Environmental Character Area Profile for the Minerals Local Plan: 6. Bredon

1. Introduction

1.1. Minerals development usually takes place on previously undeveloped land and can therefore result in permanent change to the natural environment and green spaces in Worcestershire. The impacts of both the working and the restoration of mineral sites need to be considered in detail in the development of the Worcestershire Minerals Local Plan (the MLP).

1.2. The Council will take a 'green infrastructure' (GI) approach to considering these impacts. The GI approach is a different way of thinking about the green spaces in Worcestershire. It moves beyond solely considering the environmental benefits of green spaces and integrates the consideration of economic, health and social benefits in the planning and management of green spaces. Rather than considering each green space in isolation it looks at the ways in which individual sites and corridors of green space collectively form the distinctive character of Worcestershire that attracts both visitors and business to the County.

1.3. The components of GI include biodiversity, landscape, historic environment, access and recreation and water (also know as blue infrastructure). The GI approach requires thinking about the environment as an integrated system of stepping stones or nodes in a wider network[1].

Green infrastructure and mineral workings and restoration

1.4. There is significant potential for mineral workings to destroy existing networks of green infrastructure if the nature and character of these networks is not taken into account. However there is also significant potential to contribute positively to green infrastructure through the restoration of mineral workings.

1.5. The GI approach extends beyond thinking about designated sites of biodiversity or historic interest. This means that the impact of a mineral working on the wider environment and the integrated system of stepping stones or nodes in a wider network[2] will need to be considered.

Environmental Character Areas[3] and the Minerals Local Plan

1.6. The Worcestershire Green Infrastructure Partnership has undertaken an analysis of the landscape character, biodiversity and the historic environment of Worcestershire to identify 30 distinct GI Environmental Character Areas (ECAs). Details about how these were developed is set out in *Planning for a Multifunctional Green Infrastructure Framework in*

[1] Green Infrastructure Guidance – Natural England.
[2] Green Infrastructure Guidance – Natural England.
[3] Worcestershire County Council (July 2012) *Planning for a Multifunctional Green Infrastructure Framework in Worcestershire: Green Infrastructure Framework 2*

Worcestershire: Green Infrastructure Framework 2 (2012) available at www.worcestershire.gov.uk/GI

1.7. These underlie the distinctive character of Worcestershire and it is the Council's intention that the unique characteristics of each area will drive the restoration strategy for the Minerals Local Plan.

1.8. This is one of 30 profile documents which set out the characteristics and priorities for the each ECA. It sets out the mineral resources in the ECA and the GI priorities identified by the Worcestershire GI Partnership. These priorities are structured around biodiversity, historic environment, landscape character, water environment (also known as blue infrastructure) access and recreation and transport. The document is also supplemented by other locally relevant information as appropriate.

1.9. This information will be used to develop the spatial strategy and restoration priorities for each ECA.

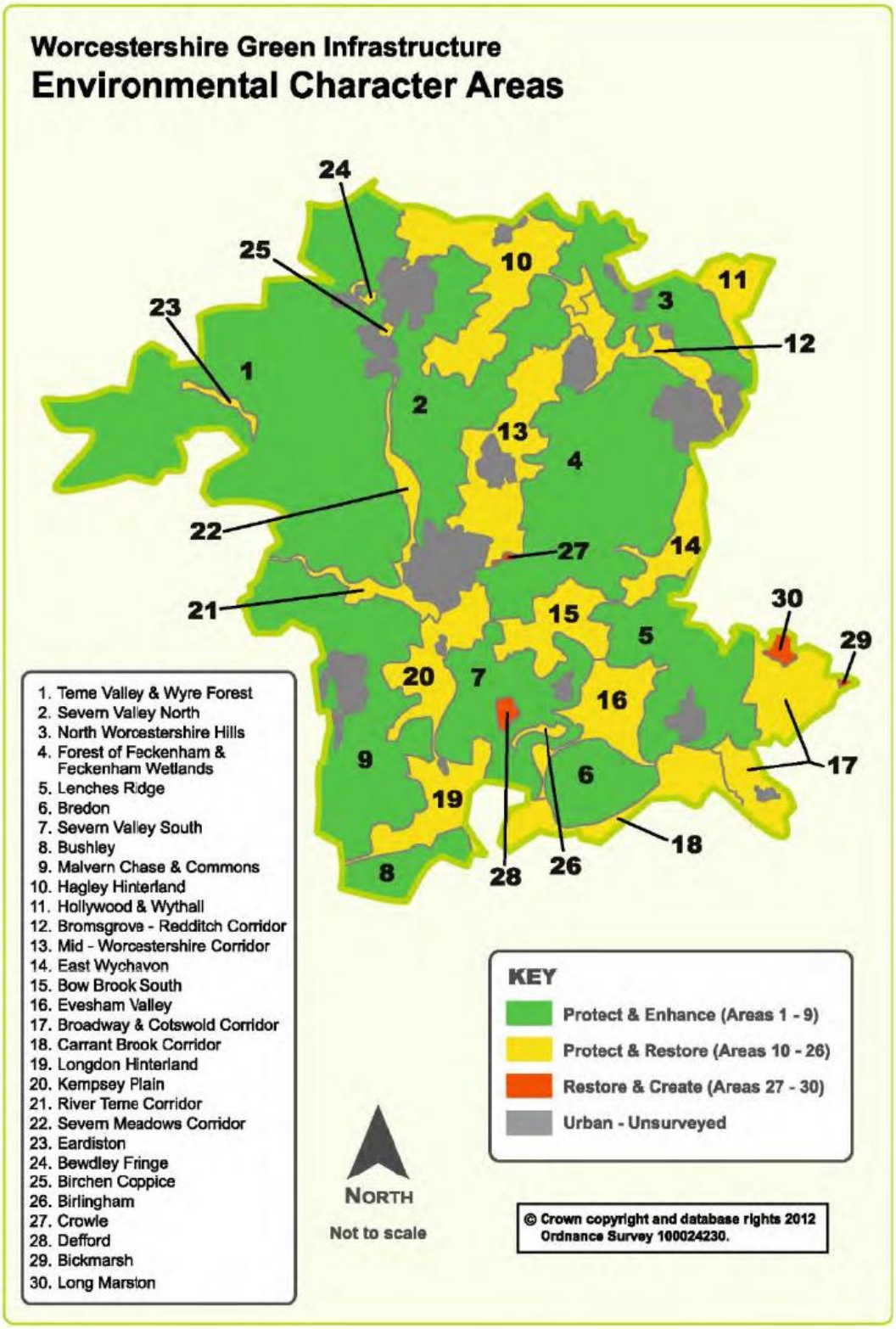
1.10. Profiles for each of the following ECAs are available on our website www.worcestershire.gov.uk/mineralsbackground:

1.11. The Environmental Character Areas are:

1. Teme Valley & Wyre Forest
2. Severn Valley North
3. North Worcestershire Hills
4. Forest of Feckenham & Feckenham Wetlands
5. Lenches Ridge
6. Bredon
7. Severn Valley South
8. Bushley
9. Malvern Chase and Commons
10. Hagley Hinterland
11. Hollywood & Wythall
12. Bromsgrove – Redditch Corridor
13. Mid-Worcestershire Corridor
14. East Wychavon
15. Bow Brook South
16. Evesham Valley
17. Broadway & Cotswold Corridor
18. Carrant Brook Corridor
19. Longdon Hinterland
20. Kempsey Plain
21. River Teme Corridor
22. Severn Meadows Corridor
23. Eardiston
24. Bewdley Fringe
25. Birchen Coppice
26. Birlingham
27. Crowle
28. Defford
29. Bickmarsh
30. Long Marston

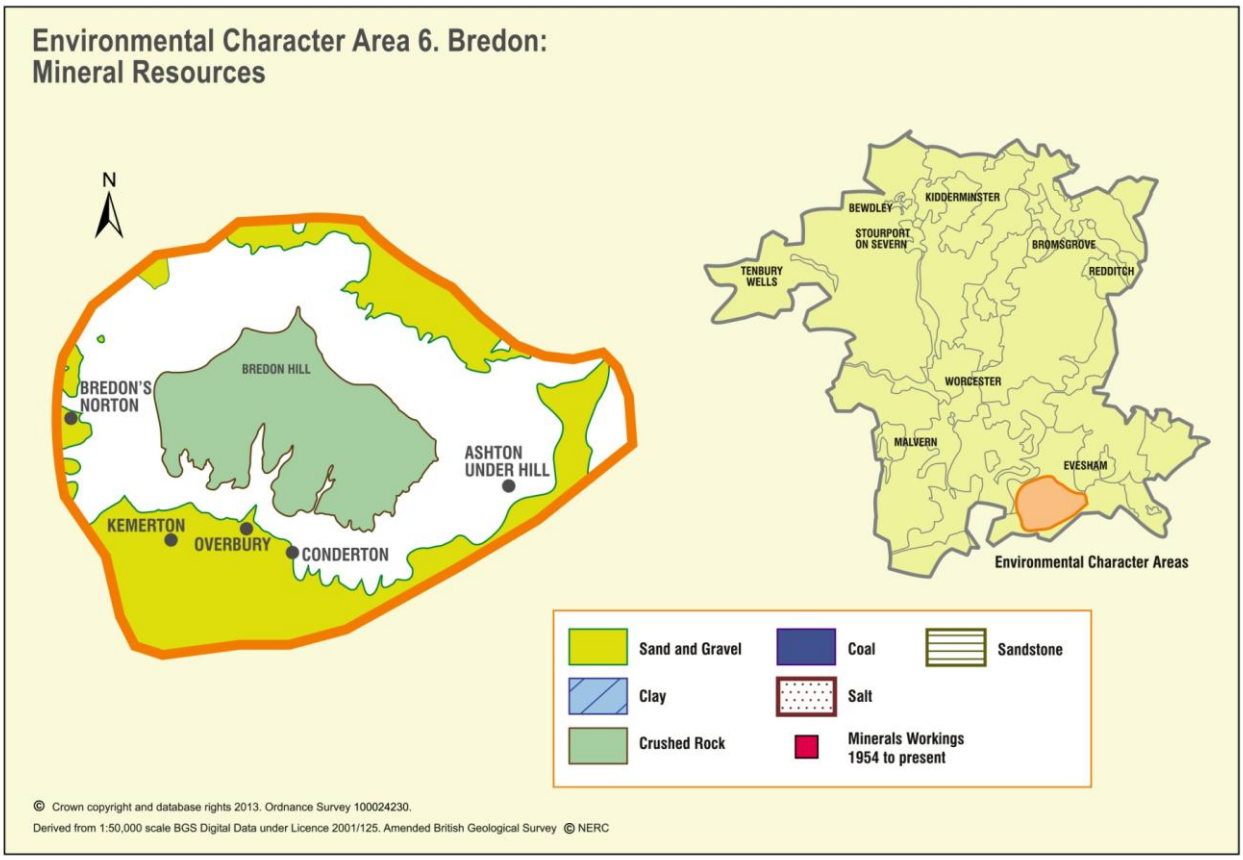
These are illustrated on Figure 1. Environmental Character Areas.

Figure 1. Environmental Character Areas



2. Characteristics and priorities of the Bredon ECA 6

Figure 2. Environmental Character Area 6 Bredon: Mineral Resources



Mineral Resources

Aggregates

2.1. Details about the aggregate resources in this ECA are given in the background report "Analysis of Mineral Resources in Worcestershire" available on www.worcestershire.gov.uk/mineralsbackground. The following is therefore only a simple summary.

Sand and gravel

2.2. ECA 6 includes potentially important resources, including fan gravels and terrace deposits in wide sweeps across the area. Some of these deposits have been extensively worked under several planning permissions but the deposits are covered by clays and silts and estimates of the depth and quality of the resource are difficult to calculate.

Hard rock

2.3. The ECA includes potentially very large limestone deposits in Bredon Hill but the quality and extent of the resource varies across the site. Several

old quarries, all of which preceded planning controls, can be identified. Large areas of the slopes around the hill are covered by clay, mudstone and silt landslips and are demonstrably unstable.

Building Stone

2.4. The hill has clearly been worked in several places in the historic past and the older houses, walls and outbuildings villages all around it are almost completely built from local stone.

Industrial minerals

Clay

2.5. The hill is surrounded by massive landslips of mudstones (to the west) and Upper and Lower Lias Clays and silts to the east. There is no clear evidence however of significant clay works in the area.

Silica sand

2.6. There is no evidence that suitable strata exist.

Brine

2.7. There is no evidence of brine working in this area or that Halite deposits might exist at depth.

Future Growth

2.8. The key driver for mineral extraction is to provide the raw materials required for the economy to function properly and for homes and infrastructure to be built. Minerals are unevenly distributed. Some of the minerals that we need are not found in Worcestershire and will need to be imported from outside the County. Many minerals are expensive to transport, particularly aggregates as they are a relatively low value and bulky material, and they are likely to be used close to their source, meaning that some local mineral extraction will be needed to support local growth in housing and the associated infrastructure that is required, or to provide raw materials for local industry. On average, about 80 per cent of mineral products are used within 30 miles of the quarry.

2.9. This ECA is a rural area within Wychavon District. The district anticipates the development of 5,807 homes, 18.5 ha of employment land and a new neighbourhood centre in the next 14-18 years[4]. The ECA includes the Catergory 1 village of Bredon and the Category 2 villages of Ashton under Hill and Overbury which are proposed for some development in the South Worcestershire Development Plan proposed submission document[5].

[4] Information gathered by Worcestershire County Council in early 2013. This gives a good indication of the likely levels of development which can be expected, but for the latest figures please refer to the relevant City, District or Borough Council.

[5] Category 1, 2 and 3 villages are fourth in the five tier settlement hierarchy set out in the South Worcestershire Development Plan proposed submission document. Their role is predominately aimed at meeting locally identified housing and employment needs. They are therefore suited to accommodate market and affordable housing needs alongside limited employment for local needs. The scale of allocated development is significantly less than that

2.10. These and other areas beyond the boundary of the ECA could create demand for minerals in this Environmental Character Area, including Tewkesbury and Ashchurch approximately 3km to the south of the ECA which are proposed as strategic or housing allocations in the Gloucester, Cheltenham and Tewkesbury Joint Core Strategy "Developing the Preferred Option" consultation document.

Green Infrastructure priorities[6]

2.11. All Environmental Character Areas (ECA's) have been placed into one of three categories based on their overall score for Green Infrastructure. These are:

1. Protect and enhance
2. Protect and restore
3. Restore and create

2.12. The category is based an assessment of the ECAs landscape character, biodiversity and the historic environment characteristics. These characteristics were each attributed a score, with biodiversity being given a greater weighting than landscape and the historic environment, each of which were given equal but lower weightings.

2.13. The strategic GI approach for the Bredon ECA is to *protect and enhance.* The overarching principle identified by the GI partnership is to protect and enhance Bredon Hill National Nature Reserve.

Landscape and biodiversity

2.14. The Bredon Environmental Character Area corresponds to the Cotswolds and Bredon Hill Regional Landscape Character Area identified by the County Landscape Character Assessment and includes a band of flatter encircling land. Bredon Hill is a National Nature Reserve (NNR) and is geologically part of the Cotswolds. The hill lies within the Cotswolds Area of Outstanding Natural Beauty but as the result of erosion over millions of years it now stands isolated in the Vale of Evesham.

2.15. The predominant lowland Landscape Types in this south-eastern quadrant of Worcestershire are typical of the planned landscapes making up the central part of England. These are organised landscapes, quite different in character to the more organic, ancient landscapes of the west. The county Landscape Character Assessment identifies the flat area of land encircling Bredon Hill as Principal Village Farmlands where woodland is not typical, tree cover being confined to sparsely scattered hedgerow and streamside trees. This area was once heavily treed with hedgerow elms and their loss has transformed the character of the landscape. Medium-to-large scale fields are characteristic, separated by hedgerows and

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for the urban areas and is aimed at helping to address housing needs and support local services.

[6] Worcestershire County Council (July 2012) *Planning for a Multifunctional Green Infrastructure Framework in Worcestershire: Green Infrastructure Framework 2*

intensively cropped for cereals and market gardening. The settlement pattern is nucleated with farms being sited within or on the edge of villages and not in the open countryside as is the case in most of the more ancient, western parts of the county.

2.16. The central part of the ECA consists of the rising land of Bredon Hill, topped with the Landscape Type identified as Limestone Estatelands where, at the summit, adjacent to Kemerton Camp, is a small stone tower called Parsons Folly (or the Tower). Outstanding panoramic views from here extend across the Vale of Evesham and beyond. The Limestone Estatelands are characterised by large fields, separated by drystone walls on thin, stony soils. Woodland is of a planned character being generally estate plantations and belts of trees with a noticeable element of beech, which thrives on such poor soil.

2.17. Encircling this are the two areas of Principal Wooded Hills and Wooded Hills and Farmlands on the lower, more fertile slopes. Here the soil is deeper and less stony and can support native woodland and mixed crops. Hedges are a prominent feature of these landscapes. Superimposed on the rural landscape character are the two ancient parklands at Overbury Court and Castle Hill, both important for their veteran trees and unimproved grassland.

2.18. The 46 ha of the Nature Reserve is part of a wider area designated for conservation including a SSSI and a Special Area for Conservation. The latter designation is in place to protect the rare violet click beetle which is only found within three sites in the UK. Bredon's other most important feature is its collection of invertebrates associated with old trees and dead wood, and the hill ranks as one of the top five sites in Britain for these creatures.

2.19. The site of the NNR has been used for sheep pasture for hundreds of years creating a mixture of scrub, grassland and wood pasture. A feature of the scarp slope is the large number of open-grown trees, many of which are more than 300 years old and direct descendants of the original 'wildwood'. They are home to a vast array of invertebrates that depend on decaying wood in ancient trees.

2.20. The unimproved grassland is herb-rich with salad burnet, wild thyme, common rock rose, pyramidal orchid and dwarf thistle. Locally uncommon plants found here include chalk milkwort, horseshoe vetch and bee orchid. Glow-worms are frequently seen at the site and butterflies found in the grassland areas include marbled white, brown argus and dingy skipper. The scrub areas, characterised by hawthorn and ivy, with elder and blackthorn, provide important breeding sites for many bird species including whitethroat, linnet and yellowhammer.

GI Priorities:

2.21. The landscape and biodiversity priorities identified for the Bredon ECA are[7]:

- Protect the historic pattern of field enclosure (rectilinear drystone walls in the Limestone Estatelands; organic pattern of hedgerows in the Wooded Hills of the north scarp; large hedged fields in the Wooded Hills and Farmlands of the south scarp);
- Protect and enhance tree cover pattern (linear tree belts and small estate plantations in the Limestone Estatelands; large, interlocking native woodland in the Wooded Hills of the north scarp; large, discrete woodland blocks on the south scarp); address the balance and intensity of land use as appropriate in each of the Landscape Types, where possible seeking opportunities to restore permanent pasture.
- Manage and protect the valuable grassland and scrub habitats, especially within the NNR.
- Encourage the continuation of sheep pasture.
- Protect the veteran tree resource.
- Acknowledge and protect the historic parklands.
- Priority to protect, buffer and enhance existing sites to create linked networks of habitat where possible.
- Restore and enhance calcareous grassland.

Geodiversity

2.22. Bredon Hill is an outlier of the Cotswold escarpment and is formed of the same Jurassic (205-142 million years ago) rocks. The main mass of Bredon Hill is formed by clays and silts deposited in shallow sea, which are overlain by the iron-rich sandy limestone of the Marlstone Rock. The top of the hill is formed by the shallow marine sands and limestones of the Middle Jurassic Inferior Oolite. A zone of large, fossil landslips can be seen on the southern slope of Bredon Hill, north of Kemerton. These have occurred at the junction between the Inferior Oolite and the underlying clays of the Lias. The clays form an impenetrable barrier to water, which seeps naturally through the porous limestone above, forming a natural spring-line around the southern flanks of Bredon Hill[8].

2.23. There are five Local Geological Sites in the ECA.

Historic Environment[9]

2.24. Bredon Hill and the small area of the Cotswold scarp at Broadway represent are important historic landscapes; Bredon Hill is significant for prehistoric monuments including Iron Age hillforts. at Bredon Camp and Conderton Camp both of which have been the subject of programmes of excavation (Cruso Hencken 1938; Thomas 2005), while a double Beaker

[7] Worcestershire County Council (July 2012) *Planning for a Multifunctional Green Infrastructure Framework in Worcestershire: Green Infrastructure Framework 2*

[8] Natural England, England's geology, Sites, Bredon Hill - http://www.naturalengland.org.uk/ourwork/conservation/geodiversity/englands/sites/local_ID101.aspx

[9] Historic Environment and Archaeology Service, Worcestershire County Council and Cotswold Archaeology (R Jackson and H Dalwood et al) (November 2007) *"Archaeology and aggregates in Worcestershire: A resource assessment and research agenda"* Supported by English Heritage through the Aggregates Levy Sustainability Fund.

burial discovered on Bredon Hill in 1963 (Thomas 1967) is also an important find.

2.25. The lower slopes, especially the gentler southern slops are extremely rich in archaeological site, ranging from prehistoric, through Romano British, Anglo Saxon and medieval. There are 10 Scheduled ancient monuments in this character area, making it the highest density of designated sites. Palaeolithic artefacts have been recovered making this area important for remains of this date. While much of the southern gravels have been worked, where undisturbed deposits occur there is a high potential for significant remains.

2.26. On the north-eastern slopes stands the remains of Elmley Castle.

2.27. Historic landscape character is dominated by estate farmlands with planned enclosure over much of the areas. Variations occur along the upper northern slops with the partial enclosure of upland grazing by stone walls and scattered woodlands.

GI Priorities:

2.28. The historic environment priorities identified for the Bredon ECA are[10]:

- Conserve the HE diversity of Bredon Hill and its hinterland: extensive below ground prehistoric and Romano-British settlement on the southern slops and Carrant Brook corridor; upland character grazing with dry stone walling on the northern and western slopes with prehistoric and Romano-British settlement on the northern lowlands adjacent to the Avon.

Blue Infrastructure

2.29. At least 12 small, un- named streams are mapped in this ECA at 1:50,000 scale. The Merry Brook and another, important large, un-named stream, (running from Elmley Castle to Cropthorne) rise in this ECA and feed into the Avon.

2.30. The principal risk of flooding in this part of Wychavon is from the River Avon in Evesham and Pershore and many small watercourses in the rural areas, surface water is also an issue in many locations. Wychavon LPA considers that Beckford and Little Comberton both outside of, but adjoining this ECA, are not defended to a satisfactory standard.

2.31. The geology can have an effect on the runoff, and the flooding, within a catchment as a result of the permeability of the strata. The geology within South Worcestershire is variable. Impermeable clays and mudstones dominate the Warwickshire Avon sub-catchment and Groundwater flooding is not considered to be a major issue in the South Worcestershire Joint Core Strategy area.

[10] Worcestershire County Council (July 2012) *Planning for a Multifunctional Green Infrastructure Framework in Worcestershire: Green Infrastructure Framework 2*

2.32. The River Severn Catchment Flood Management Plan makes this a Policy 3 area, where it will "Continue with existing or alternative actions to manage risk at the current level."

Water Quality

2.33. Most of this ECA is categorised as either having water company point source pressure or agricultural/diffuse pollution pressure.

2.34. The River Avon west of Evesham, Merry Brook and the un-named stream running from Elmley Castle to Cropthorne have moderate ecological potential but contain unacceptable levels of phosphorus and of Benzo(ghi) perelyne and indeno (123-cd) pyrene to be able to achieve a good status. Groundwater status is classified as good.

Water quantity

2.35. No water is available.

GI Priorities:

2.36. The blue infrastructure priorities identified for the Bredon ECA are[11]:

- Reduce dependence on raised flood defences, as this is unsustainable in the long term, by taking opportunities to restore sustainable natural storage of floodwater on undeveloped floodplains.
- Make more space for rivers through urban areas via 'blue corridors' (i.e. Restoring access for floodwater onto key strips of floodplain. This requires redevelopment to be limited to flood-compatible land-uses e.g. parkland).
- Some designated 'aquatic conservation' sites are in unfavourable condition. Activities that affect these sites must be changed to improve their condition.
- Ensure that the run-off from all proposed development is minimised. For example, SUDS must be encouraged and targeted within planning approvals.
- Encourage the retro-fitting of SUDS where surface water flooding is already a problem.
- Support ecological improvements. Examples of this include Severn & Avon Wetlands Project; Natural England's three fluvial SSSIs; Cotswold AONB.

Access, informal recreation and tourism

2.37. This ECA is in Wychavon District. Only 3.6% of the Wychavon District is accessible natural greenspace, this is the lowest proportion across all districts in Worcestershire. As a whole accessibility to greenspace is poor with only 20% of households in Wychavon are within 5km of 100ha+sites and 2% of households within 10km of 500ha+sites.

[11] Worcestershire County Council (July 2012) *Planning for a Multifunctional Green Infrastructure Framework in Worcestershire: Green Infrastructure Framework 2*

2.38. There are 3 sub-regional recreation assets in Wychavon District. One of these, Bredon Hill, is located in this ECA. Bredon Hill is classified as one of the outliers to the Cotswolds and is used primarily for informal recreation using the network of footpaths on the site. It is also a Special Area of Conservation and a National Nature Reserve, with the result that the site is very sensitive to visitor pressure.

2.39. There are deficiencies in opportunities for access and recreation across the Vale of Evesham, with the Rights of Way network being less dense than in any other area of the County. There is also a lack of sites such as Country Parks, picnic places and Registered Commons. Few nature reserves exist although there are a number of smaller community sites such as Village Greens and Millennium Greens.

2.40. Provision is required at both a strategic and neighbourhood level. At a neighbourhood or local scale there is scope for towns and villages to address natural greenspace needs within the rural communities. This should be a requirement of development and other options should be explored for existing communities such as stewardship agreements.

GI Priorities:

2.41. The access and recreation priorities identified for the Bredon ECA are[12]:

- Consider the proximity to and ability to integrate with the rights of way network, recreational way-marked routes and the cycle network;
- 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.
- 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.
- 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.

Transport

Road

2.42. All roads in this Environmental Character Area are minor, although the A46 between Evesham and Tewkesbury runs close to the southern edge of the ECA.

2.43. The Worcestershire Advisory Lorry Route Map does not show any low bridges which would restrict the movement of vehicles over 16'3" (4.95m) on the lorry route network. Local roads may have further restrictions and will need further assessment if they are to be used for accessing mineral resources.

[12] Worcestershire County Council (July 2012) *Planning for a Multifunctional Green Infrastructure Framework in Worcestershire: Green Infrastructure Framework 2*

Rail

2.44. There are no network rail lines in the ECA, although the Birmingham-Bristol line passes near to the western edge of the ECA.

Water

2.45. There are no navigable waterways in the ECA, although the River Avon is near to the northern boundary at Great Comberton. It is an operational river navigation, capable of carrying commercial traffic and is navigable for 45 miles from Tewkesbury to Stratford on Avon.

GI Priorities:

2.46. The GI transport priorities identified for the Bredon ECA are[13]:

- 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.

LTP Priorities:

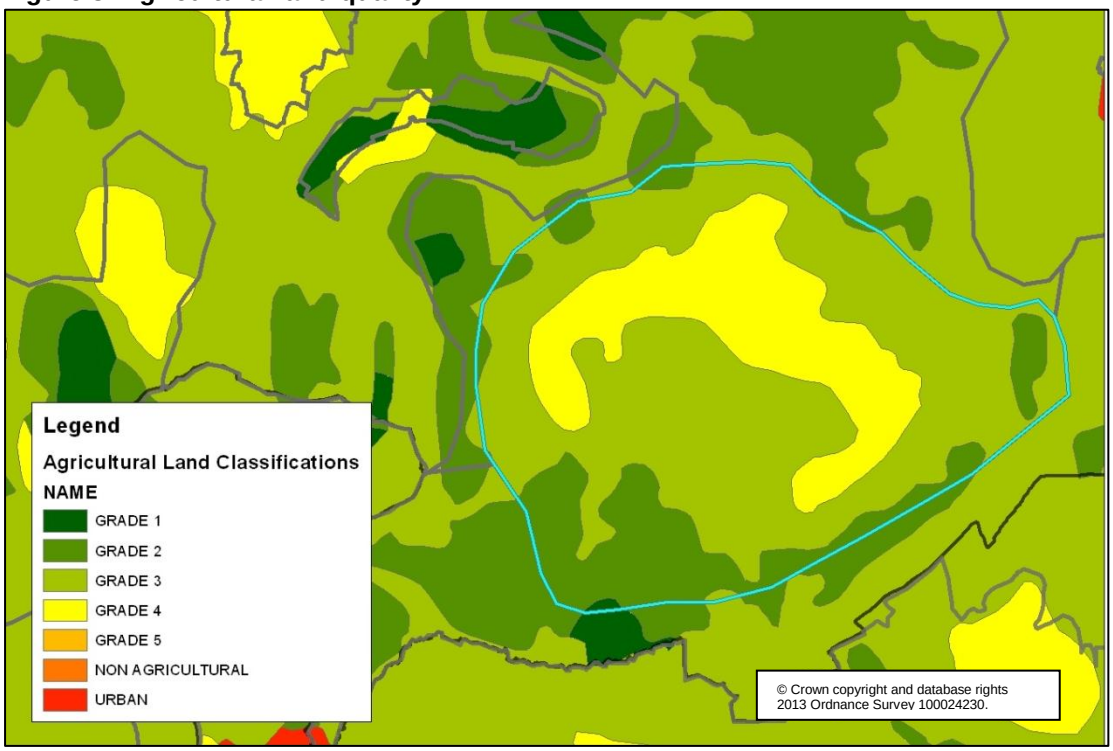
2.47. There are no LTP transport priorities identified for the Bredon ECA.

Agriculture/Forestry

2.48. The agricultural land use in this ECA is dominated by mixed farming and pastoral land on and around Bredon Hill with cash crops around the perimeter. Agricultural land quality varies across the area, with low grade 4 land on Bredon Hill, become better quality grade 3 land and high quality grade 2 land around the edges of the ECA, as shown in Figure 3.

[13] Worcestershire County Council (July 2012) *Planning for a Multifunctional Green Infrastructure Framework in Worcestershire: Green Infrastructure Framework 2*

Figure 3. Agricultural land quality



2.49. The forestry commission's woodland opportunity maps show that a large proportion of this ECA is listed as priority 2 for woodland creation which could benefit landscape character, biodiversity, cultural heritage and/or public access (Figure 4). They also show that some of the ECA around Bredon Hill is an ancient woodland landscape which is prioritised for woodland restoration (Figure 5).

Figure 4. Woodland creation for landscape, biodiversity, heritage and public access

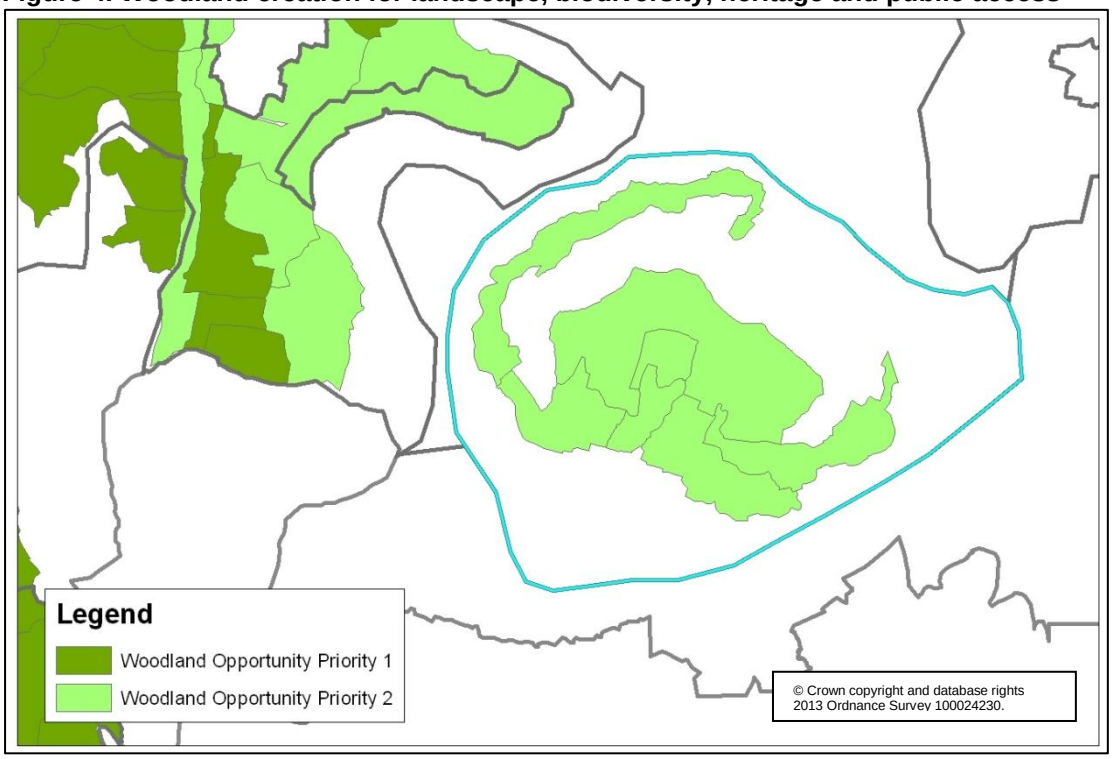
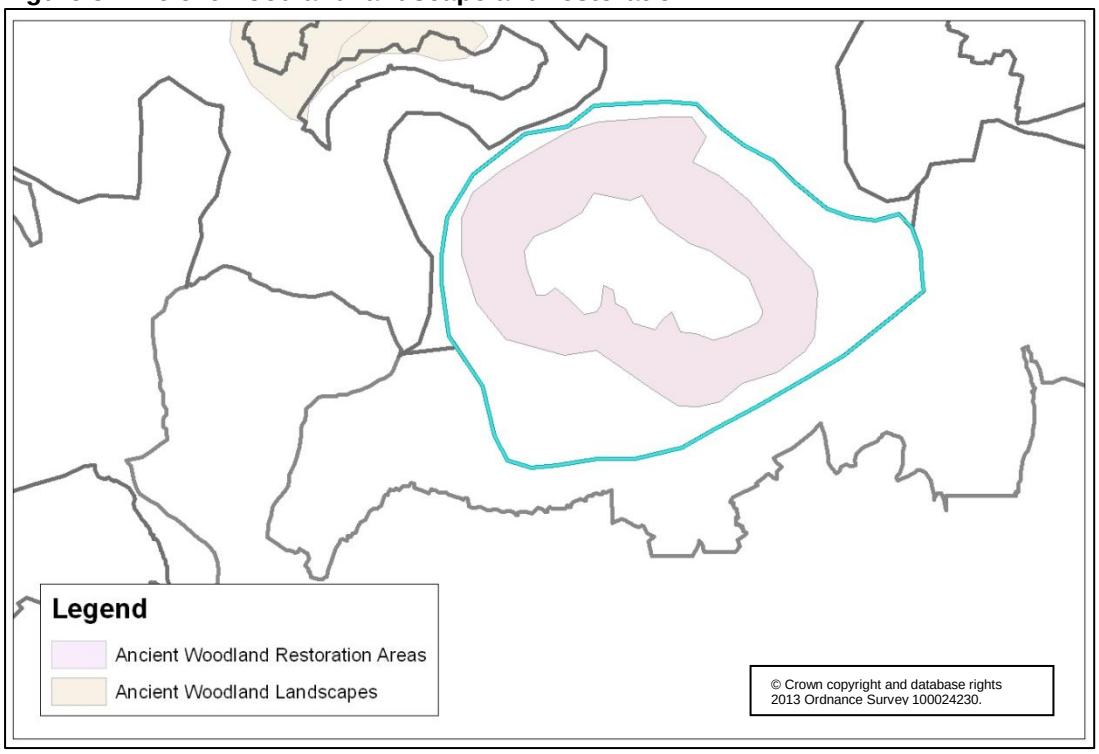


Figure 5. Ancient woodland landscape and restoration



Climate Change

2.50. Some effects of climate change will be similar across the whole county and many of the issues which can be addressed are likely to be common to all ECAs, such as:

- Improving air quality
- Providing flood risk management solutions
- Preventing water and soils pollution as a result of climate change related extreme weather conditions
- Promoting energy efficient and low carbon solutions
- Contributing to renewable energy production

Opportunities and issues

2.51. Green Infrastructure features such as buffering of watercourses provide a way of minimising fluvial flooding. Planned landscaping incorporating flood defences could provide both and short term benefits and sustainable drainage schemes (SUDS) are a mechanism for managing both fluvial and pluvial flood risk.

2.52. Agricultural and horticultural businesses could face damaging water shortages in the coming decades as a result of climate change. In many parts of Worcestershire, water resources are under severe pressure. The majority of catchments in which horticultural production is concentrated have been defined by the Environment Agency as being either over-licensed and/or over-abstracted. Well executed water storage facilities could not only provide water supply for the business in the dry periods but

a wide range of green infrastructure benefits such as biodiversity or landscape and opportunities for increased physical activity and exposure to nature.

2.53. Large and important areas of heathland, bracken and conifer woodland in this ECA are amongst the habitats most at risk from fire as a result of climate change.

Socio-economic considerations

3.54. The analysis of the socio-economic situation in Worcestershire in this strategy considers the economy and health & well-being at a high level. It is not intended to draw a full picture of the economy or health and well-being in the county, instead it focuses only on the indicators which are of most relevance to green infrastructure:

- **Economy**: unemployment, household income and deprivation levels.
- **Health and well-being**: health deprivation, heart diseases, obesity, mental health problems and respiratory conditions.
- **Access to sites for informal recreation**: considers links between informal recreation opportunities and mental and physical well-being.

2.55. There is thought to be a link between green infrastructure and some aspects of health. The issues of obesity, respiratory conditions, mental health, heart disease and health deprivation have been considered in this context.

2.56. 26% (120,000) of the Worcestershire's adult population is obese and another 40% is overweight. The adult obesity levels in Worcestershire are higher than the national average. The level of childhood obesity is around the national average, at 10% of five year olds and 18% of eleven year olds. In terms of land cover, most of the Worcestershire area has some problems with obesity. The areas in proximity to Bredon Hill are however amongst the better performing areas in the county.

2.57. Obesity and respiratory problems in this county generally follow the same geographical pattern. Mental health problems, by contrast, tend to be found in the and around major settlements. Although mortality rates from cardiovascular diseases are significantly lower than the national rate, patterns of heart diseases are more dispersed than the other health indicators assessed and poor performance is found across the county. Contrary to other health indicators, heart diseases are least prevalent in some of the urban areas.

2.58. The overarching principles identified by the GI partnership regarding socio-economic matters for this ECA are:

- Primary focus on enhancements to support overall health of residents.
- Support for employment creation.