

West of England Strategic Green Infrastructure Framework



Bath & North East
Somerset Council



South Gloucestershire
Council



May 2011

Prepared by the West of England Green Infrastructure Group, on behalf of the West of England Partnership*, Natural England, Environment Agency, and Forestry Commission. The group works together to share knowledge and take joint action to support Green Infrastructure delivery across the West of England

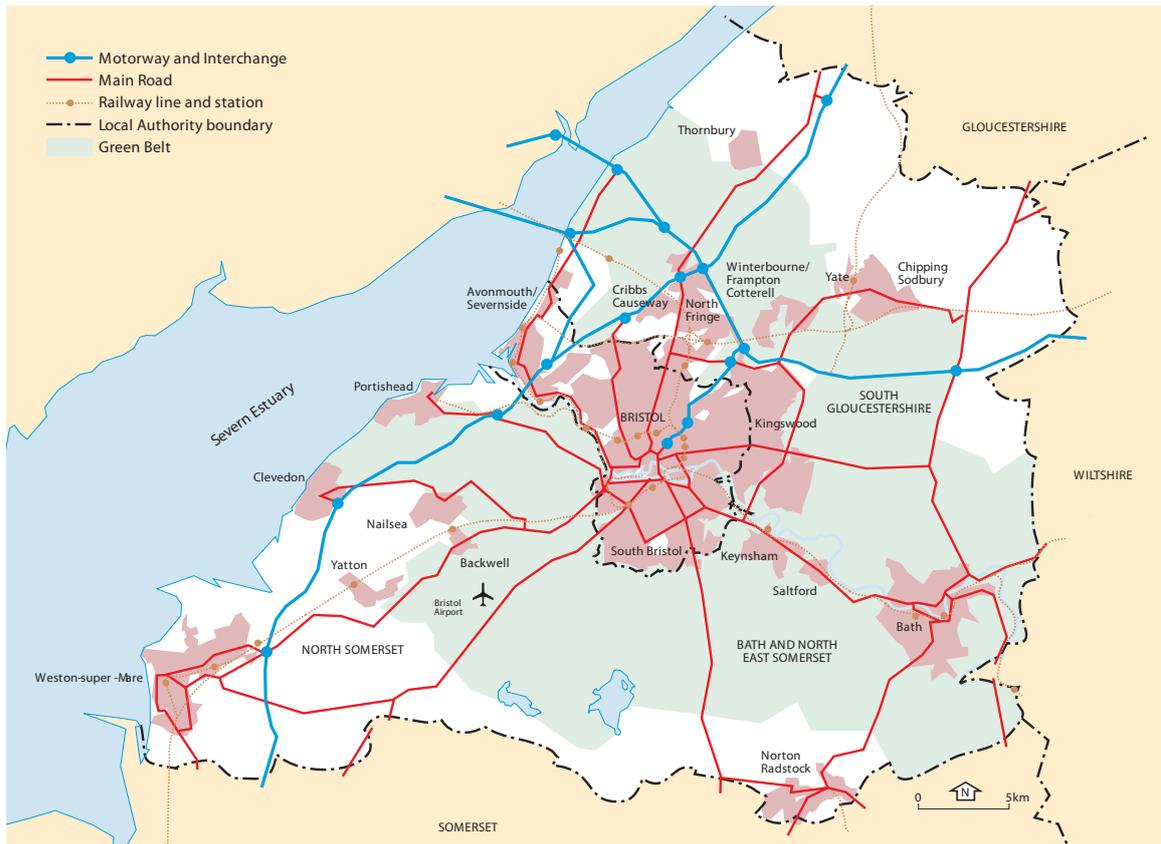
* North Somerset Council have not signed up to this West of England Green Infrastructure Framework but will continue to address green infrastructure through their emerging Core Strategy and Green Infrastructure Strategy.

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1. INTRODUCTION

- 1.1 The West of England is a functional economic area consisting of the four local authorities of Bath and North East Somerset, Bristol, North Somerset and South Gloucestershire. This includes the strategically significant cities and towns of Bristol, Bath and Weston-super-Mare, which provide employment and services for a wide rural hinterland.



- 1.2 The West of England is the gateway to the south west and also has one of the fastest growing economies in the UK. One of the main attractions of this area, which has contributed to its economic success, is the outstanding and diverse natural environment, including the international nature conservation sites along the Severn Estuary, the Mendip Hills and Cotswolds Areas of Outstanding Natural Beauty.
- 1.3 The four authorities have a history of working together as a partnership on economic, spatial, transport and infrastructure planning to deliver sustainable economic growth. They are committed to working collaboratively with the Environment Agency, Natural England, the Forestry Commission, development industry and other key partners to deliver sustainable development. This includes accommodating sustainable growth in homes and jobs in the right locations to meet the needs of communities. The protection and enhancement of green infrastructure is key to supporting the development of sustainable communities and maintaining a high quality of life.

What is Green Infrastructure?

- 1.4 Green infrastructure is a planned network of green (and blue) spaces and corridors within, around and between towns and cities, which can be designed, maintained, and improved to meet the needs of local communities, wildlife and the environment.
- 1.5 Green infrastructure assets may be publicly or privately owned, may be with or without public access, and may be in urban and rural locations.
- 1.6 A network of green infrastructure offers multiple benefits, which are essential to the sustainable growth of communities and the economy. These include:
 - Promoting economic growth, employment and skills improvement;
 - Supporting resilient ecosystems and biodiversity;
 - Mitigating and adapting the natural and built environment to climate change;
 - Recognising and enhancing a legible network of physical green spaces and corridors;
 - Reducing and managing flood risk;
 - Improving mental and physical health, and the cohesion of local communities;
 - Increasing sustainable food production;
 - Maintaining and enhancing cultural heritage, landscapes and natural resources.
- 1.7 A significant level of evidence clearly demonstrates the cost-effectiveness associated with the multiple benefits delivered by green infrastructure (see Appendix 1).
- 1.8 The Coalition Government, which has committed to being the “greenest Government ever”, clearly recognises that economic prosperity and our natural environment are mutually interdependent. An understanding of the value of our natural resources must therefore be considered in decision making at all levels¹.

What is Strategic Green Infrastructure?

- 1.9 By its very nature, green infrastructure is a strategic concept, extending beyond administrative boundaries and between users, organisations and government departments.
- 1.10 Strategic green infrastructure assets are those, which the authorities and their partners consider to have significance across the West of England, and therefore provide multiple functions and benefits of value to the communities and environment beyond the local level. Maintaining and enhancing these assets as part of a larger strategic green infrastructure network will therefore safeguard and extend the flow of benefits for people, ecosystems, and natural ecological processes across the West of England.

¹ An invitation to shape the Nature of England: Discussion Document, Defra, July 2010

- 1.11 For the purposes of this document the strategic green infrastructure network in the West of England has been defined as a series of interlinked green (e.g. nature reserves, woodland) and blue (e.g. rivers, lakes, brooks) sites and corridors of area wide significance.
- 1.12 For more detail on how the West of England strategic green infrastructure network has been defined please see Appendix 3.
- 1.13 Local or neighbourhood scale green assets, where they are not an integral part of the strategic network, are not addressed in this framework. Nevertheless, local green infrastructure assets have the potential to create links to the strategic GI network and their benefits can make an important contribution to the eight cross-cutting themes identified by this Framework.
- 1.14 The protection, maintenance and enhancement of all green infrastructure assets is addressed within the authorities emerging Core Strategies (see Appendix 2) and other Development Plan Documents including Neighbourhood Plans and Green Infrastructure Strategies.

Purpose and Scope of this Framework

- 1.15 The West of England authorities are developing Core Strategy and Development management policies on GI and B&NES and South Gloucestershire are in the process of developing specific Green Infrastructure Strategies to support these policies (see Appendix 2). This West of England Framework is complimentary to these policies and strategies, providing a strategic context for green infrastructure delivery, including opportunities for working across local authority boundaries.
- 1.16 The purpose of this Framework is therefore to clearly identify:
- a shared vision, objectives and principles for green infrastructure across the West of England;
 - green infrastructure of strategic importance, including green infrastructure areas and corridors, which may cross local authority boundaries;
 - the benefits delivered by green infrastructure, including as part of new development.
- 1.17 The strategic overview provided by the Framework will therefore promote a more consistent approach and better understanding of strategic green infrastructure across the partnership area. This will deliver the following benefits:
- The GI Framework provides an evidence base to support green infrastructure policy within emerging Core Strategies and Development Plan Documents;
 - A better appreciation of the need to plan for green infrastructure at a strategic, as well as local scale;
 - The protection and, where possible, expansion of the West of England green infrastructure network, in particular, cross-boundary linkages;

- Co-ordination of resources and actions directed at green infrastructure by the authorities and their partner's to achieve more cost effective outcomes, which support the delivery of sustainable growth.

Status of the Green Infrastructure Framework and its role in decision making

1.18 This Green Infrastructure Framework is not a policy document, but provides part of the evidence base to support the authorities Core Strategies and other development plan documents. As such, the Framework should be seen as guidance that may be useful as a material consideration when considering development proposals that contain, or have the potential to contain, elements of green infrastructure.

Consultation and Engagement

- 1.19 The Green Infrastructure Framework reflects detailed discussions, workshop findings² and a consideration of national and local evidence, to set out a shared understanding of green infrastructure and a commitment by the partner's to work collaboratively to ensure a co-ordinated approach is taken to GI planning and delivery across the West of England.
- 1.20 In publishing this document the partners are seeking wider engagement from other stakeholders including local communities and the development industry, in order to maintain and enhance the strategic green infrastructure network.

2. VISION AND STRATEGIC OBJECTIVES OF THE GREEN INFRASTRUCTURE FRAMEWORK

Vision

By 2026 the West of England will have an enhanced and sustainable green infrastructure network consisting of a multifunctional, connected and legible network of strategic green sites and corridors, that will be widely beneficial to communities, wildlife and the environment to support sustainable growth across the West of England.

Strategic Objectives

- 2.1 The Partnership has agreed the following objectives for green infrastructure provision across the partnership area:
- Maintain a functional and connected strategic green infrastructure network and maximise opportunities for enhancing the network;

² Making Connections workshop hosted by Natural England, March 2010

- Ensure that the multi-functional benefits of green infrastructure are clearly recognised by authorities, agencies and other partners, and are considered throughout the planning process, especially during plan making and pre-application discussions;
- Ensure that new development, wherever possible, supports the maintenance and enhancement of the strategic green infrastructure network, in a way that contributes to as many of the eight cross-cutting themes (identified in table 3.1) as possible;
- Ensure early, continuous and effective engagement between the authorities, agencies and other partners in the delivery of green infrastructure across the West of England;
- Monitor and keep an up to date shared evidence base on green infrastructure across the West of England;
- Secure the investment necessary to unlock major development opportunities, including securing investment in green infrastructure;
- Ensure businesses and communities are more aware of environmental challenges and opportunities for green infrastructure in the West of England, including promoting good examples of green infrastructure work underway, and how these can be expanded upon.

3. FUNCTIONS AND BENEFITS OF GREEN INFRASTRUCTURE

3.1 A network of green infrastructure has the potential to provide multiple economic, environmental and social benefits. The table below demonstrates how well planned and designed green infrastructure can contribute to eight different cross-cutting themes.

Table 3.1: The multiple benefits of green infrastructure

Cross-cutting Theme	Green Infrastructure Functions and Benefits
<p>Promoting economic growth, employment and skills improvement</p>	<p>Open spaces, trees, wildlife areas, river corridors, and even flood mitigation schemes can all increase the visual amenity of an area. This can encourage inward investment by creating the attractive environments desired by businesses for their employees and clients.</p>  <p>Source: SPark 2011. Crown Copyright.</p>

Cross-cutting Theme	Green Infrastructure Functions and Benefits
	<p data-bbox="539 293 1414 591">A green, healthy environment is essential to creating successful places, in which people want to live and work. Some of the most prestigious and profitable residential, office and industrial spaces include high quality green spaces. For example, the restoration and landscaping of Queen Square in Bristol, has attracted a wide variety of businesses to the area, and the substantially increased the value of commercial buildings reflect the popularity of the area.</p>  <p data-bbox="539 992 1046 1021">Source: BCC, VisTech, 2011. Crown Copyright.</p> <p data-bbox="539 1025 1414 1323">A high quality and attractive built environment, which utilises GI, can encourage tourism and recreational visits to support local economies. Many of the green infrastructure assets in the West of England play a crucial role in defining the area, and contributing to its unique sense of place. For example, the distinctive landscapes of the Mendip and Cotswolds Areas of Outstanding Natural Beauty (AONB) attract millions of international and national visitors to the West of England each year³.</p>  <p data-bbox="539 1859 1222 1888">Source: West of England Partnership, 2011. Crown Copyright.</p>

³ Your Guide to the Cotswolds area of Outstanding Natural Beauty, Cotswold AONB, 2007

Cross-cutting Theme	Green Infrastructure Functions and Benefits
	<p>An attractive natural environment can provide a stimulating and inspirational environment, promoting increased productivity and learning.</p>
<p>Supporting resilient ecosystems and biodiversity</p>	<p>Maintaining a GI network with corridors suitable for wildlife movement supports genetic exchange and allows species to adapt to the consequences of climate change and development through migration.</p>  <p>Source: B&NES Council, 2011. Crown Copyright.</p> <p>A protected and diverse range of habitats can increase species richness to meet Biodiversity Action Plans.</p>

Cross-cutting Theme	Green Infrastructure Functions and Benefits
<p>Mitigating and adapting the natural and built environment to climate change</p>	<p>Many GI assets, including open space, trees and water, counteract the urban heat island effect by providing natural air conditioning, shading and absorption of greenhouse gases.</p>  <p>Source: West of England Partnership 2011. Crown Copyright.</p>
	<p>Green infrastructure, such as cycle routes, public rights of way, and tree-lined routes, can support and encourage green travel, contributing to a reduction of CO² emissions from transport. The West of England benefits from a number of nationally and regionally connected cycle routes, which are important for commuting, recreation and wildlife.</p>  <p>Source: Bath Tourism Plus, 2011. Crown Copyright.</p>

Cross-cutting Theme	Green Infrastructure Functions and Benefits
	<p>Green infrastructure is an important source of biomass, which can be used to produce renewable heat and energy. Wood fuel, for example, is an important source of renewable energy. Sustainable management of woodland by wood fuel suppliers can simultaneously support biodiversity. Such practice is promoted across the West of England by Westwoods, an independent wood fuel broker.</p>
<p>Recognising and enhancing a legible network of physical green spaces and corridors</p>	<p>Green infrastructure corridors, such as rivers, cycle routes, public rights of way and linear wildlife sites, can link up green spaces, creating corridors for the movement of wildlife and people. For example, the River Frome Valley, which extends from the Cotswold Hills, through South Gloucestershire to the centre of Bristol, provides an important green corridor for people and wildlife.</p>  <p>Source: Bristol City Council, 2011. Crown Copyright.</p> <p>Green travel routes provide a real, cheaper, alternative to the private car, facilitating sustainable travel, and maximising opportunities to access green infrastructure within and outside of urban areas. For example the Bath to Bristol railway Path, which extends from Bath city centre, through South Gloucestershire, into Bristol city centre, provides an important commuting route, as well opportunities for recreation and migration of wildlife.</p>

Cross-cutting Theme	Green Infrastructure Functions and Benefits
	<p>The provision of green infrastructure, such as trees and shrubs, can create pleasant environments in areas dominated by transport and other grey infrastructure (e.g. rail, road, utilities). This can promote walking, cycling, and the movement of wildlife within and through the built environment.</p>  <p>Source: BCC VisTech, 2011. Crown Copyright.</p>
<p>Reducing and managing Floodrisk</p>	<p>Green spaces (such as a suitably located park and sports field), ponds and other bodies of water can be used as temporary floodwater storage when required, thus reducing strategic flood risk.</p>

Cross-cutting Theme	Green Infrastructure Functions and Benefits
	<p>Trees, soft surfacing and sustainable urban drainage systems (SUDS) reduce and control run-off, increase permeability and provide water storage capacity. For example, swales and a detention pond, which have been used to capture water run-off at Bristol Business Park, also improve the visual quality of the park and provide a valuable function for people and wildlife</p>  <p>Source: CABE, 2010. Crown Copyright.</p>
<p>Improving mental and physical health, and the cohesion of local communities</p>	<p>Parks, football pitches, playgrounds and green travel routes can provide opportunities for exercise and active lifestyles. This can help to address health issues such as obesity, heart disease and mental illness. A number of Green Gyms, are supported across the West of England, which encourage outdoors exercise and social interaction.</p>  <p>Source: B&NES Council, 2011. Crown Copyright.</p>

Cross-cutting Theme	Green Infrastructure Functions and Benefits
	<p>Parks, allotments and river corridors can provide a focal point for social interaction. This encourages social cohesion and can help to reduce social exclusion and inequalities.</p>  <p>Source: BCC VisTech, 2011. Crown Copyright.</p> <p>Local air quality can be improved by the presence of forests, woodlands and street trees, with obvious health benefits.</p> <p>Easy access to green infrastructure, reduces levels of depression, aggression and violent behaviour. The Breakthrough Project, in South Gloucestershire, for example, utilises outdoor sports and physical activities to engage children with behavioural issues.</p>
<p>Increasing sustainable food production</p>	<p>Protecting spaces capable of growing urban food (e.g. community orchards, market gardens, allotments and school grounds) can reduce food miles and encourage people to eat more healthily.</p> <p>Allotments and community orchards can foster community pride, improve social cohesion, and provide a focus for the community.</p>  <p>Source: City Design Group/ Bristol Design/CABE</p>

Cross-cutting Theme	Green Infrastructure Functions and Benefits
<p>Maintaining and enhancing cultural heritage, landscapes and natural resources</p>	<p>Retaining well-planned open spaces, street trees, and river corridors can contribute to place making, providing an attractive and locally distinctive environment. Landscapes such as the Cotswolds and Mendips AONB provide an attractive and locally distinctive environment, as well as supporting a wide range of linked ecological systems. Jurassic Limestone Grasslands, for example, are a rare landscape, which support rare species of plants and animals. The Cotswold AONB grassland project, therefore, works with landowners across 96 limestone grassland sites within the Cotswolds to ensure their conservation.</p>  <p>Source: Natural England, 2011. Crown Copyright.</p>

- 3.2 The list of functions and benefits associated with each GI theme above is not exhaustive. However, it is clear that well designed and connected green infrastructure, which is designed to meet as many of the eight themes as possible, can result in multifunctional benefits to the economy, the environment and for people.

4. PRINCIPLES OF GREEN INFRASTRUCTURE PROVISION IN THE WEST OF ENGLAND

- 4.1 The authorities have set out a shared set of principles to guide the delivery, maintenance and protection of GI across the West of England. These principles will offer our partners' clarity and consistency; ensuring resources are directed to secure maximum benefits.

Principle 1 – Maintain and enhance the connectivity and function of the Strategic GI Network:

- 4.2 The benefits and functions of GI assets are often maximised and available to greater numbers of people and species, when they form part of a connected network. As a first priority the existing strategic GI network in the West of England therefore needs to be recognised, maintained and enhanced in any plans for growth and change within the partnership area.
- 4.3 To ensure existing benefits of the network are maintained, and that enhancements maximise and contribute to wider benefits, proposals for GI should look to the following additional principles:

Principle 2 – GI provision, maintenance and enhancement should contribute to the eight cross-cutting themes:

- 4.4 GI assets and the networks they create are already delivering a range of benefits and functions to individual people, communities and biodiversity across the West of England.
- 4.5 Better planning, design, and management of GI across the partnership area can maximise these benefits.
- 4.6 To assist plans, strategies and development proposals, this GI Framework sets out eight cross-cutting themes to which it considers that the functions and benefits of GI can contribute:
- Promoting economic growth, employment and skills improvement;
 - Supporting resilient ecosystems and biodiversity;
 - Mitigating and adapting the natural and built environment to climate change;
 - Reducing and managing flood risk;
 - Recognising and enhancing a legible network of physical green spaces and corridors;
 - Improving mental and physical health, and the cohesion of local communities;
 - Increasing sustainable food production;
 - Protecting and enhancing cultural heritage, landscapes and natural resources.
- 4.7 The West of England authorities and their partners therefore expect plans, strategies or development proposals to address, where appropriate and feasible, all eight themes, by promoting/delivering/facilitating appropriate multifunctional green infrastructure, which also contributes to the connectivity of the strategic GI network.
- 4.8 To assist plans, strategies and development proposals to address the eight cross-cutting themes, table 3.1 links each theme to the functions and benefits associated with GI, and where appropriate provides local examples.

Principle 3 – Secure a net gain in strategic GI:

- 4.9 A net gain in strategic green infrastructure across the West of England should be sought so as to address the needs of current and future populations. Generally, within

development proposals this may take the form of the protection or enhancement of existing GI assets or the provision of new or replacement assets

- 4.10 To ensure that new development contributes to the protection and enhancement of the strategic GI network, innovative solutions and joint working with the development industry is required. A commitment to the provision of green infrastructure should be reflected by development management policies across the partnership area, ensuring GI opportunities are considered and therefore integrated with infrastructure delivery from the very start of the project planning process.

Principle 4 – Sustainable Delivery

- 4.11 Proposals for GI and development proposals including elements of GI should be deliverable and underlain with a delivery programme including funding, implementation and future management and maintenance. Opportunities to support the vision and objectives of this Framework should be considered during the development and planning process, preferably at an early stage, such as during detailed design and masterplanning.
- 4.12 The principles of Green infrastructure should be considered as part of the planning and design of other forms of infrastructure to support development, including new transport routes, flood mitigation, sports and recreation facilities.

Principle 5 – Continual improvement of GI must be based on a sound understanding of existing assets

- 4.13 Whilst maintenance is crucial, a flexible approach to accommodating development will require a consideration of the quality of existing assets and the potential for provision of new and improved GI. Provision of GI in the West of England should be planned around existing environmental and cultural characteristics to deliver positive benefits for existing and expanding communities.

Principle 6 – Maintenance and enhancement of the GI network must consider multi-functionality and accessibility

- 4.14 GI should ideally be multifunctional and accessible to all; nevertheless, it is recognised that it is appropriate to consider such properties on a site-by-site basis. Physical accessibility may be inappropriate at all times and sites with a limited, but still valuable, number of functions should not be discounted. Individual GI sites become truly multi-functional when they are linked into the strategic GI network, which achieves greater benefits than the sum of its parts.

Principle 7 - Opportunities for the delivery, maintenance and enhancement of GI beyond the development management process should be maximised

- 4.15 Partnership working with all parties interested in the protection and enhancement of the natural environment will be key to raising awareness of GI and its benefits. Furthermore, effective maintenance and enhancement of existing assets may be achieved by working closely with neighbouring authorities, trusts, government agencies, property owners, landlords and agents, tenants and occupiers, local communities and amenity groups.

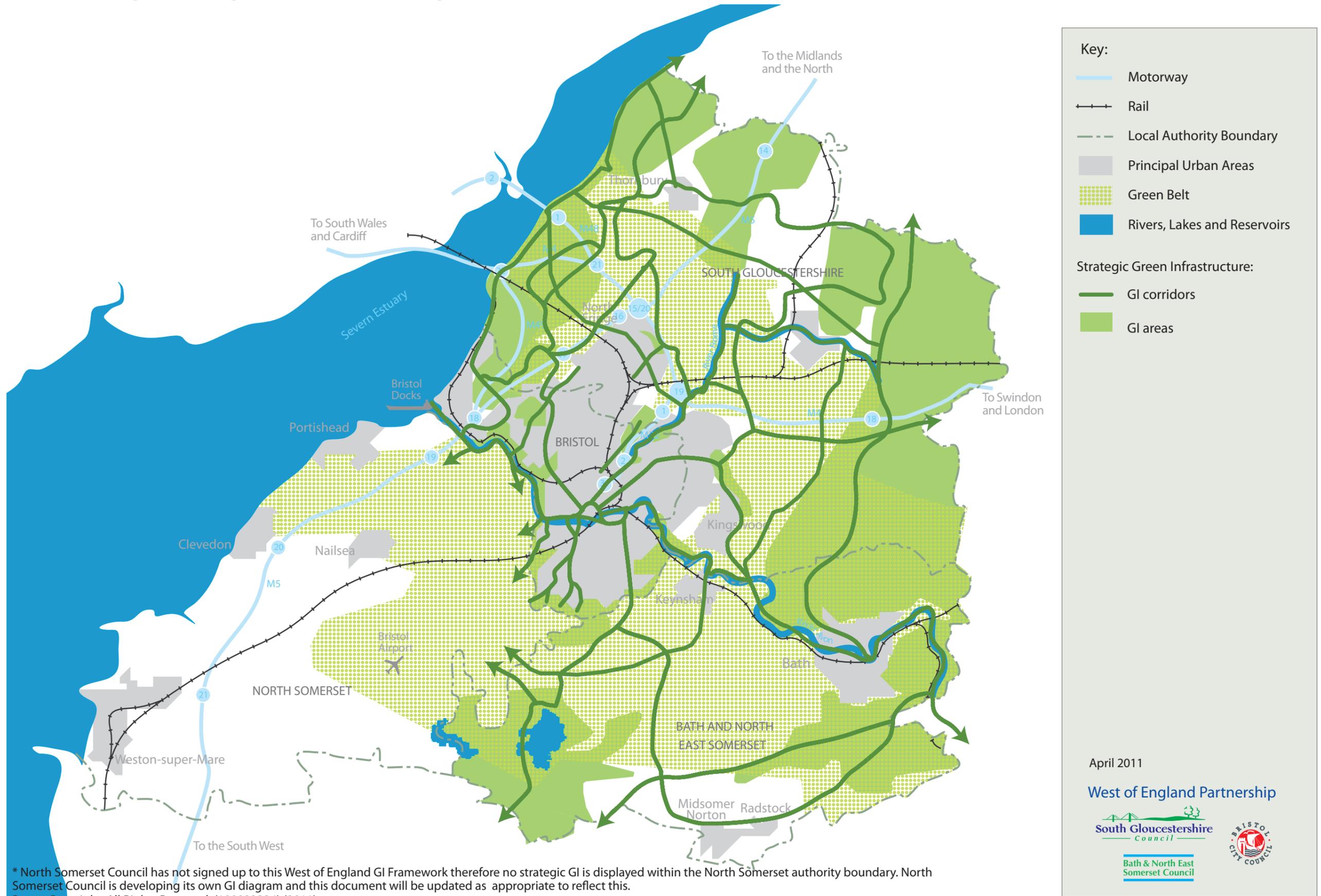
5. WEST OF ENGLAND STRATEGIC GREEN INFRASTRUCTURE NETWORK

- 5.1 The West of England Green Infrastructure Group has developed a methodology for identifying strategic green infrastructure across the West of England. Diagrams 5.1 to 5.4 show the key components of the strategic GI network and the way in which the network is connected across the West of England. This methodology is based on the approach used by B&NES, Bristol and South Gloucestershire Councils in their individual core strategies (Please refer to Appendix 2 and 3 for more detail).
- 5.2 The diagram is indicative only and does not represent precise locations nor designate land to be kept free from development. Nevertheless, the strategic GI areas and corridors represented are important at both a West of England and local authority scale; their protection and enhancement should therefore be considered as part of the decision making process.
- 5.3 Figures 5.2 and 5.3 provide greater detail on the main components of the network. The strategic green infrastructure network has been informed by the more locally specific GI networks identified by B&NES, Bristol and South Gloucestershire within their Core Strategies (see appendix 2).
- 5.4 Whilst this Framework identifies a strategic green infrastructure network across the authorities, it is recognised that this network has wider links to areas outside of the West of England authority boundaries. The strategic green infrastructure diagram (Figure 5.1) illustrates this, and the authorities are committed to liaising with neighbouring authorities as appropriate when preparing policies and plans.
- 5.5 The strategic green infrastructure network supports the population of the West of England by providing linkages between principal urban areas and green assets across the partnership area and beyond. Its multiple functions are essential to creating sustainable communities and supporting the areas rich and diverse environment.
- 5.6 Protecting and maintaining the green infrastructure network will therefore be essential to support sustainable growth, particularly at priority growth locations. These are depicted at Figure 5.4.
- 5.7 The West of England authorities are committed to working with partners to ensure that opportunities to strengthen the strategic green infrastructure network, and make the most of our existing assets, are explored.

5.8 The strategic green infrastructure network can be improved in two ways by:

- 1) Making better use of the existing GI network and the assets within it by:
 - promoting public awareness and therefore use of green infrastructure;
 - improving the management of green infrastructure assets, and;
 - capitalising on opportunities to increase multi-functionality.
- 2) Taking opportunities to improve connectivity by:
 - addressing breaks or gaps in the strategic network;
 - creating new links into the strategic network for people, wildlife, and natural ecosystems.

Figure 5.1 West of England* Strategic Green Infrastructure Diagram



Key:

- Motorway
- Rail
- Local Authority Boundary
- Principal Urban Areas
- Green Belt
- Rivers, Lakes and Reservoirs

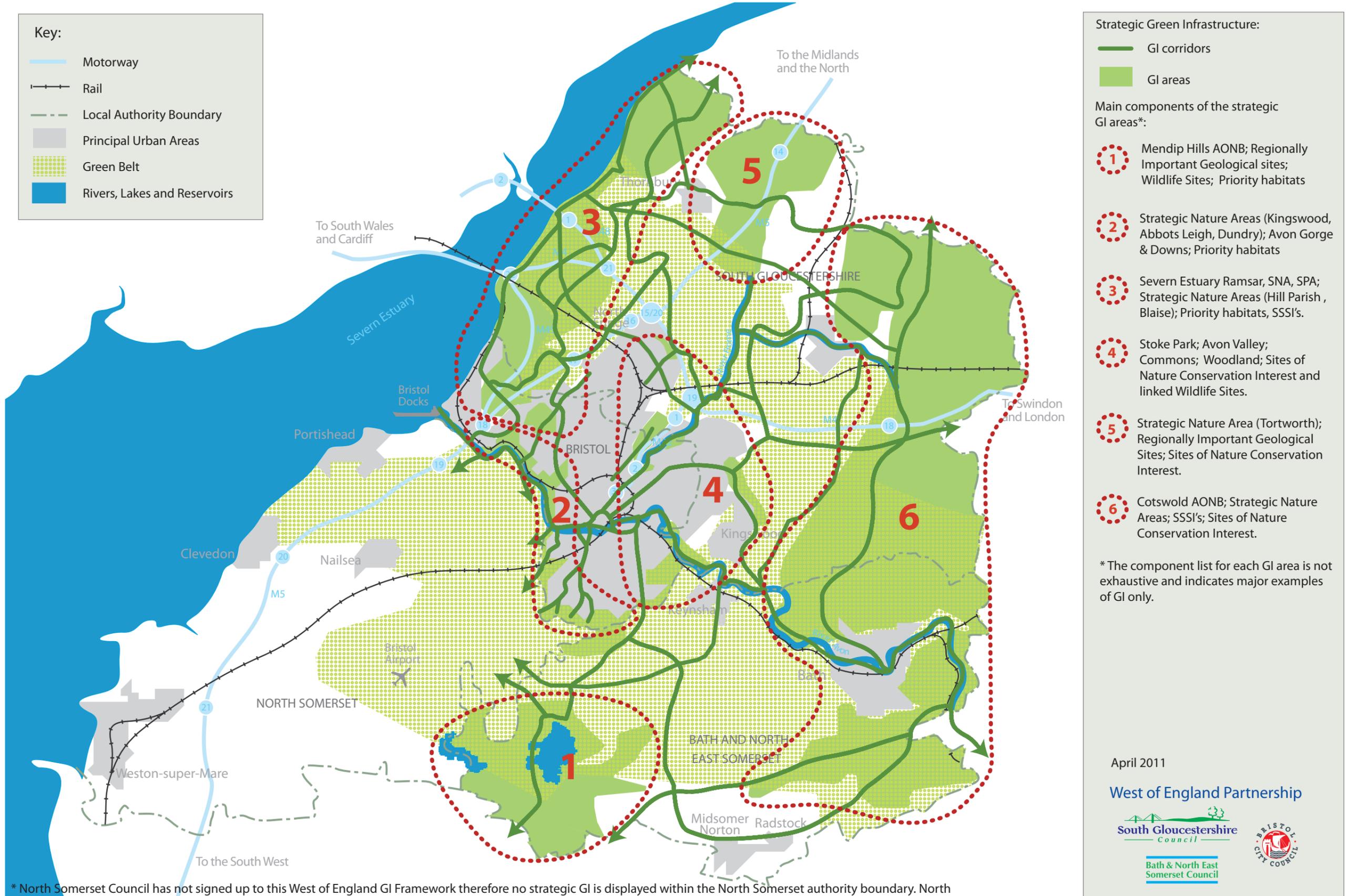
Strategic Green Infrastructure:

- GI corridors
- GI areas

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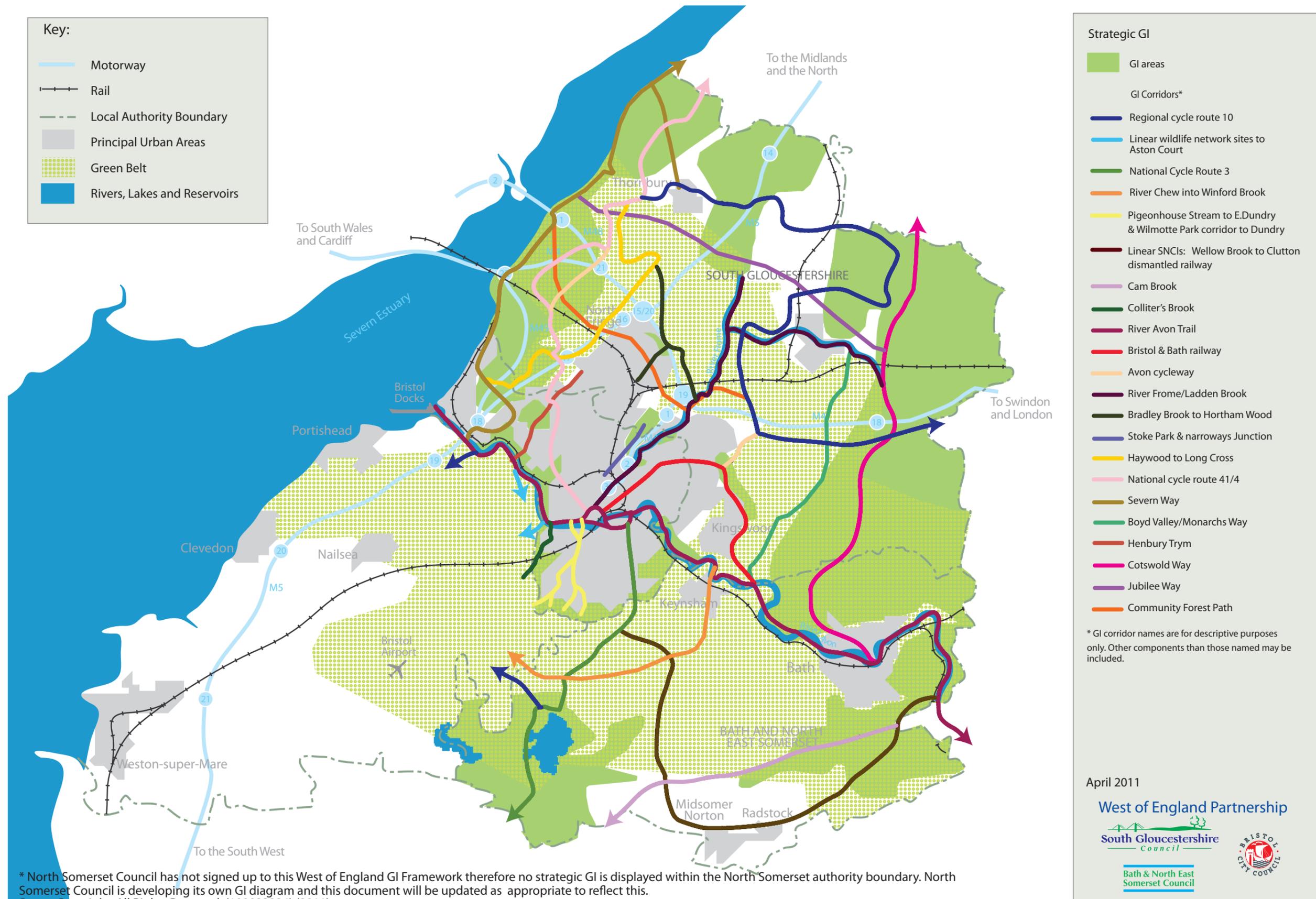
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Figure 5.2 West of England* Strategic Green Infrastructure Areas



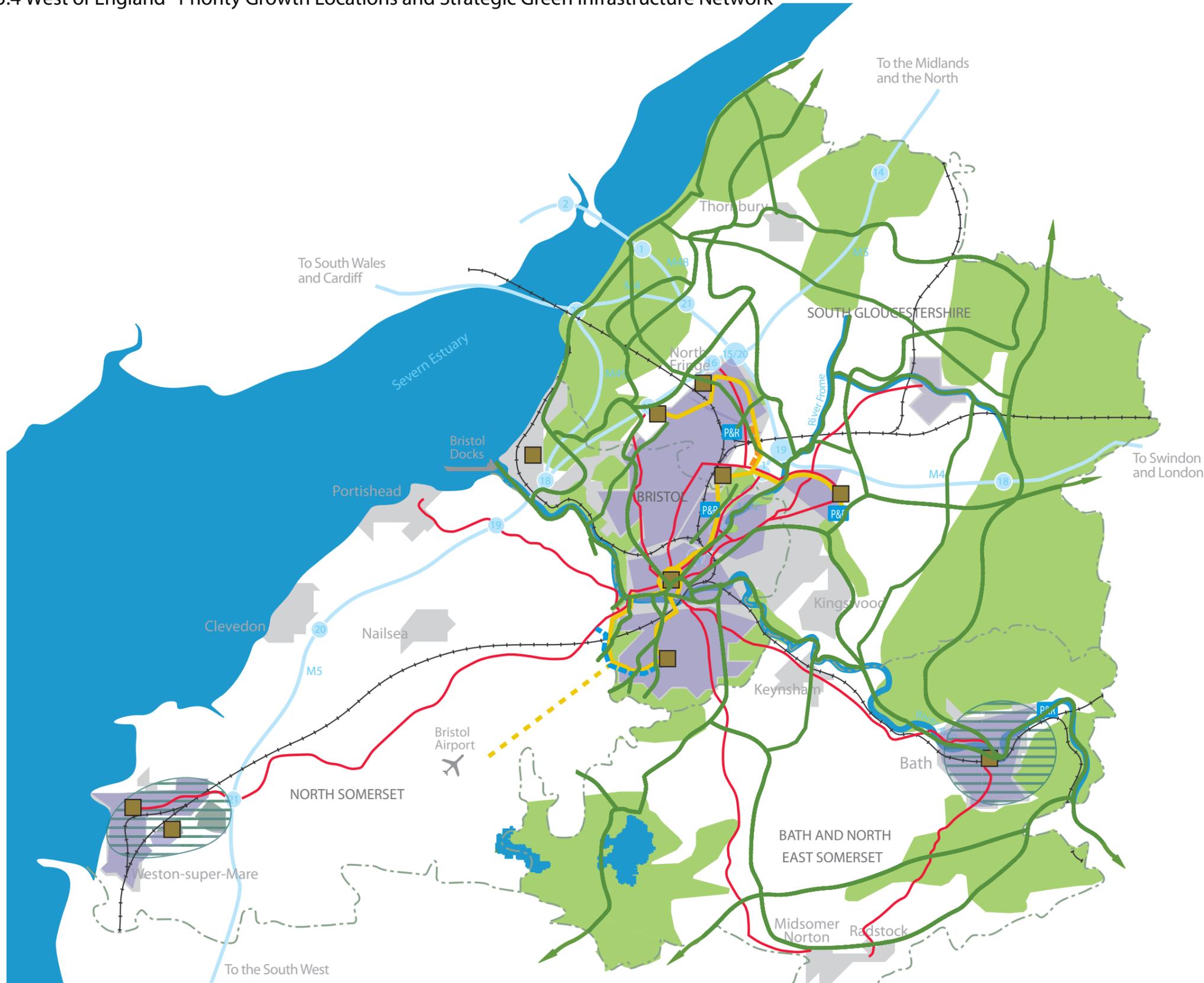
* North Somerset Council has not signed up to this West of England GI Framework therefore no strategic GI is displayed within the North Somerset authority boundary. North Somerset Council is developing its own GI diagram and this document will be updated as appropriate to reflect this.
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Figure 5.3 West of England* Strategic Green Infrastructure Network



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5.4 West of England* Priority Growth Locations and Strategic Green Infrastructure Network



Key:

- Motorway
- Rail
- Greater Bristol Bus Network (in progress)
- Local Authority Boundary
- Principal Urban Areas
- Rivers, Lakes and Reservoirs

Strategic Green Infrastructure:

- GI corridors
- GI areas

Major Transport Schemes:

- Rapid Transit
- Rapid Transit Feeder Service
- South Bristol Link
- Stoke Gifford Transport Link
- Transport Package
- New Park & Ride Site

New Homes and Jobs, 2006-2026:

- Priority growth locations
- Priority employment sites

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6. IMPLEMENTATION AND RESOURCES OF THIS FRAMEWORK

- 6.1 The implementation of the high-level principles identified by this Strategic Green Infrastructure Framework will be secured through the authorities emerging Core Strategies, individual development sites, joint working with partners, and the Green Infrastructure Strategies already being produced by some authorities.
- 6.2 Any resources required to secure the maintenance and enhancement of the strategic green infrastructure network will be dependent on:
 - The design and delivery of individual development proposals. In particular, influencing the delivery of major grey infrastructure (e.g. rail, road, utilities) to provide green infrastructure enhancements;
 - Developer contributions, negotiated through the development management process;
 - The priorities and resources of partners involved in the Framework;
 - Projects that community or neighbourhood level action groups undertake.
- 6.3 In order to maximise available resources, it will be essential that partner's of this Framework co-ordinate bids for GI funding and share resources and expertise where appropriate.
- 6.4 The West of England authorities will review this GI Framework and update as necessary, as Core Strategies and Green Infrastructure Strategies are finalised.

7. APPENDICES

APPENDIX 1. Evidence Base

The following studies have provided a significant level of evidence to demonstrate the cost-effectiveness of green infrastructure and its benefits.

Author	Title	Date	Summary
TEEB	Mainstreaming the economic of nature	2010	Globally, the degradation of our planet's ecosystems is costing us €50 billion each year.
Environment Agency	Using science to create a better place	2009	Creating coastal wetlands to improve flood defence can also benefit wildlife. Such a scheme on the Humber is providing £440k every year in flood protection benefits, as well as creating a habitat for 150 bird species.
Groundwork UK	The Contribution of the Local Environment to the Local Economy	2007	Found that environmental improvements and tree planting on an industrial estate in Middlesbrough was linked to an increase in occupancy and the development of adjacent Brownfield land.
Gill et al		2007	Modelling conducted on Manchester found that adding green roofs to all retail and high-density residential buildings in town centres reduces run off by 17.0 – 19.9%.
GHK Consulting	Social and Economic Benefits of the Natural Environment: Review of Evidence	2006	<p>The net present value of carbon storage of woodlands has been estimated at £492 million in the South West.</p> <p>The current cost of physical inactivity in England is estimated to be £8.2 billion. Based on present trends obesity is likely to overtake smoking as the biggest killer in 10-15 years.</p> <p>The net increase in the benefits attributable to pollution absorption by woodland for deaths avoided is estimated to range between £199,367 and £11,373,707 yearly in Britain.</p> <p>Activities which are closely and positively connected with the management of the natural environment support 299,000 full time equivalent jobs in England and contribute £7.6 billion in GVA.</p>
Kahn		2006	Green Cities are "a magnet for the highly educated". Green Cities attract skilled workers.
Land Use Consultants	The environment, economic growth and competitiveness	2006	Over 35% of companies relocating to SW England quoted environmental attractiveness as a key reason for their move.
Goode, D.	Green Infrastructure	2006	It is estimated that some 33 million people make over 2.5 billion visits each year to urban green space in England.

Author	Title	Date	Summary
CABE	Does money grow on trees?	2005	This study shows there are significant commercial benefits attached to the inclusion of open space in new development. The attractiveness of a development to buyers increases with the level of green space within or nearby. In certain cases, for certain types of property, the total costs of giving land over to open space can be offset, either partly or completely, by uplifts in land value as a result.
National Urban Forestry Unit	Trees Matter	2005	A study in the West Midlands has suggested that doubling tree cover across the Region would reduce the concentration of fine PM10 particles by 25%, preventing 140 air pollution related premature deaths in the region every year.
Dr William Bird	Natural Fit	2004	Public activity in a park in Portsmouth has been estimated to save the local economy £4.4m each year in health costings, including £910,000 to the NHS.
Forestry Commission	Social and Environmental benefits of forestry	2004	The total value of woodland recreation is estimated to be around £400 million per year for the UK.
Defra	Revealing the Value of the Natural Environment in England	2004	Forestry activity is estimated to support 14,740 full-time equivalent (FTE) jobs directly and 27,170 in total, and contribute £380 million to net output directly, and £1,000 million in total.
Greater London Authority	Valuing Greenness	2003	Used hedonic price modelling to assess the impact of proximity of green spaces on house prices in London wards. Found greenspace is the 5th most significant factor in explaining the variation in house prices.
Vellidis et al		2002	It is estimated that the annual cost of agricultural diffuse pollution in the UK is at least £238.11 million. Deliberate planting of forest buffer zones can be a very effective method of preventing diffuse pollution entering rivers.
Kuo, F. & Sullivan, WC	Environment and crime in the inner city: does vegetation reduce crime	2001	Found that the presence of vegetation can half the incidence of violent and property crimes in otherwise identical public housing, and that crime is lower in inner city areas with more natural vegetation.
De Vries et al	Nature and Health: the relation between health and green space in people's living environment	2001	Green spaces are associated with better health regardless of socio-economic status. For every 10% increase in local green space there can be a measurable reduction in health complaints.
Evans, R.	Soil erosion and its impact in England & Wales	1996	Environmental degradation causes significant costs to the economy. The annual cost of soil erosion in the UK is around £40million.

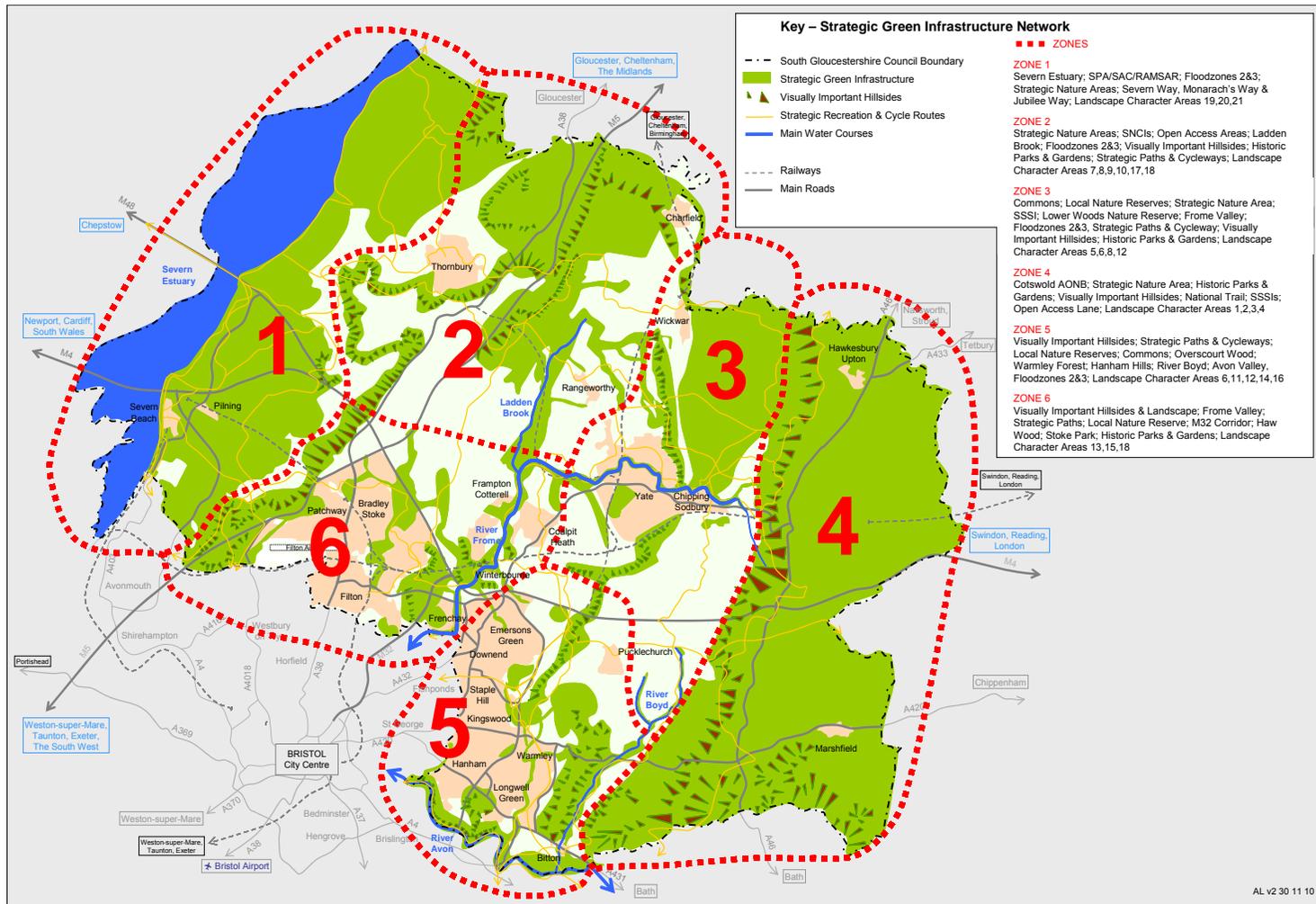
Note: The research studies listed above should be considered in conjunction with their background notes, methodology and any recognised limitations or concerns.

Figure A2.2. Bristol Green Infrastructure Diagram



- | | |
|--|---|
| 1 Severn Estuary SSSI / SPA / Ramsar site link to Severnside | 13 River Avon corridor to Keynsham |
| 2 Salt Rhine link north to Sevenside | 14 Stockwood Open Space link to Stockwood Vale |
| 3 Stream (Henbury Trym) corridor to Cribbs Causeway | 15 Stockwood Open Space link to Whitchurch |
| 4 Okebourne Road open space link to Filton railway cutting | 16 Whitchurch Railway Path and stream corridor to Whitchurch |
| 5 Filton Golf Course link to Charlton Common | 17 Brislington Brook and stream corridor to East Dundry |
| 6 Filton Golf Course link to east | 18 Pigeonhouse Stream corridor to East Dundry |
| 7 Railway corridor to Filton | 19 Wilmotte Park corridor to Dundry Hill |
| 8 Stoke Park link to Wallscourt Farm | 20 Witherwood Park and Malago corridor to Highridge |
| 9 Stoke Park link to M32 corridor | 21 Colliters Brook corridor to Highridge |
| 10 River Frome corridor to Whiteshill and Bradley Brook | 22 Ashton Court link to Long Ashton |
| 11 Bristol & Bath Railway Path corridor to Rodway and Siston Commons | 23 Ashton Court link to west |
| 12 River Avon link to Kingswood via Stradbroom / Magpie Bottom | 24 Avon Gorge corridor to Severn Estuary SSSI / SPA / Ramsar site |

Figure A2.3. South Gloucestershire Green Infrastructure Diagram



- A.2.2 B&NES and South Gloucestershire Councils are already progressing Green Infrastructure Strategies for their areas to deliver green infrastructure at the district and local level.
- A.2.3 Core Strategy policies, supported by relevant Supplementary Planning Documents (SPDs), and where prepared, GI Strategies, will therefore be key to planning for green infrastructure provision in the West of England.
- A.2.4 A commitment to working jointly, across administrative boundaries, to protect, maintain and enhance a well connected network of strategic green infrastructure assets is demonstrated by emerging Core Strategies. This will contribute to the West of England's commitment to: conserve and enhance biodiversity, landscape character and protected species and habitats; reduce carbon emissions and mitigate the impacts of climate change; enhance townscapes and visual amenity; improve health and well-being; and sustainable economic growth.
- A.2.5 In order to protect greenbelt land and ensure growth and development takes place within environmental limits, development plans across the West of England seek to make optimum use of brownfield land to meet future development needs, whilst also taking into account the potential importance of these sites for wildlife. Maintaining and enhancing a multifunctional network of well-connected strategic green infrastructure, which extends across, and connects, urban centres to quality green spaces will therefore ensure a high quality of life is maintained across the partnership area.
- A.2.6 Delivery of green infrastructure will be addressed through the Development Management process within each authority. There will be opportunities for improving or expanding the strategic GI network through new development, either on or off site.
- A.2.7 Opportunities for the delivery, maintenance, and enhancement of green infrastructure beyond the development management process should also be maximised. Partnership working with all parties interested in the protection and enhancement of the natural environment will be key to raising awareness of green infrastructure and its benefits. Furthermore, effective maintenance of existing assets may be achieved by working closely with property owners, landlords and agents, tenants and occupiers, local communities and amenity groups.
- A.2.8 Green infrastructure Strategies or supplementary planning guidance, already being produced by the local authorities will provide further detailed guidance on the implementation of green infrastructure policy. These documents are being developed within the context of the existing strategic green infrastructure network identified by this Framework, ensuring that any cross-boundary issues are recognised and addressed.

Regional Policy

- A.2.9 The draft Regional Spatial Strategy (RSS) for the South West⁴ required that local authorities and partners work together across administrative boundaries to: identify

⁴ Published June 2006 by the south West Regional Assembly. Revoked by the Secretary of state July 2010

priorities and partnerships for green infrastructure; coordinate policies setting out broad locations for green infrastructure across administrative boundaries; and develop a green infrastructure plan with a delivery programme to support green infrastructure policies. In May 2010, the Secretary of State announced central governments intention to revoke Regional Spatial Strategies as part of the forthcoming Localism Bill. Guidance for Local Planning Authorities following the announcement of the intended revocation of regional strategies⁵ nevertheless advises that “authorities should continue to draw on available information, including data from partners, to address cross boundary issues such as the provision of green infrastructure and wildlife corridors”.

National Policy

- A.2.10 The concept of green infrastructure is firmly embodied in national policy guidance including PPS12, which identifies an essential role for spatial planning in setting a positive framework for the delivery of social, physical and green infrastructure.
- A.2.11 PPS12 defines Green infrastructure as “a network of multi-functional green space, both new and existing, both rural and urban, which supports the natural and ecological processes and is integral to the health and quality of life of sustainable communities.”⁶
- A.2.12 National planning policy recognises that networks of natural habitats are a valuable resource, providing sustainable access, linking sites of biological importance, and providing valuable migratory and genetic exchange routes for species across the wider area. A consideration of the protection and expansion of such networks is therefore required when planning for all forms of development, economic growth, biodiversity and conservation, climate change, and flood risk.
- A.2.13 Defra has committed to publish a Natural Environment White Paper by spring 2011. A discussion paper, “An invitation to shape the Nature of England” published in July 2010, recognises the benefits of a coherent and resilient green infrastructure network. Ways in which local authorities can work together, and with their local partners, to pursue an integrated and effective approach to green infrastructure delivery are encouraged, including a potential role for Local Enterprise Partnerships.

⁵ Issued by CLG 6th July 2010

⁶ PPS12, CLG,

APPENDIX 3. Defining a West of England Strategic Green Infrastructure Network

- A.3.1 This Framework defines strategic green infrastructure as sites and corridors which demonstrate one or more of the following characteristics:
- recognised as being locally strategic (e.g. Durdham Downs or Ashton Court), nationally or internationally important (e.g. Cotswold or Mendip AONB and Severn Estuary);
 - Connect other areas or corridors of strategic GI, providing access for wildlife and/or communities
 - Cross LA boundaries.
- A.3.2 Strategic green infrastructure corridors consist of:
- Linear clusters of strategic green infrastructure;
 - Green travel routes (e.g. cycle routes, certain Public Rights of Way, disused railway lines and long distance footpaths);
 - Watercourses, which extend across administrative boundaries or link strategic green spaces
- A.3.3 Green Belt land is not automatically identified as strategic green infrastructure. Green Belt is a policy designation used to maintain the coherence and character of settlements; land designated as Green Belt is therefore not done so on the basis of its landscape value. Nevertheless, where Green Belt land in the West of England (see table overleaf) demonstrates the characteristics identified of strategic green infrastructure it will be included in the network.
- A.3.4 Strategic green infrastructure should demonstrate at least one of the characteristics listed in the matrix overleaf and contribute to achieving at least one of the eight cross-cutting themes identified by this Framework.

Strategic Green Infrastructure Matrix		Strategic characteristic			
		Crosses administrative boundary	Environmental designation as being of international, national or local importance	Designated as a strategic nature area by the South West Nature Map	Connects areas or corridors of strategic GI, providing access for wildlife and/or communities
Cross-cutting themes	Promoting economic growth, employment and skills improvement				
	Supporting resilient ecosystems and biodiversity				
	Mitigating and adapting the natural and built environment to climate change				
	Recognising and enhancing a legible network of physical green spaces and corridors				
	Reducing and managing flood risk				
	Improving the mental and physical health, and cohesion of local communities				
	Increasing sustainable food production				
	Maintaining and enhancing cultural heritage, landscapes and natural resources				