Landscape character assessment

Landscape character overview
The hierarchy of character mapping

Method and structure of the landscape character assessment
Explanation of landscape types and guidance, as an introduction to the sections that follow

Landscape character assessment
Description and analysis of the nine landscape character types

Landscape character overview

The Brecks LCA promotes the unique landscape character of the Brecks, the variety of different landscapes within the area and a record of what is distinctive and special within each landscape type, as well as landscape elements and features that are particularly vulnerable to change. It fits within the hierarchy of landscape character units established at national, county and district level. As the study location plan (Map 1 on page 5) shows, the Brecks LCA study area covers parts of three counties and five districts so a landscape character assessment of the Brecks must refer to and complement several existing assessments.

The Brecks LCA has not 'started afresh' but has used the existing LCAs as a core reference, reviewing and amending the boundaries of landscape types and drawing on the existing descriptions to develop a 'Brecks-centric' assessment. The core LCAs used as a reference are:

- East of England Regional Typology[13]
- Suffolk County Landscape Typology[14]
- Breckland District LCA[15]
- Kings Lynn and West Norfolk LCA[16]

Setting aside the larger scale East of England typology, the other three studies map 29 different landscape character types within the study area. The Brecks LCA refines these down to nine landscape types, which together describe the landscape character of the Brecks NCA.

The core distinctive landscape types of the Brecks are the Brecks Arable Heathland Mosaic, the Brecks Plantations and the narrow River Valleys, but the boundary of NCA 85 incorporates parts of the contrasting landscapes that fringe the Brecks, including the Rolling Clay Farmlands to the north and east, the Plateau Estate Farmlands to the south and east and the Settled Fens to the west.

The nine Brecks landscape types are shown on Map 5 (page 26) and are described in detail in the subsections that follow. Note that a tenth landscape type, Rolling Chalkland Estates, is also shown on the map but is not described in this report because it is marginal to the character of the Brecks. Information about this landscape type can be found on the link to Suffolk County Council's landscape typology[12].

Many landscape character assessments also define local, geographically specific landscape character areas. This level of detail has not been included in the Brecks LCA, where the focus is on landscape character types which best describe the way that people experience and recognise the Brecks – as areas of heath, plantation, farmland and river valley.

[13] http://landscape-east.org.uk/east-england-landscape-typology

[14] http://www.suffolklandscape.org.uk/landscape_map.aspx

[15] Breckland District Landscape Character Assessment, Chris Blandford Associates, March 2007 - http://80.82.124.74/sites/default/files/Uploads/Landscape%20Character%20Assessment%20-%20May%202007%20Final.pdf

[16] King's Lynn & West Norfolk Landscape Character Assessment, Land Use Consultants, May 2007 - http://www.west-norfolk.gov.uk/Default.aspx?page=24625

Although the Brecks has a relatively large scale landscape pattern, people tend to experience the landscape in quite a compartmentalised way. This is because settlement has long been concentrated in the narrow river valleys and because large scale land uses, not least the extensive conifer plantations of Thetford Forest, the airfields and the fenced off STANTA, restrict views to substantial areas. Rather than map and describe the potentially large number of local landscape character areas in the Brecks, the Brecks LCA focuses on the pattern of landscape types.

Section 4 of this report explains how this pattern of landscape types has provided the framework for the specific land use history that sets the Brecks apart from surrounding landscapes. 'Zooming in' on five case study areas, it describes the evolution of local landscape character, illustrating how remnants from layers of history create 'time-depth' and a unique sense of place.

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Map 8
Landscape character

Method and structure of the landscape character assessment

The methodology for the Brecks LCA follows national guidance[17]. It is an 'integrated LCA' which provides a detailed, integrated description of the landscape type which covers relevant aspects of physical, historic, land use, biodiversity, settlement and aesthetic character in a fluent style. The sub-sections for each landscape type include an analysis of what is important and why?

This is an important part of the assessment which focuses on landscape sensitivity, significance and value. The two are closely inter-related as the most sensitive aspects of landscapes are typically those that are also important because they are unusual or special examples of their type. The methodology is set out in the Topic Paper on techniques for judging landscape capacity and sensitivity prepared by the former Countryside Agency (now Natural England)[18] which considers:

- **landscape character sensitivity** - the degree to which the landscape is robust and able to accommodate change without adverse impacts on its character - records the sensitivity of individual elements of the landscape, particularly those that are critical to distinctive landscape character, as well as the physical condition and its 'intactness';

- **visual sensitivity** - the general visibility of the landscape (influenced by the screening effects of landform and land cover), the number and type of people likely to perceive any changes that occur and the potential scope to mitigate the visual effects of landscape change that might take place; and

- **landscape value** - areas of land that are recognised for their biodiversity, heritage or possible literary or artistic importance by designations or other published material such as guides or promoted walks.

Finally each landscape type section contains guidance for land management which describes how landscape change can be directed to conserve and enhance distinctive landscape character.

The sub-sections that follow provide an integrated assessment of the character, and sensitivity of the nine landscape character types identified within the Brecks LCA, along with guidance for managing landscape change:

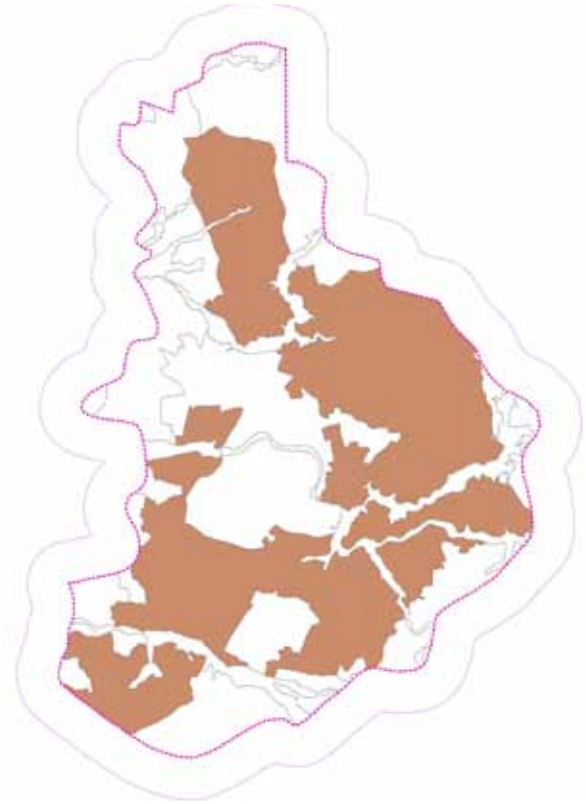
- Brecks Arable Heathland Mosaic
- Brecks Plantation
- Low Chalk Farmland
- Rolling Clay Farmland
- Plateau Estate Farmland
- Settled Fen
- River Valleys
- Chalk River Valleys

[17] Landscape Character Assessment Guidance for England and Scotland, Countryside Agency, 2002

[18] Landscape Character Assessment Series: Topic Paper 6 - Techniques and Criteria for Judging Capacity and Sensitivity, The Countryside Agency and Scottish Natural Heritage, 2005

Brecks Arable Heathland Mosaic

Brecks Arable Heathland Mosaic



Distinctive landscape characteristics

- Flat or gently sloping plateaux underlain by chalk, but with free-draining sandy soils
- Large scale mosaic of lowland heath, mixed farmland, conifer plantations, broadleaf woodland and tree belts
- Juxtaposition of acid and calcareous soils contributes to distinctive and exceptionally rich biodiversity
- Belts of contorted Scots pine form a striking silhouette against the fields, defining the Brecks
- Strongly geometric structure of fields, tree belts, roads and tracks
- Virtually no villages, but a dispersed pattern of farmsteads, hamlets and estates
- Wealth of archaeological heritage charting continuity of settlement from Mesolithic times and including Neolithic flint mines, medieval priories and rabbit warrens, 18th century designed parklands and 20th century military defences and training grounds

Landscape character

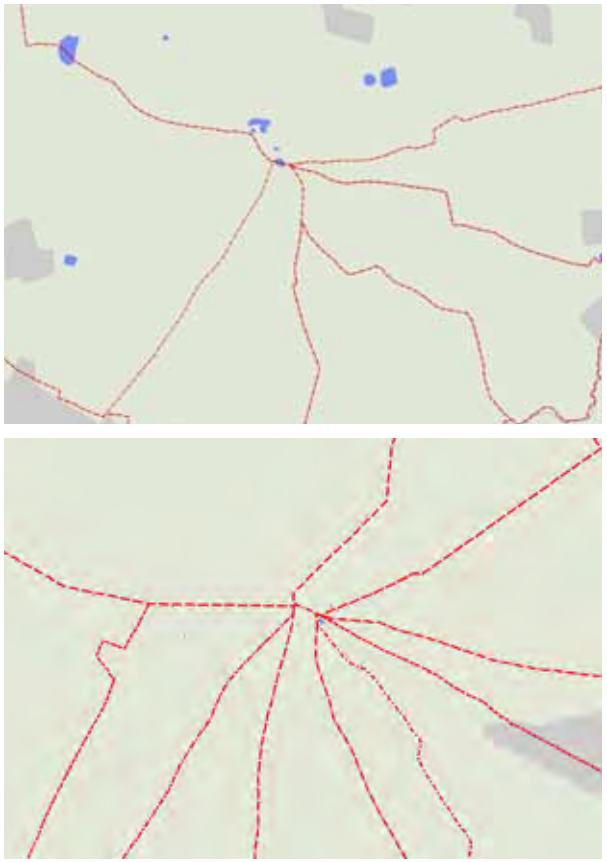
Flat or gently rolling plateaux with free draining, sandy soils overlie a varied mix of glacial sand, clay and gravel deposits. Much of the surface has a covering of acidic sands, but the sands often overlie a calcareous substrate and in some parts of the plateau the dominant soil type is a chalky rendzina. Occasionally the different types of soil are juxtaposed at a microscale creating areas of 'patterned ground' where contrasting stripes of chalk and acidic grassland/heather grow on slight ridges and troughs of sandy and chalky soils. Most examples have been 'lost' under encroaching tree and scrub cover but the phenomenon is visible on heaths and commons such as Brettenham Heath.

There are few watercourses on the plateaux of the Brecks Arable Heathland Mosaic, but scattered across the heaths to the north and east of Thetford, particularly near Wretham, are rounded meres or dolines, where water levels vary according to levels of saturation in the chalk bedrock below. Examples are Fowlmere, Mickle Mere, Ringmere and Langmere. Other, small-scale tightly clustered groups of marshy depressions and rounded pools are thought to be relic ground ice depressions which date

from periglacial times. Some of these are 'pingos' which formed when freezing ground-ice expanded to create a rounded mound, which subsequently collapsed to become a circular pond or wetland when the ice thawed as conditions warmed. These features usually occur where the underlying chalk bedrock is relatively close to the surface, mantled by shallow deposits. On the Brecks Arable Heathland Mosaic there are striking examples on and around Thompson Common and near the village of Great Hockham.

Pollen records from Hockham Mere suggest that a mosaic of heathy vegetation developed from Neolithic times, when early settlers first cleared post glacial vegetation. While permanent settlements were sited in river valleys, the higher, drier parts of the plateau were used for grazing, maintaining a fairly open landscape and encouraging the establishment of lowland heath. Relatively minor embankments would have been prominent in this open landscape and it is thought that the Bronze Age burial barrows sited along the upper margins of river valleys might have been prominent 'markers' in the landscape. There are many such tumuli throughout the central Brecks, but a good example is the Seven Hills on the ridge between the valleys of the River Thet and the Little Ouse near Brettenham – the line of barrows may have been visible from both valleys.

As the medieval economy developed, the dry, sandy soils of the upper chalk plateau were of marginal fertility and some were used as common land, for sheep grazing and as rabbit warrens. The layout of parishes was designed to provide a transect across a range of soil types, from the low lying silts of the river valleys to arable fields on the more calcareous soils and grazing lands on the seasonally dry plateaux. The latter were farmed as temporary outfields or 'brecks' which were grazed or later ploughed for a period of time before being left to revert to heath. Sheep were systematically moved from the heaths to overnight 'folds' on permanent arable land, which benefitted from the dung. The meres were an important source of water on the plateau and the boundaries of parishes sometimes converged to take advantage of them. For instance nine parishes meet near the mere at Rymer and six near Ringmere.



Parish boundaries are aligned to take advantage of the fluctuating meres - a valuable source of water on the dry plateau. Ringmere and Langmere above; Rymer Mere below

Straight tracks across an arid heathland plateau

The earliest warrens were established on the poorest soils and were owned by ecclesiastical landlords: the Bishop of Ely had a warren at Brandon by 1252 and the prior and convent of Ely had received a specific grant of a warren at Lakenheath in 1300, but had held 'free-warren' hunting rights since 1251. Warrens were often enclosed by large turf embankments, which served to help keep the rabbits away from adjacent crops and to define ownership.The larger warrens had defensible lodges to protect gamekeepers and hunting parties against armed poachers.

The lack of water on the sandy Brecks plateaux and the relatively infertile soils discouraged the development of settlements, a pattern which persists today. Villages are concentrated on the

sides of the valleys that run through the Brecks, with scattered small hamlets and farmsteads on the drier central plateaux.

From the 15th century onwards, low land prices and a sparse population, reduced by recurring outbreaks of plague, provided opportunities for the amalgamation of landholdings. This trend gathered pace in the 18th and 19th centuries when the popularity of game shooting and the cheapness of the land offered an opportunity for 'new money' to acquire the status symbol of a landed estate, for instance at Kilverstone and West Tofts. Many of the warrens and heaths became part of these shooting estates or were enclosed during the 18th and 19th century periods of agricultural improvement. The geometric pattern of fields, bordered by straight roads and tracks, that is so typical of the Brecks dates from the map-based work of surveyors at this time.

By the mid 19th century much of the Brecks was enclosed; the remaining extensive areas of common heathland and warrens were areas where the soil fertility was too low to merit investment. However during the agricultural depression of the 1880s and through into the early 20th century, much of the heathland that had been reclaimed during the enclosure was left to revert to heath, repeating the pattern of the local economy in previous centuries.

Knettishall Heath - a remnant of the medieval common heathland and warrens, where the soil fertility has always been too low to merit investment in permanent agricultural crops

Written comments from travellers from the seventeenth century onwards suggest that the Brecks was a relatively barren, desert-like landscape, with vast tracts of sand and limited vegetation. Where overgrazing reduced the protective cover of vegetation, the sandy soils were subject to wind blow and sometimes formed dunes which moved across the landscape. The large landowners responded with an intensive programme of tree planting, initially on and around their mansions and parks, but also within the wider agricultural landscape. During the early 19th century, many landowners followed a fashion for planting Scots pine 'hedges' to enclose their fields. Scots pine grows successfully on the infertile, sandy Brecks soils and these early 19th century pine hedges, which have grown up to form pine trees with contorted, sculptural forms, are a distinctive feature of the Brecks today.

Today the Brecks Arable Heathland Mosaic is a large scale, extensive mosaic of lowland heath, rectilinear plantation woodlands, tree belts and arable fields, with some remaining areas of parkland. In the 20th century the widespread use of irrigation has transformed the agricultural potential of the land and irrigated vegetable crops form part of the agricultural mosaic. Pig farming is also common and often visually prominent. Most vernacular buildings are farmsteads, barns or estate buildings from the 18th and 19th centuries. Many are built of brick and a 'white'

The boundary of the Stanford military training area - sometimes lines of pines and plantations form abrupt edges, but elsewhere the boundary is softened by regenerating pines and heathland scrub. Wire fences control stock

One of the cluster of pingos on Thompson Common

brick which is actually yellowish grey or cream in colour is common near Culford and Thetford.

While agriculture is an important part of the local economy, extensive tracts of lowland heath are conserved as nationally and internationally important habitats. The core habitats are the open dry heaths, areas of acidic and calcareous grassland, inland sand dunes and the wetlands associated with meres and periglacial depressions. The citation for the Breckland Area of Special Conservation states that the Brecks contains mosaics of heather-dominated heathland, acidic grassland and calcareous grassland that are unlike those of any other site. The Brecks heaths support rare flora and fauna including rare plants such as perennial knawel (found on dry heaths), the grey hair-grass (found on active inland sand dunes) and ground nesting birds such as stone curlew, woodlark and nightjar.

This landscape was historically far more extensive than it is today, but a large area of the heaths and estates was planted with conifers by the Forestry Commission from the 1920s and is described as a separate landscape type – Brecks Plantations. The flat landform, sparse population extensive scale of the Brecks Arable Heathland Mosaic landscape proved suitable for the development of World War II airfields, which were established at Lakenheath, Cavenham, Honington and Knettishall. The bases at Knettishall and Cavenham have since been disbanded: at Knettishall the land has reverted to agricultural use; at Cavenham the airfield site has been used for sand and gravel extraction. The extensive military training area at Stanford is cut off from public access, but has provided an opportunity for the conservation of an extensive area of rare and highly valued heath habitats.

This is a relatively open and very extensive landscape, with long views which are always framed by pine lines and plantations. The straight roads are busy noisy corridors of movement, but away from the roads the landscape feels remote and peaceful, with a touch of wilderness at times. The landscape has a richly textured, colourful and rather unkempt character – the smooth, cultivated arable fields contrast with the rough textures of the bracken strewn verges and pine lines alongside. Arable fields predominate, but intensive pig farming and some poultry farming also forms part of the land cover mosaic. The changing patterns and textures of the crops, meadows and verges contributes to the colourful character of the landscape.

Overall the diverse and historic pattern of heath, fields, plantations and pine rows and the rich sense of history stretching right back to Neolithic times, combine to make the Brecks Arable Heathland Mosaic an exceptionally distinctive and evocative landscape.

What's important and why?

The diverse pattern of land uses and varied backdrop of woodland and tree belts ensures that, from a visual point of view, this landscape can generally accommodate change, through carefully designed woodland planting. However, the wild character and perceived remoteness of the open heaths is sensitive to landscape change; any built development, signage or fencing could be visually intrusive in this natural landscape. The pine lines are also important and sensitive landscape features because they are the most distinctive characteristic of the Brecks Arable Heathland Mosaic, instantly recognisable as representing the Brecks. But they are of similar age and are vulnerable to disease or general decline.

The international importance of the Brecks Arable Heathland Mosaic for biodiversity must take precedence in judgements about this landscape's capacity to accommodate change so overall the landscape is exceptionally vulnerable to change which would disrupt the delicate balance of factors which govern its biodiversity. The most sensitive habitats within the landscape mosaic are the areas of lowland calcareous grassland, lowland acid grassland and lowland heath, which support many rare flora and fauna. Other sensitive elements include the fluctuating meres, periglacial wetland features and headwater fens (particularly of the River Wissey), which are particularly vulnerable to water extraction (from the underlying chalk aquifer) and climate change.

The heritage features of the Brecks Arable Heathland Mosaic are nationally important and there is an exceptionally dense concentration of historic features and sites which date from Neolithic times to World War II. The historic sites and settings of these features are often not well conserved and the loss of their historic landscape context makes some sites difficult to understand.

Generally the Brecks Arable Heathland Mosaic is in moderate –poor condition. The historic structure and features of the landscape, including the pine lines, thorn hedges, warren banks, roads and tracks are often in poor condition and many historic features are overgrown by woodland and scrub.

Landscape character sensitivity	Visual sensitivity	Landscape value
The diverse patchwork of fields, heath, woodland and tree belts provides a robust visual structure for accommodating landscape change. Areas that are managed for biodiversity are in good condition, many historic features are overgrown, the pine lines are deteriorating and the uniform age structure makes this locally distinctive feature vulnerable to change. Locally distinctive and sensitive landscape features are: • The pine lines • Open heathland with a richly textured micro-scale mosaic of heather, acidic and chalk grassland • Fluctuating meres and wetlands (of periglacial origin) • Diverse, balanced mosaic of land uses; open land predominates but is partially enclosed by tree belts • Arable field margins, which are rich in floar and fauna • Historic features, eg tumuli, trackways, warren banks and lodges	Long views are always framed by woodland blocks and/or pine lines but there is nevertheless a long depth of view. Some areas of heathland are exceptionally open. Overall the landscape feels moderately open, and most areas have good opportunities to mitigate the visual impact of landscape change.	This is an internationally important landscape, of value for its rare and vulnerable biodiversity and for its exceptionally long time-depth and concentration of heritage features. Specific international and national designations are: • Breckland SPA • Breckland, Waveney Little Ouse and Valley Fens and Norfolk Valley Fens SACs • Numerous Scheduled Ancient Monuments, including ancient trackways and defensive embankments, Bronze Age Barrows, Neolithic flint mines, archaeological excavations for a range of prehistoric sites, deserted medieval villages, the remains of medieval rabbit warrens and historic parklands including Euston Park. • SSSIs and national nature reserves – focused on heathland and mere

Landscape strategy

The principal forces for landscape change are set out below, along with notes on how the changes can be managed to conserve the distinctive landscape character of the Brecks Arable Heathland Mosaic.

Conversion and expansion of farmsteads and small group of estate buildings, for agricultural, residential and/or commercial uses – The Brecks Arable Heathland Mosaic does not have a history of clustered settlement but groups of farm buildings are often a focus in views, seen against a backdrop of tree belts and plantations. A few farmsteads incorporate listed buildings abut many have good potential for expansion and /or conversion to other uses, provided patterns of existing trees and woodlands are conserved and extended to provide a partial visual screen and integrate the new development. Guidance for integrating new farm development includes:

- Avoid or minimise the visual impact of new development in views across or adjacent to natural heathland, where such changes could detract from the natural, wild character of the heathland landscape which is increasingly scarce.
- Conserve the scale and proportion of the farmstead within the context of the surrounding large scale landscape. Farm buildings are typically seen in the middle distance across open fields and framed by woodlands and tree belts. Expansion of farmsteads in small-scale landscapes or in locations where they are alongside roads would be more difficult to accommodate without changing local landscape character.
- Building materials should be appropriate for the style of existing buildings present. Brick is often used. Staining used for exterior boarding should be capable of weathering in the traditional way, as a permanent dark or black colouring is not locally appropriate.
- Minimise visible changes to the surrounding agricultural landscape, as land use changes (including the introduction of garden boundaries, lighting and other suburban features) have the potential to be more visually intrusive than built development in this large scale landscape mosaic.
- Integrate new large-scale agricultural buildings in open countryside by careful choice of form, orientation and colour of buildings. Whenever possible, new agricultural buildings should relate to an existing cluster of buildings and to existing mature trees and woodlands which can provide a backdrop to views. Carefully designed tree planting, which extends the existing pattern of plantations, tree belts and hedgerows, will help to integrate and screen new agricultural development.

Large scale farm buildings set against a backdrop of woodland - extensive new planting is already beginning to integrate the structures within the wider landscape pattern

Redevelopment of former airfield sites – Existing fencing, hangar buildings, runways and signage can be visually intrusive and redevelopment may offer opportunities to improve the landscape and visual impact of such sites. Any strategic masterplan for redevelopment should incorporate opportunities for extensive off-site planting which can be designed to integrate the development within the wider large scale pattern of woodlands, tree belts and fields. Specific issues relating to airfield development include the conservation of historic and cultural features, such as bunkers and control towers, and the need for a layout that retains them in an appropriate setting. The alignment of runways should be echoed in the layout of buildings and open spaces.

Changes in the management and use of historic parklands - Any proposals for change could have a negative impact on historic landscapes. The majority of sites, regardless of designation status, will require an overarching management plan or strategy to guide change. This should be based on historic research and should cover the conservation, preservation and management of existing historic features, as well as the restoration or creation of new or lost ones. Individual sites may require deer fencing and new woodland planting, as well as screening and mitigation schemes, may require effective protection from deer to support their establishment.

Development of leisure and recreational facilities – There may be scope to accommodate leisure development within relatively wooded and enclosed parts of the Brecks Arable Heathland Mosaic, provided such sites are at a distance from areas of heath, the setting of historic features and areas of existing tranquillity. Development of leisure facilities such as golf courses, caravan parks, holiday centres, visitor centres and car parks can only be accommodated if they are carefully screened by existing woodlands and strategically sited new woodland planting. The bustle, colours and movement of cars and caravans could be extremely intrusive in open views across the mosaic so careful design and mitigation is essential to ensure that development is carefully integrated.

The 'before-and-after' sketches on pages 48 and 49 illustrate how high quality leisure facilities can be accommodated within a sensitive heathland edge landscape, using a hypothetical example of an information point within a small visitor car park.

There is no scope to accommodate leisure development within or within viewing distance of heathland components of the Brecks Arable Heathland Mosaic and existing areas of tranquillity, where such development could constitute a profound and undesirable change to the area's natural, undisturbed

Access and interpretation at Brettenham Heath

character. Erosion on many narrow roads within the Brecks Arable Heathland Mosaic suggests that there is a need for more small car parks and nature viewpoints, increasing the accessibility of the landscape.

New infrastructure development – including reservoirs and roads – the abrupt steep embankments of reservoirs are intrusive features which are generally not well integrated in the Brecks Arable Heathland Mosaic. Guidance to improve the integration of these and other infrastructure developments include:

- Extend existing woodlands and tree belts with new planting that is carefully designed to screen the abrupt slopes and access roads that are associated with new storage reservoirs. Extensive new planting will be required to integrate this form of infrastructure within this relatively open arable landscape
- There may be opportunities to create valuable dry heathland habitats on bare ground and newly constructed embankments, provided locally sourced substrate with impoverished soils is used.
- Ensure new hedgerows are planted alongside new or altered roads in order to reduce the perceived scale of road developments and integrate with the existing network of rectilinear boundaries. Blocks of woodland should extend right up to the edge of roads in places, creating 'pinch-points along the roads and adding variety to local views

The 'before-and-after' sketches on pages 94 and 95 (within the section referring to the Plateau Estate Farmland landscape type) illustrate how the issue of integrating farm reservoirs in large scale agricultural landscapes might be approached using a hypothetical example.

Changes in heathland management prescriptions and agricultural subsidies, which have the potential to change the balance, proportion and quality of the open agricultural and heathland components of the Brecks Arable Heathland Mosaic.

In some areas the use of fleece and plastic, as well as outdoor pig production, has had a significant effect on the landscape. The siting and style of structures subject to planning control, such as static feed bins for pigs and poly tunnels should be appropriately conditioned to minimise their landscape impact. Guidance for land management practices that will conserve and enhance distinctive landscape character includes:

- Identify opportunities to extend and connect areas of lowland heath and dry acid and calcareous

Irrigation for crops has increased levels of abstraction from the underlying chalk aquifer and acres of plastic sheeting are visually intrusive

[18] op. cit. 12, page 26

grassland habitat, particularly on the fringes of the Breckland SPA and SAC.

- Buffer existing heathland by restoring or creating habitats adjacent to existing sites or by encouraging low input agricultural systems on land adjacent to heathland.
- Areas of existing heathland should be managed in accordance with the detailed prescriptions contained within ecological guidance such as the Breckland Biodiversity Audit[18]. For the majority of heathland areas, such guidance is likely to include heavy and intense grazing and the application of physical disturbance (rotovation and turf stripping). Management should generally be dynamic, episodic and disruptive as gradual recovery from grazing or disturbance provides conditions and structures not found on homogenously managed sites.
- Manage arable field margins and buffer existing trackways and track verges in accordance with cultivated agri-environmental prescriptions which are likely to involve no fertiliser or herbicides. Encourage a strategic approach to the continuous management of field boundaries across areas under different landownership.
- Conserve and enhance the character, quality and connectivity of woodlands, shelterbelts and field hedgerows, maintaining the existing proportion of open fields to heath to woodland or, if possible increasing the proportion of heathland within the overall mosaic.
- Enhance the diversity of woodland and arable field habitats by woodland management to improve the age structure and species composition of woodlands and plantations
- Plant deciduous native trees on the fringes of woodlands and plantations to enhance their ecological value and visual character.
- Conserve and manage the margins of groundwater fed meres, pingos and headwater fens, maintaining a broad buffer to adjacent farmland, removing all adjacent scrub and woodland and introducing grazing (and possibly mechanical clearance) in accordance with the advice contained within detailed management prescriptions.

Erosion of the setting of distinctive historic and archaeological features, some of which are relatively invisible in the landscape due to tree and scrub cover. Priority should be given to the conservation of distinctive archaeological evidence, including Bronze Age barrows, defensive embankments and trackways, medieval deserted villages and warren banks, remnant historic features associated with the 18th and 19th century Breckland estates, the pits associated with historic flint mines and 20th century military structures and sites

This Bronze Age barrow near Knettishall Heath is barely discernible beneath the trees

[19]Tom Williamson, 2010, The Breckland Pine Rows: History, Ecology and Landscape Character, University of East Anglia

The decline of the distinctive pine lines as a result of age and mechanical removal. It is thought that the majority of pine lines were planted between 1815 and 1820 [19] so these features are now c.190 years of age. The average lifespan of a Scots pine tree is expected to be 150-300 years which means that the Brecks trees may well survive for many years to come, but an active programme of management and replanting would conserve these distinctive landscape features. New pine lines should be planted in areas where they were known to have been planted in the 1920s and should be subject to appropriate management to encourage the distinctive, contorted form that is typical of the Brecks. There is a need to research techniques for the effective management of pine lines.

Erosion of the small-scale character and quality of the straight, narrow roads that is characteristic of the Brecks Arable Heathland Mosaic and which are often subject to fast cars and verge erosion due to visitor pressures. Guidance for road and roadside management includes:

- Give priority to the conservation of Roadside Nature Reserves, which have been designated to improve and enhance a highly visible and characteristic component of the Brecks landscape and biodiversity.
- Enhance the principal road corridors that provide gateway views to the Brecks, with a coordinated strategy of tree planting, hedgerow/pine line management and signage that is designed to take account of key views
- Conserve the characteristic straight alignment and sequence of open and enclosed views associated with roads across the Brecks Arable Heathland Mosaic, wherever possible conserving and creating new heathland habitats in prominent roadside locations.
- Avoid traffic calming measures and signage in rural locations that could have an urbanising effect.

Visitor car parks – interpretation and access

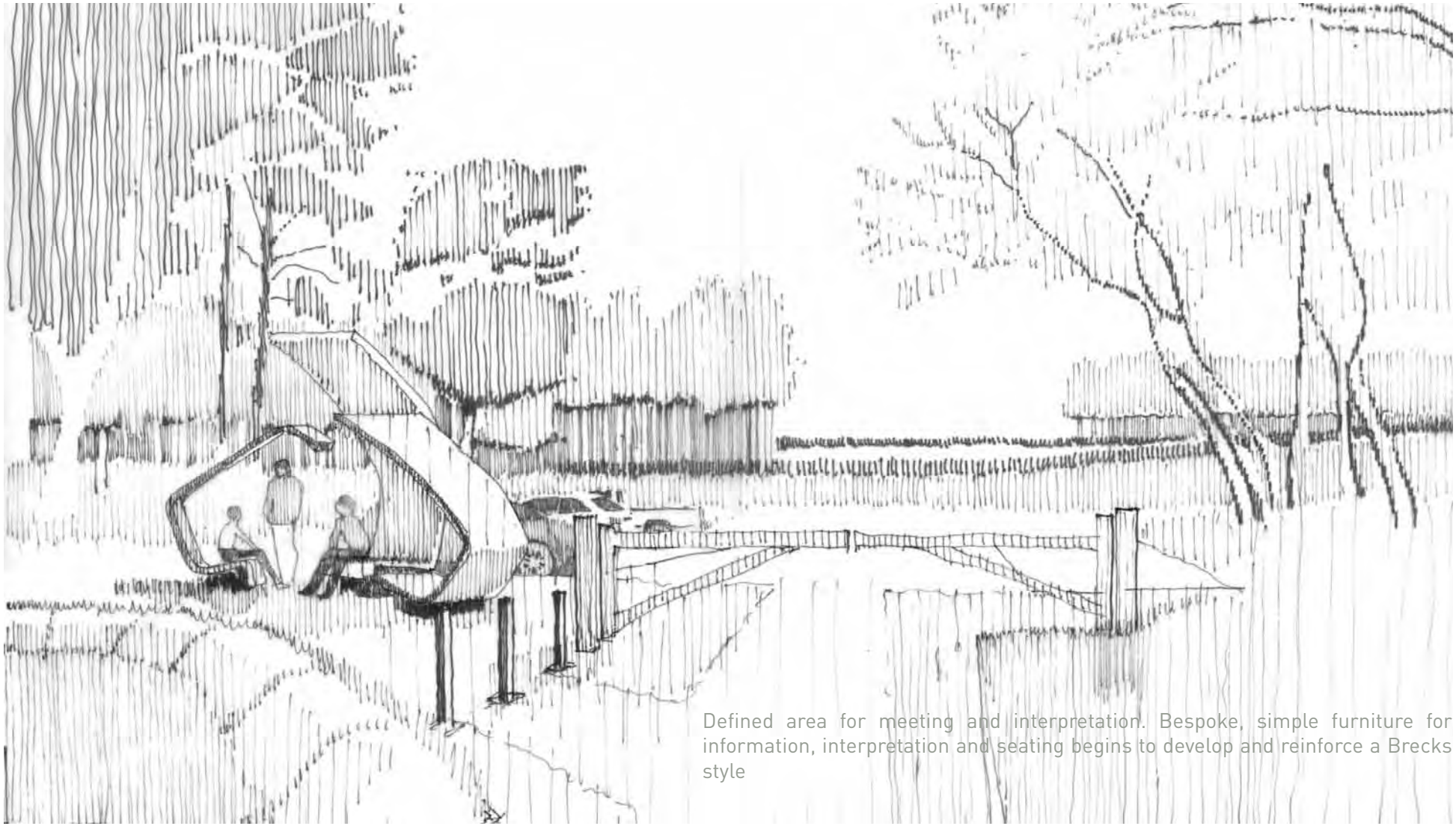
One approach to improving the quality of visitor facilities within a sensitive heathland edge visitor car park - illustrated as a hypothetical example.

Lack of clarity and interpretation

BEFORE

Erosion and litter, plus the use of poor quality materials suggests lack of management and encourages vandalism and anti-social behaviour.

AFTER



Defined area for meeting and interpretation. Bespoke, simple furniture for information, interpretation and seating begins to develop and reinforce a Brecks style

Overarching principles and priorities for land management in the Brecks Arable Heathland Mosaic

- Conserve the natural, wild character of the heathland landscape, avoiding development that could detract from this scarce and important quality
- Conserve and restore the distinctive Brecks pine rows through a programme of replanting and management.
- Extend and connect areas of lowland heath and dry acid and calcareous grassland habitat, together with the small-scale wetlands of meres, fen and pingos, actively managing these internationally important habitats to conserve biodiversity.
- Conserve the setting and integrity of historic features so that they are visible and easily interpreted as part of the distinctive local character of the Brecks mosaic.

Brecks Plantations

Brecks Plantations

Distinctive landscape characteristics

- Flat or gently sloping plateaux underlain by chalk, but with free-draining sandy soils
- Extensive plantation forestry is the dominant influence; small isolated areas of heathy grassland
- Simple, large scale landscape pattern, with homogeneous, geometric plantation blocks
- Densely enclosed character; views are contained by plantations and channelled down the long straight roads and rides
- Conifer species predominant, but broadleaves such as oak, beech and birch create a softer, more diverse woodland edge along many forest roads and along some former estate and field boundaries
- Belts and lines of contorted Scots pine are a distinctive feature
- Numerous historic sites, often 'hidden' within the forest, including Neolithic flint mines at Grimes Graves, Bronze Age barrows and medieval warrens and lodges
- Network of straight rural roads, with distinctive angular junctions
- Looking towards the plantations from adjacent areas, the skyline is defined by straight, continuous plantation edges, silhouetted against the sky

Landscape character

Flat or gently rolling plateaux with free draining, sandy soils formed from a varied mix of glacial sand, clay and gravel deposits overlying a solid chalk geology. The landform slopes gently towards the river valleys, but the subtle elevation change is not immediately obvious due to the almost blanket coverage of the plantations.

Much of the surface has a covering of acidic sands, but the sands often overlie a calcareous substrate and in some parts of the plateau the dominant soil type is a chalky rendzina. Occasionally the different types of soil are juxtaposed at a microscale creating areas of 'patterned ground' where contrasting stripes of chalk and acidic grassland/heather grow on slight ridges and troughs of sandy and chalky soils. Most examples have been 'lost' under encroaching tree and scrub cover but the phenomenon is

visible on some open land within the forest, eg near the Grimes Graves site at Lynford.

The underlying chalk on this part of the plateau contains flints and, in late Neolithic times this region was at the centre of an important trade for flint axes and other tools, which were manufactured from locally mined flint and possibly traded along long distance paths like the Icknield Way. A deep, high quality seam of 'floorstone' flint was mined from shafts dug deep into the chalk. The Neolithic flint mines are thought to have been a well developed industry, covering a wide area; today the conserved site near Lynford is known as Grimes Graves.

The dominant soil type beneath the Brecks Plantations is an acidic, sandy soil which is prone to wind erosion. Before the Forestry Commission plantations (ie 1920's) the area currently defined as the Brecks Plantations landscape character type would have been part of the overall Brecks heathland mosaic, albeit a relatively dry part of the plateau. The Fossditch is a defensive linear earthwork constructed in the Early Saxon period along what may have been the boundary between the Brecks and the Fens. This embankment and ditch is still visible, although it is now partially surrounded by trees and so is no longer legible in the wider landscape.

Throughout the medieval period, the extensive heathlands were used as part of the infield-

Grimes Graves - the remnant pit shafts of the Neolithic flint mines appear as a 'lunar' landscape of grassy craters on the surface today

outfield system; sheep were grazed on heaths during the day and 'folded' on the arable land overnight in a complex system which enabled the fertility of the permanent arable land to be maintained through the transfer of nutrients in the animals' dung. Settlements were typically on the edge of the river valleys, close to water, but parish areas typically included a variety of land types, from valley floor marsh to extensive heathland. Crops, such as wheat and barley, were grown on common fields with reasonably good soils and some relatively infertile heathlands were cultivated on a temporary basis as outfield 'brecks' – ploughed and cropped for a few years before being returned to rough grazing. The least fertile – dry and acidic – soils were typically used as rabbit warrens, with rabbits bred for their meat and fur.

The Brecks was a regional centre for the rabbit trade and the rabbit warrens were protected from poachers by guards based at warren lodges. The medieval stone lodge at Thetford Warren remains as an evocative ruin. Many warrens were later enclosed by perimeter banks to define ownership and prevent the rabbits from damaging adjacent crops. Such warren banks are often visible beneath the dense trees and scrub, for instance at Downham High Warren and Thetford Warren; the former has sections of parallel trapping banks and some banks are reinforced with flint facings.

Evidence for the poverty of the sandy heathland soils and their extreme vulnerability to wind erosion is provided by Thomas Wright's 1668 description of the 'wandring' near Santon Downham (see Section 2). This and other descriptions by later Victorian travellers emphasise the barrenness and aridity of the Brecks plateau landscapes. However, the scrubby heathlands of the Brecks were well known as favourable land for hunting and in the early 17th century the open areas around Thetford became a royal hunting ground, used by both King James and King Charles. In 1636 a warrant was issued for the preservation of the king's game 'of hare, partridge and other wildfowl' within a 12 mile radius of Thetford.

Despite the scrub cover that would have been present for game, the overall lack of vegetation on the Brecks plateaux would have been one of the factors contributing to the 17th century 'sand blows'. The landscape became progressively more enclosed during the 18th and 19th centuries, when landowners of the larger Brecks estates, such as Elveden, Santon Downham and Brandon planted vast numbers of trees, in part as cover for game, but also as part of the process of 'improving' their estates, in keeping with the fashion for parkland landscapes. The majority of the distinctive Scots pine lines were planted at this time, initially as hedges to control and shelter stock. Left to grow unmanaged, the lines of Scots pine trees developed contorted forms

Thetford Forest has areas of broadleaf woodland as well as conifer plantations. These trees are at Thetford Warren, part of the medieval Royal hunting ground.

There are remnants of the 18th to 20th century woodland plantations and of field boundaries enclosed during the late 18th to early 19th century Parliamentary Enclosure. For instance, the distinctive line of mature oaks along the A134 is part of the former West Tofts parkland.

The landscape was fundamentally changed in character in the 1920s when, following the 1919 Forestry Bill, extensive parts of the Brecks estates were purchased on the open market and planted predominantly with conifers. The land was in a degraded state at this time, following years of economic depression. Today Thetford Forest is the largest lowland forest in the UK and its acidic and calcareous soils support a mix of coniferous species (including Scots pine, Corsican pine and larch) and broadleaf trees. Two main silvicultural systems are used to manage the forest: just over 13,000 hectares are managed under a rotational clear fell system which is a key requirement to deliver suitable habitat for woodlark and nightjar; around 4,000 hectares are managed under a continuous cover silvicultural system (this includes over 1,000 hectares of broadleaf species); the remaining 1,000 hectares are managed open space where a variety of habitat management regimes are used (this includes 300 hectares of heathland recreation where grazing sheep and ponies are deployed).
Large blocks of conifers dominate the landscape, but the forest rides, roads and areas of open

Broadleaf woodland alongside one of the straight roads through the Brecks Plantations

heath and farmland provide corridors and patches of high biodiversity. Much of Brecks Plantations landscape falls within the Breckland Forest SSSI (and the wider Breckland SPA), which is important for populations of nightjar and woodlark, as well as flora and fauna which require the heathland and calcareous grassland habitats found within open areas within the forest.

This landscape type encompasses areas where the influence of conifer plantations is dominant over extensive areas; other parts of the Brecks, within the Brecks Arable Heathland Mosaic, also have extensive tracts of woodland and plantation.

Away from the principal settlements of Brandon and Thetford, there are only isolated, small settlements and the dense forest has an empty, tranquil character, although parts of the forest are managed for recreation, with a forest activity centre and a network of waymarked routes accessed from small car parks and picnic sites. Vernacular building materials include brick and thatch, but there is much modern infill development on the fringes of Brandon and Thetford. The long straight roads and rides create striking, channelled vistas, often fringed and framed by narrow strips of broadleaf woodland. Gorse, bracken and twisted Scots pine trees often create a highly textured and colourful foreground to the forest vistas.

What's important and why?

The dense tree cover ensures that this landscape can accommodate change, through carefully designed woodland planting and planned forest design (with the alignment and form of future coupes taken into account). The most sensitive areas of the landscapes are the roads and rides, together with the clear framed vistas along them and the isolated open areas of heath and farmland within the forest, which are valued for their heathland and calcareous grassland biodiversity. Sensitive landscape elements and features include the remnant distinctive pine lines and the many archaeological and historic sites, including well known sites such as Grimes Graves, but also many other examples of earthworks, buildings and industrial heritage that may be partially hidden by tree and scrub cover. The extensive and homogeneous forest cover can make the historic context for such sites difficult to understand, but former field patterns and pathways are often conserved as the network of forest rides that structure the plantations.

Thetford Forest is sustainably managed by the Forestry Commission seeking to achieve a balanced approach delivering Environmental, Social and Operational programmes. The Forest's Design Plans aim to deliver public benefits in the form of improved habitats for wildlife, attractive woodlands for people and rural employment for communities. Since the majority of Thetford Forest is designated as a SSSI, the forest management work includes monitoring the condition of the SSSI, as well as plans for future work which will enhance its important woodland, heathland and calcareous grassland habitats. Given this intensive and strategic land management regime, the landscape of the Brecks Plantations is in good condition.

Landscape character sensitivity	Visual sensitivity	Landscape value
The dense forest cover provides a robust context for accommodating landscape change. The forest is strategically and sustainably managed and is in good condition. However, many historic features are overgrown, the pine lines are deteriorating and the uniform age structure makes this locally distinctive feature vulnerable to change. Locally distinctive and sensitive landscape features are: • The pine lines • Open heathland with a richly textured micro-scale mosaic of heather, acidic and chalk grassland • Framed vistas and roadside corridor landscapes • Skylines • Historic features, eg Neolithic flint mines, tumuli, trackways, warren banks and lodges	Throughout the forest, there are good opportunities to mitigate the visual impact of landscape change, but publicly accessible views are directed to a few, specific elements within the wider landscape, namely the edges of roads and forest rides, the perimeter of forest blocks and the forest skylines, all of which are highly sensitive to change. In addition, long, straight vistas are always framed by woodland blocks and such views are channelled, but highly sensitive. The promotion and use of the forest for recreation ensures that parts of the forest are accessible to visitors, as well as local residents.	Most of Thetford Forest is designated for populations of woodlark and nightjar that contribute to the Breckland Special Protection Area, but nationally important assemblages of rare plants and invertebrates are also important interest features of the SSSI. Specific international and national designations are: • Breckland SPA • Breckland Forest SSSI – designated for Nightjar and woodlark • Scheduled Ancient Monuments, including Neolithic flint mines of Grimes Graves, the Saxon earthworks of the Fossditch, Bronze Age Barrows, the perimeter banks of medieval rabbit warrens and historic parklands.

Landscape strategy

The principal forces for landscape change are set out below, along with notes on how the changes can be managed to conserve the distinctive landscape character of the Brecks Plantations.

Conversion of farmsteads and small group of estate buildings and associated new development, for recreational, residential and/or commercial uses – Most pressure for residential and mixed use development is on the fringes of existing larger settlements, but the forest is a focus for recreational and leisure development and some estate or farm buildings may have good potential for expansion and /or conversion to other uses, provided patterns of existing trees and woodlands are conserved and extended to provide a partial visual screen and integrate the new development. Guidance for integrating new recreational/leisure development includes:

- Integrate new development or additions (together with associated infrastructure in the form of lighting, signage and fencing) with large scale tree planting which relates to and is integrated with existing trees and forestry. Take the opportunity to soften the visual edges of existing plantations, with extensive broadleaf planting.
- Avoid or minimise the visual impact of new development in views across or adjacent to natural heathland, where such changes could detract from the natural, wild character of the heathland landscape which is increasingly scarce.
- Avoid new development, including car parks and lighting along forest roads and adjacent to rides, where it could be intrusive in the framed forest vistas. Use of such sites should be unnecessary, given the extensive choice of alternative, well wooded sites where there is a robust visual screen.
- Conserve wooded skylines and ensure that all views to new development are seen against a backdrop of woodland.
- Building materials should be appropriate for the style of existing buildings present. Brick is often used. Staining used for exterior boarding should be capable of weathering in the traditional way, as a permanent dark or black colouring is not locally appropriate.
- Design car parks and caravan sites so that vehicles are partially screened with local tree and scrub heathland species such as pine, oak, birch, gorse and bracken, balancing requirements for screening with the need to minimise opportunities for antisocial behaviour. There is likely to be scope to accommodate these sites provided they are well integrated within the wider 'edge-of-forest' context. Hard surfaces should be of sandy aggregate that blends within the rural context.

Intensively used recreational landscape - picnic site at High Lodge

New infrastructure development – including signage, lighting and improvements to roads. The vast majority of people experience the landscape of the Brecks Plantations from forest roads and rides so the channelled views and framed vistas along these routes are highly sensitive to change. The use of the forest landscapes for recreation and leisure developments has created a plethora of signs, which is often visually intrusive. Guidance to improve the integration of road and utility infrastructure developments includes:

- Conserve the predominantly remote and tranquil character of the forests by new planting of broadleaf tree and shrub species, along with gorse and holly, which will help to soften, integrate and potentially screen new development
- Integrate new infrastructure development within the existing rectilinear landscape pattern, which has straight boundaries and angular junctions. Blocks of woodland should extend right up to the edge of roads in places, creating 'pinch-points and adding variety to local views.
- Avoid traffic calming measures and signage in rural locations that could have an urbanising effect.
- Design small scale infrastructure such as signage, lighting and interpretation boards with simple forms and appropriate local materials so that it is well integrated within the surrounding landscape. Control the use of visually intrusive and unnecessary signage.
- Enhance the principal road corridors that provide gateway views to the Brecks, with a coordinated strategy of tree planting, hedgerow/pine line management and signage that is designed to take account of key views
- Wherever possible, conserve and create new heathland habitats in prominent roadside locations.

Changes in heathland management prescriptions and agricultural subsidies, which have the potential to change the balance, proportion and quality of the open agricultural and heathland components of the Brecks Plantations. In some areas the use of fleece and plastic, as well as outdoor pig production, has had a significant effect on the landscape. The siting and style of structures subject to planning control, such as static feed bins for pigs and poly tunnels should be appropriately conditioned to minimise their landscape impact. Guidance for land management practices that will conserve and enhance distinctive landscape character includes:

- Identify opportunities to extend and connect areas of lowland heath and dry acid and calcareous grassland habitat, particularly on the fringes of the Breckland SPA and SAC.
- Buffer existing heathland by restoring or creating habitats adjacent to existing sites or by encouraging low input agricultural systems on land adjacent to heathland.

The structures and extensive mud associated with pig farming can be intrusive in local views

- Areas of existing heathland should be managed in accordance with the detailed prescriptions contained within ecological guidance such as the Breckland Biodiversity Audit . For the majority of heathland areas, such guidance is likely to include heavy and intense grazing and the application of physical disturbance (rotovation and turf stripping). Management should generally be dynamic, episodic and disruptive as gradual recovery from grazing or disturbance provides conditions and structures not found on homogenously managed sites.
- Manage and buffer existing trackways and track verges in accordance with cultivated agri-environmental prescriptions which are likely to involve no fertiliser or herbicides.
- Conserve and enhance the character, quality and connectivity of woodlands, shelterbelts and field hedgerows, maintaining the existing proportion of open fields to heath to woodland or, if possible increasing the proportion of heathland within the overall mosaic.
- Enhance the diversity of woodland and farmland habitats by woodland management to improve the age structure and species composition of woodlands and plantations.

Fragmentation of ecological networks within the wider plantation landscape. In the forest landscape, fire-routes and ride (track-way) verges already provide a widely dispersed network. However this network is spatially interrupted and incomplete due to shading of track elements when adjacent tree crops pass thicket stage . Guidance for land management practices that will increase the biodiversity resilience of the plantations includes:

- Consider strategic management that buffers and links multiple sites of biodiversity value into large contiguous networks. Connections between existing open and heathland areas are particularly valuable, providing enhanced dispersal into clear-felled and restocked areas
- Connectivity among dispersed sites could be achieved by providing juxtaposition of grass strips, disturbed ground, and cultivated field margins along existing track-ways
- Create wide, permanently un-shaded 'superhighways' for plant and invertebrate dispersal, flanked by disturbed strips of ground (e.g. with ploughing or turf stripping treatments to create bare disturbed sand and chalk) and by nectar rich ungrazed flower rich verges.
- Connectivity elements may be provided by revitalising stock droving activity to provide cross links with these 'super-highways'.
- Give priority to strategic links across the forest landscape between key heathland SSSIs, such as linking Weeting Heath to Cranwich and Grimes Graves or Lakenheath Warren to Thetford Golf Course and Marshes via High Lodge.

Open grassland alongside tracks through the Brecks Plantations is valuable acid grassland habitat

The contorted form of the Scots pine lines developed because they were originally planted and trimmed (in the early 19th century) as hedgerows, but have since been allowed to grow out.

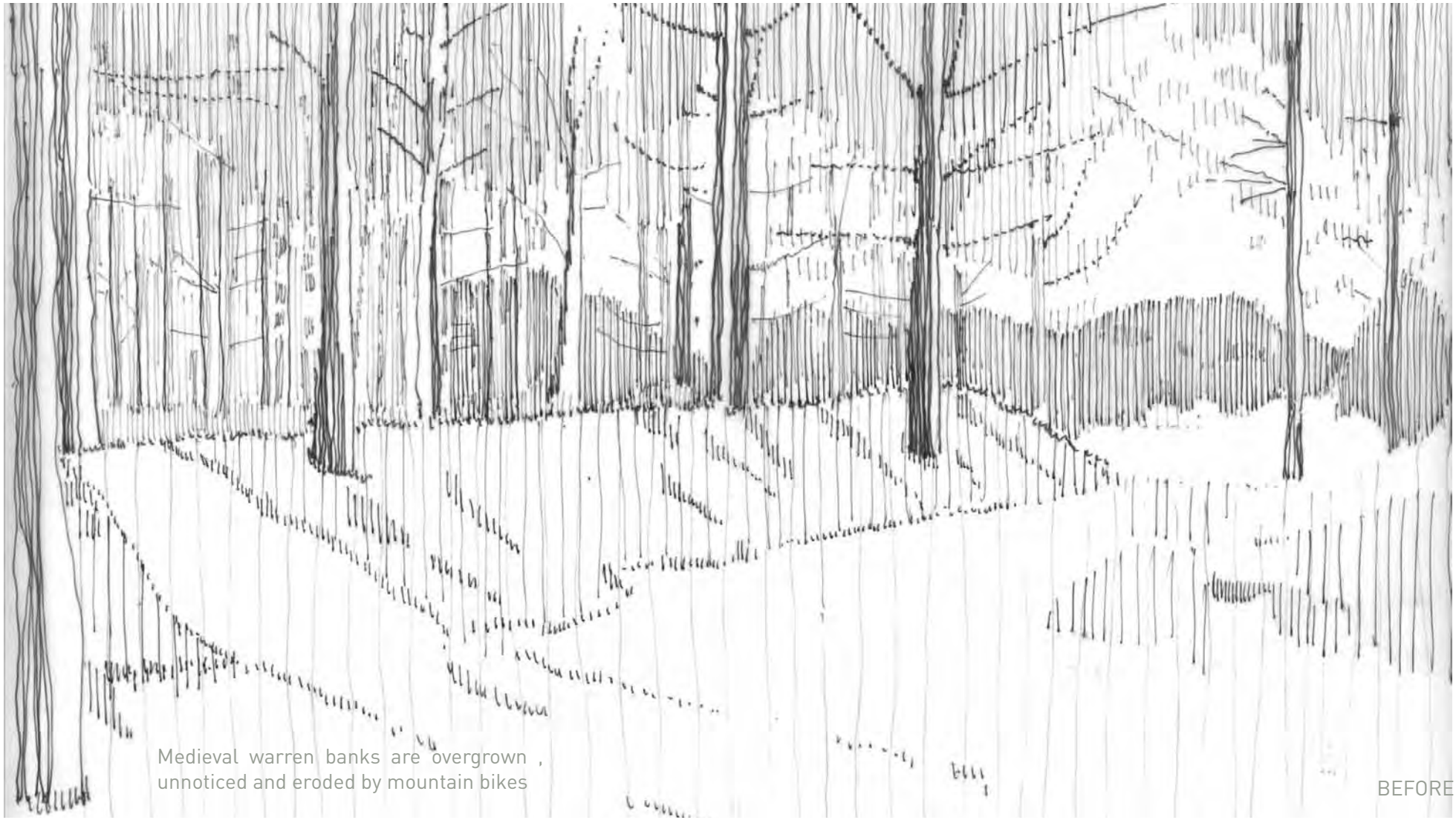
Erosion of the setting of distinctive historic and archaeological features, some of which are relatively invisible in the landscape due to tree and scrub cover. Priority should be given to the conservation of distinctive archaeological evidence, including Bronze Age barrows, defensive embankments and trackways, medieval deserted villages and warren banks, remnant historic features associated with the 18th and 19th century Breckland estates, the pits associated with historic flint mines and 20th century military structures and sites.

The 'before-and-after' sketches on pages 62 and 63 illustrate how the setting of distinctive historic features might be conserved, without compromising accessibility, using a hypothetical example of eroded medieval warren banks within a conifer plantation. Note; if trees are removed from warren banks, their stumps/roots should be left in situ and killed off using an approved chemical root killer.

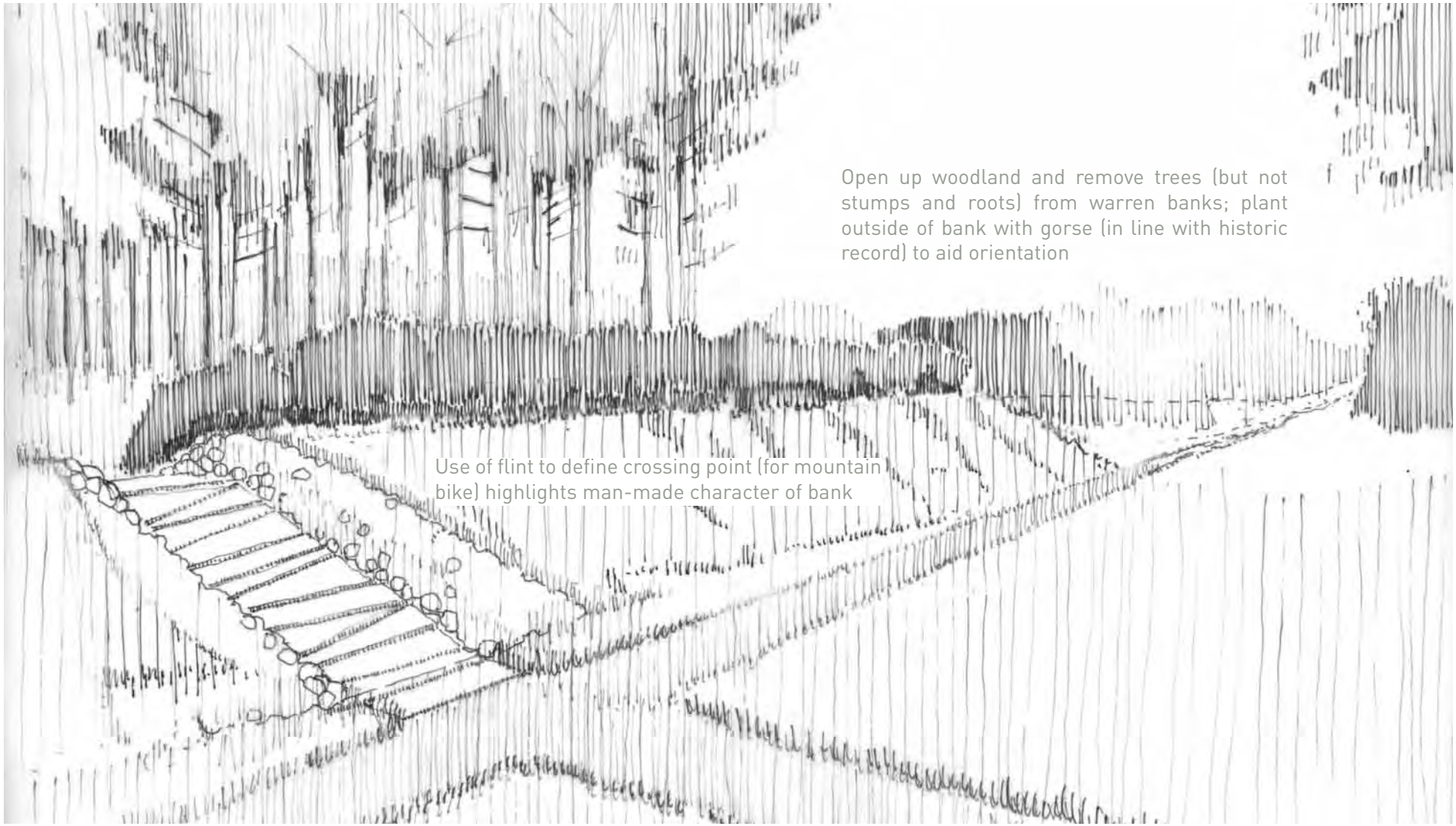
The decline of the distinctive pine lines as a result of age and mechanical removal. It is thought that the majority of pine lines were planted between 1815 and 1820 so these features are now c.190 years of age. The average lifespan of a Scots pine tree is expected to be 150-300 years which means that the Brecks trees may well survive for many years to come, but an active programme of management and replanting would conserve these distinctive landscape features

Interpretation of historic features

One approach to improving the conservation, interpretation and accessibility of distinctive historic features - illustrated as a hypothetical example.



AFTER


Open up woodland and remove trees (but not stumps and roots) from warren banks; plant outside of bank with gorse (in line with historic record) to aid orientation
Use of flint to define crossing point (for mountain bike) highlights man-made character of bank

Overarching principles and priorities for land management in the Brecks Plantations

- Reduce fragmentation of heathland and calcareous grassland habitats by buffering, extending and linking existing biodiverse sites along roads, tracks and forestry coupes.
- Conserve the setting and integrity of historic features so that they are visible and easily interpreted as part of the distinctive local character of the Brecks Plantations.
- Integrate new built and infrastructure development, including signage, lighting and road improvements, by carefully designed planting of local tree and shrub species and by the use of appropriate materials and forms.

Low Chalk Farmland

Low Chalk Farmland

Distinctive landscape characteristics

- Flat or very gently sloping farmland on chalk and gravel outcrops which forms part of the transition from Brecks to Fens
- Medium-large arable fields interspersed by belts and blocks of mixed woodland
- Most fields bounded by hawthorn hedgerows, but some field margins are marked by wire fencing or lines of trees; in some places fields are unenclosed
- Rectilinear field shapes, but varied field boundaries and irregularly sized woodland blocks create a diffused landscape pattern
- Long views, always framed by woodland, but becoming more open towards the fens
- Clustered settlements and large isolated farmsteads with scattered groups of farm buildings
- Tree belts of Scots pine and poplar are local features, silhouetted against the sky
- Airbases and communications equipment are local landmarks

Landscape character

This flat farmland landscape marks the transition between the Brecks plateau to the east and the flat peatlands of the fen basin to the west. It is found near the settlements of Barton Mills, Mildenhall and Lakenheath in Suffolk and extends northwards along the western boundary of the Brecks between Hockwold cum Wilton and Narborough. The Low Chalk Farmland is underlain by outcrops of free-draining chalk and gravel on the edge of the Brecks chalk plateau and low 'islands' of chalk on the margins of the Fens which are surrounded by peat and alluvial fen soils. Much of the Low Chalk farmland is unaffected by drift deposits and free-draining soils are either calcareous rendzinas or brown soils. The farmland seems completely flat, but in fact gradually slopes very gradually towards the higher Brecks plateau to the east. The gentle slopes are most obvious near Lakenheath and Foulden.

This transitional landscape, between the Brecks and the Fens, was a focus for early settlement from the Palaeolithic period to Iron Age and Roman times. There have been numerous archaeological finds

recorded in the area but none of the pre-Roman heritage is immediately visible. Palaeoliths (flint implements and waste flakes) have been found in the gravels of the pre-Anglian Bytham River near Lakenheath and Mildenhall and later finds include Mesolithic flintworks, Neolithic pottery and barrows. Settlement sites dating from the early Bronze Age are rare, but excavation of a site at West Row has revealed the form of a farming settlement on the edge of the fen. The Fens were relatively dry in Roman times and were well settled and farmed, with roads and canals. Some settlements on the Low Chalk Farmland date from Roman times: Hockwold sum Wilton was a linear settlement with two temple sites on a Roman or pre Roman route and there were high status Roman villa sites with bath houses at Feltwell, Mildenhall and Eriswell.

Most settlements developed during the medieval period and were surrounded by an agricultural pattern based on open fields and the fold course systems of sheep and cereals, especially barley. There was a concentration of settlement along the edge of the fen edge. An example is the fen-edge hamlets which fringed the common fields of Mildenhall, including West Row, Beck Row, Holywell Green and Wilde Street. Each formerly had small or linear greens that now only survive as place names eg Thistley Green.

The open fields were enclosed during the 19th century under the Parliamentary Enclosure acts but in many areas the present day field pattern is a result of later amalgamation and reorganisation of landholdings. This part of the fen edge landscape was historically well settled because it has relatively good well drained soils, between the dry, sandy soils to the east and the wetter fens to the west. Fields are typically surrounded by hedges rather than the ditches that are typical of fields in the adjacent Fens.

The flat arable fields alongside Old Methwold Road, a straight land across a relatively large scale farmland landscape in which views are always framed by woodland plantations.

The Low Chalk Farmland has been strongly influenced by the impacts of 20th century military action. Mildenhall, Feltwell and Marham airfields are all within the area. Mildenhall covers over 420 ha and dominates the Low Chalk Farmland on this part of the fen margins. In the Mildenhall area, where the airport and

settlements are 'squeezed' against the edge of the fen, the Low Chalk Farmland consists of straight-edged fields divided by minimal or no hedges. Houses, industry or airport buildings and structures form the backdrop to every view and the rural landscape is fairly degraded, with only a few remnant features, such as tree lined droves, on the edges of the fens.

To the north of Mildenhall, the Low Chalk Farmland within the study area is within a less densely settled area, away from the fen edge. Here the landscape has a more consistent, unified character, although hedgerows are inconsistent and gappy in places. Away from the principal roads, it feels tranquil and deeply rural. Views to the west, towards the Fens, are typically more open, whereas views eastwards, towards the Brecks, have a more wooded, enclosed character. However woodlands and tree belts form a backdrop to all views.

The Low Chalk Farmland is well settled. The clustered villages and hamlets, which developed historically as a result of favourable soils, have formed the basis for later expansion and the presence of local airbases has been a key driver for this growth. The result has been development of residential estates on the fringes of most villages. The traditional materials used are buff coloured brick, red brick and clay tiles, but settlements have a wide mix of styles and materials.

What's important and why?

The relatively high proportion of tree cover in this landscape type enables it to accommodate change, through carefully designed woodland planting which extends and integrates with the existing landscape pattern. The most sensitive areas of the landscapes are the rural lanes and green lanes and also areas on the fringes of settlements, which may have a smaller scale pattern of fields and woodlands and which are particularly accessible and important in local views and settlement gateways.

The condition of this landscape varies; areas with relatively low or sporadic tree cover are more vulnerable to change, particularly if they are also close to settlements or large scale, intrusive land uses such as major air bases. The majority of the area is not covered by any statutory designations, but the most valuable elements and features are the remnant historic landscape and settlement features such as green lanes, species-rich boundary hedgerows and historic village centre greens, which may in part be enclosed by traditional buildings. Valuable ecological networks include inter-connected woodlands, tree belts and hedgerows, together with adjacent arable field margins.

Landscape character sensitivity	Visual sensitivity	Landscape value
In areas where there is a high proportion of woodland and tree cover, the landscape provides a robust context for accommodating landscape change. But it is more sensitive, and generally in a more degraded condition, towards the south of the study area, where the Low Chalk Farmland is dominated by the Lakenheath and Mildenhall airbases. Locally distinctive and sensitive landscape features are: • Patchwork of arable fields and blocks of mixed woodland forms a striking and distinctive landscape pattern • Wooded skylines • Rural lanes (and green lanes) and tree lined droves • Remnant historic village greens and associated traditional buildings in village centres	Long views are typical, but views are typically set against a backdrop of woodland and there is likely to be good scope to screen and integrate new development by designing new woodland planting that extends and 'fits' the pattern of the existing woodlands and tree belts. However this landscape is vulnerable to the visual impact of tall structures, which could not be screened by woodland. The landscape in the south of the study area, close to the settlements of Barton Mills, Mildenhall, Lakenheath, is visually more sensitive than that to the north (between Hockwold cum Wilton and Narborough) because it is more densely settled and more open in character. Elsewhere the gateway views from settlements and rural roads are particularly vulnerable to change.	Parts of the Low Chalk Farmland (near Hockwold cum Wilton and Mildenhall Wood) are within the Breckland Special Protection Area and therefore make a contribution to the habitats of the stone curlew, nightjar and woodlark. Elsewhere, the most valuable ecological habitats are the network of mixed woodlands and tree belts, in combination with arable field margins which are important for a wide range of flora and fauna. Aspal Close, an ancient wood pasture that was once the 'home close' of a small manor house is an important remnant historic and ecological landscape feature at Beck Row, near Mildenhall.

Landscape strategy

The principal forces for landscape change are set out below, along with notes on how the changes can be managed to conserve the distinctive landscape character of the Low Chalk Farmland.

Expansion of settlements – Most pressure for residential and mixed use development is on the fringes of existing settlements. Detailed analysis of the potential impacts of such growth is subject to site specific assessment and is beyond the scope of this report. However it is relevant to provide some generic guidance for minimising negative impacts of settlement expansion on the surrounding landscapes:

- Conserve existing mature trees, woodlands and hedgerows and use these existing networks and landscape patterns as the basis for new green infrastructure connections
- Identify and conserve any existing remnant landscape features on the fringes of settlements, such as smaller pastures, orchards and greens. These should be incorporated within proposed green infrastucture networks
- Conserve the existing landscape setting of individual towns and villages and avoid coalescence of existing settlements with adjacent hamlets in areas of relatively dense settlement eg near Mildenhall
- Integrate new development or additions (together with associated infrastructure in the form of lighting, signage and fencing) with large scale tree planting which relates to and is integrated with existing woodlands, tree belts and hedgerows.
- Conserve wooded skylines and ensure that all views to new development are seen against a backdrop of woodland.

The 'before-and-after' sketches on pages 73 and 74 illustrate how the issue of integrating new development on settlement fringes might be approached using a hypothetical example.

Traditional buildings in Hockwold - local materials are an attractive mix of brick, flint and white render

Conversion and expansion of farmsteads, for agricultural, residential and/or commercial uses - Some farmsteads are of medieval origin and incorporate listed buildings, but the majority are 'late' historic farm buildings dating from the 19th century enclosure and may have the potential to accommodate expansion and conversion to other uses, provided patterns of existing trees and woodlands are conserved and extended to provide a partial visual screen and integrate the new development. Guidance for integrating new farm development includes:

- Conserve the scale and proportion of the farmstead within the context of the surrounding large scale

landscape. Views to farmsteads and farm buildings are commonplace in the Low Chalk Farmland landscapes, but these are typically long views, with buildings seen in the middle distance across open fields and framed by woodlands and tree belts. Expansion of farmsteads in small-scale landscapes of in locations where they are alongside roads would be more difficult to accommodate without changing local landscape character.

- Conserve the characteristic clustered form of farmsteads and avoid linear development
- Building materials should be appropriate for the style of existing buildings present – staining used for exterior boarding should be capable of weathering in the traditional way, as a permanent dark or black colouring is not locally appropriate.
- Minimise visible changes to the surrounding agricultural landscape, as land use changes (including the introduction of garden boundaries, lighting and other suburban features) have the potential to be more visually intrusive than built development in this large scale, relatively open landscape.
- Integrate new large-scale agricultural buildings in open countryside by careful choice of form, orientation and colour of buildings. Whenever possible, new agricultural buildings should relate to an existing cluster of buildings and to existing mature trees and woodlands which can provide a backdrop to views. Carefully designed tree planting, which extends the existing pattern of plantations, tree belts and hedgerows, will help to integrate and screen new agricultural development.

New infrastructure development, including reservoirs and signage, lighting and improvements to roads – the roads and rural lanes are the most accessible parts of the Low Chalk Farmland landscape and the gateway views to the surrounding farmland and settlements are highly sensitive to change. Reservoirs are often visually intrusive in this relatively flat landscape. Guidance to improve the integration of road, reservoir and utility infrastructure developments includes:

- Ensure new hedgerows are planted alongside new or altered roads in order to reduce the perceived scale of road developments and integrate with the existing network of rectilinear boundaries. Blocks of woodland should extend right up to the edge of roads in places, creating 'pinch-points along the roads and adding variety to local views.
- Extend existing woodlands and tree belts with new planting that is carefully designed to screen the abrupt slopes and access roads that are associated with new storage reservoirs. Extensive new planting will be required to integrate this form of infrastructure within the open arable landscape
- Avoid traffic calming measures and signage in rural locations that could have an urbanising effect.
- Design small scale infrastructure such as signage, lighting and interpretation boards with simple

The stark, engineered profile of the embankments surrounding reservoirs can seem odd and poorly integrated within the surrounding farmland

Old Methwold Road - a straight hedged lane across the Low Chalk Farmland to the north of Feltwell.

forms and appropriate local materials so that it is well integrated within the surrounding landscape. Control the use of visually intrusive and unnecessary signage.

The 'before-and-after' sketches on pages 94 and 95 (within the section referring to the Plateau Estate Farmland landscape type) illustrate how the issue of integrating farm reservoirs in large scale agricultural landscapes might be approached using a hypothetical example.

Changes in land use on settlement fringes, particularly the proliferation of post and rail fencing and the subdivision of land into small horse paddocks using temporary tape. There are also pressures for the expansion of garden curtilage, all of which can have a significant visual effect. Guidance for managing such local-scale change includes:

- New tree and hedgerow planting (using native species) along field and property boundaries will integrate and screen land use changes that result in visual intrusion in a locally appropriate manner.
- Minimise the proliferation of different types of boundary enclosure; brown fencing tapes should be used and planting may be necessary to soften the impact of post-and-rail fencing. Field shelters and material storage areas should be sited so as to minimise their visual impact.
- New or expanded garden curtilage should be designed to fit into the local context and respect the established pattern. It is relatively simple to screen such changes with tree and hedgerow planting in this well treed landscape.

Fragmentation of ecological networks and changes in agri-environmental schemes and agricultural subsidies, which have the potential to change the balance and quality of land uses and sensitive landscape elements within the Low Chalk Farmland landscape. Guidance for land management practices that will conserve and enhance distinctive landscape character includes:

- Manage and buffer existing trackways and track verges in accordance with cultivated agri-environmental prescriptions which are likely to involve no fertiliser or herbicides.
- Consider strategic management that buffers and links multiple woodland sites of biodiversity value into large contiguous networks.
- Conserve and enhance the character, quality and connectivity of woodlands, shelterbelts and field hedgerows, maintaining and increasing the overall proportion of woodland to arable fields within the overall landscape pattern.
- Enhance the diversity of woodland and farmland habitats by woodland management to improve the age structure and species composition of woodlands and plantations

Arable land, with trackways alongside hedged arable fields, to the north of Hockwold cum Wilton

Enhancing village gateways

One approach to improving the integration of built development on settlement fringes - illustrated as a hypothetical example.

Minor structures are dominant and distract from distinctive local landmarks

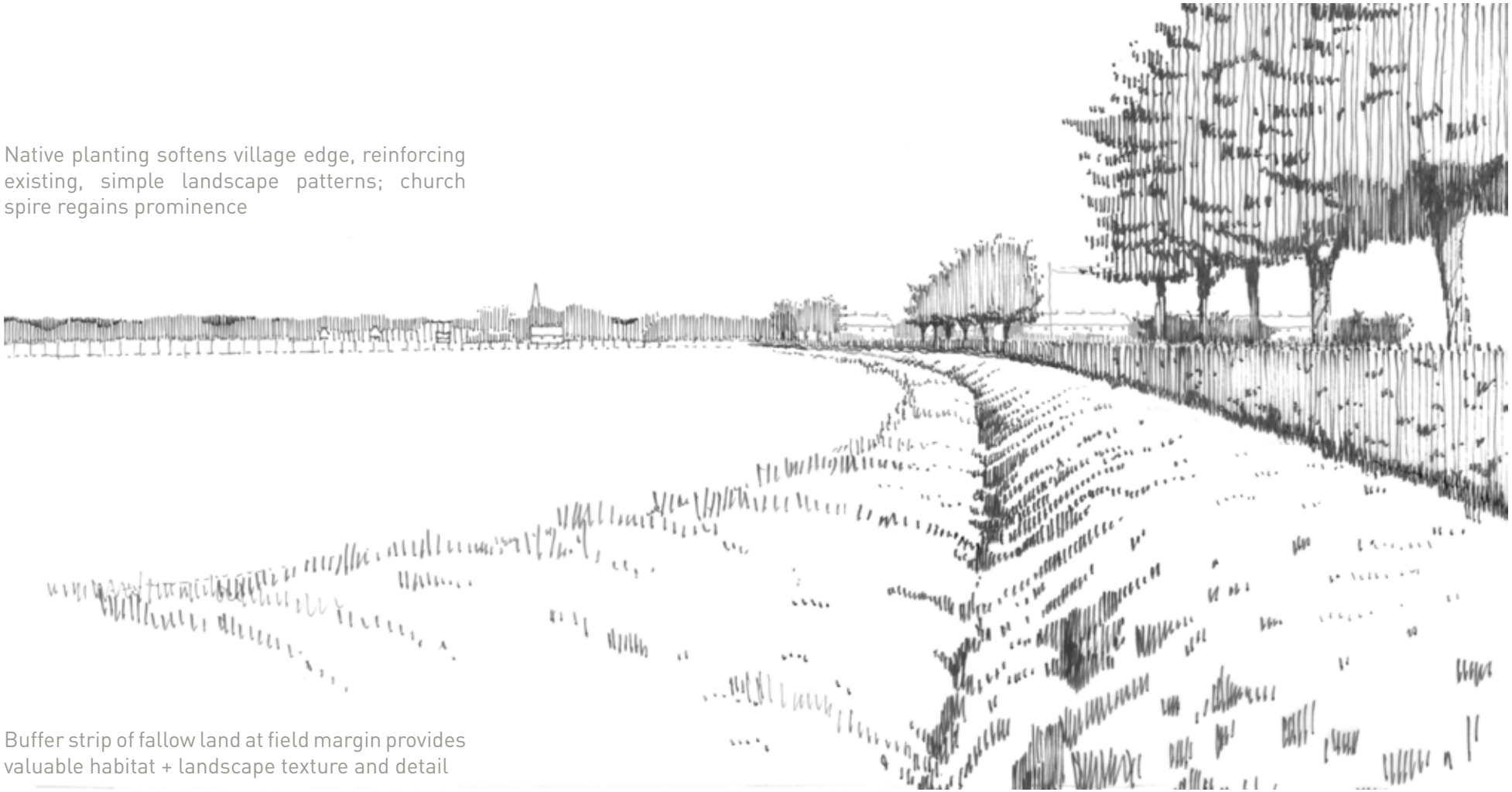
Stark relationship between village and surrounding arable farmland - may occur when built development has obliterated the small -scale landscape pattern of paddocks, orchards and greenways which traditionally formed a transition to large scale farmland

BEFORE

AFTER

New tree and hedgerow planting provides enclosure and a distinctive village gateway

Native planting softens village edge, reinforcing existing, simple landscape patterns; church spire regains prominence



Buffer strip of fallow land at field margin provides valuable habitat + landscape texture and detail

Overarching principles and priorities for land management in the Low Chalk Farmland

- Reduce fragmentation of woodland and hedgerow networks by buffering, extending and linking existing biodiverse sites along woodlands, roads and tracks.
- Conserve and enhance the landscape setting of existing settlements, taking account of gateway views from local roads.
- Integrate new built and infrastructure development, including signage, lighting and road improvements, by conserving and extending existing networks of trees and hedgerows as new and enhanced green infrastructure links that connect new settlement with the surrounding countryside.
- Ensure new reservoirs are integrated within open farmland landscapes by extensive new tree planting, designed to screen views to their abrupt slopes and any associated infrastructure.

Rolling Clay Farmland

Rolling Clay Farmland

Distinctive landscape characteristics

- Rolling arable farmland underlain by deep boulder clays
- Large scale, open arable fields on broad ridgetops; scattered mixed woodlands and hedgerow trees provide moderate enclosure on rolling lower slopes
- Rectilinear field pattern defined by neat hawthorn hedgerows
- Groups of mature hedgerow oak trees along rural lanes
- Long, relatively open views, particularly from ridgetops
- Rural character, with small clustered hamlets and villages linked by a dense network of hedged lanes and tracks
- Church towers, pylons and wind turbines (at North Pickenham) are local landmarks

Landscape character

The Rolling Clay Farmland is the most elevated landscape type within the study area, to the north and east of the Brecks. It is underlain by chalk bedrock, but here the chalk is covered by deep glacial drift deposits of the boulder clays (Lowestoft Till) which extend across central Norfolk and Suffolk. Shallow river valleys and dry tributary valleys have cut through the underlying chalk to form a gently rolling landform with a broad, smooth profile. There are often drift deposits of sandy soils overlying the clay, particularly on more elevated ridges.

The land rises to 84m AOD on the ridge to the north of Swaffham, but elsewhere on the eastern fringes of the Brecks study area, the average elevation of the Rolling Clay Farmland is between 40 and 60m AOD. This is a large scale arable farmland landscape, which becomes more open and exposed above the 55m contour and towards the broad ridgetops, from which there are long, open views across adjacent landscapes.

From the post glacial period onwards, settlement was concentrated in the river valleys, but the scatter of

archaeological finds suggests activity throughout the Neolithic and Bronze Age and pollen evidence from a range of sites suggests that these rolling claylands were farmed from the Iron Age. There are Bronze Age bowl barrows in the plantations just east of the A1065 to the south of Swaffham.

The Roman road known as the Peddar's Way runs through parts of the study area, near Watton and to the north of Swaffham, where it crosses the ridge of Bartholomew's Hills and descends to the cross the River Nar at Castle Acre. This route would have brought settlement and commerce to villages along the eastern fringes of the Brecks. The site of a Roman settlement at Woodcock Hall, near Watton is a scheduled monument.

Place name evidence suggests that the Rolling Clay Farmland was well settled by the Saxon period (Swaffham, Watton and Pickenham) and this relatively elevated landscape would have been grazed as part of the medieval agrarian system. There is evidence of a deserted medieval settlement just beyond the study area at Palgrave and also of a former medieval market place and leper hospital at Bartholomew's Hills. Areas of less fertile soil, for instance where sandy drift deposits are influential, were used for rabbit warrens in medieval times. The remnant banks of former medieval warrens remain in woodland near South Pickenham (South Pickenham Warren) and Cockley Cley.

Large scale, rolling arable farmland subdivided by neat hawthorn hedgerows with scattered oak hedgerow trees - near Great Cressingham

The medieval common fields were enclosed during the 19th century under Parliamentary Enclosure Acts. There was an amalgamation of landholdings during this period, along with the development of halls with designed parkland landscapes. Small plantations and tree clumps in some parts of the Rolling Clay Farmland are the outlying remnants from designed parkland landscapes at Narford Hall, Cockley Cley Hall and Pickenham Hall.

Today the medium-large scale landscape pattern dates from the 19th century enclosure, although many fields have since been enlarged as agricultural systems have become increasingly intensive. All the land has been enclosed and converted to arable land. This is a rural, farmland landscape, dominated by arable fields with a large scale, rectilinear pattern. Fields are enclosed by hawthorn hedgerows and generally become larger on higher land. There is a widely dispersed settlement pattern of clustered villages and hamlets, connected by narrow lanes. The lanes are tightly enclosed by hedgerows and, since hedgerow oak and ash trees are typically concentrated along the lanes, views are often channelled along enclosed road corridors through an otherwise quite open landscape. At field gates and on ridgetops, there are long views across adjacent landscapes.

There are blocks of mixed woodland throughout the Rolling Clay Farmland, but woodland cover is generally sparse and the farmland landscape is more open on the ridgetops. Tree cover increases towards the valleys, with blocks of mixed woodland and hedgerow oak trees. The field pattern becomes smaller in scale on lower slopes and near to villages.

The flat, broad ridgetops were used for military airfields during World War II. Pickenham Airfield is on the north eastern fringes of the study areas and the wind turbines on this site are a local landmark. The former US air base at Snetterton is now used as a centre for car/bike track racing – the Snetterton Circuit was constructed in 1951. Elsewhere lines of pylons are sometimes prominent as they cross open farmland and there are local views to church towers at villages such as Castle Acre, South Pickenham and East Harling.

Overall, this is a deeply rural landscape, which seems 'neat' and tidy in comparison with the Brecks to the west.

Typical lane in the Rolling Clay Farmland - tidy hedgerows and mature hedgerow oak trees. Views across the adjacent arable fields are limited to field gates

What's important and why?

The Rolling Clay Farmland has a distinctive character, particularly when seen alongside the heathy vegetation of the Brecks to the west. Here most fields and roads are enclosed by neat hawthorn hedgerows and the landscape has an established, well organised character. Some field hedgerows have been lost through intensive arable production, but overall the landscape is in good condition.

The most sensitive landscape elements and features are the hedged rural roads and lanes, together with the many mature hedgerow oaks trees that channel views along these routes. The remnant clumps of specimen trees and plantations in fields adjacent to estate parklands are also distinctive local features. Also sensitive are the long, open views from this landscape, which provide opportunities to look across to adjacent landscapes, including the wooded skyline of the Brecks to the west. Many types of landscape change could be screened or integrated within such views through woodland planting, but tall structures, such as pylons, wind turbines or communication masts could remain visible. Parts of the landscape fall within the Breckland SPA and the margins of arable fields and woodlands have potentially high biodiversity value.

Landscape character sensitivity	Visual sensitivity	Landscape value
Neat, rural farmland landscape, which has lost some of the historic field pattern due to agricultural intensification. Nevertheless it has a strong character and can accommodate landscape change through sympathetic woodland and hedgerow planting. Locally distinctive and sensitive landscape features are: • Hedged rural lanes • Mature hedgerow oaks, which are remnants of the historic field and landscape pattern. • Green lanes • Remnant parkland features	The elevated and relatively open views from the Rolling Clay Farmland mean that it has high visual sensitivity, with good inter-visibility across adjoining landscape types. However, there are plenty of opportunities to mitigate the visual impact of landscape change through new tree, hedgerow and woodland planting to integrate changes and provide a visual screen.	Part of the Rolling Clay farmland falls within the Breckland SPA, designated because it makes a contribution to the habitats of the stone curlew, nightjar and woodlark. The most valuable habitats within this landscape type are the arable field margins, species-rich hedgerows (along parish boundaries and rural lanes) and mixed woodlands. The Bronze Age barrows, Roman settlement site and the Peddar's Way are scheduled ancient monuments of national importance and the area also includes important remnants of medieval settlements and warrens.

Landscape strategy

The principal forces for landscape change are set out below, along with notes on how the changes can be managed to conserve the distinctive landscape character of the Rolling Clay Farmland.

Conversion and expansion of farmsteads, for agricultural, residential and/or commercial uses - Some farmsteads are of medieval origin and incorporate listed buildings, but the majority are 'late' historic farm buildings dating from the 19th century enclosure and may have the potential to accommodate expansion and conversion to other uses, provided patterns of existing trees and woodlands are conserved and extended to provide a partial visual screen and integrate the new development. Guidance for integrating new farm development includes:

- Conserve the scale and proportion of the farmstead within the context of the surrounding large scale landscape. Views to farmsteads and farm buildings are commonplace in the Rolling Clay Farmland, but these are typically long views, with buildings seen in the middle distance across open fields and framed by woodlands and tree belts. Expansion of farmsteads in small-scale landscapes of in locations where they are alongside roads would be more difficult to accommodate without changing local landscape character.
- Conserve the characteristic clustered form of farmsteads and avoid linear development
- Building materials should be appropriate for the style of existing buildings present – staining used for exterior boarding should be capable of weathering in the traditional way, as a permanent dark or black colouring is not locally appropriate.
- Minimise visible changes to the surrounding agricultural landscape, as land use changes (including the introduction of garden boundaries, lighting and other suburban features) have the potential to be more visually intrusive than built development in this large scale, relatively open landscape.
- Integrate new large-scale agricultural buildings in open countryside by careful choice of form, orientation and colour of buildings. Whenever possible, new agricultural buildings should relate to an existing cluster of buildings and to existing mature trees and woodlands which can provide a backdrop to views. Carefully designed tree planting, which extends the existing pattern of plantations, tree belts and hedgerows, will help to integrate and screen new agricultural development.

Commercial property near East Harling, within the Rolling Clay Farmland

Expansion of existing settlements and the creation of new settlement patterns. The regular, large scale pattern of hedged arable fields has the capacity to accommodate new built development provided new development is associated with new planting that is designed to integrate settlement growth, providing a partial screen to reduce the degree of landscape and visual impact. Guidance for integrating new built development includes:

- Integrate the settlement edge with the surrounding rural and sparsely settled countryside by extending existing woodland and tree belts and connecting hedgerows so that the visual impact of built development is softened.
- Conserve the small-scale pattern of rural roads, particularly at the entrance to settlements. New hedgerow tree planting in these locations will provide positive gateway features which are typical of this landscape type.
- Maintain a geometric pattern of straight lanes and built frontages, which fits with the existing scale and pattern of the settlement edge landscape.
- Conserve the clustered pattern of settlement which is typical of this landscape – linear development should be avoided.

New infrastructure development, including signage, lighting and improvements to roads – the narrow roads and hedged rural lanes are the most accessible parts of the Rolling Clay Farmland and the open views from the roads to the surrounding landscape are highly sensitive to change. Guidance to improve the integration of road and utility infrastructure developments includes:

- Plant new native hedgerows and hedgerow trees alongside new or altered roads to integrate these changes within the characteristic hedged landscape pattern
- Avoid traffic calming measures and signage in rural locations that could have an urbanising effect.
- Design small scale infrastructure such as signage, lighting and interpretation boards with simple forms and appropriate local materials so that it is well integrated within the surrounding landscape. Control the use of visually intrusive and unnecessary signage.

Changes in agricultural subsidies and management, which would drive changes in the intensity of cultivation and the management of field boundaries. The changes in cropping practices that have taken place across some of the Rolling Clay Farmland, such as the use of fleece and plastic, as well as outdoor pig production, have had a significant effect on the landscape.

Narrow roads are vulnerable to small-scale changes, particularly hedgerow removal, which changes the characteristic sense of enclosure along rural roads

The siting and style of structures subject to planning control, such as static feed bins for pigs and poly tunnels should be appropriately conditioned to minimise their landscape impact. Guidance for farm management practices that will conserve and enhance distinctive landscape character include:

- Conserve and enhance the character, quality and connectivity of woodlands, shelterbelts and field hedgerows, maintaining and increasing the overall proportion of woodland to arable fields within the overall landscape pattern
- Increase the connectivity of the network of woodlands, tree belts and hedgerows, introducing new planting to connect gaps, maintaining buffer strips alongside trees and boundaries to protect the ecological corridors from mechanical and chemical damage.
- Enhance the diversity of woodland and plantation habitats by woodland management to improve the age structure and species composition of woodlands and plantations
- Plant deciduous native trees on the fringes of woodlands and plantations to enhance their ecological value and visual character.
- Enhance the biodiversity of arable habitats by managing arable field margins and buffering existing trackways and track verges in accordance with cultivated agri-environmental prescriptions which are likely to involve no fertiliser or herbicides.

Development of farm reservoirs – the abrupt steep embankments of reservoirs are intrusive features which are generally not well integrated in the Rolling Clay Farmland. Guidance to improve the integration of reservoir developments includes:

- Extend existing woodlands and tree belts with new planting that is carefully designed to screen the abrupt slopes and access roads that are associated with new storage reservoirs. Extensive new planting will be required to integrate this form of infrastructure within this relatively open arable landscape

The 'before-and-after' sketches on pages 94 and 95 (within the section referring to the Plateau Estate Farmland landscape type) illustrate how the issue of integrating farm reservoirs in large scale agricultural landscapes might be approached using a hypothetical example.

Increase the connectivity of the network of woodlands and hedgerows across the open clay farmland landscape, introducing new planting to connect gaps and maintaining buffer strips alongside hedgerows

Overarching principles and priorities for land management in the Rolling Clay Farmland

- Conserve existing mature woodlands, trees and hedgerows, which give a strong rectilinear structure to the landscape; aim to increase the proportion of tree cover
- Ensure new development (and infrastructure) is integrated by new tree planting that is designed to reinforce and extend existing patterns of trees and woodlands.
- Conserve and enhance the network of narrow hedged roads and tracks, which contrasts with the surrounding open farmland
- New planting at the entrances to villages will enhance these gateway views and strengthen distinctive landscape character

Plateau Estate Farmlands

Plateau Estate Farmlands

Distinctive landscape characteristics

- Gently rolling farmland on light, sandy soils
- Field ponds
- Large scale rectilinear pattern of fields interspersed with large blocks of woodland and tree belts
- Discontinuous hedgerows; groups of mature hedgerow oaks and ash trees are occasional features
- Clustered villages and scattered farmsteads connected by a network of straight lanes
- Remnants of 18th and 19th century parkland landscapes
- Long views, framed by woodlands and tree belts.

Landscape character

A gently rolling plateau farmland landscape, which forms a transition between the heathlands of the central Brecks and the clay farmlands to the south and east. The plateau is formed from a mixture of chalky clay and sandy glacial deposits which have developed mainly free-draining loams and sandy soils. There are relatively few water courses, but round field ponds are a common feature on parts of the plateau, where there are pockets of heavy clay.

This large scale landscape of big open fields, woodland blocks and straight tree belts developed as a result of the late enclosure of areas of common land and heath. Traditionally the area around Bury St Edmunds was one of large common fields and heaths and some common-field arable farming was surviving here in the 18th and early 19th centuries, when it was enclosed through parliamentary acts. The late enclosure has resulted in a relatively open, planned landscape with regularly shaped fields bounded by straight hedge-lines.

Remnant tree clumps and lines of mature trees provide a hint of former designed landscapes on parts of the plateau. The most prominent is the parkland surrounding the Tudor mansion of Hengrave Hall on the terraces to the south of the Lark Valley near Bury St Edmunds. The mansion dates from the 1530s, when it was built by Sir Thomas Kytson, a London merchant who dealt in luxury textiles. It is constructed from pale bricks and stone -some taken from demolished local monastic houses following their dissolution. The original park at Hengrave was established over former common field strips in 1587, and still retains much of its original shape and layout, with some redesign in the picturesque tradition in the early 19th century.

The enclosure of heathland and marginal farmland in the wider landscape at this time, a period of economic recession, provided the opportunity for an influx of wealthy landowners to purchase and create landscape parks. An example within the study area is the 19th century terraced gardens and pleasure grounds at Culford Park and the former hall and parkland at Fornham St Genevieve which has since been demolished and its park excavated for sand and gravel.

In most places the historic parkland landscapes are no longer obvious landscape features, but occasional stretches of well built stone or brick walls and farm buildings and short avenues of trees provide clues to this former use. The small clumps of ancient woodland near Risby are remnants of wood pasture and contain important veteran trees.

Large scale arable farmland often provides a foreground to views towards the wooded Brecks

The Plateau Estate Farmlands have a long history of settlement, with clustered small villages and dispersed farmsteads connected by a network of straight lanes and tracks. The scale of the landscape pattern varies according to the composition of the underlying soils, drainage and the location of settlement, but the overriding pattern is one of large rectilinear arable fields bounded by low hedgerows or tree belts and interspersed with large blocks of woodland. There are some Scots Pine tree belts, but these are not dominant over the landscape type as a whole. Most areas of former heathland and common have been enclosed as farmland.

What's important and why?

The strong geometry and large scale pattern of the Plateau Estate Farmlands landscape is not inherently vulnerable to change and this is a relatively robust landscape which is likely to be able to accommodate change without detriment to its distinctive landscape character. However, the typical long, open views across the farmland plateau (and often across adjacent landscape types) are a sensitive component of the local landscape. These long views provide a strong sense of the extensive rural character of the area and would be vulnerable to the development of tall structures which could not be screened by woodland blocks. Other elements and features of the landscape that are particularly sensitive to change are the hedged straight lanes, groups of mature hedgerow trees (which may sometimes be remnants of historic parkland landscapes) and field ponds.

Landscape character sensitivity	Visual sensitivity	Landscape value
The large scale, geometric pattern of this farmland landscape is relatively robust. The landscape is in moderately good condition, although hedgerow removal is common and this detracts from the resilience of landscape, particularly where it occurs alongside local lanes and tracks. Locally distinctive and sensitive landscape features are: • narrow, straight hedged lanes and field tracks; • groups of mature hedgerow oak trees at junctions and near settlements; and • round field ponds • the regular, inter-connecting pattern of woodlands, copses and tree belts which provides a strong overarching landscape structure.	Long, open views across the plateau farmland create a sense of an extensive, deeply rural and tranquil farmland. Views are framed by blocks of woodland and wooded shelterbelts, which provide a strong visual screen, but open arable fields predominate and overall the landscape feels relatively open, with a strong depth of vision and opportunities for views across adjacent landscape types.	Key components of landscape value are: • pockets of remnant semi-natural ancient woodland at Brakey Pin, Flempton and Oak Pin and Old Broom, Risby (designated as County Wildlife Sites); • Hengrave Hall and the remnant historic landscape parklands at Culford Park (grade II listed) and at Hengrave (although the park is not on English Heritage's registered list of historic parks and gardens); • conservation areas and clusters of listed buildings (often medieval) at the villages of Hengrave, Fornham all Saints, Great Livermere, Honington, Ixworth Thorpe and Coney Weston

Landscape strategy

The principal forces for landscape change are set out below, along with notes on how the changes can be managed to conserve the distinctive landscape character of the Plateau Estate Farmlands.

Expansion of existing settlements and the creation of new settlement patterns. The regular, large scale pattern of arable fields and woodlands has the capacity to accommodate new built development as the extensive pattern of woodland cover can be adapted to integrate settlement growth, providing a partial screen to reduce the degree of landscape and visual impact. Guidance for integrating new built development includes:

- Integrate the settlement edge with the surrounding rural and sparsely settled countryside by extending existing woodland and tree belts and connecting hedgerows so that the visual impact of built development is softened.
- Conserve the small-scale pattern of rural roads, particularly at the entrance to settlements. New hedgerow tree planting in these locations will provide positive gateway features which are typical of this landscape type.
- Maintain a geometric pattern of straight lanes and built frontages, which fits with the existing scale and pattern of the settlement edge landscape.
- Conserve the clustered pattern of settlement which is typical of this landscape – linear development should be avoided.
- Avoid the expansion of settlement close to the margins of this landscape type, where the plateau meets adjacent river valleys. Built development in such locations risks significant landscape and visual impacts because of the abrupt change in scale between the large scale plateau farmland and the small scale of adjacent valley landscape types.

Former airfields may be targeted for development as brownfield sites; they are often exceptionally open, large-scale landscapes, which require extensive structural planting to integrate new development

Conversion and expansion of farmsteads, for agricultural, residential and/or commercial uses - Some farmsteads are of medieval origin and incorporate listed buildings, but the majority are 'late' historic farm buildings dating from the 19th century enclosure and may have the potential to accommodate expansion and conversion to other uses, provided patterns of existing trees and woodlands are conserved and extended to provide a partial visual screen and integrate the new development. Guidance for integrating new farm development includes:

- Conserve the scale and proportion of the farmstead within the context of the surrounding large scale landscape. Views to farmsteads and farm buildings are commonplace in the Plateau Estate Farmlands, but these are typically long views, with buildings seen in the middle distance across open fields and framed by woodlands and tree belts. Expansion of farmsteads in small-scale landscapes of in locations where they are alongside roads would be more difficult to accommodate without changing local landscape character.
- Conserve the characteristic clustered form of farmsteads and avoid linear development
- Building materials should be appropriate for the style of existing buildings present – staining used for exterior boarding should be capable of weathering in the traditional way, as a permanent dark or black colouring is not locally appropriate.
- Minimise visible changes to the surrounding agricultural landscape, as land use changes (including the introduction of garden boundaries, lighting and other suburban features) have the potential to be more visually intrusive than built development in this large scale, relatively open landscape.
- Integrate new large-scale agricultural buildings in open countryside by careful choice of form, orientation and colour of buildings. Whenever possible, new agricultural buildings should relate to an existing cluster of buildings and to existing mature trees and woodlands which can provide a backdrop to views. Carefully designed tree planting, which extends the existing pattern of plantations, tree belts and hedgerows, will help to integrate and screen new agricultural development.

Changes in the management and use of historic parklands - Any proposals for change could have a negative impact on historic landscapes. The majority of sites, regardless of designation status, will require an overarching management plan or strategy to guide change. This should be based on historic research and should cover the conservation, preservation and management of existing historic features, as well as the restoration or creation of new or lost ones.

Individual sites may require deer fencing to support their establishment, as well as new woodland planting to mitigate landscape and visual impacts.

Changes in agricultural subsidies and management, which would drive changes in the intensity of cultivation and the management of field boundaries. The changes in cropping practices that have taken place across some of the plateau farmlands, such as the use of fleece and plastic, as well as outdoor pig production, have had a significant effect on the landscape.

The siting and style of structures subject to planning control, such as static feed bins for pigs and poly tunnels should be appropriately conditioned to minimise their landscape impact. Guidance for farm management practices that will conserve and enhance distinctive landscape character include:

- Conserve and enhance the character, quality and connectivity of woodlands, shelterbelts and field hedgerows, maintaining the existing proportion of open fields to woodland.
- Increase the connectivity of the network of woodlands, tree belts and hedgerows, introducing new planting to connect gaps, maintaining buffer strips alongside trees and boundaries to protect the ecological corridors from mechanical and chemical damage.
- Enhance the diversity of woodland and arable field habitats by woodland management to improve the age structure and species composition of woodlands and plantations
- Plant deciduous native trees on the fringes of woodlands and plantations to enhance their ecological value and visual character.
- Conserve and manage field ponds and their associated fringe habitats, providing a 2m buffer to protect the wetland from mechanical damage and eutrophication.

New infrastructure development – including reservoirs and roads – the abrupt steep embankments of reservoirs are intrusive features which are generally not well integrated in the Plateau Estate Farmlands. Guidance to improve the integration of these and other infrastructure developments include:

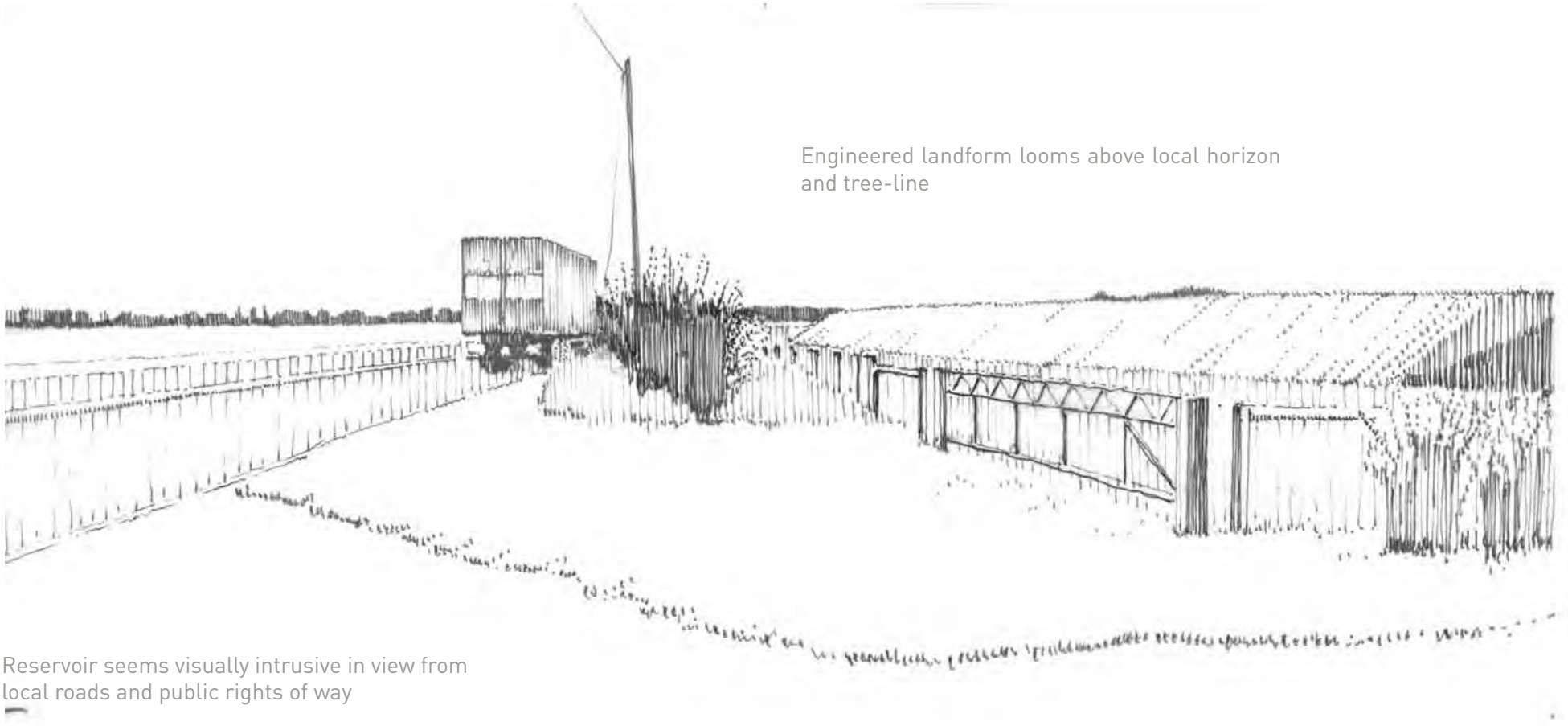
- Extend existing woodlands and tree belts with new planting that is carefully designed to screen the abrupt slopes and access roads that are associated with new storage reservoirs. Extensive new planting will be required to integrate this form of infrastructure within this relatively open arable landscape
- Ensure new hedgerows are planted alongside new or altered roads in order to reduce the perceived scale of road developments and integrate with the existing network of rectilinear boundaries. Blocks of woodland should extend right up to the edge of roads in places, creating 'pinch-points along the roads and adding variety to local views.

The 'before-and-after' sketches on pages 94 and 95 illustrate how the issue of integrating farm reservoirs in large scale agricultural landscapes might be approached using a hypothetical example.

Field ponds are a characteristic feature of the Plateau Estate Farmland - a buffer zone surrounding the wetland would protect the habitat from physical damage and eutrophication

Integrating reservoir development

One approach to tackling the issue of visually intrusive reservoir development - illustrated as a hypothetical example.

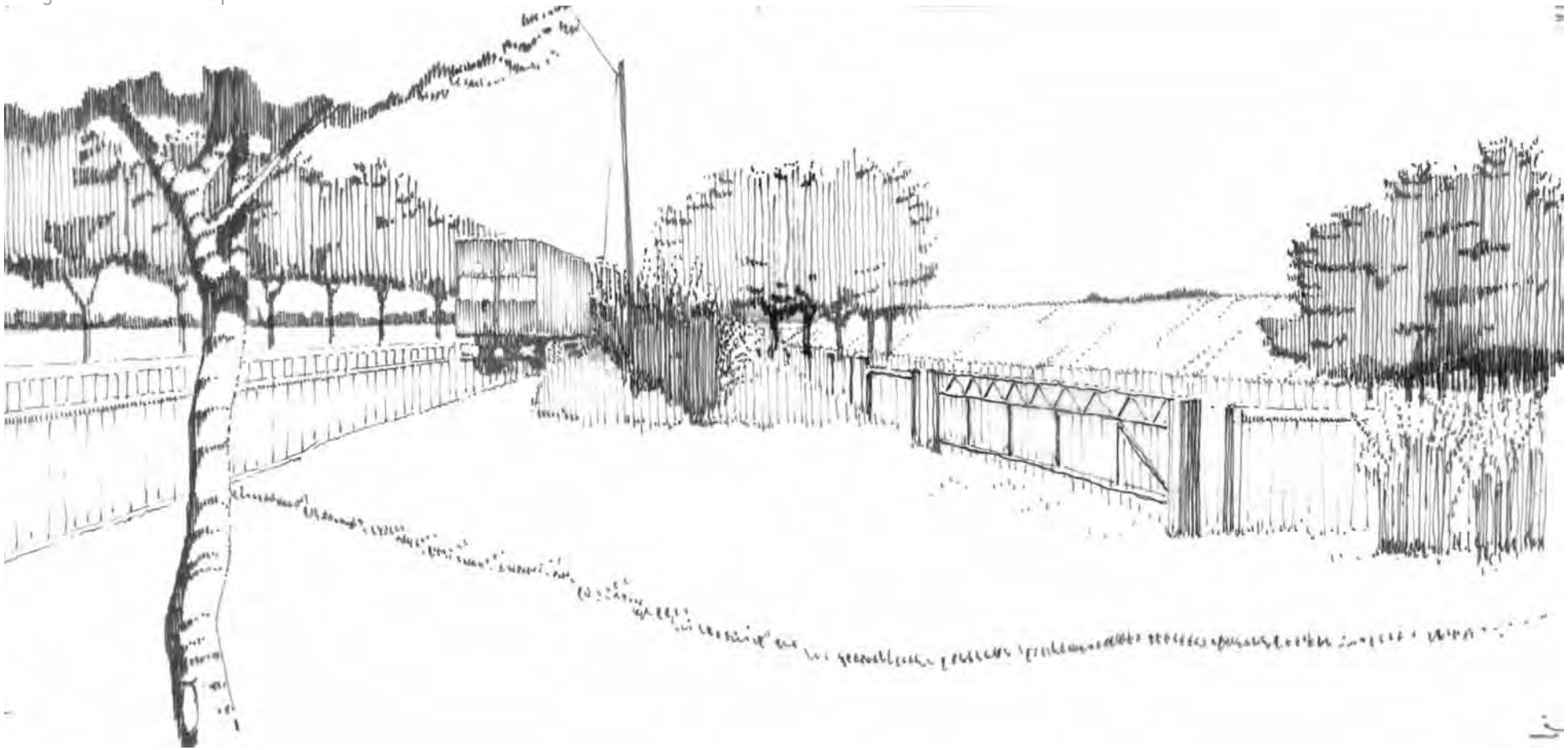


BEFORE

AFTER

Compensation planting off-site assists integration at landscape scale

New foreground tree planting breaks the local horizon in views from the road, softening the stark appearance of the reservoir landform



May be opportunities for new meadow and woodland habitat on leftover pieces of land

Overarching principles and priorities for land management in the Plateau Estate Farmlands

- Reinforce the historic pattern of regular, rectilinear boundaries
- Restore, maintain and enhance the inter-connected network of tree belts and plantations which provide a strong visual structure across this landscape type
- Extend existing woodland and tree belts to ensure that new development is always partially screened and viewed against a wooded backdrop
- Conserve the characteristic contrasts in scale and pattern of the plateau farmland landscape

Settled Fen

Settled Fen

Distinctive landscape characteristics

- Completely flat and low lying landscape of peaty soils on the margins of the Fens
- Small-medium rectangular paddocks and fields, separated by reed filled drainage ditches
- Patches of carr woodland provide some enclosure and break the geometry of the field pattern
- Scattered scrub along roads and some field margins
- Pony paddocks and small holdings
- Unsettled, but often fringed by settlement on the more elevated margins of the Fens and the Brecks

Landscape character

A completely flat, low lying landscape on the eastern margins of the Fen Basin along the lower reaches of the Rivers Lark, Little Ouse and Nar near to their confluence with the extensive floodplain fens of the Fen Basin. Small areas of Settled Fen are found on the far western edge of the study area at Hurst Fen (north of Mildenhall), Wangford Fen, the lower Little Ouse (west of Brandon) and part of Marham Fen.

These areas have an underlying micro-topography of sandy hummocks and peat- filled hollows, covered by a desiccating surface peat layer that gives the area the appearance of a flat plain. Most of the land is at sea level, but small sandy islands and ridges may rise to about 4m above sea level. The black, peaty soils vary from very sandy, where underlying sand ridges are close to the surface, to almost pure peat over the deeper hollows.

The extent of the Fen Basin changed over time as this vast area was progressively and repeatedly flooded and clogged by silt from rising sea levels and marsh from sluggish river courses. This changing hydrology would have influenced levels of groundwater saturation around the margins of the Fen Basin, although the springs on the edges of Eriswell Lode and Wangford Fen would have maintained marshy fen in their vicinity. From post-glacial times the edges of the Fens were a focus for settlement and archaeological

excavation at such sites has revealed finds that date from the Mesolithic period onwards. The sites of a Neolithic settlement at Hurst Fen, near Mildenhall, of Saxon occupation on Chequer Meadow, Brandon and a substantial Romano-British site at Leylands Farm, Hockwold all fall within the Settled Fenland. They would have been close to water and to a variety of different habitats and hunting grounds, but on land that was sufficiently dry for settlement. Hoards of Bronze Age metalwork have been found from area of the Fen edge, including sites further downstream on the edge of the Rivers Wissey and Little Ouse and some archaeologists suggest that they are the relics of ritual ceremonies where valuable weapons and implements were thrown into the marsh. Such finds demonstrate the importance of the fen edge landscape to the early settlers.

From the medieval period, parts of these marginal fens were open fen common, such as Mildenhall Common Fen and some areas were classified as 'Poor's Fen', where the village poor, lacking other rights, were still able to cut peat or harvest sedge, such as Pashford Poor's Fen in the south-west part of Wangford Fen. Most of the marginal fens were drained through 'assarting' - the process by which common land was enclosed piecemeal by private landowners to form pasture. This process enabled local economic diversification, with products such as meat, butter and wool alongside the traditional

The small scale pattern of rectangular plots that is typical of the Settled Fen reflects the historic allocation of landholdings following the drainage of the common fenlands

fenland products of reed, sedge and peat. The marginal Settled Fen areas would have been on the cusp of the productive pasturelands and the marshy fen. They were unsettled, but would have been an important part of the mix of landscape types which formed a productive parish. Following drainage, the land was allotted in small parcels and this relatively small scale pattern of agriculture, small holdings and paddocks remains today. It is very different to the vast scale of the open arable landscapes of the central fens to the west.

The first edition OS Map shows that by 1882, the margins of Wangford Fen had been ditched and reclaimed but it also shows areas of marsh on the margins of the fen, for instance on the edges of Palmer's Heath but also to the east of the road that is now the A1065. This evidence suggests that the Settled Fen was more extensive and wetter in the 19th century than it is today.

Today the area of Wangford Fen has been reduced as the fen soils have become progressively drier. The hydrological changes in the area reflect improved drainage in the wider fen basin, along with abstraction

of groundwater sources. The pattern of change varies from one locality to the next. For instance, the hydrology of Hurst Fen and Eriswell Lode Fen was relatively unaffected by 18th and 19th century drainage schemes, but these marginal fens became drier as a result of the construction of the Cut-off Channel in the early 1960s. This flood relief channel runs some 27 miles northwards from the River Lark at Barton Mills to Denver and intercepts the waters of the Rivers Lark, Little Ouse and Wissey, carrying them directly to the complex of sluices at Denver.

There is a striking contrast in character between the sandy heathland and plantations of the Brecks and the flat, pastures, paddocks and reed-filled ditches of the Settled Fen. The transition to the expansive, arable farmlands of the wider fen basin is more gradual, but the small-scale pattern and scruffy, marginal character of the Settled Fen landscape is distinctive. Areas close to larger settlements are dominated by pony paddocks and small holdings, while the more remote parts of Wangford Fen are small pastures and arable fields, always surrounded by reed-filled ditches. The fields are partially enclosed by scrub and gappy hedgerows and the area has a rather unkempt appearance, particularly on the fringes of settlements, where the sheds, signs and fences associated with smallholdings and horsiculture are sometimes prominent.

The pattern of rectangular fields is interrupted by areas of carr and wet woodland, which are of high biodiversity importance. For instance, Hurst Fen and Howlett Hills, together with Mildenhall Woods support a valuable mosaic of wetland habitats, with peripheral areas of acid grassland. The whole area has County Wildlife Site status, as does Marham Fen in the north of the study area. Overall the Settled Fen seems fairly enclosed, with a scruffy character. Belts of poplars are occasional prominent features on some field margins and small conifer plantations are encroaching along the eastern margins of Wangford Fen.

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Straight, narrow lanes bordered by reedy ditches - the relatively open landscape of Marham Fen in the north of the study area

What's important and why?

The Settled Fen 'feels' like a remnant landscape, caught between the 'busy' landscape of the settlements and roads on the edge of the fens and the wide open, vast plain of the Fens to the west. Much of the Settled Fen has a degraded, piecemeal character and seems 'hemmed in' by surrounding, more dominant landscape types.

The small-scale geometric pattern of the landscape is vulnerable to change and is generally highly visible from local roads. Areas with a relatively high proportion of woodland are able to accommodate some change, but much of the woodland within the Settled Fen is wet woodland, of high biodiversity value and even these areas are small in scale. Overall this is a vulnerable landscape, of high biodiversity value, in areas that are under pressure for change.

Landscape character sensitivity	Visual sensitivity	Landscape value
Small-scale, untidy and 'remnant' character which is under pressure for change from adjacent development and land uses. Vulnerable to change because signs, structures and even new planting can cumulatively change and easily overwhelm the characteristic small-scale landscape pattern. Locally distinctive and sensitive landscape features are: • Small-scale pattern of rectangular paddocks and fields • Reed-filled ditches • Rural lanes	Much of the Settled Fen are visible from adjacent roads and there are often views across the Settled Fen to adjacent landscape types. There is very little scope to accommodate landscape change without fundamentally changing the proportion and scale of the landscape pattern. The open Settled Fen landscapes of Wangford Fen and the lower Little Ouse valley have particularly high visual sensitivity.	Parts of the Settled Fen (at Hurst Fen, Wangford Fen and the Little Ouse Valley) are within the Breckland Special Protection Area and therefore make a contribution to the habitats of the stone curlew, nightjar and woodlark. Overall, the most valuable ecological habitats are the fen, reedbeds, wet grassland, wet woodland and carr, which are S41 UK priority habitats. The Neolithic settlement site at Hurst Fen, the Romano-British settlement site at Leylands Farm, undated earthworks on the edge of the Little Ouse river and the Saxon occupation site at Chequer Meadow, Brandon are all scheduled ancient monuments of national importance for their archaeological record.

Landscape strategy

The principal forces for landscape change are set out below, along with notes on how the changes can be managed to conserve the distinctive landscape character of the Settled Fen.

Development management – There is pressure for built development on the fringes of some parts of the Settled Fen, but the small-scale pattern of landownership and pressure for new structures, caravans, signs, changes to garden curtilage and property extensions, as well as a range of temporary commercial uses, can result in change that is visually intrusive. This is particularly a problem where smallholdings and houses are located adjacent to roads. Some of these changes may be beyond the remit of the development control system. Guidance for minimising negative impacts of adjacent development includes:

- Conserve existing mature trees, woodlands and hedgerows, which form a backdrop to new structures and signs
- New planting should be of native broadleaf species and designed to integrate development within the scale and character of the landscape, reflecting the existing pattern of fields
- Conserve the small-scale network of ditches, reeds and scrub that forms the characteristic boundary to fields
- Avoid earthworks and changes to the local (completely flat) landform
- Avoid linear development along the narrow roads and lanes
- Minimise visible changes to the surrounding agricultural landscape, as land use changes (including the introduction of garden boundaries, lighting and other suburban features) have the potential to be visually intrusive.
- Building materials should be appropriate for the style of existing buildings present. Brick is often used. Staining used for exterior boarding should be capable of weathering in the traditional way.

New infrastructure development, including signage, lighting and improvements to roads – the narrow roads and rural lanes are the most accessible parts of the Settled Fen and views from the roads to the surrounding landscape are highly sensitive to change. Guidance to improve the integration of road and utility infrastructure developments includes:

Large sheds and farm buildings can seem over scaled within the small-scale Settled Fen

- Plant new hedgerows alongside new or altered roads to integrate these changes within the former small-scale landscape pattern, but some of the Settled Fen roads are not enclosed by hedgerows and in these situations the pre-existing landcover pattern should be re-established.
- Avoid modification to the existing hydrological system and the network of ditches and dykes that typically surround fields and run alongside roads.
- Avoid traffic calming measures and signage in rural locations that could have an urbanising effect.
- Design small scale infrastructure such as signage, lighting and interpretation boards with simple forms and appropriate local materials so that it is well integrated within the surrounding landscape. Control the use of visually intrusive and unnecessary signage.

Over abstraction of water from the Brecks' rivers and chalk aquifer has increased, along with flood management measures designed to get the water away quickly. This has led to drying out of former wetland habitats in the Settled Fen, as well as to the accumulation of silt and changes in the aquatic vegetation structure. In addition, high nutrient levels are a problem in many of the rivers and can lead to prolific algal growth and associated dissolved oxygen problems, particularly during period of low flow. Such water stress problems are exacerbated by the erratic and extreme climatic events associated with climate change. Guidance for managing water levels and water quality includes:

- Recognise the role of lower river valleys, with areas of fen, for the storage of floodwater and aquifer recharge and encourage the use of floodplains for these purposes
- Work in partnership with farmers to encourage the uptake of agri-environment options that harvest and conserve water, protect watercourses and prevent water quality deterioration by reducing diffuse pollution, ensuring compliance with regulations on nitrate vulnerable zones to manage fertiliser inputs.
- Manage agricultural practices that could result in damage to water quality, including manure and slurry applications, particularly soil erosion and sedimentation in flood conditions due to intensive pig rearing.
- Increase grassland strips along field drains and water courses in areas of arable land to capture sediment and nutrients
- Create buffer areas between points of potential nutrient input and sensitive riparian habitats.

Well drained arable land on Wangford Fen, an area which has become progressively drier as a result of drainage and groundwater extraction

Land use changes within this small-scale landscape pattern. The key pressure for change is the use of meadows for horse paddocks, but there may also be pressures for intensification of agriculture, with conversion of pastures to arable fields. There may also be pressures for the expansion of domestic gardens or paddocks, all of which can have a significant visual effect. Guidance for managing such local-scale change includes:

- New tree and (in some areas) hedgerow planting (using native species) along field and property boundaries may integrate and screen land use changes that result in visual intrusion in a locally appropriate manner.
- Minimise the proliferation of different types of boundary enclosure; brown fencing tapes should be used and planting may be necessary to soften the impact of post-and-rail fencing. Field shelters and material storage areas should be sited so as to minimise their visual impact.
- New or expanded garden curtilage should be designed to fit into the local context and respect the established pattern. The objective is to create a clearly defined distinction between the wholly domestic areas and, for example, land to be used as a paddock.
- The use of low impact materials such as post and wire fencing is preferable to close boarded fencing or fence panels.

Fragmentation of ecological networks and changes in land use, which have the potential to change the balance and quality of land uses and sensitive landscape elements with the Settled Fen. Guidance for land management practices that will conserve and enhance distinctive landscape character includes:

- Manage and buffer existing trackways and track verges in accordance with cultivated agri-environmental prescriptions which are likely to involve no fertiliser or herbicides.
- Consider strategic management that buffers and links multiple woodland sites of biodiversity value into large contiguous networks.
- Conserve and enhance the character, quality and connectivity of woodlands, shelterbelts and field hedgerows, maintaining and increasing the overall proportion of woodland to arable fields within the overall landscape pattern.
- Enhance the diversity of woodland and farmland habitats by woodland management to improve the age structure and species composition of woodlands and plantations

Pony paddocks on the Settled Fen near Mildenhall

Overarching principles and priorities for land management in the Settled Fen

- Manage water levels and water quality to conserve the biodiversity of the sensitive wetland habitats found within the Settled Fen
- Conserve and enhance the small-scale landscape pattern of the Settled Fen, minimising the landscape and visual impact of local changes to boundaries and the addition of structures, signs and temporary uses
- Conserve existing mature trees, woodland and hedgerows; new planting should reinforce existing landscape patterns, integrating and partially screening new development

River Valleys

River Valleys

Distinctive landscape characteristics

- Lush, small scale landscape defined by shallow river valleys with a subtle sense of enclosure
- A mix of peat, sandy and alluvium on flat valley floor; often drift deposits of sand and gravel on flat or very gently sloping valley sides
- Diverse mosaic of wetland habitats surrounding headwater springs and alongside river channel, including areas of reedbed, carr woodland, marsh and fen
- Small irregularly shaped floodplain pastures, divided by a network of ditches and dykes, contrast with surrounding arable fields
- Curving narrow rural roads and tracks often define the edge of the floodplain
- Concentration of historic sites, reflecting a long history of human settlement and intervention
- Settlements are sited on floodplain edge, often at historic crossing points
- Gravel extraction, resulting in extensive lakes and reedbeds
- Intimate, tranquil landscape

Landscape character

The River Valleys landscape type includes all of the river valleys within the Brecks with the exception of the River Nar, a chalk river which is described separately as a Chalk River Valley landscape type. The valley systems of the Rivers Wissey, Thet, Little Ouse (with the Black Bourn) and Lark are described within the Brecks River Valleys landscape type.

The Brecks river valley systems were formed by glacial outwash at the end of the Anglian Glaciation, the last time that ice sheets extended as far as the Brecks. The glacial meltwaters carved shallow valleys into the chalk plateau, draining westwards to the fen basin from the more elevated boulder clays of central Suffolk and Norfolk. Drifts of sand and gravel were often deposited by the glacial meltwaters on the valley sides and have had a strong influence on valley soils, on early colonisation and on the development

of agriculture and mineral workings. In places the glacial drift material is overlain with peat dominated soils.

The river valley floodplains are predominantly pasture, although there are areas of wet meadow, fen, reedbed, alder/willow carr and wet woodland, which create a diverse, small-scale mosaic of valuable wetland habitats within the linear river valley corridor. The distribution of archaeological finds demonstrates that the Brecks river valleys have been the focus for human settlement since Mesolithic times, demonstrating the importance of proximity to water in the relatively dry landscape of the Brecks. Early settlers used the rivers for transportation and communication and benefited from the rich diversity of produce available on the fertile floodplains. The meadows were used for grazing stock, with waterlogged areas left as fen or utilised as wet woodland or alder carr.

There are Mesolithic sites along the Lark and Little Ouse and pottery scatters from the Bronze Age suggest the edge of river valleys were favoured as sites for settlement. The pattern of scattered farmsteads along river valleys persisted throughout the Iron Age. Excavations at West Stow suggest a small self sufficient farmstead with animal husbandry based on cattle. The gravel river terrace deposits provided dry riverside sites for settlement at West Harling, where excavations revealed four enclosures on a

gravel terrace overlooking the River Thet, and at Thetford, where an Iron Age fort may have been strategically sited to control the fords where historic routes crossed the rivers Ouse and Thet. Many clustered riverside settlements, such as Brettenham and Icklingham, originated as river fording or bridging points and other hamlets developed around medieval mills. Villages, farmsteads and halls were always sited on the higher land on the edge of the floodplain or on higher 'islands' of gravel within the valleys as at Santon House (and church) on the Little Ouse. A few medieval farmsteads, usually of manorial rank, were moated. Small stone or brick bridges are attractive landmarks throughout the River Valleys, often at the centre of historic villages. Traditional building materials are red brick and flint, visible in historic walls, churches, halls and farmsteads throughout the river valley landscapes.

During the 18th and 19th century, parkland landscapes were developed in many river valleys, for instance at Shadwell and West Harling (on the River Thet), Didlington, Hilborough and Bodney (on the River Wissey) and Culford (on the River Lark). Lakes, woodlands and groups of specimen parkland trees are remnant features in many valleys.

The floodplain landscapes are defined by curving historic field boundaries and often by narrow

The tussocky, highly textured landscape of the river valley floodplains contrasts with the surrounding farmland. This is the Black Bourn at Fakenham Magna

roads and tracks. Floodplain meadows are divided by wet ditches or dykes that in places are lined by trees or scrubby hedges supplemented by post and wire fencing. The floodplain land is commonly subdivided by dykes set at right angles to the river channel, forming a distorted 'ladder' pattern. The valley grassland usually forms part of a larger agricultural land holding, with larger fields on drier, elevated land and there are sometimes arable fields on land that has been drained on the upper fringes of valleys. Remnant former commons, heathland and medieval warrens such as Cavenham Heath (on the River Lark), Snarehill Warren (on the Little Ouse) and Mundford Common (on the River Wissey) developed on free draining terrace gravels with acidic soils and suggest the diversity of historic land use within the river valleys.

The river valleys are relatively lush, with a naturally high groundwater. These spring-fed wetlands support rich aquatic habitats, with an exceptionally diverse range of species, including some that are rare and of national importance. These include the native white-clawed crayfish (in the Little Ouse), otters and water voles. Parts of the headwater fen habitats are of international importance, with aquatic flora and invertebrate species that are adapted to the nutrient-poor, chalky water and fluctuating levels of flow. Within the river valleys, the diverse mosaic of wetland habitats includes reedbeds, grazing marsh, floodplain meadows, carr woodland and unimproved grassland, all connected by a network of ditches, dykes, tributary streams and water courses.

The Little Ouse has a wooded character as it passes through Thetford Forest

Gravel extraction has been a significant influence within river valleys where there are extensive terrace gravel deposits, most notably in the valley of the River Lark, but also at Ickburgh (River Wissey) and near Thetford (Little Ouse). The resulting large pools and reedbeds form part of the mosaic of wetland habitats on the valley floor; at Lackford, the gravel pits are a Local Nature Reserve.

All the River Valleys have a small, intimate scale which contrasts with the surrounding typically large scale landscapes of the Brecks, but the character of the individual river valleys varies. The valleys of the Thet and Little Ouse are well wooded and the western part of the Thet valley is dominated by the plantations of Thetford Forest. Away from the influence of the larger settlements of Brandon and Thetford, these river valleys seem narrow and secluded. The valley of the River Lark has a broader floodplain and a larger scale, with extensive heathland near Icklingham. The Black Bourn has a deeply rural character, with attractive open views to the surrounding farmland and parkland at Euston Hall. The valley system of the River Wissey also has a small scale character, but here the tributary river valleys are secluded, with a secretive, almost domestic scale.

What's important and why?

The narrow, secluded River Valleys that thread through the Brecks are exceptionally sensitive landscapes because their small-scale, diverse landscape mosaic can easily be overwhelmed by development and by local changes in land use or water quality/flow. This vulnerability is heightened by the narrow form of most river valleys and their subtle landform, which ensures that their intimate landscape character can be disrupted by changes in adjacent landscape types.

Sections of the River Valleys are in good condition, with an intact lowland river valley assemblage of natural water course and historic landscape elements, including alder carr, floodplain meadow and fen. However, in places the small-scale landscape pattern is disrupted by mineral extraction, linear built development and by the realignment and widening of adjacent roads.

The traditional land management system of the river valleys is cattle grazing, but many relatively inaccessible, small valley floor pastures are neglected and peripheral to any form of active agriculture and are in poor condition due to under-grazing and scrub encroachment or their use as horse paddocks.

Landscape character sensitivity	Visual sensitivity	Landscape value
The intimate scale and diverse character of the River Valleys is vulnerable to change as the distinctive small scale pattern of these landscapes is finely balanced and can easily be overwhelmed by changes in the proportion or scale of individual elements. In addition, the typically narrow form and subtle topography of the River Valleys ensures that they are very sensitive to changes in adjacent landscapes. Locally distinctive and sensitive landscape features are: • Small- scale, diverse mosaic of riparian and wetland habitats which contrasts with surrounding larger scale landscapes • Sinuous edges of floodplain, river and marsh, defined by curving tracks, roads and hedgerows • Historic bridges and villages at crossing points, including particularly the fording points of the Icknield Way • Subtle landform and narrow form of river valleys	In general, the River Valleys have a secluded character which is distinctly more enclosed and smaller-scale than the surrounding Brecks landscapes. Views are typically enclosed by the hedgerows, woodland, carr woodland and groups of trees on the valley floor and along rural lanes. Churches and village buildings are often surprise landmarks in local views. There are strong contrasts in the visual character and accessibility of the different river valleys, depending on opportunities for views from local roads and bridges. Since the majority of Brecks settlements are sited on the fringes of the River Valleys, these landscapes provide the setting and focus for local views and corridors of movement for a relatively high proportion of residents and visitors.	Key components of landscape value are: • Exceptionally valuable spring-fed wetlands and headwater fen habitats, some of which are of international importance and included within the Breckland SAC • Concentration of semi-natural wetland habitats, including many SSSIs and County Wildlife Sites; • Numerous historic bridges and riverside settlements, mills and halls – conservation areas and clusters of listed buildings • Important archaeological sites, including Bronze Age, Romano-British and Saxon settlements • Remnant historic landscape parklands, eg Didlington and Shadwell.

Landscape strategy

The principal forces for landscape change are set out below, along with notes on how the changes can be managed to conserve the distinctive landscape character of the River Valleys.

New built development within riverside settlements and alongside roads adjacent to valley floodplains. Settlement in the Brecks has historically been concentrated along the river valleys and the narrow, small-scale valley landscapes form part of the landscape setting of historic village centres. Views from and along the valley floor are vulnerable to any large scale development within the riverside villages and, in particular, along the valley-side roads. Guidance for integrating new built development includes:

- Conserve the small-scale character of the valley settlements, with a sequence of framed views to and from the valley floor; avoid over-scaled buildings which project above the skyline.
- Conserve the character of river valley views to landmark buildings and bridges and also the occasional longer framed views that connect the river valley landscapes to the surrounding farmlands, heathlands and commons in the surrounding Brecks Heathland Mosaic.
- New built development should be related to existing clusters of buildings. Avoid linear development along valley side roads which intrudes upon their rural character and disrupts the characteristic gateway approach to individual villages along the valley routes.
- The majority of valley side built development will be visible from the valley floor and should be designed to the highest standards, using local materials that fit sympathetically with the local vernacular. In most river valley landscapes this means bricks, with some clunch, flint and render.
- Maintain the rural road network, resisting highway upgrading works that could have an urbanising influence and giving priority to the conservation of historic river crossing points
- New planting associated with valley side development can help to conserve the enclosed, secluded character of villages by providing a backdrop to views from the valley floor. Planting should be of native species and should be designed to extend the visual influence of existing tree groups and belts of woodland, creating curving 'layers' of native vegetation that give visual emphasis to the sinuous form of the river valley.

Land use changes, which disrupt the characteristic diverse, small-scale patterns of fields and habitats on the valley floor. The loss of traditional grazed floodplain pastures and the creation of small horse paddocks and associated structures can significantly degrade the quality and condition of the river valley landscapes. Pastures that are inaccessible or of marginal economic value may be left unused and become colonised by wet woodland and scrub. Guidance for managing land use change includes:

- Support the continuation of traditional economic activities, including grazing with cattle and sheep. The continuation of traditional agricultural practices is integral to the character and condition of the river valley landscapes and grazing is often critical to the successful management of important wildlife sites in the landscape.
- Maintain a high proportion of grassland. The conversion of grassland to arable production as a result of drainage and 'shaving off' areas of grassland on the drier, outer fringes of valley pastures reduces the scale and integrity of the river valley landscapes. Arable reversion, through agri-environment schemes, or with expansion of livestock enterprises, can help to maintain the character of this landscape and also deliver ecological benefits.
- Manage the proportion of wet woodland and scrub and encourage appropriate planting and management of woodlands. The river valley landscapes contain a mix of wet and plantation woodland and it is important to conserve a balance that is appropriate and in keeping with the distinctive local character and level of enclosure of each river valley landscape. While wet woodland is an important part of the habitat mix, excessive creation of plantation woodland should be avoided.
- Mitigate the impact of horse grazing. The proliferation of post and rail fencing and the subdivision of land into small paddocks using temporary tape can be particularly intrusive. If necessary, brown or green tape should be conditioned and planting required to soften the impact of the fencing and structures associated with horsiculture. Where possible, field layouts should be designed to reflect the historic pattern of boundaries and field shelters and material storage areas should also be located to minimise their visual impact.

Neglect of characteristic ditch and hedgerow networks. The small-scale, often irregular pattern of valley floodplain meadows is a distinctive feature of the river valley landscapes, which is vulnerable to changes in drainage and land use. Guidance for conserving these field patterns includes:

- Conserve the small-scale historic field pattern, particularly on the fringes of riverside settlements

Traditional grazing on the broad pastures beside the River Lark near Icklingham.

- Give priority to the conservation of the curved and sinuous boundaries, marked by hedgerows and trees, that often occur on and along the edge of river floodplains; many are historic, species rich hedgerows which conserve the rural, enclosed character of the valley and some mark abandoned meanders or the course of former tributary streams
- Conserve and manage the network of ditches and dykes on the floodplain, which connect and maintain riparian and wetland habitats along the floodplain.

Over abstraction of water from the Brecks' rivers and chalk aquifer has increased, leading to insufficient levels for agriculture and the conservation of the valuable wetland habitats within the fluctuating meres and river valleys. This has led to drying out of upper and middle sections and riparian zones, but also to accumulation of silt and changes in the aquatic vegetation structure. In addition, high nutrient levels are a problem in many of the rivers and can lead to prolific algal growth and associated dissolved oxygen problems, particularly during period of low flow. Such water stress problems are exacerbated by the erratic and extreme climatic events associated with climate change. Guidance for managing water levels and water quality includes:

- Recognise the role of river valleys for the storage of floodwater and aquifer recharge and encourage the use of floodplains for these purposes so that the floodplain grasslands contribute directly to aquifer recharge into the chalk in areas where overlying glacial deposits are permeable.
- Work in partnership with farmers to encourage the uptake of agri-environment options that harvest and conserve water, protect watercourses and prevent water quality deterioration by reducing diffuse pollution, ensuring compliance with regulations on nitrate vulnerable zones to manage fertiliser inputs.
- Manage agricultural practices that could result in damage to water quality, including manure and slurry applications, particularly soil erosion and sedimentation in flood conditions due to intensive pig rearing.
- Increase grassland strips along field drains and water courses in areas of arable land to capture sediment and nutrients
- Create buffer areas between points of potential nutrient input and sensitive riparian habitats.

The 'before-and-after' sketches on pages 119 and 120 illustrate how issues of over-abstraction might be approached using a hypothetical example.

Avoid physical modification of river channels and provide a broad buffer between arable fields and wetland habitats - arable fields sweep close to the edge of this recently dredged tributary stream

Repair fragmented spring-fed wetlands in the valleys of the Lark, Wissey, Little Ouse and Thet rivers – the river valleys are amongst the most vulnerable and pressurized habitats in the Brecks. Guidance for wetland habitat conservation includes:

- Avoid physical modification of river channels – dredging river beds and confining water to specific channels for flood defence, drainage, navigation and other purposes leads to increased pressure on this fragile resource
- Encourage opportunities for the creation of new areas of priority reedbed, fen and alder carr woodland habitat in areas of relatively low biodiversity interest.

The 'before-and-after' sketches on pages 119 and 120 illustrate how issues of fragmentation and physical modification of water courses might be approached using a hypothetical example.

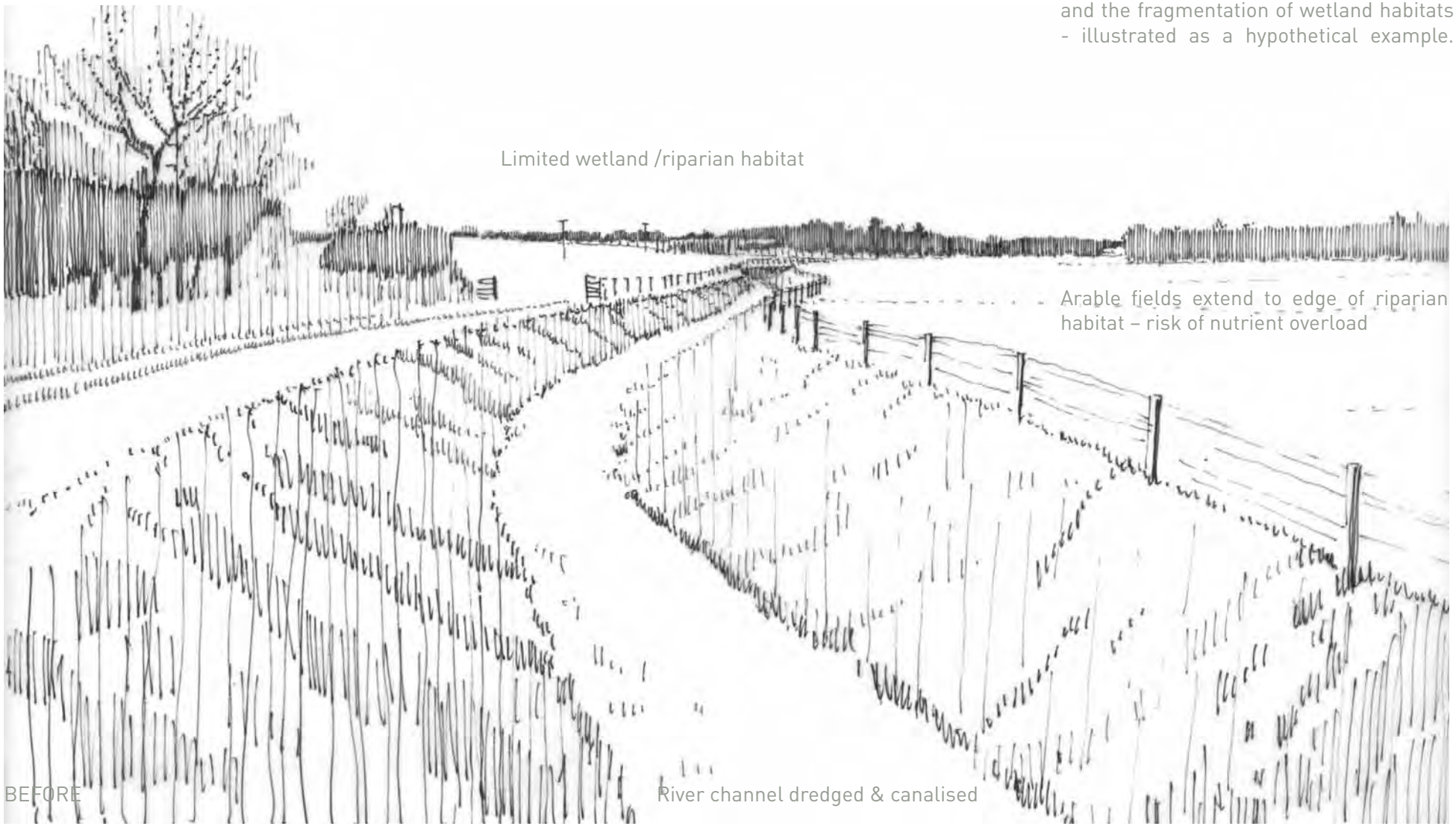
Erosion of the intimate, tranquil character of the river valleys as a result of increased visitor and recreational pressure. The River Valleys offer superb opportunities for recreation. They are the focus for settlement and the natural starting point for walks and cycle routes. They provide good access to nature, along with opportunities for environmental education and understanding heritage. However, there is a risk that the narrow roads and small village landscape of the river valleys could be overwhelmed by visitor pressures, with subsequent loss of their characteristic intimacy and tranquillity. Guidance for improvements to access and green infrastructure includes:

- Encourage multi-functional green infrastructure, with connections between the River Valleys and surrounding landscapes so that the small scale landscape of the river valleys is conserved. Access routes between the River Valleys and surrounding Heathland Farmland Mosaic will encourage understanding of the functional inter-relationships between the landscapes of the heaths, farmland and river valleys.
- Manage visitor pressures at popular and sensitive sites by investing in high quality infrastructure and interpretation, which meets the different needs and levels of use of a range of visitors. Carefully designed car parks and cycle routes are particularly important.
- Manage levels of potential disturbance by diverting cycle and vehicular routes away from sensitive riverside habitats.
- Provide high quality interpretation, with car parks and cycle hire at larger riverside centres, such as Thetford and Brandon and at visitor centres. Invest in and encourage the use of multi-user routes that take people into the river valleys and surrounding landscapes without their cars.

Recreation pressures have caused erosion of riparian habitats and a poor quality riverside environment at this location on the Little Ouse

River floodplain landscapes

One approach to tackling issues of over-abstraction, modification of water channels (for flood water management) and the fragmentation of wetland habitats - illustrated as a hypothetical example.



AFTER

Extensive re-grading of river banks increases storage capacity and restores floodplain
Inter-connected network of wetland and riparian habitat along river corridor; wet pastures on floodplain

Overarching principles and priorities for land management in the River Valleys

- Conserve the strong contrasts in scale and diversity between the River Valleys and surrounding farmland, heathland and plantation landscapes.
- Conserve the small-scale character of river valley settlements, with a sequence of framed views to and from the valley floor; avoid over-scaled buildings that project above the local skyline.
- Buffer sensitive river valley habitats from damage caused by development or agricultural practices.
- Conserve the characteristic proportions of the diverse mosaic of land uses within each river valley, encouraging traditional land use management, including grazing by cattle and sheep.

Chalk River Valleys

Chalk River Valleys

The River Nar, in the northern part of the Brecks, is classified separately to the other River Valleys because it is a 'chalk river', fed by springs arising from the underlying chalk. It has a distinctive landform and an exceptionally high biodiversity. The guidance set out for the River Valleys landscape type will also apply to the Chalk River Valleys and is not repeated in this section of the report.

Distinctive landscape characteristics

- Meandering fast-flowing chalk river, which flows through a narrow, often steep-sided valley.
- Narrow floodplain; grazing pasture is interspersed with areas of parkland, wet meadow and wet woodland.
- Enclosed, well wooded character, particularly in the vicinity of the parklands associated with Narford Hall.
- Small remnant heathy commons alongside the river, as at West Acre and Castle Acre.
- The course of the River Nar and sections of the floodplain are designated as SSSI due to its value as a chalk river habitat.
- Mill ponds, weirs, fords, bridging points and historic riverside walks – this is an accessible river with a sequence of attractive landmarks.
- River is a focus for settlement; a sequence of small villages is clustered along the river valley eg Narborough, West Acre, South Acre and Castle Acre.
- Historic parklands, with extensive woodlands, lakes and clusters of veteran trees at Narborough Hall and Narford Hall.
- Prominent historic landmarks at West Acre and Castle Acre.

Landscape character

The only river valley within the Chalk River Valleys landscape type that is within the Brecks study area is the River Nar. The valley systems of the Rivers Wissey, Thet, Little Ouse (with the Black Bourn) and Lark are described separately within the Brecks River Valleys landscape type.

The chalk rivers were formed by glacial outwash at the end of the Anglian Glaciation, the last time that ice sheets extended as far as the Brecks. The glacial meltwaters carved valleys into the chalk plateau, draining westwards to the fen basin from the more elevated boulder clays of central Suffolk and Norfolk. Drifts of sand and gravel were often deposited by the glacial meltwaters on the valley sides and have had a strong influence on valley soils, on early colonisation and on the development of agriculture and mineral workings. The course of the River Nar has a sequence of riffles and pools, with gravel beds. In places the glacial drift material is overlain with peat dominated soils and associated areas of heathland and common. The River Nar is fed by springs rising from the Upper Chalk and has cool lime-rich water that has a more constant temperature, with flows less affected by recent rainfall than other rivers. It flows within a narrow, meandering valley, which has steep slopes for part of the course (between Castle Acre and Narford Hall).

The entire course of the River Nar is designated as a SSSI because of its quality as a chalk river habitat, with areas of wet woodland, pasture and meadows on the valley floor.

The river valley floodplains are predominantly pasture, although there are areas of wet meadow, fen, reedbed, alder/willow carr and

River Nar at West Acre, next to the historic ford, mill pond and weir

wet woodland, which create a diverse, small-scale mosaic of valuable wetland habitats within the winding river valley corridor. The river valley is well wooded and views are contained by a combination of landform, woodland and hedgerows. The majority of the woodland is native broadleaf woodland associated with the extensive parklands of Narford Hall, but there are also Scots pine and broadleaf tree belts, copses and some conifer plantations within and on the fringes of the valley which contribute to its wooded, secluded character.

The floodplain widens to the east of Castle Acre and here the valley floor pastures are subdivided by a geometric network of field ditches and bounded by hedgerows and hedgerow trees.

Like the other Brecks river valleys, the River Nar has been the focus for human settlement since Mesolithic times, demonstrating the importance of proximity to water in the relatively dry landscape of the Brecks. Early settlers used the rivers for transportation and communication and benefited from the rich diversity of produce available on the fertile floodplains. The meadows were used for grazing stock, with waterlogged areas left as fen or utilised as wet woodland or alder carr.

The small town of Castle Acre developed at the point where the Peddar's Way crossed the River Nar and the hamlet of West Acre developed around the site of a medieval mill. The ford, weirs and mill pond at West Acre and the Norman motte and bailey castle and priory at Castle Acre form part of a sequence of attractive landmarks along the river valley. Castle Acre has a prominent, defensive site overlooking the valley and the historic bridge crossing over the Nar. Here the traditional building materials include brick, carstone, clunch and flint. Some historic buildings are timber framed. Remnant former commons, such as Castle Acre Common, developed on free draining terrace gravels with acidic soils close to settlements and were part of the complex and small scale mosaic of land uses within the river valleys.

During the 18th and 19th century, a parkland landscape was developed at Narford Hall. The lake, designed parklands, woodlands and framed views associated with this mansion are a feature of the valley. Groups of smaller ponds and lakes along the valley floor originated as medieval mill ponds or, in some cases from more recent gravel extraction.

The Nar chalk river valley is relatively lush, with clear water and relatively stable water flow. These spring-fed wetlands support rich aquatic habitats, with an exceptionally diverse range of species, including some that are rare and of national importance. Within the chalk river

The historic village of Castle Acre, viewed from the farmland to the south. The church, together with the ruins of the castle and priory make a dramatic and picturesque composition

valleys, the diverse mosaic of wetland habitats includes reedbeds, grazing marsh, floodplain meadows, carr woodland and unimproved grassland, all connected by a network of ditches, dykes, tributary streams and water courses.

Typical chalk river species include water crowfoot, brown trout, bullhead, white clawed crayfish, water vole and otter. Gravel extraction has been a significant influence in areas where there are extensive terrace gravel deposits, most notably near the village of South Acre. The resulting large pools and reedbeds form part of the mosaic of wetland habitats on the valley floor. The valley of the River Nar has an exceptionally diverse and enclosed rural character, with views to a sequence of historic landmark churches and village buildings, as well as the dramatic prominent ruined site of the castle and priory at Castle Acre.

What's important and why?

The narrow, secluded Nar Chalk River Valley is an exceptionally sensitive landscape because its small-scale, diverse landscape mosaic can easily be overwhelmed by development and by local changes in land use or water quality/flow.
The Nar river valley is in good condition. The floodplain meadows are actively managed by traditional grazing and the landscape pattern has a coherent, unified character, defined by consistent land use and valley landform. The principal landscape elements of pasture and woodland are in good condition and the wet woodland, grazing pasture, wet meadows, commons and chalk river course form a range of diverse habitats. The SSSI designation demonstrates the ecological richness of the landscape.

Reflections - the mill pond at West Acre

Landscape character sensitivity	Visual sensitivity	Landscape value
The intimate scale and diverse character of the Nar Chalk River Valley is vulnerable to change as the distinctive small scale pattern of this landscape is finely balanced and can easily be overwhelmed by changes in the proportion or scale of individual elements. Locally distinctive and sensitive landscape features are: • Small- scale, diverse mosaic of riparian and wetland habitats which contrasts with surrounding larger scale landscapes • Sinuous edges of floodplain, river and marsh, defined by curving tracks, roads and hedgerows • Historic bridges, weirs, fords and villages at crossing points • Remnant heathy commons adjacent to river and local villages • Parkland landscapes and dramatic framed views associated with Narford Hall • Meandering, narrow form of river valleys	The Nar Chalk River Valley has a secluded character which is distinctly more enclosed and smaller-scale than the surrounding Brecks landscapes. This valley has a distinctive character, with strong contrasts in scale, degrees of enclosure and landscape pattern. Views are enclosed by the hedgerows, woodland, carr woodland and groups of trees on the valley floor and along rural lanes, but there are some dramatic views to Narford Hall and to the village and prominent ruined castle of Castle Acre. The Nar river valley is the focus for a sequence of villages and hamlets and the Nar Valley Way, a recreational route along the valley. The river provides the setting and focus for local views and corridors of movement for a relatively high proportion of residents and visitors.	Key components of landscape value are: • Ecologically valuable chalk river habitats which are nationally important and designated as a SSSI • Clear water with riffles, pools and gravel beds, which provide sites for fish spawning, as well as characteristic chalk river plant and insect habitats; • Historic bridges, weirs, fords, mill ponds and riverside settlements with mills, halls and manor houses – conservation areas and clusters of listed buildings • Important archaeological sites, including Castle Acre's motte and bailey castle, the remains of an Augustinian priory at West Acre and of a Cluniac priory at Castle Acre and remnant moated sites on the valley floor; • Historic parkland landscape at Narford Hall.