change adaptation should be incorporated in all schemes.
	The LTP4 provides opportunities to support flood risk management objectives as part of highway infrastructure proposals.	Neutral	Sustainable drainage systems should be incorporated in scheme design to ensure no negative effect due to surface water flooding. Schemes should be designed to ensure they are resilient to the effects of fluvial flooding, and also do not increase the risk of flooding elsewhere.

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Land, Soil And Water Resources	New transport infrastructure has the potential to directly or indirectly lead to the loss of areas classified as the best and most versatile agricultural land in North East Worcestershire.	Neutral	Where schemes are located on the best and most versatile agricultural land, schemes should seek to minimise landtake.
	The construction, maintenance and operation of transport infrastructure should seek to reduce the amount of primary materials required, make beneficial use of surplus materials and minimise the landfill disposal of waste generated throughout the asset's lifecycle.	Neutral	Should be secured through design and procurement of engineered schemes.
	New transport infrastructure has the potential to modify water flow regimes and lead to effects on water quality.	Neutral	Sustainable drainage systems should be incorporated in scheme design to ensure the run-off rate is not increased.
	Increased use of existing transport infrastructure, which may not be designed to current standards has the potential to lead to a deterioration of water quality in controlled waters.	Neutral	Sustainable drainage systems and other associated water management measures shall be incorporated in scheme design.
Historic Environment And Landscape	New transport schemes have the potential to lead to landtake on the Green Belt in North East Worcestershire.	Negative	Careful design of schemes to minimise landtake within the Green Belt.
	New transport infrastructure and associated development has the potential for beneficial or adverse effects on the historic environment.	Uncertain (depending on scheme design, layout, scale and location)	Scheme design and layout should seek to minimise effects on the setting and fabric of the historic environment and landscape / townscape quality. Project level environmental assessments will consider potential issues such as visual impacts, light and noise pollution, and the loss of features important for landscape/townscape character in more detail.

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Population And Communities	New development should be accessible by a range of sustainable transport modes to help limit the effects of congestion, economic vitality, and residents' quality of life. This is particularly important in Redditch where 20% of households do not have access to a car.	Uncertain	The delivery of new housing and employment land to be accompanied by the delivery of appropriate new sustainable transport infrastructure. Developer contributions should be used to ensure new developments are serviced by sustainable travel modes.
	An ageing population structure, particularly in Bromsgrove, is likely to increase demand for access to services (e.g. healthcare services).	Positive	None
Health And Well Being	An ageing population structure, particularly in Bromsgrove, is likely to increase demand for access to healthcare services.	Positive	None
	Reducing road accidents and enhancing road safety should be a key consideration.	Uncertain	Through helping to release induced demand, the in-combination effects of multiple capacity enhancements schemes and housing and employment growth in the wider South Worcestershire Delivery Area have the potential to have impacts on road safety. However junction enhancements may enhance road safety for vulnerable users such as pedestrians and cyclists.
	Investment in safe walking and cycling infrastructure and green infrastructure should be supported in order to encourage increased physical activity and mental health.	Positive	None

Table NTS 2: Summary Of Assessment Findings – South Worcestershire

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Air Quality	The four AQMAs in South Worcestershire (three in Worcester, one in Evesham) have been designated due to NO_2 emissions from road transport.	Positive	None
	There is a need to reduce emissions from road transport, especially in/around Worcester and Evesham.	Uncertain	Monitoring of local air quality and road use to ensure no negative effects from 'induced demand'.
	There is a need to limit the effects of new development areas in South Worcestershire on air quality.	Negative	Further modelling is recommended to provide further clarity on the in-combination effects of air quality from the Local Plan allocations proposed in South Worcestershire and the LTP4 together during implementation.
	Encourage sustainable modes of transport such as walking, cycling and public transport use in Worcester.	Positive	None
Biodiversity	Limiting the effects of new development areas in South Worcestershire on biodiversity.	Negative	Careful design and layout of new transport infrastructure to minimise effects on protected sites; avoiding the loss of key habitats (including BAP Habitats); and the incorporation of features which support ecological networks.
	Protecting the integrity of the SACs and SSSIs in the area.	Negative	Careful design and layout of new transport infrastructure to minimise effects on SACs and SSSIs.
	Opportunities for enhancements for green infrastructure provision to deliver longer term biodiversity benefits.	Uncertain	Where practicable, all schemes should incorporate measures which support sub-regional green infrastructure networks.
	Opportunities for ecological connections across the Strategy Area to support species distribution in light of climate change impacts on biodiversity.	Uncertain	Where practicable, all schemes should incorporate measures to enable and strengthen ecological connections.
	Protection of biodiversity through the Roadside Verge Nature Reserve (RVNR) project.	Uncertain	Where practicable, all schemes should protect and expand the Roadside Verge Nature Reserve network.

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Climate Change	New housing and employment growth in South Worcestershire has the potential to increase total GHG emissions from transport.	Negative	Initiatives which propose improvements to sustainable transport networks (including public transport and pedestrian and cycle links) should be designed to limit traffic growth resulting from in-combination effects of Local Plan allocations and highway capacity improvements.
	A reduction in public transport services has the potential to increase personal car use.	Uncertain	Proposed LTP initiatives to support rail services and rail infrastructure in the Delivery Area will support public transport measures. Whilst enhancements to bus services are not directly proposed through the schemes and initiatives, journey times and bus reliability will be supported by capacity enhancements. This will support rural accessibility.
	Per capita emissions in Worcester continue to be lower than the national average; however these have seen little reduction.	Positive	None
	Per capita emissions in Malvern Hills and Wychavon continue to be higher than the national average.	Positive	None
	Climate change has the potential to increase the vulnerability of the Strategy Area's transport infrastructure to extreme weather events in the future.	Uncertain	Climate change adaptation should be incorporated in all schemes.
	The LTP4 provides opportunities to support flood risk management objectives as part of highway infrastructure proposals.	Neutral	Sustainable drainage systems should be incorporated in scheme design to ensure no negative effect due to surface water flooding. Where appropriate, schemes should be designed to ensure they are resilient to the effects of fluvial flooding, and also do not increase the risk of flooding elsewhere.

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Land, Soil And Water Resources	New transport infrastructure has the potential to directly or indirectly lead to the loss of areas classified as the best and most versatile agricultural land in South Worcestershire.	Uncertain	In a number of cases recent land classification has not been undertaken, and the differentiation between Grade 3a land and Grade 3b land has not been established. Where schemes are located on best and most versatile agricultural land, schemes should seek to minimise landtake.
	The construction, maintenance and operation of transport infrastructure should seek to reduce the amount of primary materials required, make beneficial use of surplus materials and minimise the landfill disposal of waste generated throughout the asset's lifecycle.	Neutral	Should be secured through design and procurement of engineered schemes.
	New transport infrastructure has the potential to modify water flow regimes and lead to effects on water quality.	Neutral	Sustainable drainage systems should be incorporated in scheme design to ensure the run-off rate is not increased.
	Increased use of existing transport infrastructure, which may not be designed to current standards has the potential to lead to a deterioration of water quality in controlled waters.	Neutral	Sustainable drainage systems and other associated water management measures should be incorporated within scheme design.

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Historic Environment And Landscape	New transport schemes have the potential to affect the integrity of the two AONBs present in South Worcestershire, as well as views out of the AONBs.	Uncertain (depending on scheme design, layout, scale and location)	Scheme design and layout should seek to minimise effects on the integrity and views out of AONBs. Where appropriate, project level environmental assessments will consider potential issues such as visual impacts, light and noise pollution, and the loss of features important for landscape character in more detail. Adherence to AONB Management Plans and concomitant guidance and consultation with AONB Partnerships will be key actions to help to minimise detrimental impacts.
	New transport schemes have the potential to affect the Areas of Great Landscape Value and Green Belt in the area.	Uncertain (depending on scheme design, layout, scale and location)	Careful design of schemes to minimise landtake within the Green Belt. Scheme design and layout should seek to minimise effects on the integrity and views out of Areas of Great Landscape Value. Project level environmental assessments will consider potential issues such as visual impacts, light and noise pollution, and the loss of features important for landscape character in more detail.
	There are significant concentrations of historic environment assets in Worcester and Malvern, many of which are nationally or locally designated.	Uncertain (depending on scheme design, layout, scale and location)	Scheme design and layout should seek to minimise effects on the setting and fabric of the historic environment. Where appropriate, project level environmental assessments will consider potential issues such as the setting of the asset and the scheme's visual impact.
	New transport infrastructure and associated development has the potential for beneficial or adverse effects on the historic environment.	Uncertain (depending on scheme design, layout, scale and location)	Scheme design and layout should seek to minimise effects on the setting and fabric of the historic environment. Where appropriate, project level environmental assessments will consider potential issues such as the setting of the asset and the scheme's visual impact.

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Population And Communities	Rural areas in the Strategy Area have a greater potential to experience poor accessibility to key services and facilities and employment and leisure opportunities.	Positive	None
	In Worcester 22% of households do not have access to a car. As such there is a greater reliance on public transport networks and walking and cycling.	Positive	None
	New development should be accessible by a range of sustainable transport modes to help limit the effects of congestion, economic vitality, and residents' quality of life.	Uncertain	The delivery of new housing and employment land to be accompanied by the delivery of appropriate new sustainable transport infrastructure. Developer contributions should be used to ensure new developments are serviced by sustainable travel modes.
	An ageing population is likely to increase demand for access to services (e.g. healthcare services).	Positive	None
Health And Well Being	An ageing population is likely to increase demand for access to services (e.g. healthcare services).	Positive	None
	Due to the rural nature of much of South Worcestershire, access to leisure, recreational and sporting facilities and well as health services has the potential to be a larger issue than for many other parts of Worcestershire.	Positive	None
	Whilst road safety is a key issue in Worcester in particular, reducing road accidents and enhancing road safety should be a key consideration in all parts of the Strategy Area.	Uncertain	Through helping to release induced demand, the in-combination effects of multiple capacity enhancements schemes and housing and employment growth in the wider South Worcestershire Delivery Area have the potential to have impacts on road safety. However junction enhancements may enhance road safety for vulnerable users such as pedestrians and cyclists.
	Investment in safe walking and cycling infrastructure and green infrastructure should be supported in order to encourage increased physical activity and promote mental health.	Positive	None

Table NTS 3: Summary Of Assessment Findings – Wyre Forest

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Air Quality	Air quality issues within the two AQMAs in Wyre Forest are associated with NO_2 emissions from road transport.	Positive	None
	There is a need to reduce emissions from road transport, especially in/around Kidderminster and Bewdley.	Uncertain	Monitoring of local air quality and road use to ensure no negative effects from 'induced demand'.
	There is a need to limit the effects of new development areas in Wyre Forest on air quality.	Negative	Further modelling is recommended to provide further clarity on the in-combination effects of air quality from Local Plan allocations proposed in Wyre Forest and the LTP4 together during implementation.
	There is a need to encourage sustainable modes of transport such as walking, cycling and public transport use.	Positive	None
Biodiversity	Limiting the effects of new development areas in Wyre Forest on biodiversity.	Negative	Careful design and layout of new developments to minimise effects on protected sites; avoiding the loss of key habitats (including BAP Habitats); and the incorporation of features which support ecological networks.
	Opportunities for enhancements for green infrastructure provision to deliver longer term biodiversity benefits.	Uncertain	Where practicable, all schemes should incorporate green infrastructure measures.
	Opportunities for ecological connections across the Strategy Area to support species distribution in light of climate change impacts on biodiversity.	Uncertain	Where practicable, all schemes should incorporate measures to enable and strengthen ecological connections.
	Protection of biodiversity through the Roadside Verge Nature Reserve (RVNR) project.	Uncertain	Where practicable, all schemes should protect and expand on the Roadside Verge Nature Reserve project.

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Climate Change	New housing and employment growth in Wyre Forest has the potential to increase total GHG emissions from transport.	Negative	Initiatives which propose improvements to sustainable transport networks (including public transport and pedestrian and cycle links) should be designed to limit traffic growth resulting from in-combination effects of Local Plan allocations and highway capacity improvements.
	Per capita emissions in the Wyre Forest continue to be lower than the national average, however this has seen little reduction in comparison to other areas.	Positive	None
	Climate change has the potential to increase the vulnerability of the Strategy Area's transport infrastructure to extreme weather events in the future.	Uncertain	Climate change adaptation measures should be incorporated in all schemes.
	The LTP4 provides opportunities to support flood risk management objectives as part of highway infrastructure proposals.	Neutral	Sustainable drainage systems should be incorporated in scheme design to ensure no negative effect due to surface water flooding. Schemes should be designed to ensure they are resilient to the effects of fluvial flooding, and also do not increase the risk of flooding elsewhere.

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Land, Soil And Water Resources	New transport infrastructure has the potential to directly or indirectly lead to the loss of areas classified as the best and most versatile agricultural land in the Wyre Forest Delivery Area.	Uncertain	In a number of cases recent land classification has not been undertaken, and the differentiation between Grade 3a land and Grade 3b land has not been established for the three schemes with Grade 3 land. Where schemes are located on best and most versatile agricultural land, schemes should seek to minimise landtake.
	The construction, maintenance and operation of transport infrastructure should seek to reduce the amount of primary materials required, make beneficial use of surplus materials and minimise the landfill disposal of waste generated throughout the asset's lifecycle.		Should be secured through design and procurement of engineered schemes.
	New transport infrastructure has the potential to modify water flow regimes and lead to effects on water quality.	Neutral	Sustainable drainage systems should be incorporated in scheme design to ensure the run-off rate is not increased.
	Increased use of existing transport infrastructure, which may not be designed to current standards has the potential to lead to a deterioration of water quality in controlled waters.	Neutral	Sustainable drainage systems and other associated water management measures should be incorporated in scheme design.
Historic Environment And Landscape	New transport schemes have the potential to affect the Green Belt and non-designated landscapes of significance in Wyre Forest.	Neutral	Careful design of schemes to minimise landtake within the Green Belt and areas of higher landscape value.
	New transport infrastructure and associated development has the potential for beneficial or adverse effects on the historic environment.	Uncertain (depending on scheme design, layout, scale and location)	Scheme design and layout should seek to minimise effects on the setting and fabric of the historic environment and landscape / townscape quality. Project level environmental assessments will consider potential issues such as visual impacts, light and noise pollution, and the loss of features important for landscape/townscape character in more detail.

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Population And Communities	Higher levels of deprivation potentially affecting accessibility to key services and employment and leisure opportunities.	Positive	None
	New development should be accessible by a range of sustainable transport modes to help limit the effects of congestion, economic vitality, and residents' quality of life.	Uncertain	The delivery of new housing and employment land to be accompanied by the delivery of appropriate new sustainable transport infrastructure. Developer contributions should be used to ensure new developments are serviced by sustainable travel modes.
	An ageing population structure in Wyre Forest is likely to increase demand for access to services (e.g. healthcare services).	Positive	None
Health And Well Being	Wyre Forest has higher levels of 'fair' and 'bad' health compared to Worcestershire averages.	Positive	None
	An ageing population structure and is likely to increase demand for access to health services.	Positive	None
	Reducing road accidents and enhancing road safety should be a key consideration.	Uncertain	Through helping to release induced demand, the in-combination effects of multiple capacity enhancements schemes and housing and employment growth in the wider South Worcestershire Delivery Area have the potential to have impacts on road safety. However junction enhancements may enhance road safety for vulnerable users such as pedestrians and cyclists.
	Investment in safe walking and cycling infrastructure and green infrastructure should be supported in order to encourage increased physical activity and mental health.	Positive	None

Next Steps

Following the completion of consultation on the current LTP4 document, comments will be reviewed and analysed. The final LTP4 will then be developed, with a view to adoption in 2018. Any changes arising to the LTP4 following consultation will need to be assessed as part of the SEA process.

An Adoption Statement will be published to accompany the adopted LTP4 and will present:

- The reasons for choosing the preferred strategy for the LTP4 as adopted in the light of other reasonable alternatives dealt with;
- How environmental considerations have been integrated into the LTP4;
- How consultation responses have been taken into account; and
- Measures that are to be taken to monitor the significant environmental effects of the LTP4.

1. Introduction

1.1 Background

AECOM has been commissioned to undertake an independent Strategic Environmental Assessment (SEA) in support of Worcestershire County Council's new Local Transport Plan.

Worcestershire County Council adopted their third Local Transport Plan (LTP3) in February 2011. The LTP3 provides policy and strategy context for major transport projects in Worcestershire and enables Worcestershire County Council to bid for additional Government funding over the 15 year time period of the plan. It also helps secure funds from development and ensure these are properly used to improve the efficiency of the county's transport networks.

Whilst the LTP3 was prepared in conjunction with the Worcestershire Sustainable Community Strategy and the emerging Core Strategies at that time, the policy framework for the LTP3 has significantly moved on in the time period since adoption. This includes in relation to the introduction of the National Planning Policy Framework in March 2012, the progress of new joint and district Local Plans in Worcestershire and the introduction of the Strategic Economic Plan for the Worcestershire Local Enterprise Partnership. In addition funding mechanisms, the evidence base and local, county and regional aspirations have changed and many of the schemes outlined in the LTP3 have been delivered.

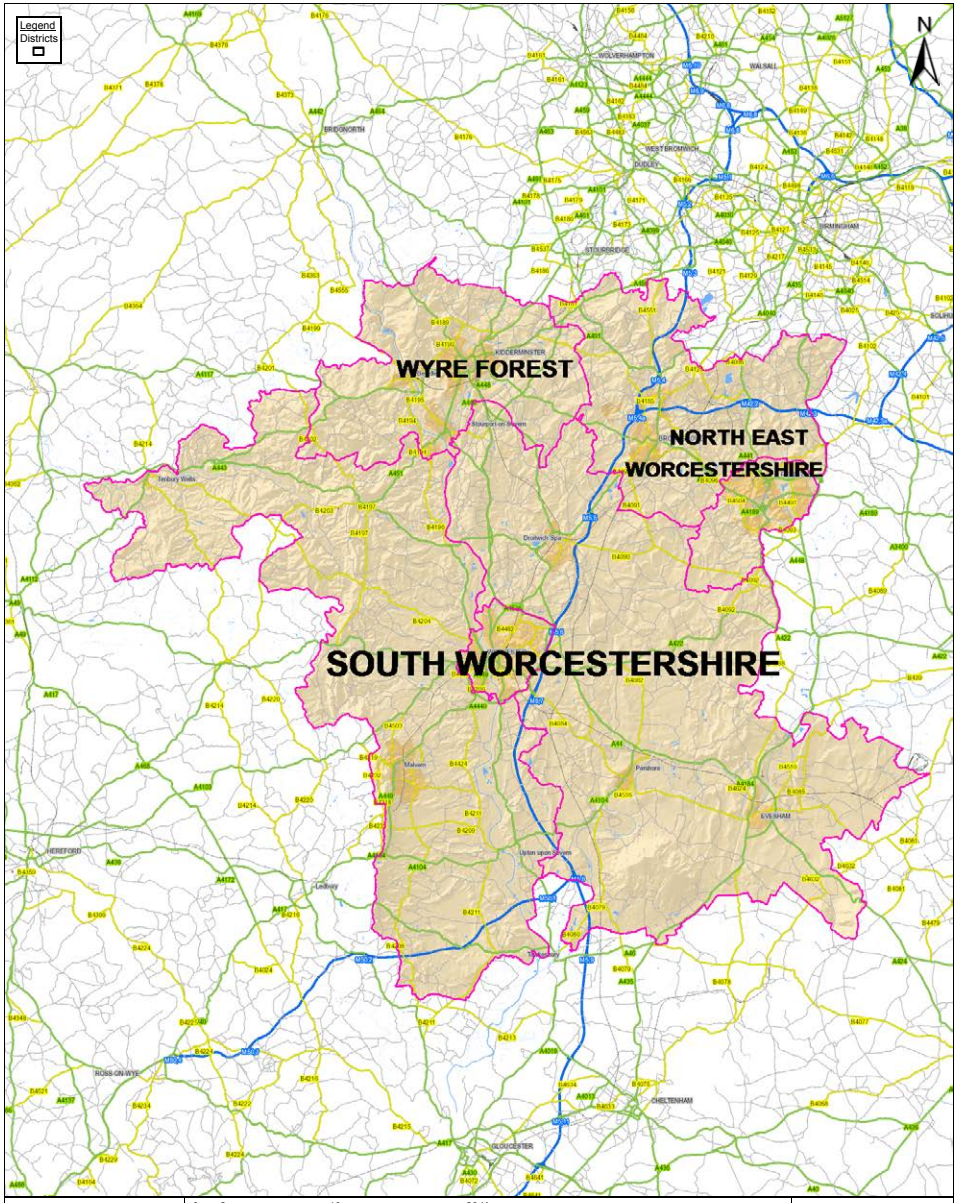
In this context, to ensure that the Local Transport Plan remains fit for purpose, Worcestershire County Council is currently preparing a new LTP4 following a comprehensive review of the evidence base. It is envisaged that the LTP4 will be adopted in 2018.

Key information relating to the LTP4 is presented in Table 1.1.

Table 1.1: Key Facts Relating To The Worcestershire LTP 2018-2030

Name Of Responsible Authority	Worcestershire County Council
Title Of Plan	Worcestershire's Local Transport Plan 2018 – 2030 (LTP4)
Subject	Transport Plan
Purpose	The LTP4 will be Worcestershire's fourth Local Transport Plan. The LTP4 will update Worcestershire County Council's third Local Transport Plan (LTP3), which was adopted in 2011.
Timescale	From 2018 to 2030
Area Covered By The LTP4	Worcestershire County: Figure 1.1
Key Contents Of The LTP4	The current document for the LTP4 presents the Strategic Delivery Programme for the plan, which sets out WCC's proposed approach to the delivery of transport schemes in Worcestershire (see Section 1.2).
Contact Point	Michele Jones, Transport Strategy Team, Worcestershire County Council MCJones@worcestershire.gov.uk

Figure 1.1: LTP4 Strategy Areas



1.2 Priorities And Objectives For The LTP4

The LTP4 sets out the issues and Worcestershire County Council's priorities for investment in transport infrastructure, technology and services to support travel by all relevant modes of transport, including walking, cycling, rail, highways (car, van, freight and motorcycles), bus and community transport. The approach recognises that the county's transport networks have a finite capacity. Recognising the financial constraints relating to increased capacity, Worcestershire County Council aims to target investment in three broad areas:

- Transport technology;
- Travel choice; and
- Capacity enhancement

The LTP4 is underpinned by Worcestershire County Council's Corporate Plan 'Shaping Worcestershire's Future 2017-2022' with its four key priorities:

- Open for Business;
- The Environment;
- Children and Families; and
- Health and Well-being.

The LTP4 also reflects the Worcestershire Local Enterprise Partnership's vision for the county:

'To build a connected, creative, dynamic economy that delivers increased prosperity for all those who choose to live, work, visit and invest in Worcestershire.'

In the context of the above, the key objectives for the LTP4 are as follows:

- To support Worcestershire's economic competitiveness and growth through delivering a safe, reliable and efficient transport network;
- To limit the impacts of transport in Worcestershire on the local environment, by supporting enhancements to the natural environment and biodiversity, investing in transport infrastructure to reduce flood risk and other environmental damage, and reducing transport-related emissions of nitrogen dioxide, particulate matter, greenhouse gases and noise pollution. This will support delivery of the desired outcomes of tackling climate change and reducing the impacts of transport on public health;
- To contribute towards better safety, security, health and longer life expectancy in Worcestershire, by reducing the risk of death, injury or illness arising from transport and promoting healthy modes of travel;
- To optimise equality of opportunity for all of Worcestershire's citizens with the desired outcome of creating a fairer society;
- To enhance the quality of life for Worcestershire's residents by promoting a healthy, natural environment, for people, wildlife and habitats, conserving our historic built environment and preserving our heritage assets.

A central element of the LTP4 will be to present strategies for three 'Delivery Areas' in the county. These will describe the transport issues and proposed transport initiatives to be taken forward in each area.

The three Delivery Areas for the LTP4 are as follows:

- North East Worcestershire (comprising Redditch Borough and Bromsgrove District);
- Wyre Forest (comprising Wyre Forest District); and
- South Worcestershire (comprising Malvern Hills District, Worcester City and Wychavon District).

The location of the three Delivery Areas is shown in Figure 1.1 above.

Worcestershire County Council anticipates that packaging schemes through these three Delivery Area Strategies will deliver greater cumulative benefits than individual scheme investments, increasing value for money achieved and resulting in stronger business cases for investment.

1.3 SEA Explained

SEA is a mechanism for considering and communicating the environmental impacts of an emerging plan and potential alternatives. The aim of SEA is to inform and influence the plan-making process with a view to avoiding and mitigating negative impacts. Through this approach, the SEA seeks to maximise the environmental performance of the LTP4.

An SEA is required for Local Transport Plans in accordance with the procedures prescribed by the Environmental Assessment of Plans and Programmes Regulations 2004 (the SEA Regulations [2]) which transpose into national law the SEA Directive [3].

[2] SI 2004 No. 1633, The Environmental Assessment of Plans and Programmes Regulations 2004 http://www.legislation.gov.uk/uksi/2004/1633/pdfs/uksi_20041633_en.pdf

[3] Directive 2001/42/EC http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32001L0042

Two key procedural requirements of the SEA Directive are that:

- When deciding on 'the scope and level of detail of the information' which must be included in the Environmental Report there is a consultation with nationally designated authorities concerned with environmental issues; and
- A report (the 'Environmental Report') is published for consultation alongside the Draft Plan that presents an assessment of the Draft Plan (i.e. discusses 'likely significant effects' that would result from plan implementation) and reasonable alternatives.

This Environmental Report is concerned with the second point above. Scoping (the first point) is discussed in Section 1.5.1 below.

1.4 This Environmental Report

The SEA Regulations require that a report is published for consultation alongside the draft plan that 'identifies, describes and evaluates' the likely significant effects of implementing 'the plan, and reasonable alternatives'. The report must then be taken into account, alongside consultation responses, when finalising the plan.

In line with the SEA Regulations this report – which is known as the 'Environmental Report' – must essentially answer four questions:

- What is the scope of the SEA?;
- What has Plan-making / SEA involved up to this point?;
    - Preparation of the draft plan must have been informed by at least one earlier plan-making / SEA iteration. 'Reasonable alternatives' must have been assessed.
- What are the assessment findings at this current stage?;
    - i.e. in relation to the draft plan.
- What happens next?

These questions are derived from Schedule 2 of the SEA Regulations, which present 'the information to be provided within the report. Table 1.2 presents the linkages between the regulatory requirements and the four SEA questions.

Table 1.2: Questions That Must Be Answered By The Environmental Report In Order To Meet Regulatory [4] Requirements

Environmental Report Question		In Line With Schedule II The Report Must Include...
What is the scope of the SEA?	What is the plan seeking to achieve?	An outline of the contents, main objectives of the plan and relationship with other relevant plans and programmes
	What is the sustainability 'context' and baseline?	The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan The environmental characteristics of areas likely to be significantly affected Any existing environmental problems which are relevant to the plan including those relating to any areas of a particular environmental importance
	What are the key issues and objectives that should be a focus?	Key problems / issues and objectives that should be a focus of (i.e. provide a 'framework' for) assessment
What has plan-making / SEA involved up to this point?		Outline reasons for selecting the alternatives dealt with (and thus an explanation of the 'reasonableness' of the approach) The likely significant effects associated with alternatives Outline reasons for selecting the preferred approach in-light of alternatives assessment / a description of how environmental objectives and considerations are reflected in the draft plan.
What are the assessment findings at this current stage?		The likely significant effects associated with the draft plan The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects of implementing the draft plan
What happens next?		The next steps for plan making / SEA process.
N.B. The right-hand column of Table 1.2 does not quote directly from Schedule II of the Regulations. Rather, it reflects a degree of interpretation.		

[4] Environmental Assessment of Plans and Programmes Regulations 2004

1.5 What Is The Scope Of The SEA?

1.5.1 SEA Scoping Report

The SEA Regulations require that 'When deciding on the scope and level of detail of the information that must be included in the Environmental Report, the responsible authority shall consult the consultation bodies'. In England, the consultation bodies are Natural England, the Environment Agency and Historic England.[5] As such, these authorities were consulted on an SEA Scoping Report in September 2016.

The SEA Scoping Report presented information for the following seven environmental themes:

- Air quality;
- Biodiversity;
- Climate change (incorporating mitigation and adaptation);
- Land, soil and water resources;
- Historic environment and landscape;
- Population and communities; and
- Health and well-being.

These environmental themes incorporate the 'SEA topics' suggested by Annex I(f) of the SEA Directive [6] and reflect the purpose of the LTP4 and its potential environmental effects.

Comments received on the Scoping Report, and how they have been considered and addressed through the ongoing development of the SEA process, are presented in Table 1.3.

[5] In-line with Article 6(3).of the SEA Directive, these consultation bodies were selected because 'by reason of their specific environmental responsibilities,[they] are likely to be concerned by the environmental effects of implementing plans and programmes.'

[6] The SEA Directive is 'of a procedural nature' (para 9 of the Directive preamble) and does not set out to prescribe particular issues that should and should not be a focus, beyond requiring a focus 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' [our emphasis]

Table 1.3 Consultation Responses Received On The SEA Scoping Report

	Consultation Response	How The Response Was Considered And Addressed
Natural England	Natural England supports the need identified at 3.3. of the SEA Scoping document for the full SEA to focus on limiting the effects of new development on biodiversity within the Transport Plan area, and requirement for commitments to the creation of Green Infrastructure (GI), ecological connectivity and the specific Roadside Verge Nature Reservation (RVNR) project.	Comment noted.
	Natural England further supports the conclusions of 3.4 of the SEA Scoping Document, particularly the need to protect the integrity of Special Areas of Conservation (SACs), Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNRs), Local Wildlife and Geology Sites, as well as the need to protect and enhance priority habitats and protected species within the plan area.	Comment noted.
	Point 3.4 of the Scoping Document makes specific reference to limiting the adverse effects of new transport infrastructure on biodiversity networks. Natural England welcomes the wider consideration of biodiversity networks, as part of the practical delivery of a landscape scale approach to biodiversity, and supports the identified need for the detailed consideration of the connectivity of sites, habitats and species.	Comment noted.

	Consultation Response	How The Response Was Considered And Addressed
Environment Agency	The themes incorporate the 'SEA topics' suggested by Annex I(f) of the SEA Directive and appear reasonable to reflect the purpose of the LTP4 and its potential environmental effects.	Comment noted.
	We understand that you have consulted Natural England (NE) for comments and as the lead on the SSSI/ SAC they will offer you some advice on the options to protect and enhance such designations etc. As a general comment, we would lead on any Habitat Regulations Assessment should an Environmental Permit e.g. Flood Risk Activity Permit associated with a bridge crossing as part of a road infrastructure scheme, be necessary under EPR for works potentially affecting a SSSI or SAC. The SEA objectives and questions for biodiversity cover the water environment and priority species relevant to our remit (with reference to the EA/NE joint protocol on protected species) and these appear reasonable to help ensure protection and enhancement of such.	Comment noted.

	Consultation Response	How The Response Was Considered And Addressed
Environment Agency	The climate change adaptation section should be amended to include some further references to more recent guidance The National Planning Practice Guidance (NPPG) refers to Environment Agency guidance on considering climate change in planning decisions which is available online: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances This has been updated and replaces the September 2013 guidance. It should be used to help planners, developers and advisors implement the National Planning Policy Framework (NPPF)'s policies and practice guidance on flood risk. It will help inform Flood Risk Assessments (FRA's) for planning applications, local plans, neighbourhood plans and other projects. We have produced Climate Change Guidance for our local area. This is attached for your consideration / reference. For fluvial risk, it should be noted that there is a need to include a 70% allowance for climate change (peak river flows) to inform the location, impacts and design of a transport scheme. For example, to improve flood risk resilience, we would expect new or improved highway infrastructure to be sited above the 1% plus climate change (70%) flood level plus an appropriate freeboard allowance. We note that the SEA questions already identify the 'resilience of the transport network' and sequential test in relation to 'facilitating development in areas at lower risk of flooding'. The above climate change increases are likely to impact upon this. NOTE – With regard to parking, it is our opinion that any possible park and ride scheme should be directed away from areas of high flood risk (1% plus climate change flood extent).	The policy section in Appendix A has been updated to reflect this (Box 4.4). Reference to incorporating climate change allowances into FRAs and the requirement for improved flood risk resilience in all new or improved highway infrastructure has been considered within the relevant sections of this Environmental Report (Sections 4.2.3, 5.2.3 and 6.2.3).
	The SA could also look at 'ensuring flood risk reduction/improvement to the flood regime'. For example, for transport schemes, an option to look at strategic flood risk management and reduction measures could be incorporated, for example flood storage improvements, which can often be linked to other wider environmental benefits such as wet washland provision, or biodiversity enhancement, if planned.	These issues have been considered through the assessment presented in this Environmental Report (Sections 4.2.3, 5.2.3 and 6.2.3).

	Consultation Response	How The Response Was Considered And Addressed
Environment Agency	Note – Our indicative Flood Map for Planning (Rivers and sea) is referenced. However, this does not include climate change allowances and primarily shows potential flooding from Main Rivers. In considering flood risk data the limitations of our Flood Map should be acknowledged and reference could be made to the surface water maps and the Council's Strategic Flood Risk Assessment (SFRA), which may need to be reviewed and updated as part of the Local Plan review. In considering other types of flooding a reference should be made to ordinary watercourses some of which have not been mapped on our Flood Map (catchments smaller than 3km^2 are not represented. Whilst the smaller catchments do not have an associated flood extent based on our flood map, this does not mean there is no flood risk associated with the watercourse). There are a number of options that the plan could help deliver to make the existing and new infrastructure more resilient to flooding.	Reference to surface water flooding has been included within this Environmental Report (Sections 4.2.3, 5.2.3 and 6.2.3).
	Within the policy context/baseline data section of the report, there is a reference to groundwater vulnerability, source protection zones (SPZs) and we note the WFD comments. Our current Severn River Basin Management Plan (December 2015) is included and we note that relevant text is considered, for example the impact a road scheme can have on the water environment.	Comment noted.
	Groundwater Vulnerability is an important consideration in Worcestershire and further information is available in our CAMS documents (as referenced).	Comment noted.
	In considering groundwater vulnerability, we would recommend that reference be made to our Groundwater Protection: Policy and Practice (GP3) guidance. This has comprehensive advice on road infrastructure requirements and pollution prevention.	Reference to GP3 has been added to Section 5.1.3 in Appendix A.
	We would expect Worcestershire County Council to help address WFD failures through its role as planner, issuing ordinary watercourse consents and as land manager. All watercourses in the County (and UK) are duty bound to reach Good Ecological Status or Potential (GES/GEP) by 2027. It is essential that WFD is fully integrated into the Local Plan process and that all future development helps to address the issues that currently prevent the watercourse from achieving GES/GEP. WFD data is available from our Catchment Data Explorer tool at: http://environment.data.gov.uk/catchment-planning/RiverBasinDistrict/9	Comment noted
	We support the SEA objective and questions which seek to 'protect and enhance Worcestershire's Water resources' by improving water quality and protection groundwater supplies – you could add "and all controlled waters" (to include surface waters etc).	SEA Framework has been updated to reflect suggestion.

	Consultation Response	How The Response Was Considered And Addressed
Environment Agency	Future development should help to facilitate the restoration of watercourses, such as de-culverting of any watercourse within or on the boundary of a site, naturalising artificially engineered river bank or beds, and providing an adequate riparian corridor in meeting flood risk and WFD objectives.	This has been included within this SEA Environmental Report (Sections 4.2.4, 5.2.4 and 6.2.4).
	The objective could include an indicator on water quality levels within the County's main watercourses. This could be linked to the status and/or potential of waterbodies under WFD objectives. This would link to the context of seeking to improve failing waterbodies through appropriate mechanisms such as Sustainable Drainage Systems (SuDS) and improvements to watercourses (including new watercourses, or opening up of culverted systems).	Additional assessment question included under this objective.

	Consultation Response	How The Response Was Considered And Addressed
Historic England	No responses were received on the Scoping Report.	N/A

1.6 Content Of The SEA Scoping Report

Reflecting the requirements of the SEA Regulations, the following information was presented in the Scoping Report for the seven environmental themes:

- Context review: This explored the environmental and sustainability 'context' for the SEA / LTP4 through reviewing high level messages (e.g. internationally, from central government and at the regional and county level) with a view to establishing the focus for the SEA;
- Baseline data: This established the baseline situation in the area in the absence of the LTP4 Review (including the future baseline) in order to help identify the plan's likely significant effects; and
- Key issues: This identified particular problems or opportunities ('issues') that should be a focus of the SEA.

Drawing on the key issues established through the above process, the Scoping Report presented an SEA Framework of objectives and assessment questions which would be used to assess the draft plan and alternatives. A summary of the key issues and the full SEA Framework is presented below. The context review and baseline data, which has been updated to reflect comments received on the Scoping Report consultation, is presented in Appendix A.

1.7 Key Issues For The SEA and SEA Framework

Drawing on the review of the sustainability context and baseline, the SEA Scoping Report identified a range of sustainability problems / issues that provide the focus of SEA. These were then translated into an SEA Framework of objectives and assessment questions. The SEA Framework provides a methodological framework for the assessment of likely significant effects on the baseline.

1.7.1 Key Issues

Chapters 4 to 6 sets out the key issues identified for each of the seven themes presented above. These key issues, which were established as part of SEA scoping undertaken earlier in 2016, are presented by each of the three Delivery Areas.

1.7.2 SEA Framework

The SEA Framework provides a way in which the environmental effects of the LTP4 and alternatives can be defined and subsequently analysed based on a structured and consistent approach.

The objectives and assessment questions are presented for each environmental theme in Table 1..

Table 1.4: SEA Framework For The Worcestershire LTP4

SEA Objective		Assessment Questions
Air Quality	Deliver improvements in air quality in Worcestershire	Will the option/proposal help to: • Reduce emissions of pollutants from transport? • Improve air quality within Air Quality Management Areas (AQMAs)? • Promote the use of low emission vehicles? • Promote enhancements in sustainable modes of transport? • Promote enhancements to green infrastructure networks to facilitate increased absorption and dissipation of nitrogen dioxide and other pollutants?
Biodiversity	Support the integrity of internationally, nationally and locally designated sites	Will the option/proposal help to: • Protect the integrity of the Special Area of Conservations (SAC), Sites of Special Scientific Interest (SSSI) and National Nature Reserves (NNR) present in Worcestershire? • Manage pressures on locally designated sites, including Local Nature Reserves (LNR) and Roadside Verge Nature Reserve (RVNR) sites?
	Protect and enhance habitats and species in Worcestershire	Will the option/proposal help to: • Protect and enhance semi-natural habitats? • Protect and enhance priority habitats, and the habitat of priority species? • Increase the resilience of Worcestershire's biodiversity to the potential effects of climate change?
	Minimise cumulative and synergistic effects resulting from the in-combination effects of LTP4 proposals and new development areas in Worcestershire	Will the option/proposal help to: • Limit the effects of new transport infrastructure on biodiversity networks? • Support green infrastructure enhancements and creation?

SEA Objective		Assessment Questions
Climate Change	Support climate change mitigation in Worcestershire through limiting the contribution of transport to greenhouse gas emissions in the county.	Will the option/proposal help to: • Reduce the carbon footprint of Worcestershire? • Promote sustainable transport? • Promote use of alternative fuel and electric vehicles?
	Deliver a transport infrastructure resilient to the effects of climate change.	Will the option/proposal help to: • Increase the resilience of the transport network to the effects of climate change? • Facilitate development in areas at lower risk of flooding? • Support flood risk reduction/improvement to the flood regime
	Facilitate coordinated design of flood protection measures with those of transport infrastructure.	Will the option/proposal help to: • Promote a coordinated approach to the management of flood risk across public infrastructure provision?
Land, Soil And Water Resources	Ensure the more efficient use of land.	Will the option/proposal help to: • Assist in facilitating the re-use of previously developed land? • Avoid the development of the best and most versatile agricultural land and areas containing valuable mineral resources?
	Promote sustainable waste management solutions that encourage the reduction, re-use and recycling of waste.	Will the option/proposal help to: • Encourage recycling of materials and minimise consumption of resources during construction, operation and maintenance of new transport infrastructure? • Encourage the use of alternative transport methods for the movement of waste in the county?
	Protect and enhance Worcestershire's water resources	Will the option/proposal help to: • Improve water quality? • Protect groundwater supplies and all controlled waters? • Support enhancements to the status and/or potential of waterbodies under WFD objectives?

SEA Objective		Assessment Questions
Historic Environment And Landscape	Preserve and enhance Worcestershire's cultural heritage resource, including its historic environment and archaeological assets.	Will the option/proposal help to: • Conserve and enhance buildings and structures of architectural or historic interest? • Support the integrity of the historic setting of key buildings of cultural heritage interest? • Conserve and enhance local diversity and distinctiveness? • Reduce street clutter from road signage? • Support access to, interpretation and understanding of the historic environment?
	Protect and enhance the character and quality of Worcestershire's landscapes and townscapes.	Will the option/proposal help to: • Support the management objectives of the two AONBs in the county? • Protect and enhance features and areas which contribute to landscape and townscape character? • Conserve and enhance conservation areas?
Population And Communities	Promote sustainable transport use and reduce the need to travel.	Will the option/proposal help to: • Encourage modal shift to more sustainable forms of travel? • Reduce the need to travel?
	Delivery of a transport infrastructure to meet the foreseeable needs of the varied communities of Worcestershire.	Will the option/proposal help to: • Improve accessibility to services, facilities and amenities? • Meet the needs of a growing and ageing population? • Meet the needs of those living in rural areas? • Address the needs of all age groups? • Maintain or enhance the quality of life of residents?
	Support economic development in Worcestershire.	Will the option/proposal help to: • Support economic development and areas of high growth pressures? • Improve accessibility to employment opportunities?

SEA Objective		Assessment Questions
Health And Wellbeing	Improve the health and well-being of Worcestershire's residents.	Will the option/proposal help to: • Promote accessibility to a range of leisure, health and community facilities, for all age groups? • Encourage healthy lifestyles and reduce health inequalities? • Enhance the provision of, and access to, green infrastructure in the county, in accordance with national standards? • Improve access to the countryside for recreation?
	Enhance road safety in Worcestershire.	Will the option/proposal help to: • Improve road safety and reduce road accidents?

2. Assessment Of Reasonable Alternatives For The LTP4

2.1 Reasonable Alternatives

A key element of the SEA process is the assessment of 'reasonable alternatives' for the LTP4. To reflect this, two alternative approaches have been considered in relation to the types of schemes and initiatives to be taken forward through the LTP4 development process.

These options are as follows:

Option 1: Focus on capacity enhancements

This option would focus the LTP4 on increasing the capacity of key transport networks in Worcestershire, including road networks.

Option 2: Focus on 'soft' transport measures and demand management measures

This option would focus the LTP4 on delivering initiatives aimed at influencing individual decision making processes to promote voluntary behavioural changes.

The assessment of the options outlined above reflects a desire to explore the sustainability implications of two contrasting alternative approaches for the LTP4 which either:

- 1) focuses on engineered solutions which enables demand to be met; or
- 2) provides an emphasis on transport measures which change travel behaviour.

These options were considered through the SEA Framework of objectives and assessment questions developed during scoping (see Section 1.7.2).

2.2 Assessment Findings

Table 2.1 describes the findings of the assessment of Option 1 and Option 2 outlined above; these are presented through the seven environmental themes [7]. To support the assessment findings, the two options have been ranked in terms of their environmental performance against each theme, a score of 1 being superior to a score of 2. It is anticipated that this will provide the reader with a likely indication of the comparative environmental performance of the two options in relation to the various themes.

[7] Discussed in Section 1.5.

Table 2.1: Assessment Findings: Reasonable Alternatives

Option 1: Focus On Capacity Enhancements Option 2: Focus On 'Soft' Transport Measures And Demand Management Measures			
Environmental Theme	**Discussion Of Potential Effects And Relative Merits Of Options**	**Rank Of Options' Relative Merits**	
		Option 1	**Option 2**
Air quality	Road capacity enhancements facilitated by Option 1 have the potential to lead to air quality enhancements at 'pinchpoints' on the network which have existing air quality issues. This will support significant enhancements of air quality at specific locations. However an overall increase in emissions of air pollutants may arise as a result of road capacity enhancements, due to a stimulation of traffic on some routes. Option 2, through focusing on alternatives to the private car, has the potential to encourage modal shift and reduce emissions from transport. However the option will do less to address air quality issues at key bottlenecks on the network.	N/A	N/A
Biodiversity	Option 1 has increased potential to lead to direct impacts on biodiversity. This includes through habitat loss and fragmentation, impacts on ecological connections and disturbance. In this context, the increased number of 'hard' transport infrastructure schemes likely to be initiated through Option 1 have the potential to focus impacts on the biodiversity assets (including nature conservation designations, habitats and species and geological assets) located in the vicinity of the key routes and areas targeted for interventions. Potential effects on biodiversity resulting from capacity enhancements will however depend on design and avoidance / mitigation measures proposed. As such, potential effects on biodiversity assets depend on elements such as the retention and incorporation of biodiversity features and the provision of green infrastructure enhancements identified at scheme design level. Likewise, many interventions have the potential to promote net gains in biodiversity value with appropriate design and layout. An approach which focuses to a greater degree on soft measures and demand management measures is less likely to lead direct adverse impacts on ecological networks. Habitats and species also have the potential to benefit from initiatives taken forward through this option by an encouragement of modal shift, a limitation in traffic flows and improved traffic management. This will help limit effects on biodiversity from air quality issues, animal road kills and disturbance.	2	1

Option 1: Focus On Capacity Enhancements Option 2: Focus On 'Soft' Transport Measures And Demand Management Measures			
Environmental Theme	**Discussion Of Potential Effects And Relative Merits Of Options**	**Rank Of Options' Relative Merits**	
		Option 1	**Option 2**
Climate Change	In terms of greenhouse gas (GHG) emissions, road transport is an increasingly significant contributor to emissions in Worcestershire. The extent to which the two options have the potential to support climate change mitigation through facilitating a reduced level of car dependency is therefore a key element. In this context Option 2 has increased potential to improve the viability and attractiveness of alternatives to travel by the private car and promote modal shift to more sustainable (and lower GHG emissions) forms of transport, including public transport and active modes of transport (walking and cycling). This will support transport choices with lower GHG emissions. Option 1's likely promotion of road schemes that relieve congestion and / or increase capacity has the potential effect of releasing demand for vehicle trips currently suppressed. This occurs when individuals who currently do not make a trip using a private vehicle (perhaps because a road is too busy and congested) now decide to make that trip. As such the release of this 'induced demand' may lead to increases in GHG emissions through this option. In terms of adapting to the effects of climate change, Option 1, through promoting capacity enhancements has more potential than Option 2 to lead to proposals which enhance the resilience of particular locations climate change. However, the effect of initiatives depends on detailed interventions, including scheme design and layout, the integration of green infrastructure provision and other measures to help regulate the effects of extreme weather events. Similarly the effect of initiatives on fluvial, surface water and groundwater flooding depend on scheme design considerations, including location, design and layout and the implementation of measures such as sustainable drainage systems.	2	1

Option 1: Focus On Capacity Enhancements Option 2: Focus On 'Soft' Transport Measures And Demand Management Measures			
Environmental Theme	**Discussion Of Potential Effects And Relative Merits Of Options**	**Rank Of Options' Relative Merits**	
		Option 1	**Option 2**
Land, Soil And Water Resources	In relation to land and soils resources, the effect of the options depend on the extent to which the approaches put forward lead to landtake on areas of the higher quality agricultural land. Likewise, the extent to which the options encourage the use of recycled materials and minimise the consumption of resources during the construction, operation and maintenance of new transport infrastructure will be a key consideration. In this context Option 1 has increased potential to lead to the loss of higher quality agricultural land due to an increased requirement for landtake from capacity enhancements when compared to demand management and 'soft' transport measures. In terms of water resources Option 1 also has increased potential to lead to effects on water quality and water availability. However, it is difficult to come to a conclusion regarding the potential for development at any given location to result in negative effects without an understanding of the design measures that will be put in place alongside new transport initiatives. However no adverse effects are anticipated as transport projects do not 'consume' water resources and standard design practice would preclude adverse effects on water abstraction or groundwater; though localised issues associated with perched watertables could be encountered.	2	1

Option 1: Focus On Capacity Enhancements Option 2: Focus On 'Soft' Transport Measures And Demand Management Measures			
Environmental Theme	**Discussion Of Potential Effects And Relative Merits Of Options**	**Rank Of Options' Relative Merits**	
		Option 1	**Option 2**
Historic Environment And Landscape	Option 1 has increased potential to lead to direct impacts on the historic environment and landscape/townscape from transport capacity enhancements. This includes through direct impacts on features and areas of cultural heritage interest and local distinctiveness. In this context the increased number of 'hard' transport infrastructure schemes likely to be initiated through Option 1 have the potential to lead to impacts on the key assets (including designated features and areas) located in the vicinity of the key routes and areas targeted for interventions. The significance of effects from these interventions will however depend on design, layout and scale of the schemes, and mitigation and avoidance measures proposed. In this context well designed schemes have the potential to lead to enhancements to the public realm and the setting of the historic environment. Similarly, at some locations, including in town centres, measures which help to relieve congestion may support improvements to local distinctiveness and the quality of the public realm. In relation to Option 2, an approach which focuses to a greater degree on soft measures and demand management measures is less likely to lead direct adverse impacts on the historic environment and landscape and townscape character. The setting of the historic environment and landscape/townscape quality also has the potential to benefit from initiatives taken forward through this option by an encouragement of modal shift, a limitation in traffic flows and improved traffic management. This will help limit adverse effects from traffic on the setting of historic environment assets and landscape/townscape character. Overall therefore, Option 2 has increased potential to lead to a wider range of positive effects in relation to this theme.	2	1

Option 1: Focus On Capacity Enhancements Option 2: Focus On 'Soft' Transport Measures And Demand Management Measures			
Environmental Theme	**Discussion Of Potential Effects And Relative Merits Of Options**	**Rank Of Options' Relative Merits**	
		Option 1	**Option 2**
Population And Communities	The quality of life of Worcestershire's residents is closely linked to accessibility. In this context both options have the potential to lead to accessibility enhancements, with Option 1 facilitating capacity enhancements and Option 2 facilitating behavioural changes which will support accessibility by a wider range of modes of transport. However, the focus on soft measures through Option 2 without significant capacity enhancements is less likely to facilitate enhancements to transport infrastructure to meet the requirements of a growing population and economy. In this context, a complementary blend of Option 1 and Option 2 would do most to enhance residents' accessibility to services, facilities and opportunities, both within Worcestershire and further afield. Transport capacity enhancements also have the potential to lead to a range of economic opportunities through enhancing connections with the strategic and local transport network and key employment areas. This mirrors the aims of the Worcestershire Local Enterprise Partnership and Worcestershire County Council's Corporate Plan, which seek to enhance the vitality of the county's economy.	1	2
Health And Well-Being	Option 1, through enabling a reduction of congestion at key bottlenecks on the network, has the potential to reduce impacts of traffic and congestion on health and wellbeing at these locations. This includes through enhancements to air and noise quality, and improvements in the quality of the public realm. However a potential stimulation of traffic growth in some locations due to induced demand has the potential to have wider negative effects on health and wellbeing of residents through impacts on the quality of the public realm. Option 2, through promoting demand management measures and 'soft' transport measures will promote alternatives to the private car. In this context, through delivering initiatives aimed at influencing individual decision making processes to promote voluntary behavioural changes, the option has the potential to promote the use of healthier modes of travel and active travel choices, including walking and cycling. This will support the health and wellbeing of residents.	2	1

2.3 Development Of A Preferred Strategy For The LTP4

In light of the findings presented above, it was considered that a blend of capacity enhancements, demand management and 'soft' measures would be appropriate to take forward for the purposes of the LTP4.

Whilst it was recognised that capacity enhancements have the potential to stimulate induced demand, and potentially lead to direct and indirect impacts on features, areas and networks of environmental sensitivity, it was considered that the implementation of appropriate 'soft' measures accompanying capacity enhancements would enable the potential benefits of such enhancements to be 'locked in'. Alongside it was recognised that such capacity enhancements have the potential to offer benefits for the quality of the public realm and on biodiversity, the historic environment and landscape and townscape, if designed appropriately and mitigation and avoidance measures are integrated within scheme design.

In this context it was considered that a strategy which incorporates capacity enhancements, demand management and 'soft' measures would offer the widest range of benefits for accessibility, congestion and the quality of life of residents in the three Delivery Areas of Worcestershire. Economically it would also support the aims of the Worcestershire Local Enterprise Partnership and Worcestershire County Council's Corporate Plan, which seek to enhance the vitality of the county's economy.

3. Assessment Of The Current Version Of The LTP4

3.1 Background

The Environmental Report must include:

- The likely significant effects associated with the draft plan approach; and
- The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects of implementing the draft plan approach.

This section of the Environmental Report presents assessment findings in relation to the current consultation draft of the Strategic Delivery Programme for the LTP4. The draft plan presents a vision and strategic objectives for the LTP4 and supporting policies. The policies comprise a series of transport schemes and initiatives for each of the three Delivery Areas.

The schemes and initiatives, which will be delivered through a Strategic Delivery Programme, have been grouped into the following elements:

- North East Worcestershire:
  - Strategic Transport Schemes for North East Worcestershire;
  - Redditch Package; and
  - Bromsgrove Package.
- South Worcestershire:
  - Strategic Transport Schemes for South Worcestershire;
  - Strategic Active Travel Corridor Schemes for South Worcestershire;
  - Droitwich Package;
  - Vale of Evesham Package;
  - Malvern and Tenbury Wells Package;
  - Pershore Package; and
  - Worcester Package.
- Wyre Forest:
  - Strategic Schemes for Wyre Forest;
  - Kidderminster Package; and
  - Stourport-on-Severn and Bewdley Package.

3.2 Assessment Methodology

The assessment identifies and evaluates the likely significant effects of the preferred approach on the baseline, utilising the SEA Framework developed through scoping as a methodological framework. Findings have been presented through the seven environmental themes developed during scoping:

- Air quality;
- Biodiversity;
- Climate change (incorporating mitigation and adaptation);
- Land, soil and water resources;
- Historic environment and landscape;
- Population and communities; and
- Health and well-being.

For each of the above environmental themes, assessment findings have been discussed in relation to the three Delivery Areas:

- North East Worcestershire;
- South Worcestershire; and
- Wyre Forest.

Chapter 7 then presents a summary of the key assessment findings.

3.3 Limitations Of Assessment

It is important to acknowledge the limitations of the approach to be undertaken to the assessment. These limitations relate to both the scope and coverage of the plan and the nature of the SEA process.

The following considerations should therefore be acknowledged in regard to the assessment:

- Some interventions to be taken forward through the LTP4 are not spatially specific and thus are deployed across the county. This situation can reduce the confidence in forecasting potential environmental outcomes; and
- Where the proposed intervention has a specific geographic location, the available scheme definition and the subsequent scheme design activities can lead to uncertainties as to the resultant impact. In such situations it is recognised that potential impacts identified in the SEA may well be capable of being avoided or mitigated during subsequent scheme design activities.

Where appropriate, the SEA will acknowledge these limitations throughout the process.

It should also be noted that additional interventions have been added to the LTP subsequent to the SEA process being conducted, whilst some of those listed in this document may have changed scope. These proposed new and amended interventions will appear in the final adopted version of the LTP, and will have their environmental impacts assessed to an appropriate degree during scheme development.

Similarly, the final adopted version of the LTP may show that certain schemes from the draft plan assessed here have been removed. Any such schemes remain here for reasons of transparency, as they were assessed at the time the SEA was conducted.

More generally, every effort is made to predict effects accurately; however, this is inherently challenging given the high level nature of the policy approaches under consideration, and limited understanding of the baseline.[8] Because of the uncertainties involved there is inevitably a need to make assumptions. Assumptions are made cautiously, and explained within the text. The aim is to strike a balance between comprehensiveness and conciseness/accessibility to the public. In many instances, given reasonable assumptions, it is not possible to predict significant effects, but it is possible to comment on merits (or otherwise) in more general terms.

It is important to note that effects are predicted taking account of the criteria presented within Schedule 1 of the SEA Regulations.[9] So, for example, account is taken of the probability, duration, frequency and reversibility of effects as far as possible. Cumulative effects are also considered. These effect 'characteristics' are described within the assessment as appropriate.

[8] The implication being that it is difficult, if not impossible, to identify a 'cause-effect relationship' with any certainty.

[9] Environmental Assessment of Plans and Programmes Regulations 2004

4. North East Worcestershire

4.1 Key LTP4 Initiatives For Delivery Area

Table 4.1 provides a summary of the key LTP4 initiatives for North East Worcestershire.

Table 4.1: Key LTP4 Initiatives For North East Worcestershire

LTP4 Scheme	Scheme ID	Scheme Name
Strategic Transport Schemes for North East Worcestershire	NEST1	Lickey End (M42 Junction 1). Major Junction Enhancement Scheme and Lickey End AQMA Remediation
	NEST2	Bromsgrove A38 Strategic Corridor (Lydiate Ash to Hanbury Turn)
	NEST3	Redditch Transport Strategy
	NEST4	North East Worcestershire Transport Telematics Investment Package
	NEST5	Old Birmingham Road / Linehouse Lane / Braces Lane Junction (Marlbrook)
	NEST6	Hagley Junctions
	NEST7	Wythall Rail Station Enhancement Scheme
	NEST8	Hagley Rail Station Enhancement Scheme
	NEST9	Alvechurch Rail Station Enhancement Scheme

LTP4 Scheme	Scheme ID	Scheme Name
Strategic Active Travel Corridor Schemes	NEAT1	Dodford to Bromsgrove
	NEAT2	Bournheath/Fairfield to Bromsgrove
	NEAT3	Rubery / Catshill to Bromsgrove Improvement
	NEAT4	Bromsgrove Improvements, including assessment of provision along A38 corridor
	NEAT5	South Bromsgrove Links
	NEAT6	Bromsgrove Railway Station Link
	NEAT7	Stourport-On-Severn to Bromsgrove
	NEAT8	Redditch to Bromsgrove

LTP4 Scheme	Scheme ID	Scheme Name
Redditch Package	R1	Parking Strategy
	R2	Active Travel Network Investment Programme
	R3	Ran Tan Major Junction Capacity Enhancement Scheme
	R4	Battens Drive / Warwick Highway Junction
	R5	Alders Drive / Warwick Highway Junction
	R6	Plymouth Road / Bromsgrove Road Junction
	R7	B4184 Windsor Road /Birmingham Road Junction
	R8	A441 Birmingham Road / B4101 Dagnell End Road Junction
	R9	Station Enhancement Scheme
	R10	Hewell Road / Batchley Road junction
	R11	Alexandra Hospital Bus Transport Interchange Scheme

LTP4 Scheme	Scheme ID	Scheme Name
Bromsgrove Package	BR1	Bromsgrove Transport Strategy
	BR2	Bromsgrove – Strategic Active Travel Network Investment Programme (Including Catshill, Marlbrook and Lickey End)
	BR3	Broad Street/Stourbridge Road Junction
	BR4	Parkfield – The Strand / Market Street / Stourbridge Road / Birmingham Road Junction
	BR5	Bromsgrove – St John Street / Hanover Street / Kidderminster Road Junction
	BR6	Bromsgrove – Worcester Road/Rock Hill Key Corridor of Improvement (including Worcester Road AQMA Remediation)
	BR7	Bromsgrove Station – Car Park Extension Scheme
	RB1	Rubery Public Realm Scheme

4.2 Assessment Findings

4.2.1 Air Quality

Key Issues For The Delivery Area Identified During Scoping

The key issues for North East Worcestershire identified during scoping are:

- The four AQMAs in North East Worcestershire have been designated due to NO_2 emissions from road transport;
- There is a need to reduce emissions from road transport, especially in/around Redditch, Bromsgrove and Hagley;
- There is a need to limit the effects of new development areas in North East Worcestershire on air quality; and
- There is a need to encourage sustainable modes of transport such as walking, cycling and public transport use.

Assessment Findings

There are four AQMAs in North East Worcestershire, comprising: the Lickey End AQMA; the Worcester Road AQMA; the Stoke Heath AQMA and the Kidderminster Road AQMA. Stoke Heath AQMA consists of an area encompassing parts of Redditch Road, Sherwood Road, Austin Road, Stoke Road and Hanbury Road in Stoke Heath, Bromsgrove where there are exceedances of the NO_2 annual mean.

The LTP4 contains measures to address exceedance of NO_2 levels at these AQMAs. This involves:

- Major junction enhancements at Lickey End (M42 Junction 1) (though the first stage is to look at strategic options for the junction);
- A review of Bromsgrove's highway network to explore options to improve and disperse traffic flow; as well as systematic investment in the Worcester Road/Rock Hill key corridor, both will aim to provide AQMA remediation at Worcester Road;
- A review of a number of junctions in Hagley to assess in part capacity and traffic flows; and
- The Bromsgrove A38 Strategic Corridor major enhancements that will address delay and congestion at junctions on the Bromsgrove eastern bypass.

These measures would be expected to reduce congestion in these areas with significant positive effects for air quality.

In addition to those noted above, highway improvements are proposed which are intended to increase highway capacity and/or relieve congestion at:

- Old Birmingham Road/Linehouse Lane/Braces Lane Junction (Marlbrook);
- Ran Tan Junction;
- Battens Drive/Warwick Highway Junction;
- Plymouth Road/Bromsgrove Road Junction;
- B4184 Windsor Road; and
- A441 Birmingham Road/B4101 Dagnell End Road Junction.

None of these highway improvements proposed in North East Worcestershire are within an AQMA, however all will contribute to an improvement in air quality in these areas through improved traffic flows and a reduction in congestion.

More widely, the LTP4 measures in North East Worcestershire are focused on reducing road congestion, mostly by increasing road and junction capacity at specific pinch points. For individual journeys, less congestion means reduced journey times and increased fuel efficiency as a result of more consistent travel speeds and less braking and accelerating. Reduced congestion can therefore limit NO_2 and particulate matter (PM) emissions (including PM10 and PM2.5) from individual vehicle trips.

However, the relationship between individuals' travel choices and NO_2 and PM emissions is complex and uncertain. For instance, road schemes that relieve congestion and / or increase capacity can have the effect of releasing demand for vehicle trips currently suppressed. This occurs when individuals who currently do not make a trip using a private vehicle (perhaps because a road is too busy and congested) now decide to make that trip. These individuals therefore take advantage of the increased road capacity provided which now reduces the cost (in time and monetary terms) of making a trip they previously decided not to make, or made using an alternative. In transport planning terms this concept is known as 'induced demand'. A modal shift from road-based trips to sustainable transport-based trips can also have a similar effect where the shift by some existing road users to sustainable transport modes frees up capacity on the road network- which is then utilised by 'new' road trips.

There are no specific measures in the Strategic Delivery Programme of the LTP4 that promote enhancements to green infrastructure networks to facilitate increased absorption and dissipation of nitrogen dioxide and other pollutants; however this should be considered as a part of all major junction improvement schemes and public realm improvements.

The Strategic Delivery Programme for the LTP4 contains measures aimed at reducing the use of private vehicles for journeys where it is practicable to do so. This involves a wide range of initiatives but in general terms the package of measures is intended to improve the viability of alternative transport options. Key measures include: rail station enhancement schemes at Wythall, Hagley, Alvechurch and Redditch; investment in safe walking and cycling links across Redditch and Bromsgrove; and development of a transport interchange at Alexandra Hospital, Redditch.

The focus in the LTP4 on improving the accessibility and attractiveness of public transport would be expected to lead to an increase in public transport patronage. Similarly, improvements to cycle and pedestrian infrastructure would be expected to promote increased levels of active travel. Whilst this has not been confirmed by a transport assessment, this is likely to support modal shift from private vehicle trips to other modes. A reduction in car-based travel would therefore be expected to have air quality benefits, notably a reduction in NO_2 emissions, which is the main source of air pollution and the reason for the designation of the AQMAs designated in the Delivery Area.

The Strategic Delivery Programme in LTP4 does not specifically address promotion of low emission vehicles; however where improvements to car parking is proposed (for example at train stations), as well as part of the Redditch Car Parking Strategy, provision is likely to be made for the installation of electric vehicle charging points.

The Borough of Redditch Local Plan No.4 seeks to allocate 6,400 dwellings between 2011 and 2030, and the Bromsgrove District Plan 2011-30 seeks to allocate in the region of 7,000 houses. The Local Plans also seek to allocate 55 hectares of employment land in Redditch Borough and 28 hectares of employment land in Bromsgrove District. In this context in addition to a potential increase in road-based travel through induced demand, the addition of 13,400 homes and over 83ha of employment in the North East Worcestershire Delivery Area in the period to 2031 will generate demand for new trips. Whilst the Local Plans to an extent plan for growth around public transport nodes (e.g. railway stations) and includes policies and objectives (e.g. strategic objectives) to promote sustainable travel choices, the growth in the area has the potential to result in an increase in road journeys.

At this stage there is no quantitative information available on what impact the LTP4 (either individually or cumulatively with strategic land use change such as promoted by the two Local Plans) would have in relation to NO_2 and PM emissions. Based on available information however, it is likely that the LTP4, in combination with the Local Plans, would result in an overall increase in NO_2 and PM emissions in North East Worcestershire.

4.2.2 Biodiversity

Key Issues For The Delivery Area Identified During Scoping

The key issues for North East Worcestershire identified during scoping are:

- Limiting the effects of new development areas on biodiversity in North East Worcestershire;
- Protecting the integrity of the significant areas of SSSI located in the Strategy Area;
- Opportunities for enhancements for green infrastructure provision to deliver longer term biodiversity benefits;
- Opportunities for ecological connections across the Strategy Area to support species distribution in light of climate change impacts on biodiversity; and
- Protection of biodiversity through the Roadside Verge Nature Reserve (RVNR) project.

Assessment Findings

There are no internationally designated sites in the North East Worcestershire Delivery Area; however there are a number of nationally designated sites (Sites of Special Scientific Interest (SSSIs)).

SSSI Impact Risk Zones and show where schemes of a different nature may affect SSSIs (for example infrastructure, residential, or agricultural schemes). The following engineered schemes are located within a SSSI Impact Risk Zone that are relevant for transport proposals:

Strategic Transport Schemes for North East Worcestershire:

- Alvechurch Rail Station Enhancement Scheme;
- Redditch Transport Strategy.

Redditch:

- A441 Birmingham Road / B4101 Dagnell End Road Junction;
- B4184 Windsor Road / Birmingham Road Junction;
- Plymouth Road / Bromsgrove Road Junction;
- Station Enhancement Scheme;
- Battens Drive/Warwick Highway Junction;
- Alexandra Hospital Bus Interchange Scheme;
- Ran Tan Major Junction Capacity Enhancement Scheme; and
- Active Travel Network Investment Programme (depending on location and type of scheme).

Bromsgrove:

- Strategic Active Travel Network Investment Programme (depending on location and type of scheme).

These initiatives have the potential for negative effects on SSSIs to occur if unmitigated, either as a result of direct impacts, (landtake, habitat loss and fragmentation), or as a result of indirect impacts (noise and light pollution, and disturbance). Impacts will vary depending on the scale of the scheme and the distance to the SSSI.

The following schemes have the potential to lead to the loss of areas of Biodiversity Action Plan Priority Habitat without appropriate avoidance, mitigation or replacements measures:

Redditch:

- B4184 Windsor Road / Birmingham Road Junction (deciduous woodland);
- Battens Drive / Warwick Highway Junction (deciduous woodland);
- Alexandra Hospital Transport Interchange Scheme (deciduous woodland); and
- Ran Tan Major Junction Capacity Enhancement Scheme (deciduous woodland, semi-improved grassland).

In addition, the following currently undefined schemes may affect a range of Biodiversity Action Plan Priority Habitats:

- Redditch Active Travel Network Investment Programme Evesham Transport Strategy; and
- Bromsgrove- Strategic Active Travel Network Investment Programme (depending on location and type of scheme).

Potential effects on biodiversity resulting from the above initiatives will depend on the design and layout of the scheme and the mitigation measures proposed.

Biodiversity enhancements should be incorporated into all relevant initiatives that are proposed in the LTP4 and seek to provide enhancements for green infrastructure provision; provide ecological connections to support species distribution; and also protect and expand on the Roadside Verge Nature Reserve project.

The LTP4 includes a large number of engineered schemes for the road network in North East Worcestershire, with each scheme having the potential for landtake. While landtake for a junction improvement may be small compared to that of a new road, there is therefore the potential for a greater cumulative landtake in North East Worcestershire if all schemes were undertaken. At this stage there is no quantitative information available on what the impact of all the LTP4 initiatives would be; however it would result in an overall decrease in biodiversity, unless offset by biodiversity enhancements, as outlined above.

4.2.3 Climate Change

Key Issues For The Delivery Area Identified During Scoping

- New housing and employment growth in North East Worcestershire has the potential to increase total GHG emissions from transport;
- Per capita emissions in Redditch continue to be lower than the national average; these however have seen little reduction compared to surrounding areas;
- Per capita emissions in Bromsgrove continue to be higher than the national average, and the highest in the county;
- Climate change has the potential to increase the vulnerability of the Strategy Area's transport infrastructure to extreme weather events in the future; and
- The LTP4 provides opportunities to support flood risk management objectives as part of highway infrastructure proposals.

Assessment Findings

Climate Change Mitigation

In the North East Worcestershire Delivery Area, the LTP4 proposes a wide range of measures intended to improve the viability and attractiveness of alternatives to travel by the private car and promote modal shift to more sustainable (and lower GHG emission) forms of transport, including public transport and active modes of transport (walking and cycling). This will support transport choices with lower GHG emissions. Measures with the potential to support these positive effects include the rail station enhancement schemes at Wythall, Hagley and Alvechurch, the Active Travel Network Investment Programme in Redditch, Bromsgrove, Catshill, Marlbrook and Lickey End, the development of Alexandra Hospital Bus Interchange Scheme, and the Rubey Public Ream Scheme.

Other LTP4 measures in the Delivery Area are focused on reducing road congestion, mostly by increasing road and junction capacity. For individual journeys, less congestion means reduced journey times and increased fuel efficiency as a result of more consistent travel speeds and less braking and accelerating. Reduced congestion can therefore limit GHG emissions from individual vehicle trips.

However, the relationship between individuals' travel choices and GHG emissions is complex and uncertain. For instance, road schemes that relieve congestion and / or increase capacity can have the effect of releasing demand for vehicle trips currently suppressed. This occurs when individuals who currently do not make a trip using a private vehicle (perhaps because a road is too busy and congested) now decide to make that trip. These individuals therefore take advantage of the increased road capacity provided which now reduces the cost (in time and

monetary terms) of making a trip they previously decided not to make, or made using an alternative. In transport planning terms this concept is known as 'induced demand'. A modal shift from road-based trips to sustainable transport-based trips can also have a similar effect where the shift by some existing road users to sustainable transport modes frees up capacity on the road network- which is then utilised by 'new' road trips.

The Borough of Redditch Local Plan No.4 seeks to allocates 6,400 dwellings between 2011 and 2030, and the Bromsgrove District Plan 2011-30 seeks to allocate in the region of 7,000 houses. The Local Plans also seek to allocate 55 hectares of employment land in Redditch Borough and 28 hectares of employment land in Bromsgrove District. In this context in addition to a potential increase in road-based travel through induced demand, the addition of 13,400 homes and over 83ha of employment in the North East Worcestershire Delivery Area in the period to 2031 will generate demand for new trips. Whilst the Local Plans to an extent plan for growth around public transport nodes (e.g. railway stations) and includes policies and objectives (e.g. strategic objectives) to promote sustainable travel choices, growth in the Delivery Area associated with the two Local Plans are likely to result in an increase in road journeys.

At this stage there is no quantitative information available on what impact the LTP4 (either individually or cumulatively with strategic land use change such as promoted by the two Local Plans) would have in relation to GHG emissions. Based on available information however, it is likely that the LTP4, in combination with the Local Plans, would result in an overall increase in GHG emissions in North East Worcestershire.

Climate Change Adaptation

In relation to flooding, a number of the proposed transport schemes are within locations and areas at risk of fluvial or surface water flooding. This includes as follows:

- NEST2 Bromsgrove A38 Strategic Corridor (Lydiate Ash to Hanbury Turn): a number of locations on the A38 corridor are at risk of fluvial and surface water flooding. For example the section known as Stoke Road is within an area at high risk of fluvial and surface water flooding;
- NEST6 Hagley Junctions: The A456 at Hagley is within an area of fluvial and surface water flooding;
- R6 B4184 Windsor Road / Birmingham Road Junction (part of Redditch Package): Part of the junction is at medium risk of fluvial flooding; the surrounding area is at high risk of surface water flooding;
- BR1 Bromsgrove Transport Strategy (part of Bromsgrove Package): Parts of Bromsgrove town centre are at risk of fluvial flooding (associated with the presence of the Spadesbourne Brook) and surface water flooding;
- BR4 Parkfield – Strand / Market Street / Stourbridge Road / Birmingham Road Junction (part of Bromsgrove Package): The junction is at medium risk of fluvial flooding and high risk of surface water flooding;

- BR5 Bromsgrove – St John Street / Hanover Street / Kidderminster Road Junction (part of Bromsgrove Package): The junction is at low risk of fluvial flooding; and

- BR7 Bromsgrove Station – Car Park Extension Scheme (part of Bromsgrove Package): The area around the station is at high risk of surface water flooding.

Whilst these transport schemes have the potential to increase flood risk in these area, these packages of transport improvements have the potential to enable the implementation of measures which help reduce and manage flood risk in these locations, as well as to decrease vulnerability to extreme weather events in the future. In particular, the schemes have significant potential to address and limit surface water run off issues in the vicinities of the schemes through the integration of features within these enhancements which reduces such flood risk, such as sustainable drainage systems and appropriate design and layout.

Where appropriate, it is anticipated that flood risk assessments (FRAs) will be undertaken on engineered schemes. The FRAs will incorporate appropriate allowances for climate change, in accordance with Environment Agency guidance [10], to help to minimise vulnerability and provide resilience to flooding. For fluvial risk, it should be noted that there is a need to include a 70% allowance for climate change (peak river flows) to inform the location, impacts and design of a transport scheme. For example, to improve flood risk resilience, new or improved highway infrastructure should be sited above the 1% plus climate change (70%) flood level plus an appropriate freeboard allowance.

4.2.4 Land, Soil And Water Resources

Key Issues For The Delivery Area Identified During Scoping

- New transport infrastructure has the potential to directly or indirectly lead to the loss of areas classified as the best and most versatile agricultural land in North East Worcestershire;

- The construction, maintenance and operation of transport infrastructure should seek to reduce the amount of primary materials required, make beneficial use of surplus materials and minimise the landfill disposal of waste generated throughout the asset's lifecycle;

- New transport infrastructure has the potential to modify water flow regimes and lead to effects on water quality; and

- Increased use of existing transport infrastructure, which may not be designed to current standards has the potential to lead to a deterioration of water quality in controlled waters.

Assessment Findings

In relation to Bromsgrove, much of the area around the town is classified as the Best and Most Versatile Agricultural Land (i.e. land classified as Grade 1, 2 or 3a agricultural land). This is with the exception of land to the south west of the town, which has been classified as Grade 3b agricultural land. As such any landtake from junction capacity improvement or road corridor improvements schemes on agricultural land in the vicinity of the

[10] Environment Agency (2016) Flood risk assessments: climate change allowances [online] available at: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances (Accessed 19 December 2016).

town has increased potential to lead to the loss of the Best and Most Versatile Agricultural Land. However, it is acknowledged that the proposed schemes are largely located within the built up area of the town, and as such are unlikely to lead to the loss of significant areas of such land in this regard.

In relation to Redditch, the combination of fewer areas of the Best and most Versatile Agricultural Land and the location of the proposed schemes and initiatives within the built up area of the town reduces the likelihood for significant effects on the soils resource.

Whilst the proposed transport infrastructure improvements have the potential to lead to effects on water quality and the flow regimes without mitigation measures, it is likely that sustainable drainage systems and other associated water management measures will be incorporated in scheme design. Hence new transport infrastructure schemes are unlikely to have significant effects on water quality and the flow regimes.

Where applicable, engineered schemes should help to facilitate the restoration of watercourses and result in potential for positive effects; such as deculverting of any watercourse within or on the boundary of a scheme, naturalising artificially engineered river bank or beds, and providing an adequate riparian corridor.

The LTP4 includes a large number of engineered schemes for the road network in North East Worcestershire, which will potentially require large volumes of primary materials for their construction. During design and procurement of engineered schemes, measure should be put in place that seek to reduce the amount of primary materials required, make beneficial use of surplus materials and minimise the landfill disposal of waste generated throughout the asset's lifecycle.

4.2.5 Historic Environment And Landscape

Key Issues For The Delivery Area Identified During Scoping

- New transport schemes have the potential to lead to landtake on the Green Belt in North East Worcestershire; and
- New transport infrastructure and associated development has the potential for beneficial or adverse effects on the historic environment.

Assessment Findings

Transport infrastructure and traffic flows have a strong influence on the setting of the historic environment and landscape character and quality. Effects can occur from poor design of transport infrastructure, including insensitively designed layouts, inappropriate signage, noise from poor road surfaces or excessive clutter.

A number of the initiatives proposed by the Strategic Delivery Programme for the LTP4 will directly or indirectly support the protection and enhancement of the historic environment and landscape and townscape quality. This includes the Active Travel Investment Programme, which seeks to create an attractive and coherent walking and cycling networks through improved surfacing, lighting and public realm improvements 'to create an attractive and coherent network'. This will support the integrity of the historic environment and promote local distinctiveness and character through promoting enhancements to the public realm. The schemes proposed for the North East Worcestershire Delivery Area will also help enhance the setting of heritage through helping facilitating modal shift from the private car.

The proposed transport infrastructure improvements, including the potential road schemes, junction capacity improvements and other schemes however have the potential to have impacts on cultural heritage assets and their settings and landscape and townscape quality. In this context the following schemes and initiatives are located within or close to key features and areas of historic environment or landscape/townscape significance:

- Redditch Transport Strategy (Listed buildings and scheduled monuments);
- North East Worcestershire Transport Telematics Investment Package (conservation areas, listed buildings and scheduled monuments);
- Hagley Junctions (listed buildings, potentially a conservation area and Registered Park and Garden);
- Hagley Rail Station Enhancement Scheme (listed building and conservation area);
- Redditch Parking Strategy (listed buildings);
- Bromsgrove – St John Street / Hanover Street / Kidderminster Road Junction (listed buildings and conservation area); and
- Parkfield – The Strand / Market Street / Stourbridge Road / Birmingham Road Junction (listed buildings and conservation area).

The significance of effects from these interventions will depend on design, layout and scale of the schemes, and mitigation and avoidance measures proposed. Further work will be required to examine and mitigate effects on townscape and landscape quality and character through the relevant project level environmental assessments accompanying the schemes. It should also be noted that some schemes also have the potential to lead to positive effects on the historic environment and landscape/townscape quality with appropriate and sensitive design and layout.

Given the coverage of the West Midlands Green Belt in North East Worcestershire, the schemes outside of the main built up areas of Bromsgrove and Redditch are within the Green Belt and have the potential to lead to landtake within the designation. However, overall landtake within the Green Belt is likely to be minimal as a result of the initiatives proposed.

As a strategic document, the Strategic Delivery Programme provides limited details about the detailed designs or layout for some interventions. Subsequently, it is unclear in many cases as to what extent local historic environment assets (including archaeological features) or landscape and townscape quality may be affected. Where appropriate, project level environmental assessments will consider potential issues such as visual impacts, light and noise pollution, and the loss of features important for landscape/townscape character in more detail.

In-combination effects on the historic environment and landscape / townscape quality may result from the strategic allocations proposed for Bromsgrove District and Redditch Borough and LTP4 initiatives. This includes through a stimulation of traffic growth and increasing visual effects on the setting of the historic environment and landscape / townscape quality. However it is likely that the initiatives proposed by the LTP4 will in many respects support the integrity of the historic environment and landscape / townscape quality through helping to mitigate the impacts of new development areas from transport.

4.2.6 Population And Communities

Key Issues For The Delivery Area Identified During Scoping

- New development should be accessible by a range of sustainable transport modes to help limit the effects of congestion, economic vitality, and residents' quality of life. This is particularly important in Redditch where 20% of households do not have access to a car; and

- An ageing population structure, particularly in Bromsgrove, is likely to increase demand for access to services (e.g. healthcare services).

Assessment Findings

The Delivery Area Strategy will bring a range of benefits for the quality of life of residents and social inclusion in North East Worcestershire through a strong focus on enhancing accessibility to services, facilities and opportunities by non-car modes and promoting new and enhanced transport links.

Public transport improvements proposed through the initiatives will have particular benefits for transport disadvantaged individuals and groups. This includes those from deprived communities, and younger and older groups who have increased reliance on public transport networks. In this context a central focus of the Delivery Area Strategy is on increasing the use of public transport, with specific measures including rail enhancements (including the station enhancement schemes at Wythall, Hagley and Alvechurch), corridor improvements, and the development of Alexandra Hospital Bus Interchange Scheme. The proposed junction improvements and use of Intelligent Transport Systems (including the Transport Telematics Investment Package) proposed through the Delivery Area Strategy also have the potential to enhance the reliability of public transport and journey times. It is considered that the improvements will also help support access to healthcare services.

The North East Worcestershire Delivery Area Strategy also takes forward initiatives aimed at promoting active travel choices. This will support the quality of life of residents through enhancing physical and psychological wellbeing, improving community cohesion and increasing engagement between residents. In this context, key initiatives proposed include the Bromsgrove Transport Strategy, the Redditch Transport Strategy, the improvements proposed for important transport corridors in the area and the Active Travel Network Investment Programme in Redditch, Bromsgrove, Catshill, Marlbrook and Lickey End and the Rubery Public Realm Scheme.

More widely in relation to socio-economic factors, the package of transport measures proposed through the Delivery Area Strategy will support the economic vitality of North East Worcestershire through helping to unlock economic potential and supporting enhancements to employment opportunities.

As discussed in relation to air quality and climate change, the large quantum of growth promoted under the two Local Plans in the area will result in increased demand for travel. While it is WCC's view that much of this demand can be met by sustainable and/or active transport modes, a large proportion will be met by private car based trips. This may have implications for the quality of life of residents at some locations.

4.2.7 Health And Well-Being

Key Issues For The Delivery Area Identified During Scoping

- An ageing population structure, particularly in Bromsgrove, is likely to increase demand for access to healthcare services;
- Reducing road accidents and enhancing road safety should be a key consideration; and
- Investment in safe walking and cycling infrastructure and green infrastructure should be supported in order to encourage increased physical activity.

Assessment Findings

The Delivery Area Strategy will bring a range of benefits for the health and wellbeing of residents in North East Worcestershire through a focus on enhancing accessibility to services, facilities and opportunities by non-car modes and promoting new and enhanced transport links.

The North East Worcestershire Delivery Area Strategy takes forward initiatives aimed at promoting active travel choices. This will support the health and wellbeing of residents through enhancing physical and psychological wellbeing, improving community cohesion and increasing engagement between residents. In this context, key initiatives proposed include the Bromsgrove Transport Strategy, the Redditch Transport Strategy, the improvements proposed for important transport corridors in the area and the Active Travel Network Investment Programme in Redditch, Bromsgrove, Catshill, Marlbrook and Lickey End and the Rubery Public Realm Scheme.

A focus of the Delivery Area Strategy is on increasing the use of public transport, with specific measures including rail enhancements (including the station enhancement schemes at Wythall, Hagley and Alvechurch), corridor improvements, and the development of Alexandra Hospital Bus Interchange Scheme. The proposed junction improvements and use of Intelligent Transport Systems (including the Transport Telematics Investment Package) proposed through the Delivery Area Strategy also have the potential to enhance the reliability of public transport and journey times. This will support access to community amenities including health, leisure and recreational facilities, with benefits for health and wellbeing. Directly related to accessibility to health services, the development of Alexandra Hospital Bus Interchange Scheme will bring significant enhancements to accessibility by public transport to this key health facility.

The LTP4 measures in North East Worcestershire are focused on reducing road congestion, mostly by increasing road and junction capacity at specific pinch points. This has the potential to support health and wellbeing through enhancing air and noise quality at key locations.

However, through helping to release induced demand, the in-combination effects of multiple capacity enhancements schemes and housing and employment growth in the wider North East Worcestershire Delivery Area have the potential to have impacts on road safety and air and noise quality. In this context it is considered that the measures aimed at influence travel behaviour will help ‘lock in’ these potential effects on health and wellbeing.

5. South Worcestershire

5.1 Key LTP4 Initiatives For Delivery Area

Table 5.1 provides a summary of the key LTP4 initiatives for South Worcestershire.

Table 5.1: Key LTP4 Initiatives For South Worcestershire

LTP4 Scheme	Scheme ID	Scheme Name
Strategic Transport Schemes for South Worcestershire	SWST1	Worcestershire Parkway.
	SWST2	M5 Junction 6 – Major Capacity Enhancement Scheme.
	SWST3	Southern Link Road (A4440) Phase 4 – Ketch to Powick Hams
	SWST4	Pershore Northern Access Improvements
	SWST5	Evesham – A46 Corridor Major Upgrade Scheme
	SWST6	Honeybourne Rail Station Improvement Scheme
	SWST7	Droitwich to Stoke Works Junction- Rail Line Redoubling
	SWST8	Rushwick (Worcester West) Station Scheme – Business Case Development
	SWST9	Worcester Rail Triangle' Major Resignalling and Reconfiguration Scheme
	SWST10	Worcester – Western Link Road Scheme
	SWST11	South Worcestershire Transport Telematics Investment Package
	SWST12	Black Bridges, Torton (A449 / A450 / A442) Junctions
	SWST13	Bluebell Farm (A4103 / A38) Junction
	SWST14	Martin Hussingtree – A38 Droitwich Road / A4538 Pershore Lane Junction
	SWST15	Holt Heath Junctions (A443 / A4133)
	SWST16	The Rhydd (B4211 Guarlford Road / B4211 Upton Road / B4424 Powick Road) Junction

LTP4 Scheme	Scheme ID	Scheme Name
	SWST17	Fernhill Heath – A38 Droitwich Road / A4536 Hurst Lane Junction
	SWST18	Welland – B4208 Gloucester Road/ B4208 Blackmore Park Road / Upper Hook Road Junction
	SWST19	Leigh Sinton – A4103 / B4503 Malvern Road Junction
	SWST20	Ankerdine Hill – (A44/B4197) Junction
	SWST21	Redoubling of the Cotswold Line Major Scheme
	SWST22	Hartlebury Rail Station Enhancement Major Scheme
	SWST23	Rural traffic management programme
	SWST24	Travel Choice support programme
	SWST25	Worcester City Centre Transport Strategy
	SWST26	Shrub Hill Station Enhancement Scheme

LTP4 Scheme	Scheme ID	Scheme Name
Strategic Active Travel Corridor Schemes for South Worcestershire	SWAT1	Worcester to Malvern Wells (NCN41) Active Travel Corridor
	SWAT2	Worcester to Droitwich Spa Active Travel Corridor
	SWAT3	Worcester to Kempsey Active Travel Corridor
	SWAT4	Worcester to Hallow Active Travel Corridor
	SWAT5	Vale West Active Travel Corridor (Pershore-Wyre Piddle-Fladbury-Charlton/Cropthorne Evesham)
	SWAT6	Vale East Active Travel Network Development and Improvements (Evesham-Badsey-Offenham-Littletons-Harvington-Wickhamford-Childswickham Broadway)
	SWAT7	Malvern to Upton-upon-Severn Active Travel Corridor Phase 1 (Malvern to Three Counties Showground)
	SWAT8	Malvern to Upton-upon-Severn Active Travel Corridor Phase 2 (Three Counties Showground to Upton-upon-Severn)
	SWAT9	Malvern to Leigh Sinton Active Travel Corridor
	SWAT10	Stourport to Hartlebury Station (Leapgate Line) Active Travel Corridor
	SWAT11	Pershore to Pinvin Active Travel Corridor
	SWAT12	Worcester North East-North West Active Travel Corridor (Lower Broadheath to Worcester Six, via new bridge at Gheluvelt Park)
	SWAT13	Worcester River Severn Active Travel Corridor (Sabrina Bridge to Kepax)
	SWAT14	Worcester – Canal Towpath Active Travel Corridor Improvement Scheme (Diglis to Tibberton)
	SWAT15	Worcester-Parkway-Pershore Active Travel Corridor

LTP4 Scheme	Scheme ID	Scheme Name
Droitwich Package	D1	Hanbury Street / Queen Street / Saltway / Bromsgrove Road (St George's Square) Junction
	D2	A38 Roman Way / B4065 Bromsgrove Road Junction
	D3	Westlands – A38 Roman Way / A442 Kidderminster Road Junction
	D4	A38 Roman Way / B4090 Worcester Road Junction
	D5	Droitwich Spa High Street Public Realm Scheme
	D6	Active Travel Network Investment Programme
	D7	Rail Station Improvement Scheme
	D8	Parking Strategy (To include parking for cars, motorcycles and covered parking for bicycles)

LTP4 Scheme	Scheme ID	Scheme Name
Vale of Evesham Package	E1	Evesham Rail Station Improvement Scheme
	E2	Evesham Transport Strategy
	E3	Port Street Key Corridor of Improvement (including AQMA Remediation, public realm and Waterside junction improvements)
	E4	Active Travel Network Investment Programme
	E5	A4184 High Street / A4184 Greenhill / B4624 Worcester Road Junction
	E6	Abbey Bridge Junction – Abbey Road / Pershore Road / Waterside / Cheltenham Road
	E7	Vine Street / High Street / Bridge Street Junction
	E8	A4184 (Cheltenham Road) / Davies Road Junction
	E9	Parking Strategy (To include parking for cars, motorcycles and covered parking for bicycles)
	B1	Broadway – Visitor Access Improvement (Experimental Scheme)

LTP4 Scheme	Scheme ID	Scheme Name
Malvern and Tenbury Wells Package	M1	Great Malvern Town Centre Regeneration Scheme
	M2	Parking Strategy (To include parking for cars, motorcycles and covered parking for bicycles)
	M3	Malvern Link (A449) Key Corridor of Improvement (Including Public Realm and Junction Enhancement at: Worcester Road / Howsell Road / Pickersleigh Road, Worcester Road / Newtown Road / Hornyold Road, Worcester Road / Pickersleigh Avenue / Richmond Road)
	M4	Malvern Link – Station Car Park Expansion Scheme
	M5	Active Travel Network Investment Programme
	M6	B4208 Barnards Green Road / Pound Bank Road Junction
	M7	B4208 Pickersleigh Road / North End Lane / Hayslan Road junction
	M8	B4211 Barnards Green Rd / B4208 Pickersleigh Rd / Upper Chase Rd / Court Rd / Avenue Rd junction
	M9	A449 Belle Vue Terrace / Wells Road / B4211 Church Street junction
	M10	B4208 Barnards Green Rd / B4211 Poolbrook Road junction
	M11	Malvern (Three Counties Showground) – B4208 Blackmore Park Rd / B4209 Hanley Road
	M12	B4219 Cowleigh Road/Cowleigh Bank/Old Hollow junction
	M13	A449 Wells Road / Upper Welland Road Junction
	T1	Tenbury Wells (Teme Street) Public Realm Enhancement Scheme (Phase 2)
	T2	A443/A456 (Newnham Bridge) Junction

LTP4 Scheme	Scheme ID	Scheme Name
Pershore Package	P1	Pershore Rail Station Improvement Scheme
	P2	High Street (Church Street to Priest Lane) Public Realm Scheme
	P3	Parking Strategy (To include parking for cars, motorcycles and covered parking for bicycles)
	P4	A44 Allens Hill / A4104 Terrace Road / B4082 Main Street Junction
	P5	A4104 Worcester Road / B4084 Three Springs Road Junction
	P6	A4104 Worcester Road / B4084 Station Road / High Street Junction
	P7	A4104 Station Road / B4083 Wyre Road Junction

LTP4 Scheme	Scheme ID	Scheme Name
Worcester Package	W1	Worcester Rainbow Hill / Astwood Road / Bilford Road / Blackpole Road Key Corridor of Improvement
	W2	Foregate Street Station Enhancement Scheme
	W3	Worcester – A449 Bromwich Road / A449 Malvern Road / Malvern Road / Canada Way Key Corridor of Improvement
	W4	Worcester East-West Axis Key Corridor of Improvement
	W5	Worcester Wildwood – A44 / A4440 Nunnery Way / A4440 Swinesherd Way / Wildwood Drive Junction
	W6	Worcester – A449 North of Worcester (Ombersley Road) Junction
	W7	Worcester – A4440 Grange Way / B4636 Newtown Road Junction
	W8	Worcester – A4536 Blackpole Road / Cotswold Way Junction
	W9	Worcester – Crown East (A44 / A4440 / A4103) Junction
	W10	Worcester – Red Hill – A44 London Road / A44 Whittington Road / Spetchley Road Junction

5.2 Assessment Findings

5.2.1 Air Quality

Key Issues For The Delivery Area Identified During Scoping

The key issues for South Worcestershire identified during scoping are:

- The four AQMAs in South Worcestershire (three in Worcester, one in Evesham) have been designated due to NO_2 emissions from road transport;
- There is a need to reduce emissions from road transport, especially in/around Worcester and Evesham;
- There is a need to limit the effects of new development areas in South Worcestershire on air quality; and
- Encourage sustainable modes of transport such as walking, cycling and public transport use in Worcester.

Assessment Findings

There are four AQMAs in South Worcestershire including: Bridge Street / Dolday, Lowesmoor / Rainbow Hill, St. Johns, and Port Street. The Strategic Delivery Programme for the LTP4 contains measures to address exceedances of NO_2 levels at these AQMAs. This involves:

- Port Street key corridor improvements, including upgrading the junction to improve its efficiency capacity;
- Worcester Rainbow Hill/ Astwood Road/ Bilford Road / Blackpole Road key corridor of improvements, including improving journey times and reducing congestion;
- A449 Bromwich Road/ A449 Malvern Road/ Malvern Road / Canada Way key corridor of improvement, incorporating a systematic investment in a key corridor to reduce congestion; and
- Worcester east-west axis key corridor of improvement, incorporating a systematic investment in a key corridor to reduce congestion.

These measures would be expected to reduce congestion in these areas with significant positive effects for air quality.

In addition to those noted above, highway improvements are proposed which are intended to increase highway capacity and/ or relieve congestion at:

- M5 Junction 6 major capacity enhancement scheme;
- Southern link road (A4440) Phase 4 – Ketch to Powick Hams;
- Pershore Northern Access Improvements;
- Evesham A46 Corridor Major Upgrade Scheme;
- Worcester Western Link Road Scheme; and
- Malvern Link (A449) Key Corridor of Improvement;

In addition there are a number of proposed comprehensive reviews of junctions proposed, however the construction of these is not included in the Strategic Delivery Programme in LTP4.

None of these highway improvements proposed in South Worcestershire are within an AQMA, however all will contribute to an improvement in air quality in these areas through improved traffic flows and a reduction in congestion.

More generally, the LTP4 measures in South Worcestershire AQMAs are focused on reducing road congestion, mostly by increasing road and junction capacity at specific pinch points. For individual journeys, less congestion means reduced journey times and increased fuel efficiency as a result of more consistent travel speeds and less braking and accelerating. Reduced congestion can therefore limit NO_2 and particulate matter (PM) emissions (including PM10 and PM2.5) from individual vehicle trips.

However, the relationship between individuals' travel choices and NO_2 and PM emissions is complex and uncertain. For instance, road schemes that relieve congestion and / or increase capacity can have the effect of releasing demand for vehicle trips currently suppressed. This occurs when individuals who currently do not make a trip using a private vehicle (perhaps because a road is too busy and congested) now decide to make that trip. These individuals therefore take advantage of the increased road capacity provided which now reduces the cost (in time and monetary terms) of making a trip they previously decided not to make, or made using an alternative. In transport planning terms this concept is known as 'induced demand'. A modal shift from road-based trips to sustainable transport-based trips can also have a similar effect where the shift by some existing road users to sustainable transport modes frees up capacity on the road network- which is then utilised by 'new' road trips.

There are no specific measures in the Strategic Delivery Programme of LPT4 that promote enhancements to green infrastructure networks to facilitate increased absorption and dissipation of nitrogen dioxide and other pollutants; however this should be considered as a part of all major junction improvement schemes and public realm improvements.

The Strategic Delivery Programme in LTP4 contains measures aimed at reducing the use of private vehicles for journeys where it is practicable to do so. This involves a wide range of initiatives but in general terms the package of measures is intended to improve the viability of alternative transport options. Key measures include:

- Rail station enhancement schemes at Honeybourne, Hartlebury, Droitwich, Evesham, Malvern, Pershore, Foregate Street, and Shrub Hill;
- Investment in safe walking and cycling links through an Active Travel Investment Programme in Droitwich, Evesham, and Malvern which is proposed to create a comprehensive, integrated network linking residential areas with key trip attractors, including schools, rail stations, town centres and employment locations; and
- Public realm improvements.

The focus in the LTP4 on improving the accessibility and attractiveness of public transport would be expected to lead to an increase in public transport patronage. Similarly, improvements to cycle and pedestrian infrastructure would be expected to promote increased levels of active travel. Whilst this has not been confirmed by a transport assessment, this is likely to support modal shift from private vehicle trips to other modes. A reduction in car-based travel would therefore be expected to have air quality benefits, notably a reduction in NO_2 emissions, which is the main source of air pollution and the reason for the designation of the AQMA.

The Strategic Delivery Programme for the LTP4 does not specifically address promotion of low emission vehicles; however where improvements to car parking is proposed (for example at train stations), as well as part of the Droitwich, Malvern and Tenbury Wells, and Pershore Car Parking Strategy, provision should be made for installation of electric vehicle charging points.

The administrative areas of Malvern Hills District, Worcester City and Wychavon District have joined together to produce the South Worcestershire Development Plan (2016). The Plan will enable the development of nearly 300 hectares of employment land and the building of 28,400 new homes between 2006 and 2030; though it is acknowledges that a significant amount of the development included in it has already taken place. In this context, in addition to a potential increase in road-based travel through induced demand, the addition of 28,400 homes and over 300ha of employment land in the South Worcestershire Delivery Area in the period to 2030 will generate demand for new trips. Whilst the Development Plan to an extent plans for growth around public transport nodes (e.g. railway stations) and includes policies and objectives (e.g. strategic objectives) to promote sustainable travel choices, the Development Plan is likely to result in an increase in road journeys.

At this stage there is no quantitative information available on what impact the LTP4 (either individually or cumulatively with strategic land use change such as promoted by the Development Plan) would have in relation to NO_2 and PM emissions. Based on available information however, it is likely that the LTP4, in combination with the Development Plan, would result in an overall increase in NO_2 and PM emissions in South Worcestershire.

5.2.2 Biodiversity

Key Issues For The Delivery Area Identified During Scoping

The key issues for South Worcestershire identified during scoping are:

- Limiting the effects of new development areas in South Worcestershire on biodiversity;
- Protecting the integrity of the SACs and SSSIs in the area;
- Opportunities for enhancements for green infrastructure provision to deliver longer term biodiversity benefits;
- Opportunities for ecological connections across the Strategy Area to support species distribution in light of climate change impacts on biodiversity; and
- Protection of biodiversity through the Roadside Verge Nature Reserve (RVNR) project.

Assessment Findings

There are two internationally designated sites in the South Worcestershire Delivery Area: Bredon Hill SAC and Lyppard Grange Ponds SAC. The potential environmental impact of policies in the LTP4 has been subject to assessment as part of the Habitats Regulations Assessment (HRA) being undertaken alongside the LTP4.

There are a number of nationally designated sites (SSSIs and NNRs). SSSI Impact Risk Zones are located around SSSIs and show where schemes of different natures may affect SSSI. The following engineered schemes are located within a SSSI Impact Risk Zone that are relevant for transport proposals:

Strategic Transport Schemes for South Worcestershire:

- Worcestershire Parkway;
- M5 Junction 6 – Major Capacity Enhancement Scheme;
- Southern Link Road (A4440) Phase 4 – Ketch to Powick Hams;
- Pershore Northern Access Improvements;
- Worcester – Western Link Road Scheme;
- Black Bridges, Torton (A449 / A450 / A442) Junctions;
- Bluebell Farm (A4103 / A38) Junction;
- Martin Hussingtree – A38 Droitwich Road / A4538 Pershore Lane Junction;
- The Rhydd (B4211 Guarlford Road / B4211 Upton Road / B4424 Powick Road) Junction;

- Welland – B4208 Gloucester Road/ B4208 Blackmore Park Road / Upper Hook Road Junction;
- Leigh Sinton – A4103 / B4503 Malvern Road Junction;
- Ankerdine Hill – (A44/B4197) Junction (deciduous woodland); and
- Hartlebury Rail Station Enhancement Scheme Major Scheme.

Droitwich:

- Hanbury Street / Queen Street / Saltway / Bromsgrove Road (St George's Square) Junction;
- Westlands – A38 Roman Way / A442 Kidderminster Road Junction;
- Rail Station Improvement Scheme; and
- A38 Roman Way / B4090 Worcester Road Junction.

Malvern and Tenbury Wells:

- Great Malvern Town Centre Regeneration Scheme;
- Malvern (Three Counties Showground) – B4208 Blackmore Park Rd / B4209 Hanley Road;
- A449 Wells Road / Upper Welland Road Junction;
- B4208 Barnards Green Road / Pound Bank Road Junction;
- B4211 Barnards Green Rd / B4208 Pickersleigh Rd / Upper Chase Rd / Court Rd / Avenue Rd junction;
- B4208 Barnards Green Rd / B4211 Poolbrook Road junction;
- A449 Belle Vue Terrace / Wells Road / B4211 Church Street junction;
- Malvern Link – Station Car Park Expansion Scheme;
- Malvern Link (A449) Key Corridor of Improvement;
- B4219 Cowleigh Road/Cowleigh Bank/Old Hollow junction;
- B4208 Pickersleigh Road / North End Lane / Hayslan Road junction;
- Active Travel Network Investment Programme; and
- Tenbury Wells (Teme Street) Public Realm Enhancement Scheme (Phase 2).

Pershore:

- A4104 Worcester Road /B4084 Three Springs Road Junction;
- A4104 Worcester Road /B4084 Station Road / High Street Junction; and
- High Street (Church Street to Priest Lane) Public Realm Scheme.

Worcester:

- Worcester – A449 North of Worcester (Ombersley Road) Junction;
- Worcester Rainbow Hill/Astwood Road/Bilford Road/ Blackpole Road Key Corridor of Improvement;

- Worcester – A4440 Grange Way / B4636 Newtown Road Junction;
- Worcester Wildwood – A44 / A4440 Nunnery Way / A4440 Swinesherd Way / Wildwood Drive Junction;
- Worcester – A449 Bromwich Road / A449 Malvern Road / Malvern Road / Canada Way Key Corridor of Improvement;
- Worcester East-West Axis Key Corridor of Improvement; and
- Worcester – Crown East (A44 / A4440 / A4103) Junction.

These initiatives have the potential for negative effects on SSSIs to occur if unmitigated, either as a result of direct impacts, (landtake, habitat loss and fragmentation), or as a result of indirect impacts (noise and light pollution, and disturbance). Impacts will vary depending on the scale of the scheme and the distance to the SSSIs.

In addition, the South Worcestershire strategic active travel corridors schemes occur across numerous SSSI Impact Risk Zones. However the nature of such schemes (which focus on enhancing pedestrian and cycle networks are unlikely to lead to significant effects on the integrity of SSSIs in the Delivery Area.

There are two NNRs located within South Worcestershire: Bredon Hill and Forester's Green Meadows. No initiatives in the Strategic Delivery Programme for South Worcestershire are likely to impact on these, due to their distance from the site.

The following schemes have the potential to lead to the loss of areas of Biodiversity Action Plan Priority Habitat without appropriate avoidance, mitigation or replacement measures:

Strategic Transport Schemes for South Worcestershire:

- Worcestershire Parkway (lowland meadows, deciduous woodland);
- M5 Junction 6 – Major Capacity Enhancement Scheme (Ancient Replanted Woodland, deciduous woodland);
- Southern Link Road (A4440) Phase 4 – Ketch to Powick Hams (deciduous woodland);
- Pershore Northern Access Improvements (deciduous woodland, traditional orchard);
- Worcester – Western Link Road Scheme (deciduous woodland, traditional orchard, Ancient & Semi-Natural Woodland);
- Black Bridges, Torton (A449 / A450 / A442) Junctions (deciduous woodland);
- Welland – B4208 Gloucester Road/ B4208 Blackmore Park Road / Upper Hook Road Junction (deciduous woodland); and
- Ankerdine Hill – (A44/B4197) Junction (deciduous woodland).

Droitwich:

- Westlands – A38 Roman Way / A442 Kidderminster Road Junction (deciduous woodland); and
- A38 Roman Way / B4090 Worcester Road Junction (deciduous woodland).

Malvern and Tenbury Wells:

- Malvern (Three Counties Showground) – B4208 Blackmore Park Rd / B4209 Hanley Road (deciduous woodland and traditional orchard);
- A449 Wells Road / Upper Welland Road Junction (deciduous woodland); and
- Malvern Link (A449) Key Corridor of Improvement (deciduous woodland).

Pershore:

- A44 Allens Hill / A4104 Terrace Road / B4082 Main Street Junction (deciduous woodland).

Worcester:

- Worcester Rainbow Hill/Astwood Road/Bilford Road/ Blackpole Road Key Corridor of Improvement (deciduous woodland);
- Worcester Wildwood – A44 / A4440 Nunnery Way / A4440 Swinesherd Way / Wildwood Drive Junction (lowland meadow, traditional orchard); and
- Worcester East-West Axis Key Corridor of Improvement (deciduous woodland).

In addition the following currently undefined schemes may affect a range of Biodiversity Action Plan Priority Habitats:

- South Worcestershire Strategic Active Travel Corridors Schemes;
- Evesham Transport Strategy;
- Evesham Active Travel Network Investment Programme, in particular the Evesham West Walk/Cycle Bridge included within this package; and
- Great Malvern Active Travel Network Investment Programme.

Potential effects on biodiversity resulting from the above initiatives will depend on the design and layout of the scheme and the mitigation measures proposed.

There are a number of schemes for which a business case is being developed. Some of these are major schemes, including the proposed upgrade of the A46 from the M5 to M40. It is not possible to assess these schemes through the SEA Environmental Report, as proposals are at an early stage, with details uncertain.

Biodiversity enhancements should be incorporated into all relevant initiatives that are proposed in the LTP4 and seek to: provide enhancements for green infrastructure provision; provide ecological connections to support species distribution; and also protect and expand on the Roadside Verge Nature Reserve project.

The LTP4 includes a large number of engineered schemes for the road network in South Worcestershire, with each scheme having the potential for landtake. While landtake for a junction improvement may be small, there is therefore the potential for

a greater cumulative landtake in South Worcestershire. At this stage there is no quantitative information available on what the impact of all the LTP4 initiatives would be; however it is likely landtake would result in an overall decrease in biodiversity unless offset biodiversity enhancements are implemented, as outlined above.

5.2.3 Climate Change

Key Issues For The Delivery Area Identified During Scoping

- New housing and employment growth in South Worcestershire has the potential to increase total GHG emissions from transport;
- The reduction in public transport services has the potential to increase personal car use;
- Per capita emissions in Worcester continue to be lower than the national average; however these have seen little reduction;
- Per capita emissions in Malvern Hills and Wychavon continue to be higher than the national average;
- Climate change has the potential to increase the vulnerability of the Strategy Area's transport infrastructure to extreme weather events in the future; and
- The LTP4 provides opportunities to support flood risk management objectives as part of highway infrastructure proposals.

Assessment Findings

Climate Change Mitigation

In the South Worcestershire Delivery Area, the Strategic Delivery Programme proposes a wide range of measures intended to improve the viability and attractiveness of alternatives to travel by the private car and promote modal shift to more sustainable (and lower GHG emissions) forms of transport, including public transport and active modes of transport (walking and cycling). This will support transport choices with lower GHG emissions. Measures with the potential to directly and indirectly support these positive effects include: the Worcestershire Parkway Major Scheme; the Worcester Triangle' Major Resignalling Reconfiguration Scheme; the Redoubling of the Cotswold Line Major Scheme; the Droitwich, Evesham, Pershore, Foregate Steet, Shrub Hill and Hartlebury Rail Station Enhancement and Improvement Schemes; the 15 Active Travel Corridor schemes proposed in South Worcestershire; the Active Travel Investment Programmes for Droitwich, the Vale of Evesham and Malvern and Tenbury Wells; the Droitwich Spa High Street Public Realm Scheme; the Great Malvern Town Centre Regeneration Scheme; the Tenbury Wells (Teme Street) Public Realm Enhancement Scheme (Phase 2); and the Pershore High Street Public Realm Scheme.

Other LTP4 Strategic Delivery Programme measures in South Worcestershire are focused on reducing road congestion, mostly by increasing road and junction capacity. For individual journeys, less congestion means reduced journey times and increased fuel efficiency as a result of more consistent travel speeds and less braking and accelerating. Reduced congestion can therefore limit GHG emissions from individual vehicle trips.

However, the relationship between individuals' travel choices and GHG emissions is complex and uncertain. For instance, road schemes that relieve congestion and / or increase capacity can have the effect of releasing demand for vehicle trips currently suppressed. This occurs when individuals who currently do not make a trip using a private vehicle (perhaps because a road is too busy and congested) now decide to make that trip. These individuals therefore take advantage of the increased road capacity provided which now reduces the cost (in time and monetary terms) of making a trip they previously decided not to make, or made using an alternative. In transport planning terms this concept is known as 'induced demand'. A modal shift from road-based trips to sustainable transport-based trips can also have a similar effect where the shift by some existing road users to sustainable transport modes frees up capacity on the road network- which is then utilised by 'new' road trips.

The administrative areas of Malvern Hills District, Worcester City and Wychavon District have joined together to produce the South Worcestershire Development Plan. This plan was adopted in February 2016. The plan will enable the building of 28,400 new homes between 2006 and 2030 and the development of nearly 300 hectares of employment land. Whilst a significant amount of the development included in the plan has already taken place or planning permission has already been given, development at this scale will generate demand for new trips. Whilst the Local Plan to an extent plans for growth around public transport nodes (e.g. railway stations) and includes policies and objectives (e.g. strategic objectives) to promote sustainable travel choices, the Local Plan is likely to result in an increase in road journeys.

At this stage there is no quantitative information available on what impact the LTP4 (either individually or cumulatively with strategic land use change such as promoted by the South Worcestershire Development Plan) would have in relation to GHG emissions. Based on available information however, it is likely that the LTP4, in combination with the Development Plan, would result in an overall increase in GHG emissions in South Worcestershire.

Climate Change Adaptation

In relation to flooding a number of the proposed transport schemes within South Worcestershire are at locations and areas at risk of fluvial or surface water flooding. This includes as follows:

- **SWST2** M5 Junction 6 – Major Capacity Enhancement Scheme: Areas of high risk of surface water flooding are present at Junction 6 of the M5. Areas adjacent to the junction are also at high risk of fluvial flooding;
- **SWST3** Southern Link Road (A4440) Phase 4 – Ketch to Powick Hams: The route crosses the floodplain of the River Severn. However, it should be noted that the existing route is raised above the flood plain;
- **SWST12** Worcester – Western Link Road Scheme: The likely route would cross the floodplains of two tributaries of the River Teme;
- **D1** Hanbury Street / Queen Street / Saltway / Bromsgrove Road (St George's Square) Junction: The junction is located in an area deemed to be at high risk of fluvial and surface water flooding;

- **D2** A38 Roman Way / B4065 Bromsgrove Road Junction: The junction is deemed to be at high risk of surface water flooding;
- **E3** Port Street Key Corridor of Improvement: Part of Port Street is within an area deemed to be at medium risk of fluvial flooding. The Broadway Road/Elm Road junction is at high risk of surface water flooding;
- **E5** A4184 High Street / A4184 Greenhill / B4624 Worcester Road Junction: The junction is at high risk of surface water flooding;
- **E6** Abbey Bridge Junction – Abbey Road / Pershore Road / Waterside / Cheltenham Road: The junction is as medium risk of fluvial flooding. Part of the junction is at high risk of surface water flooding;
- **E7** Vine Street / High Street / Bridge Street Junction: The junction is at medium risk of surface water flooding;
- **M3** Malvern Link (A449) Key Corridor of Improvement: A number of locations on the corridor are at high risk of surface water flooding, in particular between Townsend Way and Lower Hoswell Road;
- **M4** Malvern Link – Station Car Park Expansion Scheme: This location is at high risk of surface water flooding;
- **M8** B4211 Barnards Green Rd / B4208 Pickersleigh Rd / Upper Chase Rd / Court Rd / Avenue Rd junction: The junction is at high risk of surface water flooding;
- **M10** B4208 Barnards Green Rd / B4211 Poolbrook Road junction;
- **W2** Worcester Rainbow Hill/Astwood Road/Bilford Road/ Blackpole Road Key Corridor of Improvement: A number of locations on the corridor are at high risk of surface water flooding, in particular on Bilford Road; and
- **W5** Worcester – A449 Bromwich Road / A449 Malvern Road / Malvern Road / Canada Way Key Corridor of Improvement: A number of locations on the corridor are at high risk of surface water flooding, particularly on Bromwich Road. The area around Malvern Road is also at high risk of fluvial flooding.

Whilst these transport schemes have the potential to increase flood risk in these area, these packages of transport improvements have the potential to enable the implementation of measures which help reduce and manage flood risk in these locations, as well as to decrease vulnerability to extreme weather events in the future. In particular the schemes have significant potential to address and limit surface water run off issues in the vicinities of the schemes through the integration of features within these enhancements which reduces such flood risk, such as sustainable drainage systems and appropriate design and layout.

Where appropriate, flood risk assessments (FRAs) will be undertaken on engineered schemes. The FRAs will incorporate appropriate allowances for climate change, in accordance with Environment Agency guidance [11], to help to minimise vulnerability and provide resilience to flooding. For fluvial risk, it should be noted that there is a need to include a 70% allowance for climate change (peak river flows) to inform the location, impacts and design of a transport scheme. For example, to improve flood risk resilience, new or improved highway infrastructure should be sited above the 1% plus climate change (70%) flood level plus an appropriate freeboard allowance.

5.2.4 Land, Soil And Water Resources

Key Issues For The Delivery Area Identified During Scoping

- New transport infrastructure has the potential to directly or indirectly lead to the loss of areas classified as the best and most versatile agricultural land in South Worcestershire;
- The construction, maintenance and operation of transport infrastructure should seek to reduce the amount of primary materials required, make beneficial use of surplus materials and minimise the landfill disposal of waste generated throughout the asset's lifecycle;
- New transport infrastructure has the potential to modify water flow regimes and lead to effects on water quality; and
- Increased use of existing transport infrastructure, which may not be designed to current standards has the potential to lead to a deterioration of water quality in controlled waters.

Assessment Findings

A number of the schemes have the potential to lead to the loss of the Best and Most Versatile Land, as set out below. In a number of cases recent land classification has not been undertaken, and the differentiation between Grade 3a land (which is land classified as the Best and Most Versatile Agricultural Land) and Grade 3b land (which is land not classified as such) has not been established. As such the schemes which have the potential to lead to landtake on Grade 3 agricultural land have also been highlighted.

- **SWST1** Worcestershire Parkway;
- **SWST2** M5 Junction 6 – Major Capacity Enhancement Scheme;
- **SWST3** Southern Link Road (A4440) Phase 4 – Ketch to Powick Hams;
- **SWST4** Pershore Northern Access Improvements;
- **SWST5** Evesham – A46 Corridor Major Upgrade Scheme;
- **SWST12** Worcester – Western Link Road Scheme;

[11] Environment Agency (2016) Flood risk assessments: climate change allowances [online] available at: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances (Accessed 19 December 2016).

- **D2** A38 Roman Way / B4065 Bromsgrove Road Junction;
- **D4** A38 Roman Way / B4090 Worcester Road Junction;
- **M13** A449 Wells Road / Upper Welland Road Junction;
- **P7** A4104 Station Road / B4083 Wyre Road Junction;
- **W8** Worcester – A449 North of Worcester (Ombersley Road) Junction; and
- **W11** Worcester – Crown East (A44 / A4440 / A4103) Junction.

The other schemes are unlikely to lead to significant loss of Grade 1, 2 or 3 land and/or are within urban areas.

Whilst the proposed transport infrastructure improvements have the potential to lead to effects on water quality and the flow regimes without mitigation measures, it is likely that sustainable drainage systems and other associated water management measures will be incorporated in scheme design. Hence new transport infrastructure schemes are unlikely to have significant effects on water quality and the flow regimes.

Where applicable, engineered schemes should help to facilitate the restoration of watercourses and result in potential for positive effects; such as de-culverting of any watercourse within or on the boundary of a scheme, naturalising artificially engineered river bank or beds, and providing an adequate riparian corridor.

The Strategic Delivery Programme for the LTP4 includes a large number of engineered schemes for the road network in South Worcestershire, which will potentially require large volumes of primary materials for their construction. During design and procurement of engineered schemes, measure should be put in place that seek to reduce the amount of primary materials required, make beneficial use of surplus materials and minimise the landfill disposal of waste generated throughout the asset's lifecycle.

5.2.5 Historic environment and landscape

Key Issues For The Delivery Area Identified During Scoping

- New transport schemes have the potential to affect the integrity of the two AONBs present in South Worcestershire, as well as views out of the AONBs;
- New transport schemes have the potential to affect the Areas of Great Landscape Value and Green Belt in the area;
- There are significant concentrations of historic environment assets in Worcester and Malvern, many of which are nationally or locally designated; and
- New transport infrastructure and associated development has the potential for beneficial or adverse effects on the historic environment.

Assessment Findings

Transport infrastructure and traffic flows have a strong influence on the setting of the historic environment and landscape character and quality. Effects can occur from poor design of transport infrastructure, including insensitively designed layouts, inappropriate signage, noise from poor road surfaces or excessive clutter.

A number of the initiatives proposed by the Strategic Delivery Programme for South Worcestershire will support the protection and enhancement of the historic environment and landscape and townscape quality. In this context the setting of heritage features and landscape/townscape quality will be promoted by the interventions' promotion of improvements to the built environment, including from support for modal shift from the private car and through public realm improvements. This includes the 15 Active Travel Corridor schemes proposed in South Worcestershire; the Active Travel Investment Programmes for Drotwich, the Vale of Evesham and Malvern and Tenbury Wells; the Droitwich Spa High Street Public Realm Scheme; the Great Malvern Town Centre Regeneration Scheme; the Tenbury Wells (Teme Street) Public Realm Enhancement Scheme (Phase 2); and the Pershore High Street Public Realm Scheme. These initiatives will therefore support the integrity of the historic environment and promote local distinctiveness and character.

The proposed transport infrastructure improvements, including the potential road schemes, junction capacity improvements and other schemes however have the potential to have impacts on cultural heritage assets and their settings and landscape and townscape quality. In this context the following schemes are located within or close to key features and areas of historic environment or landscape/townscape significance:

- M5 Junction 6 – Major Capacity Enhancement (listed building);
- Southern Link Road (A4440) Phase 4 – Ketch to Powick Hams (registered battlefield associated with the Battle of Worcester, listed building, conservation area) ;
- Evesham – A46 Corridor Major Upgrade Scheme (scheduled monument, registered battlefield associated with the Battle of Evesham);
- Worcester – Western Link Road Scheme (scheduled monument);
- South Worcestershire Transport Telematics Investment Package (potentially AONBs, Green Belt, conservation areas, listed buildings, scheduled monuments, registered battlefields, registered parks and gardens);
- Black Bridges, Torton (A449 / A450 / A442) Junctions (Green Belt);
- Martin Hussingtree – A38 Droitwich Road / A4538 Pershore Lane Junction (listed buildings, Green Belt);
- Fernhill Heath – A38 Droitwich Road / A4536 Hurst Lane Junction (Green Belt);
- Welland – B4208 Gloucester Road/ B4208 Blackmore Park Road / Upper Hook Road Junction (Malvern Hills AONB, listed buildings);
- Leigh Sinton – A4103 / B4503 Malvern Road Junction (listed buildings);
- Hanbury Street / Queen Street / Saltway / Bromsgrove Road (St George's Square) Junction (listed buildings, scheduled monument, conservation area);
- A38 Roman Way / B4065 Bromsgrove Road Junction (listed buildings, scheduled monument, conservation area);

- Droitwich Parking Strategy (listed buildings, scheduled monuments, conservation area);
- Evesham Transport Strategy (conservation area, registered battlefield, scheduled monuments, listed buildings);
- Port Street Key Corridor of Improvement (conservation area, listed buildings) ;
- Vine Street / High Street / Bridge Street Junction (conservation area, listed buildings);
- Great Malvern Parking Strategy (conservation areas, listed buildings, scheduled monuments);
- Malvern Link – Station Car Park Expansion Scheme (conservation area);
- B4211 Barnards Green Rd / B4208 Pickersleigh Rd / Upper Chase Rd / Court Rd / Avenue Rd Junction (listed buildings);
- A449 Belle Vue Terrace / Wells Road / B4211 Church Street junction (conservation area, listed buildings, scheduled monuments);
- B4208 Barnards Green Rd / B4211 Poolbrook Road Junction (listed building);
- Malvern (Three Counties Showground) – B4208 Blackmore Park Rd / B4209 Hanley Road (Malvern Hills AONB);
- B4219 Cowleigh Road/Cowleigh Bank/Old Hollow junction (listed buildings, Malvern Hills AONB);
- A449 Wells Road / Upper Welland Road Junction (Malvern Hills AONB, conservation area);
- Pershore Parking Strategy (conservation area, listed buildings, scheduled monument);
- A4104 Worcester Road / B4084 Station Road / High Street Junction (listed building, conservation area);
- Worcester City Centre Transport Strategy (conservation areas, scheduled monuments, listed buildings);
- Worcester Rainbow Hill/Astwood Road/Bilford Road/Blackpole Road Key Corridor of Improvement (conservation area, listed buildings);
- Foregate Street Station Enhancement Scheme (conservation area, listed buildings);
- Worcester – A449 Bromwich Road / A449 Malvern Road / Malvern Road / Canada Way Key Corridor of Improvement (conservation area, listed buildings);
- Worcester East-West Axis Key Corridor of Improvement (conservation areas, listed buildings, scheduled monuments); and
- Worcester – A449 North of Worcester (Ombersley Road) Junction (listed building).

The significance of effects from these interventions will depend on design, layout and scale of the schemes, and mitigation and avoidance measures proposed. Further work will be required to examine and mitigate effects on townscape and landscape quality and character through the relevant project level environmental assessments accompanying the schemes. As a strategic document, the Strategic Delivery Programme for the LTP4 provides limited details about the detailed designs or layout for some interventions. Subsequently, it is unclear in many cases as to what extent local historic environment assets (including archaeological features) or landscape and townscape quality may be affected. Where appropriate, project level environmental assessments will consider potential issues such as visual impacts, light and noise pollution, and the loss of features important for landscape/townscape character in more detail.

It should however also be noted that a number of these schemes also have significant potential to lead to positive effects on the historic environment and landscape/townscape quality with appropriate and sensitive design and layout.

In-combination effects on the historic environment and landscape / townscape quality may result from the strategic allocations proposed through the South Worcestershire Development Plan and LTP4 initiatives. This includes through a stimulation of traffic growth and increasing visual effects on the setting of the historic environment and landscape / townscape quality. However it is likely that the initiatives proposed by the LTP4 will in many respects support the integrity of the historic environment and landscape / townscape quality through helping to mitigate the impacts of new development areas from transport.

5.2.6 Population And Communities

Key Issues For The Delivery Area Identified During Scoping

- Rural areas in the Delivery Area have a greater potential to experience poor accessibility to key services and facilities and employment and leisure opportunities;
- In Worcester 22% of households do not have access to a car. As such there is a greater reliance on public transport networks and walking and cycling;
- New development should be accessible by a range of sustainable transport modes to help limit the effects of congestion, economic vitality, and residents' quality of life; and
- An ageing population is likely to increase demand for access to services (e.g. healthcare services).

Assessment Findings

The Delivery Area Strategy will bring a range of benefits for the quality of life of residents and social inclusion in South Worcestershire through a strong focus on enhancing accessibility to services, facilities and opportunities by non-car modes and promoting new and enhanced transport links.

In South Worcestershire key transport disadvantaged groups include those from rural communities. Recognising the likely ongoing role of the private car for many in rural communities, the schemes and initiatives for the Delivery Area will support accessibility in this regard through helping to reduce congestion, improving journey times and supporting multi-modal transfer. Two of the schemes support the development of new parkway rail stations – at Worcestershire Parkway and Rushwick. This

will particularly benefit those living in rural communities, given the frequent challenges of accessing key public transport nodes in the centre of towns from rural areas. The further rail enhancement measures proposed in South Worcestershire, including increasing capacities of key routes, support for the reopening of others and station capacity enhancements will also support accessibility from rural areas, as well as those in the urban areas. In terms of public transport provision, whilst no bus schemes are proposed to enhance rural accessibility, the proposed junction improvements and capacity enhancement measures proposed through the Delivery Area Strategy also have the potential to enhance the reliability of public transport and journey times. It is considered that the improvements will also help support access to community facilities.

The Delivery Area Strategy also takes forward initiatives aimed at promoting active travel choices. Key initiatives in this regard are Strategic Active Travel Corridor Schemes for 15 corridors across South Worcestershire. Other initiatives with the potential to support active travel include: the Droitwich Spa High Street Public Realm Scheme; the High Street Pershore Public Realm Scheme; the Tenbury Wells (Teme Street) Public Realm Enhancement Scheme; the Active Travel Network Investment Programmes for Droitwich, the Vale of Evesham Malvern and Tenbury Wells; the Worcester Rainbow Hill/Astwood Road/ Bilford Road/ Blackpole Road Key Corridor of Improvement; the Worcester East-West Axis Key Corridor of Improvement; and the Port Street, Malvern Link Key Corridor of Improvement. Active travel in Worcester and Evesham will be further supported by the Worcester City Centre Transport Strategy and the Evesham Transport Strategy. In this context these schemes will support the quality of life of residents through enhancing physical and psychological wellbeing, improving community cohesion and increasing engagement between residents.

More widely in relation to socio-economic factors, the package of transport measures proposed through the Delivery Area Strategy will support the economic vitality of South Worcestershire, including the rural economy, through helping to unlock economic potential and supporting enhancements to employment opportunities.

As discussed in relation to air quality and climate change, the large quantum of growth promoted under the South Worcestershire Development plan in the area will result in increased demand for travel. While it is WCC's view that much of this demand can be met by sustainable and/or active transport modes, a large proportion will be met by private car based trips. This may have implications for the quality of life of residents at some locations.

5.2.7 Health And Well-Being

Key Issues For The Delivery Area Identified During Scoping

- An ageing population is likely to increase demand for access to services (e.g. healthcare services);
- Due to the rural nature of much of South Worcestershire, access to leisure, recreational and sporting facilities as well as health services has the potential to be a larger issue than for many other parts of Worcestershire;
- Whilst road safety is a key issue in Worcester in particular, reducing road accidents and enhancing road safety should be a key consideration in all parts of the Strategy Area; and
- Investment in safe walking and cycling infrastructure and green infrastructure should be supported in order to encourage increased physical activity.

Assessment Findings

The Delivery Area Strategy for South Worcestershire takes forward initiatives aimed at promoting active travel choices. Key initiatives in this regard are Strategic Active Travel Corridor Schemes for 15 corridors across South Worcestershire. Other initiatives with the potential to support active travel include: the Droitwich Spa High Street Public Realm Scheme; the High Street Pershore Public Realm Scheme; the Tenbury Wells (Teme Street) Public Realm Enhancement Scheme; the Active Travel Network Investment Programmes for Droitwich, the Vale of Evesham Malvern and Tenbury Wells; the Worcester Rainbow Hill/Astwood Road/ Bilford Road/ Blackpole Road Key Corridor of Improvement; the Worcester East-West Axis Key Corridor of Improvement; and the Port Street, Malvern Link Key Corridor of Improvement. Active travel in Worcester and Evesham will be further supported by the Worcester City Centre Transport Strategy and the Evesham Transport Strategy. In this context these schemes will support health and wellbeing through enhancing physical and psychological wellbeing, improving community cohesion and increasing engagement between residents.

The Delivery Area Strategy will also bring a range of benefits for the health and wellbeing of residents in South Worcestershire through a focus on enhancing accessibility to services, facilities and opportunities by non-car modes and promoting new and enhanced transport links. In South Worcestershire key transport disadvantaged groups include those from rural communities. Recognising the likely ongoing role of the private car for many in rural communities, the schemes and initiatives for the Delivery Area will support accessibility in this regard through helping to reduce congestion, improving journey times and supporting multi-modal transfer. Two of the schemes support the development of new parkway rail stations – at Worcestershire Parkway and Rushwick. This will particularly benefit those living in rural communities, given the frequent challenges of accessing key public transport nodes in the centre of towns from rural areas. The further rail enhancement measures proposed in South Worcestershire, including increasing capacities of key routes, support for the reopening of others and station capacity enhancements will also support accessibility from rural areas. In terms of public transport provision, whilst no bus schemes are proposed to enhance rural accessibility, the proposed junction improvements and capacity enhancement measures proposed through the Delivery Area Strategy also have the potential to enhance the reliability of public transport and journey times. This will support the health and wellbeing of residents through enhancing access to health, leisure and recreational facilities.

Many of the LTP4 measures in South Worcestershire are focused on reducing road congestion, mostly by increasing road and junction capacity at specific pinch points. This has the potential to support health and wellbeing through enhancing air and noise quality at key locations, as well as reducing road accidents and enhancing road safety.

However, through helping to release induced demand, the in-combination effects of multiple capacity enhancement schemes and housing and employment growth in the wider Delivery Area have the potential to have impacts on road safety and air and noise quality. In this context it is considered that the measures aimed at influencing travel behaviour will help 'lock in' these potential effects on health and wellbeing.

In terms of in-combination effects between the LTP4 and other plans and proposals, limited information is available about the cumulative impact on safety for drivers, cyclist and pedestrians from the initiatives and proposals together. However, whilst none of the specific initiatives contained within the Strategic Delivery Programme would be expected to reduce safety, it is possible that the land use changes promoted by the South Worcestershire Development Plan could increase traffic on roads which already have reduced safety. At this stage, the effects of the LTP4 and the South Worcestershire Development Plan in combination are uncertain with regard to road safety. Further work is recommended to identify whether any increases in road traffic flows are predicted on roads/junctions which have a reduced safety record.

6. Wyre Forest

6.1 Key LTP4 Initiatives For Delivery Area

Table 6.1 provides a summary of the key LTP4 initiatives for Wyre Forest.

Table 6.1: Key LTP4 Initiatives For Wyre Forest

LTP4 Scheme	Scheme ID	Scheme Name
Strategic Schemes for Wyre Forest	WFST1	Kidderminster Transport Strategy Major Scheme
	WFST2	All towns: Transport Telematics Investment Package
	WFST3	Active Travel Corridor: Bewdley to Wyre Forest (Dowles Link)
	WFST4	Mustow Green Junction Enhancement Scheme
	WFST5	Blakedown Rail Station Enhancement Scheme Major Scheme
	WFST6	Rural Traffic Management Programme
	WFST7	Travel Choice Support Programme

LTP4 Scheme	Scheme ID	Scheme Name
Strategic Active Travel Corridor Schemes	WFAT1	Caunsall To Stourport-On-Severn Canal Towpath Improvement
	WFAT2	Burlish Top Link Improvement
	WFAT3	Wyre Forest To Stourport-On-Severn Improvement (Including the Dowles Link between Bewdley and the Wyre Forest)
	WFAT4	Kidderminster Railway Station Link
	WFAT5	Stourport-On-Severn To Bromsgrove

LTP4 Scheme	Scheme ID	Scheme Name
Kidderminster Package	K1	Bewdley Hill (A456) Key Corridor of Improvement (including major junctions review)
	K2	Station Enhancement Scheme
	K3	Ring Road Junction and Public Realm Improvement Scheme
	K4	Active Travel Network Investment Programme
	K5	Chester Road (A449) Key Corridor of Improvement (Including major junctions review)
	K6	A456 Birmingham Road / Hurcott Lane Junction
	K7	Sion Hill / A449 Stourbridge Road Junction
	K8	A451 Stourbridge Road / B4189 Park Gate Road Junction
	K9	A449 Wolverhampton Road / B4189 Wolverley Road / B4189 Park Gate Road Junction
	K10	Stourport Road Key Corridor of Improvement
	K11	B4190 Key Corridor of Improvement (Wribbenhall to Wolverley, including junction with A442)

LTP4 Scheme	Scheme ID	Scheme Name
Stourport-on-Severn and Bewdley Package	S1	Stourport-on-Severn Transport Strategy
	BE1	Bewdley Transport Strategy

6.2 Assessment Findings

6.2.1 Air Quality

Key Issues For The Delivery Area Identified During Scoping

The key issues for Wyre Forest identified during scoping are:

- Air quality issues within the two AQMAs in Wyre Forest are associated with NO_2 emissions from road transport;
- There is a need to reduce emissions from road transport, especially in/around Kidderminster and Bewdley;
- There is a need to limit the effects of new development areas in Wyre Forest on air quality; and
- There is a need to encourage sustainable modes of transport such as walking, cycling and public transport use.

Assessment Findings

There are two AQMAs in Wyre Forest, to include: Welchgate / Bewdley and Horsefair / Coventry Street. The LTP4 contains measures to address exceedance of NO_2 levels at these AQMAs. These include:

- Kidderminster Ring Road junction and public realm improvements, including enhancement/redevelopment of the Kidderminster ring road to improve efficiency and functionality; and
- Bewdley Transport Strategy, which will review access arrangements in the town with a particular focus on how to improve air quality.

These measures and strategies would be expected to reduce congestion in these areas with significant positive effects for air quality.

In addition to those noted above, highway improvements are proposed which are intended to increase highway capacity and/ or relieve congestion at:

- Mustow Green – junction enhancement scheme;
- Bewdley Hill (A456) – key corridor of improvements;
- Chester Road (A449) – key corridor of improvements;
- Stourport Road – key corridor of improvements; and
- B4190 – key corridor of improvements.

In addition there are a number of proposed comprehensive reviews of junctions proposed, however the construction of these is not included in the Strategic Delivery Programme for the LTP4.

None of the highway improvements proposed in Wyre Forest are within an AQMA, however all will contribute to an improvement in air quality in these areas through improved traffic flows and a reduction in congestion.

More generally, the LTP4 measures in Wyre Forest are focused on reducing road congestion, mostly by increasing road and junction capacity at specific pinch points. For individual journeys, less congestion means reduced journey times and increased fuel efficiency as a result of more consistent travel speeds and less braking and accelerating. Reduced congestion can therefore limit NO_2 and particulate matter (PM) emissions (including PM10 and PM2.5) from individual vehicle trips.

However, the relationship between individuals' travel choices and NO_2 and PM emissions is complex and uncertain. For instance, road schemes that relieve congestion and / or increase capacity can have the effect of releasing demand for vehicle trips currently suppressed. This occurs when individuals who currently do not make a trip using a private vehicle (perhaps because a road is too busy and congested) now decide to make that trip. These individuals therefore take advantage of the increased road capacity provided which now reduces the cost (in time and monetary terms) of making a trip they previously decided not to make, or made using an alternative. In transport planning terms this concept is known as 'induced demand'. A modal shift from road-based trips to sustainable transport-based trips can also have a similar effect where the shift by

some existing road users to sustainable transport modes frees up capacity on the road network- which is then utilised by 'new' road trips.

There are no specific measures in the Strategic Delivery Programme of LTP4 that promote enhancements to green infrastructure networks to facilitate increased absorption and dissipation of nitrogen dioxide and other pollutants; however this should be considered as a part of all major junction improvement schemes and public realm improvements.

The Strategic Delivery Programme for the LTP4 contains measures aimed at reducing the use of private vehicles for journeys where it is practicable to do so. This involves a wide range of initiatives but in general terms the package of measures is intended to improve the viability of alternative transport options. Key measures include:

- Rail station enhancement schemes at Blakedown and Kidderminster;
- Investment in safe walking and cycling links through an Active Travel Investment Programme between Bewdley and Wyre Forest, as well as in Kidderminster; and
- Public realm improvement.

The focus in the LTP4 on improving the accessibility and attractiveness of public transport would be expected to lead to an increase in public transport patronage. Similarly, improvements to cycle and pedestrian infrastructure would be expected to promote increased levels of active travel. Whilst this has not been confirmed by a transport assessment, this is likely to support modal shift from private vehicle trips to other modes. A reduction in car-based travel would therefore be expected to have air quality benefits, notably a reduction in NO_2 emissions, which is the main source of air pollution and the reason for the designation of the AQMA.

The Strategic Delivery Programme for the LTP4 does not specifically address promotion of low emission vehicles; however where improvements to car parking are proposed at Blakedown Railway Station provision should be made for installation of electric vehicle charging points.

The Wyre Forest District Site Allocations and Policies Local Plan 2006 – 2026 seeks to allocate 4,000 dwellings from 2006–2026 and 44 ha of employment land. However, as of April 2013, 2,869 homes have already been supplied, therefore only 1,131 are required to be built up until 2026. In this context, in addition to a potential increase in road-based travel through induced demand, the addition of 1,131 homes and over 44 ha of employment land in the Wyre Forest Delivery Area in the period to 2026 will generate demand for new trips. Whilst the Local Plan to an extent plans for growth around public transport nodes (e.g. railway stations) and includes policies and objectives (e.g. strategic objectives) to promote sustainable travel choices, the Local Plans are likely to result in an increase in road journeys.

At this stage there is no quantitative information available on what impact the LTP4 (either individually or cumulatively with strategic land use change such as promoted by the Development Plan) would have in relation to NO_2 and PM emissions. Based on available information however, it is likely that the LTP4, in combination with the Development Plan, would result in an overall increase in NO_2 and PM emissions in Wyre Forest.

6.2.2 Biodiversity

Key Issues For The Delivery Area Identified During Scoping

The key issues for Wyre Forest identified during scoping are:

- Limiting the effects of new development areas in Wyre Forest on biodiversity;
- Opportunities for enhancements for green infrastructure provision to deliver longer term biodiversity benefits;
- Opportunities for ecological connections across the Strategy Area to support species distribution in light of climate change impacts on biodiversity; and
- Protection of biodiversity through the Roadside Verge Nature Reserve (RVNR) project.

Assessment Findings

There are no internationally designated sites in the Wyre Forest Delivery Area; however there are a number of nationally designated sites (SSSIs and NNRs) present in the area. SSSI Impact Risk Zones are located around SSSIs and show where different types of project may affect SSSIs. The following engineered schemes are located within a SSSI Impact Risk Zone that are relevant for transport proposals:

Strategic Schemes for Wyre Forest:

- Active Travel Corridor – Bewdley to Wyre Forest;
- Kidderminster Transport Strategy; and
- Blakedown Rail Station Enhancement Scheme.

Kidderminster:

- B4190 Key Corridor of Improvement (Wribbenhall to Wolverley, including junction with A442);
- Bewdley Hill (A456) Key Corridor of Improvements;
- Ring Road Junction and Public Realm Improvement Scheme;
- Stourport Road Key Corridor of Improvement;
- Kidderminster Station Enhancement Scheme;
- Chester Road (A449) Key Corridor of Improvement;
- A456 Birmingham Road/ Hurcott Lane Junction;
- Sion Hill / A449 Stourbridge Road Junction;
- A451 Stourbridge Road/ B4189 Park Gate Road Junction; and
- A449 Wolverhampton Road / B4189 Wolverley Road / B4189 Park Gate Road Junction.

Stourport-on-Severn and Bewdley:

- Stourport-on-Severn Transport Strategy; and
- Bewdley Transport Strategy.

These initiatives have the potential for negative effects on SSSIs to occur if unmitigated, either as a result of direct impacts, (landtake, habitat loss and fragmentation), or as a result of indirect impacts (noise and light pollution, and disturbance). Impacts will vary depending on the scale of the scheme and the nature of likely effects.

In addition there are two NNRs present in Wyre Forest: Chaddesley Woods and Wyre Forest. The proposed Active Travel Corridor from Bewdley to Wyre may affect the NNR at Wyre Forest. However the initiative has the potential to have a positive impact from modal shift from the private car. Whilst accessibility enhancements may promote increase visitor numbers to both NNRs which can with associated impacts (such as footpath erosion, trampling of flora, increased disturbance of fauna), the initiatives offer opportunities for enhanced management of access at the NNRs.

The following schemes have the potential to lead to the loss of areas of Biodiversity Action Plan Priority Habitat without appropriate avoidance, mitigation or replacements measures:

- Active Travel Corridor – Bewdley to Wyre Forest (deciduous woodland, ancient & semi-natural woodland);
- B4190 Key Corridor of Improvement (Wribbenhall to Wolverley, including junction with A442) (deciduous woodland);
- Bewdley Hill (A456) Key Corridor of Improvements (deciduous woodland); and
- Stourport Road Key Corridor of Improvement (Wood-pasture and parkland, deciduous woodland).

In addition the following currently undefined schemes may affect a range of Biodiversity Action Plan Priority Habitats:

- Kidderminster Transport Strategy;
- Stourport-on-Severn Transport Strategy; and
- Bewdley Transport Strategy.

Potential effects on biodiversity resulting from the above initiatives will depend on the design and layout of the initiatives and the mitigation measures proposed.

Biodiversity enhancements should be incorporated into all relevant initiatives that are proposed in the LTP4 and seek to: provide enhancements for green infrastructure provision; provide ecological connections to support species distribution; and also protect and expand Roadside Verge Nature Reserve in the South Worcestershire.

The LTP4 includes a number of engineered schemes for the road network in Wyre Forest, with each scheme having the potential for landtake. While landtake for a junction improvement may be small compared to that of a new road, there is therefore the potential for a cumulative landtake in Wyre Forest if all schemes were undertaken. At this stage there is no quantitative information available on what the impact of all the LTP4 initiatives would be; however it would result in an overall decrease in biodiversity, unless offsetting and biodiversity enhancements are initiated, as outlined above.

6.2.3 Climate Change

Key Issues For The Delivery Area Identified During Scoping

- New housing and employment growth in Wyre Forest has the potential to increase total GHG emissions from transport;
- Per capita emissions in the Wyre Forest continue to be lower than the national average, however this has seen little reduction in comparison to other areas;
- Climate change has the potential to increase the vulnerability of the Strategy Area's transport infrastructure to extreme weather events in the future; and
- The LTP4 provides opportunities to support flood risk management objectives as part of highway infrastructure proposals.

Climate Change Mitigation

In the Wyre Forest Delivery Area, the Strategic Delivery Programme proposes a wide range of measures intended to improve the viability and attractiveness of alternatives to travel by the private car and promote modal shift to more sustainable (and lower GHG emissions) forms of transport, including public transport and active modes of transport (walking and cycling). This will support transport choices with lower GHG emissions. Measures with the potential to directly and indirectly support these positive effects include: the Bewdley to Wyre Forest Active Travel Corridor; the Blakedown Rail Station Enhancement Scheme; and the Kidderminster Active Travel Network Investment Programme.

Other LTP4 Strategic Delivery Programme measures in Wyre Forest are focused on reducing road congestion, mostly by increasing road and junction capacity. For individual journeys, less congestion means reduced journey times and increased fuel efficiency as a result of more consistent travel speeds and less braking and accelerating. Reduced congestion can therefore limit GHG emissions from individual vehicle trips.

However, the relationship between individuals' travel choices and GHG emissions is complex and uncertain. For instance, road schemes that relieve congestion and / or increase capacity can have the effect of releasing demand for vehicle trips currently suppressed. This occurs when individuals who currently do not make a trip using a private vehicle (perhaps because a road is too busy and congested) now decide to make that trip. These individuals therefore take advantage of the increased road capacity provided which now reduces the cost (in time and monetary terms) of making a trip they previously decided not to make, or made using an alternative. In transport planning terms this concept is known as 'induced demand'. A modal shift from road-based trips to sustainable transport-based trips can also have a similar effect where the shift by some existing road users to sustainable transport modes frees up capacity on the road network- which is then utilised by 'new' road trips.

The Site Allocations and Policies Local Plan has allocated for the construction of 4,000 dwellings from 2006–2026 which equates to an annual build rate of 200 dwellings per annum and the development of 44 hectares of employment land. The Kidderminster Central Area Action also allocates 900 dwellings within the plan period. Whilst a significant amount of the development included in the plan has already taken place or planning permission has already been given, the allocations proposed will generate demand for new trips. Whilst the Local

Plan to an extent plan for growth around public transport nodes (e.g. railway stations) and includes policies and objectives (e.g. strategic objectives) to promote sustainable travel choices, the Local Plan are likely to result in an increase in road journeys.

At this stage there is no quantitative information available on what impact the LTP4 (either individually or cumulatively with strategic land use change such as promoted by the Wyre Forest Local Plan) would have in relation to GHG emissions. Based on available information however, it is likely that the LTP4, in combination with the Local Plan, would result in an overall increase in GHG emissions in Wyre Forest.

Climate Change Adaptation

In relation to flooding a number of the proposed transport schemes within the Wyre Forest Delivery Area are at locations and areas at risk of fluvial or surface water flooding. This includes as follows:

- **WFST5** Blakedown Rail Station Enhancement Scheme: The area around the station is at medium risk of surface water flooding;
- **K3** Ring Road Junction and Public Realm Improvement Scheme: Enhancements at the junctions have the potential to have effects on surrounding areas at high risk of fluvial and surface water flooding;
- **K5** Chester Road (A449) Key Corridor of Improvement: A number of locations on Chester Road are at high risk of surface water flooding;
- **K7** Sion Hill / A449 Stourbridge Road Junction: The junction is at high risk of surface water and fluvial flooding; and
- **K10** Stourport Road Key Corridor of Improvement: A number of locations on the corridor are at high risk of surface water flooding.

Whilst these transport schemes have the potential to increase flood risk in these area, these packages of transport improvements have the potential to enable the implementation of measures which help reduce and manage flood risk in these locations, as well as to decrease vulnerability to extreme weather events in the future. In particular the schemes have significant potential to address and limit surface water run off issues in the vicinities of the schemes through the integration of features within these enhancements which reduces such flood risk, such as sustainable drainage systems and appropriate design and layout.

Where appropriate, flood risk assessments (FRAs) will be undertaken on engineered schemes. The FRAs will incorporate appropriate allowances for climate change, in accordance with Environment Agency guidance [12], to help to minimise vulnerability and provide resilience to flooding. For fluvial risk, it should be noted that there is a need to include a 70% allowance for climate change (peak river flows) to inform the location, impacts and design of a transport scheme. For example, to improve flood risk resilience, new or improved highway infrastructure should be sited above the 1% plus climate change (70%) flood level plus an appropriate freeboard allowance.

[12] Environment Agency (2016) Flood risk assessments: climate change allowances [online] available at: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances (Accessed 19 December 2016).

6.2.4 Land, Soil And Water Resources

Key Issues For The Delivery Area Identified During Scoping

- New transport infrastructure has the potential to directly or indirectly lead to the loss of areas classified as the best and most versatile agricultural land in the Wyre Forest Delivery Area;
- The construction, maintenance and operation of transport infrastructure should seek to reduce the amount of primary materials required, make beneficial use of surplus materials and minimise the landfill disposal of waste generated throughout the asset's lifecycle;
- New transport infrastructure has the potential to modify water flow regimes and lead to effects on water quality; and
- Increased use of existing transport infrastructure, which may not be designed to current standards has the potential to lead to a deterioration of water quality in controlled waters.

Assessment Findings

A number of the schemes proposed for the Wyre Forest Delivery Area have the potential to lead to the loss of the Best and Most Versatile Agricultural Land, as set out below. In a number of cases recent land classification has not been undertaken, and the differentiation between Grade 3a land (which is land classified as the Best and Most Versatile Agricultural Land) and Grade 3b land (which is land not classified as such) has not been established. As such the schemes which have the potential to lead to landtake on Grade 3 agricultural land have also been highlighted.

- **WFST4** Mustow Green Junction Enhancement Scheme;
- **K8** A451 Stourbridge Road / B4189 Park Gate Road Junction; and
- **K9** A449 Wolverhampton Road / B4189 Wolverley Road / B4189 Park Gate Road Junction.

The other schemes are unlikely to lead to significant loss of Grade 1, 2 or 3 land and/or are within urban areas.

Whilst the proposed transport infrastructure improvements have the potential to lead to effects on water quality and the flow regimes without mitigation measures, it is likely that sustainable drainage systems and other associated water management measures will be incorporated in scheme design. Hence new transport infrastructure schemes are unlikely to have significant effects on water quality and the flow regimes.

Where applicable, engineered schemes should help to facilitate the restoration of watercourses and result in potential for positive effects; such as de-culverting of any watercourse within or on the boundary of a scheme, naturalising artificially engineered river bank or beds, and providing an adequate riparian corridor.

The LTP4 includes a large number of engineered schemes for the road network in Wyre Forest, which will potentially require large volumes of primary materials for their construction. During design and procurement of engineered schemes, measure should be put in place that seek to reduce the amount of primary materials required, make beneficial use of surplus materials and minimise the landfill disposal of waste generated throughout the asset's lifecycle.

6.2.5 Historic Environment And Landscape

Key issues for the Delivery Area identified during scoping

- New transport schemes have the potential to affect the Green Belt in Wyre Forest; and
- New transport infrastructure and associated development has the potential for beneficial or adverse effects on the historic environment.

Assessment Findings

Transport infrastructure and traffic flows have a strong influence on the setting of the historic environment and landscape character and quality. Effects can occur from poor design of transport infrastructure, including insensitively designed layouts, inappropriate signage, noise from poor road surfaces or excessive clutter.

A number of the initiatives proposed by the Strategic Delivery Programme for the LTP4 will directly support the enhancement of the historic environment and facilitate enhancements to landscape and townscape character. In this context the Stourport Road Key Corridor of Improvement, the B4190 Key Corridor of Improvement, the Chester Road (A449) Key Corridor of Improvement and the Kidderminster Ring Road Junction and Public Realm Improvement Scheme all have the potential to lead to enhancements in the quality of the public realm. This will help facilitate improvements to the setting of the historic environment and enhancements to local distinctiveness and a sense of place.

The setting of heritage features and the quality of the public realm will also be supported by the measures which promote modal shift from the private car. In this context the Active Travel Corridor: Bewdley to Wyre Forest (Dowles Link) scheme, the proposed Active Travel Network Investment Programme for Kidderminster, the Kidderminster Transport Strategy, the Stourport-on-Severn Transport Strategy, the Kidderminster Rail Enhancement Scheme, the Blakedown Rail Enhancement Scheme and the Bewdley Transport Strategy will support the integrity of the historic environment and townscape character through helping to reduce the impact of traffic on key features and areas of distinctiveness.

The proposed transport infrastructure improvements, including the potential road schemes, junction capacity improvements and other schemes however have the potential to have impacts on cultural heritage assets and their settings and landscape and townscape quality. In this context the Kidderminster Transport Strategy Major Scheme may have impacts on the setting of listed buildings and the four conservation areas in Kidderminster, and the proposed junction improvements in the Key Corridors of Improvement may have direct and indirect effects on the setting of cultural heritage assets and areas of historic environment and townscape/landscape significance. The Transport Telematics Investment Package may also lead to impacts on location distinctiveness through increasing the number of Variable Message Signs in Wyre Forest.

The significance of effects from these interventions will depend on design, layout and scale of the schemes, and mitigation and avoidance measures proposed. Further work will be required to examine and mitigate effects on townscape and landscape quality and character through the relevant project level environmental assessments accompanying the schemes. It

should also be noted that some schemes also have the potential to lead to positive effects on the historic environment and landscape/townscape quality with appropriate and sensitive design and layout.

As a strategic document, the Strategic Delivery Programme provides limited details about the detailed designs or layout for some interventions. Subsequently, it is unclear in many cases as to what extent local historic environment assets (including archaeological features) or landscape and townscape quality may be affected. Where appropriate, project level environmental assessments will consider potential issues such as visual impacts, light and noise pollution, and the loss of features important for landscape/townscape character in more detail.

The West Midlands Green Belt covers the eastern part of Wyre Forest. As such whilst a number of schemes include proposals within the Green Belt, the schemes proposed are unlikely to lead to significant land take within areas covered by this designation.

In-combination effects on the historic environment and landscape / townscape quality may result from the strategic allocations proposed for Wyre Forest and LTP4 initiatives. This includes through a stimulation of traffic growth and increasing visual effects on the setting of the historic environment and landscape / townscape quality. However it is likely that the initiatives proposed by the LTP4 will in many respects support the integrity of the historic environment and landscape / townscape quality through helping to mitigate the impacts of new development areas from transport.

6.2.6 Population And Communities

Key Issues For The Delivery Area Identified During Scoping

- Higher levels of deprivation potentially affecting accessibility to key services and employment and leisure opportunities;
- New development should be accessible by a range of sustainable transport modes to help limit the effects of congestion, economic vitality, and residents' quality of life; and
- An ageing population structure in Wyre Forest is likely to increase demand for access to services (e.g. healthcare services).

Assessment Findings

The Delivery Area Strategy will bring a range of benefits for the quality of life of residents and social inclusion in Wyre Forest through a close focus on enhancing accessibility to services, facilities and opportunities by non-car modes and promoting new and enhanced transport links.

Public transport improvements proposed through the initiatives will have particular benefits for transport disadvantaged individuals and groups. This includes those from deprived communities, and younger and older groups who have increased reliance on public transport networks. In this context a central focus of the Delivery Area Strategy is on increasing the use of public transport improvements. Key initiatives and schemes in this regard are the Kidderminster Transport Strategy Major Scheme, the Blakedown Rail Station Enhancement Scheme, the Bewdley Hill Key Corridor of Improvement, the Kidderminster

Station Enhancement Scheme, the Chester Road Key Corridor of Improvement, the Stourport-on-Severn Transport Strategy and the Bewdley Transport Strategy. The junction and capacity improvements and use of Intelligent Transport Systems (including the All Towns Transport Telematics Investment Package) proposed through the Delivery Area Strategy also have the potential to enhance the reliability of public transport and journey times. It is considered that the improvements will also help support access to healthcare services.

The Wyre Forest Delivery Area Strategy also takes forward initiatives aimed at promoting active travel choices. This will support the quality of life of residents through enhancing physical and psychological wellbeing, improving community cohesion and increasing engagement between residents. In this context key initiatives proposed include the Kidderminster Transport Strategy Major Scheme, the Stourport-on-Severn Transport Strategy, the Bewdley Transport Strategy, the Bewdley Hill Key Corridor of Improvement, the Bewdley to Wyre Forest Active Travel Corridor, the Kidderminster Ring Road Junction and Public Realm Improvement Scheme, the Chester Road Key Corridor of Improvement, and the Kidderminster Active Travel Network Investment Programme.

More widely in relation to socio-economic factors, the package of transport measures proposed through the Delivery Area Strategy will support the economic vitality of Wyre Forest through helping to unlock economic potential in Kidderminster and supporting enhancements to employment opportunities.

As discussed in relation to air quality and climate change, the growth promoted through the emerging Wyre Forest Local Plan will result in increased demand for travel. While it is WCC's view that much of this demand can be met by sustainable and/or active transport modes, a large proportion will be met by private car based trips. This may have implications for the quality of life of residents at some locations.

6.2.7 Health And Well-Being

Key Issues For The Delivery Area Identified During Scoping

- Wyre Forest has higher levels of 'fair' and 'bad' health compared to Worcestershire averages;
- An ageing population structure is likely to increase demand for access to health services;
- Reducing road accidents and enhancing road safety should be a key consideration; and
- Investment in safe walking and cycling infrastructure and green infrastructure should be supported in order to encourage increased physical activity.

Assessment Findings

The Delivery Area Strategy will bring a range of benefits for the health and wellbeing of residents in Wyre Forest through a focus on enhancing accessibility to services, facilities and opportunities by non-car modes and promoting new and enhanced transport links.

In this context the Delivery Area Strategy takes forward initiatives aimed at promoting active travel choices. Key initiatives proposed include the Kidderminster Transport Strategy Major Scheme, the Stourport-on-Severn Transport Strategy, the Bewdley Transport Strategy, the Bewdley Hill Key Corridor of Improvement, the Bewdley to Wyre Forest Active Travel Corridor, the Kidderminster Ring Road Junction and Public Realm Improvement Scheme, the Chester Road Key Corridor of Improvement, and the Kidderminster Active Travel Network Investment Programme. This will support the health and wellbeing of residents through enhancing physical and psychological wellbeing, improving community cohesion and increasing engagement between residents.

A focus of the Delivery Area Strategy is on increasing the use of public transport. Key initiatives and schemes in this regard are the Kidderminster Transport Strategy Major Scheme, the Blakedown Rail Station Enhancement Scheme, the Bewdley Hill Key Corridor of Improvement, the Kidderminster Station Enhancement Scheme, the Chester Road Key Corridor of Improvement, the Stourport-on-Severn Transport Strategy and the Bewdley Transport Strategy. The junction and capacity improvements and use of Intelligent Transport Systems (including the All Towns Transport Telematics Investment Package) proposed through the Delivery Area Strategy also have the potential to enhance the reliability of public transport and journey times. This will support the health and wellbeing of residents through enhancing access to health, leisure and recreational facilities, as well as other community facilities.

Many of the LTP4 measures in Wyre Forest are focused on reducing road congestion, including by increasing road and junction capacity at specific pinch points. This has the potential to support health and wellbeing through enhancing air and noise quality at key locations, as well as reducing road accidents and enhancing road safety.

However, through helping to release induced demand, the in-combination effects of multiple capacity enhancements schemes and housing and employment growth in the wider Delivery Area have the potential to have impacts on road safety and air and noise quality. In this context it is considered that the measures aimed at influence travel behaviour will help ‘lock in’ these potential effects on health and wellbeing.

In terms of in-combination effects between the LTP4 and other plans and proposals, limited information is available about the cumulative impact on safety for drivers, cyclist and pedestrians from the initiatives and proposals together. However, whilst none of the specific initiatives contained within the Strategic Delivery Programme would be expected to reduce safety, it is possible that the land use changes promoted by the emerging Wyre Forest Local Plan could increase traffic on roads which already have reduced safety. At this stage, the effects of the LTP4 and the emerging Local Plan in combination are uncertain with regard to road safety. Further work is recommended to identify whether any increases in road traffic flows are predicted on roads/junctions which have a reduced safety record.

7. Summary Of Assessment

The following tables sets out a summary of the assessment findings by environmental theme for each Delivery Area.

7.1 North East Worcestershire

Table 7.1: Summary Of Assessment Findings – North East Worcestershire

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Air Quality	The four AQMAs in North East Worcestershire have been designated due to NO_2 emissions from road transport.	Positive	None
	There is a need to reduce emissions from road transport, especially in/around Redditch, Bromsgrove and Hagley.	Uncertain	Monitoring of local air quality and road use to ensure no negative effects from a release of 'induced demand' from new road schemes.
	There is a need to limit the effects of new development areas in North East Worcestershire on air quality.	Negative	Further modelling is recommended to provide further clarity on the in-combination effects of air quality from the Local Plan allocations proposed in North East Worcestershire and the LTP4 together during implementation.
	There is a need to encourage sustainable modes of transport such as walking, cycling and public transport use.	Positive	None

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Biodiversity	Limiting the effects of new development areas on biodiversity in North East Worcestershire.	Negative	Careful design and layout of new developments to minimise effects on protected sites; avoiding the loss of key habitats (including BAP Habitats); and the incorporation of features which support ecological networks.
	Protecting the integrity of the significant areas of SSSI located in the Strategy Area.	Negative	Careful design and layout of new developments to minimise effects on SSSIs.
	Opportunities for enhancements for green infrastructure provision to deliver longer term biodiversity benefits.	Uncertain	Where practicable, all schemes should incorporate measures which support sub-regional green infrastructure networks.
	Opportunities for ecological connections across the Strategy Area to support species distribution in light of climate change impacts on biodiversity.	Uncertain	Where practicable, schemes should incorporate measures to enable and strengthen ecological connections.
	Protection of biodiversity through the Roadside Verge Nature Reserve (RVNR) project.	Uncertain	Where practicable, all schemes should protect and expand on the Roadside Verge Nature Reserve project.

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Climate Change	New housing and employment growth in North East Worcestershire has the potential to increase total GHG emissions from transport.	Negative	Initiatives which propose improvements to sustainable transport networks (including public transport and pedestrian and cycle links) should be designed to limit traffic growth resulting from in-combination effects of Local Plan allocations and highway capacity improvements.
	Per capita emissions in Redditch continue to be lower than the national average; these however have seen little reduction compared to surrounding areas.	Positive	None
	Per capita emissions in Bromsgrove continue to be higher than the national average, and the highest in the county.	Positive	None
	Climate change has the potential to increase the vulnerability of the Strategy Area's transport infrastructure to extreme weather events in the future.	Uncertain	Climate change adaptation should be incorporated in all schemes.
	The LTP4 provides opportunities to support flood risk management objectives as part of highway infrastructure proposals.	Neutral	Sustainable drainage systems should be incorporated in scheme design to ensure no negative effect due to surface water flooding. Schemes should be designed to ensure they are resilient to the effects of fluvial flooding, and also do not increase the risk of flooding elsewhere.

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Land, Soil And Water Resources	New transport infrastructure has the potential to directly or indirectly lead to the loss of areas classified as the best and most versatile agricultural land in North East Worcestershire.	Neutral	Where schemes are located on the best and most versatile agricultural land, schemes should seek to minimise landtake.
	The construction, maintenance and operation of transport infrastructure should seek to reduce the amount of primary materials required, make beneficial use of surplus materials and minimise the landfill disposal of waste generated throughout the asset's lifecycle.	Neutral	Should be secured through design and procurement of engineered schemes.
	New transport infrastructure has the potential to modify water flow regimes and lead to effects on water quality.	Neutral	Sustainable drainage systems should be incorporated in scheme design to ensure the run-off rate is not increased.
	Increased use of existing transport infrastructure, which may not be designed to current standards has the potential to lead to a deterioration of water quality in controlled waters.	Neutral	Sustainable drainage systems and other associated water management measures shall be incorporated in scheme design.
Historic Environment And Landscape	New transport schemes have the potential to lead to landtake on the Green Belt in North East Worcestershire.	Negative	Careful design of schemes to minimise landtake within the Green Belt.
	New transport infrastructure and associated development has the potential for beneficial or adverse effects on the historic environment.	Uncertain (depending on scheme design, layout, scale and location)	Scheme design and layout should seek to minimise effects on the setting and fabric of the historic environment and landscape / townscape quality. Where appropriate, project level environmental assessments will consider potential issues such as visual impacts, light and noise pollution, and the loss of features important for landscape/townscape character in more detail.

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Population And Communities	New development should be accessible by a range of sustainable transport modes to help limit the effects of congestion, economic vitality, and residents' quality of life. This is particularly important in Redditch where 20% of households do not have access to a car.	Uncertain	The delivery of new housing and employment land to be accompanied by the delivery of appropriate new sustainable transport infrastructure. Developer contributions should be used to ensure new developments are serviced by sustainable travel modes.
	An ageing population structure, particularly in Bromsgrove, is likely to increase demand for access to services (e.g. healthcare services).	Positive	None
Health And Well Being	An ageing population structure, particularly in Bromsgrove, is likely to increase demand for access to healthcare services.	Positive	None
	Reducing road accidents and enhancing road safety should be a key consideration.	Uncertain	Through helping to release induced demand, the in-combination effects of multiple capacity enhancements schemes and housing and employment growth in the wider South Worcestershire Delivery Area have the potential to have impacts on road safety. However junction enhancements may enhance road safety for vulnerable users such as pedestrians and cyclists.
	Investment in walking and cycling infrastructure and green infrastructure should be supported in order to encourage increased physical activity and mental health.	Positive	None

7.2 South Worcestershire

Table 7.2: Summary Of Assessment Findings – South Worcestershire

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Air Quality	The four AQMAs in South Worcestershire (three in Worcester, one in Evesham) have been designated due to NO_2 emissions from road transport.	Positive	None
	There is a need to reduce emissions from road transport, especially in/around Worcester and Evesham.	Uncertain	Monitoring of local air quality and road use to ensure no negative effects from 'induced demand'.
	There is a need to limit the effects of new development areas in South Worcestershire on air quality.	Negative	Further modelling is recommended to provide further clarity on the in-combination effects of air quality from the Local Plan allocations proposed in South Worcestershire and the LTP4 together during implementation.
	Encourage sustainable modes of transport such as walking, cycling and public transport use in Worcester.	Positive	None

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Biodiversity	Limiting the effects of new development areas in South Worcestershire on biodiversity.	Negative	Careful design and layout of new transport infrastructure to minimise effects on protected sites; avoiding the loss of key habitats (including BAP Habitats); and the incorporation of features which support ecological networks.
	Protecting the integrity of the SACs and SSSIs in the area.	Negative	Careful design and layout of new transport infrastructure to minimise effects on SACs and SSSIs.
	Opportunities for enhancements for green infrastructure provision to deliver longer term biodiversity benefits.	Uncertain	Where practicable, all schemes should incorporate measures which support sub-regional green infrastructure networks.
	Opportunities for ecological connections across the Strategy Area to support species distribution in light of climate change impacts on biodiversity.	Uncertain	Where practicable, all schemes should incorporate measures to enable and strengthen ecological connections.
	Protection of biodiversity through the Roadside Verge Nature Reserve (RVNR) project.	Uncertain	Where practicable, all schemes should protect and expand the Roadside Verge Nature Reserve network.

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Climate Change	New housing and employment growth in South Worcestershire has the potential to increase total GHG emissions from transport.	Negative	Initiatives which propose improvements to sustainable transport networks (including public transport and pedestrian and cycle links) should be designed to limit traffic growth resulting from in-combination effects of Local Plan allocations and highway capacity improvements.
	A reduction in public transport services has the potential to increase personal car use.	Uncertain	Proposed LTP initiatives to support rail services and rail infrastructure in the Delivery Area will support public transport measures. Whilst enhancements to bus services are not directly proposed through the schemes and initiatives, journey times and bus reliability will be supported by capacity enhancements. This will support rural accessibility.
	Per capita emissions in Worcester continue to be lower than the national average; however these have seen little reduction.	Positive	None
	Per capita emissions in Malvern Hills and Wychavon continue to be higher than the national average.	Positive	None
	Climate change has the potential to increase the vulnerability of the Strategy Area's transport infrastructure to extreme weather events in the future.	Uncertain	Climate change adaptation should be incorporated in all schemes.
	The LTP4 provides opportunities to support flood risk management objectives as part of highway infrastructure proposals.	Neutral	Sustainable drainage systems should be incorporated in scheme design to ensure no negative effect due to surface water flooding. Where appropriate, schemes should be designed to ensure they are resilient to the effects of fluvial flooding, and also do not increase the risk of flooding elsewhere.

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Land, Soil And Water Resources	New transport infrastructure has the potential to directly or indirectly lead to the loss of areas classified as the best and most versatile agricultural land in South Worcestershire.	Uncertain	In a number of cases recent land classification has not been undertaken, and the differentiation between Grade 3a land and Grade 3b land has not been established. Where schemes are located on best and most versatile agricultural land, schemes should seek to minimise landtake.
	The construction, maintenance and operation of transport infrastructure should seek to reduce the amount of primary materials required, make beneficial use of surplus materials and minimise the landfill disposal of waste generated throughout the asset's lifecycle.	Neutral	Should be secured through design and procurement of engineered schemes.
	New transport infrastructure has the potential to modify water flow regimes and lead to effects on water quality.	Neutral	Sustainable drainage systems should be incorporated in scheme design to ensure the run-off rate is not increased.
	Increased use of existing transport infrastructure, which may not be designed to current standards has the potential to lead to a deterioration of water quality in controlled waters.	Neutral	Sustainable drainage systems and other associated water management measures should be incorporated within scheme design.

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Historic Environment And Landscape	New transport schemes have the potential to affect the integrity of the two AONBs present in South Worcestershire, as well as views out of the AONBs.	Uncertain (depending on scheme design, layout, scale and location)	Scheme design and layout should seek to minimise effects on the integrity and views out of AONBs. Where appropriate, project level environmental assessments will consider potential issues such as visual impacts, light and noise pollution, and the loss of features important for landscape character in more detail. Adherence to AONB Management Plans and concomitant guidance and consultation with AONB Partnerships will be key actions to help to minimise detrimental impacts.
	New transport schemes have the potential to affect the Areas of Great Landscape Value and Green Belt in the area.	Uncertain (depending on scheme design, layout, scale and location)	Careful design of schemes to minimise landtake within the Green Belt. Scheme design and layout should seek to minimise effects on the integrity and views out of Areas of Great Landscape Value. Where appropriate, project level environmental assessments will consider potential issues such as visual impacts, light and noise pollution, and the loss of features important for landscape character in more detail.
	There are significant concentrations of historic environment assets in Worcester and Malvern, many of which are nationally or locally designated.	Uncertain (depending on scheme design, layout, scale and location)	Scheme design and layout should seek to minimise effects on the setting and fabric of the historic environment. Where appropriate, project level environmental assessments will consider potential issues such as the setting of the asset and the scheme's visual impact.
	New transport infrastructure and associated development has the potential for beneficial or adverse effects on the historic environment.	Uncertain (depending on scheme design, layout, scale and location)	Scheme design and layout should seek to minimise effects on the setting and fabric of the historic environment. Where appropriate, project level environmental assessments will consider potential issues such as the setting of the asset and the scheme's visual impact.

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Population And Communities	Rural areas in the Strategy Area have a greater potential to experience poor accessibility to key services and facilities and employment and leisure opportunities.	Positive	None
	In Worcester 22% of households do not have access to a car. As such there is a greater reliance on public transport networks and walking and cycling.	Positive	None
	New development should be accessible by a range of sustainable transport modes to help limit the effects of congestion, economic vitality, and residents' quality of life.	Uncertain	The delivery of new housing and employment land to be accompanied by the delivery of appropriate new sustainable transport infrastructure. Developer contributions should be used to ensure new developments are serviced by sustainable travel modes.
	An ageing population is likely to increase demand for access to services (e.g. healthcare services).	Positive	None
Health And Well Being	An ageing population is likely to increase demand for access to services (e.g. healthcare services).	Positive	None
	Due to the rural nature of much of South Worcestershire, access to leisure, recreational and sporting facilities and well as health services has the potential to be a larger issue than for many other parts of Worcestershire.	Positive	None
	Whilst road safety is a key issue in Worcester in particular, reducing road accidents and enhancing road safety should be a key consideration in all parts of the Strategy Area.	Uncertain	Through helping to release induced demand, the in-combination effects of multiple capacity enhancements schemes and housing and employment growth in the wider South Worcestershire Delivery Area have the potential to have impacts on road safety. However junction enhancements may enhance road safety for vulnerable users such as pedestrians and cyclists.
	Investment in safe walking and cycling infrastructure and green infrastructure should be supported in order to encourage increased physical activity and promote mental health.	Positive	None

7.3 Wyre Forest

Table 7.3: Summary Of Assessment Findings – Wyre Forest

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Air Quality	Air quality issues within the two AQMAs in Wyre Forest are associated with NO_2 emissions from road transport.	Positive	None
	There is a need to reduce emissions from road transport, especially in/around Kidderminster and Bewdley.	Uncertain	Monitoring of local air quality and road use to ensure no negative effects from 'induced demand'.
	There is a need to limit the effects of new development areas in Wyre Forest on air quality.	Negative	Further modelling is recommended to provide further clarity on the in-combination effects of air quality from Local Plan allocations proposed in Wyre Forest and the LTP4 together during implementation.
	There is a need to encourage sustainable modes of transport such as walking, cycling and public transport use.	Positive	None
Biodiversity	Limiting the effects of new development areas in Wyre Forest on biodiversity.	Negative	Careful design and layout of new developments to minimise effects on protected sites; avoiding the loss of key habitats (including BAP Habitats); and the incorporation of features which support ecological networks.
	Opportunities for enhancements for green infrastructure provision to deliver longer term biodiversity benefits.	Uncertain	Where practicable, all schemes should incorporate green infrastructure measures.
	Opportunities for ecological connections across the Strategy Area to support species distribution in light of climate change impacts on biodiversity.	Uncertain	Where practicable, all schemes should incorporate measures to enable and strengthen ecological connections.
	Protection of biodiversity through the Roadside Verge Nature Reserve (RVNR) project.	Uncertain	Where practicable, all schemes should protect and expand on the Roadside Verge Nature Reserve project.

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Climate Change	New housing and employment growth in Wyre Forest has the potential to increase total GHG emissions from transport.	Negative	Initiatives which propose improvements to sustainable transport networks (including public transport and pedestrian and cycle links) should be designed to limit traffic growth resulting from in-combination effects of Local Plan allocations and highway capacity improvements.
	Per capita emissions in the Wyre Forest continue to be lower than the national average, however this has seen little reduction in comparison to other areas.	Positive	None
	Climate change has the potential to increase the vulnerability of the Strategy Area's transport infrastructure to extreme weather events in the future.	Uncertain	Climate change adaptation measures should be incorporated in all schemes.
	The LTP4 provides opportunities to support flood risk management objectives as part of highway infrastructure proposals.	Neutral	Sustainable drainage systems should be incorporated in scheme design to ensure no negative effect due to surface water flooding. Schemes should be designed to ensure they are resilient to the effects of fluvial flooding, and also do not increase the risk of flooding elsewhere.

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Land, Soil And Water Resources	New transport infrastructure has the potential to directly or indirectly lead to the loss of areas classified as the best and most versatile agricultural land in the Wyre Forest Delivery Area.	Uncertain	In a number of cases recent land classification has not been undertaken, and the differentiation between Grade 3a land and Grade 3b land has not been established for the three schemes with Grade 3 land. Where schemes are located on best and most versatile agricultural land, schemes should seek to minimise landtake.
	The construction, maintenance and operation of transport infrastructure should seek to reduce the amount of primary materials required, make beneficial use of surplus materials and minimise the landfill disposal of waste generated throughout the asset's lifecycle.		Should be secured through design and procurement of engineered schemes.
	New transport infrastructure has the potential to modify water flow regimes and lead to effects on water quality.	Neutral	Sustainable drainage systems should be incorporated in scheme design to ensure the run-off rate is not increased.
	Increased use of existing transport infrastructure, which may not be designed to current standards has the potential to lead to a deterioration of water quality in controlled waters.	Neutral	Sustainable drainage systems and other associated water management measures should be incorporated in scheme design.
Historic Environment And Landscape	New transport schemes have the potential to affect the Green Belt in Wyre Forest and non-designated landscapes of significance.	Neutral	Careful design of schemes to minimise landtake within the Green Belt and areas of higher landscape value.
	New transport infrastructure and associated development has the potential for beneficial or adverse effects on the historic environment.	Uncertain (depending on scheme design, layout, scale and location)	Scheme design and layout should seek to minimise effects on the setting and fabric of the historic environment and landscape / townscape quality. Where appropriate, project level environmental assessments will consider potential issues such as visual impacts, light and noise pollution, and the loss of features important for landscape/townscape character in more detail.

Environmental Theme	Key Issue	Effect Of Initiatives	Action For Delivery
Population And Communities	Higher levels of deprivation potentially affecting accessibility to key services and employment and leisure opportunities.	Positive	None
	New development should be accessible by a range of sustainable transport modes to help limit the effects of congestion, economic vitality, and residents' quality of life.	Uncertain	The delivery of new housing and employment land to be accompanied by the delivery of appropriate new sustainable transport infrastructure. Developer contributions should be used to ensure new developments are serviced by sustainable travel modes.
	An ageing population structure in Wyre Forest is likely to increase demand for access to services (e.g. healthcare services).	Positive	None
Health And Well Being	Wyre Forest has higher levels of 'fair' and 'bad' health compared to Worcestershire averages.	Positive	None
	An ageing population structure and is likely to increase demand for access to health services.	Positive	None
	Reducing road accidents and enhancing road safety should be a key consideration.	Uncertain	Through helping to release induced demand, the in-combination effects of multiple capacity enhancements schemes and housing and employment growth in the wider South Worcestershire Delivery Area have the potential to have impacts on road safety. However junction enhancements may enhance road safety for vulnerable users such as pedestrians and cyclists.
	Investment in safe walking and cycling infrastructure and green infrastructure should be supported in order to encourage increased physical activity and mental health.	Positive	None

8. What Are The Next Steps?

8.1 Introduction

This section of the Environmental Report explains next steps that will be taken as part of the plan-making / SEA process.

8.2 Plan Finalisation

This Environmental Report has been published to accompany the consultation draft of the Strategic Delivery Programme for the Worcestershire LTP4. Following the consultation period, comments will be reviewed and analysed. The final LTP4 will then be developed in early 2017, with a view to adoption in 2018. Any changes arising to the LTP4 following consultation will need to be assessed as part of the SEA process.

SEA Regulations 16.3c)(iii) and 16.4 require that a 'statement' be made available to accompany the plan, as soon as possible after the adoption of the plan or programme. The purpose of the SEA Statement is to outline how the SEA process has influenced and informed the LTP4 development process and demonstrate how consultation on the SEA has been taken into account.

As the regulations outline, the statement should contain the following information:

- The reasons for choosing the preferred strategy for the LTP4 as adopted in the light of other reasonable alternatives dealt with;
- How environmental considerations have been integrated into the LTP4;
- How consultation responses have been taken into account; and
- Measures that are to be taken to monitor the significant environmental effects of the LTP4.

To meet these requirements, a SEA Adoption Statement will be published with the adopted version of Worcestershire's Local Transport Plan (LTP) 2018 - 2030.

Appendix A SEA Evidence Base

(See separate document)

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Worcestershire
Local Enterprise Partnership

worcestershire
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