Green Infrastructure Framework 1:
Context and Baseline

July 2018

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INTRODUCTION

Worcestershire Green Infrastructure Partnership

The Worcestershire Green Infrastructure Partnership (GI Partnership) is a cross-disciplinary partnership of statutory agencies, voluntary organisations, Worcestershire's city, borough and districts councils and the county council[1]. The purpose of the GI Partnership is to optimise planning and delivery of green infrastructure (GI) in Worcestershire. It works to integrate multifunctional GI into developments and projects across the county in order to maximise its benefits to the natural and built environment. The partners represent a diverse range of interests, all focused on the natural and historic environment but encompassing sustainability, recreation, health and transport.

Worcestershire Green Infrastructure Strategy

The GI Partnership developed the Worcestershire Green Infrastructure Strategy 2013-18 (Worcestershire GI Strategy) as a non-statutory county-wide guidance document setting out high-level priorities to be further investigated at the local and site level. The Worcestershire GI Strategy is adopted and endorsed through the District Councils' Local Plans. It has also been supported and promoted by the Local Nature Partnership and Local Enterprise Partnership. The Strategy aims to direct and drive the delivery of green infrastructure in the county and inform relevant strategies and plans prepared by partner organisations.

Evidence base

The Worcestershire GI Strategy is supported by a number of evidence base documents which cover the following issues:

- GI Framework Document 1 (this document) – establishes the GI concept, and the policy context and baseline information for each GI theme
- GI Framework Document 2 – establishes the Environmental Character Areas based on natural environment datasets
- GI Framework Document 3 – investigates the supply, potential need and capacity of strategic recreational assets
- GI Framework Document 4 – investigates the economic, health and climate change benefits of GI
- Valuing, costing and viability guidance – provides guidance on the financial considerations of GI including the value, viability, funding and costing of GI assets and their future management.

[1] The full membership of the Worcestershire Green Infrastructure Partnership is provided in Appendix 1

Green Infrastructure Implementation Plan

In 2015, the GI Partnership developed an Implementation Plan which established a spatial focus for collective action on GI in Worcestershire. The Plan will be updated regularly to ensure that remains sufficiently robust to inform GI projects and GI-related grant applications. The Plan includes a periodically updated list of projects that will deliver GI in Worcestershire according to the priorities outlined in the Worcestershire GI Strategy.

Purpose and audience

This document is the first of a suite of GI evidence base papers prepared to support the Worcestershire GI Strategy and the wider work of the GI Partnership. It is a guidance document introducing the concept of green infrastructure and identifying key GI themes and background information to assist in delivering GI in Worcestershire.

This document is intended to support members of the GI Partnership, including Local Planning Authorities (LPA) and other organisations involved in the development of GI policies and strategies. It can also inform the work of the Worcestershire Local Nature Partnership and Worcestershire Local Enterprise Partnership. It also aims to help developers interpret GI issues, and to assist in site masterplanning.

Format

The document is divided into the following four sections:

- **Introduction** –provides the background to GI work in Worcestershire, and sets out the purpose, audience and scope of the document.
- **Green infrastructure context** – introduces the concept of GI and the functions and elements of GI, illustrated by a number of case studies. It also provides information on national and local policy on GI.
- **Policy context** – contains a summary of key points extracted from the national and local policy documents
- **Delivery of green infrastructure** – provides information on delivery of GI on new development sites (including through concept planning) and other GI projects and priorities.
- **Baseline green infrastructure information** – collates practical advice, available data, useful tools and literature on GI themes and components.

This document will be periodically updated to reflect the most up-to-date GI policy, guidance and approaches.

GREEN INFRASTRUCTURE CONTEXT

Green Infrastructure is the network of green spaces and natural elements that intersperse and connect our cities, towns and villages. It is the open spaces, waterways, gardens, woodlands, green corridors, wildlife habitats, street trees, natural heritage and open countryside. Green Infrastructure provides multiple benefits for the economy, the environment and people.

Green Infrastructure may also be seen as part of the life-support system of an area; providing functions and environmental services to a community, such as employment, recreation, physical health and mental well-being, social interaction, contact with nature, drainage and flood management, climate change adaptation and pollution control. It may be considered the essence of local character and sense of place, the very heart of a community, or dear to the hearts of many thousands some distance away.

It spans administrative and political boundaries; it is publicly and privately owned, and it may be semi-natural or man-made in its origins. It may be green, brown or blue – think of canals or derelict land, woodlands in winter or ploughed fields. It may be wrapped around by houses, schools, factories or commercial properties.

In urban situations it complements and balances the built environment; in rural settings it provides a framework for sustainable economies and biodiversity; in-between it links town and country and interconnects wider environmental processes.

West Midlands Regional Assembly (2006) Green Infrastructure: A Prospectus for the West Midlands Region

GI is an approach to the natural and built environment which seeks solutions to multiple problems that may be faced by an area of land as a result of development. It seeks more fully and intelligently designed human environments in harmony with the conditions of setting, environment and climate change[2].

The key principle of GI is its structural continuity and functional connectivity. It is based on GI corridors which link up various GI assets on- and off-site, creating natural areas for biodiversity and enabling species to move within their habitat. It also allows humans to access and move around green spaces which respect the landscape character and deliver a range of ecosystem services, such as surface water management.

[2] Tom Armour and Andrew Tempany (2017) Mainstream green infrastructure, in the Journal of the Town and Country Planning Association October 2017 vol 86 No 10

Multifunctional GI

Well-designed GI offers opportunities to deliver a number of functions and activities through the use of a single area of land. For example, a small verge on a side of a road, if planted with wildflowers, can contribute towards biodiversity and provide flood management benefits whilst enhancing the visual quality of the area. The achievement of these outcomes depends on a coordinated approach to protecting, enhancing and managing GI assets.

GI Components

GI comprises a number of components: biodiversity, landscape, historic environment, access and recreation and blue infrastructure (water). A GI approach provides a comprehensive and integrated way of looking at site/place design and management of natural and historic assets.

Biodiversity

Biodiversity concerns the variety of life on earth at every level of function, from genes and microorganisms, individual species and communities of species, to complex habitats and ecosystems.

The maintenance and enhancement of biodiversity is a fundamental function of GI; almost all forms of GI have the potential to contribute to the conservation of biodiversity, both directly (providing specific habitat types for various species and enabling wildlife to move through the landscape), and indirectly (by raising awareness and enabling people to experience, use, interact with and better appreciate their natural environment).

Landscapes and open spaces planned to promote connectivity of communities and the integrity of ecological processes are a key element in nature and biodiversity conservation.

Landscape

The landscape and visual aspects of GI consider the influences on the physical form of the landscape and the effect of human activity upon it. Landscape character strongly influences our perception and enjoyment of green spaces as destinations and sets important parameters for the design and setting of new and existing settlements and movement routes.

Historic environment

Historic environment covers the diverse contribution that historic assets, historic places and inherited landscape character bring to GI. The interaction between past society and land use has shaped the modern landscape, created networks of multi-functional space and assets with a high potential to inform and enhance GI provision. There is also a key role for GI to deliver protection and awareness of below-ground archaeology and the settings of historic assets.

Access and recreation

Access and recreation covers sustainable travel routes such as cycling and walking paths, bridleways and parks and other green areas which offer opportunities for informal recreation.

The sustainable movement opportunities provided by GI can contribute to better health and wellbeing outcomes by encouraging physical activity and reducing sedentary lifestyles. They can also contribute towards the provision of and access to greenspace, including public parks, woods and other informal recreation areas.

Blue infrastructure

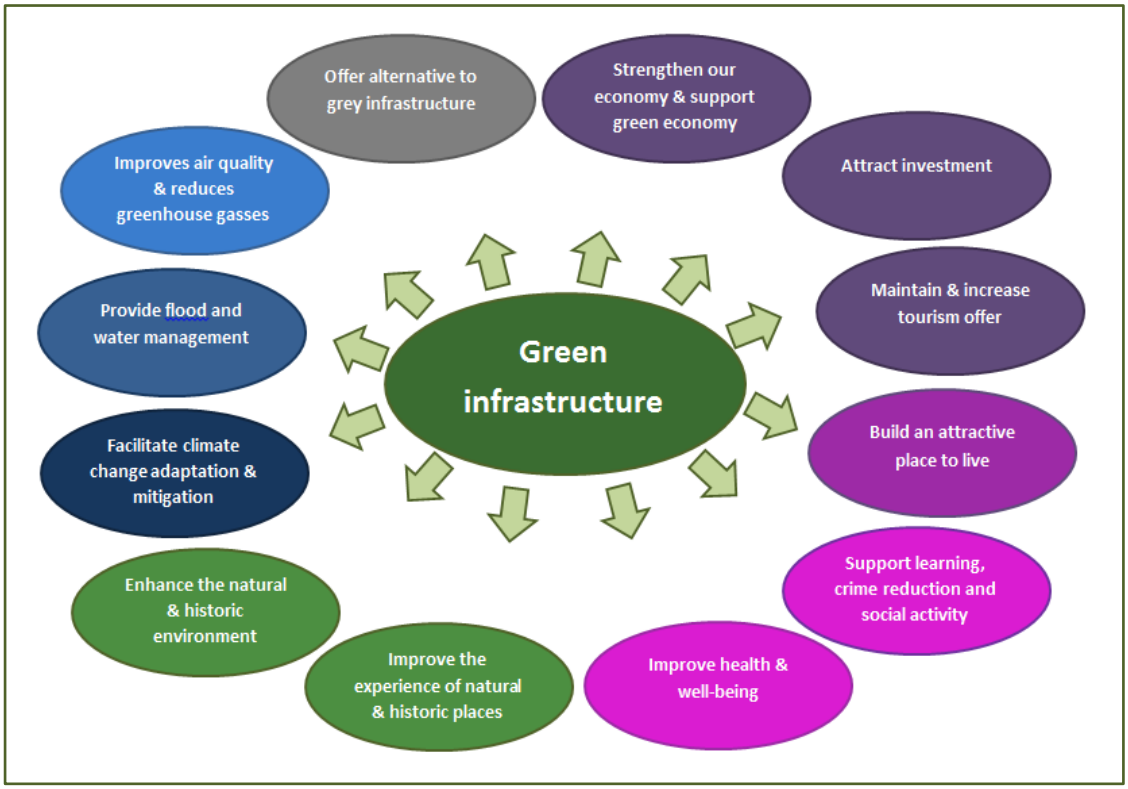
GI refers to the ‘green’ but also the 'blue’ features that exist within the natural and built environment. Watercourses, ground water sources, ponds, etc. can all be described as blue infrastructure. The quality and quantity of surface water and sustainable flood management opportunities are key considerations in GI planning.

Green infrastructure benefits

GI tends to perform more than one function. In combination these functions can deliver multiple socio-economic and environmental benefits.

A single GI project can tackle or offer a partial solution to several problems and deliver multiple objectives. This makes GI a valuable, beneficial, cost-effective and practical tool in addressing various environmental and socio-economic demands and pressures. Figure 1 illustrates the multifunctional benefits that GI can provide.

Figure 1: Benefits of multifunctional GI



Natural and historic environment benefits

Hedgehog highways – the Beacons development, Rugby

The developer of a housing site in Rugby has been working with the local Wildlife Trust to ensure the development will be 'hedgehog-friendly'. This includes designing fencing that will encourage hedgehogs to migrate between gardens and other green corridors within and beyond the site. The development is within a 'Hedgehog Improvement Area' funded by the British Hedgehog Preservation Society, which aims to improve connectivity of green spaces for hedgehogs.

Source: Housebuilder first in Houlton to build "highways for hedgehogs" by Andy Morris in Rugby Observer, 18th January 2018

Photo credits (from the top): Henry Johnson, Steve Kidgell, Hedgehog Street Champions

Ecology and habitats

The biodiversity benefits of GI are far-reaching. Green spaces and wider GI networks can create well-functioning ecosystems which support habitats and increase species movement for diverse wildlife including protected species. As the area available for wildlife increases, both the population size of individual species and the total species richness of an area increase. Linear features and 'greenways' provide connectivity between habitats resulting in greater species diversity. GI activities should lead to positive impacts on natural environment elements such as water, soils and air quality. This in turn will support a healthy environment for the local fauna and flora to flourish.

Landscape and visual qualities

The direct result of well-designed GI interventions should be re-introduction or enhancement of locally characteristic landscape features such as boundary features and protection of the local landscape character. Any existing important features can be protected by careful inclusion within site/place design, as well as being buffered to protect from any potential further degradation. GI can also protect and enhance the visual qualities of an area by greening and creating more attractive environments. The design of GI and its networks can impact positively on the key views to and from a development.

Historic environment

GI offers opportunities to recognise and incorporate historic environment elements such as underground archaeology, designated and undesignated assets and historic landscape features into comprehensive GI networks and area/site design. As a result, these elements can be preserved, enhanced and appreciated by residents for years to come.

Integrating access to green spaces and historic places into the everyday lives of communities can help to develop a connection with the local area.

Landscape and historic character of the 'North Site' mixed-use development, Malvern

This site is an example of the successful integration of historic landscape features and inherited landscape character with new development.

Mature broadleaf trees were retained throughout the development area. These have origins dating to at least the 19th century; some were in-field trees whilst others were hedgerow trees and are the only surviving features of once complete field boundaries. They have a substantial root protection zone, and have been afforded enough space to thrive, providing enhancement as functional green infrastructure.

A tributary of the Whippets Brook has been integrated into the site's sustainable drainage network and now forms part of a wide green corridor. Both the tributary and the mature trees provide permeability through the site, protect historic landscape features, and visually soften the development.

A belt of mature broadleaf trees on the western boundary of the site is a feature grown out from an historic hedgerow. It now contributes towards screening the development from the Malvern Hills AONB and the immediate rural setting. This is further enhanced by the dark hardwood cladding used in some of the new houses. This is a good example of how choice of material can work effectively with green infrastructure features to enhance the effectiveness of screening and integration.

Water management (flood risk, water quality and quantity)

GI can influence water quality through limiting diffuse pollution and controlling water levels in watercourses. For example, trees can provide storage and interception of pollutants at source, filtering out of pollutants in the canopy and the roots.

GI plays a key role in improving drainage and reducing the volume of runoff. Sustainable drainage (SuDS) can control water flow at source through trees and vegetation, green roofs, infiltration trenches and filter drains, swales and basins and ponds and wetlands.

Sustainable Drainage System at Earls Court Farm development

A comprehensive sustainable drainage system (SuDS) including balancing ponds was provided as part of a 145 homes development on the edge of Worcester. The SuDS provided opportunities for biodiversity, amenity and aesthetic enhancement as part of a holistic and multifunctional green infrastructure. The SuDS is set within an area of greenspace and has shallow sloping sides to fit in with the surrounding landscape and make it easily accessible for both maintenance and recreation.

Soil quality and erosion

The quality of soils is important for plant and animal productivity, maintaining and enhancing the quality of water and air as well as supporting human health. Polluted soils can contaminate underground and ground water sources which can negatively affect the quality of plants and cause water-related health issues to humans and animals. Soil erosion and degradation of topsoil reduces the soil's quality and fertility. GI can contribute to the protection of soil quality and the reduction of soil erosion. For example, increasing permanent vegetation will help slow down soil erosion by diminishing the impact of raindrops on barren surfaces and by improving soil strength and stability through encouraging the build-up of soil organic matter and the action of roots.

Middle Severn Catchment Based Approach

Worcestershire Wildlife Trust and the Severn Rivers Trust, in partnership with other organisations including statutory agencies and Worcestershire's local authorities, developed the Middle Severn Catchment Approach as part of the wider Catchment-Based Approach. An integrated stakeholder-driven assessment of a catchment provided a comprehensive understanding of the challenges of managing water quality and quantity, and enhancing ecology, recreation and leisure and enabled the development of a strategic and cost-effective catchment management intervention plan.

The wider project was to prepare an "Ecosystem Services Visualisation" covering the whole River Severn Catchment. The project aimed to make effective use of data and evidence to inform catchment management planning.

Source: Worcestershire Middle Severn (2017) CaBA Catchment Management Plan

Climate change

GI can provide benefits in both mitigation (reducing greenhouse gas emissions) of and adaptation (reducing effects of extreme weather events) to climate change. In terms of climate change adaptation, it can provide natural shading and cooling to counter rising temperatures

through parks, open spaces, water bodies, street trees and green roofs. GI can provide functional space for flood attenuation, including SuDS schemes which help slow down and absorb excess rainfall to reduce surface run-off and consequent flooding.

Climate change mitigation benefits include supporting the creation of infrastructure which encourages sustainable transport such as walking and cycling, thus reducing emissions of greenhouse gases whilst making routes more attractive through vegetation/tree planting. Maintaining and planting trees and other vegetation which serve as carbon sinks/stores can help to improve local air quality.

Socio-economic benefits

Economic benefits

There is a link between environmental improvements and the regeneration of deprived areas. Investment in landscaping, parks, trees and allotments can change negative perceptions of neighbourhoods by making them more visually attractive and providing opportunities for the local community to experience the natural environment. This, consequently, can reduce empty homes and increase property prices in the area.

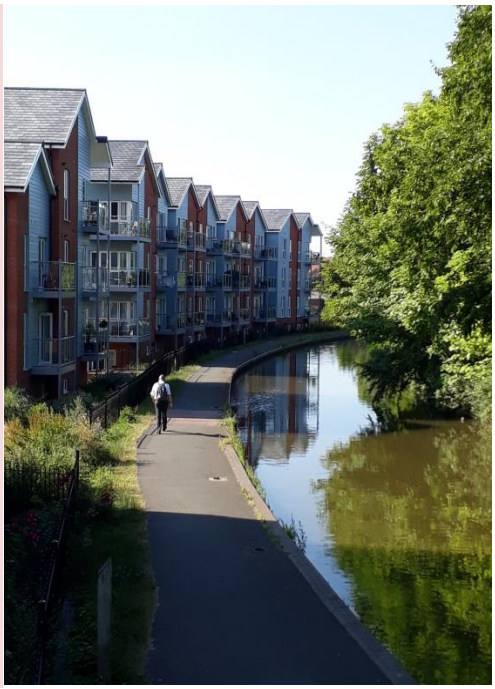
GI can boost economic growth and job creation. The natural environment provides a range of products and services which contribute to the expansion of various economic sectors in Worcestershire. It can attract inward investment and support job creation in the area. Various factors such as visual attractiveness and quality of place can play an important part in companies' decisions about siting their premises. There is also an awareness of the promotional effect that businesses incorporating environmentally friendly solutions can have on their customers, partners and employees.

Accessible and high-quality green spaces can be a potential attractor for visitors, contributing to the tourism sector. Tourists visit Worcestershire for many purposes including enjoyment of the county's countryside, scenery and wildlife, visiting attractions and events, using waterways, exploring the local heritage, and taking part in activities.

Canal-side development on the former Worcester City football ground

This development, located in the heart of Worcester, borders the Worcester & Birmingham Canal and benefits from its proximity to a tow path which stretches along the canal.

The site's design allows residents to take advantage of the benefits of its canal-side location, including attractive views and easy access for walking and cycling. The added benefit of this design is the potential for 'passive surveillance' to reduce antisocial behaviour around the canal, creating a more welcoming environment for residents and other users of the towpath and waterway.



Health and wellbeing benefits

There is a strong link between the provision of accessible and high-quality green spaces and improved health and wellbeing. The contribution that GI, as part of development, provides to health and wellbeing can be divided into three categories: reduction of exposure to environmental hazards, access and engagement with the natural environment, and adaptation to climate change[3].

Provision of accessible and well-maintained green spaces, recreational facilities, green community assets and networks of green routes encourages physical activity and helps to build it into people's daily activities. This can positively contribute to the reduced risk of diseases associated with inactivity[4] and to improved mental health outcomes. Creation of facilities such as allotments and community orchards can encourage physical activity and improve accessibility to healthy foods, including fruit and vegetables, to improve people's eating habits.

Provision and careful location of green areas within or in close proximity to new developments, including preserving the existing and planting new trees, hedges and grassed areas, reduces concentrations of air pollutants which in turn reduces the risk of people developing chronic conditions such as Chronic Obstructive Pulmonary Disease[5]. Additionally, provision of natural flood protection solutions including SuDS will reduce the threat and scale of flooding and at the same time reduce the impact of flooding on people's physical and mental health, including stress and mental illness.

[3] Public Health England (2017) Spatial Planning for Health: An evidence resource for planning and designing healthier places

[4] Obesity and associated conditions such as type II diabetes, cardiovascular disease, risk of mortality and other chronic conditions

[5] Chronic obstructive pulmonary disease (COPD) is the name for a group of lung conditions that cause breathing difficulties

Greening areas through, for example, planting trees, hedges and grassed areas, has a cooling effect on the environment and can help to reduce the contribution of the built environment to climate change. This can contribute towards a reduction in fatal illnesses, such as heat stroke, associated with extremes of heat.

The Habberley Valley circular

The Habberley Valley circular is a 2.5 mile recreational route in Worcestershire. Being on the edge of Kidderminster and starting at the Habberley Valley Local Nature Reserve car park means that it is easily accessible for a large number of people, both locally and from further afield.

The walk takes in a variety of habitats from open grassland and pasture to heathland and rich woodland and passes some interesting sites, including Honey Brook and the ancient rock houses.

Social impacts

Local green spaces such as parks can facilitate increased social interaction, contributing towards community cohesion and development of an attachment to the locality. Where residents perceive the quality of green space to be good they are generally more satisfied with their neighbourhood. This is also applies to groups particularly at risk of social exclusion. Whilst there are barriers to participation such as lack of time and issues of costs and transport, evidence suggests people are likely to use accessible green spaces, most likely those in proximity to their homes.

There is evidence to suggest that domestic violence levels can be lower in greener areas, and crime levels significantly lower in residences near natural spaces. This may be caused by potentially stronger community ties that residents of deprived neighbourhoods can develop in greener surroundings[6].

The socio-economic benefits of benefits of GI are further explored in Green Infrastructure Framework 4.

[6] Forest Research (nd) Social interaction, inclusion and community cohesion. Benefits of green infrastructure Evidence Note

Birmingham New Street Station: Living Wall

In 2016, Birmingham New Street Station underwent remodelling and refurbishment. As part of this project a large, featureless brick wall in the area fronting the station was turned into a green living wall. The living wall system included a high density of planting with no bare areas on the face. Below the planted area is a low wall which provides informal seating alongside a new pedestrian walkway.

It is hoped that this project will provide multiple functions:

- Aesthetic value
- Ecological enhancements
- A place of rest for pedestrians
- Interception of rainfall
- Pollution reduction
- Reduction of the urban heath island effect

Source: UK Green Building Council (2015) Demystifying Green Infrastructure

Ecosystem Services

Living things including both fauna and flora are essential ingredients of a well-functioning ecosystem. For example, food production requires good quality natural resources such as soils and water. Nature can provide wide-ranging societal and economic benefits, which are an effect of the processes often described as "ecosystem services".

The ecosystem services approach means recognising that we derive numerous benefits from natural environment systems and process, many of which we are reliant on for the continued functioning of the natural environment and our interactions with it.

Both ecosystem services and GI approaches recognise that most areas of land have the potential to deliver a very wide range of services (such as flood management, biodiversity or recreation) and it is important that the diversity of these services is recognised in policy and decision making. There may, however, be a limit to the extent that multifunctionality can be pursued without impairing the delivery of one or more of the services involved. For example, there may be trade-offs to be made between archaeology and diversity of wildlife or flood management.

Natural capital

The ecosystem services approach links closely to the recent work by the Natural Capital Committee[7] on the financial value of services provided by the natural environment. Natural capital refers to those elements of the natural environment which benefit services to people by underpinning the provision of clean air, clean water, food, recreation and a plethora of high value and often essential goods and services[8]. The services derived from natural capital are generally not accounted for and difficult to measure in terms of market prices. This is why they are often prone to over-exploitation and degradation leading to erosion of this capital, sometimes irreversibly, in the longer term.

What is natural capital?
Natural capital is the sum of our ecosystems, species, freshwater, land, soils, minerals, our air and our seas. These are all elements of nature that either directly or indirectly bring value to people and the country at large. They do this in many ways but chiefly by providing us with food, clean air and water, wildlife, energy, wood, recreation and protection from hazards.

Source: HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment

The natural capital approach aims to ensure that the present UK natural capital is maintained and enhanced in perpetuity by providing either an economic value or equating to an economic value to ensure that it supports increased economic growth and an improved quality of life for communities. The main goals of this work are to achieve economic, health and wellbeing benefits.

The revised NPPF document states that planning policies and decisions should contribute to and enhance the natural and local environment by, inter alia, recognising the wider benefits from natural capital and ecosystem services[9]. The 25 Year Environment Plan[10] published in January 2018 sets out the Government's actions to understand the full value of benefits offered by the environment and cultural heritage to the overall economy and then use these findings in informing any future policy and decision making. A set of metrics for natural capital will be developed in cooperation with scientists, economists and environmentalists to assess the progress towards a better environment.

GI is at the heart of the natural capital approach as it encompasses the natural environment elements and focuses on the many functions they can deliver both in terms of natural environment enhancements and the societal and economic benefits. The multifunctional nature of GI means that it can deliver value for money services utilising the natural capital at the same time as maintaining and enhancing these assets.

[7] The Natural Capital Committee (NCC) is an independent advisory committee. It provides advice to the government on the sustainable use of natural capital - that is, our natural assets including forests, rivers, land, minerals and oceans. The committee's broad remit also covers the benefits we derive from natural assets, such as food, recreation, clean water, hazard protection and clean air.
[8] Natural Capital Committee(2015) Advice to Government on Research Priorities
[9] Ministry of Housing, Communities & Local Government (2018) Revised National Planning Policy Framework
[10] HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment

One of the major barriers to investment in GI is the inability to account for its social, environmental and economic value to inform decision-making and link the specific cost of investment to the overall value of the outcomes. The Government's natural capital framework can help to recognise this value.

POLICY CONTEXT

National policy and guidance

The multifunctional approach to GI is promoted in national policy and has been increasingly and successfully integrated into local policies. A summary of key points extracted from national and local policy documents can be found below. The full list of adopted GI polices can be found in Appendix 1 of this document.

Please note this section represents a moment in time and it will be updated periodically to reflect national and local policy changes.

Revised National Planning Policy Framework (2018)

The revised National Planning Policy Framework (NPPF) states that "Strategic policies should set out an overall strategy for the pattern, scale and quality of development, and make sufficient provision12 for [inter alia] conservation and enhancement of the natural, built and historic environment, including landscapes and green infrastructure, and planning measures to address climate change mitigation and adaptation" (para 20). It states that plans should, inter alia, "take a strategic approach to maintaining and enhancing networks of habitats and green infrastructure" and "plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries" (para 171). The revised NPPF also states that planning policies should plan for the provision of safe and accessible green infrastructure to enable and support healthy lifestyles (para 92).

National Planning Policy Framework (2012)

The National Planning Policy Framework (NPPF) states that Local Plans should address climate change, biodiversity and landscape issues through "planning positively for the creation, protection, enhancement and management of networks of biodiversity and green infrastructure" (para 114).

National Planning Practice Guidance

This online guidance published to support the NPPF highlights GI as a way of delivering high quality sustainable development. It provides high level guidance on how it should be implemented through the planning system. It states that Local Plans should identify the strategic location of existing and proposed GI networks which could be supported by relevant supplementary planning documents. The cross boundary nature of GI means that neighbouring authorities should work collaboratively with each other and external partners to ensure that GI in their area is delivered. It also states that GI "be a key consideration in both local plans and planning decisions where relevant" (Green Infrastructure section, Para: 028).

Defra 25 Year Environment Plan (2018)

The 25 Year Environment Plan sets out the Government's ambition and actions to help support a healthy natural environment. It recognises that "the provision of more and better quality green infrastructure including urban trees will make towns and cities attractive places to live and work, and bring about key long-term improvements in people's health". The Plan aims to encourage consistency in quality of green infrastructure by establishing standards for GI. It also aims to create more GI by supporting Local Authorities in assessing GI provision against these new standards and through incorporating the Government's commitments on GI into national planning policy and guidance.

Natural Environment White Paper (2011)

Defra's White Paper recognises that nature, economic growth, prosperous communities and personal wellbeing are interconnected. It sees a wider value, in addition to the intrinsic one, to the natural environment which provides a range of benefits and services to different spheres of people's lives. The document suggests that inclusion of GI, supporting well-functioning ecosystems and coherent ecological networks, could increase the value that the natural environment generates to the economy and health and wellbeing. The document emphasises the multifunctional benefits of GI.

Local policy

The GI Partnership supports Worcestershire's local authorities in developing their green infrastructure (GI) policies and strategies. The GI Strategy and associated evidence underpin this process. All Local Plans in the county, both emerging and adopted, include GI polices which are briefly described below.

Malvern Hills District Council, Wychavon District Council and Worcester City Council, South Worcestershire Development Plan – Adopted February 2016

SWDP 5: Green Infrastructure

Policy SWDP 5 states that housing development proposals (including mixed-use schemes) are required to contribute towards the provision, maintenance, improvement and connectivity of GI. Greenfield sites exceeding 1ha (gross) should provide up to 40% GI and greenfield sites of less than 1ha but more than 0.2ha (gross) 20%. There is no specific target for brownfield sites.

The policy encourages applicants to agree the precise form of GI with the local planning authority in advance of a planning application, as this will depend on local circumstances as well as priorities set out in the Worcestershire GI Strategy.

It states that proposals which would have a detrimental impact on important GI attributes within the Environmental Character Areas identified as “protect and enhance” or “protect and restore" will generally not be allowed.

Borough of Redditch Local Plan No.4 – Adopted January 2017

Policy 11 Green Infrastructure

This policy states that GI should be safeguarded and new development should contribute positively towards "GI networks" recognised in the Redditch Borough GI Strategy and support the Worcestershire GI Framework.

Bromsgrove District Plan 2011-2030 - Adopted January 2017

BDP24 Green Infrastructure

This policy aims to deliver a high-quality multi-functional GI network. It is expected that developments in Bromsgrove district will adopt a holistic approach to GI, improve connectivity and enhance the quality of GI, as well as providing for the appropriate long-term management of GI. Developments should have regard to, and contribute towards, the county-wide GI Strategy, any local GI Strategies and, where available, the GI Concept Plans. For large-scale developments, developers are expected to prepare a Concept Plan[11] for the area, which would then serve to inform all developments in that area as they come forward.

Wyre Forest District Core Strategy (2006 - 2026) – adopted December 2010

CP13: Providing a Green Infrastructure Network

This policy safeguards the existing GI networks in the Wyre Forest district. It states that new developments will be expected to contribute positively to this network. The Green Infrastructure Study and Green Infrastructure Strategy are to be used to identify where green space contributions are spent and the requirements on individual sites.

Where private garden space is not provided for each dwelling, communal gardens or allotment spaces will be required in order to improve health and wellbeing, support local biodiversity and, where possible, strengthen landscape characteristics. Roof-top gardens and green roofs are also encouraged in order to help address climate change and enhance biodiversity.

The draft Worcestershire Minerals Local Plan - Third Stage Consultation Document

The vision in Worcestershire County Council's draft Minerals Local Plan states that "Mineral sites will form an integrated part of Worcestershire's multifunctional green infrastructure network".

The restoration of mineral workings usually creates 'green spaces', with restoration in Worcestershire tending to restore land to agriculture, create habitats or create recreation facilities. The draft Minerals Local Plan aims to take a holistic approach to driving the restoration of mineral workings in a way that delivers networks of GI. The approach is to use GI principles to drive restoration in the county; however the specifics of this approach will vary depending on the type of mineral being worked and the quality of the existing green infrastructure assets in that location.

[11] An evidence based document which specifies the GI principles and networks on development sites to be followed in the masterplanning process

DELIVERY OF GREEN INFRASTRUCTURE

Types of green infrastructure projects

Delivery of green infrastructure (GI) is affected by the scale and type of the scheme. Green infrastructure can be delivered at various scales from smaller neighbourhood and local scale through to large-scale strategic GI projects. These can include delivery of GI on new development sites through the planning process or large-scale GI projects which provide functions and facilities benefiting more than one district or population within the county.

Quantum of green infrastructure

Even a small area of land such as a grass verge or a hedgerow can contribute to positive GI outcomes. Achieving multifunctional benefits and meeting the needs of communities, however, requires multiple natural environment assets which are linked together to provide functional networks. More expansive areas and well-functioning networks of green spaces are also more economically beneficial, as more attractive surroundings with easy access to and views of green infrastructure can impact positively on property and land prices and property saleability, as discussed earlier in this document. The 2009 public attitudes and behaviours survey identified that 95% of people consider informal recreation spaces such as parks and green spaces important in making somewhere a good place to live[12]. This is why the quantum of GI provided as part of new development sites is very important.

National guidance recommends that approximately 40% of land and water in a development should be dedicated to GI. This approach was first introduced in the now revoked Eco-Towns Supplement to Planning Policy Statement 1 and has also been recommended by the by the Town & Country Planning Association and The Wildlife Trusts[13]. The 40% target related to all parts of the site, including gardens.

The recent TCPA guidance document stated that as a general rule, 50% of the land total in a new Garden City should be green infrastructure, including private gardens and green roofs[14]. It also provides national examples of areas which expanded GI thresholds even further with Hampstead Garden City dedicating 60%[15] of land to GI whilst the draft London Environment Strategy proposes more than 50% of land cover to become green spaces[16].

[12] CABE Space (2010) Urban green nation: Building the evidence base

[13] Town & Country Planning Association and The Wildlife Trusts (2012) Planning for a Healthy Environment – good practice guidance for green infrastructure and biodiversity

[14] Town & Country Planning Association (2017) Garden City Standards for the 21st Century: Practical Guides for Creating Successful New Communities, Guide 7: Planning for Green and Prosperous Places

[15] Town & Country Planning Association (2008) The Essential Role of Green Infrastructure: Eco-towns Green Infrastructure Worksheet

[16].Mayor of London. Greater London Authority (2017) London Environment Strategy. Draft for Public Consultation

Kingsbrook development near Aylesbury, Buckinghamshire

This development site comprises 2,450 new homes and over 400ha of land. Approximately 50% of the site area has been allocated to green infrastructure including ponds, parks, meadows, orchards and a nature reserve with a shallow bay to encourage invertebrates. The site has been designed so wildlife can move freely through the residential areas connected with green networks including wildlife corridors of hedges, strips of wildflower grassland and gaps in fences and walls.

The site caters well for birds and bats. Hop-over points for bats allow these species to cross busy roads safely and the provision of a vertical bank encourages nesting of sand martins and kingfishers. A number of homes have been built using a special brick which allows birds to roost without causing any damage to the properties.

The flood management on this site includes sustainable drainage which channels water along swales allowing the development of wildlife-rich natural wetlands.

Source: *Welcome to Kingsbrook, Britain's most wildlife-friendly housing development by* Sarah Knapton by Sarah Knapton in The Telegraph, 12 November 2017

The Worcestershire GI Strategy suggests that the 40% GI provision is achievable and viable without including private gardens. Excluding private gardens has the benefit of securing a greater degree of GI functionality, and GI maintenance and management has the potential to be secured into perpetuity. GI which includes private gardens does not provide this long-term security of function, as the management of gardens is subject to the decisions of individual householders. The 'target' proportion of GI should not, however, undermine the quality and functionality of GI networks and in some cases a figure close to the target may be acceptable where the multifunctional GI would be of particularly high quality. This approach has been followed in the South Worcestershire Development Plan's policy SWDP5, which requires greenfield sites exceeding 1ha (gross) to provide up to 40% of GI.

Concept Planning

What is a GI Concept Plan?
A GI Concept Plan is a document to guide the approach to GI on development sites or over wider areas. It provides high-level green infrastructure principles and identifies broad green infrastructure corridors based on the underlying evidence base for the site/wider area. It prioritises GI principles according to their role, added value, multifunctionality and the ecosystems services which they bring to the area.

The GI Partnership supports Worcestershire's Local Planning Authorities in delivering GI on strategic development sites. The GI Partnership's working group prepares GI Concept Plans which identify the GI principles and networks to be followed in the sites' masterplanning. In some instances, the Concept Plans are adopted by the respective Local Planning Authorities to become a

material consideration in the planning applications process. Alternatively, the Concept Plans may become an instrument to facilitate the dialogue between the GI Partnership and applicants on matters relating to GI on a particular development site.

The GI Partnership has successfully developed a number of GI Concept Plans and worked with the Local Planning Authorities and applicants for strategic development sites across the county including the Worcester South Urban Extension, Worcester Technology Park (Worcester Six), (Newlands (North East Malvern), Redditch Eastern Gateway and Foxlydiate. This approach ensured early engagement regarding GI priorities and networks for the respective sites. This process delivered time, risk and cost efficiencies in the development of mitigation strategies. In contrast to the normal development of site options, having the right people in the same room at the same time enabled rapid resolution of site-specific issues.

Green infrastructure principles

The key to planning and managing GI on a piece of land is to consider the area in its context. This includes considering the features of the site and the networks of habitats, sustainable transport routes, water courses, etc. that surround it. The principles for considering how GI can be integrated into a project will depend on its size and type. However some overarching principles which cut across all GI projects can be identified. They include:

- Assessment of the site and existing GI networks
- Identification of the requirements of the project, the value delivered by any existing GI assets, and the priorities for enhancement
- Design of GI corridors to maximise their multi-functionality, ensuring that on-site GI links to off-site GI and strengthens the cumulative benefits of networks
- Agree proposals for the long-term management and maintenance of the GI

Viability

Financial viability is an important consideration when planning for GI on development sites. It will affect the amount of land that can be dedicated to alternative land uses on the site and affect how much GI can be secured from a particular site. It will therefore be an important component of GI discussions with developers and local authorities. The importance of the viability of developments coming forward through Local Plans is set out in the NPPF and the GI partnership recognises that this will have implications for GI across Worcestershire.

Worcester South Urban Extension Green Infrastructure Concept Plan

The Worcestershire Green Infrastructure Partnership, in collaboration with the applicant (EDP representing Wellbeck) prepared a Green Infrastructure Concept Plan for the Worcester South Urban Extension. This mixed-used development consists of 2,204 dwellings and 14ha of employment land. The Green Infrastructure Concept Plan incorporated mutually agreed green infrastructure priorities and corridors which should deliver a variety of functions including sustainable drainage, biodiversity, landscape, historic environment and informal recreation space. The Plan also addresses the maintenance and long-term management of green infrastructure assets.

The Plan informed the final site masterplan and the applicant's version of the Green Infrastructure Concept Statement, submitted as part of the outline planning application. The green infrastructure (excluding gardens) amounted to 40% of a total land cover, in line with the South Worcestershire Development Plan's Green Infrastructure policy.

Reflecting on the value of joint working, EDP Partner Ben Rosedale observed: "*From the outset, the GI Group provided a very effective forum for discussions between the developer's consultant team and the key consultees. In contrast to the normal development of site options, having the right people in the same room at the same time enabled very rapid resolution of site-specific issues. We were also able to jointly produce a GI Concept Plan containing agreed objectives for the delivery and monitoring of GI on site. By agreeing the priorities at an early stage, the developer team have been able to progress landscape design options and consideration of viability issues with increased confidence – which we believe will deliver time, risk and cost efficiencies in the development of mitigation strategies**.*"

** Email correspondence dated 31st October 2012*

GI provision can have a positive impact on the viability of developments, through increased sales or rental receipts due to the improved attractiveness of the area and through its integrated approach to delivering multiple functions on a single area of land which reduces the need to allocate space to, for example, deliver flood risk management, habitat enhancements and recreation opportunities. However, it can also add to development costs through, for example, the planting of various species or the lost opportunity value of land dedicated to GI.

This subject is further explored in the GI viability guidance available on the Worcestershire GI Partnership's webpages.

Long-term management and maintenance

The long-term management and maintenance of GI is important to ensure that the existing and newly created assets maintain their role and function. Without appropriate management, functions can be lost or impaired over time. For development sites, both management plans and

funding should form a part of proposals for the site development and these arrangements should be secured alongside planning permission.

Information on forms of funding and arrangements for the long-term management and maintenance of GI can be found in the GI viability guidance available on the Worcestershire GI Partnership's webpages.

BASELINE INFORMATION

This section includes advice and data sources relating to each of the components of GI. It is a collection of information at a high level which will need to be interpreted and where relevant complemented with additional information and surveys at the local and site level.

Biodiversity

Why?

Biodiversity includes the variety of living organisms, in all its forms and interactions. All these organisms link with one another within their environment to create interconnected ecosystems. Ecosystems are controlled both by external and internal factors. Removing or changing any of these elements can irreversibly change the functioning of the ecosystems and the quality of the natural environment.

Biodiversity is facing challenges such as the decline of species, loss of habitats and risks associated with climate change[17]. There is overwhelming evidence that, in common with the rest of the UK Worcestershire has suffered huge losses of habitats and species (for example loss of grasslands and the decline in skylark numbers recorded in recent years)[18]. GI can help in minimising these losses in the future by contributing to biodiversity gain by safeguarding, enhancing, restoring, and creating wildlife habitat and by integrating biodiversity into the built environment. GI allows connections between functional ecological corridors and provides shelter and opportunities for wildlife to forage and disperse across the landscape. These opportunities can sit alongside and as a result of developments rather than at their expense. GI offers opportunities for the protection of existing designated sites and irreplaceable habitats of international, national and local importance and for the creation, restoration, connectivity, enhancements and management of habitats and features for biodiversity.

Data and advice

The Worcestershire Habitat Inventory (WHI)

The WHI is a field-by-field GIS database of habitat and land-use data with entire county coverage. The data is derived from digitisation of all existing available datasets, a systematic field–by-field aerial photo interpretation survey based on Local Wildlife Sites/Site of Special Scientific Interest condition surveys, ad hoc surveys and aerial photo sets and supported by ground truthing.

The WHI was mapped systematically using 1Km grid squares as a guide. Habitats in each square were interpreted from aerial photos and existing data was checked and added to each field where available. Archaeological and other features of note were recorded and comments added. Areas of uncertainty or particular interest were marked for ground survey at a later date.

[17] RSPB (2016) State of Nature Report 2016

[18] State of the Environment report 2010/11 Frequency of occurrence of three widespread breeding birds

The WHI captures existing data and shows habitats as a snapshot in time. The GIS functionality enables full integration of habitat and land-use data with other available electronic datasets that have a spatial element, for example other environmental, species, archaeological, socio-economic and demographic datasets. The targeted on the ground surveys where undertaken in 2011, 2012 and 2016 and fed into the WHI evidence. WCC is currently working on the latest WHI data update.

The WHI is intended primarily for use as a tool to assist strategic planning decision making and provides baseline evidence for GI work streams. It is aimed at WCC officers, District Council planners and partnership organisations. The WHI information is available on Worcestershire County Council's webpages.

Worcestershire Biological Records Centre (WBRC) data

Worcestershire Biological Records Centre (WBRC) stores and manages habitat and species data collected within the county. Habitat data includes land use databases such as the Worcestershire Habitat Inventory and digitised maps of county Nature Reserves and Local Wildlife Sites.

Data is collected and submitted to WBRC by various people and stakeholders, including Worcestershire Wildlife Trust, ecological consultancies, Natural England, WCC and members of the public. Further information on WBRC can be found at http://www.wbrc.org.uk/.

Landscape Description Unit Ecological Profiles and Biodiversity baseline

This data classifies discrete areas of the county Landscape Description Units (LDUs), showing, in a county context, whether they are of low, below average, medium, above average or high biodiversity importance. When augmented with WHI and WBRC data, this data can be used to determine the likely degree of biodiversity importance to inform the approach to GI at particular area. The Ecological Profiles can be obtained by clicking on the LDU level features on the Worcestershire Landscape Character Assessment webpages.

Worcestershire Biodiversity Action Plan

The Worcestershire Biodiversity Action Plan (BAP) identifies priority habitats and species important within the county, setting objectives for their conservation and outlining the actions needed.

One of the main aims of the Worcestershire Biodiversity Action Plan is to assess how the limited resources available can best be used to protect and enhance what remains allowing species and habitats to adapt.

There are 47 Action Plans within the Worcestershire BAP: 19 habitats, 25 species and three generic action plans covering overarching themes:

- Biological recording and information
- Biodiversity education, awareness and involvement
- Policy, grants and legislation.

Each plan gives an overview of the current status of the habitat or species within the county, identifies particular threats to it and current areas of work or activity being undertaken by partner organisations. The plan then presents targets for maintenance, restoration, expansion or creation (as appropriate) for the conservation of that habitat or species, followed by a list of actions that the Biodiversity Partnership should take to achieve these targets.

It is imperative that plans, policies and strategies produced in the county having the potential to impact on biodiversity take all possible steps to not only protect the existing biodiversity resource but to enhance what is currently there and take opportunities to create new high-quality natural habitats for people and wildlife to share.

Targets and actions within the current BAP expired on 31st December 2017. The Worcestershire Biodiversity Partnership is currently working on a review of the BAP and new targets and actions for 2018-27.

Biodiversity Net Gain

Biodiversity net gain is an approach to protecting the natural environment that leaves biodiversity in a better state than it was before. This approach builds on the so-called mitigation hierarchy set out in para. 118 of the NPPF (2012) (avoid-mitigate-compensate). More recently, Government commitment to this approach has been emphasised in the 25 Year Environment Plan and the revised NPPF (2018). New developments offer opportunities to achieve an overall benefit for biodiversity whilst delivering long-lasting and meaningful benefits for society and the economy. The Chartered Institute of Ecology and Environmental Management Biodiversity produced a Net Gain: Good practice principles for development which provides guidance to the development industry on how net gain requirements can be met. More detailed practitioners' guidance is anticipated in the future.

Worcestershire Woodland Guidelines

Worcestershire Woodland Guidelines provides guidance on the landscape and biodiversity aspects of woodland planting and management in Worcestershire. The guidance presents the 'ideal' for landscape and ecology practises, and is intended to help create new woodland or manage existing woodland in a way which complement or improves the current woodland landscape character and ecology of the county.

The guidance is in the form of two maps and accompanying information and guidance notes. The first map shows Worcestershire Landscape Types, the second Worcestershire Ecological Zones. Accompanying each Landscape Zone and Ecological Type is text providing detailed recommendations on the pattern, size and location of woodland planting, along with advice on which species to choose to best reflect the natural woodland communities prevalent in the area.

The Worcestershire Woodland Guidelines can be accessed on the Worcestershire Landscape Character Assessment web pages.

Woodland Opportunity Mapping

A broader regional context to woodland creation is provided by the Regional Woodland Opportunities Map. The map looks at the potential for woodland creation across the West Midlands within four themes – landscape, biodiversity, cultural heritage and access. For each of these themes, maps of the region are provided which divide the area into three zones for woodland creation – priority 1 (highest priority for creation), priority 2 (priority for creation) and low priority (low priority for creation). The Woodland Opportunities Map is available on the Forestry Commission website.

Key documents and tools

- National Planning Policy Framework (2012)
- Revised National Planning Policy Framework (2018)
- Worcestershire Biodiversity Action Plan, Worcestershire Biodiversity Partnership
- Worcestershire Habitat Inventory, Worcestershire County Council
- Worcestershire Biological Records Centre
- Forestry Commission (2007) West Midland Woodland Opportunity Mapping
- Woodland Trust (2017) Planner's Manual for Ancient Woodland and Veteran Trees

Landscape

Why?

Landscape provides a spatial context and structural framework for GI that is a fundamental to developing opportunities for protection and enhancement at both the strategic and local scale. Rural and urban landscapes are comprised of many characteristics that coalesce to create the physical and visual manifestations that have arisen as a result of the interaction between society and its environment. It is this process that has created what we interpret as landscape character. Landscape character is an important consideration in GI because it encompasses the physical landform, natural and cultural features that are fundamental, structural parts of the environment. Landscape features include networks of hedgerows, woodlands, orchards, areas of meadow, heath and other species rich grassland, parkland and other designed landscapes, street trees and other urban amenity landscapes, domestic gardens, water features and other wetlands. These are all landscape assets that have an intrinsic multifunctional value and offer opportunities for protection, enhancement and informed creation within the context of the established network.

Data and advice

The Worcestershire Landscape Character Assessment (LCA) is one of two countywide data sets that are applied in support of the Worcestershire GI Strategy process. The LCA identifies 22 Landscape Types across the county, each defined by a particular representation of geology, topography, soils, tree cover, land use and settlement pattern. These broad types are further subdivided into 449 Landscape Description Units (LDU) that identify local, sub-parish scale character. The LDUs are then subdivided into 1259 Landscape Cover Parcels (LCP) that identify areas of distinctive character and minor variation of attributes within each LDU. Historic Landscape Characterisation (HLC) adds an even finer grain of detail based on a minimum assessment area of 3 hectares, and an assessment of time-depth based on evidence derived from historic mapping. HLC provides countywide coverage (excluding Worcester City) of 14,942 mapped polygons arranged into 11 HLC Groups.

A countywide assessment of landscape condition, based on Land Cover Parcel coverage, was completed in 2008. This analysed the visibility of three main landscape attributes – tree cover pattern, field boundaries and enclosure patterns and scored each landscape unit according to how well represented these attributes were at that time. This presents an indicative assessment of point-in-time condition that should used with other key datasets, such as: Worcestershire Habitat Mapping and soils and geology mapping that should support the identification of multifunctional opportunities at both a local and larger landscape scale. The Worcestershire Landscape Character Assessment Supplementary Guidance (2012) provides a contextual framework for guiding assessment and the identification of opportunities based on landscape characteristics presented in the 22 Landscape Types. The Supplementary Guidance is further enhanced by a suite of factsheets for each Landscape Type covering planning, land management, as well as, specific issues and opportunities.

Landscape Character Assessment is an objective, descriptive process and so cannot provide guidance on the potential visual impacts of change in the landscape, as this needs to be assessed with reference to the type and extent of proposed change. General guidance on potential visual impacts – and visual impact assessment methodology – can be provided if broad areas or sites are identified.

The full Worcestershire LCA can be accessed on the Worcestershire County Council's webpages. This site provides:

- Background information
- National context
- Interactive maps
- Database access
- Technical documentation and other publications
- Advice sheets for each Landscape Type providing general guidance on landscape issues for development and land management.

The characterisation evidence base, along with European and national guidance, county supplementary guidance and district landscape policies, provide a foundation for assessment and design. This is supported by additional guidance documents, papers and online GIS resources that can inform good practice. These resources should be used to inform master-planning for integrated and effective GI design.

Key documents and tools

- National Planning Policy Framework (2012)
- Revised National Planning Policy Framework (2018)
- European Landscape Convention (2000) and Guidance (2009)
- Worcestershire Landscape Character Assessment: Process, Products and its Role in the Planning System (2008)
- Worcestershire Landscape Character Assessment: Supplementary Guidance (2012)
- Worcestershire Landscape Character: Planning and Development Guidelines
- Worcestershire Landscape Character interactive map
- Worcestershire Historic Landscape Character interactive map

Historic Environment

Why?

The historic environment encompasses all landscapes, places, structures, buried deposits, artefacts and cultural materials that are a result of human interaction with the environment. It is, therefore, the inherited material expression of past society that continues to influence the landscapes, townscapes and subsurface makeup of all parts of the nation, regardless of perceptions of redeveloped urban places or apparent rural remoteness. Its presence is sometimes obvious in, for example, historic designed landscapes. It is, however, often a less obvious yet intrinsic part of all landscapes, places and assets that are imbedded in existing GI networks. Heritage assets are rarely isolated, and their setting is a vital part of how they relate to, interact with and influence the places of which they are a part. It is in this context that there are often opportunities to enhance or restore the setting of heritage assets through new GI design. This provides wider multifunctional opportunities for notably biodiversity, through enhanced habitat connectivity, and also for public amenity space, in addition to contributions towards SuDS and urban cooling functions. The historic environment does not present a strategic constraint on new design, but rather it can inform well-managed change and opportunities for creative design based on its contribution to the identity of place and established networks.

Data and advice

The primary evidence base for the historic environment in Worcestershire is provided by the county Historic Environment Record (HER), which as of autumn 2017, holds over 75,000 records of archaeological sites, historic buildings, designed landscapes, buried landscapes and events where archaeological investigations have taken place. This includes records for designated and non-designated assets and a wide range of related sources and research generated information that includes, grey literature reports[19], historic mapping and characterisation mapping.

Key historic landscape and characterisation datasets held by the HER that are relevant and cut across other environmental themes informing GI assessment and design include:

- Historic Landscape Characterisation: fine-grained mapping of inherited landscape character that provides a time-depth and evidence of change across the landscape.
- Historic Environment Character Zones: a strategic scale assessment based on an amalgamation of Landscape Description Units and selected HER data that was analysed to produce thematic mapping for survival, potential, group value, diversity and sensitivity.
- Historic Farmsteads Characterisation: a record of all farmsteads extant or lost in Worcestershire with background guidance that includes a methodology for assessing setting, GI and SuDS opportunities.

[19] Grey literature is all documents produced as a result of archaeological work in Worcestershire, be that part of DC or any study that produces material that is unpublished, but held in the HER archive.

- Tithe and Inclosure Mapping: 18th – 19th century land use maps covering most of the county with 46 parishes/estates digitally available as part of the HER.

Dedicated advice is available from the HER and Advisory Team for both rural and urban landscapes, supported by specialist advice from environmental archaeologists.

Key documents and tools

- National Planning Policy Framework (2012)
- Revised National Planning Policy Framework (2018)
- Historic England Guidance
- Worcestershire Historic Landscape Characterisation
- Worcestershire Historic Environment Records
- Worcestershire Historic Farmsteads Guidance
- Worcestershire Your Place Matters (local assessment guidance)

Water Management

Why?

GI can play a key role in sustainable drainage, drought mitigation, and flood and water stress reduction, through providing opportunities for attenuation or infiltration that can help to recharge aquifers as well as to maintain levels in watercourses or other blue infrastructure features.

Flood management

Flood risk varies in nature and extent throughout the county. There are two main types of flooding which occur in Worcestershire. Pluvial flooding, also known as surface water flooding, occurs when an extremely heavy downpour of rain saturates drainage systems and the excess water cannot be absorbed. Fluvial flooding, from main rivers and ordinary watercourses, occurs when rivers burst their banks as a result of sustained or intense rainfall. Some areas of the county are also affected by groundwater flooding. WCC, in its role of the Lead Local Flood Authority (LLFA), is responsible for surface water, ordinary watercourse and groundwater flooding. The Environment Agency is responsible for main river flooding.

The Revised National Planning Policy Framework introduces the requirement to incorporate sustainable drainage systems on major developments (unless there is clear evidence that this would be inappropriate). The systems should, where possible provide multifunctional benefits (para 165)[20]. This policy provides a planning policy hook for the provision of SuDS and their integration with other GI elements to deliver multifunctionality on all major developments in the county.

Subsequently all major developments are expected to include sustainable drainage systems and for these to be given increased weight in the determination of planning applications. Planning applications that fail to meet a policy requirement to deliver SuDS instead of conventional drainage could be refused. The LLFAs are statutory consultees for major applications in relation to surface water drainage.

SuDS are designed to reduce the potential impact of new and existing developments with respect to surface water drainage discharges. Increasing urbanisation has caused problems with flash flooding after intense and prolonged periods of rainfall. This is due to the increase in the amount of hard surfaces (including asphalt, concrete and building structures) which limit the natural infiltration of water into the ground.

Diffuse pollution reduces water quality, especially in more urbanised areas. Delivering a healthy natural environment through GI improvements can make significant improvements to both run-off quantity and water quality. Sustainable drainage systems reintroduce natural features in strategic places within developments to reduce run-off and provide natural cleaning of

[20] Ministry of Housing, Communities & Local Government (2018) Draft Revised National Planning Policy Framework

rainwater before it enters watercourses. Well-designed GI combines this drainage function with others such as access and recreation, landscape and ecological enhancements. For example, a naturally designed and appropriately managed attenuation feature can be used by residents for recreation (e.g. leisure and dog walking) and become an attractive landscaping feature which provides biodiversity benefits.

Water quality and quantity

The European Union's Water Framework Directive (2010) aims to improve the ecological status and prevent further deterioration of the water environment, promote the sustainable use of water, reduce water pollution and ensure a progressive reduction in groundwater pollution. It is based on the strategic catchment level approach in River Basin Districts[21] across England and Wales.

The quality of water bodies determines the types of animals and plants that can live in them. Good quality water bodies are able to support healthy ecosystems and benefit human health. Uncontrolled runoff can damage the water ecosystem and devalue the condition of the natural environment.

Data and advice

Sustainable drainage systems: Maximising the potential for people and wildlife

SuDS Guidance produced by Wildfowl and Wetland Trust and RSPB provides guidance to local authorities, developers, architects and masterplanners on how to design SuDS to maximise their biodiversity potential. It includes a set of design criteria, design features and long-term-management required to achieve this goal. The guide also signposts relevant guidance and best-practice case studies to highlight and explain the opportunities for delivering better places for people and wildlife.

Sustainable Drainage Design and Valuation Guide

WCC is currently producing a Sustainable Drainage Design and Valuation Guide. The guide links the design of SuDS with the evaluation requirements of planning. It provides guides on how SuDS can be successfully integrated into the fabric of development to fit well with the local landscape and address community and environmental consideration in the local area. The guide provides design principles and advice that should help applicants to design, take through planning, build and manage successful SuDS schemes. Local examples of good practice also feature in this document. Once completed, the document will be available on the Worcestershire LLFAs webpages.

[21] River basin districts are defined as the area of land and sea, made up of one or more neighbouring river basins together with their associated groundwaters and coastal waters, which is identified under Article 3(1) of the Water Framework Directive as the main unit for management of river basins.

Surface Water Management Plan

A Surface Water Management Plan (SWMP) has been prepared by Worcestershire County Council (WCC) under its LLFA role. This document includes information produced a result of a strategic, county-wide assessment of flood risk from all sources, including surface water. It identifies priority locations for further action based on these findings. An extensive evidence base has been compiled comprising detailed information on over 1,700 known floodspots across Worcestershire. This data illustrates that a lot has been achieved in Worcestershire in terms of flood risk reduction; it also helps to identify the areas of focus for future actions. This evidence base will help to alleviate flood risk in Worcestershire through implementation of the Surface Water Management Plan Action Plan and the influence of the Local Flood Risk Management Strategy. The document is currently being finalised and once completed it will be available on the Worcestershire LLFAs webpages.

Local Flood Risk Management Plans

There are currently three local flood risk management plans being developed in Worcestershire for the areas have been identified at greatest risk of flooding – Bromsgrove, Droitwich and Redditch. The local flood risk management plans identify priority locations for flood risk improvements within these areas. Throughout each area they identify clusters of floodspots from a variety of flooding sources. Once completed, the documents will be available on the Worcestershire LLFA's webpages.

Worcestershire Register of Flood Schemes

The Register of Schemes is a dataset of the known flood schemes in Worcestershire. Information on these schemes, including who to contact for full details on each of the schemes is available from the Flood Risk Management Team at Worcestershire County Council.

Catchment Flood Management Plan

Flood risks vary within different parts of a river catchment and as a result different approaches are needed for different locations. Catchment Flood Management Plans are produced by the Environment Agency to establish flood risk management policies to assist all key decision makers in delivering long-term flood risk management. The River Severn Catchment Flood Management Plan identifies six policy areas which set out policies and broad types of action that should be taken to reduce flood risk, based on the extent, nature and scale of current and future flood risk in this part of the catchment.

River Basin Management Plans

The Environment Agency is responsible for producing River Basin Management Plans for each of the seven river basin districts covering England. The Management Plans are designed to protect and improve the quality of our water environment. Information on actions to protect water quality in Worcestershire is covered under the Severn River Basin Management Plan 2015-2021 available on the Environment Agency's webpages.

Water quality mapping

The Environment Agency also produces up-to-date information on the quality of bodies of water. Information for the Severn River Basin District is available from the Environment Agency's online data tool, Catchment Data Explorer.

Abstraction licensing strategies

Groundwater levels vary in response to rainfall, amounts abstracted and aquifer characteristics. The shape and size of a groundwater source protection zone depends on the condition of the ground, how the groundwater is removed, and other environmental factors. The zones are defined by the Environment Agency using a model of the groundwater environment. The Worcestershire Middle Severn Catchment Abstraction Strategy is available from the Environment Agency's webpages.

Key documents and tools

- The Flood and Water Management Act 2010
- Revised National Planning Policy Framework (2018)
- Defra (2004) Making Space for Water
- Worcestershire County Council (2016) Local Flood Risk Management Strategy
- Worcestershire County Council (2016)The Local Flood Risk Management Strategy Action Plan 2015-2021
- Worcestershire County Council (2011) Planning for Water in Worcestershire Technical Research Paper
- Worcestershire Green Infrastructure Partnership (2012) Green Infrastructure Framework 2
- CIRIA (2007) Suds Manual
- Wildfowl and Wetland Trust and RSPB (2012) Sustainable Drainage Systems, maximising the potential for wildlife and people
- Landscape institute Technical note (2014) Management and maintenance of Sustainable Drainage Systems (SuDS) landscapes

Recreation and Tourism

Why?

Recreation and tourism is an important social dimension of GI. It allows local people and visitors to engage with the natural environment and to experience first-hand the biodiversity, landscape and history of an area. GI provides for a wealth of opportunities involving people. The opportunities encompass the full range of GI; from parks and gardens to footpaths and cycleways.

The natural environment of Worcestershire is a great asset to the recreation and tourism industry. A number of landscapes and habitats in the county such as the Malvern Hills and the Wyre Forest are nationally recognised and recreational resources ranging from the Droitwich Canals to the Lickey Hills are widely appreciated by local communities and visitors alike. These places make valuable contributions to the county's economy through visitor spend and supporting recreation and through tourism related jobs.

There is an opportunity to provide multiple benefits through the appropriate management of sensitive recreation sites. This requires an appropriate balance in the access to these assets to ensure their special qualities are not eroded through misuse and they are not underutilised.

Data and advice

Access and recreation assets

Within the county, there is a range of existing provision of natural open space which delivers a wide range of recreational opportunities. These include publicly and privately owned and managed countryside sites such as country parks, picnic sites and countryside visitor attractions, public parks, recreational routes such as walking and cycling routes, and the public and permissive rights of way network as well as rivers, canals and other water bodies. In 2013, the Worcestershire GI Partnership analysed the size and capacity of Worcestershire's recreation assets. Some potential locations for the creation of new county-scale recreation areas were also identified. The result of this work can be found in the Worcestershire Green Infrastructure Framework 3: Access and Recreation.

The value of tourism

The 2015 Worcestershire Local Enterprise Partnership's study assessed the value of tourism to the Worcestershire economy. The study identified that in 2009, there were an estimated 1.7 million trips made by visitors to the Malvern Hills, creating almost 1,200 additional jobs in the area[22].

[22] Worcestershire Enterprise Partnership (2013) The Value of Tourism in Worcestershire, Final Report

Public Rights of Way and Trails Map

An on-line map of Public Rights of Way and many other recreation facilities, including circular routes and trails in the county, can be found at https://gis.worcestershire.gov.uk/website/Countryside/.

Key documents and tools

- Worcestershire County Council (nd) Rights of Way Improvement Plan
- Worcestershire County Council (2009) Worcestershire Access and Informal Recreation Strategy 2009-2019
- Worcestershire Green Infrastructure Framework 3: Access and Recreation, Worcestershire Green Infrastructure Partnership
- Destination Management Plan 2016 – 2021, Destination Worcestershire
- Strategic Economic Plan, Worcestershire Local Enterprise Partnership

Sustainable Transport

Why?

The provision of well-connected and maintained cycling and walking networks can lead to healthier and less congested places where people have a genuine choice about how they get around. Sustainable transport can also reduce emission of greenhouse which can impact on our functioning ecosystems. GI planning can support this by designing sustainable transport into the network of green spaces and corridors as part of area/site development. It is also important for these routes to link with the wider local and national cycle and walking networks. The greatest GI benefits are from those routes which, alongside providing physical activity and recreational functions, deliver ecological, landscape or drainage enhancements through tree and hedge planting and general greening of the route ways and road verges.

Data and advice

National Cycle Network

The National Cycle Network is a network of on-road and off-road cycling and walking routes which links up villages, town and cities. The National Cycle Network is mainly owned by local authorities and other landowners like Network Rail, the Highways Agency, National Trust, Forestry Commission and Canal and River Trust. During 2017 and 2018, Sustrans, is reviewing the present physical condition of the national network. The review findings will be used to work with the government and local partners on the development and maintenance of existing walking and cycling routes. The National Cycle Network can be viewed on the Sustrans webpages.

Local Cycle Routes

A series of leisure cycling routes are available in Worcestershire. Each circular route features a mix of quiet lanes, off-road cycle paths and sections of bridleway. The routes start from locations around Worcester City and are of varied lengths. There is also a mix of A to B routes that take in parts of the national cycle network that runs throughout Worcestershire. WCC's website contains a local list of circular cycle routes and interactive maps of all Worcestershire cycle routes.

Streetscape Design Guide

Worcestershire County Council's Strategic Transport team is currently developing the Streetscape Design Guide which will provide information on how different forms of transport infrastructure should be designed and integrated into existing and new built environments to serve local people whist maintaining and enhancing the natural environment. This includes the provision of walking and cycling. Following public consultation, the Guide is currently being reviewed and should be published in 2018.

Local Transport Plan 4 and sustainable transport projects

Sustainable transport in Worcestershire is guided by the Worcestershire Local Transport Plan 4 which holds a schedule of aspirational walking and cycling networks and investment priorities for the county ("Strategic Active Travel Corridor Schemes and Active Travel Networks").

Significant walking and cycling infrastructure projects are planned in Worcestershire in the next 5 years, including:

- Creation of a network of walking and cycling routes across Bromsgrove, linking residential areas, employment sites, schools, the hospital, the town centre and the railway station.
- Phase four of Southern Link Road, which will include significant new and upgraded walking and cycling infrastructure
- A route for walking and cycling between Worcester and Pershore that will link both conurbations with the forthcoming Worcestershire Parkway Station.

Key documents and tools

- Worcestershire Local Transport Plan 4, Worcestershire County Council
- Transport Investment Strategy, Department for Transport
- Worcestershire Streetscape Design Guide, Worcestershire County Council

Health and wellbeing

Why?

Good quality, accessible green spaces can provide benefits to people's physical and mental health. GI can also contribute towards people's quality of life and sense of place. As such, GI can have a positive role in tackling health inequalities[23].

The level of impact that GI can have on the health and wellbeing of local people depends on its availability and accessibility. This is why when planning for GI at the local or site level, an assessment of the population make-up and health and wellbeing concerns for that area should be considered.

Data and advice

Joint Strategic Needs Assessment

The Joint Strategic Needs Assessment (JSNA), a set of assessments, briefing and reports prepared by WCC's Public Health directorate to inform local decision making processes, is a source of information relating to health issues in Worcestershire. The JSNA provides information on:

- District and thematic health profiles
- Local performance in terms of health of the elderly, mental health, levels of physical activity, etc.

These reports can be accessed on the Public Health webpages.

Public Health England data

Public Health England also produces a number of datasets aimed to support local health and wellbeing improvement actions. With these profiles, it is possible to:

- Browse indicators at different geographical levels
- Benchmark against the regional or England average
- Export data for external use

This tool is available on Public Health England's webpages.

Health inequalities

It is widely known that health inequalities[24] are linked to the deprivation, the quality of life and levels of economic performance of a particular area. People in lower socio-economic groups are more likely to experience chronic ill-health and die earlier than those who are more advantaged. This is why evidence on local economic performance and unemployment figures is important in targeting health-related improvements in the local area. The following summaries can help in understanding the context of these areas:

- The Worcestershire County Economic Summary – this study looks the latest unemployment figures, local economic status and indicators and ward level unemployment data.
- Public Health Annual Report 2014 Health Inequalities - this document assesses the health of the local population and identifies issues about poor outcomes in local areas.

[23] Health inequalities are differences in people's health, wellbeing and life expectancy which are depended on the area that people live in and social circumstances they have been born to.

[24] Health inequalities are preventable differences in health status experienced by certain population groups.

Key documents

- Worcestershire Health and Wellbeing Strategy 2016-19, Worcestershire County Council
- Planning for Health in Worcestershire Technical Paper, Worcestershire County Council
- Green Infrastructure Framework 4: Socio-economic benefits of green infrastructure, Worcestershire Green Infrastructure Partnership

Climate change

Why?

The NPPF recognises the key role planning plays in incorporating strategies to mitigate and adapt to climate change, taking into account factors such as flood risk, water supply and changes to biodiversity and landscape. Climate change is a global challenge and is considered the greatest threat[25] to the world's environment, global economy and the population as a whole.

A changing climate poses some difficult challenges both globally and closer to home in Worcestershire. Current projections are for a move towards a trend of milder but wetter winters, hotter but drier summers and an increase in the frequency and intensity of extreme weather events such as heavy rainfall. The application of GI can help us to build our resilience to these changes. GI provides added value in the form of beneficial services; including:

- flood alleviation
- CO2 storage
- filtering pollutants
- reducing the risk of erosion – using vegetation to stabilise soils
- soil quality – avoiding leaching of soils
- restoring connectivity for species movement
- providing shading
- providing low carbon fuels (e.g. biomass)
- supporting local crops and food provision
- managing water resources

The natural environment and biological processes can be used to both reduce the total amount of carbon produced in Worcestershire and act as carbon sinks. The way that land is managed has an impact on the amount of carbon emitted into the environment or alternatively captured by soil or vegetation. Combined with improvements in energy efficiency and new technologies, the natural environment can be seen as an effective and sustainable way of reducing CO2 levels in the county. The latest data for Worcestershire indicates emissions from land use, land use change and forestry reduced by 72.5% between 2005 and 2015.

Data and advice

Worcestershire Climate Change Strategy

The Worcestershire Climate Change Strategy 2012-2020 has the following key aims

- build Worcestershire's low carbon economy
- sets tough but critical carbon targets
- adapt to inevitable climate change
- empower Worcestershire's communities to take action

[25] World Economic Forum (2018) The Global Risk Report

The UK Climate Projections

The UK Climate Projections (UKCP09) website is the source of climate information for the UK. It provides information on historical climate data and future climate projections for variables such as temperature, rainfall and snowfall, air pressure, cloud and humidity.

UKCP09 provides climate projections for the UK for three different future greenhouse gas emissions scenarios: a low emissions scenario, a medium emissions scenario and a high emissions scenario. The website provides ready-made maps, key findings and broader reports. It also allows users to set their own parameters for data variables and generate customised output graphs and charts, maps or raw data.

The revision of the UKCP09 tool is due in 2018.

National Biodiversity Climate Change Vulnerability Assessment

The climate change vulnerability assessment is a GIS model developed by Natural England. It provides an evaluation of the vulnerability of priority habitats to climate change based on principles of adaptation for biodiversity. It identifies why areas are vulnerable and which possible interventions can have the biggest impact in increasing resilience to the changing climate. Key outputs are maps showing the areas vulnerable to climate change across the country. The vulnerability data can be downloaded from the Government data webpages.

Key documents and tools

- Worcestershire Climate Change Strategy 2012-2020
- The UK Climate Projections (UKCP09)

Soils

Why?

Soils are a requisite for human life; they grow our food and help keep our drinking water clean by breaking down and locking away substances that may be harmful to people and wildlife. Soils are a key factor in defining the landscape character of Worcestershire and they have a strong influence on land use within the county.

As well as supporting our diverse landscapes, soils play a vital role in maintaining the balance of gases in the air we breathe and in storing and releasing carbon. GI can support the quality of soils by providing better infiltration and mitigating climate change. This in turn can provide further benefits through healthier crops and increased production.

Data and advice

The Planning for Soils Technical Research Paper produced by WCC is a comprehensive guide to planning for soils which includes information on policy, the quality of soils and the ways in which Worcestershire soils can be protected.

Natural England holds and publishes data on the quality of soils in the UK. The Agricultural Land Classification maps can be viewed online on the agencies webpages.

Key documents

- The EU Water Framework Directive 2000
- Defra (2011) Safeguarding our Soils - A Strategy for England
- Worcestershire County Council (2011) The Planning for Soils Technical Paper

APPENDIX 1 WORCESTERSHIRE GREEN INFRASTRUCTURE PARTNERSHIP MEMBER ORGANISATIONS

The GI Partnership comprises representatives with technical and/or strategic competencies and planning interests in green infrastructure. The Partnership has representation at a senior level from the following organisations:

- Bromsgrove District Council
- Environment Agency
- Forestry Commission
- Historic England
- Malvern Hills District Council
- Natural England
- Redditch Borough Council
- Worcester City Council
- Worcestershire County Council
- Worcestershire Wildlife Trust
- Wychavon District Council
- Wyre Forest District Council

APPENDIX 2 GREEN INFRASTRUCTURE POLICIES

Revised National Planning Policy Framework (2018)

Strategic policies

20. Strategic policies should set out an overall strategy for the pattern, scale and quality of development, and make sufficient provision for, inter alia, conservation and enhancement of the natural, built and historic environment, including landscapes and **green infrastructure**, and planning measures to address climate change mitigation and adaptation (para 20 (f)).

Promoting healthy and safe communities

91. Planning policies and decisions should aim to achieve healthy, inclusive and safe places which, [inter alia], enable and support healthy lifestyles, especially where this would address identified local health and well-being needs – for example through the provision of safe and accessible **green infrastructure**, sports facilities, local shops, access to healthier food, allotments and layouts that encourage walking and cycling (para 91 (c)).

Planning for climate change

150. New development should be planned for in ways that:
a) avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of **green infrastructure** (para 150 (a)).

Conserving and enhancing the natural environment

171. Plans should: distinguish between the hierarchy of international, national and locally designated sites; allocate land with the least environmental or amenity value, where consistent with other policies in this Framework; take a strategic approach to maintaining and enhancing networks of habitats and **green infrastructure**; and plan for the enhancement of natural capital at a catchment or landscape scale across local authority boundaries.

Ground conditions and pollution

181. (…) Opportunities to improve air quality or mitigate impacts should be identified, such as through traffic and travel management, and **green infrastructure** provision and enhancement (…).

National Planning Policy Framework (2012)

99. "Local Plans should take account of climate change over the longer term, including factors such as flood risk, coastal change, water supply and changes to biodiversity and landscape. New development should be planned to avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable,

care should be taken to ensure that risks can be managed through suitable adaptation measures, including through **the planning of green infrastructure**".

114. "Local planning authorities should:

- set out a strategic approach in their Local Plans, planning positively for the creation, protection, enhancement and management of networks of biodiversity and **green infrastructure;**"

South Worcestershire Development Plan – Adopted February 2016

SWDP 5: Green Infrastructure

A. Housing development proposals (including mixed-use schemes) are required to contribute towards the provision, maintenance, improvement and connectivity of Green Infrastructure (GI) as follows (subject to financial viability ([20]):)

i. For greenfield sites exceeding 1ha (gross) - 40% Green Infrastructure (GI)([21]).

ii. For greenfield sites of less than 1ha but more than 0.2ha (gross) – 20% Green Infrastructure (GI)([22]).

iii. For brownfield sites – no specific Green Infrastructure (GI) figure([23]).

B. The precise form and function(s) of GI will depend on local circumstances and the Worcestershire Green Infrastructure Strategy's priorities. Developers should seek to agree these matters with the local planning authority in advance of a planning application. Effective management arrangements should also be clearly set out and secured. Once a planning permission has been implemented, the associated GI will be protected as Green Space (SWDP 38 refers).

C. Other than specific site allocations in the development plan, development proposals that would have a detrimental impact on important GI attributes within the areas identified as "protect and enhance" or "protect and restore", as identified on the Environmental Character Areas Map , will not be permitted unless:

i. A robust, independent assessment of community and technical need shows the specific GI typology to be surplus to requirements in that location; and

ii. Replacement of, or investment in, GI of at least equal community and technical benefit is secured.

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20 Provision of Green Infrastructure at a lower level than that required by this policy will need to be justified by a robust viability assessment.

21 Excluding private gardens.

22 Excluding private gardens.

23 Proposals will need to satisfy other SWDP policies, e.g. SWDP 21: Design, SWDP 22: Biodiversity & Geodiversity, SWDP 29: Sustainable Drainage Systems, SWDP 39: Provision for Green Space and Outdoor Community Uses in New Development and in most cases this will necessarily mean parts of the site performing a Green Infrastructure (GI) function.

Bromsgrove District Plan 2011-30 – Adopted January 2017

BDP24 Green Infrastructure

BDP24.1 The Council will deliver a high quality multi-functional Green Infrastructure network by:

a. Ensuring developments adopt a holistic approach to deliver the multiple benefits and vital services of Green Infrastructure, with priorities determined by local circumstances;

b. Requiring development to improve connectivity and enhance the quality of Green Infrastructure;

c. Requiring development to provide for the appropriate long term management of Green Infrastructure;

d. Requiring development to have regard to and contribute towards, the emerging Worcestershire Green Infrastructure Strategy, any local GI Strategy and where available, the GI Concept Plans. For large scale development, developers will need to prepare a Concept Plan for the area, which would then serve to inform all developments in that area as they come forward.

Borough of Redditch Local Plan No.4 – Adopted January 2017

Policy 11 Green Infrastructure

11.2 The Green Infrastructure (GI) Network makes an important and valued contribution to the Borough of Redditch and its distinctiveness. The GI Network is a multifunctional resource that includes, but is not limited to, green spaces and corridors, waterways, natural heritage and wildlife habitats.

11.3 The existing GI Network will be safeguarded and new development will be required to contribute positively to the GI Network, in line with the findings of the Redditch Borough GI Strategy and to support the Worcestershire Sub-Regional GI Framework. Opportunities will be sought to improve and maintain the Network for the benefit of people, wildlife and the character and appearance of the Borough.

11.4 The Borough Council will produce Green Infrastructure Concept Statements to guide masterplanning and development of Strategic Sites.

Wyre Forest District Council Core Strategy (2006 – 2026) Adopted December 2010

CP13: PROVIDING A GREEN INFRASTRUCTURE NETWORK

Developing a Green Infrastructure Network

The existing green infrastructure network within the District, as set out within the emerging Green Infrastructure Strategy, will be safeguarded.

New development will be required to contribute positively towards the District's green infrastructure network. The Green Infrastructure Study and Green Infrastructure Strategy will be used to identify where green space contributions are spent and the requirements on individual sites. Open space typologies, identified within the PPG17 audit as being deficient, will be prioritised for further provision.

The following features have been identified as key green infrastructure assets and essential to the District's local distinctiveness:

- The Rivers Severn and Stour and the associated wetlands;
- The Staffordshire and Worcestershire Canal;
- The District's heathlands and acid grasslands;
- The Wyre Forest and associated areas of high landscape and biodiversity value.

These features will be safeguarded and new developments must positively contribute towards the enhancement of their green infrastructure value.

Provision of Open Space in New Developments

All new development will be expected to provide open space where technically feasible. Where private garden space is not provided for each dwelling, communal gardens or allotment spaces will be required in order to improve health and wellbeing, support local biodiversity and, where possible, strengthen landscape characteristics. Roof-top gardens and green roofs will be encouraged in order to help address climate change and enhance biodiversity.