



West of England Joint Local Transport Plan 4 Habitats Regulations Assessment Report



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Executive Summary

ClearLead Consulting has been commissioned to undertake a Habitats Regulations Assessment (HRA) of the draft West of England (WoE) Joint Local Transport Plan (JLTP) 4.

Habitats Regulations Assessment (HRA) is required of the JLTP in accordance with Article 6 (3) of the EU Habitats Directive¹ as transposed into the UK law by the Conservation of Habitats and Species Regulations 2017 ('the Habitats Regulations'). Habitats Regulations requires an assessment (referred to as a HRA) to be undertaken in respect of any plan or project which either alone or in combination with other plans or projects would be likely to have a significant effect on a site designated within the Natura 2000 network (or European sites) and is not directly connected with, or necessary to, the management of the site. In 2009, the Department of Transport also issued guidance that local transport authorities need to consider if their Local Transport Plan is likely to have a significant effect on a European site².

An HRA should determine whether a plan would adversely affect the integrity of a European site in terms of its nature conservation objectives. Where negative effects are identified, other options should be examined to avoid any potential for damaging effects.

'Screening' is the first stage in HRA. If Likely Significant Effects (LSEs) on European sites are identified in screening, measures must be put in place to avoid them. Further investigation may be necessary to understand how a plan might affect the integrity of European sites i.e. Appropriate Assessment and to develop effective avoidance and mitigation measures (or consider mitigation measures already proposed in relation to schemes and projects).

The following European sites have been considered in the HRA of the WoE JLTP4:

- Avon Gorge Woodlands SAC;
- Bath and Bradford-on-Avon Bats SAC;
- Chew Valley Lake SPA;
- Mells Valley SAC;

¹ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

² 'European Sites' are: candidate Special Areas of Conservation (cSACs), Special Areas of Conservation (SACs) and Sites of Community Importance (SCIs)²; and Special Protection Areas (SPAs). The National Planning Policy Framework also requires proposed SPAs, possible SACs, listed or proposed Ramsar sites, and sites required to provide compensatory measures to be treated as European sites in England.

- Mendip Limestone Grasslands SAC;
- Mendip Woodlands SAC;
- North Somerset & Mendip Bats SAC;
- River Usk / Afon Wysg SAC;
- River Wye SAC;
- Rodborough Common SAC;
- Salisbury Plain SAC and SPA;
- Severn Estuary SAC, SPA and Ramsar;
- Somerset Levels and Moor SPA and Ramsar;
- Wye Valley and Forest of Dean Bats SAC; and
- Wye Valley Woodlands SAC.

Apart from 'softer' actions which will occur as a result of the JLTP4, such as improving information provision and road safety training, it is the major schemes set out within the plan which will physically deliver the JLTP4 with regards to, for example, infrastructure development and changes to traffic. HRA screening has therefore focussed on the major schemes in order to identify the potential LSEs on European sites resulting from the JLTP4.

A Geographical Information System (GIS) has been used along with expert judgement to screen the major schemes for potential LSEs.

Screening has identified whether:

- a. The scheme is not likely to have a significant effect on a European site - no LSE identified;
- b. The scheme is likely to have a significant effect on a European site either alone or in-combination with other plans and projects - LSE identified; or
- c. It is not possible to rule out the risk of significant effects on a European site, either alone or in-combination with other plans and projects – LSE identified.

The findings of the screening stage have identified LSEs in relation to the following sites:

- Avon Gorge Woodlands SAC;
- Bath and Bradford-on- Avon Bats SAC;
- Chew Valley Lake SPA;
- Mendip Limestone Grasslands SAC;
- Mendip Woodlands SAC;
- North Somerset and Mendip Bats SAC;
- Severn Estuary SAC, SPA and Ramsar; and
- River Wye / Afon Gwy SAC.



Some uncertainty has also been identified in relation to some schemes for which insufficient details are available at this stage to allow screening.

As LSEs and uncertainty have been identified in the screening stage, the HRA must progress to the second stage (appropriate assessment) in which the potential effects and uncertainty identified in screening will be considered in more detail, including any mitigation already proposed and identifying additional mitigation if necessary.

It is envisaged that the appropriate assessment will need to consider the following potential effects:

- Loss of foraging areas or severance of flyways used by bats;
- Increase in recreational pressures;
- Spread of diseases;
- Spread of invasive species;
- Water pollution;
- Marine litter;
- Loss of habitats for birds;
- Physical modification of watercourses; and
- Coastal squeeze effects.

The appropriate assessment will reflect the strategic nature of the JLTP4 and will make reference to the appropriate assessment of the Joint Spatial Plan which is soon to be finalised. The JLTP4 appropriate assessment work will commence as soon as possible after consultation on the screening findings with Natural England.

1 Introduction

1.1 This Report

ClearLead Consulting has been commissioned to undertake a Habitats Regulations Assessment (HRA) of the draft West of England (WoE) Joint Local Transport Plan (LTP) 4. This report sets out the background, methodology and findings of HRA screening.

1.2 Background

The WoE includes the unitary authority areas of Bath & North East Somerset (B&NES), Bristol City, South Gloucestershire and North Somerset. As local transport authorities, the WoE authorities are legally required to produce an LTP under the Transport Act 2000, as revised by the Local Transport Act 2008.

Under the Transport Act 2000, local transport authorities are obligated to produce a LTP every five years and to keep it under review. For the first round of LTPs, each of the unitary authorities of B&NES, Bristol, North Somerset and South Gloucestershire individually prepared plans, which covered the period 2001 to 2006. For the second round of LTPs (LTP2), the four authorities prepared a joint plan covering the period between 2006 and 2011. The current Joint LTP (LTP3) sets out the 15-year Transport Vision for the period 2011 to 2026.

Under the new Transport Act (2008), LTPs are no longer required to be replaced every five years, but instead planning authorities may replace their plans as they see fit.

In 2017 B&NES, Bristol, North Somerset and South Gloucestershire councils voted to proceed with a devolution deal, and as a result, the new West of England Combined Authority was established. Due to this and the new added flexibility of the revised Transport Act (2008), it was agreed that a new Joint Local Transport Plan 4 (JLTP4) would be produced.

1.3 The need for HRA

Habitats Regulations Assessment (HRA) is required of the JLTP in accordance with Article 6 (3) of the EU Habitats Directive³ as transposed into the UK law by the Conservation of Habitats and Species Regulations 2017 ('the Habitats Regulations'). Habitats Regulations requires an

³ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.



assessment (referred to as a Habitats Regulations Assessment or HRA) to be undertaken in respect of any plan or project which either alone or in combination with other plans or projects would be likely to have a significant effect on a site designated within the Natura 2000 network (or European sites) and is not directly connected with, or necessary to, the management of the site. In 2009, the Department of Transport also issued guidance that local transport authorities need to consider if their Local Transport Plan is likely to have a significant effect on a European site.

'European Sites' are: candidate Special Areas of Conservation (cSACs), Special Areas of Conservation (SACs) and Sites of Community Importance (SCIs)⁴ designated pursuant to the Habitats Directive; and Special Protection Areas (SPAs) designated pursuant to the Birds Directive. Paragraph 118 of the National Planning Policy Framework also requires proposed SPAs, possible SACs, listed or proposed Ramsar sites, and sites required to provide compensatory measures to be treated as European sites in England.

⁴ Mainly offshore sites or sites designated in Scotland.

2 Methodology

2.1 Background

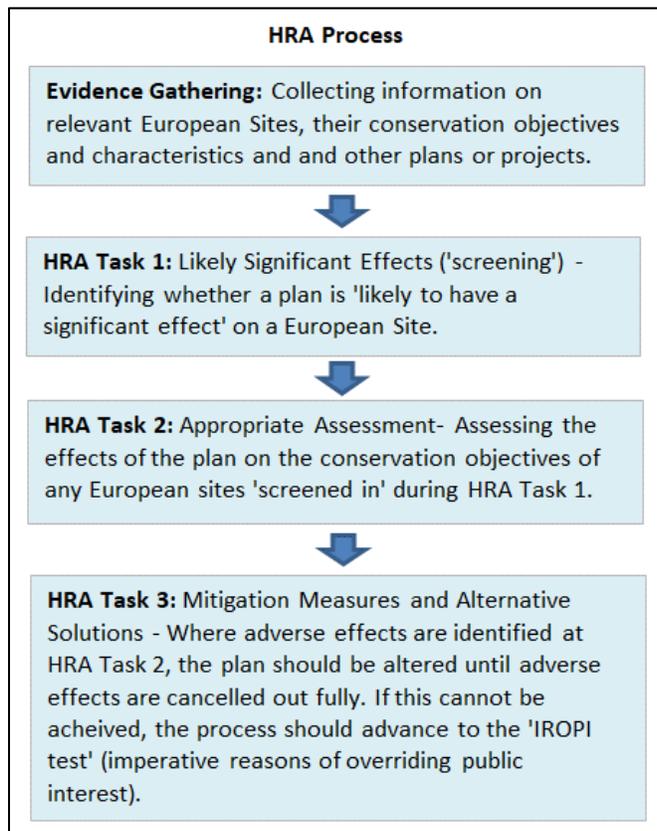
The purpose of an HRA is to assess the significance of potential impacts of a plan on relevant European sites. The assessment should determine whether the plan would adversely affect the integrity of the site in terms of its nature conservation objectives. Where negative effects are identified, other options should be examined to avoid any potential for damaging effects.

The HRA method has been informed by the following guidance documents:

- European Commission (2001). Assessment of plans and projects significantly affecting Natura 2000 sites;
- English Nature (2006) Draft Guidance – The Assessment of Regional Spatial Strategies and Sub-regional strategies under the provisions of the Habitats Regulations;
- Design Manual for Roads and Bridges. Volume 11, Section 4, Part 1: Assessment of Implications (of Highways and/or Roads Projects) on European Sites (including Appropriate Assessment) (HD 44/09); and
- Scottish Natural Heritage (January 2015) Habitats Regulations Appraisal of Plans Guidance for Plan-Making Bodies In Scotland Version 3.0 originally prepared by David Tyldesley and Associates.

Figure 2.1 sets out the HRA process. The HRA process requires close working with Natural England to obtain the necessary information, agree the process, outcomes and mitigation proposals, and to meet the requirements of the Habitats Regulations. The most effective way to achieve this is to agree the approach with Natural England and to undertake the HRA in an iterative manner, informing the development of the plan at each key stage.

Figure 2.1: HRA Process



During screening, the ‘Precautionary Principle’ will be applied: if an effect cannot be ruled out on the basis of objective information it will be reported as “likely” or not possible to rule out. Furthermore, a recent judgement⁵ by the Court of Justice of the European Union (People Over Wind) ruled that Article 6(3) of the Habitats Directive⁶ must be interpreted as meaning that mitigation measures (referred to in the judgment as measures which are intended to avoid or reduce effects) should be assessed within the framework of an Appropriate Assessment (AA) and that it is not permissible to take account of measures intended to avoid or reduce the harmful effects of the plan or project on a European site at the screening stage. The screening exercise must therefore consider elements of the plan without any proposed mitigation.

If Likely Significant Effects (LSEs) on European sites are identified in screening, measures must be put in place to avoid them. Further investigation may be necessary to understand how a plan

⁵ <https://pinslibrary.org.uk/vufind/Record/22537>

⁶ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.

might affect the integrity of European sites i.e. Appropriate Assessment and to develop effective avoidance and mitigation measures (or consider mitigation measures already proposed in relation to schemes and projects).

2.1.1 Evidence Gathering

The first task in undertaking HRA is to confirm the European designated sites to be considered. Current guidance suggests that the following European sites be included in the scope of assessment:

- All sites within the WoECA boundary; and
- Other sites shown to be linked to development within the boundary through a known 'pathway'.

Pathways are routes by which a change in activity within a plan area can lead to an effect upon a European site.

The WoE JLTP4 boundary is the same as the boundary of the WoE Joint Spatial Plan. The HRA of the Joint Spatial Plan was completed in 2017 and it is considered that it presents relevant information and a suitable approach which can be utilised within the HRA of the WoE JLTP4. The WoE Joint Spatial Plan HRA considered a list of European sites within the WoECA boundary and up to 15km from the boundary, as shown in Figure 2.2.

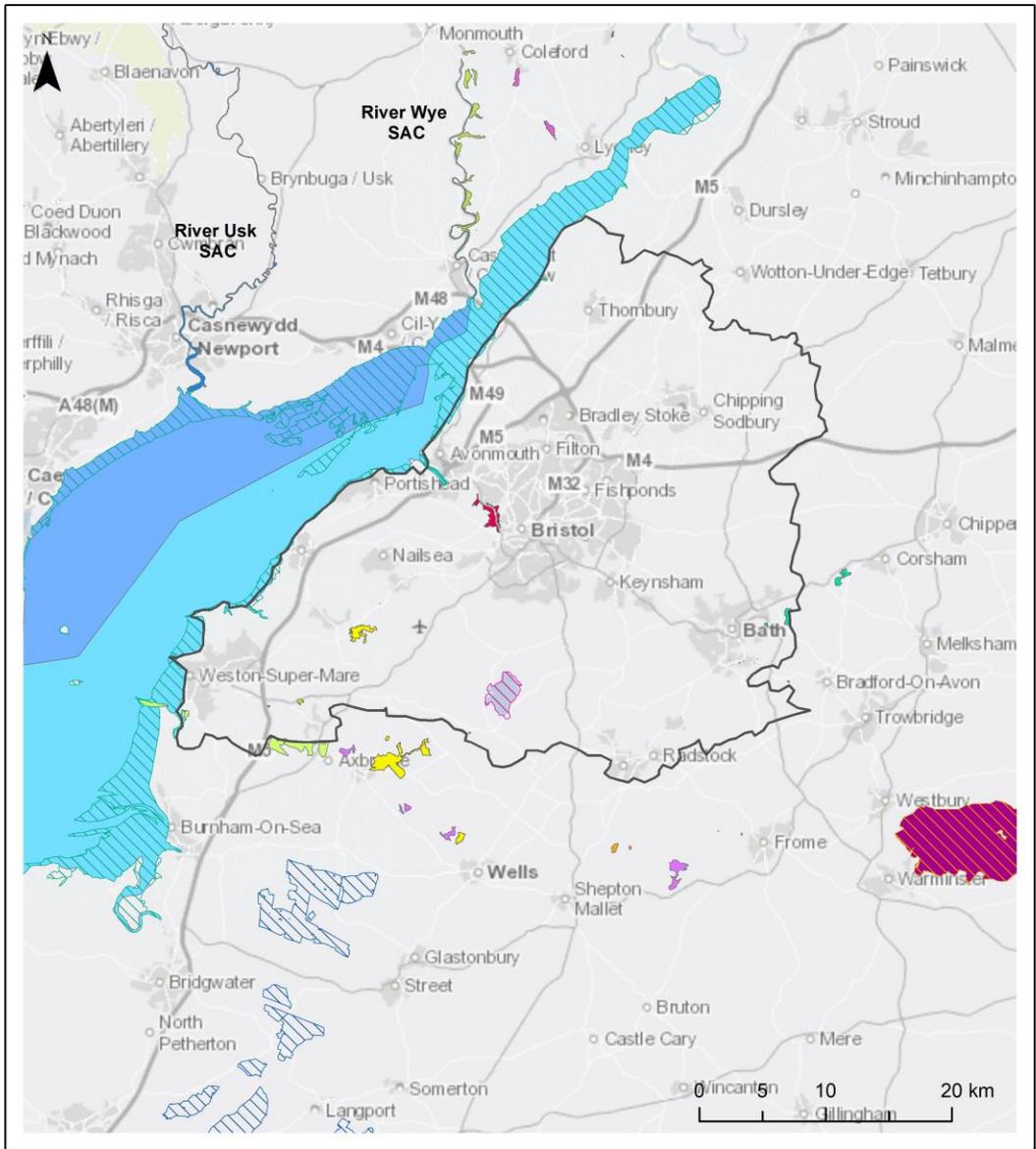
There are six European sites that lie within the WoECA boundary, which are:

- Avon Gorge Woodlands SAC;
- Chew Valley Lake SPA;
- Bath and Bradford-on-Avon Bats SAC;
- Mendip Limestone Grasslands SAC;
- North Somerset & Mendip Bats SAC; and
- Severn Estuary SAC, SPA and Ramsar.

Within a 15km buffer there are nine additional European Sites. These are:

- Mells Valley SAC;
- Mendip Woodlands SAC;
- River Usk / Afon Wysg SAC
- River Wye SAC;
- Rodborough Common SAC;
- Salisbury Plain SAC and SPA;
- Somerset Levels and Moor SPA and Ramsar;
- Wye Valley and Forest of Dean Bats SAC; and
- Wye Valley Woodlands SAC.

Figure 2.2: West of England Joint Local Transport Plan Area, 15km Buffer and European sites



Appendix 1 presents a summary of the site designations, qualifying features and priority issues currently impacting or threatening the condition of the features. This information has been obtained from the WoE Joint Spatial Plan HRA Appendix A (November 2017)⁷ and the Natural England site improvement publications.

It has been agreed with Natural England⁸ that the following European sites should be considered in the HRA of the WoE JLTP4:

- Avon Gorge Woodlands SAC;
- Bath and Bradford-on-Avon Bats SAC;
- Chew Valley Lake SPA;
- Mells Valley SAC;
- Mendip Limestone Grasslands SAC;
- Mendip Woodlands SAC;
- North Somerset & Mendip Bats SAC;
- River Usk / Afon Wysg SAC;
- River Wye SAC;
- Rodborough Common SAC;
- Salisbury Plain SAC and SPA;
- Severn Estuary SAC, SPA and Ramsar;
- Somerset Levels and Moor SPA and Ramsar;
- Wye Valley and Forest of Dean Bats SAC; and
- Wye Valley Woodlands SAC.

This concurs with the HRA of the WoE Joint Spatial Plan (November 2017), with the exception of Salisbury Plain SAC and SPA, which was not included in the WoE Joint Spatial Plan HRA. Salisbury Plain SAC and SPA has been included within the screening of the WoE JLTP in line with the precautionary principle.

2.1.2 Screening

Apart from 'softer' actions which will occur as a result of the JLTP4, such as improving information provision and road safety training, it is the major schemes set out within the plan which will physically deliver the JLTP with regards to, for example, infrastructure development and changes

⁷ Accessed from the West of England Joint Spatial Plan website on 24/09/18:

<https://www.jointplanningwofe.org.uk/consult/ti/JSPPublication/viewContent?contentid=346611>

⁸ Letter from Natural England dated 12 October 2018 responding to a consultation request from ClearLead Consulting Ltd



to traffic. HRA screening has therefore focussed on the major schemes in order to identify the potential LSEs on European sites resulting from the JLTP4.

The priority issues currently impacting or threatening the condition of the features of the European sites listed above are presented within Appendix 1. Table 2.1 identifies which of these issues could be affected by the JLTP4. For some priority issues, there is no potential impact pathway with the JLTP4 and this has been explained within Table 2.1 where this is the case. Where a potential impact pathway could exist in theory, a precautionary buffer distance from the European site has been identified, within which a major scheme could potentially result in an LSE.

Table 2.1: Identifying Theoretical Potential Impact Pathways and Buffer Zones for GIS Screening

Site	Priority issues currently impacting or threatening the condition of the feature ⁹	Potential impact pathway?	Buffer Distance	Justification
Avon Gorge Woodlands SAC	<u>Invasive species</u> particularly from <i>Cotoneaster spp.</i> , holm oak and other non-native plant species	No	N/A	Invasive plant species already occur on-site within the SAC. Also <i>Cotoneaster spp.</i> seeds are typically spread by birds ¹⁰ , and holm oak acorns by rodents and birds ¹¹ . New transport schemes such as new roads are therefore unlikely to increase the spread of invasive plant species within the SAC.
	<u>Undergrazing</u> resulting in loss of habitat	No	N/A	LTP is not likely to affect the grazing regime on the SAC.
	<u>Public access/disturbance</u> , particularly from mountain biking and vandalism	Yes	7km	7km buffer for public access/disturbance is based on the Thames Basin Heaths SPA Framework ¹² and relates to the distances people typically travel for recreation.
	<u>Change in species distribution</u> due to scrub encroachment and climate change	No	N/A	LTP is not likely to affect species distribution.

⁹ Based on Natural England site improvement publications accessed from website on 25/09/2018.

<http://publications.naturalengland.org.uk/category/5755515191689216>

¹⁰ www.plantlife.org.uk/uk/discover-wild-plants-nature/plant-fungi-species/cotoneaster

¹¹ Gómez JM, Puerta-Piñero C, Schupp EW (2008) Effectiveness of rodents as local seed dispersers of Holm oaks. *Oecologia* 155: 529–537

¹² <https://www.bracknell-forest.gov.uk/sites/default/files/documents/thames-basin-heaths-spa-delivery-framework.pdf>

Table 2.1: Identifying Theoretical Potential Impact Pathways and Buffer Zones for GIS Screening

Site	Priority issues currently impacting or threatening the condition of the feature ⁹	Potential impact pathway?	Buffer Distance	Justification
	<u>Disease</u> including ash dieback	Yes	7km	Ash dieback spores can be spread by wind and by leaves stuck to vehicles, clothes and footwear ¹³ . The 7km buffer for recreational pressures has therefore been used. This is based on the Thames Basin Heaths SPA Framework and relates to the distances people typically travel for recreation.
	<u>Air pollution</u> – impact of atmospheric nitrogen on grassland, scrub and woodland.	Yes	200m	The 200m buffer reflects the need to address issues for habitats which are considered to potentially be at risk from increased air pollution resulting from increased traffic movement ¹⁴ .
Bath and Bradford-	<u>Planning permission</u> – potential cumulative adverse impacts from development across a wide area. From both the development	Yes	8km	Greater horseshoe bats have shown to have a maximum home range of up to 8km from a roost ¹⁵¹⁶ . Planning permission could therefore have an adverse effect within this zone.

¹³ Managing Chalara Ash Dieback in England (Forestry Commission leaflet). Website accessed on 11/10/2018 [www.forestry.gov.uk/pdf/Managing-Chalara-Ash-Dieback-in-England_Feb2016.pdf/\\$FILE/Managing-Chalara-Ash-Dieback-in-England_Feb2016.pdf](http://www.forestry.gov.uk/pdf/Managing-Chalara-Ash-Dieback-in-England_Feb2016.pdf/$FILE/Managing-Chalara-Ash-Dieback-in-England_Feb2016.pdf)

¹⁴ This is based on DMRB Volume 11, Section 3, Part 1 (HA207/07): Air Quality

¹⁵ Billington, G. 2003. Radio tracking study of Greater Horseshoe bats at Buckfastleigh Caves Site of Special Scientific Interest: English Nature Research Report no. 573. Peterborough: English Nature.

¹⁶ Billington, G. 2001. Radio tracking study of Greater Horseshoe bats at Brockley Hall Stables Site of Special Scientific Interest, May – August 2001. English Nature Research Report No. 442. Peterborough: English Nature.

Table 2.1: Identifying Theoretical Potential Impact Pathways and Buffer Zones for GIS Screening

Site	Priority issues currently impacting or threatening the condition of the feature ⁹	Potential impact pathway?	Buffer Distance	Justification
on- Avon Bats SAC	themselves and the surveys which are needed to inform the planning applications (i.e. radiotracking).			
	<u>Change in land management</u>	No	N/A	The LTP is not likely to affect land management.
	<u>Direct impact on roost sites</u> due to vandalism or recreational pursuits	Yes	7km	7km buffer for public access/disturbance is based on the Thames Basin Heaths SPA Framework and relates to the distances people travel for recreation.
	<u>Offsite habitat availability/management</u> due to lack of knowledge of the usage of wider landscape by the SAC species i.e. location of feeding and 'swarming' sites. <u>Feature location, extent and condition unknown</u> due to lack of knowledge about the Bechstein's bat population within and adjacent the SAC.	Yes	8km	An 8km buffer has been used for these priority issues as greater horseshoe bats have shown to have a maximum home range of up to 8km from a roost. This buffer would also ensure any potential LSE to Bechstein's bats are also considered as they have a smaller home range (1km) ¹⁷ .
	<u>Public access/disturbance</u> due to difficulties with closing the roost sites to the public	Yes	7km	7km buffer for public access/disturbance is based on the Thames Basin Heaths SPA Framework and relates to the distances people travel for recreation.
	<u>Change in site conditions</u> due to potential collapse of mine sites	No	N/A	The LTP is not likely to affect mine sites.

¹⁷ Collins, J. (2016) Bat Surveys for Professional Ecologists: Good Practice Guidelines (3rd edition). Bat Conservation Trust. London.

Table 2.1: Identifying Theoretical Potential Impact Pathways and Buffer Zones for GIS Screening

Site	Priority issues currently impacting or threatening the condition of the feature ⁹	Potential impact pathway?	Buffer Distance	Justification
	<u>Inappropriate designation boundary</u> as several undesignated sites support important population of SAC species	Yes	8km	Greater horseshoe bats have shown to have a maximum home range of up to 8km from a roost. Important foraging sites for bats could therefore occur up to 8km from the SAC.
Chew Valley SPA	<u>Maintain favourable hydrology</u> - site is sensitive to changes in water levels. Both increases and reductions can impact upon shoveler, due to their need for soft mud in which to feed.	Yes	4km	Proposed schemes up to 4km of the SPA could potentially result in structural changes to the landscape which could adversely impact the features of this SPA.
	<u>Water quality</u> - site is sensitive to changes to water quality including eutrophication and particularly phosphate levels.	Yes	8km	Road construction and operation adjacent a watercourse linked to the Chew Valley Lake could result in contaminants within surface water run-off entering this SAC. An 8km buffer around this SAC is therefore proposed for water quality as it is considered unlikely that sites outside this zone would adversely impact this lake.
	<u>Public access/disturbance</u> as large numbers of people use the site for recreational activities including fishing, sailing and walking	Yes	7km	7km buffer for public access/disturbance is based on the Thames Basin Heaths SPA Framework and relates to the distances people travel for recreation.
Mells Valley SAC	<u>Public access/disturbance</u> – the site is regularly accessed by the public and disturbance of hibernaculum is a threat.	Yes	7km	Recreation - 7km buffer for public access/disturbance is based on the Thames Basin Heaths SPA Framework ¹² and relates to the distances people travel for recreation.
	<u>Wildfire/arson</u> -fire on site are a potential threat to hibernating bats <u>Direct impact from third party</u> due to problems with vandalism and disturbance	Yes	1km	Research has shown that urban effects including arson and damage/disturbance are more likely to occur where developments occur within 500m of a

Table 2.1: Identifying Theoretical Potential Impact Pathways and Buffer Zones for GIS Screening

Site	Priority issues currently impacting or threatening the condition of the feature ⁹	Potential impact pathway?	Buffer Distance	Justification
				European Site ^{18 19} although they do occasionally occur at greater distances. A 1km buffer zone is proposed at this stage in accordance with the 'precautionary principle' as new transport schemes could connect to existing routes that are connected to European Sites, thereby making them more accessible.
	<u>Undergrazing</u> – limestone grassland is currently ungrazed	No	N/A	LTP is not likely to affect grazing regime.
	<u>Inappropriate designation boundary</u> – key habitat could occur outside the SAC as the greater horseshoe bat maternity colony has relocated to an alternative building outside of the SAC	Yes	8km	Greater horseshoe bats have shown to have a maximum home range of up to 8km from a roost. Important foraging sites for bats could therefore occur up to 8km from the SAC.
	<u>Air pollution due to atmospheric nitrogen deposition</u> which currently exceeds critical loads	Yes	200m	The 200m buffer reflects the need to address issues for habitats which are considered to potentially be at risk from increased air pollution resulting from increased traffic movement. ¹⁴

¹⁸ Kirby, J. S. & Tantram, D.A.S. (1999) 'Monitoring heathland fires in Dorset: Phase 1' Report to Department of the Environment, Transport and the Regions: Wildlife and Countryside Directorate

¹⁹ Rylatt, F. Garside, L. Robin, S (2017) Human Impacts on Nature Reserves – The Influence of Nearby Settlements. In Practice Issue 97.

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Site	Priority issues currently impacting or threatening the condition of the feature ⁹	Potential impact pathway?	Buffer Distance	Justification
Mendip Limestone Grasslands SAC	<u>Inappropriate scrub control</u> within the grasslands and scrublands	No	N/A	The LTP is not likely to affect scrub control.
	<u>Change in land management</u> because of difficulties in managing vegetation due to terrain	No	N/A	The LTP is not likely to affect land management practices.
	<u>Disease</u> , particularly from ash dieback	Yes	7km	Ash dieback spores can be spread by wind and on leaves stuck to vehicles, clothes and footwear. The 7km buffer for recreational pressures has therefore been used. This is based on the Thames Basin Heaths SPA Framework ¹² and relates to the distances people typically travel for recreation.
	<u>Air pollution due to atmospheric nitrogen deposition</u> which currently exceeds critical loads	Yes	200m	The 200m buffer reflects the need to address issues for habitats which are considered to potentially be at risk from increased air pollution resulting from increased traffic movement ¹⁴ .
Mendip Woodlands SAC	<u>Illicit vehicles</u> – potential damage from off-road vehicles	Yes	7km	7km buffer for public access/disturbance including illicit vehicle use is based on the Thames Basin Heaths SPA Framework ¹² and relates to the distances people typically travel for recreation.
	<u>Deer</u> – adverse impact on feature through unsustainable grazing	No	N/A	The LTP is not likely to affect deer grazing
	<u>Disease</u> , particularly from ash dieback	Yes	7km	Ash dieback spores can be spread by wind and on leaves stuck to vehicles, clothes and footwear. The 7km buffer for recreational pressures has therefore been used. This is based on the Thames Basin Heaths SPA Framework ¹² and relates to the distances people typically travel for recreation.

Table 2.1: Identifying Theoretical Potential Impact Pathways and Buffer Zones for GIS Screening

Site	Priority issues currently impacting or threatening the condition of the feature ⁹	Potential impact pathway?	Buffer Distance	Justification
	<u>Air pollution due to atmospheric nitrogen deposition</u> which currently exceeds critical loads	Yes	200m	The 200m buffer reflects the need to address issues for habitats which are considered to potentially be at risk from increased air pollution resulting from increased traffic movement. ¹⁴
North Somerset and Mendip Bats SAC	<u>Undergrazing</u> of grassland	No	N/A	The LTP is not likely to affect grazing regimes.
	<u>Planning permission</u> – development on land between component SAC sites could result in the loss of foraging/commuting habitat and minor roost sites	Yes	8km	Greater horseshoe bats have shown to have a maximum home range of up to 8km from a roost. Important foraging/commuting sites for bats could therefore occur up to 8km from the SAC.
	<u>Change in site conditions</u> due to risk of collapse of mine entrance	No	N/A	The LTP is not likely to affect mine sites.
	<u>Woodland management</u> – excessive sycamore growth may be threatening species composition of woodland	No	N/A	The LTP is not likely to affect woodland management practices.
	<u>Disease</u> , particularly from ash dieback	Yes	7km	Ash dieback spores can be spread by wind and on leaves stuck to vehicles, clothes and footwear. The 7km buffer for recreational pressures has therefore been used. This is based on the Thames Basin Heaths SPA Framework ¹² and relates to the distances people typically travel for recreation.
	<u>Air pollution due to atmospheric nitrogen deposition</u> which currently exceeds critical loads	Yes	200m	The 200m buffer reflects the need to address issues for habitats which are considered to potentially be at risk from increased air pollution resulting from increased traffic movement ¹⁴ .
	The following priorities were based on the Usk Management Catchment	Yes	8km	Road construction and operation adjacent a watercourse linked to the River Usk could result in contaminants within surface water run-off entering this

Table 2.1: Identifying Theoretical Potential Impact Pathways and Buffer Zones for GIS Screening

Site	Priority issues currently impacting or threatening the condition of the feature ⁹	Potential impact pathway?	Buffer Distance	Justification
River Usk / Afon Wysg SAC	Summary ²⁰ : <u>Water Quality</u> -abstraction threats, changes in water level and water quality, including eutrophication due to diffuse pollution from agricultural land management and urban areas.			SAC. An 8km buffer around this SAC is proposed as it is considered unlikely that sites outside this zone would adversely impact this river. Water abstraction is not considered relevant to this LTP.
	<u>Invasive non-native species</u> , particularly Himalayan balsam, Japanese knotweed and giant hogweed	Yes	7km	Invasive species could be introduced to the River Usk through fly tipping of garden waste, and deliberate and accidental spread by visitors. A maximum buffer of 7km has therefore been implemented as this is considered to be the distance people typically travel for recreation. ¹²
	<u>Lack of education and advice</u>	No	N/A	The LTP is not likely to affect education provision relating to the site.
	<u>Decline in aquatic habitats and species</u> due to lack of management.	No	N/A	The LTP is not likely to affect site management practices.
River Wye / Afon Gwy SAC	<u>Water Quality</u> Abstraction threats, changes in water level and water quality, including eutrophication.	Yes	8km	Road construction and operation adjacent to a watercourse linked to the River Wye could result in contaminants within surface water run-off entering this SAC. An 8km buffer around this SAC is proposed as it is considered unlikely that proposed schemes outside this zone would adversely impact this river. As a precaution, large schemes outside of this zone would also be

²⁰ Usk Management Catchment Summary (Natural Resource Wales). Website accessed on 25/09/2018
https://cdn.naturalresources.wales/media/679394/2016_updated_usk_catchment_summary_nrw.pdf?mode=pad&rnd=131596369400000000

Table 2.1: Identifying Theoretical Potential Impact Pathways and Buffer Zones for GIS Screening

Site	Priority issues currently impacting or threatening the condition of the feature ⁹	Potential impact pathway?	Buffer Distance	Justification
				assessed for this issue.
	<u>Physical modification</u> – small scale development throughout the river is impacting on hydromorphology and character	No	N/A	The LTP major schemes are too far away to make have any physical modifications impacts.
	<u>Invasive species</u> , particularly Himalayan balsam, Japanese knotweed and giant hogweed	Yes	7km	Invasive species could be introduced to the River Wye through fly tipping of garden waste, and deliberate and accidental spread by visitors. A maximum buffer of 7km is therefore proposed as this is considered to be the distance people typically travel for recreation.
	<u>Woodland management</u>	No	N/A	The LTP is unlikely to have an effect on woodland management.
	<u>Fisheries</u> – fish stocking occurs at present and management of banks for fishing by river users (i.e. steps, mowing) is not always compatible with SAC features	Yes	7km	7km buffer is based on the Thames Basin Heaths SPA Framework ¹² and relates to the distances people (including river users) typically travel for recreation.
	<u>Public access/disturbance</u> , particularly from canoeists and anglers	Yes	7km	7km buffer for public access/disturbance is based on the Thames Basin Heaths SPA Framework ¹² and relates to the distances people typically travel for recreation.
	<u>Air pollution</u> due to atmospheric nitrogen deposition which currently exceeds critical loads	Yes	200m	The 200m buffer reflects the need to address issues for habitats which are considered to potentially be at risk from increased air pollution resulting from increased traffic movement. ¹⁴
	<u>Inappropriate scrub control</u>	No	N/A	The LTP is unlikely to have an effect on scrub control / site management.

Table 2.1: Identifying Theoretical Potential Impact Pathways and Buffer Zones for GIS Screening

Site	Priority issues currently impacting or threatening the condition of the feature ⁹	Potential impact pathway?	Buffer Distance	Justification
	<u>Undergrazing</u> of transitional mire and quaking bog feature	No	N/A	The LTP is unlikely to have an effect on grazing / site management.
	<u>Transportation corridors</u> , particularly relevant to Network Rail management activities within SAC.	Yes	200m	Management activities within existing transport corridors that occur within and adjacent a European Site have the potential to result in an LSE. A 200m buffer zone for this issue is considered sufficient to capture any LSE from new schemes. ¹⁴
Rodborough Common SAC	<u>Undergrazing of grassland and scrublands</u>	No	N/A	The LTP is unlikely to have an effect on grazing / site management. No impact pathway is identified.
	<u>Public access/disturbance</u> , particularly dog walkers	Yes	7km	7km buffer for public access/disturbance is based on the Thames Basin Heaths SPA Framework ¹² and relates to the distances people typically travel for recreation.
	<u>Air pollution due to atmospheric nitrogen deposition</u> which currently exceeds critical loads	Yes	200m	The 200m buffer reflects the need to address issues for habitats which are considered to potentially be at risk from increased air pollution resulting from increased traffic movement. ¹⁴
Salisbury Plain SAC and SPA	The below issues are relevant to the SAC and SPA: <u>Changes in species distribution</u>	Yes	15km	Stone curlews are sensitive to noise and lighting from

Table 2.1: Identifying Theoretical Potential Impact Pathways and Buffer Zones for GIS Screening

Site	Priority issues currently impacting or threatening the condition of the feature ⁹	Potential impact pathway?	Buffer Distance	Justification
				roads ²¹ . Traffic increase within the roads that occur through and adjacent the SAC/SPA could result in increased disturbance to stone curlew. In accordance with the Precautionary Principle, proposed schemes within 15km of this SPA/SAC will be screened for LSE.
	<u>Air pollution due to atmospheric nitrogen deposition</u> which currently exceeds critical loads	Yes	200m	The 200m buffer reflects the need to address issues for habitats which are considered to potentially be at risk from increased air pollution resulting from increased traffic movement. ¹⁴
Severn Estuary SAC, SPA and Ramsar	The below issues are relevant to the SAC and SPA <u>Public access/disturbance</u> particularly from dog walking, horse riding, biking, beach activities, angling and shooting	Yes	7km	7km buffer for public access/disturbance is based on the Thames Basin Heaths SPA Framework ¹² and relates to the distances people typically travel for recreation.
	<u>Physical modification of watercourse</u> by installation of barriers preventing completion of fish life cycle	Yes	7km	Road construction over a watercourse linked to the Severn Estuary could result in the installation of barriers to fish migration. A 7km buffer zone around the estuary is likely to include proposed schemes which could modify watercourses linked to the Severn Estuary. As a precaution, large schemes outside of this zone would also be assessed for this issue.

²¹ Green, R.E., Tyler, G.A. & Bowden, C.G.R. (2000) Habitat selection, ranging behaviour and diet of the stone-curlew (*Burhinus oedicnemus*) in southern England. Journal of Zoology, London, 250, 161–183.

Table 2.1: Identifying Theoretical Potential Impact Pathways and Buffer Zones for GIS Screening

Site	Priority issues currently impacting or threatening the condition of the feature ⁹	Potential impact pathway?	Buffer Distance	Justification
	<u>Impacts of development</u> - potential cumulative impact from development	Yes	N/A	This will be considered in the cumulative / in combination effects assessment.
	<u>Coastal squeeze</u> due to rising sea levels reducing available habitat	Yes	4km	Major schemes could potentially contribute to coastal squeeze by introducing new infrastructure near to the coast thereby limiting the potential to create suitable habitat in the long-term. A 4km buffer is proposed in accordance with the Precautionary Principle.
	<u>Change in land management</u> which affects species composition, habitat quality and availability	Yes	4km	The Severn Estuary qualifies as a SPA for several water bird species. These species could also feed within suitable habitats adjacent the estuary. Following the precautionary principle, a 4km buffer zone around the estuary is likely to include all sites which support water bird populations connected to the estuary.
	<u>Change in species distribution</u> resulting from climate change and manmade/natural modifications to habitat	Yes	4km	
	<u>Water pollution</u> from diffuse or direct pollution <u>Marine pollution incidents</u> – potential for significant adverse impact on its features	Yes	8km	Road construction and operation adjacent a watercourse linked to the Severn Estuary could result in contaminants within surface water run-off entering this European Site. An 8km buffer is proposed in accordance with the Precautionary Principle - it is considered unlikely that proposed transport routes outside this zone would have an LSE on the estuary.
	<u>Air pollution</u> due to atmospheric nitrogen deposition which currently exceeds critical loads	Yes	200m	The 200m buffer reflects the need to address issues for habitats which are considered to potentially be at risk from increased air pollution resulting from increased traffic movement. ¹⁴
	<u>Marine consents and permits</u> – the cumulative adverse impacts of aggregate extraction, maintenance	No	N/A	The LTP is unlikely to affect marine consents and permits, which are subject to project-level HRA.

Table 2.1: Identifying Theoretical Potential Impact Pathways and Buffer Zones for GIS Screening

Site	Priority issues currently impacting or threatening the condition of the feature ⁹	Potential impact pathway?	Buffer Distance	Justification
	dredging and disposal			
	Fisheries – potential adverse impacts from recreational and commercial fishing	Yes	7km	7km buffer for public access/disturbance is based on the Thames Basin Heaths SPA Framework ¹² and relates to the distances people typically travel for recreation.
	Invasive species, particularly from Australian barnacle, mitten crab and the Pacific oyster	No	N/A	The LTP is unlikely to affect the spread of invasive non-native species which are more likely to be affected by policies in the South West and Wales Marine plans and by marine and port activities.
	Marine litter originating from rivers	Yes	8km	Road construction and operation adjacent a watercourse linked to this European Site could result in an increase in litter entering the estuary. An 8km buffer around this SPA has been implemented in accordance with the Precautionary Principle.
Somerset Levels and Moors SPA and Ramsar	Water Quality Maintain favourable hydrology.	Yes	8km	Road construction and operation adjacent a watercourse linked to this European Site could result in contaminants within surface water run-off entering the SPA. An 8km buffer is proposed in accordance with the Precautionary Principle - it is considered unlikely that proposed transport routes outside this zone would have a LSE on the Somerset Levels.
	Water levels and abstraction.	No	N/A	The LTP is unlikely to affect water levels and abstraction.
	Maintain and upgrade water management structures	No	N/A	The LTP is unlikely to have an effect on water management.
	Change in land management due to landowners deciding to leave Higher Level Stewardship or due to land	No	N/A	The LTP is unlikely to have an effect on site management.

Table 2.1: Identifying Theoretical Potential Impact Pathways and Buffer Zones for GIS Screening

Site	Priority issues currently impacting or threatening the condition of the feature ⁹	Potential impact pathway?	Buffer Distance	Justification
	managers losing access to sites			
	<u>Peat extraction resulting in damage by direct peat removal</u>	No	N/A	The LTP is unlikely to have an effect on peat removal.
	<u>Public access/disturbance</u> particularly from dog walking	Yes	7km	7km buffer for public access/disturbance is based on the Thames Basin Heaths SPA Framework ¹² and relates to the distances people typically travel for recreation.
	<u>Offsite habitat availability/management</u> – currently limited understanding of how the SPA bird assemblages use the wider ecological network	Yes	8km	The SPA is designated for its over wintering bird assemblage which include golden plover – this species has a large winter home range (200ha) ²² and can frequently range further to feed. Following the precautionary principle, an 8km buffer zone around the SPA is likely to include all sites which support golden plover populations connected to the SPA.
Wye Valley & Forest of Dean Bat Sites SAC	<u>Physical modification of roost sites</u> due to repair, deterioration and renovation	Yes	200m	The LTP is unlikely to have a physical effect on roost sites. A 200m buffer zone around the SAC is considered sufficient to flag up any LSE from proposed transport schemes that potentially occur within or adjacent the SAC. ¹⁴
	<u>Public access/disturbance</u> to roost sites due to damage to grilles or unauthorized access by cavers	Yes	7km	7km buffer for public access/disturbance is based on the Thames Basin Heaths SPA Framework ¹² and relates to the distances people typically travel for recreation.
	<u>Habitat connectivity - between</u>	Yes	8km	Greater horseshoe bats have shown to have a

²² Kirby. J. *et al* (2000) Key habitat attributes for birds and bird assemblages in England. English Nature Research report No. 359.

Table 2.1: Identifying Theoretical Potential Impact Pathways and Buffer Zones for GIS Screening

Site	Priority issues currently impacting or threatening the condition of the feature ⁹	Potential impact pathway?	Buffer Distance	Justification
	roosts and feeding areas could be adversely impacted by changes to land management			maximum home range of up to 8km from a roost ¹⁵¹⁶ . Important foraging sites for bats could therefore occur up to 8km from the SAC.
Wye Valley Woodlands SAC	<u>Deer grazing</u> impacting woodland	No	N/A	The LTP is unlikely to have an effect on deer grazing.
	<u>Forestry/woodland management</u> required to sustain SAC features	No	N/A	The LTP is unlikely to have an effect on site management.
	<u>Invasive species</u> including Himalayan balsam, periwinkle. Japanese knotweed and cherry laurel	Yes	7km	Invasive species could be introduced to the Wye Valley through fly tipping of garden waste, and deliberate and accidental spread by visitors. A maximum buffer of 7km is therefore proposed as this is considered to be the distance people typically travel for recreation.
	<u>Habitat connectivity</u> to maintain migration of species	Yes	4.1km	Lesser horseshoe bats have shown to have a maximum home range of up to 4.1km from a roost in lowland sites ²³ . Important foraging sites for this species could therefore occur up to 4.1km from the SAC.
	<u>Species decline</u> due to inappropriate land management	No	N/A	The LTP is unlikely to have an effect on site management.
	<u>Air pollution</u> due to atmospheric nitrogen deposition which currently exceeds critical loads	Yes	200m	The 200m buffer reflects the need to address issues for habitats which are considered to potentially be at risk from increased air pollution resulting from increased traffic movement. ¹⁴
	<u>Disease</u> , particularly ash dieback and sudden oak death	Yes	7km	Ash dieback spores can be spread by wind and on leaves stuck to vehicles, clothes and footwear. The 7km buffer for recreational pressures has therefore

²³ Knight, T. 2006. The use of landscape features and habitats by the Lesser Horseshoe bat (*Rhinolophus hipposideros*). PhD thesis. University of Bristol.

Table 2.1: Identifying Theoretical Potential Impact Pathways and Buffer Zones for GIS Screening

Site	Priority issues currently impacting or threatening the condition of the feature ⁹	Potential impact pathway?	Buffer Distance	Justification
				been used. This is based on the Thames Basin Heaths SPA Framework ¹² and relates to the distances people typically travel for recreation.
	Public access/disturbance resulting in erosion and damage to ground flora and potential access to roost site	Yes	7km	7km buffer for public access/disturbance is based on the Thames Basin Heaths SPA Framework ¹² and relates to the distances people typically travel for recreation.

In summary, the buffers used for screening are:

- **8km buffer** to identify potential risk of loss of bat foraging and commuting habitat around the SACs that are designated for greater horseshoe bats;
- **8km buffer** to identify potential risk of water pollution/litter applicable to all European sites where water quality is a priority issue currently affecting or threatening the condition of a feature of the site;
- **8km buffer** to identify potential risk of habitat loss around the SPA designated for bird assemblages including golden plover.
- **7km buffer** to identify potential risk of increased recreational pressures applicable to all European sites where recreational is a priority issue currently affecting or threatening the condition of a feature of the site;
- **7km buffer** to identify potential risk of invasive species applicable to all European sites where invasive species is priority issue currently affecting or threatening the condition of a feature of the site;
- **4km buffer** to identify potential risk of loss of bat foraging and commuting habitat around SACs designated for lesser horseshoe bats;
- **4km buffer** to identify potential risk of hydrological effects applicable to all European sites where water levels are a priority issue currently affecting or threatening the condition of a feature of the site;
- **4km buffer** to identify potential risk of habitat loss around the European Sites designated for water bird assemblages (not including golden plover);
- **1km buffer** to identify potential risk of urban effects i.e. fire/arson or fly tipping applicable to all European sites where urban effects are priority issues currently affecting or threatening the condition of a feature of the site; and
- **200m buffer** to identify potential risk of localised (rather than dispersed) effects on air quality applicable to all European sites where air quality is a priority issue currently affecting or threatening the condition of a feature of the site.

This is a similar approach to that used in the HRA of the WoE Joint Spatial Plan (November 2017) but with some variation to the buffer distances. The distances suggested have been justified within Table 2.1 and the precautionary approach has been followed.

A GIS exercise was undertaken to identify all major schemes which fall within each buffer. The exercise examined each buffer in turn rather than layering buffer zones, in order to examine potential effects separately in the first instance, such as potential LSEs relating to air quality or potential LSEs relating to disturbance. Using buffer zones has helped to identify sites that could be at risk of impact from the JLTP4 schemes, and to filter out those sites not considered at risk of LSEs.

Figures showing the location of most major schemes in relation to each of the different buffer zones are presented in Section 4 of this report. Please note that not all of the major schemes are plotted on the maps because for some schemes locations or routes are not yet available. Where major schemes have not been available on GIS, location information within the JLTP4,



consultation with WoE officers and reference to supporting studies such as the Joint Transport Study²⁴ have been used to screen them.

Screening tables were prepared in Excel (presented as a technical appendix - Appendix 3). The screening tables present information on whether or not schemes fall within the identified buffer zones and a screening decision which is based on expert judgement and informed by the buffer zone analysis. The screening decisions are one of the following:

- The scheme is not likely to have a significant effect on a European site - no LSE identified;
- The scheme is likely to have a significant effect on a European site either alone or in-combination with other plans and projects - LSE identified; or
- It is not possible to rule out the risk of significant effects on a European site, either alone or in-combination with other plans and projects – LSE identified.

The potential for the JLTP4 to result in in combination effects has been discussed in Section 4.

²⁴ West of England Joint Transport Study Final Report (October 2017)

3 The West of England Joint Local Transport Plan 4

3.1 Introduction

This section describes the content of the draft WoE JLTP4.

3.2 Contents of the Plan

The draft WoE JLTP4 contains a vision and five objectives, each of which is supported by a set of outcomes, as presented within Box 3.1. The JLTP4 also presents policies and accompanying interventions (in Sections 6 to 9 of the JLTP4) and a list of major schemes which will deliver the plan objectives and policies (in Section 11 and Appendix 3 of the JLTP4).

Box 3.1: WoE JLTP4 Draft Vision, Objectives and Outcomes

Vision

The long-term aspiration for transport in the West of England is encompassed in the vision for JLTP4:

'Connecting people and places for a vibrant and inclusive West of England'

Objectives

Five objectives have been identified, based on the aspirations of the West of England authorities and previous plans and policies prepared. There is no priority allocated to the objectives as they all have a role to play in achieving the vision for the West of England. The objectives, as follows, are in no particular order:

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

Outcomes

For each of the objectives, several outcomes have been agreed. These outcomes set out what is being sought to be achieved by delivering the plan. The policies included in the plan will support the delivery of the objectives and outcomes.

Support sustainable economic growth

- Improved efficiency and reliability on local, national and international transport networks
- Delivery of new houses and jobs, identified through the JSP, is supported
- Access opportunities to employment growth areas is provided for all
- Transport assets are maintained and managed, and demonstrate value for money

- The high-quality transport network generates inward investment
- Congestion and demand on the network is better managed through technological advances

Enable equality and improve accessibility

- Connectivity is increased and transformed, enabling seamless "door-to-door" movements of people and goods
- Access to services for residents in rural or remote areas is improved
- Better information to aid travel decisions is provided
- Low carbon transport and opportunities for reducing the need to travel are maximised
- New public transport systems, smarter ticketing and faster payment options are enabled

Address poor air quality and take action against climate change

- NOx, particulates and carbon emissions are reduced
- Air quality in the AQMAs is improved
- Air quality remains better than national standards outside the AQMAs
- The transport network is resilient and adaptable
- Technological advances to improve air quality and monitoring are embraced

Contribute to better health, wellbeing, safety and security

- There is a step change in the number of healthy, low carbon walking and cycling trips
- There is a continued reduction in the number of road casualties on the transport network
- Road safety for transport users is improved, particularly for those most at risk
- Personal safety on the transport network is improved, and there is less crime and fear of crime

Create better places

- Journey experience is enhanced through an integrated and connected transport network
- The impact of the transport network on the built, natural and historic environment is minimised
- Streetscape, public spaces and urban environments are enhanced
- The transport network supports neighbourhood renewal and the regeneration of deprived areas

The major schemes in Section 11 of the JLTP4 will deliver vision, objectives, outcomes and policies of the JLTP4. Major schemes are defined as those which are estimated to cost £10M or more. Schemes estimated to cost less than £10M will be delivered by the Local Authorities via their Local Plans and are not part of the JLTP4.

The JLTP4 contains five Transformational Major Schemes, which would consist of mass transit routes, as follows:

- T1 Bristol City Centre to Airport;
- T2 Bristol City Centre to Bath;
- T3 Bristol City Centre to East Fringe;
- T4 Bristol City Centre to North Fringe; and



- T5 Bath City Centre and corridors.

These are all currently in the feasibility stage.

The JLTP4 also contains eight 'Corridor Scheme Packages' to mitigate the growth set out within the WoE Joint Spatial Plan (JSP), which were identified within the WoE Joint Transport Strategy²⁴.

In addition, there are six early investment schemes in progress (committed projects) and 20 early investment schemes under development. A further six longer term scheme opportunities are also listed in the JLTP4. Details of all of the schemes are included in Appendix 2 of this report.

4 Screening Findings

Screening of the major schemes has identified LSEs set out in Table 4.1. The Major schemes are described in Appendix 2. Detailed screening findings are presented within the technical appendix – Appendix 3.

LSEs have been identified in relation to the following sites:

- Avon Gorge Woodlands SAC;
- Bath and Bradford-on- Avon Bats SAC;
- Chew Valley Lake SPA;
- Mendip Limestone Grasslands SAC;
- Mendip Woodlands SAC;
- North Somerset and Mendip Bats SAC;
- Severn Estuary SAC, SPA and Ramsar; and
- River Wye / Afon Gwy SAC.

Some uncertainty has also been identified in relation to some schemes for which locational screening has not been possible at this stage (due to routes not being identified etc.).

Table 4.1 Likely Significant Effects Identified in Screening		
Scheme Name	European sites which could be affected by the scheme	Potential Effects
Mass Transit Schemes		
Bristol City Centre to Bath (T2)	Bath and Bradford-on- Avon Bats SAC Avon Gorge Woodlands SAC	<ul style="list-style-type: none"> Proposed route (particularly the proposed light rail route option) could potentially result in either the loss of foraging areas or severance of flyways used by the greater horseshoe bats roosting in the Bath and Bradford-on-Avon Bats SAC. The proposed route could also increase the number of passengers between Bath and Bristol potentially resulting in increased recreational pressures and spread of diseases to the SACs.
Bristol City Centre to East Fringe (T3)	Avon Gorge Woodlands SAC	<ul style="list-style-type: none"> The proposed route could increase the number of passengers between the East Fringe and Bristol, potentially increasing recreational pressures and spread of diseases to the SAC.
Bristol City Centre to North Fringe (T4)	Severn Estuary SAC, SPA and Ramsar Avon Gorge Woodlands SAC	<ul style="list-style-type: none"> The proposed route could increase the number of passengers between north Bristol and central Bristol, potentially increasing recreational pressures and spread of diseases to the European Sites. The proposed route could also result in increased water pollution and marine litter to the Severn Estuary.
Bath city centre and corridors (T5)	Bath and Bradford-on- Avon Bats SAC	<ul style="list-style-type: none"> The proposed route could result in either the loss of foraging areas or severance of flyways used by the bats roosting in the Bath and Bradford-on-Avon Bats SAC. The proposed route could also increase the number of passengers into Bath and the environs thereby resulting in increased recreational pressures to the SAC.

Table 4.1 Likely Significant Effects Identified in Screening		
Scheme Name	European sites which could be affected by the scheme	Potential Effects
Nailsea and Backwell (G4)		
Local improvements to road network in Nailsea area	Severn Estuary SAC, SPA and Ramsar North Somerset and Mendip Bats SAC Avon Gorge Woodlands SAC	<ul style="list-style-type: none"> • New roads could result in the loss of feeding habitats used by bats roosting within the North Somerset and Mendip Bats SAC or birds connected with the Severn Estuary. • The new roads could also increase number of visitors, water pollution and marine litter which could affect European Sites.
Festival Way Cycle Route	Severn Estuary SAC, SPA and Ramsar North Somerset and Mendip Bats SAC	<ul style="list-style-type: none"> • Potential to increase the number of visitors to the Severn Estuary. • Potential to increase visitors and spread of diseases to the North Somerset and Mendip Bats SAC.
Nailsea to Clevedon Cycle Route	Severn Estuary SAC, SPA and Ramsar	<ul style="list-style-type: none"> • Potential to increase the number of visitors to the Severn Estuary.
Nailsea - Backwell A370 link	Avon Gorge Woodlands SAC Severn Estuary SAC, SPA and Ramsar	<ul style="list-style-type: none"> • Potential to increase the number of visitors to the Severn Estuary and Avon Gorge SAC. • Potential to increase the spread of diseases to the Avon Gorge SAC.
M5 J19 & J20 improved multi-modal connections	Severn Estuary SAC, SPA and Ramsar North Somerset and Mendip Bats SAC	<ul style="list-style-type: none"> • Potential habitat loss within sites used by birds associated with the Severn Estuary and bats associated with the North Somerset and Mendip Bats SAC. • Potential to increase recreational pressures and spread of disease. • It is uncertain whether the new junction/multi-modal corridor would result in physical modification of watercourses associated with the Severn Estuary or an increase in water pollution and marine litter. LSEs from these issues/threats are therefore predicted due to uncertainty. The proposed scheme is unlikely to result in marine pollution incidents or coastal squeeze effects.

Table 4.1 Likely Significant Effects Identified in Screening		
Scheme Name	European sites which could be affected by the scheme	Potential Effects
Banwell and Churchill (G5)		
Sustainable travel package: Churchill Cycle Route	North Somerset and Mendip Bats SAC Severn Estuary SAC, SPA and Ramsar Mendip Woodlands SAC Mendip Limestone Grasslands SAC	<ul style="list-style-type: none"> • Potential to increase the number of visitors to the European Sites as well as spread diseases and invasive species.
Sustainable travel package: Strawberry Line Cycle Route	Severn Estuary SAC, SPA and Ramsar Mendip Woodlands SAC Mendip Limestone Grasslands SAC North Somerset and Mendip Bats SAC	<ul style="list-style-type: none"> • Potential to increase the number of visitors to the SACs and SPAs as well as spread diseases and invasive species.
A371 / A368 Banwell Bypass	Severn Estuary SAC, SPA and Ramsar Mendip Woodlands SAC Mendip Limestone Grasslands SAC North Somerset and Mendip Bats SAC	<ul style="list-style-type: none"> • Potential to result in habitat loss within sites used by birds associated with the Severn Estuary and bats associated with the North Somerset and Mendip Bats SAC. • Potential increase in recreational pressures and spread of disease. • It is uncertain whether the bypass would result in physical modification of watercourses associated with the Severn Estuary or an increase in water pollution and marine litter- LSE from these issues/threats are therefore predicted due to uncertainty. The proposed scheme is unlikely to result in marine pollution incidents or coastal squeeze effects.
A368 Churchill and Sandford Bypass	Mendip Woodlands SAC Severn Estuary SAC, SPA and Ramsar Mendip Limestone Grasslands SAC North Somerset and Mendip Bats SAC	<ul style="list-style-type: none"> • Potential result in habitat loss within sites used by birds associated with the Severn Estuary and bats associated with the North Somerset and Mendip Bats SAC. • Potential increase in recreational pressures and spread of disease. • It is uncertain whether the bypass would result in physical modification of watercourses associated with the Severn Estuary or an increase in water pollution and marine litter- LSE from these issues/threats are therefore predicted due to uncertainty. The proposed scheme is unlikely to result in marine pollution incidents or coastal squeeze effects.

Table 4.1 Likely Significant Effects Identified in Screening		
Scheme Name	European sites which could be affected by the scheme	Potential Effects
Bristol Urban Area (G7)		
Bristol walking and cycling package:	Uncertain	<ul style="list-style-type: none"> Exact routes are yet to be defined and therefore it is not possible to screen locations. LSE due to uncertainty.
A4 Portway Park & Ride expansion	Severn Estuary SAC, SPA and Ramsar	<ul style="list-style-type: none"> Potential LSE if the proposed scheme results in loss of habitats used by bird assemblages connected to the Severn Estuary. Potential water pollution during construction due to proximity to the estuary.
Weston-super-Mare (G8)		
Local highway junction improvements	Severn Estuary SAC, SPA and Ramsar Mendip Limestone Grasslands SAC North Somerset Bats SAC	<ul style="list-style-type: none"> Potential LSE in relation to airfield bridge from the Weston villages development sites onto the A370 in Weston. The bridge is proposed on grassland approximately 2km from the Severn Estuary. A LSE is therefore predicted at this stage due to uncertainty. Various potential effects.
Local walking & cycling infrastructure improvements: WSM Cycle Route	North Somerset and Mendip Bats SAC Severn Estuary SAC, SPA and Ramsar	<ul style="list-style-type: none"> Potential to increase the number of visitors to the European Sites as they are connected to one another and part of the route runs near to the Severn Estuary and North Somerset and Mendip Bats SAC. Potential spread of diseases into the North Somerset and Mendip Bats SAC.
Local walking & cycling infrastructure improvements: WSM to Clevedon Cycle Route	North Somerset and Mendip Bats SAC Severn Estuary SAC, SPA and Ramsar	<ul style="list-style-type: none"> Potential to increase the number of visitors. Potential to result in the spread of diseases.
Local walking & cycling infrastructure improvements: Sandbay Cycle Route	Severn Estuary SAC, SPA and Ramsar North Somerset and Mendip Bats SAC	<ul style="list-style-type: none"> Potential to increase the number of visitors to the European Sites as they are all connected to one another. Potential to result in the spread of diseases into the North Somerset and Mendip Bats SAC.

Table 4.1 Likely Significant Effects Identified in Screening		
Scheme Name	European sites which could be affected by the scheme	Potential Effects
		<ul style="list-style-type: none"> Part of the cycle route appears to be proposed immediately adjacent the Severn Estuary and it is uncertain whether this would result in loss of habitats connected to the Estuary or coastal squeeze effects.
Local walking & cycling infrastructure improvements: Churchill Cycle Route	North Somerset and Mendip Bats SAC Severn Estuary SAC, SPA and Ramsar Mendip Woodlands SAC Mendip Limestone Grasslands SAC	<ul style="list-style-type: none"> Potential to increase the number of visitors to the European Sites as they are all connected to one another. Potential spread of diseases into the North Somerset and Mendip Bats SAC.
Early Investment Schemes in Progress (Committed Schemes)		
M49 Avonmouth Junction Upgrade (C1)	River Wye / Afon Gwy SAC Severn Estuary SAC, SPA and Ramsar	<ul style="list-style-type: none"> Potential result in habitat loss within sites used by birds associated with the Severn Estuary. Potential increase in recreational pressures. It is uncertain whether the new junction would result in physical modification of watercourses associated or an increase in water pollution and marine litter. LSEs from these issues/threats are therefore predicted due to uncertainty. The proposed scheme is unlikely to result in marine pollution incidents or coastal squeeze effects. <p>Note: Scheme is committed therefore further investigation of project level HRA (if one exists) will be necessary and consideration of in combination effects with other non-committed schemes.</p>
MetroWest Phase 1 (C3)	Severn Estuary SAC, SPA and Ramsar	<ul style="list-style-type: none"> Potential of an increase in recreation to the European Sites as it would result in an increase in passengers. <p>Note: Scheme is committed therefore further investigation of project level HRA (if one exists) will be necessary and consideration of in combination effects with other non-committed schemes.</p>

Table 4.1 Likely Significant Effects Identified in Screening		
Scheme Name	European sites which could be affected by the scheme	Potential Effects
Bristol South West Economic Link (BSWEL) (E1)		
Package 2: A38 online improvements between A368 to Bristol Airport	North Somerset & Mendip Bats SAC	<ul style="list-style-type: none"> • Potential loss of feeding habitat for bats.
Package 4: A38	Mendip Woodlands SAC North Somerset & Mendip Bats SAC Avon Gorge Woodlands SAC Chew Valley Lake SPA	<ul style="list-style-type: none"> • Potential habitat loss within sites used by bats. • Potential increase in recreational pressures and spread of disease. • It is uncertain whether the road improvements would result in an increase in water pollution. A LSE from this issue is therefore predicted due to uncertainty.
Package 6: Rail options: Bristol Airport Rail Link Phase One	Uncertain	<ul style="list-style-type: none"> • This is subject of the mass transit feasibility study that is to be completed in December 2018. Location therefore cannot be screened. LSE due to uncertainty.
Package 7: Rail options: Bristol Airport Rail Link Phase Two	Uncertain	<ul style="list-style-type: none"> • This is a long term aspiration and may not be delivered within the JLTP4 plan period. Options for rail or tram-train between WSM and Bristol airport and then onwards to Bristol city centre are included within the BSWEL report. Potential routes for link are yet to be defined. LSE due to uncertainty.
Package 8: A370-A38 Link	Uncertain	<ul style="list-style-type: none"> • This is a long term aspiration and may not be delivered within the JLTP4 plan period. No route options are being considered yet. Currently low risk but LSE identified due to uncertainty.
Early investment schemes under development		
East of Bath Link (E2)	Bath and Bradford-on- Avon Bats SAC	<ul style="list-style-type: none"> • Potential LSE if the proposed road results in loss of feeding habitats from bats connected with the SAC.
M5 Junction 19 (E3)	Severn Estuary SAC, SPA and Ramsar North Somerset and Mendip Bats SAC	<ul style="list-style-type: none"> • Potential LSE if the proposed road results in loss of feeding habitats for bats or birds.

Table 4.1 Likely Significant Effects Identified in Screening		
Scheme Name	European sites which could be affected by the scheme	Potential Effects
		<ul style="list-style-type: none"> • Potential increase in number of visitors, water pollution and marine litter.
Passenger Rail Service and Capacity Improvements, Station Upgrades and New Stations Package (E4)	Severn Estuary SAC, SPA and Ramsar North Somerset and Mendip Bats	<ul style="list-style-type: none"> • Potential habitat loss associated with widening the tracks, potentially resulting in the loss of feeding habitats for birds and flight corridors for the bat associated with the European Sites.
(E4): Ashton Gate Station	Avon Gorge Woodlands SAC Severn Estuary SAC, SPA and Ramsar	<ul style="list-style-type: none"> • Potential LSE from increased water pollution during construction. • Potential increase in recreational pressures or spread of disease to this site.
(E4): Pill Station	Severn Estuary SAC, SPA and Ramsar	<ul style="list-style-type: none"> • Potential LSE if the proposed station results in loss of feeding habitats for birds. • Potential increase in number of visitors, water pollution and marine litter.
Early investment schemes under development		
M5 J21A (E5)	Mendip Limestone Grasslands SAC North Somerset and Mendip Bats SAC Severn Estuary SAC, SPA and Ramsar	<ul style="list-style-type: none"> • Potential habitat loss within sites used by birds and bats. • Potential increase in recreational pressures and spread of disease. • Uncertain whether the new junction/multi-modal corridor would result in physical modification of watercourses associated with the Severn Estuary or an increase in water pollution and marine litter. LSEs from these issues/threats are therefore predicted due to uncertainty. The proposed scheme is unlikely to result in marine pollution incidents or coastal squeeze effects.

Table 4.1 Likely Significant Effects Identified in Screening		
Scheme Name	European sites which could be affected by the scheme	Potential Effects
Freezing Hill junction upgrade and whole route improvements (includes Landsdown P&R) (E7)	Bath and Bradford-on- Avon Bats SAC	<ul style="list-style-type: none"> • Potential LSE if the proposed junction upgrade results in loss of feeding habitats for bats. • Potential increase in number of visitors to the SAC.
Interurban cycle routes (E8)	Uncertain	<ul style="list-style-type: none"> • These routes will be defined through the WoE Local Cycling and Walking Infrastructure Plan. Some routes have already been identified and have been screened individually. The location of other cycle routes have not yet been determined. Many of these will be delivered along the MetroBus corridors (screened elsewhere in this table). LSE due to uncertainty.
MetroBus - Bristol City Centre to Clevedon and Nailsea (E11)	North Somerset and Mendip Bats SAC Severn Estuary SAC, SPA and Ramsar Avon Gorge Woodlands SAC	<ul style="list-style-type: none"> • Potential increased passenger numbers thereby result in an increase in visitors and spread of disease to the SACs and SPA.
Park & Ride package for Bath (includes at Odd Down, Lansdown and Newbridge) (E13)	Bath and Bradford-on- Avon Bats SAC	<ul style="list-style-type: none"> • Potential LSE if the proposed road results in loss of feeding habitats from bats connected with the SAC.
MetroBus - Bristol City Centre to Severnside (E15)	Avon Gorge Woodlands SAC Severn Estuary SAC, SPA and Ramsar	<ul style="list-style-type: none"> • Potential increase in the number of visitors to these sites.
Bath Cycle Network and City Centre Package (E16): Bath cycle routes	Bath and Bradford-on- Avon Bats SAC	<ul style="list-style-type: none"> • Potential increase in recreational pressures on the SAC.

Table 4.1 Likely Significant Effects Identified in Screening		
Scheme Name	European sites which could be affected by the scheme	Potential Effects
Weston-super-Mare Cycling and Walking Network (E20)	Severn Estuary SAC, SPA and Ramsar North Somerset and Mendip Bats SAC Mendip Woodlands SAC Mendip Limestone Grasslands SAC	<ul style="list-style-type: none"> • Potential to increase the number of visitors. • Potential spread of diseases. • Potential loss of habitats connected to the Estuary or coastal squeeze effects.
Other longer-term opportunities		
Strategic Rail and Road Freight Package (L1)	Uncertain	<ul style="list-style-type: none"> • This scheme recognises a demand problem and freight issues within the network. No work has started to identify what improvements would be needed. This scheme is unlikely to come forward within the plan period. LSE due to uncertainty.
A46 to M4 route improvements, Cold Ashton (L2)	North Somerset and Mendip Bats SAC	<ul style="list-style-type: none"> • Potential LSE if proposed schemes result in habitat loss.

4.1 Potential In Combination Effects

A number of schemes could affect some European sites in the same way (i.e. increasing recreation pressure or potential loss of supporting sites) and effects could potentially combine to create an in combination effect.

The potential effects of the major schemes could also combine with the effects of other plans and projects being delivered within the WoE area and beyond. Such plans include the WoE Joint Spatial Plan (JSP), the Local Plans of the individual WoE authorities, the South West and Wales marine plans, and minerals and waste plans. Other related projects which will need to be considered include Hinkley Point C power station currently under construction within Sedgemoor District.

The JSP (Publication version November 2017) is a statutory Development Plan Document (DPD) that will provide the strategic overarching development framework for the WoE to 2036. The JSP focusses on addressing the following critical issues:

- Identifying the number of new market and affordable homes and amount of employment land that is needed across the WoE between 2016–2036.
- Identifying the most appropriate spatial strategy and strategic locations for this growth.
- Outlining the strategic transport and other infrastructure that needs to be provided in the right place and at the right time to support sustainable growth and to provide certainty for communities and those that want to invest in the area.

The Spatial Strategy within the JSP identifies an overall supply of 105,500 new homes and it supports the delivery of 82,500 jobs. In tandem with the JSP is the WoE Joint Transport Study (JTS)²⁴ which has identified potential future strategic transport proposals for delivery up to 2036 that address current challenges on the network and to inform future development proposals in the JSP. Schemes within the JTS have been included within the WoE JLTP4.

The JLTP4 delivers transport mitigation required to deliver the JSP. As such, the two plans are related, and it will be important to understand the potential effects of both. For instance, the non-transport related effects of the JSP could potentially combine with the effects of the JLTP4. This also presents an opportunity for any mitigation required for both plans to be co-ordinated.

The JLTP4 includes consideration of a large number of transport projects in the form of the major schemes, some of which are already committed and some of which are long term aspirations which may not be delivered within the JLLTP4 plan period. In combination effects assessment will therefore also need to consider the timing of the major schemes as well as the likelihood that they will be delivered within the JLTP4 plan period.



The potential for in combination effects will be considered in detail within the AA stage of the HRA. An AA is currently being undertaken of the JSP and this will be referred to in the in combination effects assessment for JLTP4.

5 Conclusions

HRA screening has identified LSEs in relation to the following sites:

- Avon Gorge Woodlands SAC;
- Bath and Bradford-on-Avon Bats SAC;
- Chew Valley Lake SPA;
- Mendip Limestone Grasslands SAC;
- Mendip Woodlands SAC;
- North Somerset and Mendip Bats SAC;
- Severn Estuary SAC, SPA and Ramsar; and
- River Wye / Afon Gwy SAC.

The potential LSEs identified in screening relate to:

- Loss of foraging areas or severance of flyways used by bats;
- Increase in recreational pressures;
- Spread of diseases;
- Spread of invasive species;
- Water pollution;
- Marine litter;
- Loss of habitats for birds;
- Physical modification of watercourses; and
- Coastal squeeze effects.

Some uncertainty has also been identified in relation to some schemes for which locational screening has not been possible at this stage (due to routes not being identified etc.).

As LSEs and uncertainty have been identified in the screening stage, the HRA must now progress to the second stage (AA) in which the potential effects and uncertainty identified will be considered in more detail, including any mitigation already proposed and identifying additional mitigation if necessary.

The AA will involve the assessment of whether a European site's integrity could be affected by the JLTP4 schemes and will include an in combination effects assessment. The assessment will include consideration of evidence and research in relation to the LSEs identified in screening.

Appendix 1 – Information about European sites

Site	Qualifying features	Conservation objectives	Priority issues currently impacting or threatening the condition of the feature ²⁵
<p>Avon Gorge Woodlands SAC</p>	<p>Annex 1 Habitats that are a primary reason for selection:</p> <ul style="list-style-type: none"> H9180. Tilio-Acerion forests of slopes, screes and ravines; Mixed woodland on base-rich soils associated with rocky slopes* <p>Annex 1 Habitats present as a qualifying feature, but not a primary reason for selection of this site:</p> <ul style="list-style-type: none"> H6210. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (FestucoBrometalia); Dry 	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;</p> <ul style="list-style-type: none"> The extent and distribution of qualifying natural habitats The structure and function (including typical species) of qualifying natural habitats, and The supporting processes on which qualifying natural habitats rely 	<p><u>Invasive species</u> particularly from <i>Cotoneaster spp</i>, Holm oak and other non-native plant species</p> <p><u>Undergrazing</u> resulting in loss of habitat</p> <p><u>Public access/disturbance</u>, particularly from mountain biking and vandalism</p> <p><u>Disease</u> including ash dieback</p> <p><u>Change in species distribution</u> due to scrub encroachment and climate change</p> <p><u>Air pollution</u> – impact of atmospheric nitrogen on grassland, scrub and woodland</p>

²⁵ Based on Natural England site improvement publications accessed from website on 25/09/2018. <http://publications.naturalengland.org.uk/category/5755515191689216>

Site	Qualifying features	Conservation objectives	Priority issues currently impacting or threatening the condition of the feature ²⁵
	grasslands and scrublands on chalk or limestone		
Bath and Bradford-on-Avon Bats SAC	<p>Annex II species that are a primary reason for selection of the site:</p> <ul style="list-style-type: none"> • S1304. Rhinolophus ferrumequinum; Greater horseshoe bat • S1323. Myotis bechsteinii; Bechstein's bat <p>Annex II species present as a qualifying feature, but not a primary reason for selection of the site:</p> <p>S1303. Rhinolophus hipposideros; Lesser horseshoe bat</p>	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;</p> <ul style="list-style-type: none"> • The extent and distribution of the habitats of qualifying species • The structure and function of the habitats of qualifying species • The supporting processes on which the habitats of qualifying species rely • The populations of qualifying species, and, • The distribution of qualifying species within the site. 	<p><u>Planning permission</u> – potential cumulative adverse impacts from development across a wide area</p> <p><u>Change in land management</u></p> <p><u>Direct impact on roost sites</u> due to vandalism or recreational pursuits</p> <p><u>Feature location, extent and condition unknown</u> due to lack of knowledge about the Bechstein's bat population within and adjacent the SAC.</p> <p><u>Offsite habitat availability/management</u> due to lack of knowledge of the usage of wider landscape by the SAC species i.e. location of feeding and 'swarming' sites.</p> <p><u>Public access/disturbance</u> due to difficulties with closing the roost sites to the public</p> <p><u>Change in site conditions</u> due to potential collapse of mine sites</p>

Site	Qualifying features	Conservation objectives	Priority issues currently impacting or threatening the condition of the feature ²⁵
			<u>Inappropriate designation boundary</u> as several undesignated sites support important population of SAC species
Chew Valley SPA	<p>Internationally important bird assemblage. This site qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:</p> <p>Over winter:</p> <p>A056. Anas clypeata; Northern shoveler (Non- breeding)</p>	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;</p> <ul style="list-style-type: none"> • The extent and distribution of the habitats of the qualifying features • The structure and function of the habitats of the qualifying features • The supporting processes on which the habitats of the qualifying features rely • The population of each of the qualifying features, and, • The distribution of the qualifying features within the site. 	<p><u>Maintain favourable hydrology</u> - site is sensitive to changes in water levels. Both increases and reductions can impact upon shoveler, due to their need for soft mud in which to feed. Also to fluctuations in water quality including eutrophication and particularly phosphate levels.</p> <p><u>Public access/disturbance</u> as large numbers of people use the site for recreational activities including fishing, sailing and walking</p>
Mells Valley SAC	<p>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:</p> <ul style="list-style-type: none"> • H6210. Semi-natural 	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status</p>	<p><u>Public access/disturbance</u> – the site is regularly accessed by the public and disturbance of hibernaculum is a threat.</p>

Site	Qualifying features	Conservation objectives	Priority issues currently impacting or threatening the condition of the feature ²⁵
	<p>dry grasslands and scrubland facies: on calcareous substrates (FestucoBrometalia); Dry grasslands and scrublands on chalk or limestone</p> <ul style="list-style-type: none"> • H8310. Caves not open to the public <p>Annex II species that are a primary reason for selection of the site:</p> <ul style="list-style-type: none"> • S1304. Rhinolophus ferrumequinum; Greater horseshoe bat 	<p>of its Qualifying Features, by maintaining or restoring;</p> <ul style="list-style-type: none"> • The extent and distribution of qualifying natural habitats and habitats of qualifying species • The structure and function (including typical species) of qualifying natural habitats • The structure and function of the habitats of qualifying species • The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely • The populations of qualifying species, and, • The distribution of qualifying species within the site. 	<p><u>Wildfire/arson</u> -fire on site are a potential threat to hibernating bats</p> <p><u>Direct impact from third party</u> due to problems with vandalism and disturbance</p> <p><u>Undergrazing</u> – limestone grassland is currently ungrazed</p> <p><u>Inappropriate designation boundary</u> - bat maternity colony has relocated to an alternative building outside of the SAC</p> <p><u>Air pollution due to atmospheric nitrogen deposition</u> which currently exceeds critical loads</p>
<p>Mendip Limestone Grasslands SAC</p>	<p>Annex I habitats that are a primary reason for the selection of the site:</p> <ul style="list-style-type: none"> • H6210. Semi-natural dry grasslands and scrubland facies: on 	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;</p>	<p><u>Inappropriate scrub control</u> within the grasslands and scrublands</p> <p><u>Change in land management</u> because of difficulties in managing vegetation due to terrain</p>

Site	Qualifying features	Conservation objectives	Priority issues currently impacting or threatening the condition of the feature ²⁵
	<p>calcareous substrates (Festuco Brometalia); Dry grasslands and scrublands on chalk or limestone</p> <p>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:</p> <ul style="list-style-type: none"> • H4030. European dry heaths • H8310. Caves not open to the public • H9180. Tilio-Acerion forests of slopes, screes and ravines; Mixed woodland on base-rich soils associated with rocky slopes* • S1304. Rhinolophus ferrumequinum; Greater horseshoe bat 	<ul style="list-style-type: none"> • The extent and distribution of qualifying natural habitats and habitats of qualifying species • The structure and function (including typical species) of qualifying natural habitats • The structure and function of the habitats of qualifying species • The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely • The populations of qualifying species, and, • The distribution of qualifying species within the site. 	<p><u>Disease</u>, particularly from ash dieback</p> <p><u>Air pollution due to atmospheric nitrogen deposition</u> which currently exceeds critical loads</p>
<p>Mendip Woodlands SAC</p>	<p>Annex I habitats that are a primary reason for the selection of the site:</p> <p>H9180. Tilio-Acerion forests of slopes, screes and ravines; Mixed woodland on</p>	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;</p>	<p><u>Illicit vehicles</u> – potential damage from off-road vehicles</p> <p><u>Deer</u> – adverse impact on feature through unsustainable grazing</p> <p><u>Disease</u>, particularly from ash dieback</p>

Site	Qualifying features	Conservation objectives	Priority issues currently impacting or threatening the condition of the feature ²⁵
	base-rich soils associated with rocky slopes*	<ul style="list-style-type: none"> • The extent and distribution of qualifying natural habitats • The structure and function (including typical species) of qualifying natural habitats, and • The supporting processes on which qualifying natural habitats rely 	<u>Air pollution due to atmospheric nitrogen deposition</u> which currently exceeds critical loads
North Somerset and Mendip Bats SAC	<p>Annex I habitats that are a primary reason for the selection of the site:</p> <ul style="list-style-type: none"> • H6210. Semi-natural dry grasslands and scrubland facies: on calcareous substrates (FestucoBrometalia); Dry grasslands and scrublands on chalk or limestone • H9180. Tilio-Acerion forests of slopes, screes and ravines; Mixed woodland on base-rich soils associated with rocky slopes* <p>Annex I habitats present as a</p>	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;</p> <ul style="list-style-type: none"> • The extent and distribution of qualifying natural habitats and habitats of qualifying species • The structure and function (including typical species) of qualifying natural habitats • The structure and function of the habitats of qualifying species 	<p><u>Undergrazing</u> of grassland</p> <p><u>Planning permission</u> – development on land between component SAC sites could result in the loss of foraging/commuting habitat and minor roost sites</p> <p><u>Change in site conditions</u> due to risk of collapse of mine entrance</p> <p><u>Woodland management</u> – excessive sycamore growth may be threatening species composition of woodland</p> <p><u>Disease</u>, particularly from ash dieback</p>

Site	Qualifying features	Conservation objectives	Priority issues currently impacting or threatening the condition of the feature ²⁵
	<p>qualifying feature, but not a primary reason for selection of this site:</p> <ul style="list-style-type: none"> • H8310. Caves not open to the public <p>Annex II species that are a primary reason for selection of the site:</p> <ul style="list-style-type: none"> • S1303. Rhinolophus hipposideros; Lesser horseshoe bat • S1304. Rhinolophus ferrumequinum; • Greater horseshoe bat 	<ul style="list-style-type: none"> • The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely • The populations of qualifying species, and, • The distribution of qualifying species within the site 	<p><u>Air pollution due to atmospheric nitrogen deposition</u> which currently exceeds critical loads</p>
<p>River Usk / Afon Wysg SAC</p>	<p>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:</p> <ul style="list-style-type: none"> • 3260 Water courses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation <p>Annex II species that are a primary reason for selection of this site</p>	<ul style="list-style-type: none"> • To maintain the availability of current spawning sites and lamprey nurseries. • To maintain suitable flows, water quality and sediment loads to sustain the population of shad, lamprey and nurseries. • To maintain riparian habitats to ensure optimum conditions for shad lamprey 	<p>The following priorities were based on the Usk Management Catchment Summary²⁶:</p> <p><u>Water Quality</u> - abstraction threats, changes in water level and water quality, including eutrophication due to diffuse pollution from agricultural land management and urban areas</p> <p><u>Invasive non-native species</u></p>

²⁶ Usk Management Catchment Summary (Natural Resource Wales). Website accessed on 25/09/2018 https://cdn.naturalresources.wales/media/679394/2016_updated_usk_catchment_summary_nrw.pdf?mode=pad&rnd=13159636940000000

Site	Qualifying features	Conservation objectives	Priority issues currently impacting or threatening the condition of the feature ²⁵
	<ul style="list-style-type: none"> • 1095 Sea lamprey <i>Petromyzon marinus</i> • 1096 Brook lamprey <i>Lampetra planeri</i> • 1099 River lamprey <i>Lampetra fluviatilis</i> • 1103 Twaite shad <i>Alosa fallax</i> • 1106 Atlantic salmon <i>Salmo salar</i> • 1163 Bullhead <i>Cottus gobio</i> • 1355 Otter <i>Lutra lutra</i> <p>Annex II species present as a qualifying feature, but not a primary reason for site selection</p> <p>1102 Allis shad <i>Alosa alosa</i></p>	<p>and bullhead.</p> <ul style="list-style-type: none"> • To identify all linking factors on the population of shad, lamprey and bullhead and to seek to remove or minimise their effects. • Protection of otter breeding sites and resting places. 	<p><u>Lack of education and advice</u></p> <p><u>Decline in aquatic habitats and species</u> due to lack of management.</p>
<p>River Wye / Afon Gwy SAC</p>	<p>Annex I habitats that are a primary reason for the selection of the site:</p> <ul style="list-style-type: none"> • H3260. Water courses of plain to montane levels with the <i>Ranunculion fluitantis</i> and <i>Callitriche/Batrachion</i> vegetation; Rivers with 	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:</p> <ul style="list-style-type: none"> • The extent and distribution of qualifying natural 	<p><u>Water Quality</u> Abstraction threats, changes in water level and water quality, including eutrophication.</p> <p><u>Physical modification</u> – small scale development throughout the river is impacting on hydromorphology and character</p> <p><u>Invasive species</u>, particularly</p>

Site	Qualifying features	Conservation objectives	Priority issues currently impacting or threatening the condition of the feature ²⁵
	<p>floating vegetation often dominated by water-crowfoot</p> <p>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:</p> <ul style="list-style-type: none"> • H7140. Transition mires and quaking bogs; Very wet mires often identified by an unstable `quaking` surface <p>Annex II species that are a primary reason for selection of the site:</p> <ul style="list-style-type: none"> • S1092. Austroptamobius pallipes; White-clawed (or Atlantic stream) crayfish • S1095. Petromyzon marinus; Sea lamprey • S1096. Lampetra planeri; Brook lamprey • S1099. Lampetra fluviatilis; River lamprey • S1103. Alosa fallax; Twaite shad • S1106. Salmo salar; Atlantic salmon 	<p>habitats and habitats of qualifying species</p> <ul style="list-style-type: none"> • The structure and function (including typical species) of qualifying natural habitats • The structure and function of the habitats of qualifying species • The supporting processes on which qualifying natural habitats and habitats of qualifying species rely • The populations of qualifying species, and, • The distribution of qualifying species within the site. 	<p>Himalyan balsam, Japanese knotweed and giant hogweed</p> <p><u>Woodland management</u></p> <p><u>Fisheries</u> – fish stocking occurs at present and management of banks for fishing (i.e. steps, mowing) is not always compatible with SAC features</p> <p><u>Public access/disturbance</u>, particularly from canoeists and anglers</p> <p><u>Air pollution</u> due to atmospheric nitrogen deposition which currently exceeds critical loads</p> <p><u>Inappropriate scrub control</u></p> <p><u>Undergrazing</u> of transitional mire and quaking bog feature</p> <p><u>Transportation corridors</u>, particularly relevant to Network Rail management activities within SAC</p>

Site	Qualifying features	Conservation objectives	Priority issues currently impacting or threatening the condition of the feature ²⁵
	<ul style="list-style-type: none"> • S1163. Cottus gobio; Bullhead • S1355. Lutra lutra; Otter <p>Annex II species present as a qualifying feature, but not a primary reason for selection of this site:</p> <p>1102 Allis shad Alosa alosa</p>		
<p>Rodborough Common SAC</p>	<p>Annex 1 habitats that are a primary reason for selection of this site:</p> <ul style="list-style-type: none"> • H6210. Semi-natural dry grasslands and scrubland facies: on calcareous substrates 	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;</p> <ul style="list-style-type: none"> • The extent and distribution of qualifying natural habitats • The structure and function (including typical species) of qualifying natural habitats, and • The supporting processes on which qualifying natural habitats rely. 	<p><u>Undergrazing of grassland and scrublands</u></p> <p><u>Public access/disturbance</u>, particularly dog walkers</p> <p><u>Air pollution due to atmospheric nitrogen deposition</u> which currently exceeds critical loads</p>

Site	Qualifying features	Conservation objectives	Priority issues currently impacting or threatening the condition of the feature ²⁵
<p>Salisbury Plain SAC and SPA</p>	<p><u>SAC</u></p> <p>Annex I habitats that are a primary reason for the selection of the site:</p> <ul style="list-style-type: none"> • 5130 Juniperus communis formations on heaths or calcareous grasslands • 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (Festuco-Brometalia) (* important orchid sites) <p>Annex II species that are a primary reason for selection of the site:</p> <ul style="list-style-type: none"> • 1065 Marsh fritillary butterfly • 1095. Petromyzon marinus (Sea lamprey) • 1099. Lampetra fluviatilis (River lamprey) • 1109. Alosa fallax (Twaite shad) <p><u>SPA</u></p> <p>This site qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European</p>	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features/aims of the Wild Bird Directive, by maintaining or restoring;</p> <p><u>SAC</u></p> <ul style="list-style-type: none"> • The extent and distribution of qualifying natural habitats and habitats of qualifying species • The structure and function (including typical species) of qualifying natural habitats • The structure and function of the habitats of qualifying species • The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely 	<p>The below issues are relevant to the SAC and SPA:</p> <p><u>Changes in species distribution</u>, particularly the juniper population</p> <p><u>Air pollution due to atmospheric nitrogen deposition</u> which currently exceeds critical loads</p>

Site	Qualifying features	Conservation objectives	Priority issues currently impacting or threatening the condition of the feature ²⁵
	<p>importance of the following species listed on Annex I of the Directive:</p> <p>During the breeding season; Stone Curlew <i>Burhinus oedicephalus</i>, 22 pairs representing at least 11.6% of the breeding population in Great Britain (Count as at 1998)</p> <p>Over winter; Hen Harrier <i>Circus cyaneus</i>, 14 individuals representing at least 1.9% of the wintering population in Great Britain (RSPB 1996/7)</p>	<ul style="list-style-type: none"> • The populations of qualifying species, and, • The distribution of qualifying species within the site. <p><u>SPA</u></p> <ul style="list-style-type: none"> • The extent and distribution of the habitats of the qualifying features • The structure and function of the habitats of the qualifying features • The supporting processes on which the habitats of the qualifying features rely • The population of each of the qualifying features, and • The distribution of the qualifying features within the site. 	
<p>Severn Estuary SAC, SPA and Ramsar</p>	<p><u>SAC</u></p> <p>Annex I habitats that are a primary reason for the selection of the site:</p>	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild</p>	<p>The below issues are relevant to the SAC and SPA</p> <p><u>Public access/disturbance</u> particularly from dog walking, horse riding, biking, beach activities, angling and shooting</p>

Site	Qualifying features	Conservation objectives	Priority issues currently impacting or threatening the condition of the feature ²⁵
	<ul style="list-style-type: none"> • 1130. Estuaries • 1140. Mudflats and sandflats not covered by seawater at low tide • 1330. Atlantic salt meadows (Glauco-Puccinellietalia maritimae) <p>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site:</p> <ul style="list-style-type: none"> • 1110. Sandbanks slightly covered by sea water all the time • 1170. Reefs <p>Annex II species that are a primary reason for selection of the site:</p> <ul style="list-style-type: none"> • 1095. Petromyzon marinus (Sea lamprey) • 1099. Lampetra fluviatilis (River lamprey) • 1109. Alosa fallax (Twaite shad) <p><u>SPA</u></p> <p>This site qualifies under Article 4.1 of the Directive (79/409/EEC) by</p>	<p>Birds Directive, by maintaining or restoring;</p> <ul style="list-style-type: none"> • The extent and distribution of the habitats of the qualifying features • The structure and function of the habitats of the qualifying features • The supporting processes on which the habitats of the qualifying features rely • The population of each of the qualifying features, and, • The distribution of the qualifying features within the site. 	<p><u>Physical modification</u> of watercourse by installation of barriers preventing completion of fish life cycle</p> <p><u>Impacts of development</u> -potential cumulative impact from development</p> <p><u>Coastal squeeze</u> due to rising sea levels reducing available habitat</p> <p><u>Change in land management</u> which affects species composition, habitat quality and availability</p> <p><u>Change in species distribution</u> resulting from climate change and manmade/natural modifications to habitat</p> <p><u>Water pollution</u> from diffuse or direct pollution</p> <p><u>Air pollution</u> due to atmospheric nitrogen deposition which currently exceeds critical loads</p> <p><u>Marine consents and permits</u> – the cumulative adverse impacts of</p>

Site	Qualifying features	Conservation objectives	Priority issues currently impacting or threatening the condition of the feature ²⁵
	<p>supporting populations of European importance of the following species listed on Annex I of the Directive:</p> <p>Over winter:</p> <ul style="list-style-type: none"> • A037. Cygnus columbianus bewickii (Bewick's swan) • Internationally important bird assemblage. <p>This site qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:</p> <p>On passage:</p> <ul style="list-style-type: none"> • Charadrius hiaticula (Ringed plover) • Calidris alpina alpina (Dunlin) • Nuntenius phaeopus (Whimbrel) • Tringa <p>tetanus (Redshank)</p> <p>Over winter:</p> <ul style="list-style-type: none"> • A394. Anser albifrons 		<p>aggregate extraction, maintenance dredging and disposal</p> <p><u>Fisheries</u> – potential adverse impacts from recreational and commercial fishing</p> <p><u>Invasive species</u>, particularly from Australian barnacle, mitten crab and the Pacific oyster</p> <p><u>Marine litter</u> originating from rivers</p> <p><u>Marine pollution incidents</u> – potential for significant adverse impact on its features</p>

Site	Qualifying features	Conservation objectives	Priority issues currently impacting or threatening the condition of the feature ²⁵
	<p>albifrons; Greater white-fronted goose (Non-breeding)</p> <ul style="list-style-type: none"> • A048. Tadorna tadorna; Common shelduck (Non-breeding) • A051. Anas strepera; Gadwall (Non-breeding) • A149. Calidris alpina alpina; Dunlin (Non-breeding) • A162. Tringa totanus; Common redshank (Non-breeding) <p>The Estuary also supports nationally important wintering populations of a further 10 species:</p> <ul style="list-style-type: none"> • Nuntenius phaeopus (Whimbrel) • Tringa tetanus (Redshank) <p><u>Ramsar</u></p> <p>Assemblage qualification: A wetland of international importance.</p> <p>The area qualifies under Article</p>		

Site	Qualifying features	Conservation objectives	Priority issues currently impacting or threatening the condition of the feature ²⁵
	<p>4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl.</p> <ul style="list-style-type: none"> • Criterion 1: Presence of Annex I features listed above for SAC. • Criterion 3: Unusual estuarine communities. • Criterion 4: Run of migratory fish between sea and river via estuary. • Criterion 5/6: Bird assemblages and species of international importance. • Criterion 8: Diverse fish populations, important feeding, nursery ground and migration route. 		
<p>Somerset Levels and Moors SPA and Ramsar</p>	<p><u>SPA</u></p> <p>This site qualifies under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive:</p> <p>Over winter:</p> <ul style="list-style-type: none"> • A037 <i>Cygnus columbianus bewickii</i>; Bewick's 	<p>Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring;</p> <ul style="list-style-type: none"> • The extent and distribution of the habitats of the qualifying features 	<p><u>Water Quality</u> Maintain favourable hydrology. Water levels and abstraction.</p> <p><u>Maintain and upgrade water management structures</u></p> <p><u>Change in land management</u> due to landowners deciding to</p>

Site	Qualifying features	Conservation objectives	Priority issues currently impacting or threatening the condition of the feature ²⁵
	<p>swan (Non-breeding)</p> <ul style="list-style-type: none"> • A140 Pluvialis apricaria; European golden plover (Non-breeding) • Waterbird assemblage <p>This site also qualifies under Article 4.2 of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:</p> <p>Over winter:</p> <ul style="list-style-type: none"> • A052 Anas crecca; Eurasian teal (Non-breeding) • A142 Vanellus vanellus; Northern lapwing (Non-breeding) • Anas clypeata(Shoveler) • Anas crecca(Teal) • Anas penelope <p>(Wigeon)</p> <p><u>Ramsar</u></p> <p>Assemblage qualification: A wetland of international importance.</p>	<ul style="list-style-type: none"> • The structure and function of the habitats of the qualifying features • The supporting processes on which the habitats of the qualifying features rely • The population of each of the qualifying features, and, • The distribution of the qualifying features within the site. 	<p>leave Higher Level Stewardship or due to land managers losing access to sites</p> <p><u>Peat extraction resulting in damage by direct peat removal</u></p> <p><u>Public access/disturbance</u> particularly from dog walking</p> <p><u>Offsite habitat availability/management</u> – currently limited understanding of how the SPA bird assemblages use the wider ecological network</p>

Site	Qualifying features	Conservation objectives	Priority issues currently impacting or threatening the condition of the feature ²⁵
	The area qualifies under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl.		
Wye Valley & Forest of Dean Bat Sites SAC	Annex II species that are a primary reason for selection of the site: <ul style="list-style-type: none"> • S1303. Rhinolophus hipposideros; Lesser horseshoe bat • S1304. Rhinolophus ferrumequinum; Greater horseshoe bat 	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring; <ul style="list-style-type: none"> • The extent and distribution of the habitats of qualifying species • The structure and function of the habitats of qualifying species • The supporting processes on which the habitats of qualifying species rely • The populations of qualifying species, and • The distribution of qualifying species within the site. 	<u>Physical modification of roost sites</u> due to repair, deterioration and renovation <u>Public access/disturbance</u> to roost sites due to damage to grilles or unauthorized access by cavers <u>Habitat connectivity</u> - between roosts and feeding areas could be adversely impacted by changes to land management
Wye Valley Woodlands SAC	Annex I habitats that are a primary reason for the selection of the site:	Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the	<u>Deer grazing</u> impacting woodland <u>Forestry/woodland management</u> required to sustain SAC features

Site	Qualifying features	Conservation objectives	Priority issues currently impacting or threatening the condition of the feature ²⁵
	<ul style="list-style-type: none"> • H9130. Asperulo-Fagetum beech forests; Beech forests on neutral to rich soils • H9180. Tilio-Acerion forests of slopes, screes and ravines; Mixed woodland on base-rich soils associated with rocky slopes* • H91J0. Taxus baccata woods of the British Isles; Yew-dominated woodland* <p>Annex II species present as a qualifying feature, but not a primary reason for selection of this site:</p> <p>S1303. Rhinolophus hipposideros; Lesser horseshoe bat)</p>	<p>Favourable Conservation Status of its Qualifying Features, by maintaining or restoring;</p> <ul style="list-style-type: none"> • The extent and distribution of qualifying natural habitats and habitats of qualifying species • The structure and function (including typical species) of qualifying natural habitats • The structure and function of the habitats of qualifying species • The supporting processes on which qualifying natural habitats and habitats of qualifying species rely • The populations of qualifying species, and, • The distribution of qualifying species within the site. 	<p><u>Invasive species</u> including Himalayan balsam, periwinkle. Japanese knotweed and cherry laurel</p> <p><u>Habitat connectivity</u> to maintain migration of species</p> <p><u>Species decline</u> due to inappropriate land management</p> <p><u>Air pollution</u> due to atmospheric nitrogen deposition which currently exceeds critical loads</p> <p><u>Disease</u>, particularly ash dieback and sudden oak death</p> <p><u>Public access/disturbance</u> resulting in erosion and damage to ground flora and potential access to roost site</p>



Appendix 2 - Details of JLTP4 Major Schemes

Transformational Major Schemes

Ref	Mass Transit Scheme	Details
T1	Bristol City Centre to Airport	Segregated mass transit route connecting Bristol Airport and South Bristol with the city centre. Through the current Mass Transit studies and the Bristol South West Economic Link project (BSWEL) (see Scheme Ref. E1 below), various options are being considered for assessment. Those options which perform well against an initial set of criteria will then be developed into more detailed option variants for further assessment. Options are being considered for bus, tram, tram-train, mass transit (fully segregated underground running) and heavy rail. Route to be determined balancing maximising patronage against engineering costs. The heavy rail option assessment includes a potential heavy rail link from Bristol Temple Meads.
T2	Bristol City Centre to Bath	A mass transit route providing high frequency, high capacity and fast public transport services between Bristol and Bath. The route from Hicks Gate to Bristol will be facilitated by diversion of traffic onto the Callington Road Link to enable reallocation of roadspace from car to public transport within Bristol. Careful consideration of routing options and future management of roadspace between Bristol and Bath, will be required. In the short term MetroBus would provide mass transit along the corridor from Bristol to Bath, and in the longer term there is an ambition for Light Rail.
T3	Bristol City Centre to East Fringe	A dedicated, segregated mass transit route providing high frequency, higher capacity and faster public transport services connecting central Bristol and the East Fringe and associated infrastructure to provide a high quality passenger experience. Sections of the dedicated route would probably need to be delivered below surface due to highway capacity constraints on the A420 and A432 corridors and environmental constraints on the Bristol-Bath Railway Path. It includes the A420/Ring road Park and Ride site(s).

T4	Bristol City Centre to North Fringe	A dedicated, segregated mass transit route providing high frequency, higher capacity and faster public transport services between central Bristol, North Bristol and the North Fringe with associated infrastructure to provide a high quality passenger experience. Constraints on the A38 Gloucester Road and other corridors mean that an underground alignment should be considered as one of the options to fully achieve the scheme objectives. This scheme would be complementary to the North Fringe - Hengrove MetroBus scheme currently being delivered and the planned MetroWest programme.
T5	Bath city centre and corridors	Introducing light rail in Bath city and environs. Given the environmental and physical constraints trams should be one of the options considered. All key routes will be considered including: <ul style="list-style-type: none"> - A367 Odd Down - Newbridge - either along the A4 or A36 integrating with the new rapid transit corridor between Bath and Bristol - Lansdown from the north of Bath - A4 from the east of Bath

JSP Transport Programme: Corridor Scheme Packages to Mitigate JSP Growth

Ref	Scheme	Details
G1	South East Bristol and Whitchurch	<p><u>A4 MetroBus + Callington Road Link</u> MetroBus service along the A4 corridor between Keynsham and Bristol, incorporating Callington Road Link to reduce congestion on the A4.</p> <p><u>Orbital MetroBus</u> MetroBus between Whitchurch and Emersons Green via a new A4-A37 link and A4174 Ring Road.</p> <p><u>A37 Sustainable Transport</u> Package of bus priority and enhanced bus services to Whitchurch, possibly including extension of MetroBus from Hengrove, and Park & Ride option at Whitchurch.</p> <p><u>Hicks Gate Park & Ride</u> New Park & Ride site south of Hicks Gate junction – this would replace existing Brislington Park & Ride site (to be used for development).</p> <p><u>Hicks Gate Junction</u> Changes to existing roundabout layout including a new link between the A4174 and A4 Keynsham Bypass.</p> <p><u>South Bristol Orbital Link</u> Made up of A4 – A37 Link between A4 Hicks Gate and A37 south of Whitchurch, and West of A37 Link_ from A37 Whitchurch connecting either to Washing Pound Lane or Halfacre Lane.</p> <p><u>Local highway improvements</u> Local traffic management schemes, including improvements to Whitchurch Lane towards Hengrove, and traffic management on A37 towards Pensford.</p>

G2	Keynsham	<p><u>Keynsham railway station</u> Review of access arrangements and passenger waiting facilities to enhance the attractiveness of rail for commuting and other travel needs from wider Keynsham area.</p> <p><u>A4-A4175 Link</u> Link between the A4 and A4175 including new bridges over rail line and possibly River Avon, and providing access to the SDL.</p> <p>Avon Mill Lane improvements - Improvements to covert Avon Mill Lane and A4175 junction to a roundabout with enhanced pedestrian and cycle facilities</p> <p>New Link Road Sustainable Travel - Package of strategic cycling corridor, bus priority, and enhanced bus services (including MetroBus) to Bristol and Bath. Including a direct link to the Bristol/Bath cycle way</p> <p>Hicks Gate Junction - Changes to existing roundabout layout including a new link between the A4174 and A4 Keynsham Bypass.</p> <p><u>Local highway improvements</u> Improvements to other junctions affected by traffic, including A4 / B3116 Roundabout (between Keynsham and Saltford) and A420 / A4175 junction at Bridgegate (in South Gloucs).</p>
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G3	Yate and Coalpit Heath	<p><u>A432 Sustainable Travel</u> Package of strategic cycling corridor, bus priority, and enhanced bus services (including MetroBus) to Coalpit Heath and Yate and potential Park & Ride option west of Yate.</p> <p><u>Yate railway station</u> Package of measures to improve access and enhance waiting facilities, including improved bus interchange on A432.</p> <p><u>Winterbourne and Frampton Cotterell Bypass</u> Single carriageway link between Stoke Gifford and Iron Acton, bypassing Winterbourne and Frampton Cotterell.</p> <p><u>Local highway improvements</u> Improvements to other parts of the network impacted by traffic, to include B4057 between Winterbourne and Stoke Gifford, B4058 / B4059 junctions at Iron Acton, and route between Yate and East Fringe via Westerleigh.</p> <p><u>Coalpit Heath and Westerleigh Bypass</u> A new multi-modal corridor (road and cycle route) from Yate to Emersons Green and the east of Bristol, connecting with the Ring Road and possibly a new M4 Junction 18A. The new link would connect the A432 Badminton Road to Westerleigh Road providing access to new employment and housing in Yate. This may be required instead of, or together with, a Winterbourne and Frampton Cotterell Bypass. This link would provide additional capacity, freeing up road space on the A432 for MetroBus (scheme XX).</p>
G4	Nailsea and Backwell	<p><u>Nailsea sustainable travel, rail station and local network improvements</u> Enhanced bus services, including options for improved connections to Bristol via the Long Ashton Park & Ride and Metrobus M2 service, improved interchange at Nailsea & Backwell rail station (cycle connections, improved parking facilities). Local improvements to road network (mostly on-line, with some local bypasses).</p> <p><u>Nailsea - Backwell A370 link</u> New link from Nailsea to A370 including crossing of the rail line, providing improved access to SDLs.</p> <p><u>M5 J19 & J20 improved multi-modal connections</u> New or improved, multi-modal connections for Nailsea & Backwell to M5 Junction 19 (Portbury) and Junction 20 (Clevedon), including bus priority, providing improved access to SDLs. Bus priority will support the delivery of enhanced bus services.</p>

G5	Banwell and Churchill	<p><u>Sustainable travel package</u> To include enhanced cycling facilities, bus priority and bus services along A368/A371 corridor and serving the SDLs. Roadspace reallocation will be enabled by bypasses on the corridor.</p> <p><u>A371 / A368 Banwell Bypass</u> Bypass to the north of Banwell, linking A371 with A368, and providing improved access to the SDL.</p> <p><u>A368 Churchill and Sandford Bypass</u> Bypass to the north of Churchill and Sandford, providing access to the SDL.</p> <p><u>Local highway improvements</u> Improvements to other junctions affected by additional traffic, including A368/A38 Churchill signals.</p>
G6	Thornbury, Buckover and Charfield	<p><u>A38 Sustainable Travel</u> Package of strategic cycling corridor, bus priority, and enhanced bus services (including metrobus) to Thornbury and Buckover, including potential Park & Ride option.</p> <p><u>Charfield Station</u> New railway station at Charfield (services to Bristol and Gloucester).</p> <p><u>M5 J14</u> Upgraded motorway junction to a full roundabout layout, improved approaches from east and west.</p> <p><u>Local highway improvements</u> Improvements to local road network in the Thornbury, Buckover and Charfield area, including capacity improvements at B4509 / B4058 junction at Charfield Hill.</p>

G7	Bristol Area	Urban	<p><u>Bristol City Centre Framework</u> Multi-modal package to improve connectivity and growth in Bristol city centre. Includes enhanced cycling provision, enhanced bus priority and reorganisation of road network in city centre core.</p> <p><u>Local bus package (GBBN2)</u> Expansion of bus priority measures across the Bristol urban area and further improvements to bus facilities to support sustained growth in bus patronage across the city.</p> <p><u>Bristol walking and cycling package</u> Improvements to walking and cycling infrastructure</p> <p><u>M32 Park & Ride</u> New Park & Ride site south of M32 J1 to intercept trips into Bristol.</p> <p><u>A38(S)/A4174 Park & Ride</u> New Park & Ride site at the A38/South Bristol Link roundabout, served by MetroBus and Airport Flyer services to Bristol.</p> <p><u>A4018 Park & Ride</u> New Park & Ride site, possibly served by rail services to Bristol from proposed Henbury station.</p> <p><u>A4 Portway and A370 Long Ashton Park & Ride expansion</u> Expansion of existing Park & Ride sites.</p>
G8	Weston-super-Mare		<p><u>Weston-super-Mare MetroBus</u> MetroBus serving Weston town centre, Weston villages, and possibly Park & Ride.</p> <p><u>Weston-super-Mare Park & Ride</u> New Park & Ride site at either A370/A371 junction, M5 J21 or proposed J21a.</p> <p><u>Local bus improvements</u> Additional bus priority measures and bus stop infrastructure to improve journey reliability.</p> <p><u>Local highway junction improvements</u> Upgrades and improvements to a number of junctions related to the primary distributor route and other key junctions around the Weston-super-Mare area.</p> <p><u>Local walking & cycling infrastructure improvements</u> Package of walking and cycling infrastructure improvements, to promote sustainable transport modes.</p>

Early investment schemes in progress (committed projects)

Ref	Scheme	Details
C1	M49 Avonmouth junction	New M49 Avonmouth junction to improve access to the port of Avonmouth and the Avonmouth Severnside Enterprise Area; works are expected to be completed by the end of 2019.
C2	Temple Quarter masterplan	Masterplan to cover the 70-hectare development zone, to feature a mixed-use quarter comprising up to 11,000 homes and a revitalised transport interchange, including improvements to Temple Meads railway station. The masterplan will include station capacity improvements, better access to Temple Meads and the area, with new public space and improvements to the public realm. The project will also involve a sensitive adaptation, development and protection of the grade 1 listed station, which was designed by Brunel.
C3	MetroWest Phase 1	Upgraded train services to half-hourly connections for Severn Beach Line and the Bath Spa to Bristol line. Reopening the Portishead Line to passenger services with an hourly service is a priority for WoE authorities. New station at Portishead and the reopening of former Pill Station.
C4	MetroWest Phase 2	Reopening of Henbury line to an hourly spur and increase train services to Yate. New stations at Henbury, North Filton and Ashley Down.
C5	Hengrove Transport Package	Internal roads and creating access for Metrobus through urban living site of around 1500 homes.
C6	Lockleaze Transport Package	Including bus lane on Muller road and accessible pathway through Stoke Park to cater for urban living sites in Lockleaze (800 homes).

Early investment schemes under development

Ref	Scheme	Details
E1	Bristol South West Economic Link (BSWEL)	<p>New multi-modal corridor between the M5 and the A38, Bristol Airport, South Bristol and Bristol City Centre to improve connectivity and overall network resilience. The BSWEL Options Assessment Report grouped together the various options to form packages, based on their broad geographical location and their likely ability to meet the project objectives in a coherent way. The packages are labelled from 1-8, indicating the potential order of implementation, although this will depend on funding sources and engagement with external partners:</p> <ul style="list-style-type: none"> • Package 1: Weston-super-Mare bus network improvements; Weston-super-Mare to Bristol bus services with MetroBus compatibility (complementary services); • Package 2: A38 online improvements between A368 to Bristol Airport, along with Downside Road junction improvements. A38 widening at Bristol Airport; • Package 3: Banwell Bypass; Rail options: Weston Parkway station; Weston-super-Mare (WsM) – Weston Parkway – Bristol Airport bus service; • Package 4: A38 offline improvements between Bristol Airport and South Bristol Link (SBL); A38/SBL Park & Ride; Sandford and Churchill Bypass; • Package 5: M5 J21A • Package 6: Rail options: Bristol Airport Rail Link Phase One: Bristol Airport to Bristol Temple Meads • Package 7: Rail options: Bristol Airport Rail Link Phase Two: Bristol Airport to Bristol Temple Meads, Severn Beach/Bath Spa, Bristol Airport to Weston-super-Mare/Taunton • Package 8: A370-A38 Link
E2	East of Bath Link	<p>A new road connecting the A36 (south of Bathampton) to A363 (near Bathford, south of A4 roundabout) or the A4, to provide a high quality north-south route connecting the A36 and A46 to the east of Bath. This route will enable north-south traffic to avoid passing through Bath.</p>
E3	M5 Junction 19	<p>Improvements to M5 Junction 19 to improve access between the M5 and the Royal Portbury Dock, Portishead, Portbury and Pill. The scheme will provide enhanced capacity to improve the efficiency of movements for freight using the Royal Portbury Dock, enhancing connectivity to national road networks. The</p>

		<p>scheme will also assist in accommodating future traffic growth generated by planned housing and employment growth in the area.</p>
E4	<p>Passenger Rail Service and Capacity Improvements, Station Upgrades and New Stations Package</p>	<p>Package of rail improvement measures: Rail service improvements, bringing the frequency of local rail services up to a minimum of 2 tph, plus hourly rail services from Weston-super-Mare to London. - Infrastructure to support service improvements including double tracks on the loop line between Weston Railway Station, reinstating the southern chord at Weston-super-Mare, and the Herluin Way to Locking Road Link (bridge replacement to enable width for double tracking; see scheme XX). - Longer rolling stock to cater for increased demand, in conjunction with longer platforms where required (including Worle, Nailsea & Backwell and Yatton), with higher quality rolling stock from all stations. - Station upgrades for existing rail stations with a focus on developing Interchange Hubs (interchange with MetroBus, Mass Transit, bus services and cycle parking provision), in conjunction with schemes to improve access to existing rail stations by sustainable modes on key routes to stations across the West of England. New railway stations at the following locations: ● Constable Road, Bristol; ● Ashton Gate, Bristol; ● St Annes, Brislington, Bristol; ● Saltford, Bath & North East Somerset. Stations to be delivered with associated infrastructure: passenger waiting facilities, bus stops, cycle stands, car parking, real-time information and be fully Equality Act compliant. Westerleigh junction upgrade.</p>
E5	<p>Smart Motorways: M4 J18-19 and M5 J17-21A</p>	<p>Smart Motorway scheme on the M4 from J18 (A46, Tormarton) to J19 (M32). This will complement the recently delivered M4 J19-20 and M5 J15-17 Smart Motorway to provide an extensive system of motorway management on the most congested parts of the network. The M4 J18-19 scheme will deliver increased capacity and enhanced reliability to complement the delivery of the new M4 J18A (to provide direct access to the Bristol East Fringe).</p> <p>Smart Motorway scheme on the M5 from J21/21a (Weston-super-Mare) to J17 (Cribbs Causeway). This will complement the recently delivered M4 J19-20 and M5 J15-17 Smart Motorway, to provide an extensive system of motorway management on the most congested parts of the network. The scheme will deliver increased capacity and enhanced reliability through a potential combination of controlled motorway, all lane running and dynamic hard shoulder running, enabling improved journey times and regional connectivity.</p>

E6	M5 J21A	A new Junction 21A on the M5 motorway south of the existing J21. This will be supported by a new multi-modal corridor connecting the new junction with the A38, bypasses for the villages of Banwell, Sandford and Churchill and major improvements to the A38 between Langford and South Bristol. The scheme will improve links to the airport and improve resilience of the Strategic Road Network. It will facilitate SDLs at Banwell and Mendip Spring Garden Village and Urban Living in Weston-super-Mare. It will also support growth at Bristol Airport.
E7	A4174 Ring Road junction improvements including Wraxall Road (Longwell Green)	Junction improvements supported by JTS linked to orbital bus route and J18a link. Wraxall Road junction will be improved to improve access onto the Ring Road and safety at the roundabout.
E8	Freezing Hill junction upgrade and whole route improvements	This includes improvements at three junctions along the route between the A420 and Lansdown P&R, known as Freezing Hill Lane. Currently there are excessive delays and the route isn't suitable for the number of vehicles using it to access Lansdown P&R. The scheme also includes localised widening of the Freezing Hill Lane route.
E9	Interurban cycle routes	Strategic cycle routes across the region to supplement those detailed in the Corridor Scheme Packages to Mitigate JSP Growth. Many of these will be delivered along the MetroBus corridors and some will be identified through the West of England Local Cycling and Walking Infrastructure Plan.
E10	M4 Junction 18A to A4174 Ring Road	New motorway junction on the M4 (Junction 18A) between Junction 19 for Bristol and Junction 18 for Bath, providing a new highway link between the M4 and the A4174 Ring Road near the Emersons Green Enterprise Area. It would necessitate improvements to the M4 between Junction 19 and the new Junction 18A, plus improvements to junctions on the A4174. The scheme was considered in a feasibility study undertaken by South Gloucestershire Council and in partnership with Highways England which examined potential location options for the junction and link road. South Gloucestershire Council's Cabinet considered the outcome of the feasibility study in March 2018 and Option 1 (the Western Option at Emersons Green) was agreed as the Council's preferred location. The study has been provided to Highways England for their consideration.

E11	MetroBus - Bristol City Centre to Clevedon and Nailsea	MetroBus route from Clevedon and Nailsea to Bristol City Centre, a rapid transit limited stop service with an emphasis on segregation from general traffic with bus lanes. The section within Bristol would use the infrastructure for the Ashton Vale to Temple Meads route, which was completed in September 2018. This will help to support growth at Nailsea and Backwell and improve connectivity and travel choices.
E12	MetroBus consolidation package	A package of measures to make further enhancements to the existing MetroBus network, with potential measures including fleet upgrade, addition of descoped infrastructure, signals replacement, and Great Stoke ('Rabbit') roundabout.
E13	Park & Ride package for Bath	A Park & Ride package comprising future expansion of three existing sites at Odd Down, Lansdown and Newbridge and to explore the options for and support delivery of a new Park and Ride site to the east of Bath to address future demand for travel and to facilitate further mode shift from cars for travel into the city.
E14	Regional Electric Vehicle Charging Network	Increasing public charging infrastructure, including through 'Go Ultra Low West' (Source West) EV charging infrastructure programme.
E15	MetroBus - Bristol City Centre to Severnside	MetroBus route from Severnside to Bristol City Centre via the A403 and A4 Portway, connecting into existing MetroBus infrastructure in Central Bristol. The route would connect the logistics cluster at Severnside and Avonmouth with Bristol City Centre via the Portway Park & Ride site. This would improve travel options and connectivity for employees and businesses in accessing Severnside and Avonmouth. The scheme builds on the extensive existing bus priority on the A4 Portway, with extended bus priority, enhanced stops and upgraded MetroBus services. In particular, further bus priorities including potential bus-only links would be needed into Severnside.
E16	Bath Cycle Network and City Centre Package	Completion of a continuous and integrated network of strategic cycle routes, comprising key corridors and cross city routes, complemented by improved permeability and investment in public realm in the city centre. This network will connect key destinations across the Bath urban area. Local routes will be improved and integrated into the strategic network as part of ongoing programmes. Bath city centre is in a natural 'bowl' with steep slopes into the city centre from the north and south. This is likely to constrain the attractiveness of cycling from the north and south, and the primary opportunities will be on east-west corridors in the city.

E17	Keynsham / Midsomer Norton and Somer Valley Public Realm Improvements Packages	Keynsham town centre public realm/ regeneration improvements to encourage sustainable modes of travel, such as walking, cycling and public transport. Including strategic cycling routes to/from Bath, Bristol, east/north Bristol and within Keynsham including completion of the link from the Somerdale cycle bridge via the River Avon towpath to the Keynsham Peninsular and the Bristol/Bath strategic cycle network. Midsomer Norton town centre public realm/ regeneration improvements to encourage sustainable modes of travel, such as walking, cycling and public transport. Highway, cyclist and pedestrian improvements linking the Somer Valley Enterprise Zone with the A37 to the west and the wider Somer Valley to the east.
E18	MetroBus - Cribbs Patchway extension	An extension to the existing North Fringe to Hengrove MetroBus route. MetroBus from Bristol Parkway to The Mall via Hatchet Road, Gipsy Patch Lane, North Way and CPNN. Includes bus lanes and bus links to enable rapid, reliable MetroBus services to connect existing and planned residential, employment and leisure areas in the North Fringe. Bus priority includes bus links at San Andreas roundabout and North Way, and bus lanes on Gipsy Patch Lane. The replacement of the existing railway bridge at Gipsy Patch Lane with a wider bridge to remove the pinch-point for motorised and non-motorised users is a key element of the scheme.
E19	Weston-super-Mare Package 2	Package of multi-modal highway/junction improvements to complement and support the other Weston-super-Mare schemes. These could include, but not be limited to, the M5 Junction 21 Bypass, A370/A371 Airport Rbt, Cross Airfield Link/A371 Rbt, West Wick Rbt, Airfield Bridge Link (which is likely to be bus/cycle/ped only) and Herluin Way to Locking Road Link.
E20	Weston-super-Mare Cycling and Walking Network	Completion of a network of legible, attractive and safe strategic cycle routes in the Weston-super-Mare area, with a focus on east-west routes from Worle and Weston Villages into the town centre. Within the Weston-super-Mare Town Centre Masterplan and SPD. This includes better pedestrian and cycling facilities to serve Weston-super-Mare as part of the JSP and Core Strategy Growth.

Other longer-term opportunities

Ref	Scheme	Details
L1	Strategic Rail and Road Freight Package	Freight consolidation centre (rail) at Avonmouth, network loading gauge enhancements on railway network, sustainable distribution projects at key stations (initially Bristol Temple Meads), and restrictions on HGV movements.
L2	A46 to M4 route improvements, Cold Ashton	Capacity improvements especially at the Cold Ashton roundabout to remove existing delays between Bath and junction 18 of the M4.
L3	Greater Bath Bus Network Package	New vehicles to implement fleet improvements at a faster pace. Real time information (RTI) screens at all stops and upgrade to thin-film-transistor (TFT) displays - seven corridor network.
L4	Henbury Loop rail services	Orbital rail service around north Bristol, introduction of passenger services along freight line.
L5	Rail services to Thornbury	This includes the reopening of the line to passenger services to Thornbury. Assumes the completion of the Westerleigh junction upgrade.
L6	M5 Junction 20 Eastern Arm to Nailsea	New multi-modal connection from M5 Junction 20 (via new eastern arm) to Nailsea, which could include highway, public transport, MetroBus and walking & cycling connections to Nailsea.