



West Sussex County Council

SUSTAINABILITY APPRAISAL SCOPING REPORT

WEST SUSSEX LOCAL TRANSPORT PLAN



West Sussex County Council

SUSTAINABILITY APPRAISAL SCOPING REPORT

WEST SUSSEX LOCAL TRANSPORT PLAN

TYPE OF DOCUMENT (VERSION) PUBLIC

PROJECT NO. 70076288

DATE: MARCH 2021

WSP

2 London Square
Cross Lanes
Guildford, Surrey
GU1 1UN

Phone: +44 148 352 8400

WSP.com



QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks	Preliminary draft for data input from WSCC	Final draft for consultation incorporating Evidence Based Data provided		
Date	January 2021	March 2021		
Prepared by	Jerome Kreule	Jerome Kreule		
Signature				
Checked by	Ursula Stevenson	Ursula Stevenson		
Signature				
Authorised by	Jo North	Jo North		
Signature				
Project number	70076288	70076288		
Report number	Prelim draft	V01		
File reference				

CONTENTS

1	INTRODUCTION	1
1.1	INTRODUCTION	1
1.2	SUSTAINABILITY APPRAISAL	1
1.3	SCOPING REPORT	3
1.4	RELATIONSHIP WITH OTHER PROCESSES	3
1.5	TRANSPORT FOR THE SOUTH EAST	4
2	LOCAL TRANSPORT PLAN	5
2.1	BACKGROUND	5
2.2	THE STRATEGY	7
2.3	THE IMPLEMENTATION PLAN	9
3	IDENTIFYING SUSTAINABILITY ISSUES	10
3.1	INTRODUCTION	10
3.2	NATURAL CAPITAL AND ECOSYSTEM SERVICES	10
3.3	MATERIALS, MINERALS AND WASTE	12
3.4	SOILS	15
3.5	BIODIVERSITY, FLORA AND FAUNA	15
3.6	AIR QUALITY	18
3.7	CLIMATE	22
3.8	NOISE	27
3.9	LANDSCAPE AND TOWNSCAPE	29
3.10	THE HISTORIC ENVIRONMENT	32
3.11	WATER	33
3.12	POPULATION	37
3.13	HEALTH	39
3.14	ECONOMY	42
4	SUSTAINABILITY APPRAISAL FRAMEWORK	46
4.1	INTRODUCTION	46

4.2	APPRAISAL FRAMEWORK	46
5	NEXT STEPS	53

TABLES

Table 3-1 – Types of Flooding affecting West Sussex and the wider UK	36
Table 3-2 - Population Across West Sussex for 2016 and Projected for 2036	38
Table 3-3 - Projected Population Growth for West Sussex	38
Table 3-4 - Life Expectancy in West Sussex and Nationally (2016-2018)	40
Table 3-5 - Users of Educational Facilities in West Sussex and the Average Journey Time by Public Transport, Cycle and Car	44
Table 3-6 - Percentage of Users within Half an Hour of Educational Facilities by Public Transport, Car and Cycle	45
Table 4-1 - Sustainability Appraisal Framework	47

FIGURES

Figure 1-1 - Summary of the LTP and SEA Processes	2
---	---

APPENDICES

[APPENDIX A: FIGURES](#)

1 INTRODUCTION

1.1 INTRODUCTION

- 1.1.1. West Sussex County Council (WSCC) are currently updating their Local Transport Plan (LTP). WSP has been commissioned by WSCC to prepare a Sustainability Appraisal (SA) for the LTP which is known as the West Sussex Transport Plan (WSTP). This Scoping Report presents the first stage in the SA process.

1.2 SUSTAINABILITY APPRAISAL

- 1.2.1. SA is a systematic process that is undertaken during the preparation of a plan. Its role is to promote sustainable development by assessing environmental, social and economic impacts, as well as mitigating any potential adverse effects that the plan might otherwise have.
- 1.2.2. Sustainability appraisals incorporate the regulatory requirements of Strategic Environmental Assessment (SEA).

STRATEGIC ENVIRONMENTAL ASSESSMENT

- 1.2.3. SEA is used to describe the application of environmental assessment to plans and programmes in accordance with European Council Directive 2001/42/EC¹. The SEA Directive is enacted in England through the “Environmental Assessment of Plans and Programmes Regulations” (SI 2004/1633, known as the SEA Regulations)². These regulations will be adhered to until they are superseded by new legislation emerging from the United Kingdom’s departure from the EU.
- 1.2.4. These Regulations place an obligation on local authorities to undertake SEA for certain plans and programmes, including the policies and implementation of all LTPs. Local transport authorities should ensure that the SEA is an integral part of developing, and later delivering, their LTP.
- 1.2.5. Figure 1-1 shows the key steps of the SEA process and the relationship with the LTP³.

¹ EC (2001) [Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the Environment](#). [Accessed November 2020]

² UK Government (2004) [SI 2004 No. 1633, The Environmental Assessment of Plans and Programmes Regulations 2004](#). [Accessed November 2020]

³ Department for Transport (2009) [Guidance of Local Transport Plan \[online\]](#) [Accessed November 2020]

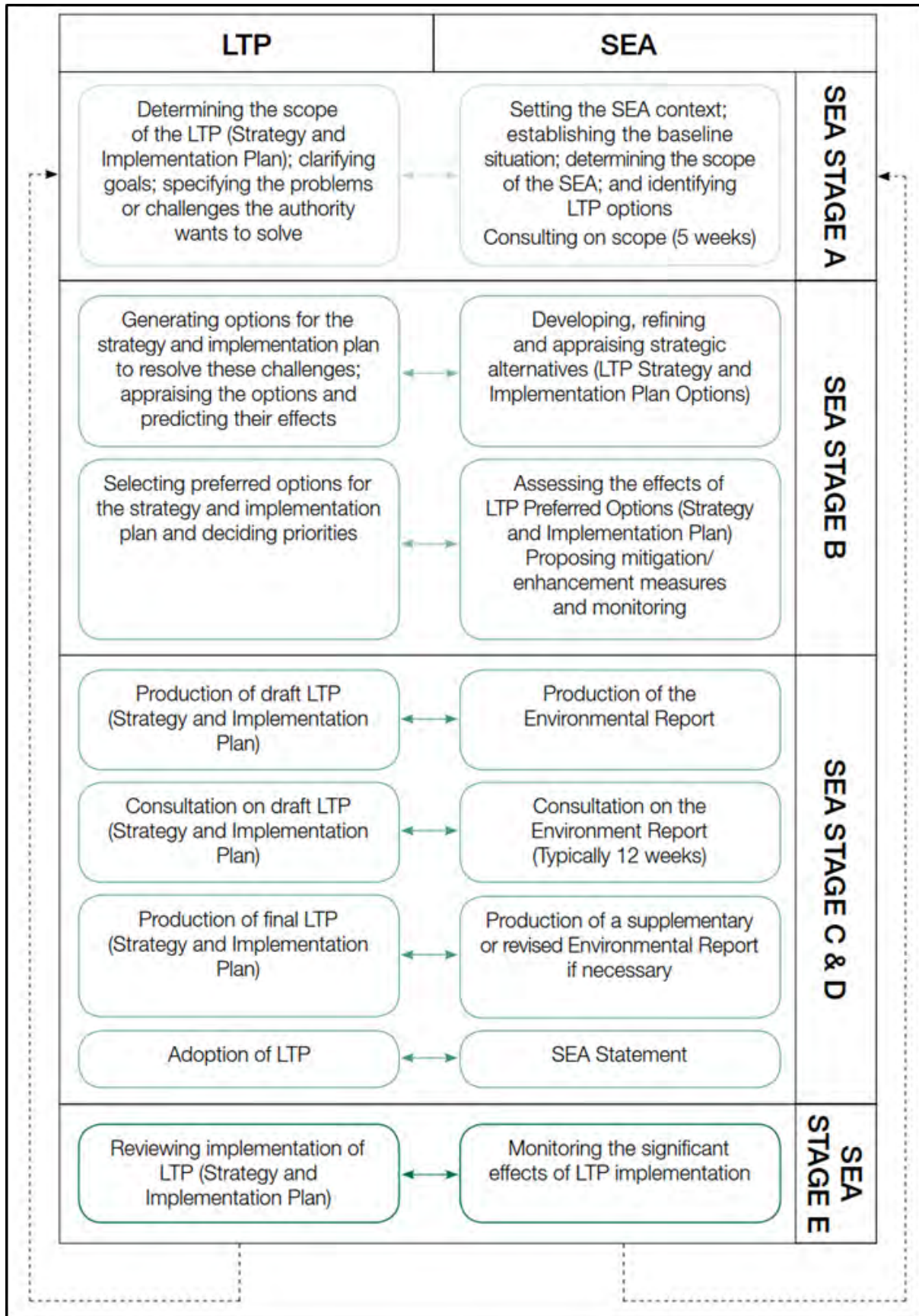


Figure 1-1 - Summary of the LTP and SEA Processes

1.3 SCOPING REPORT

1.3.1. This report represents Stage A of the process described in Figure 1-1 above. This report sets the context and scope of the sustainability appraisal through:

- Identifying likely options for delivery of the LTP (Section 2);
- A review of relevant policies plans and programmes (Section 3);
- Identifying baseline information and issues (Section 3); and
- Development of a framework for the sustainability appraisal (Section 4).

1.4 RELATIONSHIP WITH OTHER PROCESSES

HABITATS REGULATIONS ASSESSMENT

1.4.1. Under Article 6 (3) of the EU Habitats Directive⁴ as transposed into the UK law by the Habitats Regulations⁵, an assessment (referred to as a Habitats Regulations Assessment (HRA)) needs to be undertaken in respect of any plan or project which:

- Either alone or in combination with other plans or projects would be likely to have a significant effect on a site designated within the Natura 2000 network – these are Special Areas of Conservation (SACs), candidate SACs (cSACs), and Special Protection Areas (SPAs). In addition, Ramsar sites (wetlands of international importance), potential SPAs (pSPA) and in England possible SACs (pSACs), are considered in this process as a matter of law or Government policy. [These sites are collectively termed ‘European sites’ in Habitats Regulations Assessment (HRA)]; and
- Is not directly connected with, or necessary to, the management of the site.

Guidance on the Habitats Directive⁶ sets out four distinct stages for assessment under the Directive:

- Stage 1: Screening: the process which initially identifies the likely impacts upon a Natura 2000 site of a plan or project, either alone or in combination with other plans or projects, and considers whether these impacts are likely to be significant;
- Stage 2: Appropriate Assessment: the detailed consideration of the impact on the integrity of the Natura 2000 sites of the plan or project, either alone or in combination with other plans or projects, with respect to the site’s conservation objectives and its structure and function. This is to determine whether there will be adverse effects on the integrity of the site;
- Stage 3: Assessment of alternative solutions: the process which examines alternative ways of achieving the objectives of the plans or projects that avoid adverse impacts on the integrity of the Natura 2000 site; and
- Stage 4: Assessment where no alternative solutions exist and where adverse impacts remain: an assessment of whether the development is necessary for imperative reasons of overriding public interest (IROPI) and, if so, of the compensatory measures needed to maintain the overall coherence of the Natura 2000 network.

⁴ EC (1992) [Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora](#). [Accessed November 2020]

⁵ UK Government (2010) [The Conservation of Habitats and Species Regulations 2010/490 \(as amended\)](#). [Accessed November 2020]

⁶ EC (2018). [Managing Natura 2000 Sites, the provisions of Article 6 of the ‘Habitats’ Directive 92/43/EEC](#). [Accessed November 2020]

- 1.4.2. The first stage, of the Habitats Regulations Assessment (screening) as well as subsequent stages where required, will be undertaken as the LTP develops. Information from the HRA relating to Natura 2000 sites and potential impacts on them can be used within the SA.

HEALTH IMPACT ASSESSMENT

- 1.4.3. Health considerations are also a requirement of the SEA Regulations. A short technical report will be prepared, and findings included within this assessment. A separate Health Impact Assessment (HIA) process has not been undertaken.

EQUALITY IMPACT ASSESSMENT

- 1.4.4. Under the Equalities Act 2010, public bodies have a duty to assess the impact of their policies on different population groups to ensure that discrimination does not take place and, where possible, to promote equality of opportunity. A short Equalities Impact Assessment (EqIA) technical report will be prepared and the findings incorporated into the SA.

1.5 TRANSPORT FOR THE SOUTH EAST

- 1.5.1. Transport for the South East (TfSE) is a sub-national transport body for the South East of England. It brings together 16 local transport authorities, of which WSCC is one, and a range of wider stakeholders. TfSE is dedicated to creating an integrated and sustainable transport system that makes the South East more productive and competitive, improves the quality of life for all residents giving access to opportunity whilst protecting and enhancing the unique natural and built environment. TfSE's vision is for the South East to be a leading global region for net-zero carbon, sustainable economic growth where integrated transport, digital and energy networks have delivered a step change in connectivity and environmental quality.
- 1.5.2. Development of the strategy began prior to the Covid-19 pandemic, further consideration is now being given to the long-term impact of the pandemic on the South East's economy and travel patterns. From 2020 the pandemic has driven behavioural change with more individuals working from home, increased use of online retail, and individuals seeking greater access to open space. Rising inequality, technological and behavioural change, the importance of polycentricity and a new relationship with London have been identified as areas that will require further consideration to plan and build a more resilient South East in the journey towards a 'new normal'⁷.

⁷ Covid-19 recovery scenarios: [Opportunities for a more prosperous and sustainable South East](#) [accessed March 2021]

2 LOCAL TRANSPORT PLAN

2.1 BACKGROUND

POLICY CONTEXT

- 2.1.1. The existing West Sussex Transport Plan (WSTP), approved in 2011, covers the period 2011-2026. The WSTP is being updated and is expected to cover the period 2022-2036. The updated Plan will reflect changes to national, regional and local strategies and policy documents. It will also reflect the development plan intentions within adopted and emerging Local Plans across West Sussex.
- 2.1.2. In 2017 West Sussex County Council (WSCC) commenced a review of the WSTP and WSP prepared a Scoping Report, which was issued for consultation. However, the update of the WSTP was not progressed at this time.
- 2.1.3. In April 2019 WSCC passed a motion pledging to try to reach net zero carbon emissions for its own operations by 2030. A number of the district and borough councils in the area (Chichester, Horsham, Adur and Worthing) declared climate emergencies in 2019.
- 2.1.4. The WSTP will look at issues and improvements relating to a number of transport modes used in West Sussex including:
- Transport:
 - Travel behaviour in West Sussex is dominated by car travel and electric vehicles make up a very small proportion of the total number of vehicles;
 - The County Strategic Road Network has capacity pinch-points and road safety issues which reduce its efficiency leading to congestion, pollution and rat running on less suitable routes;
 - Major schemes and improvements are planned to mitigate development but will require additional funding to address pre-existing issues and improvements may have consequential impacts that need to be managed;
 - Gatwick Airport is a major international gateway that attracts passengers and employees from a wide area and surface access can have adverse impacts on communities that share routes to the Airport;
 - There are potential opportunities and consequential impacts on nearby communities from planned or potential major projects such as Gatwick Airport Station and Gatwick Airport expansion;
 - The rail network provides good services to London but there are capacity, journey time and quality issues on West Coastway services that mean the rail network is not always the preferred choice for travel between West Sussex towns and to surrounding cities;
 - There are potential opportunities and consequential impacts on nearby communities from planned or potential major projects such as the Brighton Main Line upgrades;
 - COVID19 has had a dramatic impact on travel behaviour. It is unclear what the long-term impacts will be on rail demand;
 - Bus network punctuality and efficiency is an issue due to congestion on routes into and within urban areas;
 - Public transport in rural areas is not commercially viable which may get worse as travel patterns change and new mobility solutions emerge. The cost of public transport can be a barrier to accessibility;

- The footway network is extensive (7497km) however there are only 74km of cycleway in West Sussex and severance can be particularly problematic for some users such as equestrians;
- Public acceptance of roadspace reallocation particularly when levels of cycling and walking are low compared to motorised transport; and
- Costs of improvements are likely to outweigh funding availability.
- Environment:
 - Travel patterns in West Sussex are dominated by use of vehicles that use fossil fuel propulsion which contributes to climate change and the pace of decarbonisation is not currently fast enough to meet the Government's climate change ambition to achieve net zero carbon by 2050;
 - Usage of the transport network has negative impacts (e.g. air and noise pollution) on the local natural environment, including protected areas;
 - Improving the transport network may require use of land that is protected or have negative impacts on protected areas, which may preclude or limit the available options;
 - Large areas of the County are protected for their landscape, ecological, or historic characteristics, some of which are of international importance; and
 - The transport network in West Sussex is vulnerable to the weather, particularly increased extreme events due to climate change.
- Social:
 - The County supports a growing and ageing population which is expected to grow most in existing settlements, as well as across the Coastal West Sussex area which already has a higher proportion of older people, increasing demands on transport infrastructure and services;
 - Risk of isolation in rural areas as public transport has viability challenges and there is a need to travel to access some services which has a disproportionate effect on those groups that depend on these services and public transport;
 - Transport infrastructure can cause severance and accessibility issues, which prevent access to green and blue spaces, and result in unhealthy lifestyles due to limited opportunities for active travel; and
 - Use of the transport network creates air quality, noise and light pollution that can have adverse public health and wellbeing impact.
- Economic:
 - The performance of the West Sussex economy in terms of output and productivity varies spatially. The Coastal West Sussex area typically underperforms compared to the Gatwick Diamond which benefits from the strongest transport links to London and the rest of the UK and proximity to Gatwick Airport;
 - Planned development is expected to take place, particularly in the Coastal West Sussex and Gatwick Diamond areas and there are regeneration initiatives in some coastal towns which could increase commuting if suitable jobs are not created at a similar rate to housing delivery; and
 - The COVID-19 pandemic has had a significant adverse impact on the West Sussex economy, particularly on leisure and tourism and in areas such as Crawley that are dependent on industries that have been particularly badly affected.

2.1.5. The Plan will comprise two elements, the Long Term ‘Strategy’ and the ‘Implementation Plan’.

BASELINE

- 2.1.6. West Sussex is a rural county with high car use and ownership. The main transport connections are part of the London to south-coast, east-west coastal connections and Gatwick airport local connections. The transport network as of 2016 contains 23 miles of motorway, 2,800 miles of highways and 38 railway stations. The road network experiences capacity, accessibility and connectivity issues throughout. Particular issues of traffic, bottlenecks and capacity overflow at major junctions and urban areas. The county strategic road network connects all ten major towns in West Sussex (Bognor Regis, Burgess Hill, Chichester, Crawley, East Grinstead, Haywards Heath, Horsham, Littlehampton, Shoreham and Worthing). The core roads as part of this network are the M23, A23, A27, A24, A259, A264 and the A272. The proportion of electric vehicle usage is low in West Sussex and there is limited charging infrastructure (fewer than 100 publicly accessible charging points).
- 2.1.7. The county rail network provides connections east towards Kent, west towards Bournemouth and north towards Gatwick Airport and London. Not all these routes have direct connections and rail capacity is a major issue on some routes at peak times, particular routes to London. East – west rail routes particularly on West Coastway have slower journey times which contribute to poor connectivity between economic centres (e.g. Gatwick and the Thames Valley, Brighton and South Hampshire).
- 2.1.8. The County is predominantly rural with dispersed population and as a result, in places the public transport network is dispersed, disconnected and unreliable which limits accessibility to rural areas and services. It is noted that localised bus services are regarded highly by users, however, the cost of public transport is a barrier to accessibility. The public transport bus network is overwhelmingly commercially run but some services in rural areas are not commercially viable and only operate due to financial support.
- 2.1.9. Gatwick Airport is located in the north-east of West Sussex and is the key economic driver in the area. Good rail connections exist along the Arun Valley and Brighton Main Lines to Brighton and London. The local bus network provides good access to the Airport from nearby Crawley but connections beyond are more limited.

West Sussex has an extensive PRow network of 4,071km of routes throughout West Sussex. These routes suffer from a lack of safety and a high level of dissatisfaction from users. The network includes footpaths, bridleways, restricted byways and Byways Open to All Traffic (BOATs). The network provides sustainable options for travelling to school, to work and to local services. It also contributes to people being able to lead a healthy lifestyle via the provision of areas suitable for NMUs to undertake activities such as walking, cycling and horse riding. Whilst the NMu network is extensive, less than 1% is dedicated to cycleways, as such there is a lack of cycling facilities compared to pedestrian facilities.

2.2 THE STRATEGY

- 2.2.1. Three potential strategic options for the WSTP have been formulated. These strategic options would guide the nature of interventions for the WSTP plan up to 2036 and are as follows:
- Local Living:
 - Prioritise interventions and approaches that reduce the need to travel and support short distance trips;
 - Growth related increase in trips to be offset by a reduction in trip length and frequency so total trips outcome is neutral;

- Focus interventions on larger settlements where trip distances are shorter to increase NMU mode share; and
- Improve bus network coverage in rural areas.
- Connecting Economic Centres:
 - Prioritise interventions and approaches that help to keep people and goods moving, particularly on the strategic transport network;
 - Growth related increase in trips to be accommodated through increase in highway capacity, rail and bus mode share resulting in longer and more frequent trips so total trips outcome is major increase; and
 - Focus interventions on inter-urban journeys and improve bus network quality in urban areas.
- Protecting Places and Communities:
 - Prioritise interventions and approaches that reduce impacts on communities and the environment;
 - Trip length and frequency to remain neutral but growth-related increase in trips results in slight increase in total trips; and
 - Focus interventions to increase in rail and NMU mode share.

2.2.2. Draft transport objectives for the WSTP have been formulated. These have the objective of improving the quality of life of communities in West Sussex by 2036, and are as follows:

- Reduce the need to travel by car;
- Improve the efficiency of the County Strategic Road Network, particularly east-west routes including A27, through targeted improvements to address congestion, pollution, rat-running and road safety issues;
- Minimise the impacts on the transport network of surface access to Gatwick Airport by passengers and employees and ensure transport network improvements take the needs of other users and communities that share these routes into account;
- Ensure the rail network is an attractive option for travel between West Sussex towns and to surrounding cities by improving the speed and quality of West Coastway and Arun Valley Line services and capacity on the Brighton Main Line;
- Improve bus network efficiency by reducing the effects of congestion into and within West Sussex towns, particularly where there are gaps in the rail network;
- Ensure the bus network is customer focussed to provide an attractive option for journeys to nearby towns; and
- Extend and improve the network NMU facilities, taking account of potential usage and stakeholder support, so it is coherent and high quality enough to make active travel an attractive option for short distance trips.

2.2.3. As well as the transport objectives, a series of wider objectives have been developed for the WSTP, and are as follows. These are based on the previous WSTP but are being updated to reflect changes to national and local policies, and to incorporate comments and feedback received on the existing objectives:

- Support sustainable economic prosperity across the County by levelling-up underperforming areas and recovering from the COVID-19 pandemic;
- Support development and regeneration plans across the County through strategic investments at the right time and place to ensure the transport network is fit for the future;

- Accommodate the needs of an ageing population that is expected to grow most in existing settlements in the Gatwick Diamond and Coastal West Sussex areas;
- Minimise air, noise and light pollution from use of the transport network to minimise impacts on public health and well-being;
- Ensure the transport network allows residents to live healthy lifestyles with good access to green and blue spaces, particularly on the West Sussex coast and in the protected South Downs, High Weald and Chichester Harbour;
- Ensure rural communities can access nearby towns;
- Enable the transport network to be on a pathway to net zero carbon by 2050;
- Minimise the impacts of the transport network on areas that are protected for their landscape, ecological or historic characteristics;
- Improve the transport network whilst protecting or enhancing the natural, built and historic environment; and
- To monitor and adapt infrastructure to the effects of climate change.

2.2.4. In support of the WSTP, WSCC have drafted a vision of the county and LTP4:

- “Our vision is for a West Sussex Transport network in 2036 that works for communities in the Coastal West Sussex, Gatwick Diamond and Rural West Sussex economic areas by helping to level up the coastal economy and provide access to employment and services countryside.;
- The transport network will allow residents to live healthy lifestyles with good access to the West Sussex coast and the protected South Downs, High Weald and Chichester Harbour;
- The transport network will be on a pathway to net zero carbon by 2050 through mass electrification and reduced use of fossil-fuels. It will also be safer and more efficient overall with more walking, cycling and use of public or shared transport and less congestion on major routes that connect West Sussex towns with Gatwick Airport, London and nearby cities;
- Active travel modes, public or shared transport will be attractive options in built up areas and between towns, and rural communities will have access to the services they need; and
- Transport impacts such as air pollution, noise and rat-running on adjacent communities and the environment will be minimised to protect a quality of life that reflects the characteristics of the County.”

2.3 THE IMPLEMENTATION PLAN

2.3.1. This will set out how the strategy will be implemented, identifying what infrastructure is required and any available options to achieve the Council’s objectives. It will be divided into local areas and set out issues and proposals for each area. These areas are currently envisaged to comprise the seven West Sussex District and Boroughs as well as the South Downs National Park (SDNP) area:

- Adur District;
- Arun District;
- Chichester District;
- Crawley Borough;
- Horsham District;
- Mid Sussex District;
- Worthing Borough; and
- South Downs National Park.

3 IDENTIFYING SUSTAINABILITY ISSUES

3.1 INTRODUCTION

- 3.1.1. This section sets out the sustainability policy context; baseline and any future trends regardless of the implementation of the WSTP. It identifies key issues for sustainability in relation to the WSTP. This information can then be used to develop an appraisal framework in Section 4.

3.2 NATURAL CAPITAL AND ECOSYSTEM SERVICES

- 3.2.1. Natural capital is a term used to describe those elements of the natural environment that provide benefits for humans (also known as ecosystem services), including food, water, recreation, and clean air and water. Some ecosystem services fall across a number of sustainability topics, for example, recreational and aesthetic value services could be considered under the Health, Biodiversity, Landscape and Townscape, and Water Environment topics, amongst others. Biodiversity (the variety of life on Earth) is a fundamental component of natural capital, and underpins the provision of ecosystem services, for example pollination, recreational, and water, soil, disease and pest regulation services.
- 3.2.2. A natural capital approach is therefore useful for understanding the inter-dependencies between nature, people, the economy and society, and ensuring that natural capital is considered as an integrated system. It provides a framework for incorporating the value of nature into decision-making and revealing the cost of its degradation. Degradation of natural capital (including biodiversity loss) has an adverse effect on the benefits that humanity receives from the natural environment such as flood risk reduction, food, water provision and energy production. As such, this represents an overarching topic to frame the rest of the SA.

SUMMARY OF BASELINE AND FUTURE TRENDS

Current Baseline

- 3.2.3. The UK National Ecosystem Assessment (UK NEA) (2011) revealed that the loss, fragmentation and deterioration of natural habitats in the UK since the 1940s has caused a decline in the provision of many ecosystem services, and that this declining trend is continuing. Though not the key cause, transport networks have nevertheless contributed to this decline; however, they also have the potential to improve ecosystem service delivery.
- 3.2.4. In 2011, the Government stated, through Commitment 32 of the Natural Environment White Paper, that it would “work with its transport agencies and key delivery partners to contribute to the creation of coherent and resilient ecological networks.” In response to this, Natural England published a report in 2014 investigating how land within or adjacent to transport corridors (the ‘soft estate’) can be used or enhanced for green infrastructure that delivers biodiversity gain, ecological connectivity and ecosystem services⁸.
- 3.2.5. A £3 million pilot project followed in 2015-2017, drawing together Natural England, Highways England, Network Rail, and Nature Improvement Area (NIA) partnerships in northern England⁹. The aim of the pilot was to ensure that transport corridors not only accommodate more wildlife (especially pollinators), but to benefit transport users and the wider public by making infrastructure

⁸ Natural England (2014) [NECR How transport's soft estate has enhanced green infrastructure, ecosystem services, and transport resilience in the EU](#). Available at: [Accessed December 2020]

⁹ Natural England, Defra and Highways England (2014). [Greener Transport Network to provide highways for Wildlife](#). [Accessed January 2021].

more resilient to the growing impacts of climate change, such as increased flooding and winter storms.

- 3.2.6. Its findings and recommendations have helped influence the recent Varley review into Network Rail lineside vegetation management, the establishment of the Linear Infrastructure Network (LINet), and Natural England's work on developing an eco-metric tool (in collaboration with project partners including WSP). The pilot has also had an ongoing impact within Highways England and with the Office of Road and Rail (ORR), and a similar approach is desired for transport corridors across the country.
- 3.2.7. The Office for National Statistics (ONS) has produced national level natural capital accounts. These show that approximately 20-25 million tonnes of carbon has been sequestered by vegetation in the UK each year between 2007 and 2015, whilst around 1.5 million tonnes of air pollutants have been removed each year. This equates to a monetary value of approximately £1.5 billion for carbon sequestration and £1 billion for pollution removal in 2015. The value of recreation (based on the number of hours people spend outside in the natural environment) has also been estimated for the UK. From a peak of £8.5 billion in 2010, this fell gradually to just under £6 billion in 2015. This is due to a decline in expenditure associated with visiting these sites (including fuel and public transport costs, and admission fees).

Future Trends

- 1.1.1 The declining trend in the provision of many ecosystem services reported in the UK NEA is expected to continue – in part due to the continuing deterioration, loss and fragmentation of habitats, as reported in the national 'State of Nature 2016' report¹⁰.
- 1.1.2 Further development to address the needs of the South East growing population – in combination with a changing climate – has the potential to further fragment and deteriorate the region's ecosystems, impacting on natural capital and its ability to provide ecosystem services.
- 1.1.3 An increase in the number of private vehicles on the roads and associated increases in noise pollution, air pollution, and contaminated surface water run-off, could restrict the ability of existing roadside habitats (including trees) to reduce these impacts.
- 1.1.4 However, there is also an increasing trend amongst governments and businesses to be "Future Ready", which includes addressing issues surrounding biodiversity, resource use, and climate change.

SUSTAINABILITY ISSUES FOR WSTP

- 3.2.8. Sustainability issues in relation to natural capital and ecosystem services are as follows:
- New transport routes will need to be carefully planned so that they do not cause adverse effects on ecosystems with high (potential) ecosystem services provision. Given that ecosystem services are the benefits that nature provides to people, areas of high (potential) provision are often the green and blue spaces close to centres of population, as well as connecting habitats that link these with more remote designated habitats and landscapes.
 - As transport corridors are typically linear, ensuring the connectivity of ecosystems is both an issue and an opportunity for the WSTP. There is scope to focus on redevelopment of existing assets rather than build new, to focus development away from areas of high biodiversity and ecosystem service provision, and to enhance the quality of the transport 'soft estate' alongside existing and new transport corridors in order to improve habitat connectivity.

¹⁰ Royal Society for the Protection of Birds (2016). [The State of Nature Reporting](#). [Accessed January 2021].

- Human health and quality of life can be improved by taking a natural capital approach to the WSTP. For example, improving the quality of habitats (including tree planting, sowing wildflower mix rather than amenity grassland to improve biodiversity) alongside walking and cycling routes can help encourage more active lifestyles with benefits for people's physical and mental health and wellbeing. Views of vegetation from other modes of transport (e.g. along roads and railways) can also enhance mental wellbeing, for example by reducing stress levels.
- Enhancing the quality of transport 'soft estate' can also help improve the resilience of the transport network to future climate change, for example by reducing flood risk and providing shading and cooling benefits.

3.3 MATERIALS, MINERALS AND WASTE

- 3.3.1. New transport infrastructure can lead to use of minerals and other materials, in addition to generating waste. The transport of waste and materials can lead to indirect effects from traffic such as congestion, air pollution and noise.

SUMMARY OF BASELINE AND FUTURE TRENDS

Current Baseline

Materials and Minerals

- 3.3.2. The distribution of minerals across the County is not even. West Sussex lies largely within the 'Wealden District' (as classified by the British Geological Survey). This takes the form of a sequence of geological zones spanning the north to south of West Sussex:
- Brickearth, London Clay and gravels along the coastal plain;
 - South Downs Chalks;
 - Various beds forming the Upper Greensand, Gault Clay and Lower Greensand to the north of the chalk downs;
 - Low Weald clay area; and
 - Mixed areas of sandstones and clays forming part of the High Weald (between Horsham, East Grinstead and Burgess Hill).

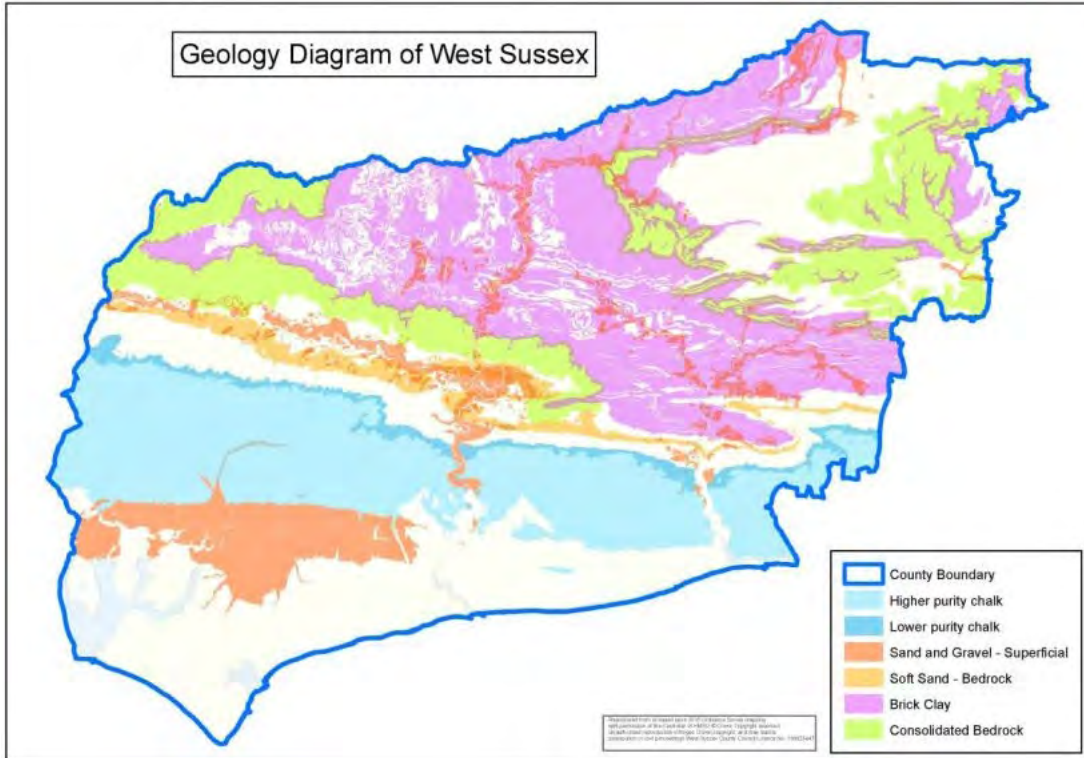


Figure 3-1 - Geology of West Sussex¹¹

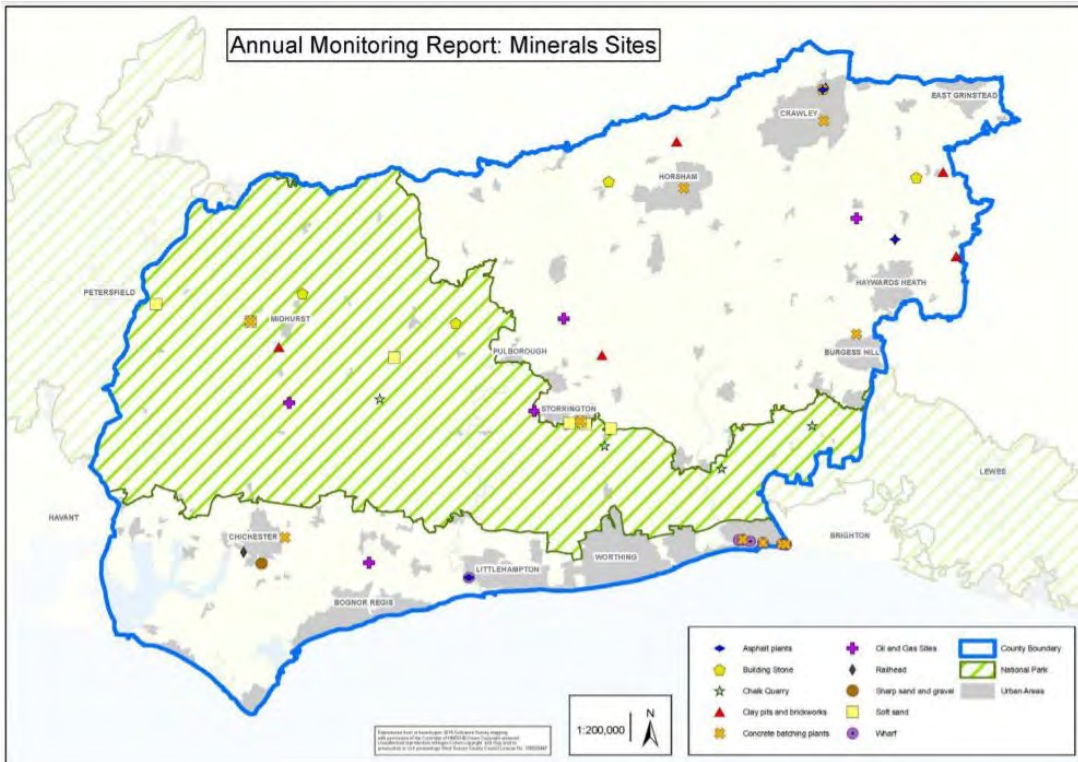


Figure 3-2 – Minerals Sites in West Sussex

¹¹ WSCC and SDNP (2018) [West Sussex Join Minerals Local Plan \[online\]](#) [Accessed November 2020].

Waste

- 3.3.3. There are over 50 waste management sites across West Sussex; the main types of facilities are recycling, recovery, treatment, disposal of inert materials, and landfill.

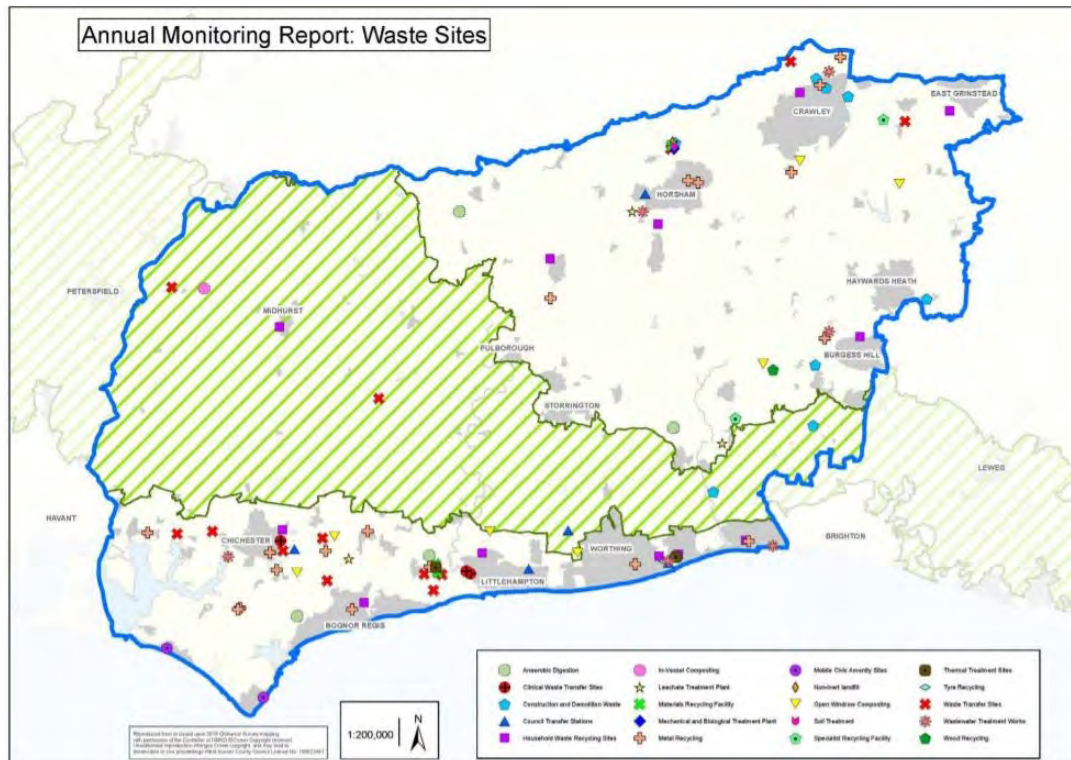


Figure 3-3 – Waste Sites in West Sussex

Future Trends

- 3.3.4. The County Council and South Downs National Park Authority have adopted a Minerals Local Plan that plans for a steady and adequate supply of minerals to meet the needs of the economy. Within West Sussex, materials are largely transported via road; there are presently no rail linked quarries within the County. It is unlikely that this will change due to the investment that would be required, and as such it is likely that materials will largely continue to be transported by road.
- 3.3.5. With a growing population, the potential for generating waste is increasing. There is a need to apply resource efficiency and waste management to minimise the amount of waste that goes to landfill. The County Council and South Downs National Park Authority have adopted a Waste Local Plan that outlines a plan to send zero waste to landfill in the future by managing waste more efficiently.

SUSTAINABILITY ISSUES FOR WSTP

- 3.3.6. Sustainability issues in relation to Materials and Waste are as follows:
- There is a reliance upon the road network to transport materials, and it is unlikely that this will change;
 - Materials, including minerals, will be required in any new transport infrastructure schemes. Similarly, application of resource efficiency including use of recycled materials is important to reducing waste and there is significant capacity for increasing the levels of recycled and secondary aggregate production used for transport infrastructure; and
 - Increasing population of the county is likely to generate more waste which requires transportation. Construction of new transport also has the potential to generate waste.

3.4 SOILS

- 3.4.1. Soil is an important natural resource for agriculture, food production, biodiversity and archaeological and geological purposes. Acknowledgement should be given to the detrimental impacts arising from soil compaction, namely erosion and cumulative pollution.

SUMMARY OF BASELINE AND FUTURE TRENDS

Current baseline

- 3.4.2. The UK has over 700 different soil types arising from the diverse array of geological deposits. The range of deposits across West Sussex across a small area has led to the development of a range of predominantly poor and infertile soils. Typically, it is only along the coastal plain of the County where soils are of Grade 1 status. Elsewhere the soils can be Grade 3 and 4, with Grade 2 on the Downs and in the river valleys¹².

Future Trends

- 3.4.3. Economic growth and rising population within the County will undoubtedly place additional pressures upon agricultural land; it is likely that land for development will become more of a premium and intensify competition for land amongst developers. Development on greenfield sites prevents their use for agriculture. New transport developments need to consider optimised use of brownfield sites, or agricultural land which is of lower grade (Grades 3b to 5) wherever possible, particularly when unlocking land for future development.

SUSTAINABILITY ISSUES FOR WSTP

- 3.4.4. It is important that any future development of the transport network in West Sussex takes account of the impacts on Best and Most Versatile (BMV) (Grades 1 to 3) agricultural land.
- 3.4.5. Sustainability issues in relation to soils are as follows:
- Future development, including infrastructure, may lead to the degradation of BMV land; and
 - Improvements to transport infrastructure will likely require land take.

3.5 BIODIVERSITY, FLORA AND FAUNA

- 3.5.1. West Sussex has a rich and diverse range of habitats. Due consideration should be given to protecting, conserving and enhancing the county's biodiversity, particularly considering the disturbance and habitat degradation that may arise from the construction of transport infrastructure.

SUMMARY OF BASELINE AND FUTURE TRENDS

Current Baseline

- 3.5.2. Sussex supports a rich diversity of habitats and species, ranging from chalk grasslands and pockets of vegetated shingle, through to heathlands across the county. However, less than 62,000 hectares (ha) of Sussex are protected for their value to wildlife; around 16% of the total land area. Sussex is also home to around 80 protected species and more than 495 species recognised as being a priority for conservation.

¹² WSCC (2010) [Sussex Historic Landscape Characterisation \[online\]](#). [Accessed November 2020]

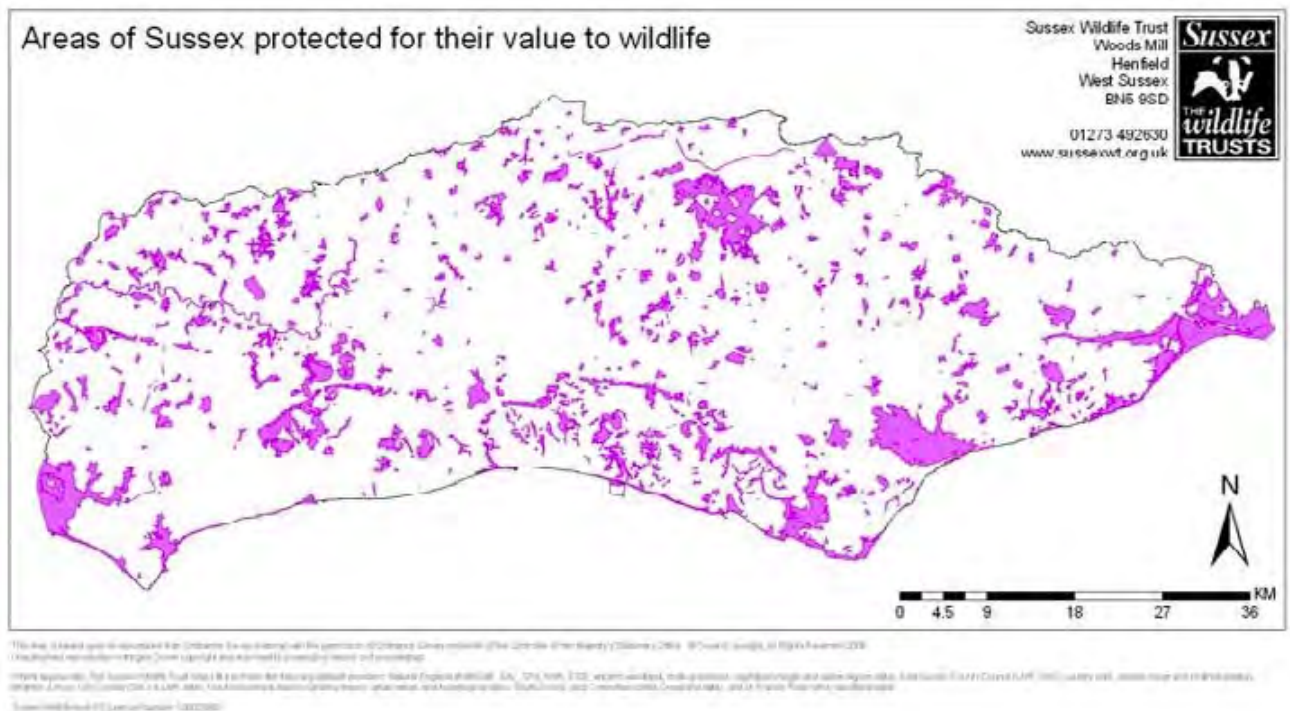


Figure 3-4 - Internationally Protected areas of West Sussex¹³

3.5.3. West Sussex has diverse range of habitats inclusive of flower meadows, ancient woodland, coastal sand dunes and shingle. The county contains a vast number of international, national, regional and local nature reserve designations, as follows (Figure A-3):

- Special Protection Areas (SPA): four;
 - Arun Valley;
 - Chichester and Langstone Harbours;
 - Pagham Harbour; and
 - Wealden Heaths.
- Special Areas for Conservation (SACs): eight;
 - Arun Valley;
 - Duncton to Bignor Escarpment;
 - Ebernoe Common;
 - Kingley Vale;
 - Rook Cliff;
 - Singleton and Cocking Tunnels;
 - Solent Maritime; and
 - The Mens.
- Ramsar Sites: three;

¹³ Sussex Wildlife Trust (2014) [Biodiversity and Planning in Sussex](#). [Accessed March 2021]

- Arun Valley;
- Chichester and Langstone Harbours; and
- Pagham Harbour.
- Sites of Special Scientific Interest (SSSI): 77;
- National Nature Reserves (NNRs): two;
- Local Nature Reserves (LNRs): 27;
- Local Geological Sites (LGS) (formerly known as Regionally Important Geological / Geomorphological Sites (RIGS)): 69;
- Local Wildlife Sites (LWS) (formerly known as Sites of Nature Conservation Importance (SNCIs)): 356;
- Biodiversity Opportunity Areas (BOAs): 75; and
- UNESCO World Biosphere Reserve (Brighton & Lewes Downs).

- 3.5.4. As shown in Figure A-3, West Sussex also contains areas of Ancient Woodland and areas of Habitats of Principal Importance (HPI). Ancient Woodland and Deciduous Woodland are particularly widespread through the county, with concentrations in SDNP to the north of Chichester and within the High Weald AONB.
- 3.5.5. According to the South East (SE) England Biodiversity Forum, the SE (of which West Sussex is within) is a key area for a range of priority habitats. For example, the SE holds over 40% of England's Ancient Woodland, making this important habitat more common in the SE than most other regions of the UK. The SE also holds more than 30% of England's broadleaved, mixed and yew woodland; and more than 40% of its lowland heath habitats. The low chalk and hard limestone hills of southern England are excellent examples of lowland calcareous grassland – famous for its floristic (and therefore invertebrate) richness. The SE region holds over 10% of England's lowland calcareous grassland resource.

Future Trends

- 1.1.5. Studies such as the '*State of Nature UK*' report have shown that nationally biodiversity has been declining despite the prevalence of conservation efforts; approximately 13% of all species across the UK are at threat of extinction. In some cases, this may be a result of the approach to designated areas on an individual basis, whereas perhaps a regional or county level approach may be more effective. The most important habitats (those for which the UK has a European level responsibility) also remain in relatively poor condition (71% unfavourable for the UK versus an EU average of 30%). A rising population and associated need for development may cause further loss, fragmentation and degradation of habitats, causing a further decline in biodiversity.
- 1.1.6. Avoiding habitat fragmentation and overall decline in biodiversity will be increasingly important as population grows, and development takes place. Development away from transport hubs and centres for employment, education and services is likely to encourage less sustainable travel methods (i.e. use of the private car). This may have knock-on effects on habitats sensitive to air quality and disturbance.
- 1.1.7. Biodiversity is also under threat from climate change, with changing temperatures and extreme weather events resulting in the loss, degradation and movement of species and habitats. Increased

frequency and severity of summer drought will be a particular threat to woodlands, with sensitive tree species on shallow freely draining soils in southern and eastern England being most at risk^{14,15}.

SUSTAINABILITY ISSUES FOR WSTP

3.5.6. Sustainability issues in relation to biodiversity, fauna and flora are as follows:

- There are a number of statutory local, national and international sites designated for nature conservation within the County which may be affected by development, including transport infrastructure;
- Habitats, particularly those designated as HPI and Ancient Woodland are at risk of being lost, damaged or fragmented by development, including transport infrastructure;
- Species, including Species of Principal Importance and protected species, may also be affected by construction and operation of new infrastructure, both directly and indirectly;
- The WSTP presents opportunities to be strategic in the enhancement of biodiversity at the landscape scale across the corridors (and, once the interventions are defined, also in relation to any necessary offsets beyond the boundary of specific developments). Existing Biodiversity Opportunity Areas (Natural England) can be combined with priorities for wider ecosystem service benefits to deliver landscape wide environment gain for biodiversity and people; and
- Biodiversity Net Gain (BNG) is the end result of a process applied to development so that overall, there is a positive outcome for biodiversity. Although not currently a legal obligation for UK development, on 14th March 2019, Her Majesty's Treasury confirmed that following consultation, the Government will use the forthcoming Environment Bill to mandate BNG for development in England, ensuring that the delivery of much-needed infrastructure and housing is not at the expense of vital biodiversity.

3.6 AIR QUALITY

3.6.1. Air Quality in West Sussex is generally good but enforced Air Quality Management Areas (AQMAs) are predominantly associated with transport sources and emissions. Potential adverse impacts affecting human health and the wider surrounding environment arising from transport sources will need to be considered.

SUMMARY OF BASELINE AND FUTURE TRENDS

Current Baseline

Air Pollution in the UK

- 3.6.2. Road transport is a major source of air pollution. Vehicles emit a range of pollutants including nitrogen oxides (NO_x) and particulate matter (PM). Nitrogen dioxide (NO₂) is of principle concern due to widespread exceedances of legal limits through the UK.
- 3.6.3. Air pollution results in damage to the natural environment. For example, NO₂ contributes to acidification of soils which can lead to loss of plant diversity. NO₂ adds excessive nutrients to water courses that can cause algal blooms, which in turn can cause fish mortality and loss of plant and animal diversity. Any proposed plans or projects that may affect a protected European nature conservation site are assessed under the Habitats Regulations (refer to Section 1.4) to consider their potential impacts, including air quality, and if those impacts will adversely affect the ecological

¹⁴ Climate UK (2012) [A Summary of Climate Change Risks for South East England](#). [Accessed January 2021]

¹⁵ The Woodland Trust (2011) [The State of the UK's Forests, Woods and Trees](#). [Accessed January 2021]

integrity of the protected site. Trees and vegetation absorb carbon dioxide (the main greenhouse gas) and filter, absorb and reduce pollutant gasses including ozone, sulphur dioxide, carbon monoxide and NO₂ as well as producing oxygen.

- 3.6.4. Figures 3-5 and 3-6 below show the changes in air pollutant concentrations between 1970 and 2019.
- 3.6.5. Between 1970 and 2019 (the most recent year for which data are available), UK estimated emissions of nitrogen oxides have fallen by 73%, UK estimated emissions of PM₁₀ particulate matter have fallen by 53% and UK estimated emissions of PM_{2.5} particulate matter have fallen by 54%. Between 2009 and 2019, emissions of nitrogen oxides have fallen by 33%, emissions of PM₁₀ have fallen by 5% and emissions of PM_{2.5} have fallen by 9%.

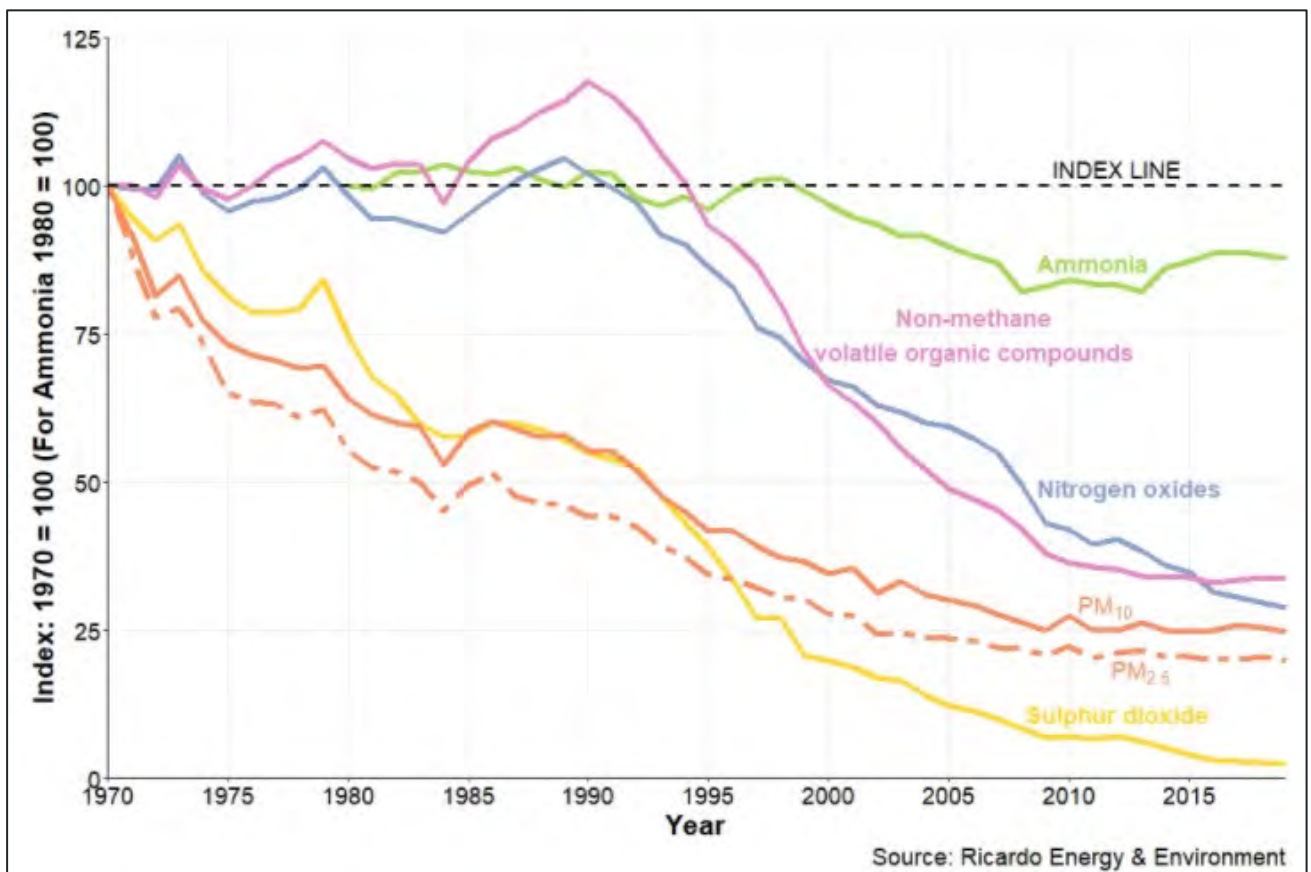


Figure 3-5 - Trends in Air Pollutant levels 1970-2019¹⁶

¹⁶ Defra (2019) National Statistics: [Emissions of Air Pollutants in the UK – Summary](#). [Accessed March 2021]

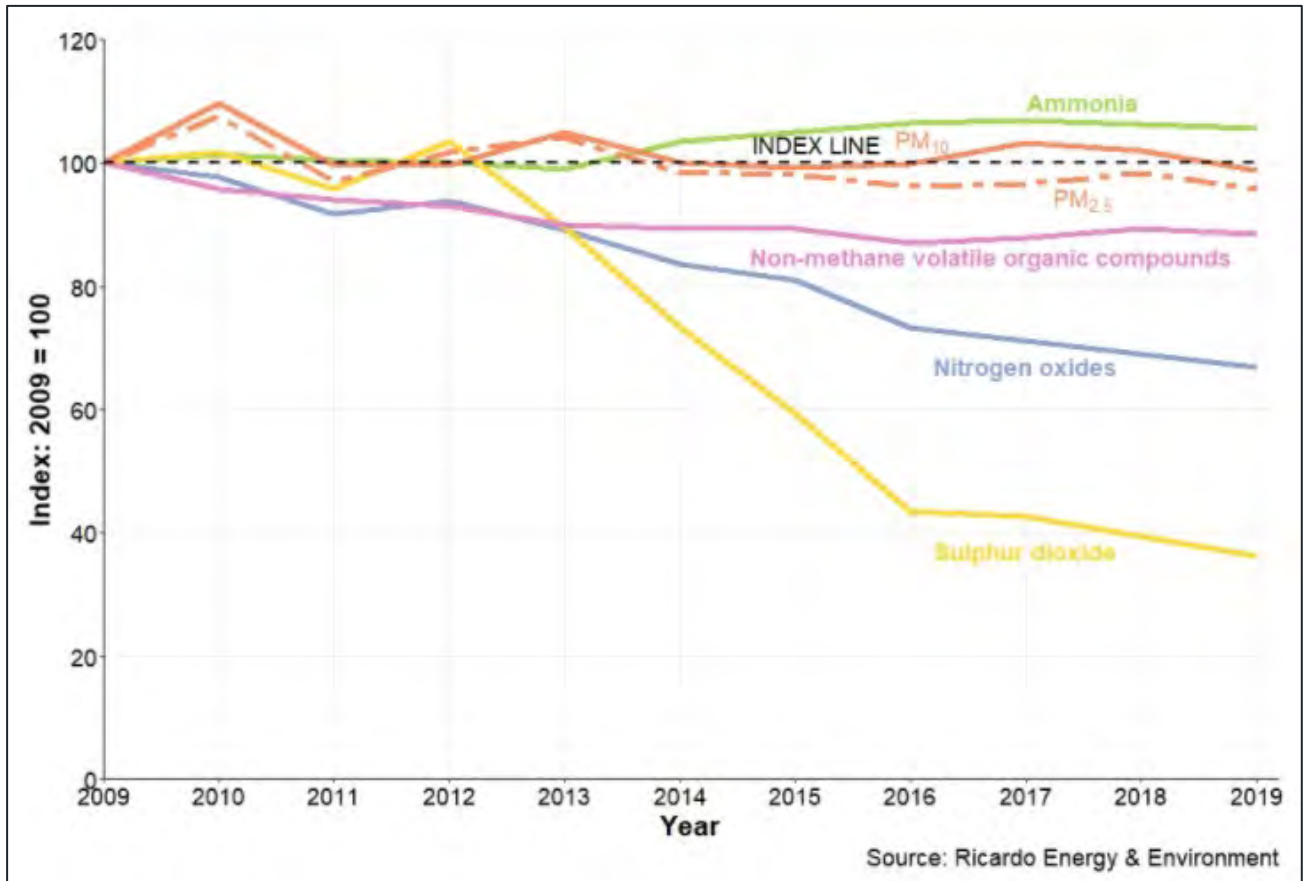


Figure 3-6 – Trends in Air Pollutant levels 2009-2019

- 3.6.6. Nitrogen oxides are key gases that contribute to overall air pollution. In the UK, levels have been steadily decreasing since 1992. However, Defra have concluded that while long-running urban background sites show a general decrease in NO₂ concentration as might be expected from the national emissions estimates, the same is not consistently true of urban traffic sites. It is likely that the trend in ambient NO₂ concentration at each individual site depends, at least in part, on the quantity and type of traffic on the adjacent road.
- 3.6.7. Particulate Matter PM is released into the atmosphere from a number of stationary and mobile sources. The major mobile source is road transport, which produces primary particles when fuels are burned or lubricants used up in the engine, when tyres and brakes wear down and from road dust. The main stationary sources are the burning of fuels for industrial, commercial and domestic purposes. Emissions of dust can also generate high concentrations of particulate matter close to quarries and construction sites. Primary particles can also be produced from natural sources, for example sea spray and dust from the Saharan desert travelling vast distances.
- 3.6.8. In the UK, the primary cause of PM₁₀ is combustion, from industry, commercial and residential areas and production processes. However, road transport forms around 6 % of all PM₁₀ concentrations. All road transport modes emit PM₁₀, but diesel vehicles emit a greater mass of particulates per vehicle kilometre, and the proportion of road transport activity by diesel-engine vehicles has increased over time. This explains that the mass emitted from road transport has fallen since 1990, but the contribution in percentage terms has increased: from 9% in 1990 to 11% in 2018.

Air Pollution in West Sussex

- 3.6.9. In West Sussex, while overall air quality is good, pollution near traffic sources and particularly in urban areas remains a significant issue. Although air quality is improving, in total, there are 11

AQMAs declared across West Sussex where national air quality objectives are not being met. All AQMAs have been declared for annual mean ($40\mu\text{g}/\text{m}^3$) exceedances in NO_2 compared with the Air Quality Strategy for England.

3.6.10. Declared AQMAs (see Figure A-1) are as follows:

- A259 High Street, Shoreham
 - An area which encompasses the High Street between the Ropetackle Roundabout and Surry Street. The AQMA was declared due to exceedances of the annual mean NO_2 objective from road sources.
- A270 Upper Shoreham Road, Southwick
 - An area which encompasses the Old Shoreham Road between Kinston Lane and Lower Drive. The AQMA was declared due to exceedances of the annual mean NO_2 objective from road sources.
- A286 Orchard Street
 - An area along Orchard Street, at the eastern end where the street meets Northgate Street. The AQMA was designated due to exceedances of the annual mean NO_2 objective, from road sources.
- A286 St Pancras Road
 - An area along St Pancras Road between Eastgate Square and New Park Road. The road forms a street canyon in this location; the AQMA was declared due to exceedances of the annual mean NO_2 objective, arising from road sources.
- A27/ A286 Stockbridge Roundabout
 - An area which encompasses the Stockbridge roundabout between the junction of the A27 and Stockbridge Road. The AQMA was designated due to exceedances of the annual mean NO_2 objective, arising from road sources.
- A272 Rumbolds Hill, Midhurst
 - An area abounds by the East Sides and West Sides of Rumbolds Hill (A272), the junctions of West Street and Petersfield Road (A272) and the junctions of North Street (A286) and Knockhundred row. The AQMA was designated due to exceedances of the annual mean NO_2 objective, from road sources.
- Hazelwick Roundabout / A2011 Crawley
 - An area which encompasses the Hazelwick Roundabout and road network extending off the junction branches. The AQMA was designated due to exceedances of the annual mean NO_2 objective, arising from road sources.
- A272 High Street, Cowfold
 - An area which incorporates the High Street and part of Station Road and Bolney Road. The AQMA was declared due to exceedances of the annual mean NO_2 objective, arising from road sources.
- A283 High Street / Manley's Hill, Storrington
 - An area which encompasses West Street, High Street, and parts of School Hill and Manleys Hill. The AQMA was declared due to exceedances of the annual mean NO_2 objective, arising from road sources.
- A273 / B2116 Stonepound Crossroads, Hassocks
 - Incorporating the junction of Stonepound Crossroads, and the associated roads leading off the junction: Hurst Road, Keymer Road, Brighton Road and London Road. The AQMA was designated due to exceedances of the annual mean NO_2 objective, arising from road transport.

- A27 / A24 Grove Lodge Roundabout
 - An area which encompasses the Crockhurst Hill, Offington Corner Roundabout to the west and Lyons Farm to the east and road network extending off the junction branches. The AQMA was designated due to exceedances of the annual mean NO₂ objective, arising from road transport.

- 3.6.11. Monitoring occurs for both NO₂ and PM (PM₁₀ and PM_{2.5}) in Chichester, Horsham, Crawley, Adur and Worthing and Mid-Sussex districts.
- 3.6.12. As shown by the AQMA classifications, NO₂ is the principle air quality issue facing West Sussex. Traffic movements throughout the county contribute to nitrogen deposition within the wider environment, as much as 80% of NO₂ emissions. Nitrogen deposition stems from the emissions of NO_x and Ammonia (NH₃), which contributes to acid deposition and eutrophication, which in turn can lead to potential changes to soil and water quality and adverse effects on receptors such as ecologically designated sites. The other major air quality issue facing West Sussex is particulate matter, with a wider geographical range (upwards of 50 miles) and sourced mainly from road transport and domestic coal / wood burning¹⁷.

Future Trends

- 3.6.13. Increased uptake of active travel and use of cleaner vehicles has potential to improve air quality in future, however, the number of vehicles is increasing (with implications for NO_x and PM concentrations). Increases in NO_x and PM concentrations have serious adverse and documented human health implications. As well as this, ecologically designated sites have the potential to be adversely affected. Future trends will require continued assessment of these effects and potentially require policy changes.

SUSTAINABILITY ISSUES FOR WSTP

- 3.6.14. Sustainability issues in relation to Air Quality are as follows:
- There are exceedances of air quality standards for NO₂ in locations around the County, resulting in a number of declared AQMAs (declared for NO₂, due to emissions from transport sources);
 - Although changes in technology mean that vehicles are producing less emissions, the number of vehicles is expected to increase, which has the potential to affect air quality and a consequence, human health, natural capital and ecological sites.

3.7 CLIMATE

- 3.7.1. Research carried out by the Town and Country Planning Association (TCPA) for the Joseph Rowntree Foundation (JRF) has concluded that the majority of new local plans in England are failing to cut carbon emissions and to plan effectively for the scale of severe meteorological events predicted for future years¹⁸.
- 3.7.2. It is noted that WSCC has not declared a Climate Emergency, but in April 2019 WSCC passed a motion pledging to try to reach net zero carbon emissions for its own operations by 2030. Of the districts and boroughs within West Sussex, five have declared climate emergencies. These are the districts and boroughs of Chichester, Adur and Worthing, Arun and Crawley. These declarations

¹⁷ West Sussex Inter-Authority Air Quality Group (2020) [Breathing Better: A partnership approach to improving air quality in West Sussex \[online\]](#). Accessed November 2020].

¹⁸ TCPA (2016) [Critically underprepared \[online\]](#). [Accessed November 2020].

reaffirm existing emission reduction commitments as well as outlining non-binding pledges for councils and individuals to adhere to.

SUMMARY OF BASELINE AND FUTURE TRENDS

- 3.7.3. Transport is one of the largest contributors to the emissions of GHGs across the UK. In 2018, approximately 1,570 Kt CO₂ was emitted from the road transport sector in West Sussex¹⁹. Across the UK, the transport sector saw an emission decrease of 1.5% in comparison to 2017 levels. 83% of local authorities saw a decrease, including West Sussex.
- 3.7.4. West Sussex, as of 2018, has a per capita emission value of 4.2 tonnes compared to a national per capita emission value of 5.2 tonnes.
- 3.7.5. In 2020, the UK Met office published a review of the state of the UK Climate²⁰. The review stated the following:
- All of the top 10 warmest years (since records in 1862) in the UK have occurred since 2002;
 - Six of the 10 wettest years (since records in 1862) in the UK have occurred since 1998; and
 - Over the last decade:
 - Winter and spring have received 13% more sunshine in comparison with the 1961-1990 average; and
 - Temperatures have been warmer by 0.9°C in comparison to the 1961-1990 average.
 - In 2019:
 - Rainfall has increased by 12% in comparison to the 1961-1990 average;
 - Leaf season has extended by 12.2 days compared to the 1999-2018 average;
 - There were six named storms;
 - Sunshine hours increased by 9% in comparison to the 1961-1990 average;
 - The least snowy year in 60 years; and
 - Set four high temperature records (21.2°C winter and 38.7°C summer).

Future Trends

- 3.7.6. In West Sussex, climate change is an increasing threat to a vulnerable county. As the climate changes, extreme weather events are predicted to become more frequent and severe. This has the potential to cause disruption to the economy and the ability for WSCC to deliver key services. Current predictions indicate a 2.3°C- 9.2°C rise in summer temperatures across the County by 2080. Although annual rainfall is expected to decrease by 1.4%, winter precipitation will increase by 13% by 2050²¹.

¹⁹ Department for Business, Energy and Industrial Strategy (2015) [UK Local Authority and Regional Estimates of Carbon Dioxide Emissions from 2005 to 2018 \[online\]](#). [Accessed November 2020]

²⁰ Met Office (2020) [State of the UK Climate Diagram](#). [Accessed March 2021]

²¹ Met office (2019) [UK Climate Projections: Headline Findings](#). [Accessed March 2021]

Climate Change

- 3.7.7. In 2018, the UK Met Office published their climate projections for the next century based on different rates of greenhouse gas emissions into the atmosphere²². The high emission scenario is anticipated to result in the following:
- Hotter summers are expected to be more common, with chances of a hot summer in 2050 being 50% (compared to a 12-25% chance in 2018) (see **Figure 3-7**);
 - Average summer rainfall could decrease by up to 47% by 2070, there could be up to 35% more precipitation in winter. This pattern may lead to more regular droughts (and subsequent water restrictions) and floods;
 - There will be an increase in the frequency and intensity of storms, which may result in year-round increases of river, surface and coastal flooding; and
 - Sea levels will rise. The coastal / tidal river setting of many communities in West Sussex may result in significant effects.
- 3.7.8. These changes will likely result in adverse effects, such as heat stress, heat-related deaths, water shortages and rising sea levels. Negative impacts on ecosystems and the natural environment will also be noticeable, with reductions in sensitive species, flora, and fauna. However, they may also offer opportunities, such as an increase in tourism to the area and the chance to develop new agricultural practices suited to warmer conditions.
- 3.7.9. Transport specific adverse effects are also likely such as heat damage to road surfaces. This may be a problem on local roads, as these have lower surface specifications than motorways and trunk roads. The heatwave of 2003, for instance, led to a significant repair bill for local authorities. Damaged roads would need to be repaired, causing disruption to traffic, with repairs potentially postponed until temperatures fell enough for the new road surface to 'set'. In some cases, this might mean working at night when it is cooler.

Flood Risk

- 3.7.10. The current baseline review identifies that areas of West Sussex are at risk of flooding (see Section 3.10 Water) from a variety of sources. Future climate change is expected to exacerbate this risk through increases in the occurrence of extreme weather events in West Sussex, alongside a 21cm rise in sea level, impacting predominantly on coastal communities. Analysis has indicated that the entire county is at high risk from flooding, despite the variation in vulnerability between the districts.

²² Met Office (2010) [UK Climate Projections Briefing Report UKCP 2018 2019 Revision \[online\]](#) [Accessed November 2020]

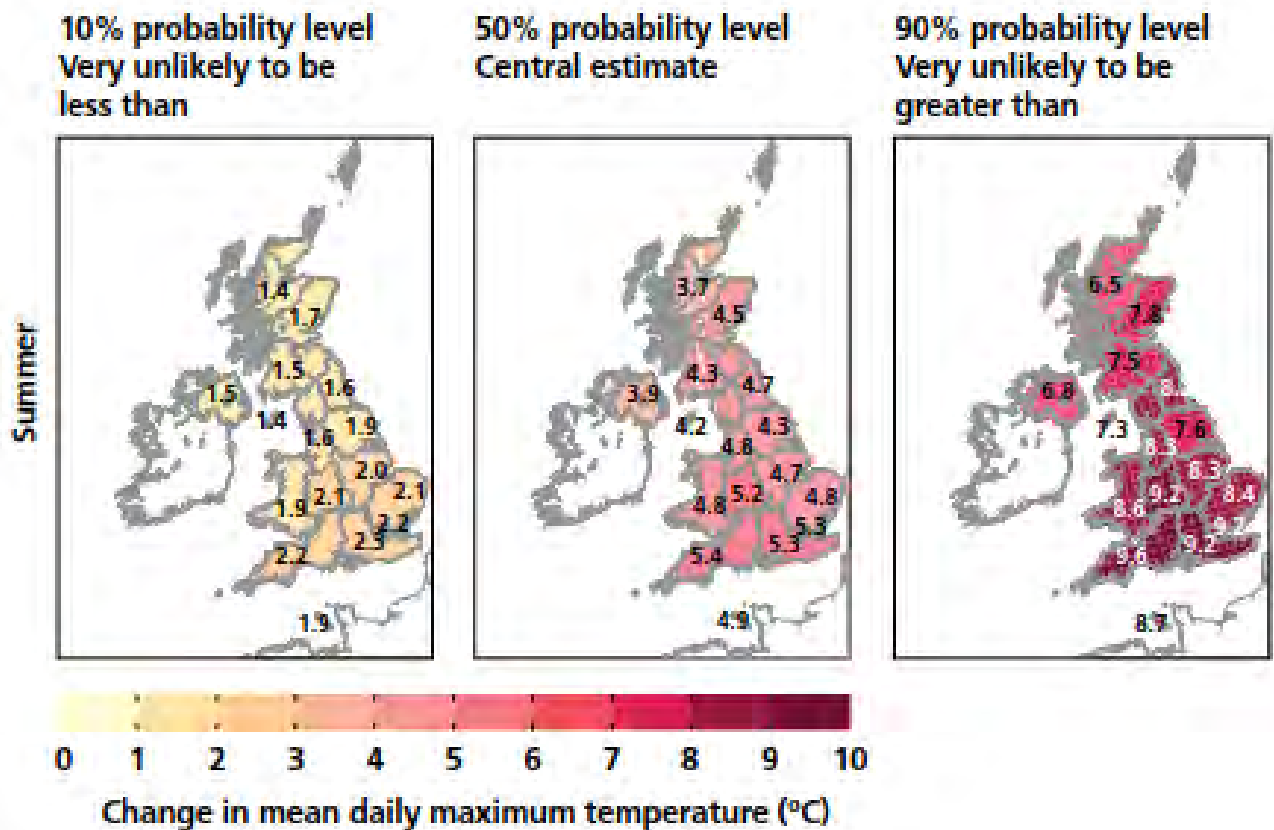


Figure 3-7 - 10, 50 and 90% Probability Levels of Changes to Summer Mean Daily Maximum Temperature Averaged Over Administrative Regions by the 2080s, Under the Medium Emissions Scenario

3.7.11. The RAIN project has been investigating the impact of severe meteorological occurrences on critical infrastructure across Europe. Conclusions highlighted that rail and road infrastructure were more vulnerable than power or telecommunications infrastructure since structural damage is not required for the system to fail.²³

Carbon Emissions

3.7.12. Road transport is a source of both greenhouse gases and air pollutants, being responsible for significant contributions to emissions of carbon dioxide, nitrogen oxides, particulate matter PM₁₀ and PM_{2.5}.

3.7.13. Across the UK, carbon emissions have been dropping since the early 1980s, but with more positive falls in emissions since 2010²⁴. This brings the total reduction to 29% over the past decade since 2010, even as the economy grew by a fifth.

3.7.14. The 2.9% fall in 2019 marks a seventh consecutive year of carbon cuts for the UK, the longest series on record. It also means UK carbon emissions in 2019 fell to levels last seen in 1988.

Emissions from road transport are likely to be significantly impacted by the adoption of the net zero target by 2050. As the UK looks to move towards this, the government’s Road to Zero transport

²³ RAIN (2014) [RAIN PROJECT \[online\]](#) [Accessed November 2020].

²⁴ [Carbon Brief \(online\) 2017 UK Carbon Analysis](#). [Accessed March 2021]

strategy²⁵ includes the ambition that by 2050 almost every car and van will be zero emission. The Committee on Climate Change (CCC)'s Net Zero Technical Report²⁶ notes that, in order to achieve the net zero target, sales of non-zero emission cars, vans and motorcycles are likely to need to end by 2035. The government's Clean Air Strategy²⁷ further examines how air pollution by pollutants other than greenhouse gases, such as nitrogen oxides and particulate matter, can be reduced.

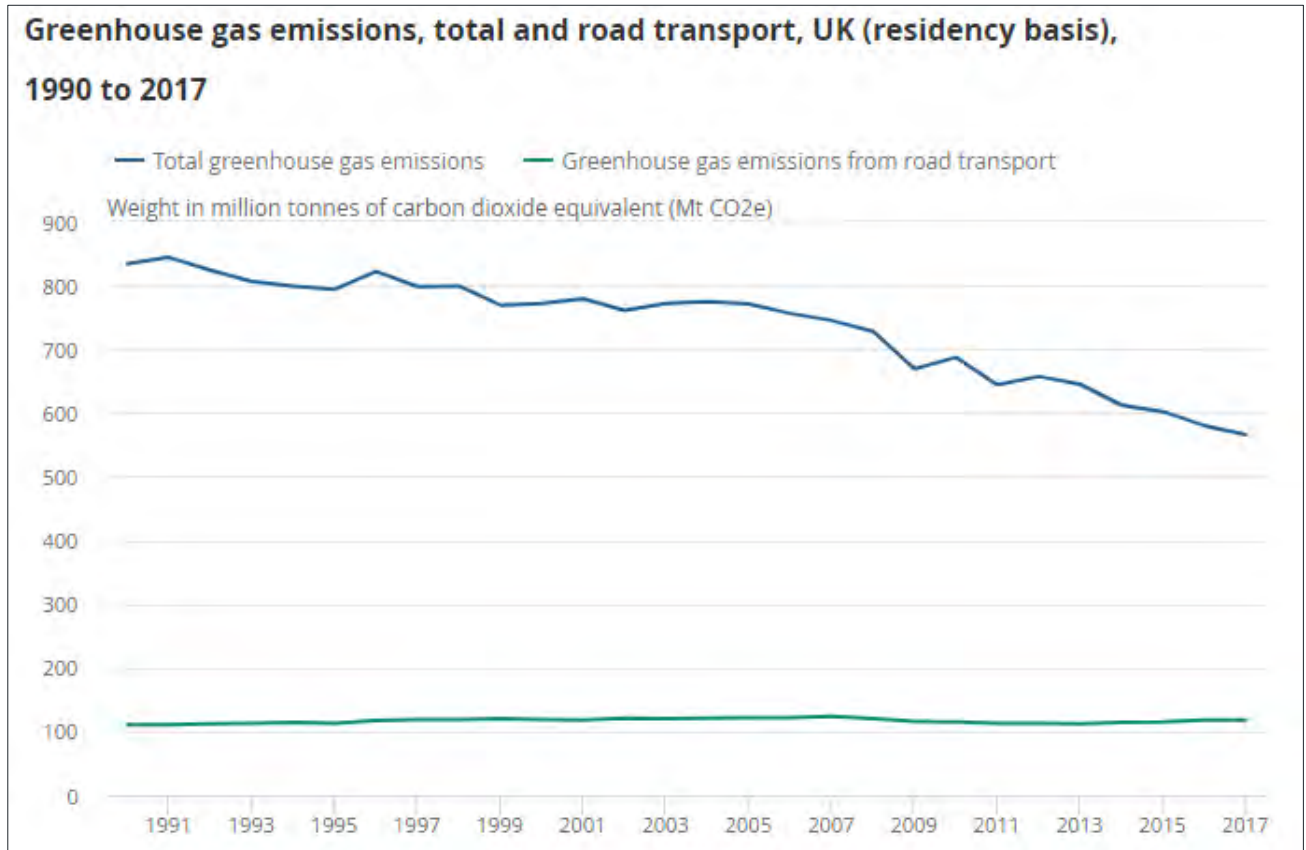


Figure 3-8 - Greenhouse Gas Emissions - Total and Road Transport²⁸

- 3.7.15. Future trends for tackling climate change will likely take the form of fossil fuel divestment and increased pressure to reduce carbon emissions. WSCC's Electric Vehicle Strategy targets 70% of new cars in the County being electric by 2030, requiring a large increase in charging infrastructure throughout the County²⁹.

²⁵ HM Government: [The Road to Zero](#) [Accessed March 2021]

²⁶ Climate Change Committee: [Net Zero Technical Report](#) [Accessed March 2021]

²⁷ HM Government: [Clean Air Strategy](#) [Accessed March 2021]

²⁸ ONS (2019) [Road Transport and Air Emissions 2019 release](#). [Accessed March 2021]

²⁹ West Sussex County Council (2019) [Electric Vehicle Strategy 2019-2030 \[online\]](#). [Accessed December 2020].

SUSTAINABILITY ISSUES FOR WSTP

3.7.16. Sustainability issues in relation to climate are as follows:

- The changing patterns in precipitation and storms makes West Sussex particularly vulnerable to an increased year-round risk of more frequent river, surface and coastal flooding;
- In 2019 WSCC committed to achieving net zero carbon emissions of its operations by 2030 and reduce carbon associated with road-based transport, some of these emission targets are falling short of expectations. It is noted that GHG emissions from road transport are reducing but not fast enough to achieve government targets;
- The transport sector is one of the largest contributors to greenhouse gas emissions with the lowest rate of reduction in emissions, despite significant investment in sustainable infrastructure and services, which must be considered accordingly before progressing future schemes; and
- The transport network and its associated infrastructure is vulnerable to the effects of climate change. In particular, the risk of flooding is widespread throughout West Sussex.

3.8 NOISE

SUMMARY OF BASELINE AND FUTURE TRENDS

Current Baseline

- 3.8.1. Anthropogenic noise causes a range of physiological and behavioural responses in terrestrial and marine wildlife, which can lead to reduced reproductive success, increased mortality risk and emigration, resulting in decreased population densities³⁰.
- 3.8.2. Although the responses to noise are very much species dependent, effects can start to appear at levels as low as 40 dB(A) for terrestrial animals. In addition to levels of noise, impacts may also depend on noise frequency and type.
- 3.8.3. At least 19% of nature protection areas covered by Natura 2000 are located in areas where noise levels are above the Environmental Noise Directive reporting thresholds because of roads, railways and aircraft.
- 3.8.4. There are 292 active Noise Important Areas (NIAs) (Figure A-1). Of these NIAs, the majority are designated as a result of road noise (204). NIAs are based on computer modelling/mapping of expected noise exposure at these locations next to main roads, given the proximity of buildings, and not based upon monitoring results at these locations.
- 3.8.5. Across West Sussex, hotspots are concentrated on main roads where traffic volumes are high, and properties are close to the roadside.
- 3.8.6. Noise from road sources is not the only source of transport related noise in West Sussex. Additional sources include airports, namely Gatwick Airport and Shoreham Airport.
- 3.8.7. West Sussex has three areas of nationally protected landscapes where tranquillity is a key feature to protect. Tranquillity is a perceptual quality of the landscape and is based on both positive and negative factors - hearing and seeing things and also not hearing and not seeing things. Positive factors are generally natural features like deciduous woodland, birdsong, running water, and negative features would be roads, traffic, buildings, machinery, power lines etc. The absence of overt human activity is often a key factor in experiencing tranquillity.

³⁰ EC (2019) [Environmental Noise in Europe – 2020](#). [Accessed March 2021]



West Sussex

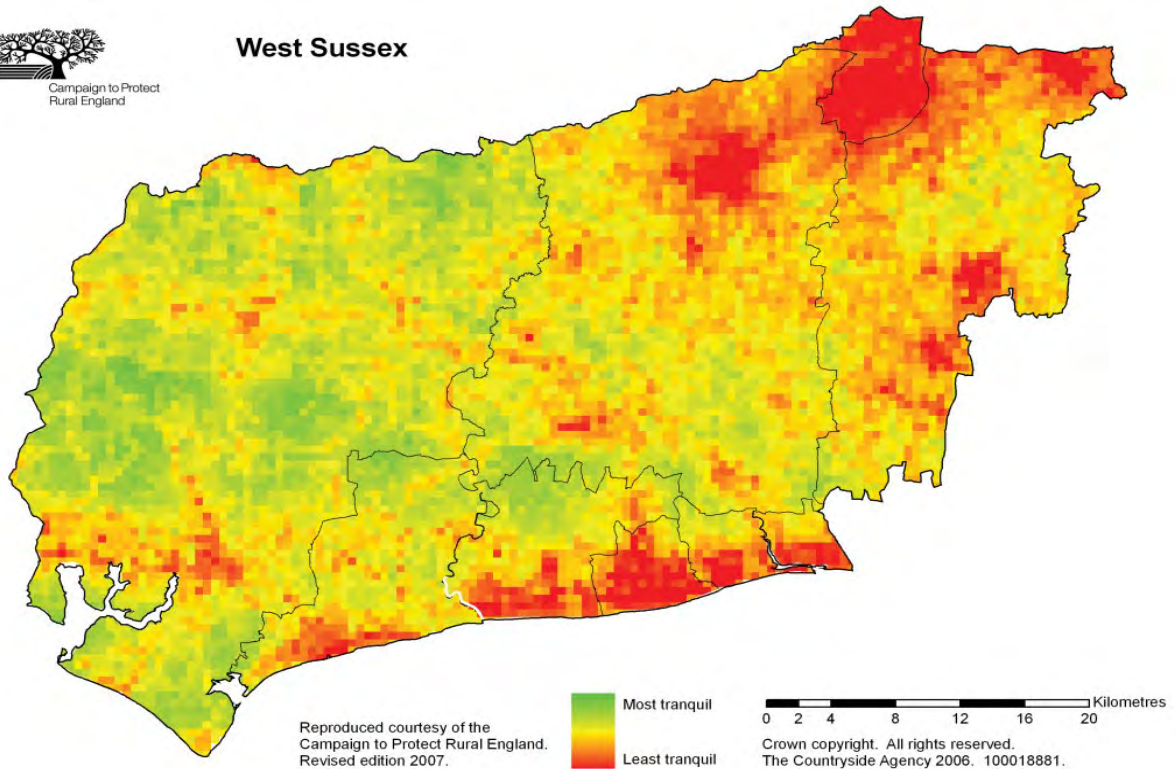


Figure 3-9 - Range of Tranquillity Across West Sussex Based on 2001 Administrative Boundaries

- 3.8.8. According to Campaign to Protect Rural England (CPRE)³¹, the least tranquil areas of West Sussex are concentrated to the north-east of the county and south coast. This aligns with the major urban areas of Crawley and Horsham in the north, and the areas of Littlehampton, Worthing and Bognor Regis along the south coast.
- 3.8.9. The effects of excessive transport noise can disturb sleep, impact upon general health and be seen as a nuisance. The promotion of active transport methods (e.g. cycling, walking etc.), increasing the proportion of NMUs may assist in counteracting adverse effects.

Future Trends

- 3.8.10. Given the projections for an increasing population in the county, and the popular use of cars as the main mode of transport, it is likely that noise levels will increase along major and minor roads. In addition, the increased population is likely to place pressure on public transport methods such as rail and buses. Increased number of services of those public transport methods would lead to similar increases in noise levels along road and rail networks.

SUSTAINABILITY ISSUES FOR WSTP

- 3.8.11. Sustainability issues in relation to noise are as follows:
 - Transport noise may adversely impact sleep, health and wellbeing as well as disturb wildlife and there is potential for an increase in noise levels in the 280 designated NIAs in West Sussex; and
 - The natural environment, particularly tranquil areas, may experience an increase in transport-related noise pollution.

³¹ CPRE and the Countryside Agency (2007) [Mapping Tranquillity \[online\]](#). [Accessed November 2020].

3.9 LANDSCAPE AND TOWNSCAPE

CURRENT BASELINE

Landscape Designations

3.9.1. Landscape character is defined as;

‘a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse’³².

3.9.2. The County is composed of five nationally defined National Character Areas (NCAs)³³ These are as follows:

- 120 – Wealden Greensand: ‘runs parallel with the South Downs in West Sussex. Around a quarter of the NCA is made up of extensive belts of woodland – both ancient mixed woods and more recent conifer plantations. In contrast, the area also features more open areas of heath on acidic soils, river valleys and mixed farming, including areas of fruit growing’;
- 121 – Low Weald: ‘a broad, low-lying clay vale which largely wraps around the northern, western and southern edges of the High Weald. It is predominantly agricultural, supporting mainly pastoral farming owing to heavy clay soils, with horticulture and some arable on lighter soils in the east, and has many densely wooded areas with a high proportion of ancient woodland.’;
- 122 – High Weald: ‘encompasses the ridged and faulted sandstone core of the Kent and Sussex Weald. It is an area of ancient countryside and one of the best surviving medieval landscapes in northern Europe. The High Weald Areas of Outstanding Natural Beauty covers 78 percent of the NCA. The High Weald consists of a mixture of fields, small woodlands and farmsteads connected by historic routeways, tracks and paths.’;
- 125 – South Downs: ‘The majority of the area falls within the South Downs National Park, a recognition of its natural beauty and importance for access and recreation and allowing for local decision-making processes to manage this nationally important area. Some eight percent of the NCA is classified as urban.’; and
- 126 – South Coast Plain: ‘a flat, coastal landscape with an intricately indented shoreline lying between the dip slope of the South Downs and South Hampshire Lowland and the water of the English Channel, Solent and part of Southampton Water. The coastline includes several major inlets which have particularly distinctive local landscapes and intertidal habitats of international environmental importance for wildfowl and waders. Chichester Harbour Area of Outstanding Natural Beauty lies within the NCA and the foothills of the South Downs, along the northern boundary, fall within the South Downs National Park.’

3.9.3. The NCAs are split into County Character Areas. The West Sussex Character Assessment³⁴ identifies 42 separate and distinct County Character Areas throughout the County (one of these being urban areas). Eight of these are located in the Wealden Greensand, 11 in the Low Weald, four in the High Weald, six in the South Downs and 12 in the South Coast Plain.

3.9.4. West Sussex is the second most wooded county in England and has a varied wooded landscape. This includes:

³² Natural England (2014) [An Approach to Landscape Character Assessment \[online\]](#). [Accessed November 2020]

³³ Natural England (2014) [National Character Area Profiles \[online\]](#). [Accessed November 2020].

³⁴ WSCC (2003) [West Sussex Landscape Character Assessment \[online\]](#). [Accessed November 2020].

- Deep Ghyll woodlands of High Weald;
- Remnant woodland belts between fields in the Low Weald;
- Downland plantations and woods; and
- Newer woods developed over the Greensand Hills.

3.9.5. The settlement pattern of the County is a strong defining characteristic, with it being a network of small to medium sized towns, villages and hamlets. The largest areas of settlements concentration are in the south and east of the County.

Areas of Outstanding Natural Beauty and National Parks

- 3.9.6. More than half of the County is within nationally protected landscapes: South Downs National Park (SDNP), Chichester Harbour Area of Outstanding Natural Beauty (AONB) and the High Weald AONB. These protected areas attract numerous visitors to the County. Much of the landscape of the County takes the form of agricultural land (see Figure A-2).
- 3.9.7. SDNP is one of England's newest National Parks (established in March 2010), covering an area of 1,627km² from Winchester to Beachy Head (Hampshire to East Sussex). The SDNP is administered by the SDNP Authority (SDNPA).
- 3.9.8. The SDNPA have two main commitments as outlined in their 2014 to 2033 Local Plan³⁵:
- Improving accessibility through a network of high-quality routes connecting communities with the landscape, heritage, attractions and transport hubs and gateways; and
 - Encourage sustainable transport and access into and around the National Park, encouraging the retention and expansion of rural transport services. The South Downs is under huge pressure from car use.

Public Rights of Way and Green Infrastructure

- 3.9.9. There are over 4,000 kilometres of Public Rights of Way (PRoW) in West Sussex, which includes footpaths, bridleways, restricted byways and byways open to all traffic (BOATs). There are also long-distance trails which partially follow PRoW such as the South Downs Way and Downs Link.
- 3.9.10. West Sussex contains a mixture of urban and rural PRoW. The paths on the coastal plain are mainly footpaths so there are very limited opportunities for users other than walkers. Although there is demand for more off-road cycling and horse-riding opportunities using the PRoW network given the flat terrain, the highly populated area and the busy nature of the road network, bridleway off-road cycling or horse-riding opportunities are very limited. The existing bridleways do not link together well which limits opportunities to use to bridleway network to those users who are also able to use the road network. North of Chichester is rural and the PRoW network offers opportunities to link communities and offer sustainable transport options. The difficulty with this is the lack of Bridleway connections particularly and those that do exist are often severed by the road network with little provision for safe crossings. In the north east of West Sussex, the limited bridleway network also often lacks connectivity or is severed by the road network.
- 3.9.11. Severance by major roads, railways and watercourses is a significant challenge for the PRoW network as crossing facilities are often not sufficient or do not exist at all. This can mean long detours for PRoW users or creates areas that are not well connected which is likely to deter usage in these areas.

³⁵ SDNPA (2014) [Local Plan 2014-2033](#). [Accessed March 2021]

- 3.9.12. West Sussex has numerous greenspaces available throughout the county. The importance of the extensive PRow and Green Infrastructure Network (GIN) in enabling residents and visitors to access the countryside with its rich natural and cultural heritage is recognised.
- 3.9.13. Each district is responsible for the management of greenspace within their boundaries. The management varies across the districts with some, such as Arun District, creating a GIN. This network links protected areas with greenspace and PRow as well as SDNP. **Figure 3-10** shows an example of the GIN, in this case for Arun District.

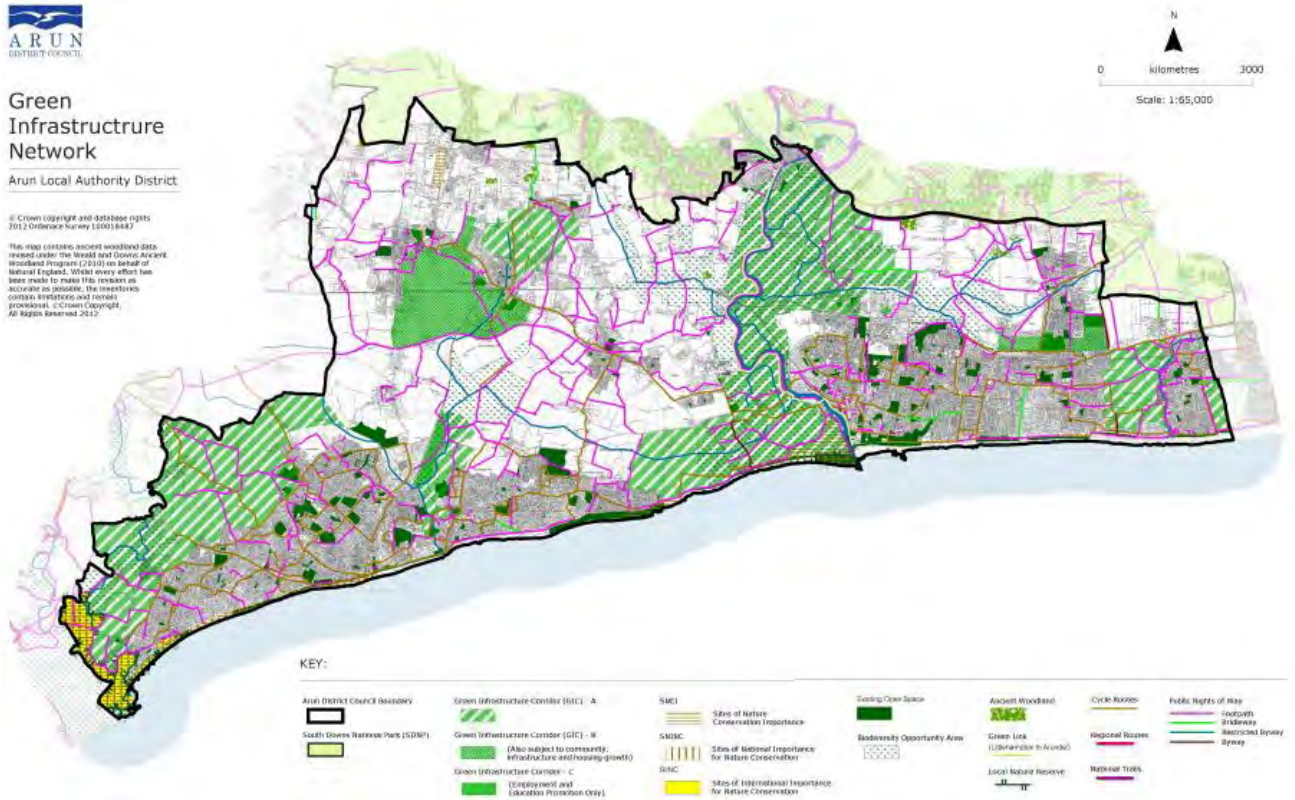


Figure 3-10 - Arun District Green Infrastructure Network³⁶

FUTURE TRENDS

- 3.9.14. Landscape character quality may be affected both positively and adversely by new transport infrastructure and residential developments, and the development of greenfield and unoccupied sites resulting from population pressure. Adverse impacts are more likely to occur in areas with no previous transport infrastructure, in particular AONBs and woodland areas, in terms of both visual amenity and overall quality (e.g. presence of new hard engineering, landscape fragmentation, signage and other infrastructure elements of height, street lighting affecting night skies, urbanisation and widening of rural roads etc.). However, future transport infrastructure may improve accessibility to valued landscape and townscape areas; other non-road infrastructure (e.g. footpath and cycling route networks) may facilitate access with little adverse impact (for example, the planned England Coast Path will be a new long-distance trail through the County), while linking up with goals identified in 3.5 Air Quality, 3.6 Climate and 3.12 Health.

³⁶ Arun District Council (2012) [Green Infrastructure Network Map \(online\)](#). [Accessed December 2020].

SUSTAINABILITY ISSUES FOR WSTP

3.9.15. Sustainability issues in relation to landscape are as follows:

- The character and quality of West Sussex's landscapes and townscapes can be eroded by the construction and operation of transport infrastructure, which may impact upon the distinctive historic character of settlements;
- GI describes the multifunctional network of green and blue spaces, landscapes, and natural elements within and between our cities, towns and villages. By connecting the centres of settlement into the surrounding landscape, GI can facilitate prosperous, active, healthy and happy communities. This network may be severed or reduced due to new transport infrastructure; and
- Transport infrastructure has the potential to erode and adversely affect local character and distinctiveness.

3.10 THE HISTORIC ENVIRONMENT

3.10.1. Conserving the character of the County is a key issue, particularly in light of pressure for continued development in the area. Transport infrastructure has the potential to erode and adversely affect local character and distinctiveness as well as impact on heritage assets. Steadily increasing tourism in West Sussex offers both challenges for the historic environment, in seasonally heavier traffic, and opportunities for enhancement, through infrastructure maintenance and improvements (e.g. Public Rights of Way and cycle network infrastructure) which can provide better and sustainable access to historic towns, villages and rural heritage assets.

CURRENT BASELINE

- 3.10.2. West Sussex has a very rich archaeological and built heritage which significantly contributes to its townscape and rural character (Figure A-4). Transport impacts to cultural heritage can result from increasing traffic levels in historic towns, cities and the countryside which may cause damage to heritage assets. Infrastructure improvements may also cause damage to historic landscapes and heritage assets during their construction.
- 3.10.3. West Sussex has 7,448 Listed Buildings, 347 Scheduled Monuments, 27 registered parks and gardens and over 9,000 entries on the West Sussex Historical Environment Record (HER)³⁷.
- 3.10.4. No World Heritage Sites or Registered Battlefields are present within the county.
- 3.10.5. A conservation area is an area of special historical interest that is protected by law. Local council and districts designate conservation areas under the Planning (Listed Buildings and Conservation Areas) Act 1990. Conservation areas can range from a small group of buildings to a whole town or village. West Sussex has in excess of 200 designated conservation areas, of which approximately half are located within the Chichester district:
- Adur and Worthing District: 33;
 - Arun District: 29;
 - Chichester District: 85;
 - Crawley Borough: 11;
 - Horsham District: 37; and
 - Mid-Sussex District: 36

³⁷ WSCC (online) [West Sussex Historic Environment Record](#). [Accessed January 2021]

- 3.10.6. There are also 166 conservation areas across the SDNP, though many of these are outside of West Sussex.
- 3.10.7. The West Sussex Historic Landscape Characterisation³⁸ details historic change of the landscape. The majority of the county (post 1800 and pre 1800) is designated as varying forms of farmland and cleared forest for farmland.

FUTURE TRENDS

- 3.10.8. The historic environment is increasingly under threat from development pressures. In addition to harm to non-designated heritage assets, the creation of new infrastructure to provide for a growing population adversely affects visual amenity and the settings of designated heritage assets.
- 3.10.9. All parts of West Sussex are highly accessible to motor vehicles. Given the substantial increase in traffic over the last few decades, many new roads have been built to cope with the flows. Large roads present particular landscape challenges and can be a threat to the integrity and setting of heritage assets.

SUSTAINABILITY ISSUES FOR WSTP

- 3.10.10. Sustainability issues in relation to the historic environment requiring protection and mitigation are as follows:
- The historic character and heritage assets are important to the county. Its conservation is affected by new development, both directly and indirectly;
 - Vehicular damage and pollution can adversely impact on historic buildings, structures and the fabric of the public realm in town and village centres; and
 - Ancillary features of transport infrastructure, inclusive of marked parking bays, yellow lines etc. can adversely impact upon the setting of the historic environment.

3.11 WATER

- 3.11.1. Climate change is likely to increase the occurrence of flooding and hence raise flood risk due to rising sea levels, increases in precipitation leading to saturated soils, and greater intensity of precipitation events.
- 3.11.2. In addition to flood risk, the quality of both surface water and ground water will require consideration as to prevent adverse impacts to their quality resulting in degradation.

SUMMARY OF BASELINE AND FUTURE TRENDS

Current Baseline

Water Pollution in the UK

- 3.11.3. Over the last 30 years, water quality changes have been positive after previous periods of poor unregulated environmentally degrading industrial practices. England has the cleanest bathing waters since records began, serious pollution incidents are steadily declining and rivers that were biologically dead are reviving.
- 3.11.4. In 2016, 86% of river water bodies had not reached good ecological status. The main reasons for this are agriculture and rural land management, the water industry, and urban and transport pressures.

³⁸ WSCC (2010) [Historic Landscape Characterisation \[online\]](#) [Accessed January 2021]

- 3.11.5. Nearly half of groundwater bodies will not reach good chemical status by 2021. For groundwaters protected for drinking water, nitrate levels were responsible for 65% of failures to achieve good chemical status.
- 3.11.6. Bathing water quality has improved over the last 30 years with 98% passing minimum standards and 65% at excellent status in 2017.
- 3.11.7. Population growth, climate change, emerging chemicals, plastic pollution, nanoparticles and fracking all present potential future threats to water quality.
- 3.11.8. Nitrate is one of the main causes of pollution within the UK and the main source of this is agricultural runoff from farmland, entering water courses and the sea. However, urbanisation and transport infrastructure is becoming more of an influencing factor of this type of pollution. Sewage discharge is a common cause of nitrate pollution within water bodies, but with increased rainfall and storm flows from non-permeable surfaces, this adds to an increasing amount of pollution from roadways; this allows a mix of sewage and surface water flow into river systems and catchments³⁹.
- 3.11.9. Urban areas and the transport network are a source of environmental contaminants, which include hydrocarbons, metals, plastics, nutrients (such as phosphate), ammonia, pathogens, sediment and solid pollutants. Such contaminants entering surface water bodies and groundwater may have an adverse impact on water quality and ecology. As well as these pollutants the physical alteration and intersection of water bodies may result in adverse effects⁴⁰.

Water Environment in West Sussex

- 3.11.10. The county has 84 known water bodies with a number of large river catchments; designated main rivers include:
 - River Arun;
 - River Adur; and
 - West Sussex Rifes.
- 3.11.11. West Sussex has a history of fluvial, coastal, surface water and groundwater flooding (Figure A-5). There are 53 'wet spot' areas which have been identified across the county, with the distribution falling into three main centres: Chichester District, large inland towns and finally coastal communities⁴¹. **Table 3-1** provides details of the types of flooding affecting West Sussex and the wider UK.
- 3.11.12. Flood Zones 2 and 3 (zones with between 0.1-1% annual probability of flooding and over 1% annual probability of flooding respectively) are present throughout West Sussex. Approximately 6.4% of the area of the county is presently susceptible to surface water flooding. The major concentrations of flood zones are associated with rivers, in particular in the south of the County in the following area:
 - Chichester and the River Lavant;
 - Bognor Regis and the Aldingbourne Rife;
 - Ryebank Rife;
 - The River Arun (in particular between Littlehampton and Pulborough);

³⁹ UK House of Commons Environmental Audit Committee (2018) [UK Progress on Reducing Nitrate Pollution](#). [Accessed March 2021]

⁴⁰ Environment Agency (2019) [2021 River Basing Management Plans: Pollution from towns, cities and transport](#). [Accessed March 2021]

⁴¹ West Sussex Lead Local Flood Authority (2013) [Local Flood Risk Management Strategy \[online\]](#) [Accessed November 2020].

- Burgess Hill and Haywards Heath;
- The River Adur and Shoreham;
- Crawley; and
- Haywards Heath.

3.11.13. West Sussex lies within the South East river basin district (extending from Hampshire to Kent). As of the Water Framework Directive 2019 assessment, the chemical and ecological classifications of water bodies within the district are as follows⁴².

- Surface Water Chemical Status (282 total): 282 failed, 0 good;
- Surface Water Ecological Status (282 total): 10 bad, 54 poor, 172 moderate, 46 good, 0 high;
- Groundwater Chemical Stats (33 total): 16 poor, 17 good; and
- Groundwater Quantitative Status (33 total): 12 poor, 21 good.

3.11.14. In 2011, West Sussex prepared a Preliminary FRA. Within the report it identified that despite widespread flood risk across the County, no area of West Sussex could be classified as an Indicative Flood Risk Area (IFRA). IFRAs are classified as the 10 most significant areas of flood risk in the UK⁴³. The report also outlined the county-wide flood risk as significant enough that developments within the County must be considered alongside and in the context of the required Strategic Flood Risk Assessments.

3.11.15. Groundwater Source Protection Zones (SPZs) are located within West Sussex. SPZs form a band from north of Chichester to north of Worthing. These SPZs take the form of Zones I, II and III (detailing the elements of the groundwater catchment). Principal Bedrock Aquifer is also present and follows the same band as the SPZs. Additionally, Secondary A superficial Aquifers are present on the West Sussex coast, in particular around Chichester and Bognor Regis.

Future Trends

3.11.16. It is postulated that peak river flows may increase by as much as 20% by 2080, increasing the risk and frequency of river flooding. Alongside this, the south-east region is sinking; low coastal areas are likely to be inundated as a result. In combination with sea-level rise (see Section 3.6) this would result in increased flood risk throughout a large proportion of the county.

Consideration of the resilience of the transport system to extreme weather needs to be informed by a deeper understanding of weather: the typical weather patterns in the UK, the characteristics of extreme weather events and the changes anticipated in the light of climate change. In the UK, local authorities are required to produce Local Flood Risk Management Strategies (LFRMS) to help raise awareness of the risks and show how the authorities respond to flooding. WSCC's LFRMS⁴⁴ focuses on:

- The risks of flooding from surface water, groundwater and ordinary watercourses but also considers flooding from rivers and the seas;
- Clarification on which authority is responsible for what in relation to the management of flood risk; and
- The defined role of West Sussex County Council as LLFA.

⁴² [Environment Agency \(2019\) South East River Basin District Summary \[online\]](#). [Accessed November 2020]

⁴³ [West Sussex County Council \(2011\) Preliminary Flood Risk Assessment \[online\]](#). [Accessed December 2020]

⁴⁴ West Sussex County Council (2013) [West Sussex Local Flood Risk Management Strategy](#). [Accessed March 2021]

Table 3-1 – Types of Flooding affecting West Sussex and the wider UK

Type of Flooding	Description
River or Fluvial Flooding	Rivers burst their banks when they cannot cope with the amount of water entering them from upstream, tributaries and surface run-off. Estuarine rivers may also be impeded depending on tidal and sea-level conditions (see Coastal Flooding).
Surface water or Pluvial Flooding	This happens when there is intense rainfall - often on ground that is already saturated or on hard dry ground or paved areas where drainage is poor. The intensity of the rainfall is such that the natural or man-made drainage capability cannot cope. It can lead to pooling of water that cannot drain away. Sudden snowmelt or hail-melt can also give surface water flooding.
Groundwater Flooding	When rainfall causes an increase in the amount of water that is naturally stored underground, which rises to the surface and causes flooding.
Coastal Flooding	Weather and tidal conditions can increase sea levels, through surge, which can flood coastal areas. Off-shore waves and the prevailing wind direction are also important.

3.11.17. Sea level rise scenarios under climate change would adversely affect West Sussex. Both the worst-case scenario (4°C rise by 2100) and best-case scenario (1.5°C rise by 2100) would result in major risks of flood events across the county, with the worst-case scenario being significantly worse (see **Figure 3-11**).

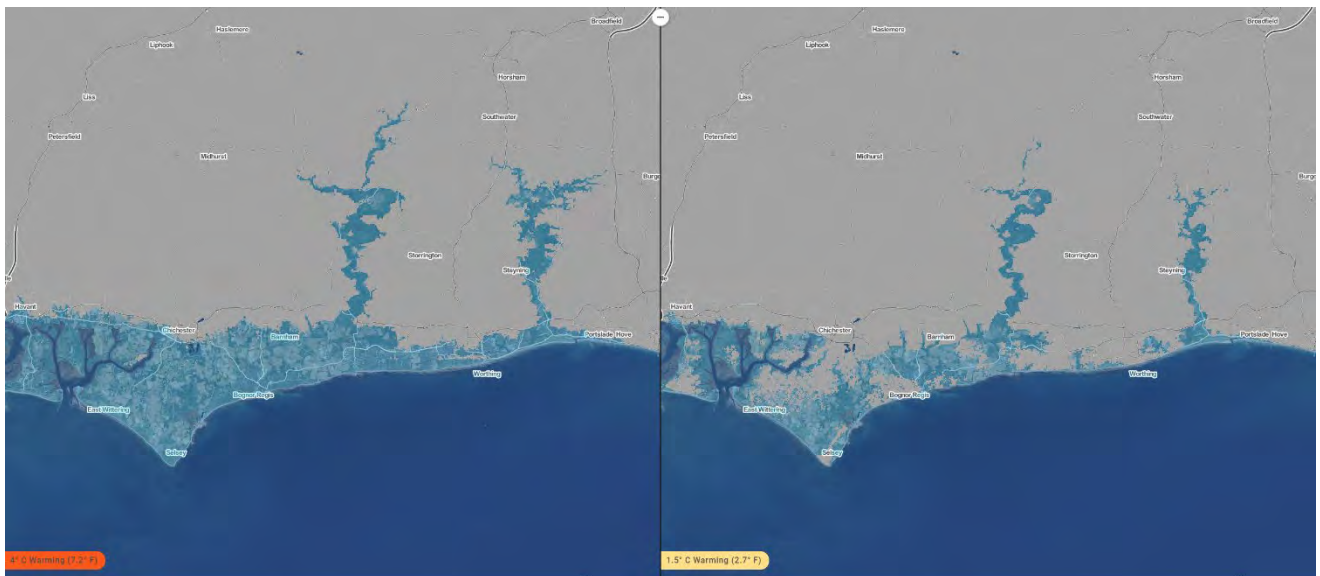


Figure 3-11 - An overview of West Sussex Coastal Flood Risk in the year 2100⁴⁵

3.11.18. Global warming and the gradual sinking of the south of England is leading to increased sea levels and loss of valuable habitats. In areas with fixed “hard” sea defences such as sea walls, saltmarsh plants cannot move inland to escape rising sea levels as they would if there were no hard sea defences. They are underwater for too long and die. This means that the area of saltmarsh gets smaller, resulting in a process called coastal squeeze. As well as loss of an important habitat, loss of

⁴⁵ Climate Central (online) [Surging Seas Mapping](#). [Accessed March 2021]

saltmarsh along the edge of the water increases the erosion of sea defences by waves and tidal current. Waves bounce off hard defences much more than saltmarsh and this increases erosion.

- 3.11.19. The RAIN project has been investigating the impact of severe weather occurrences (refer also to Section 3.6 Climate) on critical infrastructure across Europe. They conclude that rail and road infrastructure is much more vulnerable than power or telecommunications infrastructure because, there does not need to be structural damage for the system to fail⁴⁶. The official estimate of the cost of river floods in England between May and July 2007 was £3.2bn, with £100m of costs associated with road disruptions. Impacts included damage and destruction by floodwater, disruption of traffic and cessation of rail services. By the 2080s, if no action is taken, this level of cost may be incurred almost annually, due either to a one-off event or multiple events like the floods of 2007. Covering the whole UK road network, the length of road at significant likelihood of flooding is between 13,000 km and 18,000 km by the 2050s, rising to between 14,000 km and 19,000 km by the 2080s.
- 3.11.20. In terms of water quality, the requirements of the Water Framework Directive should lead to continued improvements to water quality in watercourses. However, water quality is also likely to continue to be affected by pollution incidents in the area, the presence of non-native species and physical modifications to water bodies.

SUSTAINABILITY ISSUES FOR WSTP

3.11.21. Sustainability issues in relation to water are as follows:

- Climate change is likely to increase the occurrence of flooding from all sources and hence raise the flood risk in West Sussex;
- Transport infrastructure could be required in areas of high flood risk;
- Pollution of the water environment can occur from groundwater run-off on roads and pavements after rainfall;
- The physical and chemical quality of West Sussex's water resources is already poor and an important aspect of the natural environment and can be adversely affected by, for example, pollution associated with transport infrastructure; and
- Increased in flood risk can occur through the loss of permeable surfaces due to new road construction. Any new schemes and initiatives would need to consider the need to provide a net benefit to flood risk.

3.12 POPULATION

- 3.12.1. An ageing population in West Sussex is likely to increase demand for access to services, particularly healthcare. Proposed sites for strategic development will need to be accounted for when choosing potential locations for new transport infrastructure. Transport networks should promote a range of sustainable transport modes to limit the effects of congestion, economic vitality, and residents' quality of life.

SUMMARY OF BASELINE AND FUTURE TRENDS

Current Baseline

- 3.12.2. West Sussex covers an area of approximately 1,991km², and as of 2016 had a total population of 841,733 spread across seven districts (**Table 3-2**): Worthing, Arun, Chichester, Horsham, Crawley, Mid Sussex and Adur.

⁴⁶ RAIN (2017) [RAIN project \[online\]](#) [Accessed May 2017].

- 3.12.3. Over 70% of the County’s population live within the 11 main towns, while the rural areas are sparsely populated. The largest district, Chichester, accounts for 768.3km² of the total county area; however, only 13.9% of the population reside here. The highest proportion of the population, 18.6%, resides in Arun which is the fourth largest district in the County. The population across the County is unevenly distributed and the extent of change experienced in each district varies considerably; it is expected that this trend will likely persist in the future as development is not spread evenly due to environmental constraints and land availability.

Table 3-2 - Population Across West Sussex for 2016 and Projected for 2036⁴⁷

District	Total Population		Aged 55+	
	2016	2036	2016	2036
Adur	63,290	70,524	22,618	30,223
Arun	156,676	179,821	64,892	87,959
Chichester	117,831	132,328	47,510	61,736
Crawley	111,222	124,399	26,495	38,140
Horsham	138,158	159,367	48,745	69,372
Mid Sussex	146,357	171,168	47,442	67,151
Worthing	108,200	117,930	37,233	50,919
Total	841,734	955,537	294,935	405,500

- 3.12.4. West Sussex has an older population than the national average, with 40.5% of the population aged over 64 compared to the national average of 36.7%⁴⁸. Based on 2016 data, Arun and Chichester have the greatest proportion of those aged 55+, with proportions of 41.1% and 40.3% respectively.

Future Trends

- 3.12.5. The population of West Sussex is expected to continue to grow as outlined in **Table 3-3**, with a projected growth of 18.3% by 2036. Growth rate of the male population is slightly higher than for the female population, with projected growths of 14.9% and 12.1% respectively by 2036.

Table 3-3 - Projected Population Growth for West Sussex

Population	2021	2026	2031	2036
Males	433,185	446,030	454,151	470,049
Females	454,889	454,368	471,051	485,487
All Persons	887,553	910,683	925,201	995,536

- 3.12.6. Future population projections continue to forecast the trend of an ageing population. The total population is projected to increase by 13.5% by 2036, accompanied by a 7% increase in those aged 55+. The most significant increases are projected to be in Crawley (44%) and Mid-Sussex (41.5%).

⁴⁷ WSCC (2016) West Sussex County Council [Population Estimates and Forecasts \[online\]](#). [Accessed November 2020]

⁴⁸ WSCC (2017) [Census Demographics \[online\]](#) [Accessed November 2020].

SUSTAINABILITY ISSUES FOR WSTP

3.12.7. Sustainability issues in relation to population are as follows:

- The population of West Sussex is increasing and there will be additional movement associated with this growth; and
- The ageing population is likely to increase demand for access to services.

3.13 HEALTH

SUMMARY OF BASELINE AND FUTURE TRENDS

Current Baseline

Health and Wellbeing

- 3.13.1. The health of the population in West Sussex is generally greater compared to the national average⁴⁹. West Sussex is within 20% of the least deprived counties/authorities in England, however, some neighbourhoods are within the 10% most deprived areas in England. 70,700 (including 16,700 children) people are living in poverty in the County. The least deprived areas are concentrated around East Grinstead, Burgess Hill, Haywards Heath and Chichester while the most deprived areas are Bognor Regis, Littlehampton, Worthing and Shoreham.
- 3.13.2. Nationally, those reporting a mental health impairment has been rising, with a level of 25% in 2017/18 (23% of children, 38% working age adults and 9% of state pension age). Data for West Sussex at a county level is not available but is estimated to be lower than these rates due to relative health and wealth of the county in comparison to the national average.
- 3.13.3. West Sussex had an older age structure in comparison with England, with 23% of residents being 65+ (compare to 18% in England)⁵⁰.

Access to Healthcare

- 3.13.4. A high proportion of users of hospital facilities are within 30 minutes of a facility via car, with access via public transport means being extremely low. According to Department for Transport Statistics⁵¹, the percentage of users within 30 minutes of hospitals via public transport, cycle or cars are as follows:
- Public Transport / Walking: 37%;
 - Cycle: 46%; and
 - Car: 87%.
- 3.13.5. Travel times to the nearest hospitals are as follows:
- Public Transport / Walking: 40 minutes;
 - Cycle: 38 minutes; and
 - Car: 20 minutes.

⁴⁹ Public Health England (2018) [West Sussex: Local Authority Health Profile 2018 \[online\]](#). [Accessed November 2020]

⁵⁰ West Sussex Public Health and Social Research Unit (2020) [West Sussex Joint Strategic Needs Assessment Summary 2019/20 \[online\]](#). [Accessed November 2020]

⁵¹ Department for Transport (2017) [Journey Times to Key Services by Local Authority; Table JTS406 \[online\]](#). [Accessed December 2020]

Mortality

- 3.13.6. In the 2014-16 period, West Sussex had a count of 6,901 deaths under the age of 75 (from all causes). This is significantly better than the England average (which is 333.8 compared to West Sussex's 291.1).
- 3.13.7. In the 2014-16 period, West Sussex had a count of 1,424 people seriously injured or killed on roads. This is significantly worse than the England average (which is 39.7 compared to West Sussex's 56.8).

Obesity

- 3.13.8. Levels of obesity across the County are below the national average. As of 2016/17, 15.4% of children aged 0-11 are classified as obese, falling below the national average of 20.0%. Excess weight levels in adults (aged 18+) within the County are more consistent with the England average; 60.1% compared to 61.3% respectively. Furthermore, levels of physical activity by the County's population is 68.3% compared to the national average of 66%.

Life Expectancy

- 3.13.9. Life expectancy for both men and women in West Sussex is above the national average, as indicated in **Table 3-4**.

Table 3-4 - Life Expectancy in West Sussex and Nationally (2016-2018)

	West Sussex (years)	National Average (years)
Life Expectancy (Male)	80.8	79.6
Life Expectancy (Female)	84.2	83.2

- 3.13.10. However, inequalities exist across the county; life expectancy is 7.2 years lower for men and 6.0 years lower for women in the most deprived areas of the county (between 2016-18) compared to the least deprived areas.
- 3.13.11. Healthy life expectancy for both males and females is not increasing and has fallen for women since 2012. For both male and female, the healthy life expectancy is now in line with the national average (63.9 years).

Effects of Air Pollution

- 3.13.12. A review⁵² commissioned in 2019 by the Department for Health and Social Care (DHSC) is clear on the scale of harm from air pollution. It is the largest environmental risk to the public's health in the UK with:
- Estimates of between 28,000 and 36,000 deaths each year attributed to air pollution;
 - A close association with cardiovascular and respiratory disease including lung cancer;
 - Emerging evidence that other organs may also be affected, with possible effects on dementia, low birth weight and diabetes; and
 - Emerging evidence that children in their early years are especially at risk, including asthma and poorer lung development.

⁵² PHE (2019) [Review of interventions to improve outdoor air quality and public health](#). [Accessed March 2021]

3.13.13. The World Health Organisation states that “children living near roads with heavy-duty vehicle traffic have twice the risk of respiratory problems as those living near less congested streets” in its data and statistics files⁵³.

Effects of Noise Pollution

3.13.14. The WHO states⁵⁴ that “Noise is an underestimated threat that can cause a number of short- and long-term health problems, such as for example sleep disturbance, cardiovascular effects, poorer work and school performance, hearing impairment, etc.”

3.13.15. The WHO goes on to say “Studies and statistics on the effects of chronic exposure to aircraft noise on children have found:

- consistent evidence that noise exposure harms cognitive performance;
- consistent association with impaired well-being and motivation to a slightly more limited extent; and,
- moderate evidence of effects on blood pressure and catecholamine hormone secretion.”

3.13.16. DEFRA’s report ‘Environmental Noise: Valuing impacts on: sleep disturbance, annoyance, hypertension, productivity and quiet’ estimates the annual productivity loss to England from road traffic noise per annum (based on 2014 data) to be between £2 and £6bn⁵⁵.

Future Trends

3.13.17. West Sussex exhibits higher levels of life expectancy and general health compared to the national average, and therefore demographically it is in a favourable position. However, as noted in Section 3.11 ‘Population’, West Sussex will have an expanding ageing population; accessibility to transport networks may develop into an important issue since older generations may not have access to appropriate forms of private transport, leading to isolation of those in rural communities. Similarly, there are other inequalities in access to healthcare, employment and other services for other vulnerable groups.

3.13.18. Obesity is seen as an increasing issue by health professionals, and one that will contribute to significant health impacts on individuals, including increasing the risk of a range of diseases, including heart disease, diabetes and some forms of cancer. Transport planning will play a key role in encouraging active travel choices (e.g. walking and cycling) by Non-Motorised Users (NMUs) as well as accessibility to sports and recreation facilities. Continued traffic growth without adequate provision of NMU facilities is unsustainable. One element of this NMU provision will be the pedestrianisation of urban centres and removal of parking in urban centres, creating ‘car free environments’ promoting a safer and cleaner environment for exploitation of active transport.

SUSTAINABILITY ISSUES FOR WSTP

3.13.19. Sustainability issues in relation to health are as follows:

- The population of West Sussex is an ageing population, transport and future mobility will need to reflect their needs;

⁵³ WHO (online) [Data and Statistics: Air Pollution](#). [Accessed March 2021]

⁵⁴ WHO (2018) [Environmental Noise Guidelines for the European Region](#). [Accessed March 2021]

⁵⁵ Defra (2014) [Environmental Noise: Valuing Impacts on Sleep Disturbance, Annoyance, Hypertension, Productivity and Quiet](#). [Accessed March 2021]

- There may be inequalities in access to healthcare, jobs and other services associated with transport provision; and
- Active travel can play a role in reducing obesity and increasing health and wellbeing.

3.14 ECONOMY

SUMMARY OF BASELINE AND FUTURE TRENDS

Current Baseline

Gross Value Added

- 3.14.1. The Office for National Statistics (ONS) Gross Value Added (GVA) (a contribution to GDP made by an individual producer, industry or sector based on the value of output minus the value of intermediate consumption) data from 2018 (balanced per head of population and income) gives values for West Sussex (in millions of £)⁵⁶.
 - West Sussex (south-west): 22,985; and
 - West Sussex (north-east): 30,639.
- 3.14.2. In comparison to other UK GVA regions West Sussex (North East) is ranked 33rd (out of 179) and West Sussex (South West) is ranked at 90th. The West Sussex economy as a whole is estimated to be £53,624 million. Other than 2008-2009, both regions have seen consistent economic growth in the 2001-2018 period.
- 3.14.3. The per head and income balanced figures of GVA shows West Sussex North East's performance is stronger than West Sussex South West's performance. This is probably due to the effect of Crawley and Gatwick airport on the economy in the north of the County. West Sussex's GVA is lower than England's overall, and significantly lower than the South-East regions.
- 3.14.4. Districts within West Sussex fall within three spatial economic initiatives (see **Figure 3-12**). The three areas are as follows and form part of the Coast to Capital Local Enterprise Partnership (LEP). The LEP assist and access the allocation of local funding through the following:
 - Rural West Sussex Partnership;
 - Coastal West Sussex Partnership; and
 - Gatwick Diamond Initiative.

⁵⁶ Office of National Statistics (2019) [Regional Gross Value Added \(balanced\) by head of population and income \[online\]](#). [Accessed December 2020].



Figure 3-12 - Three Areas Partnership and Coast to Capital, the Local Enterprise Partnership⁵⁷

Employment and Skills

- 3.14.5. Businesses for the most part are located where they are because their founders lived locally. Others are located elsewhere due to factors such as: the proximity of customers, availability or affordability of premises or the surrounding environment. Conversely, inward investment businesses are more influenced by access to skills and transport connections.
- 3.14.6. Nevertheless, transport infrastructure is most likely to be an important local asset and an area in need of improvement. Particular focus should be placed upon local roads, followed by improvements to major roads and finally parking. Of similar significance are bus and rail services. Cycle path and footpath enhancements are of much less significance to local businesses.
- 3.14.7. Having good geographical access to customers is very important to businesses. This is the single most important factor for businesses; more important than access to skills, quality of life, transport and connections or even access to suppliers.

⁵⁷ Coast2Capital (2011) [Coast to Capital Local Enterprise Partnership Governance and Assurance Manual \[online\]](#). [Accessed December 2020]

Access to Town Centres

- 3.14.8. Department for Transport statistics⁵⁸ indicate that approximately 292,719 people use transport to access town centres across the county. The average travel time to the nearest town centre by various modes of transport within the county is as follows:
- Public Transport / Walking: 21 minutes;
 - Cycle: 12 minutes; and
 - Car: 12 minutes.
- 3.14.9. The most frequent reasons cited for not using public transport are inconvenience and unsuitable routes, although women, people on lower incomes and those without a car are less likely to say that public transport is inconvenient, possibly because they have no other choice. The next most common reasons for not using public transport are that there is none available or that the service is infrequent⁵⁹.

Access to Education Facilities

- 3.14.10. Access to educational facilities – primary, secondary and further education – varies. Department for Transport statistics from 2014 indicate that there are approximately 137,262 people between the ages of 5-19 that are users of educational facilities in the county. **Table 3-5** indicates the split of users and the average journey times by various modes of transport. **Table 3-6** displays the proportion of users within half an hour of facilities via different modes of transport.

Table 3-5 - Users of Educational Facilities in West Sussex and the Average Journey Time by Public Transport, Cycle and Car

	Primary School (5-10 years)	Secondary School (11-15 years)	Further Education (16-19 years)
Number of users	61,794	45,983	35,419
Travel time to nearest facility via public transport / walking (minutes)	11	21	25
Travel time to nearest facility via cycle (minutes)	9	17	20
Travel time to nearest facility via car (minutes)	8	12	13

⁵⁸ Department for Transport (2017) [Journey Times to Key Services by Local Authority \[online\]](#). [Accessed December 2020]

⁵⁹ International Longevity Centre UK (2015) [The Future of Transport in an Ageing Society \[online\]](#). [Accessed December 2020].

Table 3-6 - Percentage of Users within Half an Hour of Educational Facilities by Public Transport, Car and Cycle

Percentage of Users within Half an Hour	Primary School (5-10 years)	Secondary School (11-15 years)	Further Education (16-19 years)
Public Transport	99	86	75
Cycle	100	96	81
Car	100	100	100

3.14.11. Studies carried out by Action in Rural Sussex⁶⁰ show that students in rural areas are finding it harder to get to their places of study, especially since the Education Maintenance Allowance was removed as many used this for travel expenses. There can also be problems in rural areas, particularly affecting women, if there is only one car in the household.

Future Trends

- 3.14.12. Given uncertainties linked to the EU/Single Market and unknowns over aspects such as migrant labour-force, tariffs and taxes on export/imports it is presently unknown as to how the economic market of West Sussex will change.
- 3.14.13. The Covid-19 pandemic has significantly altered the way people work, travel and undertake leisure activities in the short term. The long-term implications of this remain to be seen and may include greater emphasis and proportion of the work force working from home (although certain sectors will not be affected by this), hesitation to use public transport and increased active transport adoption. The decline of retail shopping and increased used of online sales will also likely see a decreased footfall in urban centres.

SUSTAINABILITY ISSUES FOR WSTP

- 3.14.14. Economic issues linked to transport include addressing barriers to growth; enabling greater access to well-paid and satisfying employment within a flexible labour market; characterised by diversity in activity and transferable and complementary knowledge solutions. Supporting sustainable economic development which mitigates or combats the effects of climate change is a key issue.
- 3.14.15. Sustainability issues in relation to economy are as follows:
- Poor east-west connectivity which acts as a barrier to growth;
 - Good access to customers is important; transport infrastructure is noted as an area of improvement to enable this; and
 - Sustaining economic prosperity across the County in light of the structural changes to the economy.

⁶⁰ Action in Rural Sussex (2017) [Action in Rural Sussex \[online\]](#) [Accessed December 2020]

4 SUSTAINABILITY APPRAISAL FRAMEWORK

4.1 INTRODUCTION

4.1.1. This section sets out the Sustainability Appraisal Framework which will be used in the assessment process.

4.2 APPRAISAL FRAMEWORK

4.2.1. While not specifically required by the SEA Regulations, sustainability objectives are a recognised way of considering the environmental effects of a plan or programme and comparing the effects of alternatives. The objectives are developed using the sustainability issues identified in Section 3. The objectives will be used to assess emerging policies and implementation plans from the LTP and identify likely sustainability effects.

Table 4-1 - Sustainability Appraisal Framework

Topic	Sustainability Issues Identified	Sustainability Objective
<p>Natural Capital and Ecosystem Services</p>	<ul style="list-style-type: none"> ■ New transport routes will need to be carefully planned so that they do not cause adverse effects on ecosystems with high (potential) ecosystem services provision. Given that ecosystem services are the benefits that nature provides to people, areas of high (potential) provision are often the green and blue spaces close to centres of population, as well as connecting habitats that link these with more remote designated habitats and landscapes. ■ As transport corridors are typically linear, ensuring the connectivity of ecosystems is both an issue and an opportunity for the WSTP. There is scope to focus on redevelopment of existing assets rather than build new, to focus development away from areas of high biodiversity and ecosystem service provision, and to enhance the quality of the transport ‘soft estate’ alongside existing and new transport corridors in order to improve habitat connectivity. ■ Human health and quality of life can be improved by taking a natural capital approach to the WSTP. For example, improving the quality of habitats (including tree planting/wildflower planting) alongside walking and cycling routes can help encourage more active lifestyles with benefits for people’s physical and mental health and wellbeing. Views of vegetation from other modes of transport (e.g. along roads and railways) can also enhance mental wellbeing, for example by reducing stress levels. ■ Enhancing the quality of transport ‘soft estate’ can also help improve the resilience of the transport network to future climate change, for example by reducing flood risk and providing shading and cooling benefits. 	<ul style="list-style-type: none"> ■ To maintain and enhance the provision of ecosystem services from the County’s natural capital and contribute to biodiversity net gain.

Topic	Sustainability Issues Identified	Sustainability Objective
Materials, Minerals and Waste	<ul style="list-style-type: none"> ■ There is a reliance upon the road network to transport materials, and it is unlikely that this will change; ■ Materials, including minerals, will be required in any new transport infrastructure schemes. Similarly, application of resource efficiency including use of recycled materials is important to reducing waste and there is significant capacity for increasing the levels of recycled and secondary aggregate production used for transport infrastructure; and ■ Increasing population of the county is likely to generate more waste which requires transportation. Construction of new transport also has the potential to generate waste. 	<ul style="list-style-type: none"> ■ To conserve natural resources, increase resource efficiency and reduce generation and disposal of waste.
Soils	<ul style="list-style-type: none"> ■ Future development, including infrastructure, may lead to the degradation of BMV land; and ■ Improvements to transport infrastructure will likely require land take. 	<ul style="list-style-type: none"> ■ To protect soils and minimise the loss of Best and Most Versatile land.

Topic	Sustainability Issues Identified	Sustainability Objective
Biodiversity, Flora and Fauna	<ul style="list-style-type: none"> ■ There are a number of statutory local, national and international sites designated for nature conservation within the County which may be affected by development, including transport infrastructure; ■ Habitats, particularly those designated as HPI and Ancient Woodland are at risk of being lost, damage or fragmented by development, including transport infrastructure; ■ Species, including Species of Principal Importance and protected species, may also be affected by construction and operation of new infrastructure, both directly and indirectly; ■ The WSTP presents opportunities to be strategic in the enhancement of biodiversity at the landscape scale across the corridors (and, once the interventions are defined, also in relation to any necessary offsets beyond the boundary of specific developments). Existing Biodiversity Opportunity Areas (Natural England) can be combined with priorities for wider ecosystem service benefits to deliver landscape wide environment gain for biodiversity and people; and ■ Biodiversity Net Gain (BNG) is the end result of a process applied to development so that overall, there is a positive outcome for biodiversity. Although not currently a legal obligation for UK development, on 14th March 2019, Her Majesty's Treasury confirmed that following consultation, the Government will use the forthcoming Environment Bill to mandate BNG for development in England, ensuring that the delivery of much-needed infrastructure and housing is not at the expense of vital biodiversity. 	<ul style="list-style-type: none"> ■ To protect and enhance the County's biodiversity, fauna and flora, including designated sites for nature conservation notable and protected species; ■ Enhance the connectivity between habitats through the creation of green corridors and preservation / enhancement of the Green Infrastructure Network; and ■ To ensure future schemes provide BNG.
Air Quality	<ul style="list-style-type: none"> ■ There are exceedances of air quality standards for NO₂ in locations around the County, resulting in several declared AQMAs (declared for NO₂, due to emissions from transport sources); ■ Although changes in technology mean that vehicles are producing less emissions, the number of vehicles is expected to increase, which has the potential to affect air quality and a consequence, human health, natural capital and ecological sites. 	<ul style="list-style-type: none"> ■ To reduce traffic related air pollution in AQMAs and where possible, enhance air quality elsewhere in West Sussex.

Topic	Sustainability Issues Identified	Sustainability Objective
Climate	<ul style="list-style-type: none"> ■ The changes patterns in precipitation and storms in makes West Sussex particularly vulnerable to an increased year-round risk of more frequent river, surface and coastal flooding; ■ In 2019 WSCC has committed to achieving net zero carbon emissions of its operations by 2030 and reduce carbon associated with road-based transport, some of these emission targets are falling short of expectations. It is noted that GHG emissions from road transport are reducing but not fast enough to achieve government targets; ■ The transport sector is one of the largest contributors to greenhouse gas emissions with the lowest rate of reduction in emissions, despite significant investment in sustainable infrastructure and services, which must be considered accordingly before progressing future schemes; and ■ The transport network and its associated infrastructure is vulnerable to the effects of climate change. In particular, the risk of flooding is widespread throughout West Sussex. 	<ul style="list-style-type: none"> ■ To reduce emissions of greenhouse gases and the reliance of the transport network on fossil fuels in line with net zero carbon commitments; and ■ Ensure that the local transport network builds resilience to climate change.
Noise	<ul style="list-style-type: none"> ■ Transport noise may adversely impact sensitive receptors and increase noise in the 280 designated NIAs in West Sussex; and ■ The natural environment, particularly tranquil areas, may experience an increase in transport-related noise pollution. 	<ul style="list-style-type: none"> ■ To reduce noise from transport related sources in particular in Noise Important Areas and protect tranquil areas.

Topic	Sustainability Issues Identified	Sustainability Objective
Landscape and Townscape	<ul style="list-style-type: none"> ■ The character and quality of West Sussex’s landscapes and townscapes can be eroded by the construction and operation of transport infrastructure, which may impact upon the distinctive historic character of settlements; ■ Green Infrastructure (GI) describes the multifunctional network of green and blue spaces, landscapes, and natural elements within and between our cities, towns and villages. By connecting the centres of settlement into the surrounding landscape, GI can facilitate prosperous, active, healthy and happy communities. This network may be severed or reduced due to new transport infrastructure; and ■ Transport infrastructure has the potential to erode and adversely affect local character and distinctiveness. 	<ul style="list-style-type: none"> ■ To protect and where possible, enhance the quality, character and diversity of the existing landscape, with particular care given to the SDNP and designated AONBs; and ■ To conserve and where possible, enhance Natural Capital and GI.
The Historic Environment	<ul style="list-style-type: none"> ■ The historic character and heritage assets are important to the county. Its conservation is affected by new development, both directly and indirectly; ■ Vehicular damage and pollution can adversely impact on historic buildings, structures and the fabric of the public realm in town and village centres; and ■ Ancillary features of transport infrastructure, inclusive of marked parking bays, yellow lines etc. can adversely impact upon the setting of the historic environment. 	<ul style="list-style-type: none"> ■ To protect and enhance West Sussex’s historic environment including heritage resources, historic buildings, historic landscapes and archaeological features.

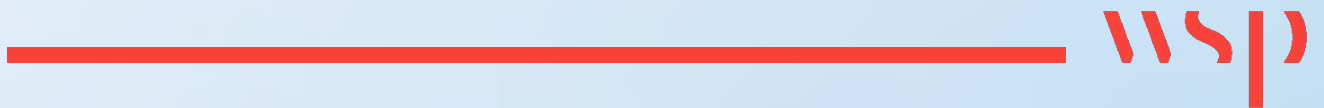
Topic	Sustainability Issues Identified	Sustainability Objective
Water	<ul style="list-style-type: none"> ■ Climate change is likely to increase the occurrence of flooding from all sources and hence raise the flood risk in West Sussex; ■ Transport infrastructure could be required in areas of high flood risk; ■ Pollution of the water environment can occur from groundwater run-off on roads and pavements after rainfall; ■ The physical and chemical quality of West Sussex’s water resources is already poor and an important aspect of the natural environment and can be adversely affected by, for example, pollution associated with transport infrastructure; and ■ Increased in flood risk can occur through the loss of permeable surfaces due to new road construction. Any new schemes and initiatives would need to consider the need to provide a net benefit to flood risk. 	<ul style="list-style-type: none"> ■ To protect and where possible, enhance water quality of the County’s rivers, groundwater and coast; and ■ To reduce vulnerability to flooding of transport infrastructure and ensure that the risk of surface water flooding is reduced by any implemented scheme or initiative.
Population	<ul style="list-style-type: none"> ■ The population of West Sussex is increasing and there will be additional movement associated with this growth; and ■ The ageing population is likely to increase demand for access to services. 	<ul style="list-style-type: none"> ■ To increase the capacity and efficiency of the transportation network to support demographic changes, including increasing travel by sustainable modes of transport.
Health	<ul style="list-style-type: none"> ■ The population of West Sussex is an ageing population, transport and future mobility will need to reflect their needs; ■ There may be inequalities in access to healthcare, jobs and other services associated with transport provision; and ■ Active travel can play a role in reducing obesity and increasing health and wellbeing. 	<ul style="list-style-type: none"> ■ To improve the mental and physical health and well-being of the population through access to transport, active travel and reductions in pollution.
Economy	<ul style="list-style-type: none"> ■ Poor east-west connectivity which acts as a barrier to growth; ■ Good access to customers is important; transport infrastructure is noted as an area of improvement to enable this; and ■ Sustaining economic prosperity across the County in light of structural changes to the economy. 	<ul style="list-style-type: none"> ■ To sustain economic prosperity, enable well paid employment and competitiveness across West Sussex through provision of reliable and accessible transport networks.

5 NEXT STEPS

- 5.1.1. WSCC sought the views of the statutory bodies on the scope of the original SA in 2017. WSCC sought internal views, particularly from the Heritage and Environment team to help ensure a robust assessment of the WSTP. Comments received from the statutory bodies from 2017 were reviewed and incorporated into this Scoping Report.
- 5.1.2. In 2020 WSCC carried out a Stakeholder survey over a six-week period in Autumn 2020. Stakeholders were asked to respond to preferred solutions and perceived challenges. There were 514 respondents from LPAs, parish councils, transport interest groups, business groups, school staff, community groups, individuals and small numbers of County Councillors.
- 5.1.3. The responses to these surveys have been incorporated into this scoping report, and in particular the aims issues and objectives identified. The survey responses will be further incorporated into the development of the WSTP.
- 5.1.4. After this review by internal WSCC consultees, this report will now be distributed to external statutory bodies for consultation. Comments arising from these consultees will be incorporated into the Sustainability Appraisal Framework and form part of the SA / SEA to be prepared to assess the emerging WSTP.

Appendix A

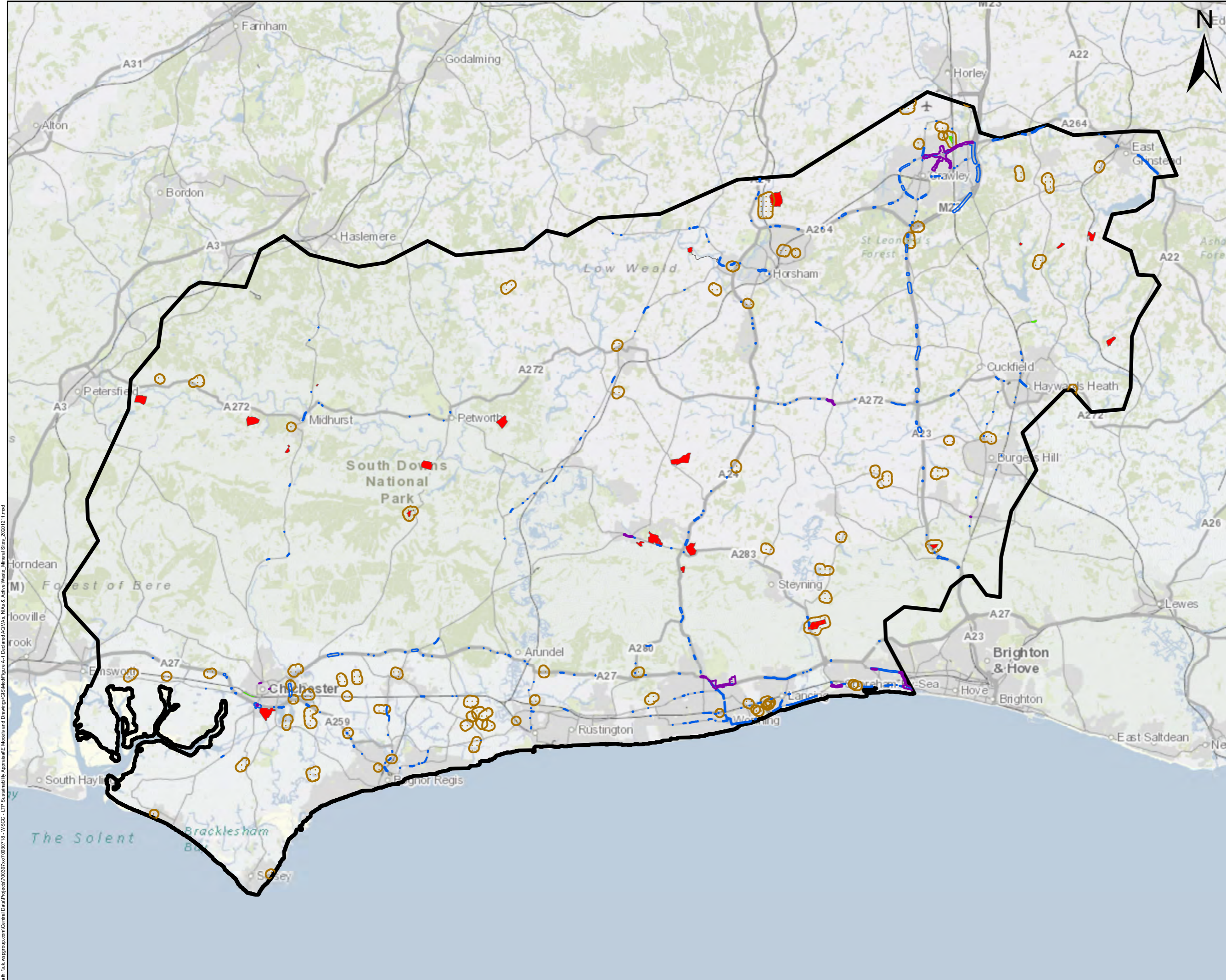
FIGURES





This appendix contains the following maps:

- Figure A-1: Declared AQMAs, NIAs, and active waste/mineral sites
- Figure A-2: Agricultural Land Classification
- Figure A-3: Ecological Designations
- Figure A-4: Designated Heritage Assets
- Figure A-5: Flood Zone Regions



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Notes

- Active Waste Sites
- Railheads
- Active Mineral Extraction Sites
- Air Quality Management Areas (AQMAs)
- Noise Important Areas (NIAs)
- West Sussex County

Copyright
 This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office.

© Crown copyright

Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.

Contains Ordnance Survey data
 © Crown copyright and database right 2020

Revision Details	By	Date	Suffix
	Check		

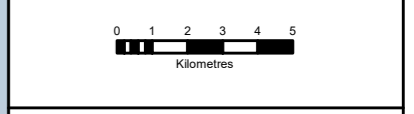
Drawing Status: **DRAFT**

Job Title: **WSSC: LTP SUSTAINABILITY APPRAISAL**

Drawing Title: **FIGURE A-1: DECLARED AQMAS, NIAs AND ACTIVE WASTE/MINERAL SITES**

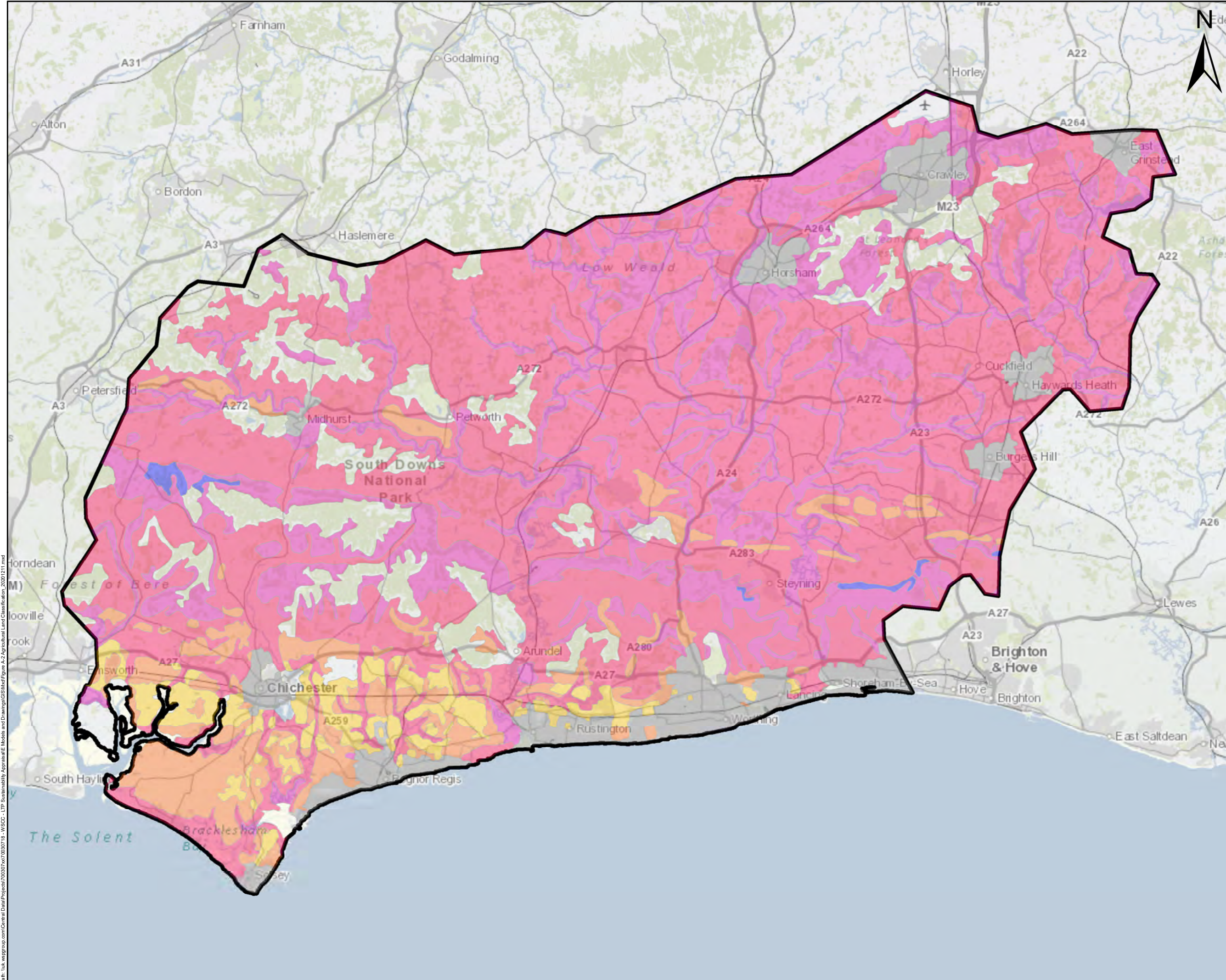
Scale at A3: **1:215,000**

Drawn	BG		
Stage 1 check	Stage 2 check	Originated	Date
CB	KG	KG	18/12/2020



Drawing Number: **70030718_001** Rev: -

Path: \\uk.wspgroup.com\Central\Drawings\Projects\70030718 - WSSC - LTP Sustainability Appraisal\E Models and Drawings\GIS\Map\Figure A-1 Declared AQMAs, NIAs & Active Waste_Mineral Sites_20201211.mxd



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Notes

Agricultural Land Classification

- Grade 1
- Grade 2
- Grade 3
- Grade 4
- Grade 5
- Urban
- No Data Available
- West Sussex County

Copyright
This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office.

© Crown copyright

Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.

Contains Ordnance Survey data
© Crown copyright and database right 2020

Revision Details	By	Date	Suffix

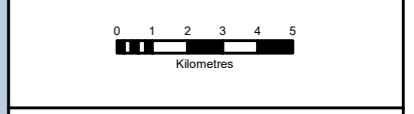
Drawing Status: **DRAFT**

Job Title: **WSSC: LTP SUSTAINABILITY APPRAISAL**

Drawing Title: **FIGURE A-2: AGRICULTURAL LAND CLASSIFICATION**

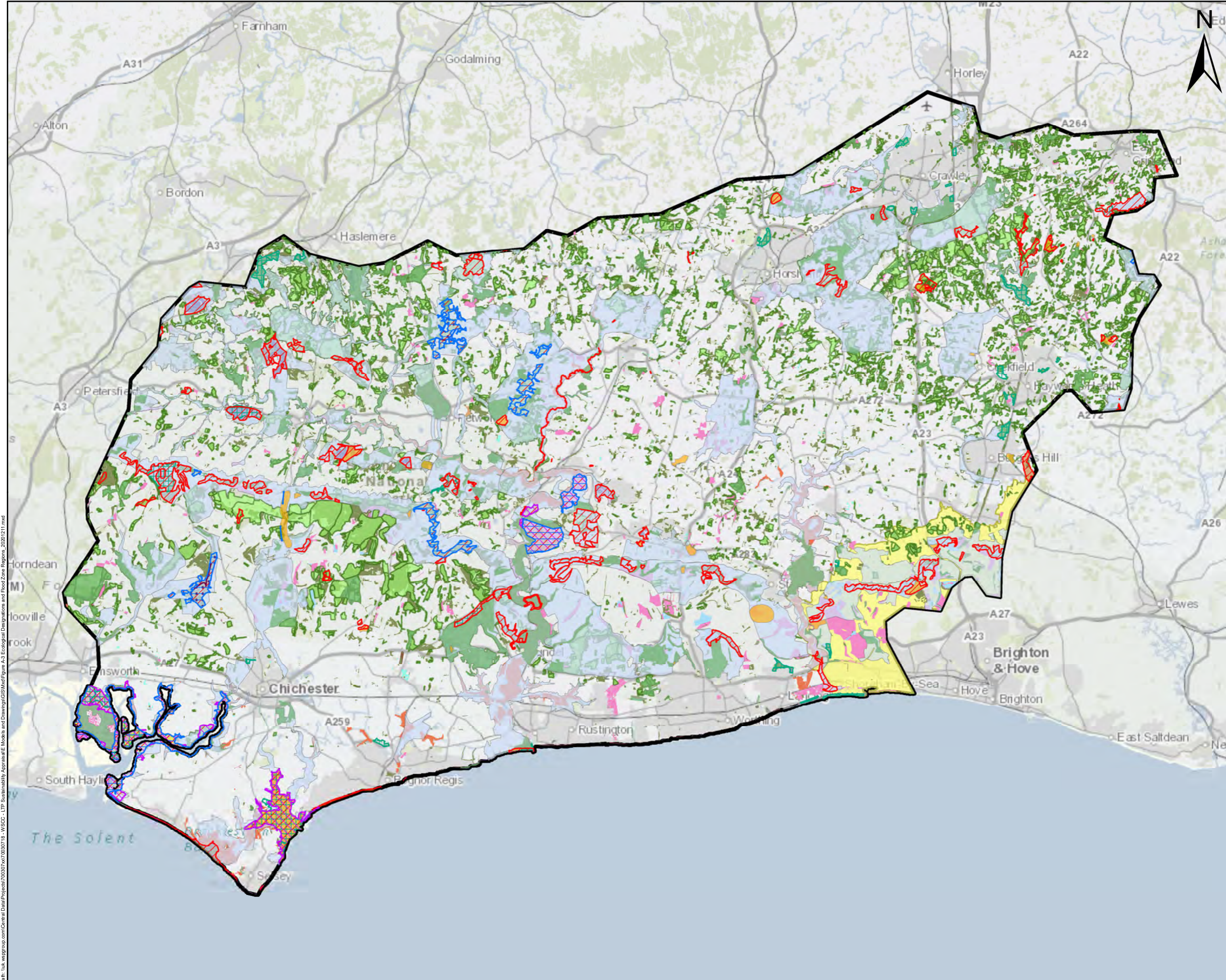
Scale at A3: **1:215,000**

Drawn	BG		
Stage 1 check	Stage 2 check	Originated	Date
CB	KG	KG	17/12/2020



Drawing Number: **70030718_002** Rev: -

Path: \\uk.wspgroup.com\Central\Drawings\Projects\70030718 - WSSC - LTP Sustainability Appraisal\E-Models and Drawings\GIS\Map\Figure A-2 Agricultural Land Classification_20201211.mxd



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

- Notes
- Special Area of Conservation (SAC)
 - National Nature Reserves (NNR)
 - Ramsar Sites
 - Site of Special Scientific Interest (SSI)
 - Local Nature Reserve (LNR)
 - Regionally Important Geological/Geomorphological Sites
 - Sites of Nature Conservation Importance (SNCIs)
 - Biodiversity Opportunity Areas (BOAs)
 - West Sussex County
 - Ancient Woodland
 - Biosphere Reserves
- Priority Habitat Inventory**
- Coastal and floodplain grazing marsh
 - Coastal saltmarsh
 - Coastal sand dunes
 - Coastal vegetated shingle
 - Deciduous woodland
 - Good quality semi-improved grassland
 - Lowland calcareous grassland
 - Lowland dry acid grassland
 - Lowland fens
 - Lowland heathland
 - Lowland meadows
 - Maritime cliff and slope
 - Mudflats
 - Purple moor grass and rush pastures
 - Reedbeds
 - Saline lagoons
 - Traditional orchard

Copyright
This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office.

© Crown copyright
Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.

Contains Ordnance Survey data
© Crown copyright and database right 2020

Revision Details	By	Date	Suffix	

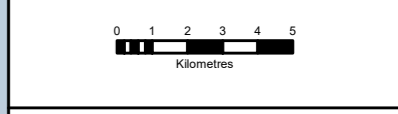
Drawing Status **DRAFT**

Job Title
**WSSC:
LTP SUSTAINABILITY APPRAISAL**

Drawing Title
**FIGURE A-3:
ECOLOGICAL DESIGNATIONS**

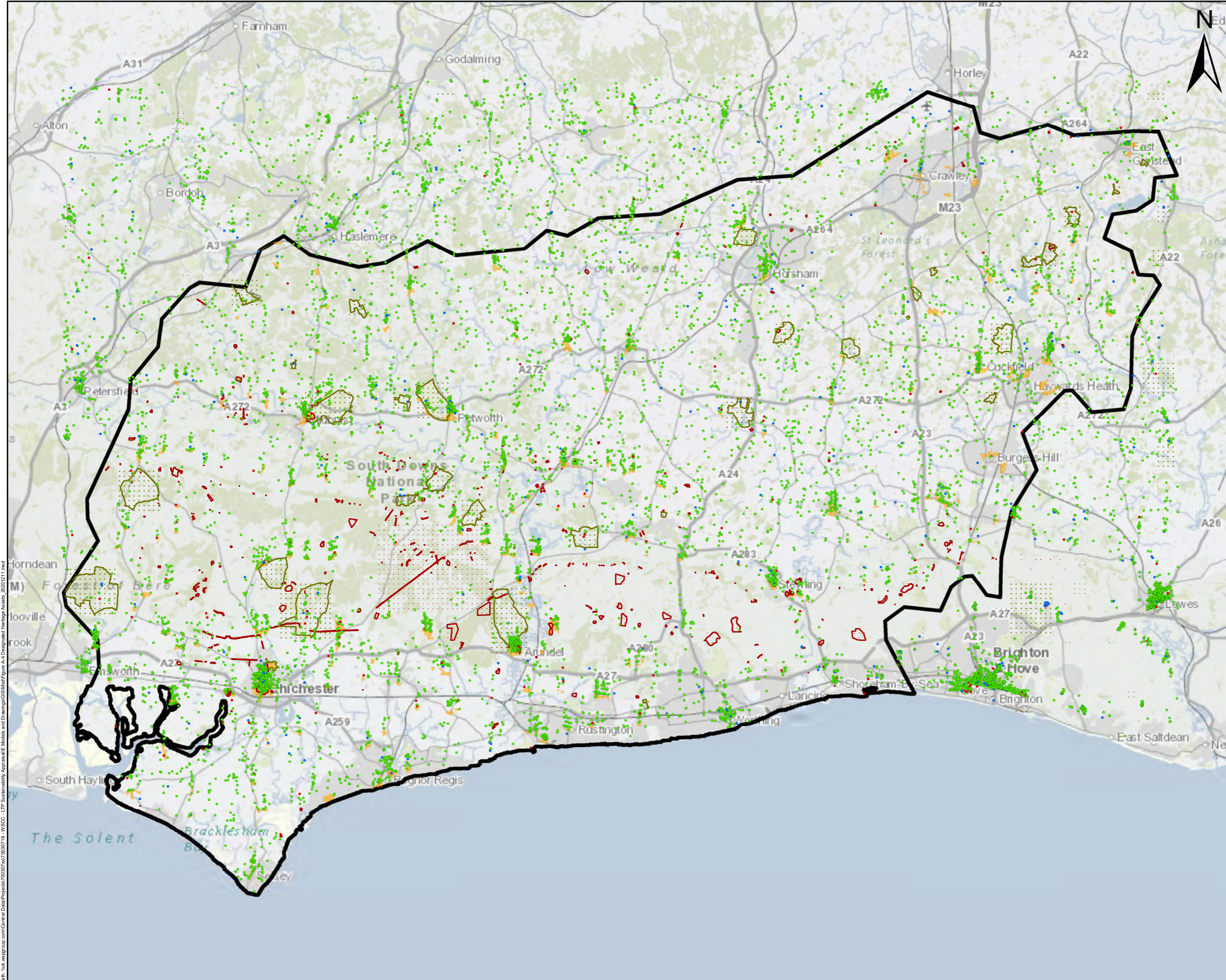
Scale at A3 **1:215,000**

Drawn	BG		
Stage 1 check	Stage 2 check	Originated	Date
CB	KG	KG	17/12/2020



Drawing Number	Rev
70030718_003	-

Path: \\uk.wspgroup.com\Central\Desktop\Projects\70030718 - WSSC - LTP Sustainability Appraisal\E Models and Drawings\GIS\MapFigure A-3 Ecological Designations and Flood Zone Regions_20201211.mxd



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

Notes

Listed Building

- I
- II
- II*

■ Conservation Areas

■ Parks and Gardens

■ Scheduled Monuments

■ West Sussex County

Copyright
 This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office.

© Crown copyright

Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.

Contains Ordnance Survey data
 © Crown copyright and database right 2020

Revision Details	By	Date	Suffix
	Check		

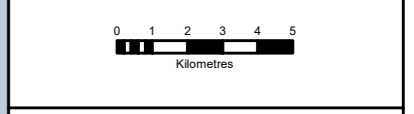
Drawing Status: **DRAFT**

Job Title: **WSSC:
LTP SUSTAINABILITY APPRAISAL**

Drawing Title: **FIGURE A-4:
DESIGNATED HERITAGE ASSETS**

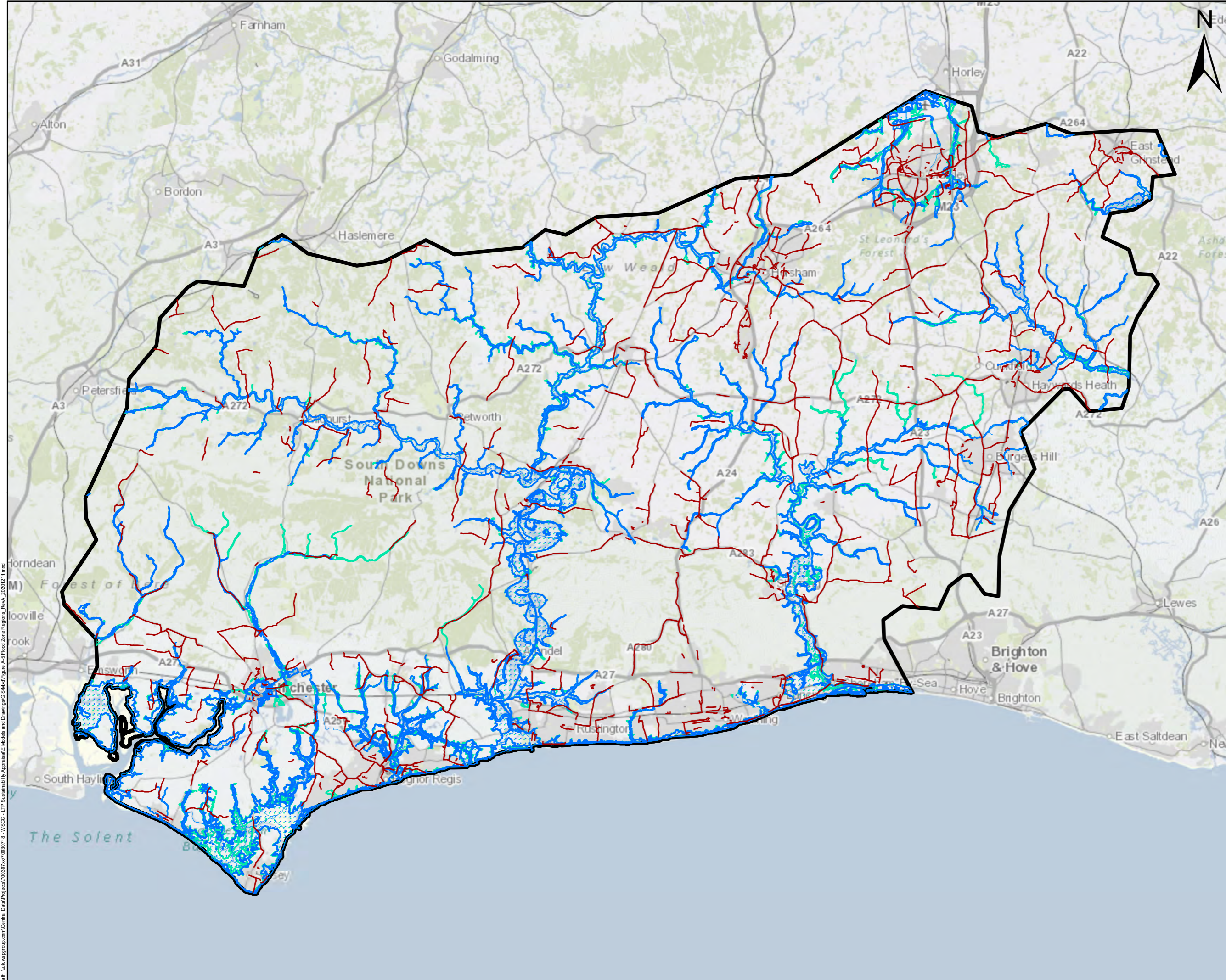
Scale at A3: **1:215,000**

Drawn	BG		
Stage 1 check	Stage 2 check	Originated	Date
CB	KG	KG	18/12/2020



Drawing Number: **70030718_004** Rev: -

Path: \\uk.wspgroup.com\Central\Drawings\Projects\70030718 - WSSC - LTP Sustainability Appraisal\E-Models and Drawings\GIS\Map\Figure A-4 Designated Heritage Assets_20201211.mxd



THIS DRAWING MAY BE USED ONLY FOR THE PURPOSE INTENDED AND ONLY WRITTEN DIMENSIONS SHALL BE USED

- Notes
- Transport Infrastructure at Risk of Flooding
 - Environment Agency Designated Main River
 - Flood Zone 3
 - Flood Zone 2
 - West Sussex County

Copyright
This map is reproduced from Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationary Office.

© Crown copyright

Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings.

Contains Ordnance Survey data
© Crown copyright and database right 2020

Revision Details	By	Date	Suffix

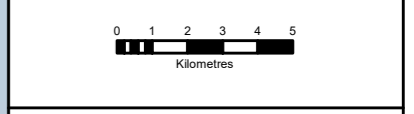
Drawing Status: **DRAFT**

Job Title: **WSSC:
LTP SUSTAINABILITY APPRAISAL**

Drawing Title: **FIGURE A-5:
FLOOD ZONE REGIONS**

Scale at A3: **1:215,000**

Drawn	BG		
Stage 1 check	CB	Stage 2 check	KG
		Originated	KG
		Date	17/12/2020



Drawing Number: **70030718_005** Rev: -

Path: \\uk.wspgroup.com\Central\Drawings\Projects\70030718 - WSSC - LTP Sustainability Appraisal\E Models and Drawings\GIS\Map\Figure A-5 Flood Zone Regions_RewA_20201211.mxd



2 London Square
Cross Lanes
Guildford, Surrey
GU1 1UN

wsp.com

PUBLIC