



Worcestershire Sub-Regional Green Infrastructure Framework

Kidderminster East Strategic Development Corridor Concept Plan

Version 1.3

The purpose of sustainable development is to construct infrastructure needed today without compromising our future ability to do so. However, adopting a sustainable approach to development delivers a diversity of benefits:

Using natural services in conjunction with engineered solutions reduces construction and capital costs; embedding a range of sustainable technologies will reduce future maintenance and running costs; protecting and enhancing the natural resources on site provides recreation and amenity opportunities which will promote land value and helps attract business to a more desirable location; greenspace can also provide opportunities for sustainable transport solutions, in turn these opportunities will promote healthier lifestyle choices as residents and visitors choose to walk and cycle in and through the settlement.

This document is a distillation of the development and planning advice and guidance offered by the Worcestershire Green Infrastructure Partnership. The advice here has been tailored for the Kidderminster East strategic development corridor and is intended to inform and expedite the design of a sustainable development welcomed by stakeholders; the aim is to help deliver a better built and natural environment.

The Kidderminster East Green Infrastructure Concept Plan has been prepared by a working group of the Worcestershire Sub-Regional Green Infrastructure Steering Group which includes: Worcestershire County Council, Wyre Forest District Council, Natural England, the Lead Local Flood Authority and North Worcestershire Water Management, the Environment Agency and Worcestershire Wildlife Trust.

While the Concept Plan has benefited from scrutiny and input from stakeholders, it is not a statutory document and holds the status of a guidance paper to provide framework for the master planning of a comprehensive multifunctional green infrastructure.

1. Introduction

1.1 What is Green Infrastructure?

The West Midlands Green Infrastructure Prospectus defines GI as:

"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 Green Infrastructure Prospectus (WMRA, undated)

1.2 The Worcestershire Green Infrastructure Partnership

The Partnership currently comprises Bromsgrove District Council, English Heritage, the Environment Agency, Forestry Commission, Malvern Hills District Council, Natural England, Redditch Borough Council, Sustrans, Woodland Trust, Worcester City Council, Worcestershire Biological Records Centre, Worcestershire County Council, Worcestershire Wildlife Trust, Wychavon District Council and Wyre Forest District Council.

The Worcestershire Green Infrastructure Partnership has produced the Worcestershire Green Infrastructure Strategy to drive forward the delivery of green infrastructure in the county. It sets out county-scale principles to inform plans and strategies being developed by partner organisations and to enable a coherent approach to delivery across a range of initiatives.

Working groups of the Worcestershire Green Infrastructure Partnership draw on the Partnership's extensive evidence bases to prepare Green Infrastructure concept

plans with the aim of guiding the delivery of Green Infrastructure within Worcestershire's key strategic development sites.

1.3 What is a concept plan?

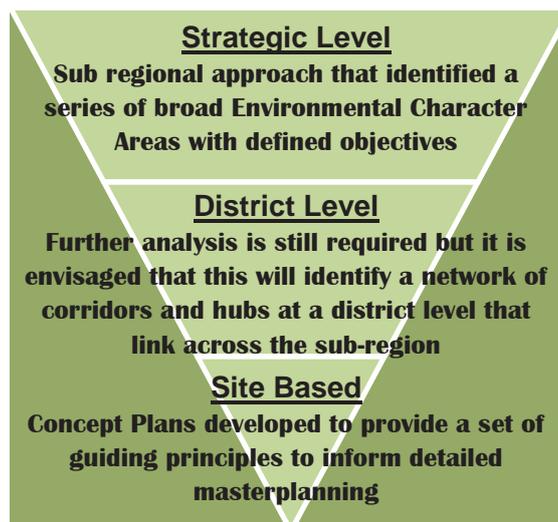
Concept plans and statements provide a framework for the development of master plans for areas of strategic growth.

This concept plan provides a statement of aims and objectives for green infrastructure that the partners to the concept plan would expect to see addressed in the masterplanning of development through the Kidderminster east strategic development corridor.

The concept plan is based on primary baseline data and the multifunctional characteristics through the development corridor. In so doing it identifies the green infrastructure assets, and spatial patterns that give rise to opportunities for a connected and multifunctional green infrastructure network.

1.4 Purpose and Aim

The concept plan for the Kidderminster East strategic development corridor is intended to provide a high level framework, consistent with the emerging Sub-Regional Green Infrastructure Framework. The long term vision is for the concept plan to form part of a suite of papers (*see table below*) that aim to inform the detailed masterplanning that will apply in these areas. It is not intended to be prescriptive, but does establish principles to demonstrate how best practice for the development and management of green and blue infrastructure can be applied on the ground.



The guiding principles of the concept plan have in part been guided by the vision in the Wyre Forest District Council Local Development Plan Review (2016-2036) Policy 6D and 31 (specifically: 31.0.1) which proposes to allocate 101.29 hectares (net) for residential (1,735 dwellings) and employment (9.66Ha). It is noted that Preferred

Options consultation states that "*the precise composition of the remaining urban extension(s) to Kidderminster is an important aspect of this consultation. As such it is not yet possible to be precise at this stage*". Within this context the Worcestershire Green Infrastructure Partnership recognises that the extent and configuration of the proposed allocation will be subject to further refinement and this process should be informed by the principles, opportunities and sensitivities outlined within this Green Infrastructure concept plan.

Consideration will in future be given to the cost of provision and management of green infrastructure. To achieve this, the concept plan provides the following:

- An overview of the local landscape character, its history, function and physical make-up, including:
 - An understanding of the current structure and broad character of the Kidderminster East strategic development corridor and surrounding settlements
 - An overview of how settlements interact with the surrounding countryside, particularly at the location of the strategic growth area;
- Summaries that outline the complexities of biodiversity and the historic environment present within the Kidderminster East corridor, in relation to its immediate setting and wider networks;
- An overview of the local access and recreation provision including walking and cycling networks;
- A view about the type, scale and provision of green infrastructure within development proposals and where relevant, beyond the site boundaries. This provides the basis for the place making principles to be embedded in the master planning of the site;
- Broad commentary about the physical capacity of the site, and the implications for the built form and development density on the provision of green infrastructure i.e. SuDS, sustainable transport provision and access to open space to support the new and existing communities.

1.5 Preparation of the statement and its status

Preparation of the concept plan has been led by the Strategic Planning & Environmental Policy team of the County Council and has been endorsed by the County Council in its role as Lead Local Flood Authority, Wyre Forest District Council, Natural England, Environment Agency and Worcestershire Wildlife Trust.

Note: *Preparation of this paper does not however imply any organisational support to any planning application within the Kidderminster East strategic development corridor.*

It should be noted that further, more detailed and technical advice with regards European Protected Species Licensing and pre-submission planning advice can be sought from both Natural England and the Environment Agency's chargeable services¹.

¹ Environment Agency: West Midlands (West) Sustainable Places (Planning) team can be reached via shwgplanning@environment-agency.gov.uk. Natural England's Pre-submission screening advice service can be

1.6 Limitations

As noted previously the concept plan provides a strategic framework for the development of master plans and it is recognised that this strategic approach brings with it limitations. The concept plans does not take account of the location of other infrastructure i.e. piping for utilities and further surveying will be required to enable the development of realistic possibilities for implementation.

The concept plans identify the need for further investigation and analysis and as such a caveat to the information provided is included where appropriate.

Representation² drafted by the Worcestershire Green Infrastructure Partnership to establish the GI Constraints and Opportunities for Wyre Forest District Council sets out further GI commentary on a site-by-site basis for each of the draft allocations which, when considered together, form the Kidderminster East strategic development corridor. **It is strongly recommended that this GI Concept Plan is read in conjunction with the wider 'Constraints and Opportunities' report.**

reached via www.gov.uk/guidance/pre-submission-screening-service-advice-on-planning-proposals-affecting-protected-species and Discretionary Advice Service can be reached via: www.gov.uk/guidance/developers-get-environmental-advice-on-your-planning-proposals

² "Local Plan (2016-2034) Preferred Options, Constraints and Opportunities Analysis February 2018 update", Worcestershire Green Infrastructure Partnership, February 2018.

2. Kidderminster East strategic development corridor

2.1 Strategic Objective

- ✓ To create an exemplar multifunctional green infrastructure scheme to serve residents of and visitors to the urban extension.
- ✓ To protect and enhance the existing green infrastructure assets through water sensitive urban design and by designing a framework of green corridors, networks and open spaces which connect the development to Kidderminster and to its surrounding rural landscape.
- ✓ To promote ecosystem services* for the site and its local area.

The objectives of the Kidderminster East strategic development corridor are to:

- Construct an exemplar strategic development making best use of soil, water and other key natural capital resources.
- Incorporate measures capable of demonstrating resilience to the predicted effects of climate change.
- Protect existing historic and landscape features and provide community assets which enhance and recognise the historic landscape and agri-industrial heritage of the surrounding settlements.
- Achieve net gain for biodiversity through the protection of on-site and offsite assets and the defragmentation of these features eg through ecologically functional habitat creation, particularly of broadleaved and wet woodland and acid grassland.
- Provide new routes for access and enjoyment of the local landscape and wider countryside
- Contribute to the sustainable development and growth of Wyre Forest and Worcestershire through the quality of access, design, and environmental amenity provided by schemes coming forward within the strategic development corridor.

The strategic development corridor is entirely located within the GI Environmental Character Area ("ECA") 2: 'Severn Valley North', as identified in the GI Framework 2 (July 2012). The primary objective of this ECA is to "**protect and enhance**" the existing GI assets and restore the Severn floodplain". For further information on the overarching principles for Green Infrastructure within this ECA please refer to Appendix B.

* Ecosystem services are the benefits people obtain from ecosystems.

These include provisioning services such as food and water; regulating services such as flood and disease control; cultural services such as spiritual, recreational, and cultural benefits; and supporting services, such as nutrient cycling, that maintain the conditions for life on Earth.

Ecosystems and Human Well-being: A Framework for Assessment. www.unep.org

The Worcestershire Green Infrastructure Strategy (2013-2018) states that:

5.18 *The quantum of green infrastructure within any new development needs to be sufficient to meet the needs of the new community, deliver multi-functionality and to fulfil the objectives of the NPPF, including sustainable development and no net loss of biodiversity. The 2007 Supplement to Planning Policy Statement 1³ suggested that this should be about 40% of the land and water area of a development, including private gardens, green roofs etc. Subsequently, the same 40% approach was also recommended by the Town & Country Planning Association / Wildlife Trust⁴.*

The Worcestershire GI Strategy goes on to highlight that 40% has proved to be **achievable** and **viable** for mixed and residential developments even where gardens have been excluded from these calculations. It is therefore expected that a 40% GI target for industrial and commercial developments is also viable and achievable. The provision of natural greenspace with its associated buffers, existing hedgerows and avenues, surface water drainage complexes and amenity space will contribute towards this 40% target and produce an outstanding natural and built environment for Kidderminster's urban extension area.

This concept is core to the strategic objectives of the Kidderminster East strategic development corridor Green Infrastructure concept plan: the development site possesses an opportunity to showcase how sustainable and innovative development can, at a landscape scale, drive Green Infrastructure benefits and economic growth, and can therefore drive forward the image of Kidderminster (and Worcestershire more broadly) as engaging with the NPPF's aspirations for economic regeneration and sustainable development.

2.2 Policy context

The policy context for this concept statement is drawn from the Wyre Forest District Council Local Plan Review (Preferred Options consultation, June 2017). Policy 31 (Kidderminster Urban Extensions) call for a number of "*sustainable, well-designed urban extensions*" which should be developed "in accordance with the criteria identified in respect of each site and all general policy requirements, including any necessary developer contributions". Developments within each of the proposed allocations will be subject to individual masterplans and development phasing to be set out within the adopted Local Development Plan in due course.

In describing the Kidderminster East urban extension, the Local Plan Review document describes the proposed allocation as having the potential to accommodate "*around 1700 dwellings together with employment sites. A*

³ Department for Communities and Local Government (2007) Planning Policy Statement 1: Planning and Climate Change, Supplement

⁴ Planning for a healthy environment – good practice guidance for green infrastructure and biodiversity, TCPA/The Wildlife Trusts, July 2012.

development of this size would also be required to provide education and community facilities. Any development would need to take into account existing constraints such as water courses, trees and hedgerows and impact on the existing landscape and the setting of heritage assets. Masterplans will be required for each of these allocations". The document adds that *"the land to the north of the Bromsgrove Road (A448) includes a series of brooks with marsh and wet woodland areas. These areas will need to be protected from development and managed as part of a wider wildlife corridor. There is also a historical irrigation system present in this area and it is recommended that this is integrated into a wider Sustainable Drainage Systems (SuDS). Allocations for employment uses are also proposed on land adjacent to Easter Park on the Worcester Road (A449) and between Hodge Hill Farm and Hodge Hill Nurseries on the A456 Birmingham Road. The latter site in particular will require very strict design and landscaping criteria as this development will create a new urban edge to Kidderminster from the Blakedown direction".* It should be noted that at this early stage the status of these sites may change however the broad principles underlying Green Infrastructure consideration across the wider strategic development corridor will still be appropriate.

2.3 Site Location

The whole strategic development corridor lies within the 'Mid Severn Sandstone Plateau' National Character Area as defined by Natural England. The Mid Severn Sandstone Plateau is predominantly rural and considered important regionally for food production, with large arable fields in the central and eastern areas, Permian and Triassic sandstones erode to free-draining, slightly acid mineral soils with remnant areas of characteristic lowland heathland and acid grasslands (supporting important flora and fauna) which were formerly widespread but now survive in small and discrete areas, notably within the locality of this strategic development corridor. Interlocking blocks of mixed woodland and old orchards provide a well-wooded landscape and conifer blocks provide a parkland estate character in places with water availability a key ecosystems services regulatory function prioritised within the NCA underlining the importance of its watercourses and associated wetland habitats. Please refer to Appendix C for further detail on NCA priorities.

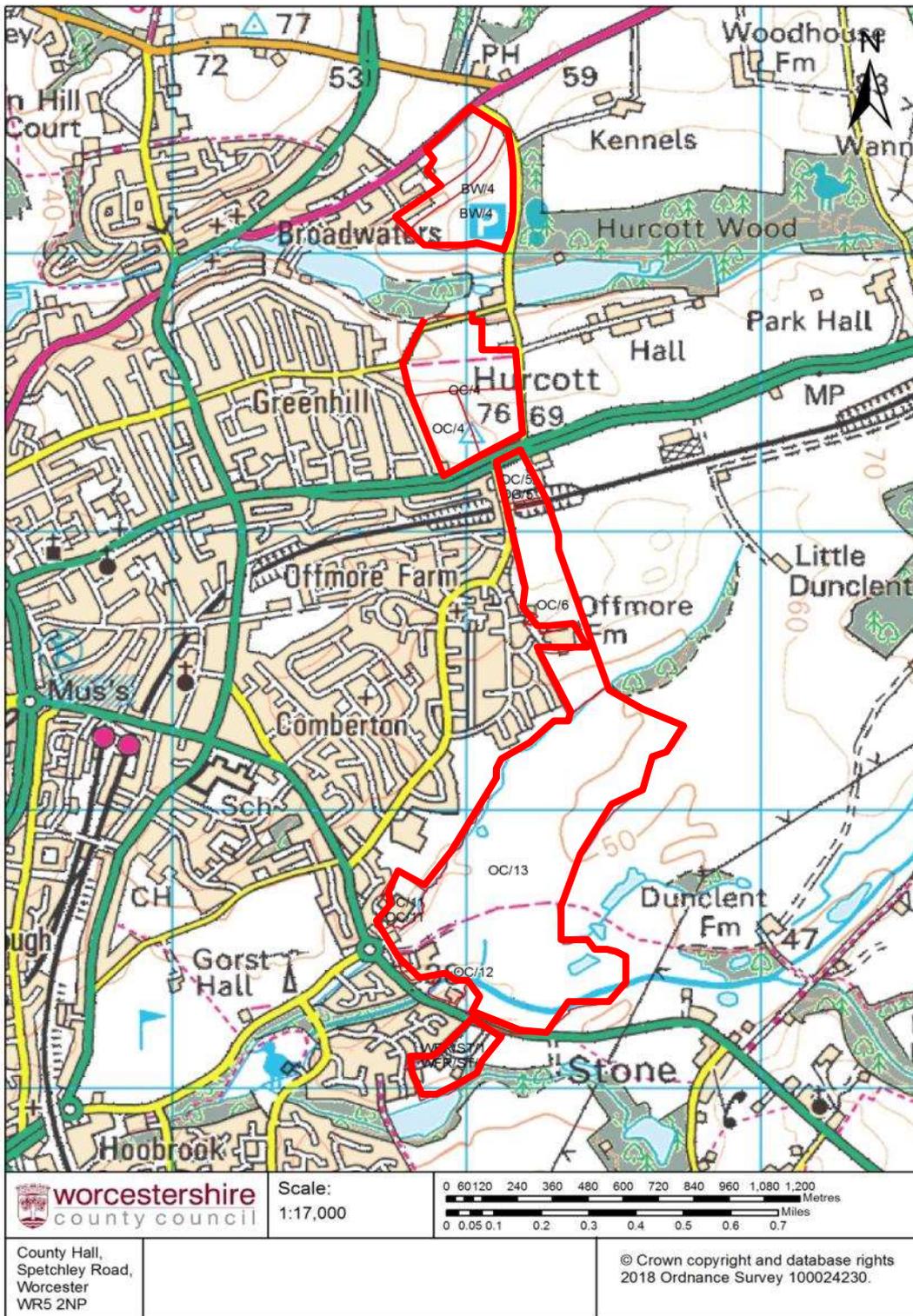
The site is located within the Stour Valley 'Natural Area' as defined by J.J.Day⁵, who notes that the valley of the Stour and its eastern tributaries present a very distinct natural area comprising the county's greatest concentrations of wetland habitats - open water, marsh, fen and carr. Biodiversity value within the area is considered to be very high. Despite this there has been a very significant decline in quality since 1970. The principal causes of this decline are attributed to drainage, eutrophication, water abstraction and creeping urbanisation (tips, houses, roads, parks, assarting). The zone may have national/international historical significance for its place in the earliest phases of the industrial revolution and is still an "*outstanding natural zone*" in its county context.

⁵ <http://www.wbrc.org.uk/worcRecd/Issue10/natarea.htm>

The Kidderminster East strategic development corridor is located to the north of the A448 Comberton Road, to the east of Kidderminster's Comberton and Offmore settlements, and crosses the A456 Birmingham Road to encompass much of the Hurcott Village settlement to stretch, at its northern tip, to the junction of the A451 Stourbridge Road where allocation BW/4 bridges northwards towards the Kidderminster North strategic development site (refer to Kidderminster North GI Concept Statement, Worc's GI Partnership, February 2018). The site forms a 'belt' of development along the north-south axis of the east of Kidderminster which, when considering allocations between BW/4 ADR at the northern extremity and the nearby FPH/26 allocation (a site not considered further within this concept plan) at the southern extremity, covers an area of approximately 115 hectares.

The site is currently comprised of predominantly arable land divided by hedgerows. Within the development corridor are a number of highways, footpaths and bridleways, unimproved grasslands, broadleaved and wet woodlands, ponds, watercourses and mature trees both as standards and within hedgerows which form noticeable natural features and key GI assets within the immediate landscape.

Figure 1: Kidderminster East strategic development corridor Boundary and Location



3. Guiding principles for development

3.1 Biodiversity

Principle objectives

1. Clear net gain for biodiversity must be achieved across the concept plan area.
2. Protect (maintain and buffer) and seek to better connect the main biodiversity features including designated sites, brook corridors and patches of wetland.
3. Create habitats within development to act as 'stepping stones' or linking features between the existing high value habitat and around the outer edge of the concept area to provide a more resilient landscape for the future.

The Worcestershire Green Infrastructure partnership recognises the strategic value and large scale of the development within its District context and contends that the principals of biodiversity net-gain should be embedded from the outset of the scheme. To this end we would advocate use of the DEFRA metric in undertaking a robust and transparent habitat auditing exercise in support of the masterplanning exercise and outline planning application

Key Constraints and opportunities.

The strategic development corridor falls within the Severn Valley North ECA. The Wyre Forest GI Strategy suggests that for biodiversity the main priorities in the ECA should be as follows.

- Links should be made with existing site management, in order to achieve site expansion and buffer the key priorities including wet woodlands and grasslands.
- Where sites are closely associated buffering should be merged to form direct links.
- In the case of the River Severn Corridor the link is already in place but augmentation of this in the floodplain will be critical for a number of GI aspirations.

These key principals fit well with requirements in the concept area. It contains a rich and important suite of designated and non-designated assets including the wetland SSSI at Hurcott and Podmore, The Hoo Brook and Blakedown Valley Local Wildlife Sites (and associated tributaries) and Captain's Pool Local Wildlife Site along with smaller parcels of grassland and wetland that are of local value. Taken together these assets form an important consideration in development here, not least because the need to buffer them from the indirect impacts of development (noise, light, recreational pressures) will require careful thought.

Water Sensitive Urban Design

Solutions to address issues of water and drainage were evaluated against the key criteria of effectiveness, reliability, low-carbon performance, scalability and deliverability for each of the game-changer sites. Solutions considered included water efficiency measures, rainwater harvesting, sustainable drainage systems, greywater reuse, wastewater reuse and stormwater harvesting.



Combined rain garden and tree pit designed to receive run-off from the street. Photo credit: Dusty Gedge

Implementing a variety of these solutions will contribute in countering the increasing pressure on potable resources and sewerage as well as reduce the risk of flooding events. These measures will help control flow rates of cleaner water and reduce incidences of exceedance through the provision of additional water storage capacity.



Hopwood Motorway Service Station; the environment here is designed to attract visitors to stay longer while also managing and cleaning through the bioretention pond shown above, the waste and surface water run-off, prior to its discharge into local watercourses.

A cohesive GI strategy addressing the development corridor will discharge a lower volume of cleaner waste water into the local infrastructure and, through provision of additional habitats, will aid water remediation contributing to the District's Water Framework targets. Carefully designed and wildlife-friendly SuDS schemes offer the opportunity to draw the wider countryside into the built environment and uplift the values of dwellings within the community.

Careful management of retained and enhanced ecological features (particularly designated assets and priority habitats) should mitigate for the potential negative effects of increased visitor pressure to historic environment features, including erosion and vandalism, as well as consider potential future opportunities for conservation and promotion

Notable species are also likely to be present and in particular bats, birds and scarce insects may need particular consideration in places.

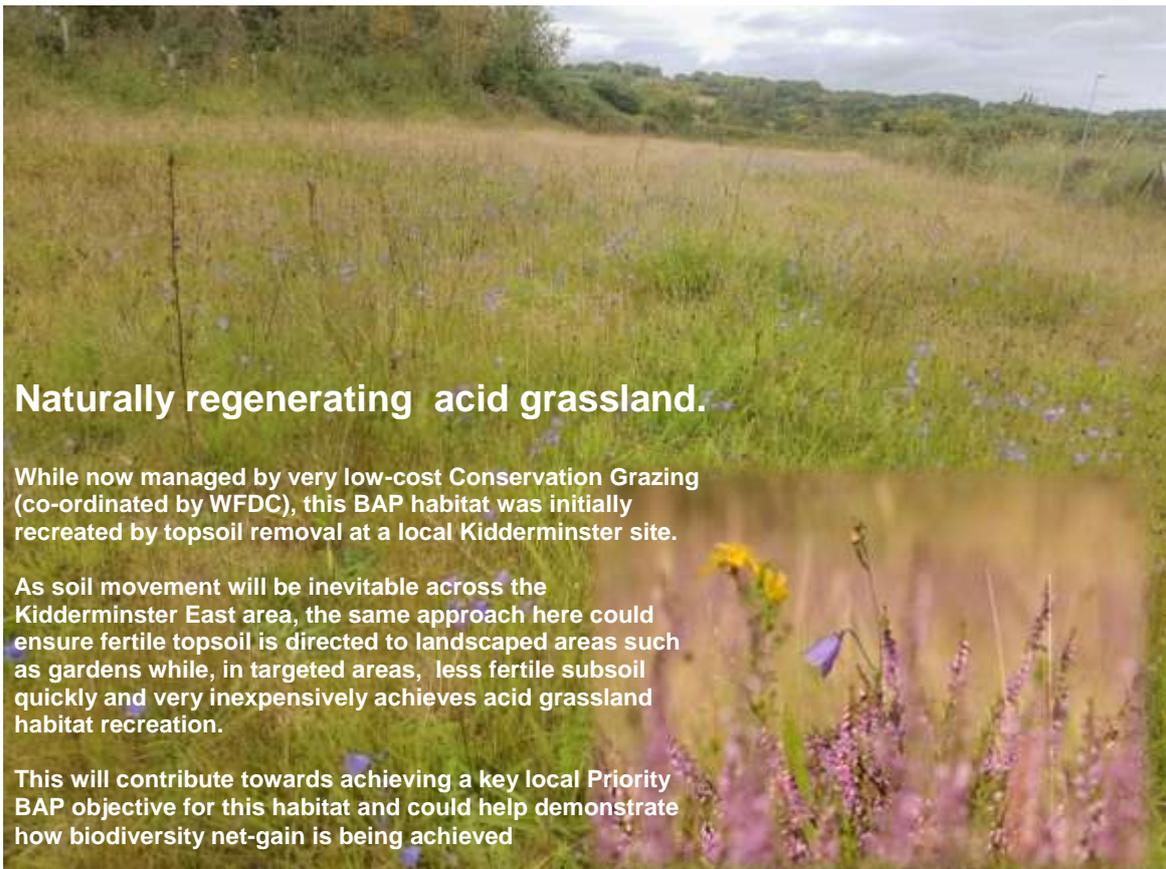
Wetland and wet woodland

Wetlands are arguably the most important biodiversity features on site, as reflected in the designation of several areas as SSSI and LWS. Protection and enhancement of these should be a key priority for development. In particular it will be critical for development to protect and enhance the SSSI at Hurcott, with emphasis on the need to consider hydrology and recreational pressure to the accessible parts of the site. More generally all the wetlands will need careful hydrological assessment and where opportunities exist steps should be taken to improve both water quality and quantity entering the sites. All watercourses, especially the Hoo Brook and its tributaries, will need buffering and any crossings will be expected to take particular care to maintain ecological links along the watercourse corridor, maximising the potential for species to move along linear features where relevant. The wetland units themselves often sit within hydrologically complex mosaics including other habitats such as woodland and acid grassland and understanding drainage and management implications will be important. This may be a particular issue to the fringes of the Hurcott SSSI where a mosaic of wetland habitats fall contiguous with important dry grasslands.

Grassland

Though the parcels are generally small there are areas of acid grassland that are of high value in the local context (see for example BW4 and OC4). These should be protected and enhanced wherever

possible with any losses compensated through mitigation including creation where appropriate. Re-linking grassland patches through development will be important for species movement and may be of especial importance to species like Hornet Robberfly (known from a number of parcels within the site in the past). Hornet Robberfly is a NERC Act S.41 and Worcestershire Biodiversity Action Plan priority species, known from only around 40 breeding sites nationally. Long term management for retained and created grassland will be particularly important. Priorities for creation should be to buffer existing resources (for example at Hurcott Pastures SSSI and adjacent the LWS grassland at the southern edge of OC13/N) and to add links to existing corridors between and alongside designated sites.



Naturally regenerating acid grassland.

While now managed by very low-cost Conservation Grazing (co-ordinated by WFDC), this BAP habitat was initially recreated by topsoil removal at a local Kidderminster site.

As soil movement will be inevitable across the Kidderminster East area, the same approach here could ensure fertile topsoil is directed to landscaped areas such as gardens while, in targeted areas, less fertile subsoil quickly and very inexpensively achieves acid grassland habitat recreation.

This will contribute towards achieving a key local Priority BAP objective for this habitat and could help demonstrate how biodiversity net-gain is being achieved

Woodland and Scrub

Much of the woodland onsite is linear in form and proposals should focus on maintaining this landscape type. Links along existing boundaries and watercourses should be augmented and improvements made to corridors between existing woodland and further afield including potential links to the Kidderminster North development zone where similar issues have been highlighted. The aim should be to use locally native species to provide both biodiversity and landscape improvements (particularly where these species provide foraging and commuting resources for species such as dormouse and bats), frame and filter views and provide better habitat links for species using the woodland strips. The eastern edge of the development area (especially in OC/6 and OC/13) would benefit from careful planting to provide a new firm edge to the development area, which would also

Measures towards landscape-connectivity

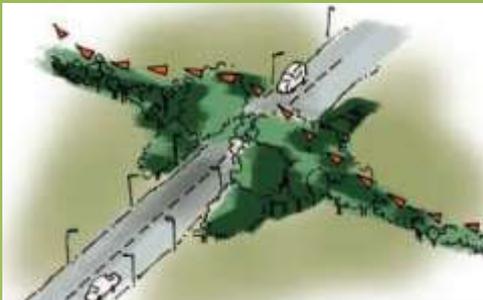
An important component of Green Infrastructure is creating a development which is 'in place' with its surroundings and which maintains ecological permeability for wildlife to disperse and for populations to survive.

This approach is demonstrated by the residential extensions of Warndon, in Worcester City. Careful masterplanning created and manages new woodland buffers which link the ancient Warndon and Tolladine Woods together. Remnants of the ancient Warndon wood can be found on site today.



Woodland corridor planting, Warndon

Where woodlands have become fragmented and woodland extensions are unfeasible, using hedgerow networks with a strategic network of densely planted 'hop-over' points replicates much the same function for wildlife.



Planting to create 'hop-overs' (adapted from Limpens *et al.*, 2005)

These opportunities need to be carefully managed to avoid scrub encroachment, to ensure succession for taller trees whose canopy provide the key 'hop-over' opportunities, and to protect these nodes and the surrounding network from unwanted light spill.

Successful delivery of this approach is critical in ensuring that rare populations of species such as dormouse and lesser horseshoe bats, as well as more widespread species suffering significant declines such as hedgehogs can benefit from the cohesive landscape-scale consideration across the strategic development corridor, helping deliver a bigger, better and more joined up natural environment.

benefit biodiversity through providing enhanced north-south links less susceptible to the effects of noise and light than those running through the 'centre' of the site or adjacent to existing development to the west.

3.2 Historic Environment

Principles for Development

1. Protect and buffer woodland and mature trees, associated with former hedgerow and administrative boundaries.
2. Protect and restore extant historic hedgerows that form an important part of the existing GI network.
3. Buffer and protect the existing GI associated with historic lanes and routeways that are amongst the oldest historic landscape assets and are highly sensitive to impact from alteration or highway improvements.
4. Historic waterbodies, including their associated structures and buildings, and features relating to Lord Foley's Irrigation system, should be buffered and where appropriate be sensitively integrated into site SuDS.
5. Buffer and protect the historic character and setting of converted traditional farm buildings and the setting of Hurcott Village.

Key constraints and opportunities

The setting of heritage assets is particularly vulnerable to impact from development, which frequently affects historic GI assets where they are a component part of the historic asset or assets setting. Inherited historic landscape character contributes strongly towards how the modern landscape is structured: its aesthetics, mosaic of habitats and hydrology. GI planning should therefore address the following opportunities:

- Protect principal views and connected sightlines between historic assets and their setting where these make a strong contribution to place, landscape character and offer opportunities for

creating multifunctional corridors through the development area.

- Protect and sensitively restore historic irrigation and water management features, and their sustainable management through integration into wider site SuDS provision.
- Protect and enhance existing GI assets that contribute towards the distinctive setting of historic assets and wider inherited landscape character.

Woodland, Mature Trees and Hedgerows

Protect and buffer woodland and mature trees, associated with former hedgerow and administrative boundaries. Where possible retain and integrate extant historic hedgerows as boundary features, or as part of open space, within new development. Hedgerows associated with BW/4 and OC/4 are remnants of an early piecemeal enclosure pattern and therefore have higher potential to be species rich. Opportunities to restore lost hedgerow boundaries as part of the new development, particularly where this would enhance connectivity with woodland and waterbodies, should be considered.

Historic routeways

Hurcott Lane (east of BW/4, OC/4 and OC/5) from Stourbridge Road, in the north, to Hurcott Village, in the south and Hurcott Road (north of OC/4) from Greenhill, in the west to Hurcott Village, in the east are narrow, winding and, in parts, sunken lanes with a strong sense of enclosure and remoteness. These roads are remnants of a once wider network of minor roads and trackways connecting scattered settlement, including farmsteads, agricultural land and woodland. With defined boundaries, incorporating hedgerows and raised banks with hedgerow and often grown out coppiced trees, these lanes have aesthetic as well as historical significance and as such should be buffered from new development and protected from erosion damage and road 'improvement' schemes such as widening and kerbing.

Historic waterbodies and structures

Hurcott and Podmore Pools (south of BW/4, north of OC/4) and Captain's Pool (south of WFR/ST/1) form part of long established and complex water management systems, associated with industrial activity east of Kidderminster. As well as having potential earlier incarnations as fishponds, Hurcott and Podmore Pools appear to have been integrated within a later, 19th century, designed landscape associated with Hurcott Hall, to the south. A small boat house on the northern side of Hurcott Pool is testament to its use for recreation and pleasure. As well as earthworks and associated buildings, there remains significant potential for surviving water management structures and some potential for remaining environmental deposits. Historic waterbodies, including their associated structures and buildings, should be buffered from new development. Careful management should mitigate for the potential negative effects of increased visitor pressure to historic environment

A better built environment



Urban biodiversity enhancements. adapted from Bat Conservation Trust – Landscape and urban design for bats and biodiversity

A range of measures which contribute in addressing drainage, summer cooling and winter insulation, amenity and recreation opportunities as well as combating the cumulative impacts of lighting and which provide new opportunities for biodiversity are succinctly shown in the illustration above, further information can be found in the Bat Conservation Trust's *Landscape and Urban Design for Biodiversity* (2012).

1. Biodiverse green roof
2. Integrated bat and bird boxes (the majority located on sunny orientations)
3. Habitat walls with opportunities for invertebrates and small mammals (located on a sunny orientation)
4. Green or living walls (easier to establish on shady orientations)
5. SuDS features which combine hard and soft landscaping to create rain gardens, rills and swales, filter strips, detention and retention ponds.
6. Climbing plants and creepers
7. Large native trees
8. Planters



'Ecological Networks' adapted from Bat Conservation Trust – Landscape and urban design for bats and biodiversity

The sum total of these measures will contribute towards the GI Concept Plan objectives of protecting and enhancing the existing green infrastructure assets by designing a framework of green corridors, networks and open spaces which will connect settlements within the strategic development corridor to urban Kidderminster and the surrounding landscape.

features, including erosion and vandalism, as well as consider potential future opportunities for conservation and promotion.

Historic Irrigation System

OC/6, OC13 and OC/12 are associated with a large scale irrigation system, known as Lord Foley's Irrigation Scheme. The irrigation system which was designed to convey waters from the high ground of the Clent Hills to the sandy arable areas of the Blakedown/Kidderminster area, dates from as early as the mid-17th century. An extensive system of well-defined ditches and channels survive along boundaries and former boundaries. There remains high potential for surviving brick and stone structures and some potential for surviving environmental deposits.

The system of extant channels and ditches (including any surviving water control structures) should be retained and fully integrated into new development, as boundary features, or as part of open space. Opportunities to promote the historic and landscape significance of this 17th century example of consummate agricultural design and innovation, as part of open space management, should also be considered. The sensitive reinstatement of some ditches and channels, identifiable as cropmarks on aerial photographs, could be considered, particularly where this would support and enhance wider connectivity across the site.

Historic Built Environment

Avoid new development in the northern half of OC/4 to buffer and protect the setting and identity of Hurcott Village, to the north, and to sustain its relevance as a significant cultural site associated with British papermaking. The southern half of OC/4 has capacity for some development. Buffer and protect the historic character and setting of converted traditional farm buildings, including prominent viewpoints into and out of the site and how they relate to surrounding landscape features such as boundaries, trees and ponds.

3.3 Blue infrastructure

Principles for Development

1. The existing hydrology must be mimicked as closely as possible using SuDS to provide on-site attenuation and surface water treatment with considerations for climate change allowance
2. The floodplain must be maintained and restored whilst the biodiversity value and water quality of watercourse corridors must be enhanced. Development should recognise and enhance the multi-functional nature of these watercourse corridors and seize opportunities to link them with the wider green infrastructure network.

Key constraints and opportunities

SuDS are required on all sites and should be used to their full potential. SuDS can be used on any site; however consideration is required for constraints and opportunities afforded by each site (e.g. soil permeability, ground water level). SuDS could be incorporated into the development at the master plan stage and provide biodiversity and amenity benefits whilst also managing water and playing a part in alleviating any flooding issues. The balance of each of these components will be different for each site.

Hydrologically the 'Kidderminster East' allocation sites fall in two catchments, the Blakedown and Hoo Brook. Both these watercourses have their source near the Clent Hills and are tributaries of the river Stour. The northern sites drain towards the Blakedown Brook which feeds several pools along its way to its confluence in Kidderminster. These pools include the Hurcott and Podmore Pools SSSI. The Blakedown catchment does not show an abundance of natural surface water features, which suggests that originally this area was predominantly drained via infiltration.

The Hoo Brook catchment too includes wet woodland corridors and various pools, including Captains Pool (Local Wildlife Site) that borders allocation site WFR/ST/1. Downstream of the allocation sites the brook discharges through Spennells Nature Reserve before its confluence with the river Stour in Kidderminster. The topography of the Hoo Brook catchment is such that higher ground water tables might be found in some of the allocation sites, which will need to be taken into account when drafting surface water management drainage strategies. The effect of any future decrease in water abstractions (national policy) upon the ground water levels locally encountered will need to be taken into account.

Allocation site OC/13N in particular is characterised by an extensive historic water meadow system, which consists of various drains and ditches and associated assets, once used to divert water from the various tributaries to flood the land, for agricultural benefit. As part of the initial investigation for this site the infrastructure still present should be established and to what extent this still performs a function in

the hydrology of this area today. There would be an opportunity to incorporate elements of the historic system in the drainage design for the site.

All sites that contain/border a watercourse will need to fully assess the extent of the flood plain. Attention is drawn to the fact that only limited lengths of the watercourse systems have already been modelled, which means that an absence of a flood zone does not mean the absence of flood risk. Some hydraulic modelling is likely to be required to confirm actual floodplain extents, including relevant fluvial climate change allowances (contact the Environment Agency⁶ for local 'climate change allowances guidance'). Development will need to exclude the areas at high risk of flooding; areas at lesser risk of flooding can be developed but with associated restrictions, following the criteria as set out in NPPF. Excluding watercourse corridors and functional flood plains will inevitably reduce the developable area, but from a biodiversity perspective opportunity this forms an opportunity as the watercourse and associated vegetation form important corridors. Where possible development should seize opportunities to use water bodies as a catalyst to enhance the ecological value of an area and link the watercourse corridors with the wider green infrastructure network.

The tributary of the Hoo Brook that borders site OC/13N on the north is currently a wet woodland which potential is compromised by litter from the development to the north and also from pollution through misconnections that reach the brook via one of the several outfalls of public surface water sewers in this stretch. Opportunities for betterment, particularly with regards water quality and value for biodiversity, are to be encouraged. Downstream the brook discharges via a 900 mm diameter culvert underneath the Comberton Road and the A448. If development would include improvements to the current road layout then improvements regarding this watercourse crossing should ideally be made too to make this watercourse crossing between the nature reserve on the downstream side and the wet woodland corridor on the upstream side easier to navigate, creating less of an obstruction for migration.

In the north of the Kidderminster East corridor application site BW/4 contains a dry valley, which we understand contains a culvert that discharges surface water from the Lea Castle site towards Podmore Pool. Development of this site would provide the opportunity to replace this culvert with an open and biodiverse watercourse. Appropriate protection measures must be in place during both construction and operation phases to prevent contamination (including spill events or sediment accumulation) to Podmore Pool SSSI. It is important to ensure that designs address exceedance pathways, so that in exceptional flooding events downstream receptors (and particularly Podmore Pool SSSI) are adequately protected.

As the sites in Kidderminster East sit atop an aquifer, treatment of road runoff and other contaminated flows must utilise sealed systems to discharge to on-site treatment before infiltration or discharge off-site. Multi-functional Sustainable Drainage Systems (SuDS) should utilise wetland systems and surface water

⁶ West Midlands (West) Sustainable Places (Planning) team: shwqplanning@environment-agency.gov.uk

Blue Infrastructure case-study: Bristol Business Park

Bristol Business Park, which is also constructed on Mercia mudstone, used a SuDS system to address discharge issues into an off-site watercourse.



A mixture of impermeable and permeable paving carry run-off from areas such as carparks together with rainwater via a network of vegetated swales to a detention basin which slows the flow and cleans the water before discharging it offsite.



An advantage to this approach is minimal loss of land to large detention ponds while also increasing storm water storage capacity over existing 'greenfield' resources and discharge rates. Embedded into the business park's landscaping, the drainage system is now an amenity and biodiversity resource. After recent prolonged storms only *"negligible flows have been observed discharging into the swales, demonstrating the attenuating attribute of the paving system"*. Care must be taken to ensure that components of a SuDS train are resistive to high pluvial/exceedance events and are outside the reach of any watercourse flooding events. If divided into smaller development 'plots' care must be taken to ensure a cohesive SuDS train starts the attenuation and filtration process 'on plot' prior to discharge into the watercourse.

attenuation basins of appropriate size. If carefully designed these SuDS features will constitute a key community asset supporting a sense of place, detailed designs should be prepared showing profile and planting to demonstrate how storage and conveyance features will also provide visual amenity and biodiversity value. Elements of the SuDS plan should be included within the Ecological Constraints and Opportunities Plan.

Where SuDS design is sensitive to appropriate planting and lighting mitigation, the surface water conveyance and attenuation features might also provide on-site foraging and commuting resources for wildlife such as bats. Any attenuation features must avoid areas susceptible to any type of flooding; Conveyance and storage features must not compromise existing or newly created high-value biodiversity areas of potential surface drainage routes.

Opportunities for betterment at Hurcott Pool, particularly with regards water quality and value for biodiversity, are to be encouraged. This could be achieved, for instance, through developer contributions. Similarly, any opportunities to explore opening up the culverted discharge to Podmore Pool replacing this with an open and biodiverse watercourse would be welcomed.

The Lead Local Flood Authority will seek compliance with the Non Statutory Technical Standards for SuDS (Defra, 2015), taking into account the latest Climate Change guidance provided by the Environment Agency. In reaching exemplar status we would anticipate that a detailed SuDS design (submitted prior to first use of development) will be in compliance with CIRIA report C753.

We encourage opening up of culverts, improvement to, naturalisation and creation of new watercourses, and the provision of other environmental infrastructure which would provide wider biodiversity benefits and help deliver Water Framework Directive (WFD) improvements, 'good ecological status' by 2027.

The northern part of the Strategic development corridor is within the Blakedown Bk – Source to confluence of River Stour WFD catchment, reference GB109054044570.

This waterbody has been classified as moderate status. Phosphates, suspended solids and low flows are major concerns for this waterbody. The origin for these failures include: point source discharges, rural diffuse pollution and low flow groundwater abstractions. There are known issues with regards low flows, sedimentation and agricultural run-off.

The southern part of the development corridor is within the Hoo Bk – Source to confluence of River Stour WFD catchment, reference GB109054044530. This waterbody is classified as 'moderate', it has problems due to nutrient enrichment that may be coming from a combination of point and rural diffuse pollution sources. Urbanisation near its confluence with the Staffs/Worcs canal at Kidderminster may also be contributing to its failure. Siltation is also known to be a problem due to the intensive farming methods within this waterbody.

Future development should therefore seek to address the issues that currently prevent the water catchment from achieving Good Ecological Status. WFD data is available from the Environment Agency 'Catchment Data Explorer' tool at: <http://environment.data.gov.uk/catchment-planning/RiverBasinDistrict/9>

With regard to other environmental constraints, the majority of the strategic corridor is located within Source Protection Zone (SPZ) 3 for the public water supply abstraction at Bellington, further to the east.

3.4 Landscape Character

Principles for Development

1. Protect and buffer the setting of Hurcott Valley, its buildings, woodland, waterbodies and lanes that form a coherent landscape of significant inherited historic character.
2. Deliver a coherent and connected network of liner woodland, regular-shaped woodland blocks and straight hedgerows that build upon extant examples characteristic of the Sandstone Estatelands Landscape Type
3. Protect, restore and integrate historic water management features and ditches into a multifunctional network of sustainable drainage.
4. Create multifunctional features that help to soften the impact of development that balance the need to maintain views out to open countryside, a key characteristic of the Sandstone Estatelands Landscape Type.

Key constraints and opportunities

A primary aim should be to develop within, enhance and restore the existing Green Infrastructure framework. This network strongly represents the wider landscape character, but would benefit greatly from improved management to deliver multifunctional opportunities that, for landscape character, include:

- The screening/softening of development.
- Provision of high quality place and amenity for both existing and new communities.
- Improved multifunctional links with existing urban Green Infrastructure networks, thereby enhancing permeability and connectivity between, existing urban, new urban and rural landscapes.
- The conservation and sensitive, adaptive integration of surviving historic irrigation assets into the site SuDS and biodiversity network.
- Green Infrastructure design, along with settlement density, should address the transition from urban to rural landscape exploring all opportunities for visual softening and connectivity.

The Kidderminster East assessment area is entirely situated within the Landscape Character Type, Sandstone Estatelands, which is described as an ordered landscape in which strong, regular field patterns, road networks and woodland shape contribute a dominant structural role in the landscape. Large plantation woodlands provide a notable structural component to the landscape, although it is the field pattern that provides the overall unity. Both the northern (north of Offmore Farmhouse) and southern (south of the A448) extents of the area are more typical of Sandstone Estatelands character with the middle section (east of Borrington Road) displaying a variation with more sinuous and irregular field patterns. The overall character is, however, consistent and it is likely the variation in character is a result of field boundaries respecting older natural watercourses, and significantly, ditches associated with the 18th century irrigation system attributed to Lord Foley. As a whole, this landscape represents the 18th and 19th century enclosure of large areas of a previously unenclosed heathland and communal farming.

The overall structural character of the landscape is largely intact despite some incidences of 20th century field boundary loss. The settlement pattern beyond the existing urban edge of Kidderminster remains characteristic with scattered farmsteads and wayside dwellings.

3.5 Woodland and Trees

Masterplanning should treat the strategic development corridor cohesively so as to both protect and re-connect assets including the mature and veteran trees identified. The NPPF provides strict protection against the deterioration or loss of irreplaceable

habitats including ancient woodland, wood-pasture, parkland and veteran trees; features which have been recorded in the local landscape. While the ancient woodland inventory does not include many ancient woodlands which are less than 2 hectares in size, the strategic development corridor includes at least one known area of ancient woodland at Captain's and Stanklyn Pools and Spennels Valley Local Wildlife Site, and the wider strategic development corridor also includes a number of other broadleaved and wet woodlands which are identified as priority habitats within the Worcestershire Biodiversity Action Plan.

Development within the strategic development corridor should therefore contribute through new planting and habitat creation to buffer and defragment existing assets and secure a technically appropriate and cohesive long-term habitat management plan addressing the favourable management of these features across the entire corridor.

A key opportunity to provide a multi-functional GI asset is present and should be realised along the northern-southern axis of the corridor's eastern border: a fringe of woodland planting should serve to provide both amenity and recreational value (e.g. providing walking trails), landscape interest (providing filtered views in and out of the new settlements and providing seasonal interest through provision of species and structural diversity), should connect to and extend beyond areas wet woodland, and include SuDS conveyance and attenuation facilities which will create 'destination' features for circular walking and cycling routes as well as a landscape-scale connective feature for wildlife.

The planting corridor should be no less than 30m in width in order to practically achieve a range of functions, although at bottlenecks or 'pinchpoints' consideration of planting densities, specimen selection, corridor width or alternative connective features will be appropriate.

If designed sensitively and delivered well the corridor's eastern fringe and its mosaic of woodland planting, watercourses, standing water and open spaces will serve to draw visitors away from more sensitive destinations within nearby ancient woodlands, Local Wildlife Sites and Sites of Special Scientific Interest. Ribbons of woodland planting will also help buffer the adjacent residences from impacts such as lighting and noise and thus help ameliorate the effects urban sprawl. Small blocks of wet woodland planting, particularly restoring and extending the woodland habitats of on the embankments of the Hoo Brook will aid buffering of sensitive watercourses, with cohesive and linear woodland planting being easier and therefore more economically viable to manage into the future.

- All ancient woodland, veteran and ancient trees should be retained and appropriately buffered within development masterplans. Current Natural England Standing Advice requires a minimum 15m buffer however where 'pollution' (eg run-off during or after construction) and 'trampling' (usually from increased public/residents use) are considered a potential issue the buffer may need to increase to at least 50m. Buffer areas should not contain SuDS or services and comprise semi-natural habitats. Veteran trees will require a

Green Infrastructure in the Built Environment



A living wall – image courtesy of CIRIA's Big Biodiversity Challenge.

Functional Green Infrastructure should knit together the wider countryside to the built developments, such as in Chobham Manor at the Queen Elizabeth Olympic Park, Stratford; at Chobham planting including street trees and fruit trees in public spaces extends into the more densely built areas through the use of trellises and green roofs; this landscaping approach has been recognised as providing shading, pollution absorption, flood and wind mitigation and biodiversity benefits. Chobham Manor also uses rain gardens to direct surface run off to help irrigate planting beds.

Water demand is anticipated to become an increasing resource requirement as the UK's climate changes and sensible use of water resources is to be promoted. For example, at Greenwich Millennium Village rainwater harvesting is designed to capture rainfall for use on external landscaping and at Leybourne Grange in Kent and Great Western Park in Didcot greywater systems use recycled bath water to flush toilets. Developments such as Cambourne in Cambridgeshire provide water butts as standard for some residents.

Fertile top soils should be re-used within new garden space where possible however where opportunities allow for creation of low maintenance habitats, such as acid grassland on road verges and margins of POS, subsoils will readily support transferred seeds from Local Wildlife Sites.

Opportunities for biodiversity mitigation and enhancement should be realised within the built environment throughout the development corridor and we recommend inclusion of artificial nesting and roosting opportunities in line with the EcoTowns guidance (refer to Appendix D). Where the development corridor becomes narrower, further consideration should be paid to increasing over provision above ratios proposed within Appendix D.



Bat tubes installed on new builds at Maybury Hill. Image courtesy of [Taylor Wimpey and Ecosulis](#).

buffer of 15 times the stem diameter or 5m from the edge of the canopy, whichever is larger.

- Connective planting and buffers to existing woodland should be no less than 15m in width but could be scalloped or feathered into the surrounding landscaping plans in order to complement the surrounding landscape character. Hedgerow and woodland planting should aim to link the existing network of hedgerows and secondary and ancient woodlands to the wider landscape.

- Hedgerow strengthening can be achieved by inclusion of additional hedgerow standards (preferably pedunculate oak, as befits the local area) and by creating hop-over's (see below) at strategic locations in order to promote cohesion and connectivity to the surrounding landscape via its network of hedgerows and woodland.

3.6 Access and recreation

Principles for Development

- Creation of a large area of multifunctional greenspace to the north east of Comberton Primary School, within OC/13 which will provide the main focus for informal outdoor recreation within the proposed development.

- Creation of a multifunctional linear wooded greenspace connecting the northern and southern ends of the site.

- Creation of new linear and circular routes that connect features within and beyond the site boundaries, particularly to the relatively dense network of Public Rights of Way (both bridleways and footpaths) to the east and the urban areas to the west.

Careful management of recreation and access to greenspace will be needed at the northern end of the site where the sensitive Hurcott Pools SSSIs exist. Whilst some increased use of this existing greenspace is inevitable (and so paths and signage will need to be upgraded on these sites to accommodate this), residents should be encouraged

south and north to make use of the wider network of public rights of way and GI features such as Kinver Edge to the north and the large area of multifunctional greenspace associated with the development to the south.

Creating a widened woodland corridor down the western flank of OC/13 would provide for a multi-use feature to include pedestrian and cycling links across the stream corridor to existing facilities within the urban area, such as play area, skate park and allotments. This woodland corridor should be accompanied by an area of open space to the east, to include additional playing fields, play area, allotments, informal amenity grassland and perhaps community orchard to create a matrix of features that could combine to become a significant multifunctional greenspace that would provide the main element of recreation resource for the development. The nature of the woodland corridor may offer opportunities for some natural play features to be incorporated within and alongside it.

This provision would need to be brought forward at the start of the proposals to ensure there are sufficient facilities in place for residents in the early stages of development and that the feature has a chance to mature.

A north-south woodland corridor, along the eastern edge of the site would provide landscape and biodiversity connectivity, and pedestrian and cycling routes could be incorporated alongside this feature. At its southern end, where a bridleway and then public footpath runs east/west, good connectivity can be provided to the network of footpaths and bridleways to the east without severing the wooded corridor.

All play and informal recreation areas should be maintained to Green Flag Award standards.

3.7 Sustainable Transport

The proposed allocations around the east of Kidderminster do not easily connect to the town's walking and cycling network. Measures will be needed to remedy this in order to mitigate for the increase in the demand to travel the allocations will bring to Kidderminster's roads. Such measures would include exploring opportunities to link the allocations to Kidderminster's quieter road network (with such links being solely for walking and cycling) and a reasonable contribution being made towards enhancing and extending the town's walking and cycling network.

It is essential that opportunities to integrate the proposed development into the bus network are explored.

3.8 Soils

The Agricultural Land Classification (ALC) survey of land East of Kidderminster was completed in 1998. Land of best and most versatile quality covers the majority of the

area. Small areas of subgrade 3b and Grade 4 land found where gradient is the main limiting factor. The underlying geology of the site is largely Triassic Sandstone with drift deposits of Terrace Gravels north of the A456 and east of Heathy Mill Farm.

Grade 1 quality land on sandy soil has been mapped in two isolated areas around Park Hall Hotel and South of Offend Farm. These soils are described as having peaty loam topsoil textures overlying sandy loam and loamy sand subsoils.

Grade 2 soils cover the majority of the site south of the A456 Birmingham Road. These soils are described as having loamy fine sand topsoil textures overlying loamy fine sand upper subsoils and medium or fine sandy loam lower subsoils to depth. They are restricted to Grade 2 due to the topsoil texture.

Soils of Subgrade 3a quality are found north of the A456 road here the soils are drier and stony.

In this area climate (particularly rainfall and relative warmth) doesn't have an over-riding influence on soil grade.

The soil resource should be maintained on site and will be an asset to the new community if protected and used for gardens, allotments and community gardens.

Please refer to the defra guidance for developers on safeguarding soils:

www.gov.uk/government/uploads/system/uploads/attachment_data/file/69308/pb132_98-code-of-practice-090910.pdf

3.10 Climate Change

Within the UK, there has been a series of reports on climate change and all areas of the UK are projected to get warmer, more so in summer than in winter. Changes in projected summer mean temperatures are greatest in southern England. Overall annual rainfall is not projected to change very much, but it is likely that average winter rainfall will increase and average summer rainfall will decrease with a likely increase in the proportion of rain falling in heavy storm events.

Climate change impacts in urban environments:

Higher intensity rainfall events coupled with hard surfaces can increase flood risk, pollution and issues with reduced recharge of ground water stores. Green infrastructure can:

- Reduce run off,
- Slow infiltration,
- Increase filtration;
- Purify water.

Specific elements of green infrastructure that address this particular climate change issue include:

- Sustainable Drainage Systems (SuDS)
- Green roofs
- Restoration of wetlands

Climate change will lead to increasing weather extremes. At the other end of the spectrum to the above flooding issue, we will also see increased periods of drought and heat waves. This will lead to water stress if we see long drought periods and continued high water usage.

Green infrastructure can:

- Help retain water⁷
- Increase biodiversity survival
- Provide cooling and shade

A green space designed with a matrix of habitats and drought tolerant planting will be more resilient e.g. meadow areas shaded by trees will be more likely to survive drought. Parks, with deep soil bases can act as natural water reserves on top of which trees increase infiltration of water in to the soil. Where large amounts of artificially provided water is required to keep green infrastructure functioning, it could cause an added water stress. This is why the right design and scale for the right place is required, integrating water capture and retention techniques, suitable planting and design.

The 'urban heat island' effect describes how urban areas are warmer than the surrounding countryside. Areas with limited vegetation, impermeable artificial surfaces and anthropogenic heat sources all contribute to this.

Green Infrastructure can:

- Provide cooling in urban areas for people and wildlife by:
- intercepting solar radiation (shade), and;
- reducing ambient air temperatures (evapotranspiration)

Through good design and retrofitting, green infrastructure can help reduce the impact of hotter summer temperatures projected as a result of climate change by providing natural cooling and shade. Particular green infrastructure assets that provide urban cooling are:

- Green and blue spaces and urban planting
- Green roofs and walls

⁷ Note also the interaction with the LLFA's and EA's Climate Change allowances, both for surface rainfall and fluvial allowances as referenced within Section 3.3.

Designing greenspaces appropriately is crucial. With regards to tree planting, broad leaved deciduous trees will have the largest adaptation impact. They reduce not only the solar radiation absorbed by people directly, but the amount of radiation absorbed by the ground which in turn is re-emitted. Leafy shrub and hedge species also reduce thermal re-emission from the ground compared to lawn surfaces, which have little cooling effect. Varied urban planting and green space design can intercept solar radiation, create evaporation but also reduce stress, improve air quality, social activity and ecological diversity and therefore can provide multiple benefits.

Biodiversity is under threat from a range of climate change related impacts, including range shifts, impacts on the timing of seasonal events, impacts on complex interactions, vulnerability to extreme events and indirect impacts from our responses to climate change and extreme weather.

Green Infrastructure within the Kidderminster East strategic development corridor **must:**

- Protect the aquifer and water sensitive habitats
- Provide increased habitat
- Reinststate natural functions
- Provide increased connectivity in fragmented areas
- Allow people to access nature and learn about the importance and enjoyment of the natural environment that might help foster greater levels of stewardship

Well-designed green infrastructure can offer biodiversity benefits including increasing habitat coverage and connectivity for species, increasing the range of species that live in an area and apply appropriate management that allows wildlife to thrive and people to enjoy it. This can be delivered in combination with the above mentioned flood and heat amelioration effects. Good quality, well planned, multifunctional green infrastructure can contribute to the creation and enhancement of the network of biodiversity rich sites to help biodiversity adapt to climate change impacts. Specific elements of green infrastructure that may address this climate change issue must therefore include:

- Habitat Creation – to increase habitat size and connectivity
- Wetlands - can provide important resting stops for migrating waders, as well as habitat for species such as Great Crested Newts
- Gardens – can provide a wildlife refuge
- Green Roofs – (where appropriate) these can be excellent for wildlife, particularly invertebrates such as pollinators

4. Prioritisation of the Green Infrastructure Assets

Table 1: Multi-functionality of Prioritised Green Infrastructure Assets

GI feature	GI theme									Ranking
	Biodiversity	Historic Environment	Landscape	Hydrology	Woodland	Soils	Climate Change	Health & Wellbeing	Access and Recreation	
Designated Sites (Inc LNR, LWS, SSSI)	✓		✓	✓	✓		✓		✓	High
Dry Woodland	✓		✓		✓		✓	✓	✓	High
Watercourses	✓	✓	✓	✓			✓		✓	High
Wet Woodland	✓		✓	✓	✓		✓			High
Open Water	✓	✓	✓	✓			?		✓	High
Fruit Trees & Ancient Trees	✓	✓	✓		✓		✓			High
Hurcott Lane / Road	✓	✓	✓						✓	High
Hedgerows	✓	✓	✓				?			Moderate
Wet Grassland	✓		✓				✓			Moderate
Traditional Farm Buildings	✓	✓	✓							Moderate
Hurcott Wood Structures	✓	✓	✓							Moderate
P.R.O.W			✓					✓	✓	Moderate
Acid Grassland	✓		✓							Moderate
Protected & Priority Species	✓	✓					?			Moderate
BMV Arable						✓				Low

Figure 2 - Key Indicative GI Corridors Map showing existing network connections beyond the site recommended pedestrian/cycle circulations within current site boundaries

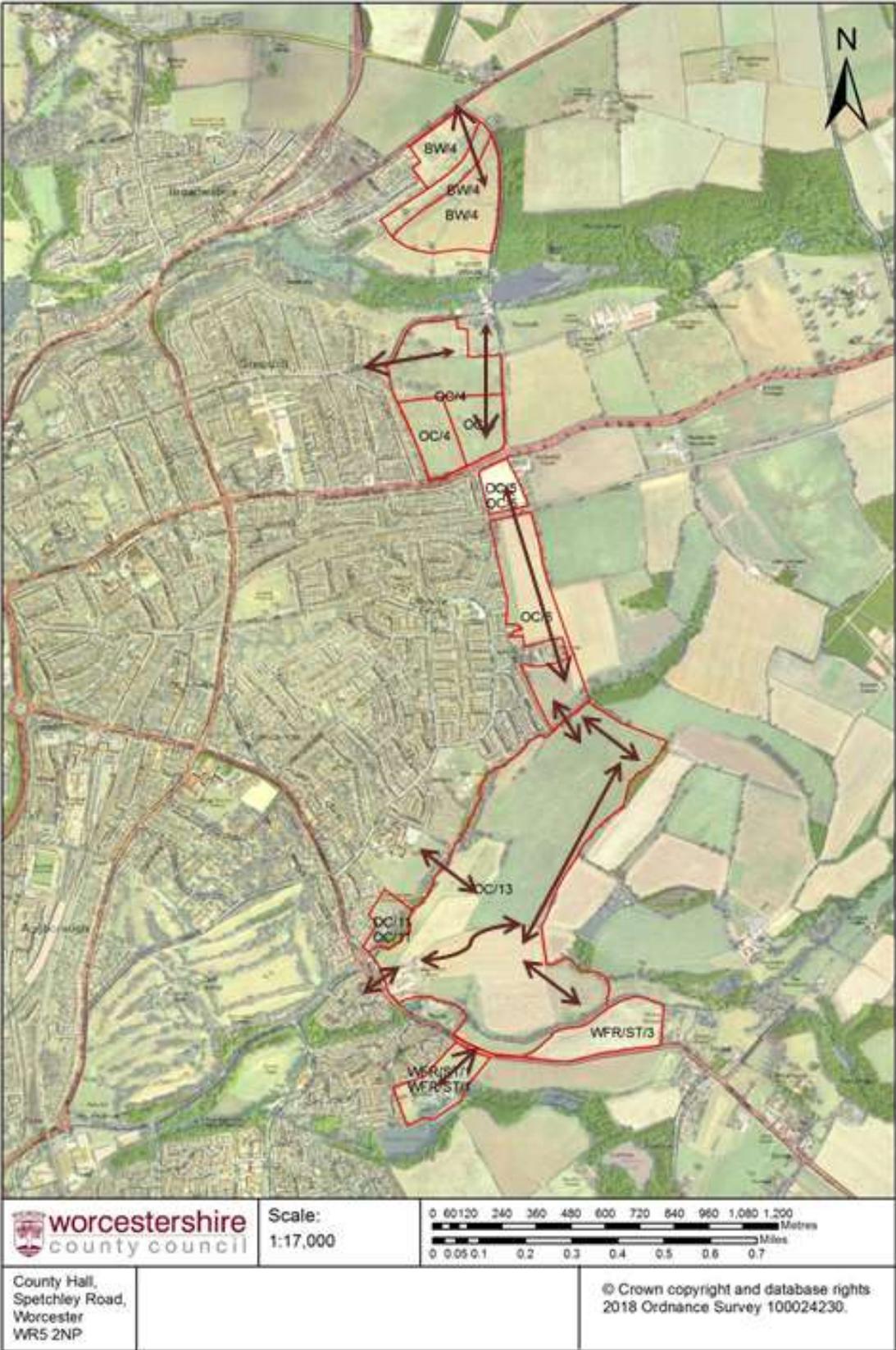


Figure 3 – Kidderminster East corridor with indicative delivery approaches for some of the key Green Infrastructure principles outlined within this concept plan



Appendix A: Supporting Evidence:

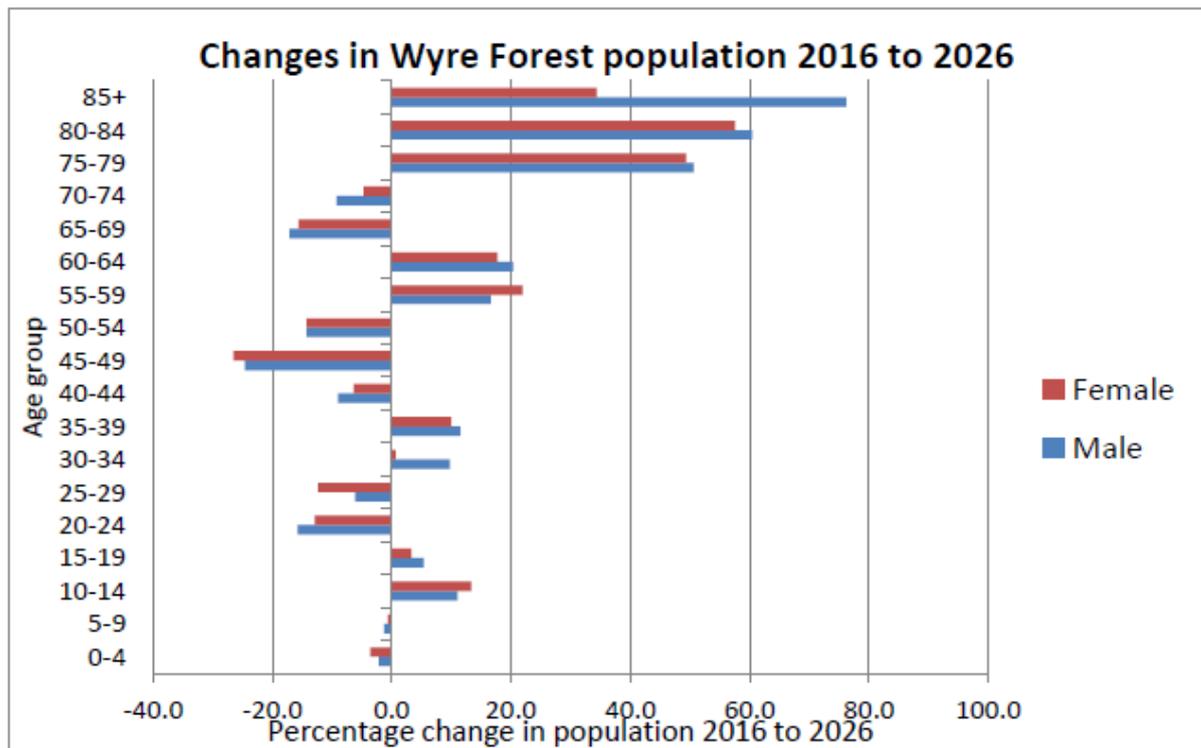
Health and Wellbeing

It is increasingly recognised that the places and spaces where we live/work have an impact on health and wellbeing and that an individual's actions to improve their lifestyle or health status are likely to be influenced by the environmental and socio-economic context within which they take place. The design of the built environment can have a significant impact on physical and mental health and how people perceive their environments. The location, density and mix of land uses can have wide-reaching implications on how individuals live their lives; it can affect user experience of access to and provision of key community facilities such as public services, employment opportunities, healthy food choices and parks and green spaces.

Health/socio-economic issues

In terms of wider socio-economic problems, Wyre Forest district faces issues associated with ageing population. As illustrated below, most noticeable is the large projected increase in the population aged 75+, particularly the over 85 age group.

Figure 4 - Projected changes in the Wyre Forest population from 2016 to 2026



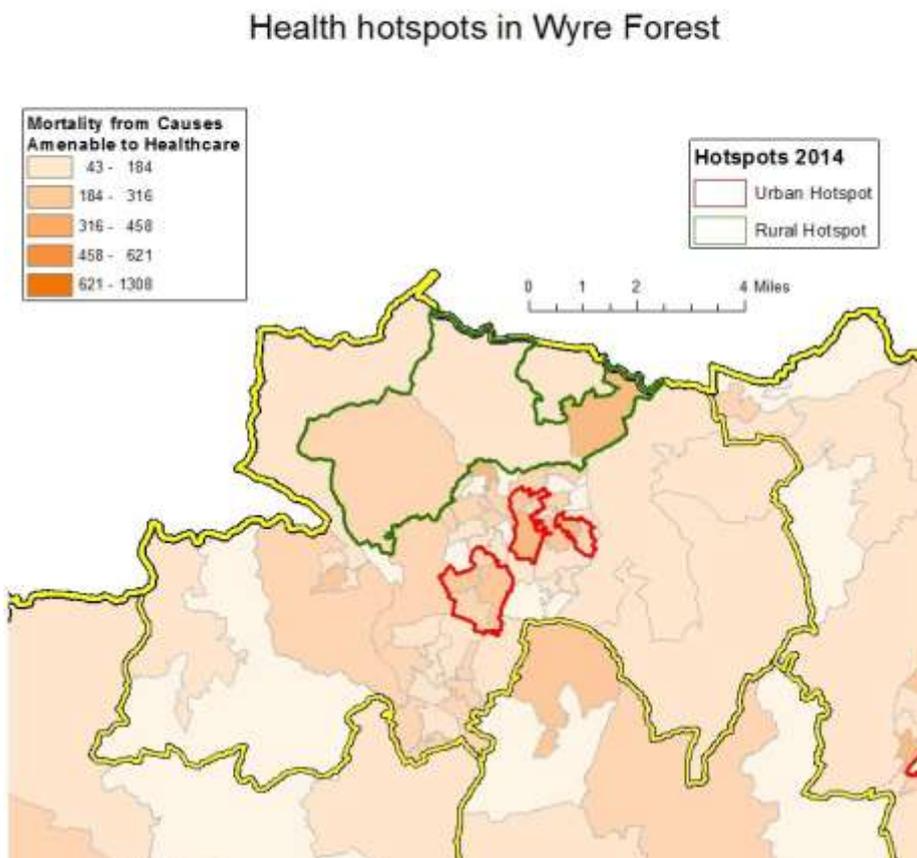
Source: ONS 2014 Population Projections

The health and wellbeing issues of the population residing in Wyre Forest are characterised by the substantial variation. Many areas of concentration of poor health fall within urban areas including Kidderminster. These health issues include:

- Excess weight in adults and child overweight and obesity
- Recorded diabetes
- Poor mental health and wellbeing including children and young people

There is a link between the socio-economic status and health outcomes of the local areas. It has been identified that a number of LSOAs in the district are in the most deprived 10% in England, most of them falling within Kidderminster. Worcestershire County Council's Public Health team identified geographic areas which characterise with poor health outcomes associated with unhealthy lifestyle factors such as inactivity, substance abuse or unhealthy diets. As illustrated on Figure 5 below, one of these areas falls immediately adjacent to the Kidderminster East Corridor area⁸.

Figure 5 - Health hotspots in Wyre Forest



Health, Wellbeing and Green Infrastructure Plans

Green infrastructure can help in mitigating some of the above mentioned health/socio-economic challenges facing the existing communities and support the health and wellbeing of the future residents of Kidderminster East Corridor by providing opportunities for active lifestyles and creating an attractive and health promoting environment. As such we would encourage that any GI plans for this area provide the following:

⁸ Worcestershire Health and Wellbeing Board (2017) Wyre Forest Health and Wellbeing Profile

- Formal and informal recreation areas accessible for the future residents of the area but also for the existing communities, in particular for those living within the high deprivation and poor health areas
- Green spaces which are well-maintained and accessible for the residents of the site including those more vulnerable such as disabled and elderly
- Walking and cycling links within the site and connect the new communities within the site and main facilities outside of the site including schools, shops, GPs etc
- Opportunities for healthy food provision through allotments, community orchards, fruit street trees
- Green spaces and walking routes which include benches placed in strategic places to encourage community/intergenerational integration
 Ensure that any seating/resting places along the walkaways are placed under trees to provide shade
 Consider possibility of circular recreational routes to cater for the need of people living with dementia
 Segregated and well-lit cycling walking routes would be preferred to serve well all groups of the population
 Use activities such nature/historic trails to encourage physical activity and mental stimulation by learning about and contact with nature/history
 Visually attractive environment which gives people strong sense of place

1. Biodiversity

Figure 6a - A merged Biodiversity Action Plan network habitat – showing ecological corridors, corridor resilience and opportunities for habitat defragmentation

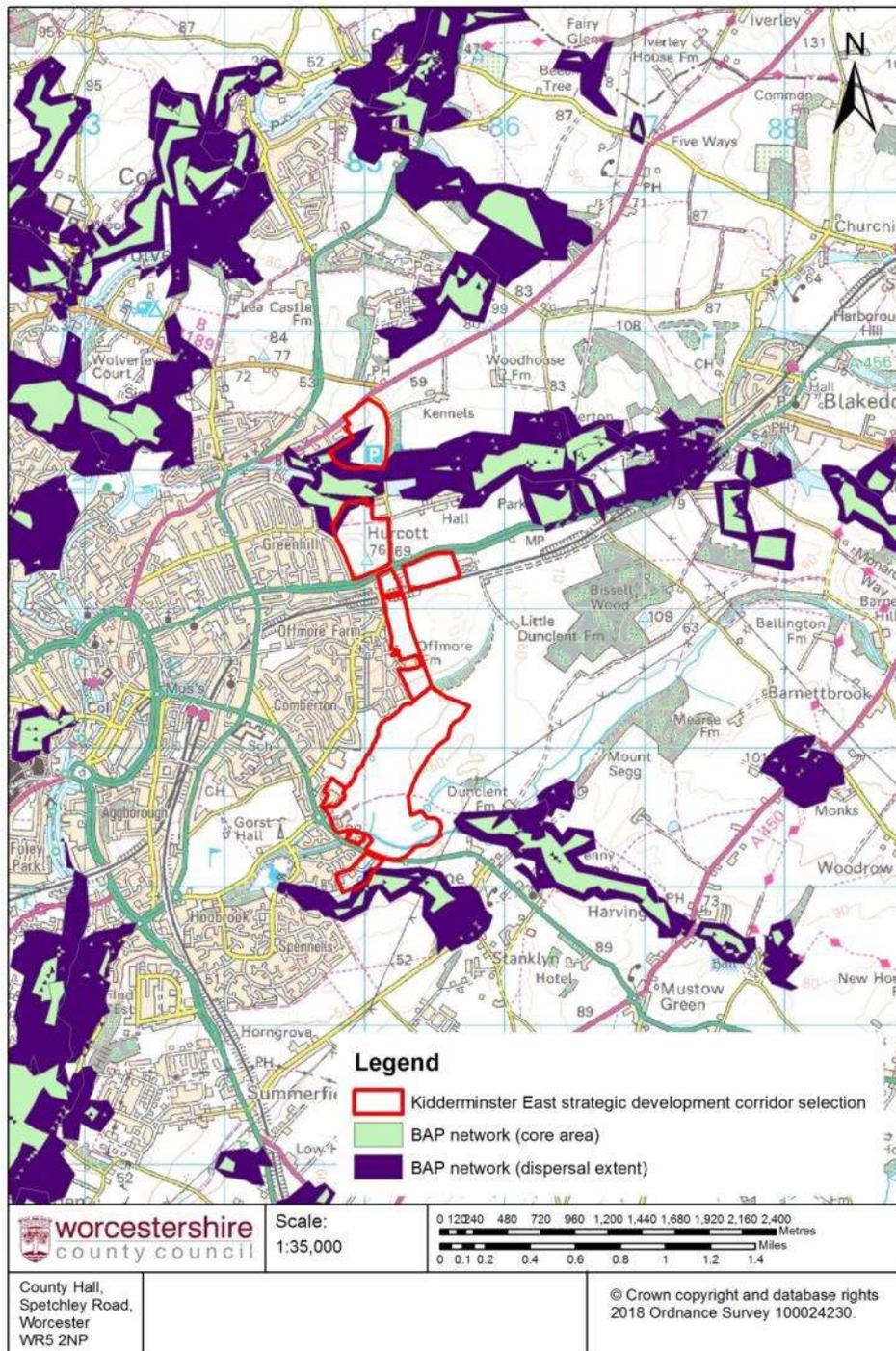
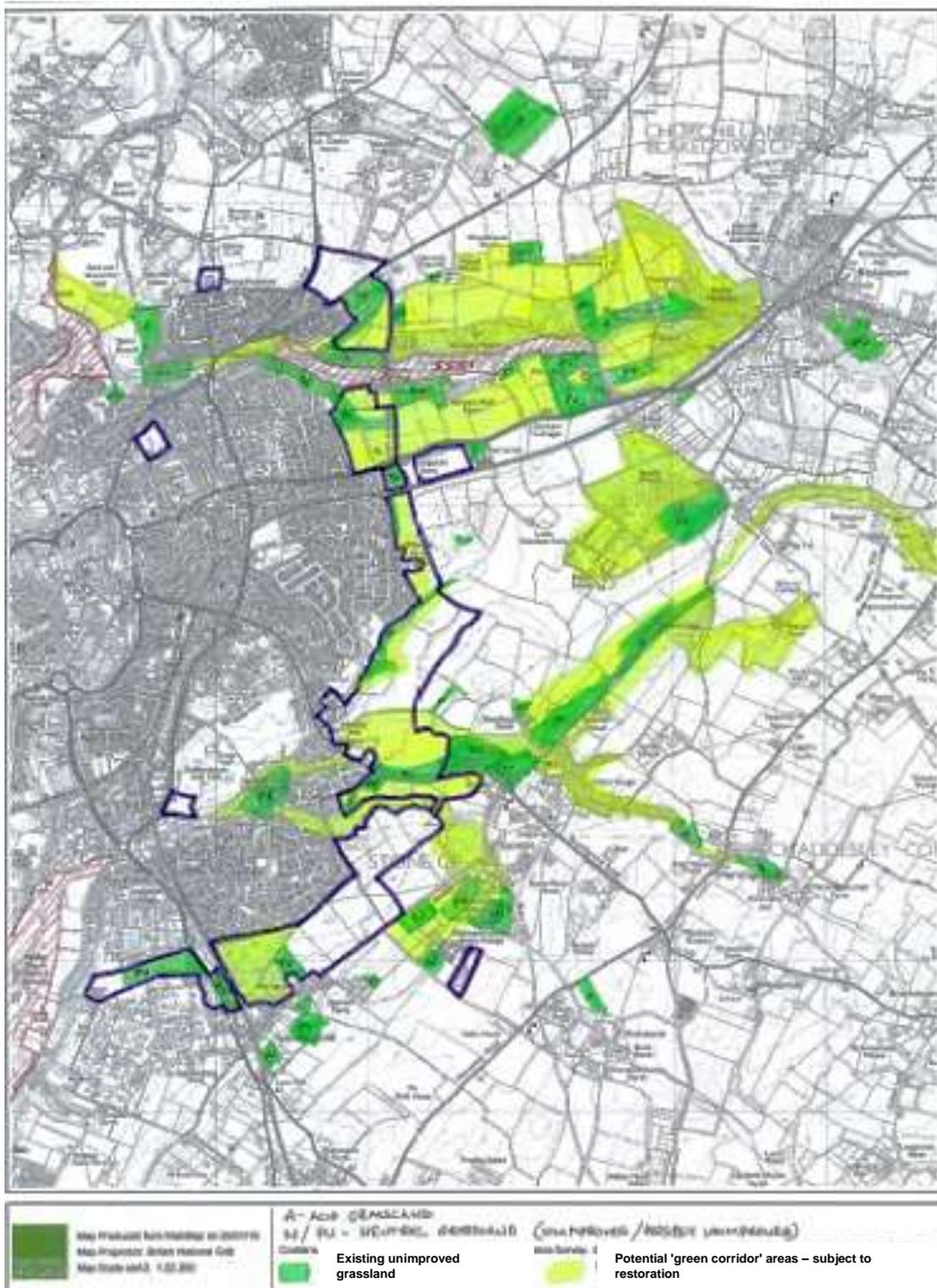


Figure 6b – Preliminary and indicative unimproved/acid grassland (re)creation opportunity map, courtesy of Natural England



Please note that, as with interpretation of the Worcestershire Habitat Inventory, analysis should be informed by ground-truthing, botanical investigation and soil sampling alongside detailed Historical and Biological Record analysis. Here green shading indicates areas of unimproved grassland while areas highlighted in yellow indicate potential through restoration to create 'green corridors' of priority habitat.

Figure 7 – Designated sites of importance for nature conservation

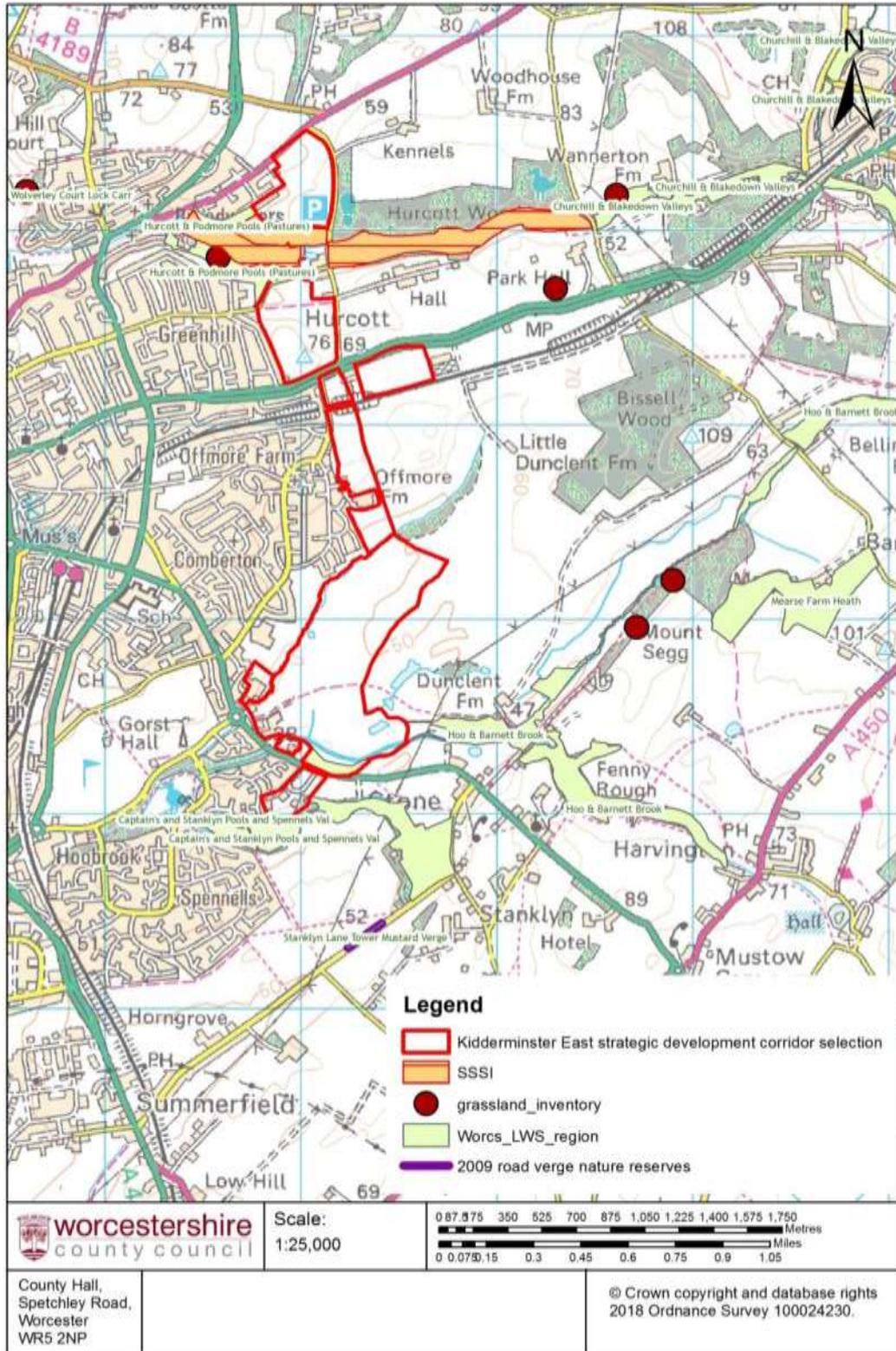
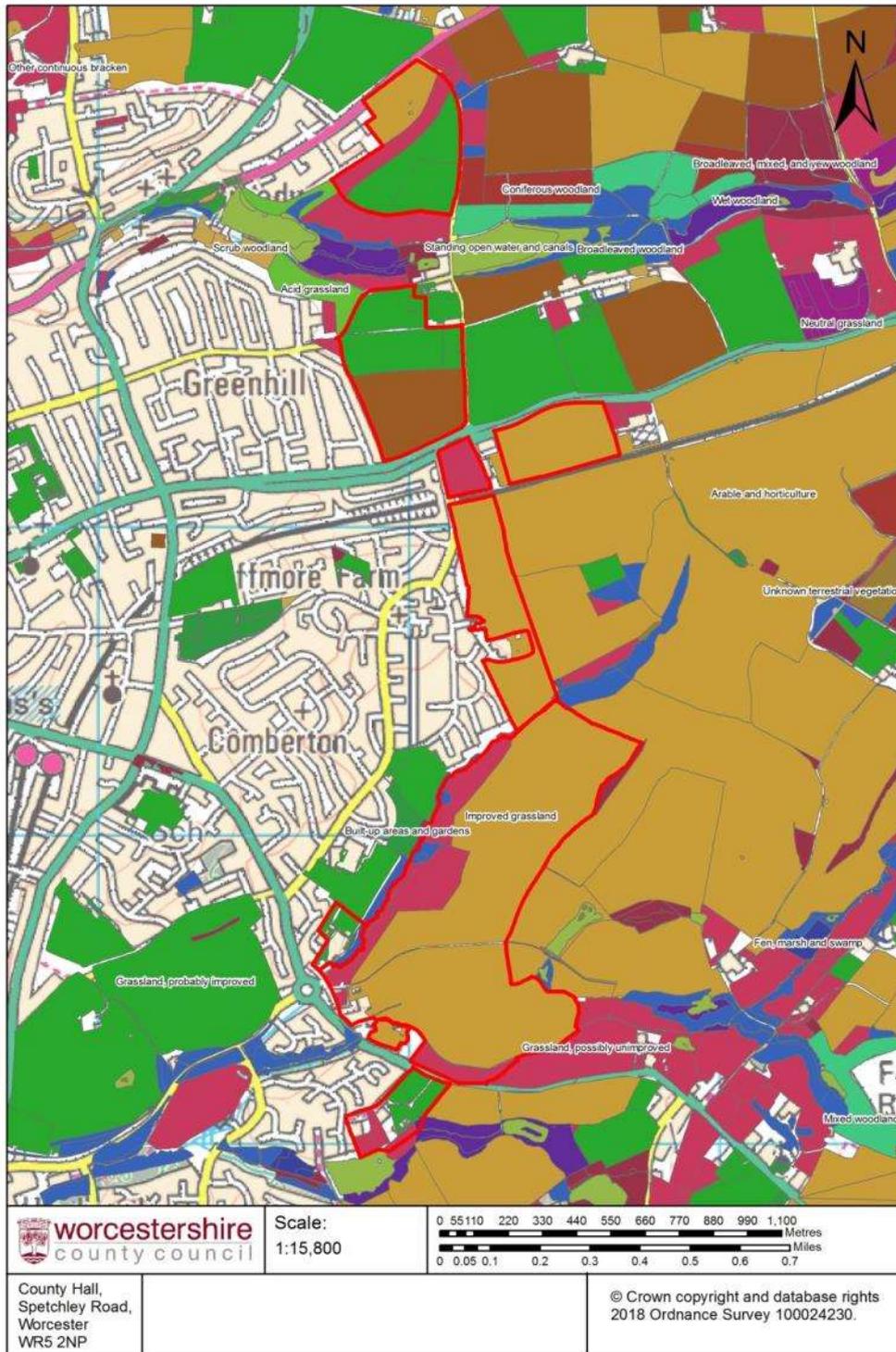


Figure 8 – Worcestershire Habitat Inventory data for the Kidderminster east strategic development corridor.



For further information refer to
[/www.worcestershire.gov.uk/info/20302/worcestershire_habitat_inventory](http://www.worcestershire.gov.uk/info/20302/worcestershire_habitat_inventory)

2. Landscape character

Figure 9 - Landscape Character Assessment at Land Cover Parcel scale

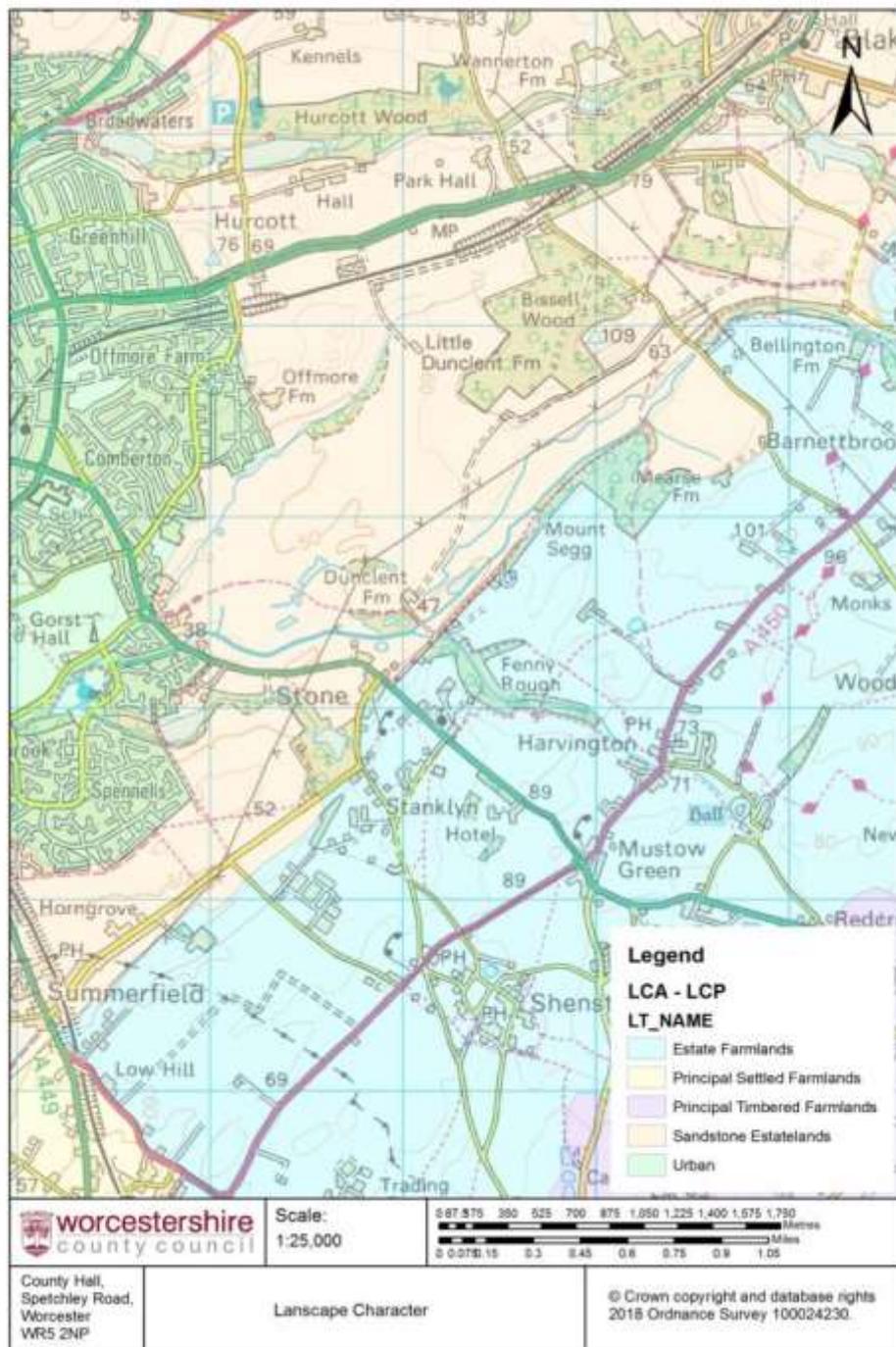
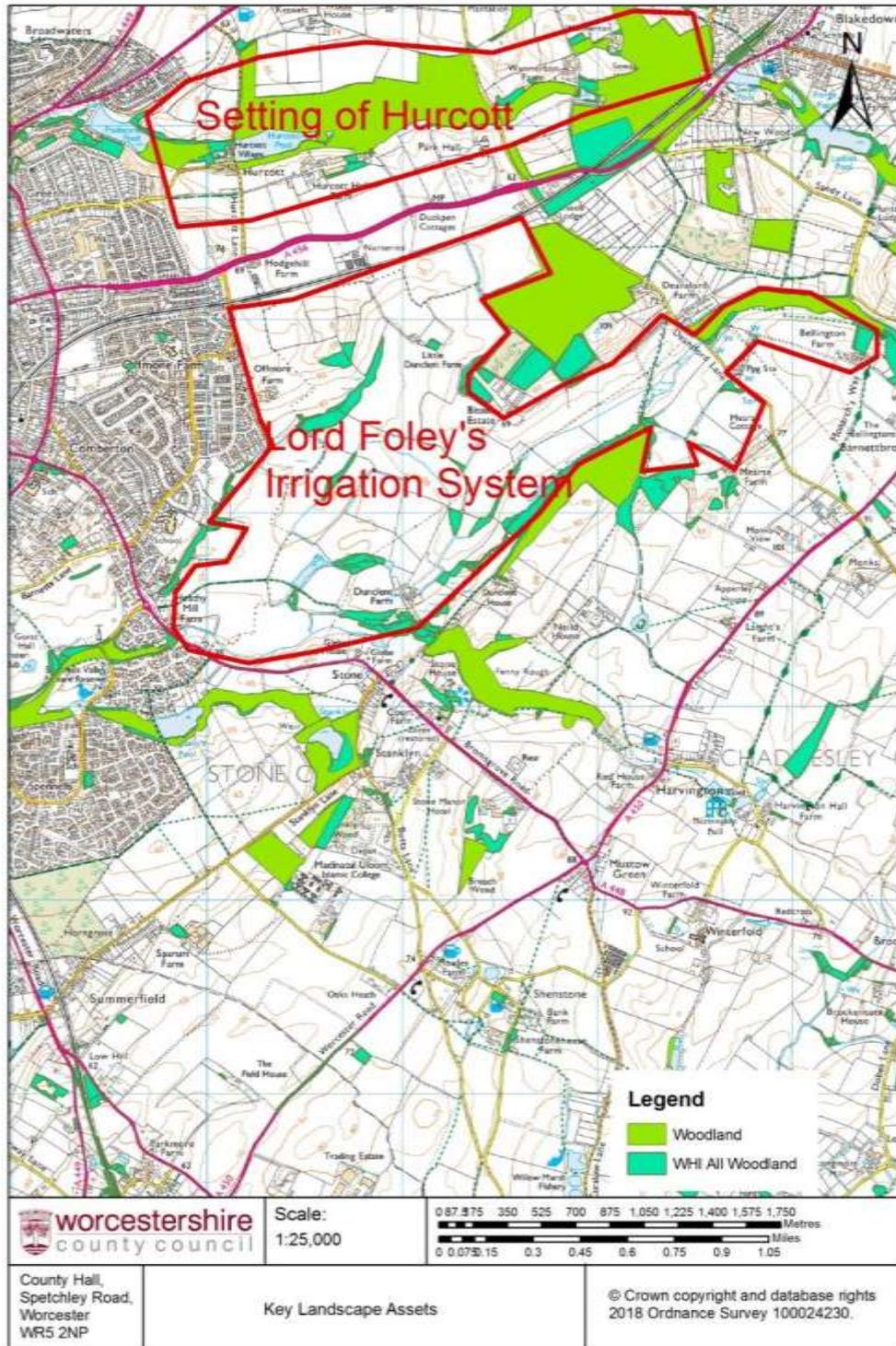
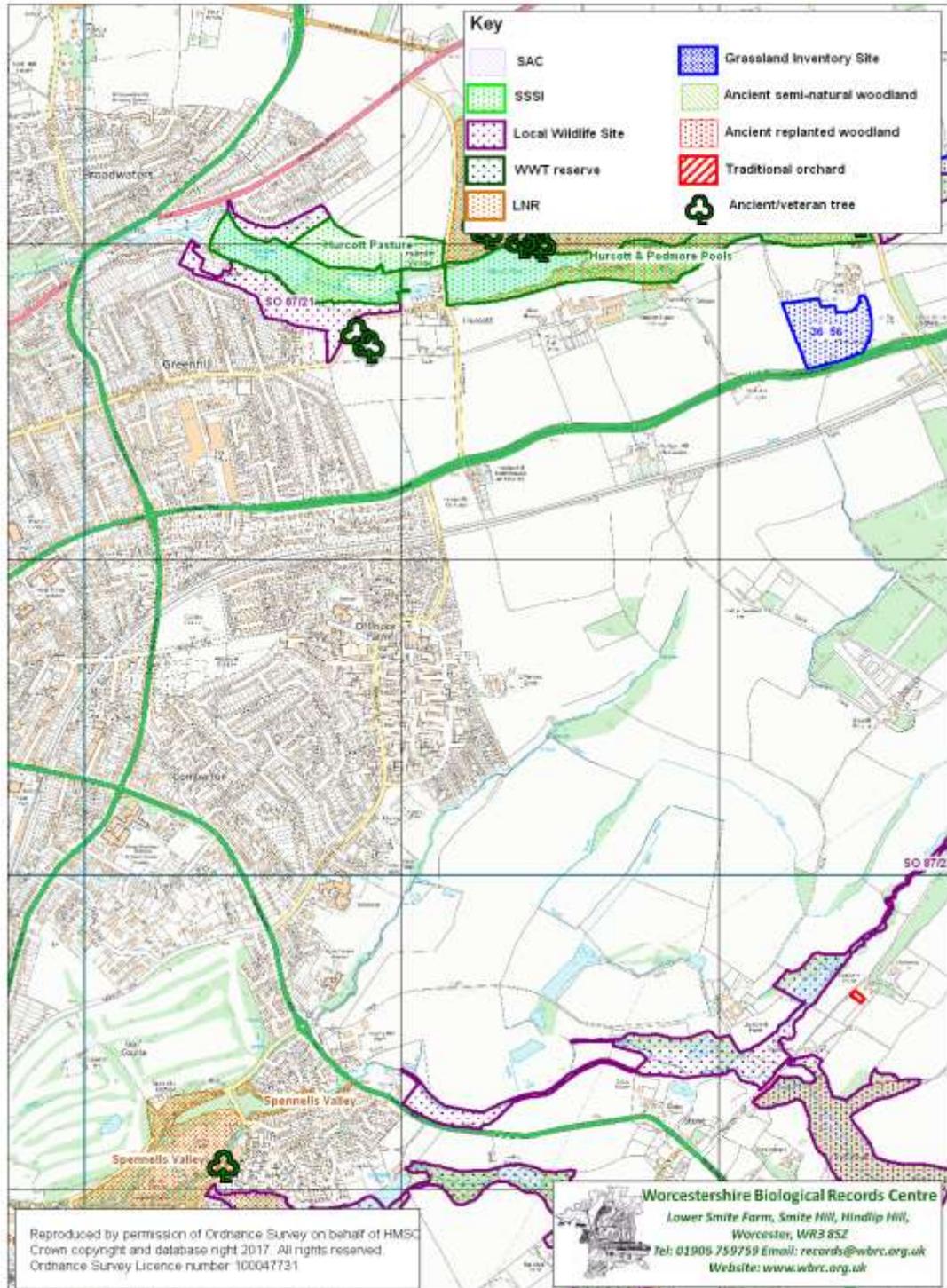


Figure 10 - Landscape Assets



3. Woodland and Trees

Figure 11 - Ancient Woodland and Veteran Tree resources.



4. Historic Environment

Figure 12 - Historic Environment Record

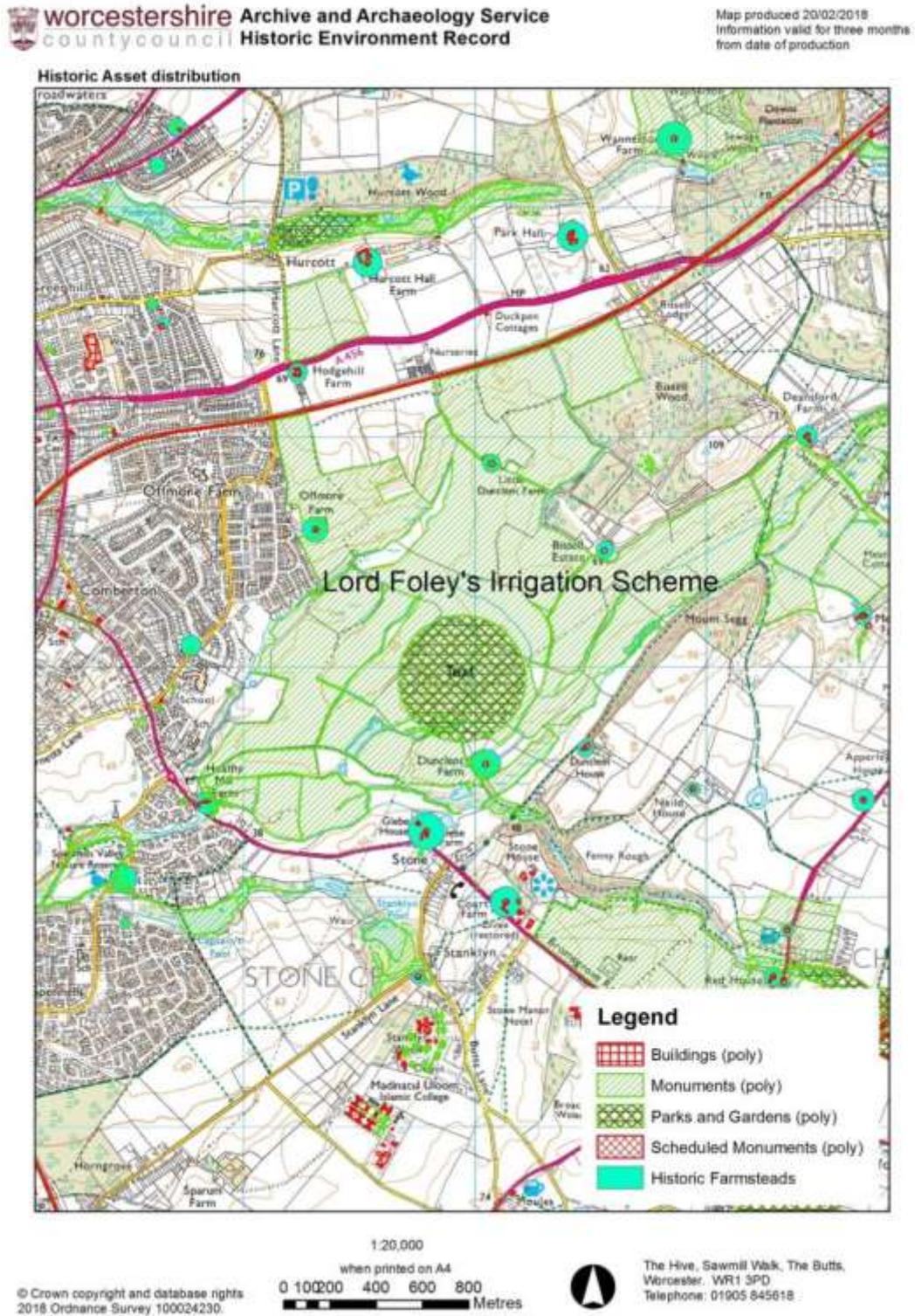
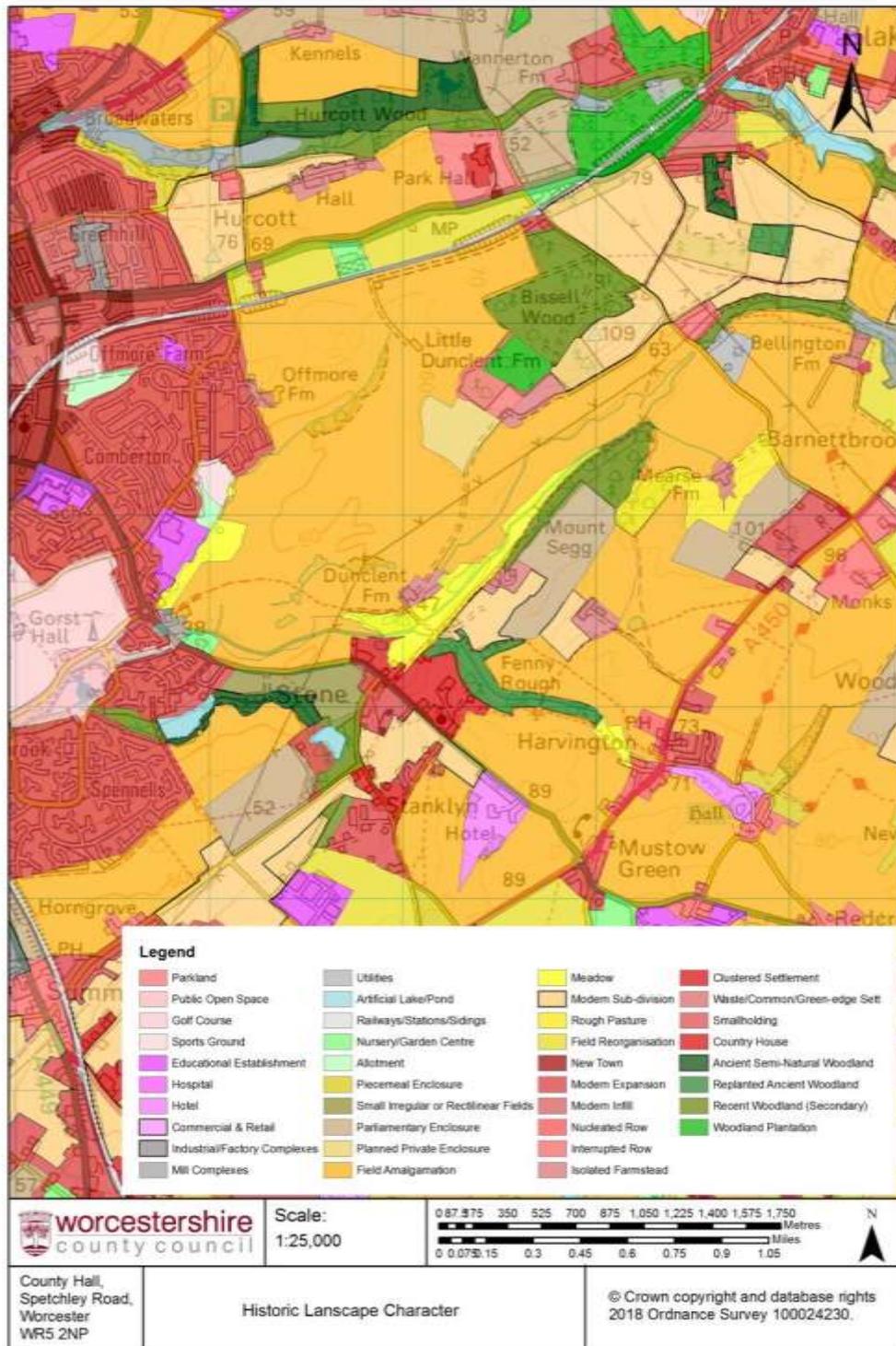


Figure 13 - Historic Landscape Characterisation

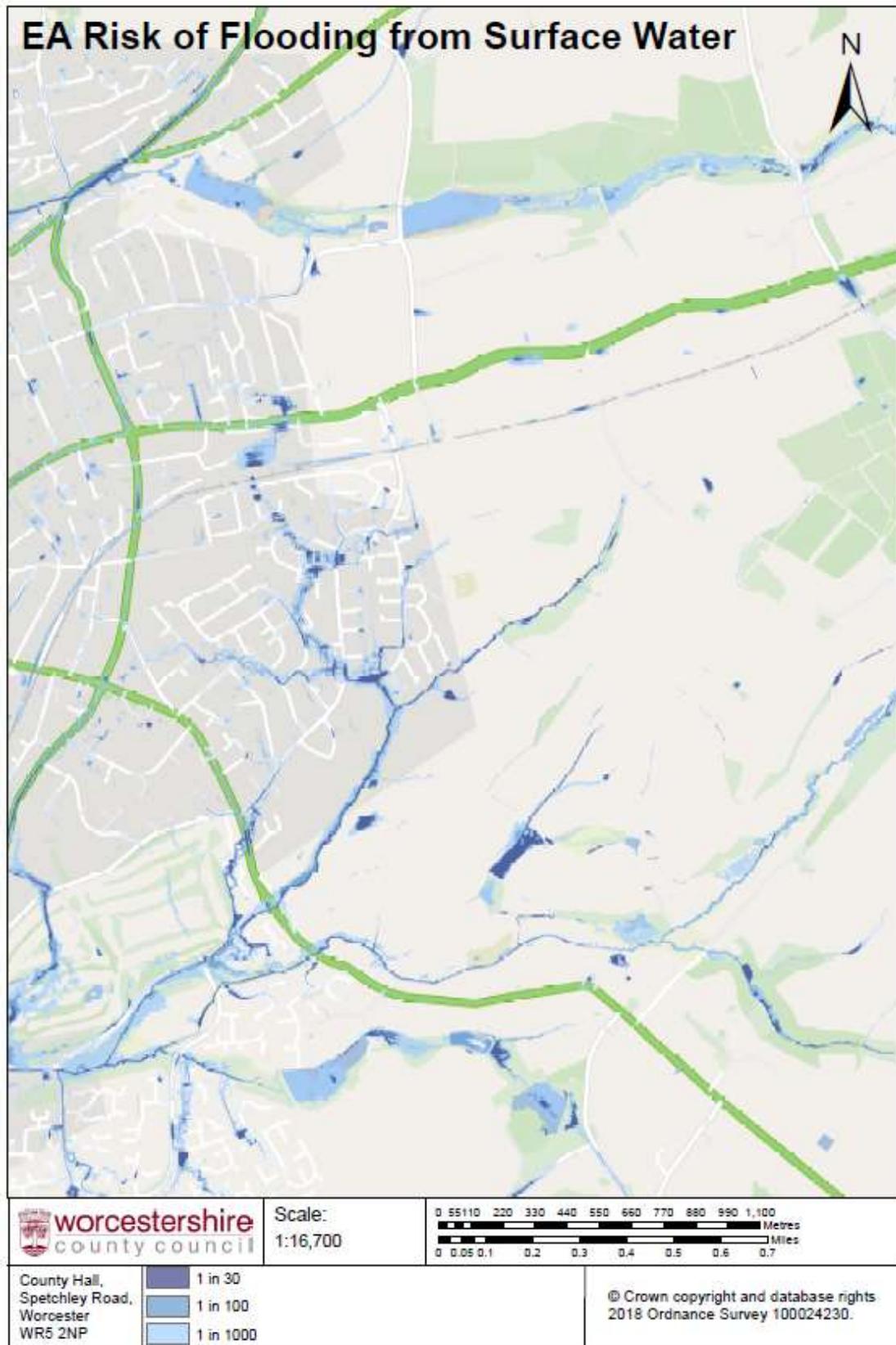


5. Blue infrastructure

Figure 14 - Surface Water Management Plan Floodspots and Floodzones
Please note that tributaries of the Hoo Brook have not been subject to national modelling, hence floodzones have not been determined.

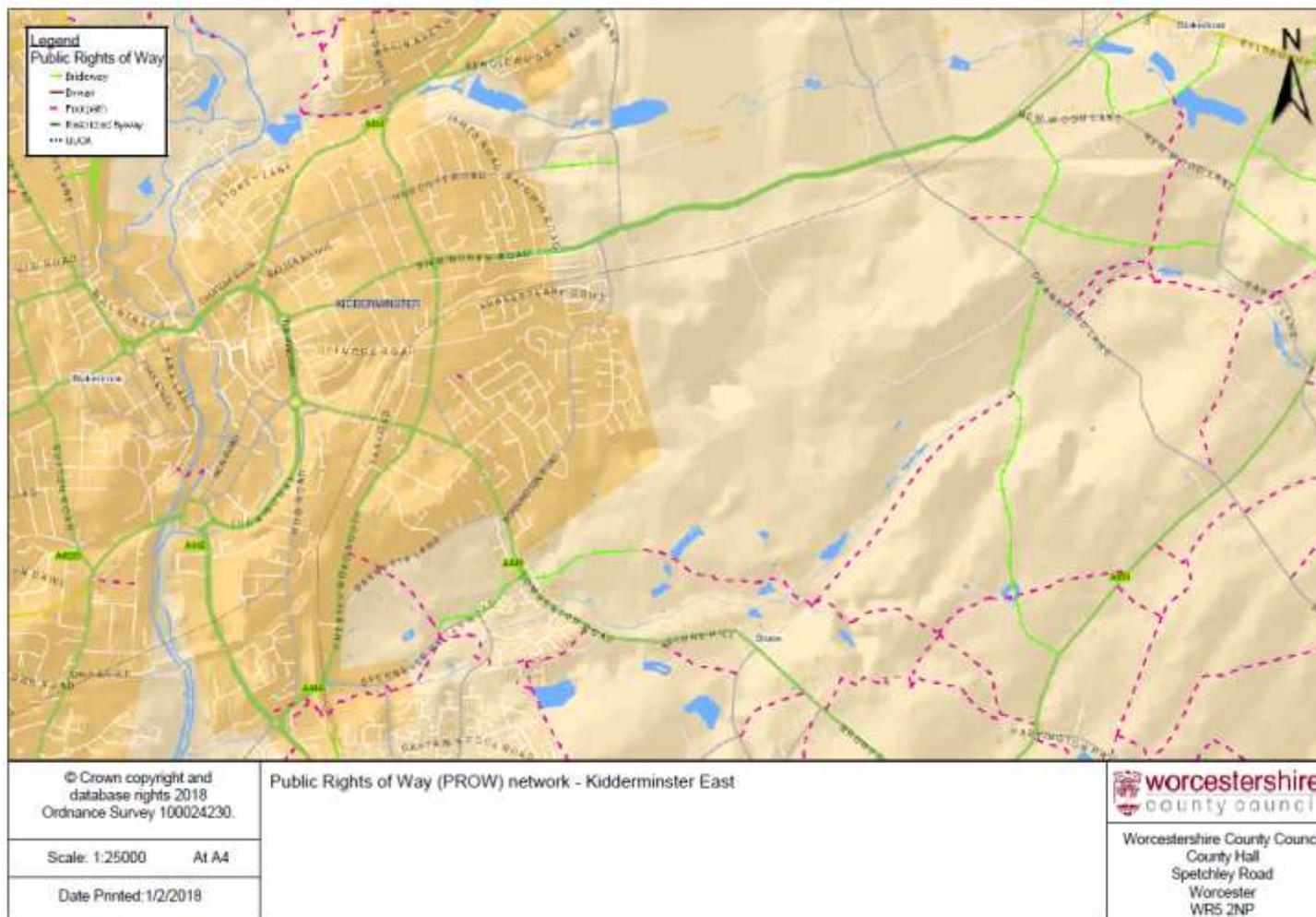


Figure 15 - Surface Water Flood Risk



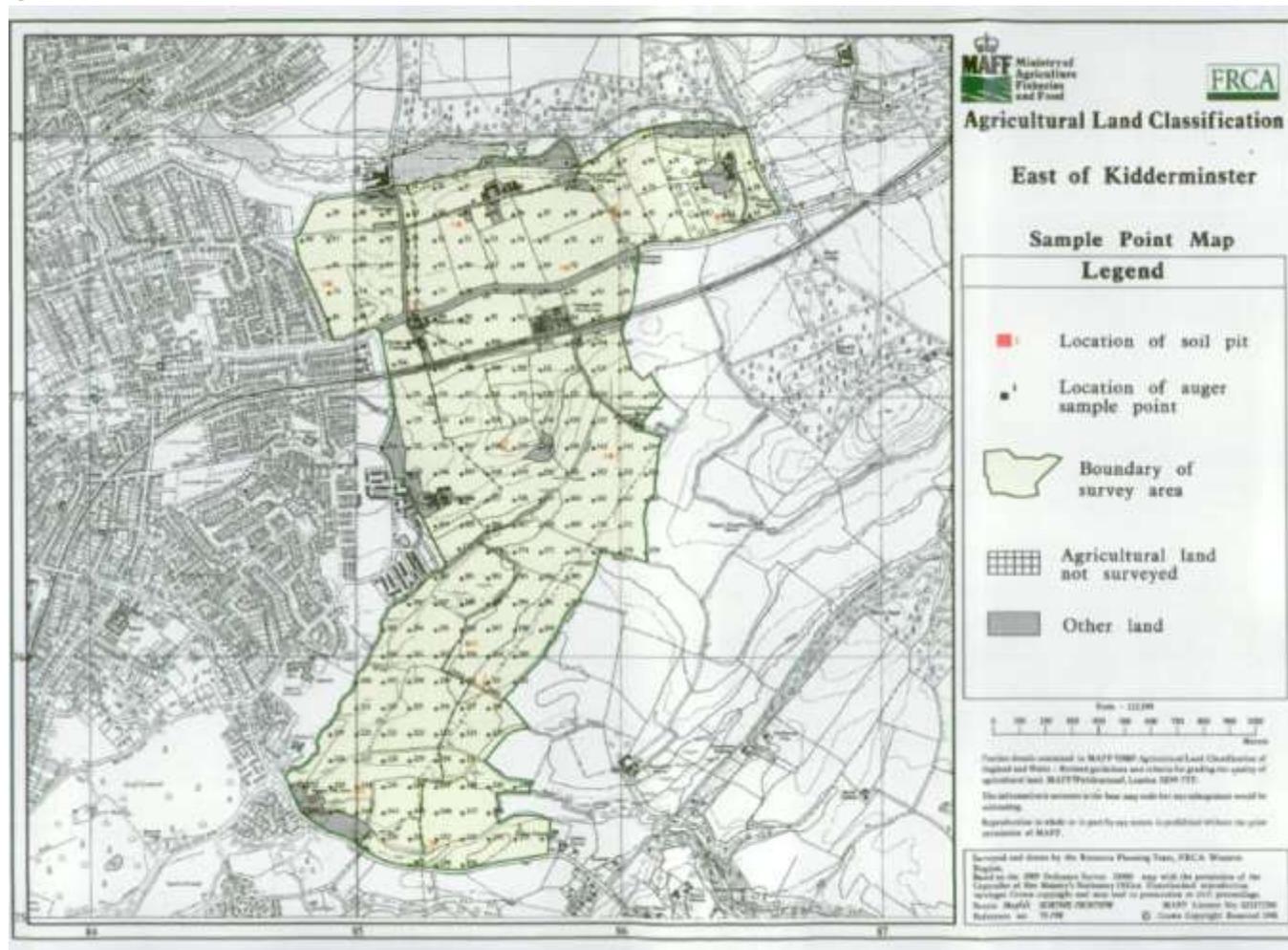
6. Access and Recreation

Figure 16 - Public Rights of Way



7. Soils

Figure 17 - Agricultural Land Classification East of Kidderminster



Appendix B: The Overarching Principles for Green Infrastructure within the Severn Valley North Environmental Character Area

Environmental Character Area: Two	Severn Valley North
Strategic GI Approach Primary Objectives:	Protect and Enhance.
Overarching principles	Restoration of the Severn floodplain
Biodiversity	<p>Links should be made with existing site management, in order to achieve site expansion and buffer the key priorities including wet woodlands and grasslands.</p> <p>Where sites are closely associated buffering should be merged to form direct links.</p> <p>In the case of the River Severn corridor the link is already in place but augmentation of this in the floodplain will be critical for a number of GI aspirations, in conjunction with enhancements to the blue infrastructure.</p>
Historic Environment	<p>Explore opportunities to protect prehistoric and Romano-British settlement on the river terraces and other sites with below ground archaeology adjacent to existing rural settlements.</p> <p>Protect and enhance historic parkland character.</p> <p>Enhance and create linkages with wider historic environment green networks (hedgerows, woodland and common).</p> <p>Enhance historic hedgerow pattern to strengthen broad historic landscape character.</p>
Landscape Character	<p>Protect and enhance the composition and pattern (planned in the estate landscapes; organic in the farmland landscapes) of hedgerows through management and replanting.</p> <p>Protect and enhance the tree cover pattern through new planting of watercourse, highway and hedgerow trees to address density and age structure; and, in the Timbered Farmlands, through creation of new woodland, with consideration for patterns of relic ancient woodland and existing woodland fragments.</p> <p>Seek opportunities to protect and create areas of permanent pasture, particularly in the Settled Farmlands and Riverside Meadows landscapes. NB This ECA also contains localised patches of Unenclosed Commons which is a (largely) unsettled, unenclosed and unwooded Landscape Type; here opportunities should be sought to retain rough grazing land use and management regimens which the support unwooded and unenclosed.</p>
Blue Infrastructure	<p>Manage areas of low, moderate or high flood risk and take action where necessary to keep pace with climate change.</p> <p>Explore opportunities to restore sustainable natural storage of floodwater on undeveloped floodplains.</p> <p>Make more space for rivers through urban areas via 'blue corridors' (i.e. Restoring access for floodwater onto key strips of floodplain by limiting redevelopment to flood-compatible land-uses e.g. parkland).</p> <p>Seek ecological improvements.</p>
Access and Recreation	<p>Consider the proximity to and ability to integrate with the rights of way network, recreational way-marked routes and the cycle network;</p> <p>Accommodate associated facilities necessary for the use and enjoyment of the site in a manner that is appropriate and able to integrate with the landscape character, wildlife and cultural interests.</p> <p>Act as a greenway from town into the countryside and utilise existing canal, former railway lines, river corridors and wherever possible link with public transport routes.</p> <p>Adopt minimum quality standards, (commensurate with its location and scale) that sites and routes should be expected to achieve will be those from the Green Flag Award Programme, and the Country Parks Accreditation Scheme, as appropriate.</p>
Transport	<p>Opportunities should be sought to protect, enhance and create green infrastructure that promotes sustainable movement by walking and cycling, reducing the need to travel by car by providing pleasant environments that promote sustainable transport as a means to minimise the impact of transport on the natural environment and mitigate the impacts of climate change.</p>

Appendix C: National Character Area (NCA) Statements of Environmental Opportunity for the contextual 'Mid Severn Sandstone Plateau'

SEO 1: Protect, expand and appropriately manage the characteristic habitats of the NCA, specifically lowland heathland, acid grasslands and woodland including orchards and hedgerows, thus reinforcing the sense of history and reducing habitat fragmentation for the benefits that this will bring to resource protection, biodiversity, climate regulation and the recreational and experiential qualities of the NCA.

SEO 2: Protect and manage the rivers and streams of the NCA to mitigate the extremes of drought and flood events, and protect the water quality of the River Severn and safeguard aquifer recharge areas by managing discharges to watercourses and protecting and increasing areas of semi-natural riparian habitats along river valleys, streams, canals and urban watercourses.

SEO 3: Protect from inappropriate development and manage a stock of post-industrial and extractive sites around Telford and the Black Country which exemplify the strong influence that geodiversity has on the landscape, through industrial development and settlement patterns and for their often unique value to biodiversity. Protect and maintain the natural geomorphological features and exposures in the river valleys that can be used for research and education to study past environmental change as well as for recreation.

SEO 4: Work in collaboration with the World Heritage Site, English Heritage and the local authorities to implement sustainable solutions to protect and manage the landscape and heritage attributes of the Ironbridge Gorge World Heritage Site and the wider historic landscape, including the canals, historic ports and bridging towns, finding sustainable solutions to manage visitor pressure, while maintaining high levels of public access for the benefits to the visitor economy and employment.

'Additional Opportunities'

1. Promote sustainable agricultural practices to maintain the food productivity of the plateau, while incorporating semi-natural habitats into arable fields and valley pastures, to protect the quality of the soil and prevent erosion, thus also increasing the contribution to biodiversity, landscape character and climate regulation.

Appendix D: Recommended provision ratios for biodiversity 'enhancements' within the built environment

Potentially appropriate species (depending on location)	Recommended number of roosts/nest sites
Crevice dwelling bats	1 in 20 structures
Bats requiring flight space	1 in 5 public buildings (non-residential)
Horseshoe bats	1 in 5 public buildings (non-residential)
Swifts	1 in 20 buildings
House martins	1 in 50 buildings
House sparrows	1 in 40 buildings
Starlings	1 in 100 buildings
Swallows	1 in 50 buildings
Barn owls	2 per medium-size development 3 per large development
Peregrine	1 per medium-size development 2 per large development

After: Table 1 'Roost and nest site provision in new development' as prepared by BCT, within EcoTowns Biodiversity Worksheet, TCPA/Natural England/CLG, 2010.

In addition to the measures outlined above, we recommend that:

- New housing development should ensure garden boundaries include at least a 125mm² (5 inch²) hole in garden fences and walls to allow access for wildlife, such as hedgehogs, frogs and toads.
- The use of hedgehog shelters and bug hotels (e.g. installed on buildings and fence posts), to provide food and nesting opportunities is encouraged.
- Garden landscaping should make use of native and 'wildlife-friendly' species, re-use the fertile agricultural soil currently on site and avoid use of peat and chemical fertilisers or insecticides.
- In proximity to watercourses and ponds (including SuDS waterbodies) and particularly where presence of herpetofauna is considered reasonably likely, gutters should be inset from the kerb and highway gulleys should include rescue ladders similar in design to Enkamat⁹

⁹ www.taysidebiodiversity.co.uk/wp-content/uploads/2015/10/2014_Angus-Amphibian-Ladders-Trial.pdf