Appendix B

Land south of Rangell Gate and east of A16, Spalding, Lincolnshire

LANDSCAPE AND VISUAL IMPACT ASSESSMENT

Extracts from Published Landscape Character Assessments

September 2021

- Natural England National Character Area - NCA46: The Fens
- East Midlands Regional Landscape Character Assessment – LCA 2a Settled Fens and Marshes
- South Holland Strategic Landscape Character Settlement – Settled Fens LCT
- Historic Landscape Character Zones

Introduction

As part of Natural England's responsibilities as set out in the Natural Environment White Paper,[1] Biodiversity 2020[2] and the European Landscape Convention,[3] we are revising profiles for England's 159 National Character Areas (NCAs). These are areas that share similar landscape characteristics, and which follow natural lines in the landscape rather than administrative boundaries, making them a good decision-making framework for the natural environment.

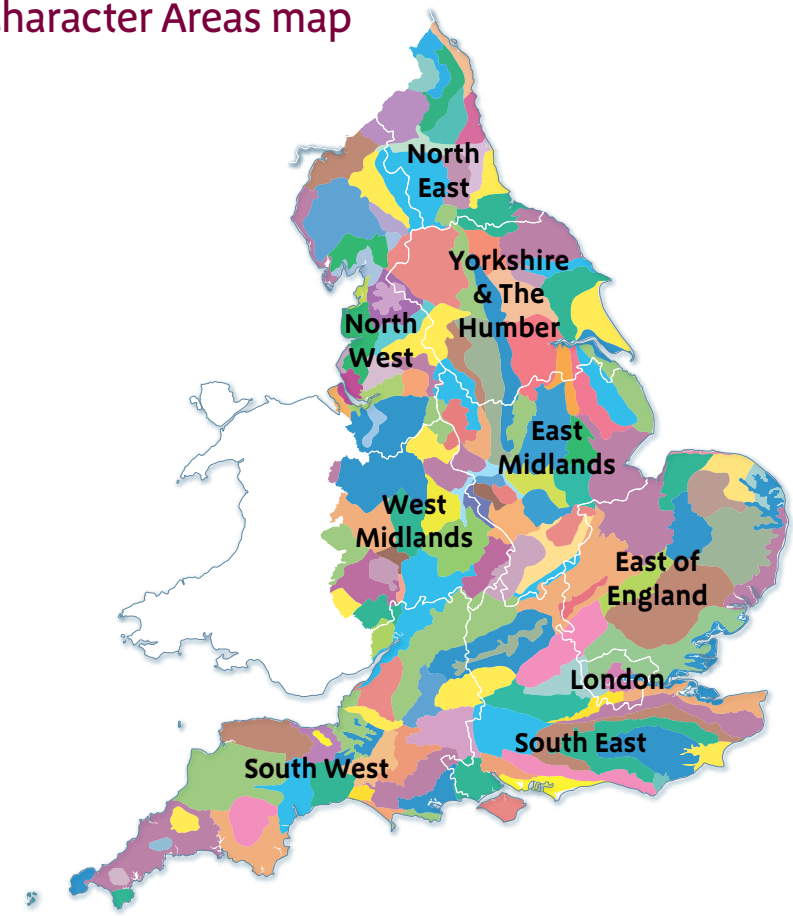
NCA profiles are guidance documents which can help communities to inform their decision-making about the places that they live in and care for. The information they contain will support the planning of conservation initiatives at a landscape scale, inform the delivery of Nature Improvement Areas and encourage broader partnership working through Local Nature Partnerships. The profiles will also help to inform choices about how land is managed and can change.

Each profile includes a description of the natural and cultural features that shape our landscapes, how the landscape has changed over time, the current key drivers for ongoing change, and a broad analysis of each area's characteristics and ecosystem services. Statements of Environmental Opportunity (SEOs) are suggested, which draw on this integrated information. The SEOs offer guidance on the critical issues, which could help to achieve sustainable growth and a more secure environmental future.

NCA profiles are working documents which draw on current evidence and knowledge. We will aim to refresh and update them periodically as new information becomes available to us.

We would like to hear how useful the NCA profiles are to you. You can contact the NCA team by emailing**ncaprofiles@naturalengland.org.uk**.

National Character Areas map



[1] The Natural Choice: Securing the Value of Nature, Defra (2011; URL: **www.official-documents.gov.uk/document/cm80/8082/8082.pdf**)
[2] Biodiversity 2020: A Strategy for England's Wildlife and Ecosystem Services, Defra (2011; URL: **www.defra.gov.uk/publications/files/pb13583-biodiversity-strategy-2020-111111.pdf**)
[3] European Landscape Convention, Council of Europe (2000; **URL: http://conventions.coe.int/Treaty/en/Treaties/Html/176.htm**)

Summary

The Fens National Character Area (NCA) is a distinctive, historic and human-influenced wetland landscape lying to the west of the Wash estuary, which formerly constituted the largest wetland area in England. The area is notable for its large-scale, flat, open landscape with extensive vistas to level horizons. The level, open topography shapes the impression of huge skies which convey a strong sense of place, tranquillity and inspiration. One per cent of the NCA falls within the Norfolk Coast Area of Outstanding Natural Beauty.

It is a large, low-lying, flat landscape with many drainage ditches, dykes and rivers that slowly drain towards the Wash, England's largest tidal estuary. The single obvious factor uniting the Fens is the low-lying, level terrain reflecting its geological past. With the exception of the Isle of Ely, which reaches above 20 m, elevations rarely pass the 10 m contour, and typically vary by little more than one or two metres over long distances. Much of the land is below sea level, relying on pumped drainage and the control of sluices at high and low tides to maintain its agricultural viability. The level horizons and the huge scale of the landscape create a strong sense of isolation and tranquillity, and a distinctive sense of place. There are, typically, large open panoramas and enormous skies, whose changing weather patterns have a strong influence on the observer. Four major rivers drain into the Wash: the Witham, Welland, Nene and Great Ouse. All rivers now have artificial canalised courses that run straight for long distances and are bounded by high banks to contain the watercourse from the lower adjacent fields.

The Fens are the bread basket of Britain. The drainage of this area from the 17th century onwards presented valuable soils which provide excellent conditions for large-scale cultivation of arable and horticultural crops; holdings of more than 100 ha make up 77 per cent of farmed land. As cultivation techniques have become more intensive, however, the soil resource is increasingly diminished through desiccation and erosion. Clays and silts laid down by marine incursions dominate the area abutting the Wash and extend inland along the rivers, forming the fertile horticultural soils of the silt fens. This area is now marginally higher in altitude than the inland peatlands which have 'wasted'. The fertile peat soils have been historically drained and managed to support national food production at the expense of other ecosystem services. Drained peat is more vulnerable to loss, particularly where the deposits are deep and the water table is kept artificially low. Peat wastage through shrinkage, oxidation and wind erosion is a long-term issue affecting the ecosystem services of the Fens.

The Wash includes salt marsh and mudflats that support large, internationally important populations of seals, waders and wildfowl, including pink-footed and Brent geese, shelduck, knots, oystercatchers, common terns and various plover species. It is accordingly designated a Ramsar site, a Special Area of Conservation (SAC), a Special Protection Area (SPA), a European Marine Site (EMS), a Site of Special Scientific Interest (SSSI), a National Nature Reserve (NNR) and a Local Nature Reserve (LNR). Other important wetland habitats include areas of relic old fen, washland, rivers, drains and a network of lesser drainage channels known locally as ditches, dykes or sewers.

Several SSSI in the Fens are designated for their buried interest – a geological record contained in the sediments of the Wash basin and fenland – making

an important contribution towards our understanding of the effects of climate and environmental change over millions of years. Also, the Oxford Clay and Kings Dyke brick pit have been very important for palaeontology, with major Jurassic reptiles including the pliosaur *Pachycostasaurus dawnii* unearthed here. *Leedsichthys*, the world's largest fish, was discovered in these sediments and is still being unearthed from them.

There is a long history of human occupation here, accounts of which can be found in the Historic Environment Records for Norfolk, Suffolk, Cambridgeshire, Peterborough and Lincolnshire. Early prehistoric sites are mostly deeply buried beneath the fen sediments or occur on the low slopes of the higher fen 'islands'. Scheduled Ancient Monuments of prehistoric to post-medieval date are located across the fens and many undesignated sites and monuments are known, again mainly from the fen edges and islands. However, Flag Fen is a site of international importance – a preserved, wooden, bronze-age platform and causeway crossing the marsh to the east of the Peterborough fen edge, off which votive deposits (symbolising a wish, desire or prayer) of bronze and iron tools, weapons and decorative items were thrown into the marsh.

Ancient remains of settlements or task sites are increasingly being discovered as the peat dries out across the fenland area, or through development – for example eight log boats were found in an ancient river channel along with associated riverside settlements at Whittlesey, and numerous artefact scatters of prehistoric to Roman sites are annually ploughed up where the peat is thinnest on the gravel island edges and emerging crests. The impressive Ely Cathedral is a major landmark dominating the Cambridgeshire peat fen from its location atop the Isle of Ely, as is 'Boston Stump' (St Botolph's Church, Boston) in the Lincolnshire silt fen, while similar island-top locations were also used for monastic and secular establishments across the fenland region (such as Ramsey, Thorney, Crowland and Chatteris). Lodes, slades and canals historically formed the early transport opportunities across the fens, commencing after the Roman conquest of Britain but increasingly in the late Saxon and medieval periods.

Authors Sir Harry Godwin and H.C. Darby have written major works on the Fens, and Rex Sly has chronicled the history of the Fens from Roman times until the present and written about fenland families and life in a series of three books published in the 2000s. Chris Gerrard has authored a book of work by fenland artists showcasing the landscapes and biodiversity of the Fens.

Although many of the Fens waterways are heavily embanked, limiting views across the landscape, water-based recreation is a popular pastime with a focus at Ely marina. Angling is popular here.



Click map to enlarge; click again to reduce

Statements of Environmental Opportunities:

- **SEO 1:** Manage the agricultural landscape and soils which allow the Fens to be a major provider of food and horticultural produce, while seeking to enhance opportunities for biodiversity.

- **SEO 2:** Manage the core wetland complexes and increase their connectivity by enhancing the main rivers, waterways and their associated riparian habitats and improve recreational access opportunities to the Fens.

- **SEO 3:** Plan for the creation of new coastal landscapes in the Wash area that are adapted and resilient to the impact of climate change, for the benefit of people and wildlife.

- **SEO 4:** Conserve, manage and enhance the Fens landscape and increase educational opportunities to access its geodiversity, archaeology and cultural heritage to enhance enjoyment and understanding for those who live and work in and visit the Fens.



The Fens today.

Description

Physical and functional links to other National Character Areas

The area abuts a number of other National Character Areas (NCAs). To the east lie North West Norfolk and The Brecks NCAs. To the south-east rises the gently rolling East Anglian Chalk NCA and to the south-west is the undulating Bedfordshire and Cambridgeshire Claylands NCA. To the west rise the gently shelving slopes of the Kesteven Uplands and the South Lincolnshire Edge NCAs. To the north-west the woods and gravel workings of the Central Lincolnshire Vale NCA gradually slope down to the Lincolnshire fens, while due north the Lincolnshire Wolds NCA rises to create a dominant 'upland' horizon. The Steeping River marks the quieter north-east boundary to the Lincolnshire Coast and Marshes NCA. The land boundary of the Fens is typically drawn along a series of catchwater drains, dykes, canalised rivers and lodes. To the north-east the Fens are bounded by the North Sea.

Four main rivers, the Witham, Welland, Nene and Great Ouse, drain much of the surface water from the East Midlands across the Fens. The rivers often flow in canalised channels before discharging into the large Wash estuary. The rivers and their associated networks of ditches and dykes provide ecological networks and functional links to other NCAs.

Marine processes strongly influence the physical and biological character of the Wash. Marine sediments originating from the eroding nearshore seabed off central Lincolnshire and the Holderness coast of East Yorkshire predominate, although some accreted sediments originate from further north. While much of this sediment settles within the Wash, some moves seaward again to help supply the coastal structures along the North Norfolk coast.

Due to its low-lying landform, views to and from the neighbouring NCAs strongly reflect their geology, particularly the higher ground of the gently rolling East Anglian Chalk NCA to the south-east, the undulating Bedfordshire Claylands to the south-west, and to the west the gradually shelving slopes of the Kesteven Uplands and the South Lincolnshire Edge NCAs, while due north the Lincolnshire Wolds NCA rises to create a dominant elevated horizon. There are vast, open views of the sky throughout and wide, flat panoramic views, particularly over the mudflats of the Wash in the east.

Fenland farming is nationally important with, for example, a quarter of England's potatoes grown here and over one-third of English vegetables. Agriculture is the major source of employment, with approximately 27,000 people employed either permanently or seasonally/temporarily throughout the year. Nearly 90 per cent of the Fens were classified as either Grade 1 or Grade 2 agricultural land under the Provisional Agricultural Land Classification (ALC) survey of the late 1960s and early 1970s. Peat wastage will have reduced this since then.

The Fens play host to several major transport links. The East Coast railway mainline cuts across the south-western corner and there are east–west rail passenger and freight lines running through the area. Major roads include the A47, the A16 and A17, among numerous other A roads which form transport corridors across the landscape. Other major infrastructure, such as power stations, major gas and electrical distribution networks, either supply surrounding NCAs or the Fens are supplied by them.

Distinct areas

- Open coastal marshes
- Drained coastal marshes
- Settled inland fens
- Open inland fens

Key characteristics

- Expansive, flat, open, low-lying wetland landscape influenced by the Wash estuary, and offering extensive vistas to level horizons and huge skies throughout, provides a sense of rural remoteness and tranquillity.
- Jurassic clays are overlain by rich, fertile calcareous and silty soils over the coastal and central fens and by dark, friable fen peat further inland. The soils are important for agriculture, which is hugely significant for the rural economy in the Fens. There are over 4,000 farms in the Fens; enough wheat is grown here annually to produce a quarter of a million loaves of bread and one million tons of potatoes are grown here. In addition to traditional vegetables, exotics such as pak choi are now cultivated. Some 40 per cent of England's bulbs and flowers are also produced in the Fens.
- The Wash is the largest estuarine system in Britain, supporting internationally important intertidal and coastal habitats influenced by constant processes of accretion and deposition, forming salt marsh and mudflats and providing habitats for wildfowl, wading birds and other wildlife, including grey seals and approximately 90 per cent of the UK's common seals. It also provides important natural sea defences and plays a key role in climate change regulation. Flood storage areas on the Nene, Cam, Lark and Ouse washes also provide significant biodiversity interest. True fen mainly occurs at remnant conservation sites, such as Baston or Wicken Fen.
- Overall, woodland cover is sparse, notably a few small woodland blocks, occasional avenues alongside roads, isolated field trees and shelterbelts of poplar, willow and occasionally leylandii hedges around farmsteads, and numerous orchards around Wisbech. Various alders, notably grey alder, are also used in shelterbelts and roadside avenues.
- The predominant land use is arable – wheat, root crops, bulbs, vegetables and market gardening made possible by actively draining reclaimed land areas. Associated horticultural glasshouses are a significant feature. Beef cattle graze narrow enclosures along the banks of rivers and dykes and on parts of the salt marsh and sea banks.
- Open fields, bounded by a network of drains and the distinctive hierarchy of rivers (some embanked), have a strong influence on the geometric/rectilinear landscape pattern. The structures create local enclosure and a slightly raised landform, which is mirrored in the road

Key characteristics (continued)

network that largely follows the edges of the system of large fields. The drains and ditches are also an important ecological network important for invertebrates, fish including spined loach, and macrophytes.

- The area is very rich in geodiversity and archaeology, with sediments containing evidence for past environmental and climate changes and with high potential for well-preserved waterlogged site remains at the fen edge, within some of the infilled palaeo-rivers and beneath the peat.

- Large, built structures exhibit a strong vertical visual influence, such as the 83 m-high octagonal tower of 'Boston Stump' (St Botolph's Church), Ely Cathedral on the highest part of the Isle of Ely dominating its surrounding fen, wind farms and other modern large-scale industrial and agricultural buildings, while drainage and flood storage structures and embanked rail and road routes interrupt the horizontal fen plain.

- Settlements and isolated farmsteads are mostly located on the modestly elevated 'geological islands' and the low, sinuous roddon banks (infilled ancient watercourses within fens). Elsewhere, villages tend to be dispersed ribbon settlements along the main arterial routes through the settled fens, and scattered farms remain as relics of earlier agricultural settlements. Domestic architecture mostly dates from after 1750 and comprises a mix of late Georgian-style brick houses and 20th-century bungalows.



Wisbech North Brink - the tidal River Nene and inland port.

The Fens today

The Fens are an expansive, flat, open, clay and peat landscape that slowly drains towards the Wash, England's largest tidal estuary. The obvious factor characterising the Fens is the low-lying, level terrain, with much of the land below sea level. The level horizons, large open panoramas and enormous skies create a strong sense of remoteness and isolation. The geological history and human intervention are strongly evident in this landscape, especially in the strong rectilinear drainage pattern that has long been used to make the land viable for agricultural production. The Fens are the bread basket of Britain and the silt and peat soils are a major and essential resource of national importance for agriculture, with wheat, vegetables and sugar beet of major value here.

The geology of the Fens can generally be described as glacial deposits on Jurassic and Cretaceous bedrock. During the Holocene (Flandrian) period, these were overlain by diverse deposits, including sands, silts, clays and peat. Elevated islands of Jurassic clay occur at the inner margins of the area where they may be overlain by Pleistocene tills or glacial sands and gravels. The soils over the wide central and coastal fens comprise rich, fertile, stoneless, calcareous, silty soils of marine origin; while inland there are swathes of dark, friable, organic-rich mineral soils and deeper fen peat, which contains partly fossilised trees known as 'bog oaks'. Due to wastage, the peats are becoming increasingly thin and in extensive areas only remnants of the former peat coverage still remain.

Agriculture is tremendously important to and in the Fens. Fenland farming is nationally important, with a quarter of England's potatoes grown on 25,000 ha here and more than a third of English vegetables on 29,000 ha. Sugar beet, at 21,500 ha, is another major fenland crop. Farmers have recently diversified into more exotic crops such as pak choi. Agriculture is a major employment sector, attracting workers from across Europe.

Water from much of the East Midlands drains eastwards across the Fens into the Wash through four major rivers: the Witham, Welland, Nene and Great Ouse. All rivers now have artificial canalised courses that run straight for long distances and are bounded by high banks to contain the watercourse from the lower adjacent fields. In some locations 'roddons', sinuous silt banks that are fossilised remnants of tidal creek systems, are elevated, in some places up to 2–3 m above the dark peat soils which have subsequently wasted as a result of continuous cultivation, drainage and wind erosion of the peat. This irreversible wastage creates an ever-greater demand for artificial drainage of the land. Remnants of the original fen, as at Wicken Fen, are rare exceptions.

There are marked variations and graduations in the Fens landscape, shaped by the differing lengths of settlement history. The 'settled inland fens', which run in a broad arc inland from the Wash between King's Lynn and Boston, form an ancient, small-scale landscape of sinuous lanes and relative intimacy with a higher density of settlements, some fine churches and remnant grasslands. The extensive 'peaty fens' or 'black fens', which were finally comprehensively drained in the 17th to 19th centuries, comprise broad rectilinear fields and straight roads. The only consistent relief to the level landform are the notches of the drainage ditches and the raised berms and banks of the artificial drainage channels. The fens of south-east Lincolnshire between the settled inland fens, where there are some hedgerows along the sinuous lanes, and the Wolds were the last area to be drained. The drainage here was so thorough that scarcely a vestige remains of what had been one of Britain's richest wildlife habitats. This is an open, productive landscape with a strongly rectilinear form. The band of marshes reclaimed from the Wash by the construction of a series

of sea wall defences begun in the 17th century has fields of vegetable crops that stand alone against the sky. Beyond the defensive walls, salt marshes and tidal mudflats, often abundant with wildfowl, stretch out into the Wash.

The Wash, an internationally important Special Protection Area (SPA)/ Ramsar site, is the largest estuarine system in Britain and this vast seascape supports an extensive habitat mosaic of salt marshes, intertidal banks of sand and mud, shallow waters and deep channels. It is the most important staging post and overwintering site for migrant wildfowl and wading birds in eastern England. It supports a valuable commercial fishery for shellfish, is an important nursery area for flatfish and holds one of the North Sea's largest breeding populations of common seals and some grey seals.

The Fens are also very important for biodiversity. The Ouse Washes and Nene Washes SPA/Ramsar sites are areas of seasonally flooded grassland important for national and international populations of breeding and overwintering waders and wildfowl. Both sites are of note for their diversity of plant and animal life. Their associated watercourses are designated for important spined loach populations. In the Welland catchment, the Counter Drain in Baston Fen Special Area of Conservation (SAC) contains high densities of spined loach. Fenland SAC holds large areas of calcareous fen and is also important for populations of spined loach and great crested newt. The Wash and North Norfolk Coast SAC is considered to be one of the best areas in the UK for sand banks and Atlantic salt meadows. In terms of biodiversity, Wicken Fen is the richest site in the UK; Holme and Woodwalton Fens are also important relic habitats.

There is negligible woodland throughout the Fens landscape, with a few trees lining roads or clustering around villages and the fen estates, as at Thorney. Exceptions include Woodwalton to the west and small ex-decoy woodlands such as in the Eastern Fens, where for instance Friskney Decoy Wood is a Lincolnshire Wildlife Trust (LWT) reserve. Extensive orchards and associated windbreaks are located in the Wisbech area to create a distinctive though dwindling landscape cover.

On the island crests and at the fen margins, archaeological features occur in large numbers, while fewer are known from the undulating deeper parts of the fen basin as here they are covered by blanketing deposits of marine clays, peat and silts. Flag Fen Archaeology Park and Scheduled Ancient Monument is home to a bronze-age wooden causeway, some 3,500 years old, and is a site of national and international importance.

Stonea Camp iron-age hill fort near March in the Cambridgeshire Fens is the lowest-lying hill fort in Britain. It has been suggested as the site of Boudicca's last stand against the Romans. Having defeated the local tribes, the Romans erected a substantial administrative/military building near Stonea Camp to impose their authority in the Fens, by then a probable imperial estate. The Fens were very important in Roman times and the Fen Causeway, or Fen Road, stretched for over 40 km between Denver, Norfolk, and Peterborough through Flag Fen, where it joined the major Roman north–south route, Ermine Street.

Around the low, clay hills, most notably the Isle of Ely, occasional remnant ridge-and-furrow pasture is evident.

The settlement pattern follows the historical development of the area. The settled inland fens or 'townlands' comprise medium to large settlement clusters around Boston, Spalding, Holbeach and Wisbech, with many villages having fine medieval churches, such as West Walton. The medieval pattern of north–south drove lines, between parent and daughter settlements on the coast and fen edge

respectively, was crossed in the 19th century by the A17 and A47. Since then the settlements in these townlands have spread along these principal routes to create ribbon developments of smallholdings, modern bungalows, farmsteads with large agricultural barns, and food processing buildings, such as Sutton Bridge.

The 'peaty fens' inland are, by contrast, very sparsely settled with isolated farmsteads and houses on local areas of raised land being the only built elements for long distances. Many fenland buildings are now derelict; either standing at alarming angles or shored up, while the linear roads have likewise suffered showing significant undulations.

Ely, Boston, Wisbech, Spalding and King's Lynn provide the major historic settlements within the Fens. Ely Cathedral dominates the skyline over a large area 'like a great ship tugging at its moorings' (Betjeman). At Boston, once England's largest port, the 83 m-high octagonal tower known as the 'Boston Stump' is a marker across the open fen. Stone for large buildings, including Ely Cathedral and the Boston Stump, was imported from the quarries of Lincolnshire (Ancaster), Northamptonshire (Barnack, now Cambridgeshire), Rutland and Yorkshire. The brick industries around Whittlesey have provided key vernacular characteristics for the landscape in that area, the products of which have been used for the traditional building style of brick and slate-roofed farmhouses and brick-pantile workers' cottages. The subtle variation in settlement patterns from fen to fen reflects settlement history and the length of time since drainage took place. A few historic pumping stations such as Stretham bear witness to the latter. Local building materials include reed for thatching and clay for bricks, with its variations in colour and texture, but the use of thatch is now exceptional as a result of the loss of reedbeds.

Roads and rail links are often situated on elevated banks, and long straight roads crossing the large fenland fields are typical. Road schemes, power lines, industrial and residential development have had an impact on local character, and light pollution associated with transport networks has become increasingly prevalent.

Communities in this NCA include many migrant workers, have high indices of multiple deprivation (IMD), and various health issues, including obesity, lower-than-average life expectancy and high levels of physical inactivity, and many experience issues with isolation. The ageing population is also an issue.

The fenland waterways are an important recreational resource and there is a major marina at Ely. Long-distance walking routes include the Ouse Valley Way, Hereward Way and Nene Valley Way while the old drove roads are an important cycling resource. Access to wildlife is of major importance for recreation and tourism, especially at the many designated sites with good visitor access. For example, the Wildfowl and Wetlands Trust (WWT) Welney Wetland Centre, part of the Ouse Washes SPA/Ramsar site, is a spectacular swan spectacle and major attraction, and Wicken Fen is one of the top tourist sites in the Fens.



Agriculture in the Fens.

The landscape through time

The solid geology of the Fens is dominated by Upper Jurassic marine clays, including the Oxford, Ampthill and Kimmeridge Clays (formed around 157–152 million years ago). Tectonic activity and sea-level changes have raised these deposits above sea level; the clays have yielded tremendously important fossil reptiles and fish new to science, including the pliosaur *Pachycostasaurus dawnii* and *Leedsichthys*, the largest fish ever discovered, as well as many invertebrate species. Additionally, an isolated mass of richly fossiliferous Upper Jurassic Corallian Limestone, including coral reef deposits, out-crops around Upware. Lower Greensand rocks at Ely and Stuntney, and Lowestoft Till at March, also form 'islands' for historic centres of human settlement.

Much of this geology is overlain by Quaternary deposits: the area was covered by a large ice sheet during the Anglian glaciation around 50,000 years BP and glacial erosion beneath the ice sheet is thought to be responsible for the scouring-out of the Fen Basin and the area now occupied by the Wash. The ice sheet deposited sands, gravels and clays across the area and left a shallow basin in which later deposits accumulated. During the Holocene, a cyclic succession of peats, estuarine and marine silts, clays and sands was deposited in both terrestrial and marine environments, reflecting sea-level changes and river flood plain activity. These demonstrate a detailed record of climatic and environmental changes over the last 11,500 years although part of this record is threatened by the shrinking peat, increased exposure and erosion. Several Sites of Special Scientific Interest (SSSI) within the NCA have been designated for this geological climate- and landscape-change record.

Much of the human history of the Fens has been a battle of man against the



A modern addition to the landscape.

forces of nature to bring out the full agricultural potential of the land. Much of the early archaeological evidence is now becoming apparent as peat wastage exposes evermore well-preserved remains. In the deepest areas of the fen basin, Mesolithic and Neolithic occupation remains lie buried beneath 4–5 m of later water-related deposits. However, these early prehistoric sites occurred on former, dry, land surfaces, indicating a period when these lowest-lying parts of the fen basin were host to dry grassland with areas of pine and deciduous woodlands – a time before the fens were wet. Nationally important designated sites of the Bronze Age are known from Flag Fen, Peterborough and Must Farm, Whittlesey, where wooden platforms, raised causeways, piled settlements and a group of eight boats have been found. In Lincolnshire, evidence of Neolithic and bronze-age occupation is often closer to the surface and tends to be known only towards the western edge.

Roman settlements occurred mainly on the high, drier islands and above the fen edge, while contemporary transport canals indicate huge efforts to traverse and control the fens. Car Dyke links the River Witham to the River Cam, while the Fen Causeway canal and road system linked a major Roman settlement at Peterborough with the Norfolk fen edge at Denver. Although salt-making sites were known throughout the fens from the 1st millennium BC, such as at Northborough, the industrialisation of this economy took off in the Roman period (for example at Deeping and Morton Fens and in the tidal creeks at March) with further expansion during the Saxon and medieval period.

In the Middle Saxon period, from around 650 AD, high-status centres and hermitages on the fen islands became centres of communities which later became monasteries with massive estates such as that at Crowland, Ramsey and Thorney. The earliest sea defences, the sea banks and sea dykes date from this period although they were subsequently expanded and modified.

At the time of the Domesday Book in 1086, monastic houses owned the vast majority of the fen and fen-edge land. The swamps of the 'black fen', veined with watercourses, famously provided refuge for the Saxon folk hero Hereward the Wake in his resistance to the Norman authorities. A monastery preceded the establishment of the abbey and the cathedral church at Ely and lands on the clay island were granted to the monks to tend. The monasteries were at the heart of large-scale attempts to drain the fens, including the creation of stretches of canalised waterways. The River Great Ouse was diverted to run close to the Isle of Ely in the 13th century.

During the Middle Ages, the wetland resource of the Fens was widely used and was a centre of productivity for fishing, wildfowling, grazing, peat extraction and salt production. Medieval fisheries owned by the numerous fen monasteries occur at the margins of the former fen meres, for example those at Whittlesey, Willingham and Soham, and eels were a dominant element of the fenland food repertoire and manorial/local economies. Requiring greater connectivity across the marshes, the medieval monasteries and abbeys promoted the realignment and canalisation of some of the fenland rivers, as at March and Ely, and created canals and slades for transport between various islands – such as those between Ely, Chatteris and Ramsey.

In the 15th century, further attempts to create comprehensive drainage systems included the 22-km Mortons Leam, which still functions today, cut between Peterborough and Guyhirn under the aegis of Bishop Morton to carry waters of the River Nene to the Wash. This was the prototype for post-medieval fenland drainage schemes. Piecemeal drainage through 'assarting',

the process by which common land was enclosed under licence from landlords, allowed areas off the fen edge to be drained. This can be seen in the field systems surrounding some of the fen islands.

Seasonal grazing was prevalent in the medieval period when a pattern of radiating drove lines known as 'The Smeeth' developed between the coast and the inland grazing on the fens. Salt-making was also characteristic at that time. Residual mounds or 'salterns' remain in many places, especially at Spalding and around Boston. There is a line of salterns extending several kilometres southwards from Wainfleet.

The earthworks of 17th-century English Civil War defences are preserved in many parts of the fens, especially at the river estuaries and around the Wash. In the same century, the most important phase of land claim began when the 4th Earl of Bedford gained a Royal Charter to drain the 'wastelands' to create good summer grazing. The first engineering works commenced in the 1630s, but progress was halted by the Civil War. In the 1650s, Cornelius Vermuyden, a Dutch engineer, was appointed to continue the works. Rivers were straightened to increase water flow and sluices created against tidal inflow. The Hundred Foot or Ouse Washes were created to enable temporary controlled flooding at high tides and high river levels. Through this process the North, Middle and South 'Bedford' Levels were created. At this time, the economy in the area depended heavily on fishing, especially of eels, wildfowling and mixed farming. The fiercely independent locals, known as the 'Fen Tigers', fought against the drainage works which they thought would take away their livelihoods.

As peat soil was drained, it wasted and land levels lowered, which necessitated artificial pumping. In the 18th century, wind-powered pumps covered the landscape, to be replaced by steam pumps in the 19th century which allowed the shallower open water of the meres to be drained. Whittlesey Mere was the last mere to be drained in the 19th century. Reclamation of the coastal salt marshes has also been significant, with new sea walls built to extend the rich agricultural land into the Wash resulting in loss of estuary habitats. Today, diesel and electric pumps are used to manage water levels.

The drainage was so advantageous to the productivity of the land that the former pastoral areas were converted to Grade 1 soils suitable for intensive arable, vegetable and horticultural production, with rebuilt farmsteads accommodating the yard-fed cattle whose manure further boosted fertility. The wealth created by the drainage of the area also came from new sources such as seed and bulb cultivation. The last areas to be drained were the East, West and Wildmore Fens of south-east Lincolnshire. Besides the draining of the inland fens, the reclamation of the coastal salt marshes has been significant. Council smallholdings developed as a distinctive feature of the Fens in the late-19th to mid-20th centuries.

The most noticeable change in the landscape at the end of the 20th and beginning of the 21st centuries has been caused by improved farming techniques such as trickle irrigation and the use of more precise technology. The Fens have remained mainly rural, although infrastructure – including wind turbines and rail gantries, visible from long distances – has been constructed. The bombing range at RAF Wainfleet has now closed but RAF Holbeach is still in regular use with aircraft noise carrying across wide areas. There have been recent efforts to re-create fenland to provide important habitat for rarer species and there has been focused activity on re-creating areas of wet grassland and fen, in particular at the Great Fen through the Great Fen Project, with the intention of creating an important link between Woodwalton and Holme Fens in the Cambridgeshire Fens. Partnership working elsewhere is also focusing efforts to re-create fenland to provide important habitat for rare species.

Ecosystem services

The Fens NCA provides a wide range of benefits to society. Each is derived from the attributes and processes (both natural and cultural features) within the area. These benefits are known collectively as 'ecosystem services'. The predominant services are summarised below. Further information on ecosystem services provided in the Fens NCA is contained in the 'Analysis' section of this document.

Provisioning services (food, fibre and water supply)

- **Food provision**: Of the soils in the Fens, 87 per cent are classified as Grade 1 and Grade 2 agricultural land. The Fens NCA is one of the most important areas of food production in the UK, producing 37 per cent of our outdoor vegetables, 24 per cent of our potatoes, and 17 per cent of our sugar beet. An estimated 4,000 farms employ 27,000 people, pointing to some very intensively managed systems of food provision. Cropping includes a mix of arable crops, field-scale vegetables and fruit (for example around Wisbech). Glasshouses, polytunnels and plastic sheeting are a feature on the productive soils and multiple cropping is often undertaken with irrigation to satisfy market forces. This can place significant stress on soil and water resources.

- **Water availability:** There are a number of major rivers in the NCA, including the Great Ouse, rising on the Yardley–Whittlewood Ridge on the Northamptonshire–Buckinghamshire border, and the Nene and Welland, which rise in the Northamptonshire Uplands NCA. Small parts of a number of major aquifers fall just within the Fens NCA boundary. Where catchment abstraction management strategy (CAMS) assessments have been undertaken, their status is assessed as 'no water available' in the summer months and 'water available' during the winter months. Rivers in the south and far south-east of the NCA generally have an 'over-abstracted' status. This has implications for active river processes, and the ecosystem services provided, throughout the system. Groundwater is also over-abstracted and again the underlying geology has implications for storage and yield.

- **Genetic diversity:** There are opportunities to preserve old varieties of fruit from traditional orchards for their taste, their genetic information and possible future crop breeding for resistance to diseases, for instance. A few rare breed livestock are maintained in the Fens – these are an important genetic resource.

Regulating services (water purification, air quality maintenance and climate regulation)

- **Climate regulation:** Peat deposits represent a key part of the carbon storage resource of the UK. Salt marshes and mudflats also have potential for long-term storage of carbon. Based on a review of the available literature, it appears likely that fenland peat soils are wasting at up to around 2.1 cm/year. For the surviving areas of deep peat it is estimated that the average wastage rate is around 1.5 cm/year. This is equivalent to around 9 per cent of the annual loss of organic carbon from 0–15 cm depth of all soils across England and Wales reported by Bellamy and others (2005) and about 0.3 per cent of the UK's annual industrial emissions of carbon dioxide.

- **Regulating soil erosion:** Loamy and clayey soils with impeded drainage, particularly those with a high silt content, are easily compacted by machinery or livestock if accessed when wet, increasing risks of localised water run-off. Lighter-textured, silt-rich soils are at risk of water erosion

and sediment loss where cultivated or if bare soil is exposed, but this is likely to be localised due to lack of gradients. The coarser-textured (fine sandy and silty) mineral soils are also prone to wind erosion, particularly where low in organic matter content.

The peat-rich soils in this NCA are at risk of erosion. Loss of peat soil through peat wastage as a result of shrinkage by drainage and oxidation and wind erosion of exposed soils is particularly problematic with spring-sown root cropping such as sugar beet, carrots and parsnips where land is exposed throughout the winter. Wind erosion can be a major problem – 'fen blows' during prolonged dry spells can quickly erode large quantities of soil and, if they occur shortly after seeding, can result in large economic losses.

The loamy and sandy soils with naturally high groundwater and a peaty surface and the fen peat soils typical of inland areas are permeable soils with good infiltration and therefore at low risk of water erosion (except where cultivated land is susceptible to flooding) but are at high risk of wind erosion (blowing), especially where spring-sown crops are grown. Drainage and cultivation are leading to ongoing loss (wastage) of surface peat through shrinkage and oxidation.

Water erosion of soils is an issue in the Little Ouse priority catchment with light sandy soils, under maize and root cropping. In the Lincolnshire Coast Rivers catchment, water erosion may be associated with outdoor pig rearing or intensive cereal and oilseed rape production.

Increased rates of erosion and weathering are also likely as a consequence of future climate change.

- **Regulating soil quality:** The fine, light silty fens and the dark, humus-rich peaty fens are the key natural resource of the Fens. Wastage and lowering of the inland peat areas and the gradual transformation of their soils over time from peaty to mineral dominated, together with sea-level rise in an area dominated by pumped artificial drainage, will have a major impact on the ecosystem services provided in the longer term. In some wasted peat soils, locally the subsoils become highly acidic giving rise to hard, iron-rich 'drummy' layers affecting crop rooting and growth, and for damaging iron-ochre formation which blocks drains.

- **Regulating water quality:** Excess nitrates, phosphates and pesticides have led to pollution and eutrophication in watercourses. In addition, soil erosion is identified as an issue. The Anglian River Basin Management Plan indicates that the ecological status of rivers and waterways in the NCA is either good or moderate. Owing to a range of factors (cross-compliance, Environment Agency (EA) schemes, catchment sensitive farming (CSF), technological improvements and better understanding among farmers), water quality is improving. Chemical water quality is generally good apart from sections of the Nene and Great Ouse which fail to reach good status within the majority of their lengths within the NCA. Where the groundwater chemical status has been assessed, it is rated as good.

- **Regulating water flow:** The Fens are low lying with much land below sea level. The Environment Agency flood risk map indicates that the majority of the NCA is at high risk of river and/or coastal flooding. Flood control is a key issue for most of the NCA, particularly since the major flooding events in 1953. Possible increases in precipitation associated with climate change may lead to an increase in flooding. However, most settlements are offered some protection from flooding by manmade defences on

the coast and main rivers. In addition, washlands (areas of permanent grassland deliberately flooded to prevent rivers overtopping) have been created on the major river systems.

- **Regulating coastal flooding and erosion:** The coastline within this NCA is formed of mudflats and salt marshes, which provide internationally important habitats for wildlife as well as important natural sea defences, backed by manmade coastal defences. The salt marshes are currently increasing in area, affording increased natural protection for the coastline. Over the medium and long term, it is probable that the balance of salt marsh and mudflats will change or be lost altogether through erosion, as a result of climate change, and associated isostatic adjustment will increase coastal squeeze where the salt marsh is constrained by coastal defences on its landward side. In the short term, the policy approach is to hold the existing sea bank alignments and in the medium and long term (with the risk of erosion of mudflats and salt marshes) landward realignment will need to be considered as an alternative to holding the line. Climate change presents a challenge to how we regulate/change the balance.

Cultural services (inspiration, education and wellbeing)

- **Sense of place/inspiration**: The sense of place in the Fens is provided by the geodiversity underpinning the large-scale, flat and open landscape with long views, expansive skies and spectacular sunsets. The feeling of scale is further emphasised by the rich and varied, intensive agricultural land use that also produces strong seasonal changes from the black of bare, peaty soils to the rich colours of agriculture to the whites of winter. The feel and light in the landscape can quickly change with weather conditions. The landscape and its associated wildlife have inspired artists including Sir Peter Scott (who founded the Wildfowl and Wetland Trust) and more recently Carry Akroyd.

Traditional activities such as ice skating on frozen marshes, eeling and punting through reedbeds have become even more marginalised during the 20th and early 21st centuries. Graham Swift's 1980s novel Waterland keenly identifies the changing lifestyles of fenland people.

- **Sense of history**: The Fens' distinct history and character is inextricably associated with the rich soils which are only accessible as a result of persistent efforts to drain the area. The drainage infrastructure (including the network of drainage ditches, embankments and pumping stations) provides an evident reminder of the area's reclaimed past. The sediments themselves contain a record of ancient landscape and climates, with the currently wasting peat revealing well-preserved remains of prehistoric landscapes with especially rich archaeology, including prehistoric and Roman artefacts and features found on fen margins. Diverse field patterns are being exposed, ranging from the ancient semi-regular enclosure of the settled fens to the engineered 18th-century fields of the open inland fens.

  The underlying clay has enabled a brick-making industry which has been a major part of local economies and provided much employment at the 'brick pits.'

- **Tranquillity:** Many parts of the Fens are tranquil, particularly around the edge of the Wash. The open and empty landscape means different things to different people; some can find it featureless and intimidating whereas others value the tranquillity that still persists away from the settlements and major transport corridors. Sense of tranquillity is likely to be particularly associated with the area's remaining wetland habitats, notably the large marsh areas adjacent to the Wash.

- **Recreation:** Major habitat restoration projects at Great Fen, Willow Tree Fen and Wicken Fen offer opportunities for improving and creating new access. There is a visionary long-term plan for a Fens Waterway Link joining Lincoln, Boston and Ely, which will progressively open up the Fens for boating. New national coastal access routes are planned and there are opportunities for promoting long-distance walking (such as the Ouse Valley Way, Hereward Way and Nene Valley Way). In addition to the Fens Waterway Link project, the Fens for the Future project is providing a long-term vision. Both aim to give local people a sense of ownership of their local waterways and a sense of belonging, with opportunities for recreation, enjoyment and healthy activities.

- **Biodiversity:** The Fens are particularly important in terms of their biodiversity. Areas of the Fens have been designated as Special Areas of Conservation (SAC) and Special Protection Areas (SPA) because they are internationally important for species including the spined loach. Important habitats include seasonally flooded, wet grassland such as the Ouse Washes, calcareous fen and ditches. The large embayment of the Wash, with its associated salt marsh and mudflats, provides important habitats for a number of bird species including pink-footed and Brent geese, shelduck, lapwings, oystercatchers, common terns and various plover species. The Fens are important as a feeding ground for marsh harriers; the Wash also has 90 per cent of the UK's common seals.

- **Geodiversity:** Geodiversity is also very important in determining the wider landscape and character of the Fens, from the topography to the soils. More locally, the Jurassic clays are significant for palaeontology, with major Jurassic reptiles present and many smaller fossils – ammonites, belemnites and other genera – common. Leedsichthys, the world's largest fish, was discovered in, and is still being unearthed from, these same sediments. The Quaternary deposits contain important records of climate and environmental change. These provide an important context and insight into our understanding of the potential impacts of future climate change and global warming. Several Sites of Special Scientific Interest (SSSI) have been notified for their buried Holocene (Flandrian) sediments, which record fluctuations of relative land and sea levels during the Holocene. The Ouse Washes are geomorphologically significant as a notable example of a naturally functioning flood plain system.



The famous Holme Post demonstrates the historic wastage of peat.

Statements of Environmental Opportunity

SEO 1: Manage the agricultural landscape and soils which allow the Fens to be a major provider of food and horticultural produce, while seeking to enhance opportunities for biodiversity.

For example, by:

- Maintaining the valuable, productive, open agricultural landscape of the Fens National Character Area (NCA) with its high-quality soils, many of which are classed as Grade 1 agricultural land, through sustainable farming and agricultural agreements to the benefit of food production, biodiversity, sense of place and climate change regulation.
- Increasing opportunities to manage and protect the remaining peat resource, for example by raising water levels, to maintain (or enhance where possible) the build-up of organic matter; and encouraging landowners and managers to pursue such activities.
- Encouraging landowners and managers to use sustainable farming methods that protect the soil, such as maintaining vegetative cover and using grass buffer strips to reduce soil erosion from susceptible arable fields in the autumn and winter.
- Encouraging the adoption of good practice to avoid soil compaction and maintain good soil structure.
- Encouraging landowners and managers to manage land to prevent peat from drying out, and to maintain wetted peat soils to reduce loss through compaction, oxidation and wastage.
- For mineral soils in the NCA, promoting management techniques to build up soil organic matter to help maintain and enhance soil quality.
- Encouraging farmers to use techniques such as establishing break crops to manage land and protect soil.
- Encouraging minimum tillage and greater use of organic manures, biosolids and digestates plus soil conditioners, which will help to ameliorate soil losses if pursued on sufficient scale.
- Encouraging the establishment of areas of semi-natural habitat such as reedbed and washland which slow the passage of water through the hydrological system.
- Restoring and managing traditional orchards where there is already a traditional pattern, for example around Wisbech, promoting the planting of new orchards of mixed fruit trees to encourage bees where they are absent, and promoting the expansion of traditional shelterbelts around orchards.

SEO 2: Manage the core wetland complexes and increase their connectivity by enhancing the main rivers, waterways and their associated riparian habitats and improve recreational access opportunities to the Fens.

For example, by:

- Promoting the creation and restoration of wetland landscapes through co-ordinated and sensitive management of water resources in conjunction with Fens for the Future partners, including Internal Drainage Boards (IDBs) and the farming community.
- Managing key wetland sites, including Wicken, Woodwalton and Holme Fens, remnants of the original fen, together with the great washlands which will form the core wetland complexes.
- In addition to the existing core areas, developing extensions at Baston Fen, Great Fen and Wicken Fen as envisioned in the Wicken Vision, as well as new areas such as Lakenheath Fen, Needingworth and the Wissey Wetland, to create more and larger areas of wetland habitats.
- Improving the water quality and quantity in water bodies in the Fens and improving their habitat value by creating buffer zones and undertaking habitat enhancement works, and identifying means by which issues including diffuse pollution can be co-operatively tackled, thus making a valuable contribution to outcomes required by the Water Framework Directive.
- Critically assessing the engineered network of ditches, installing new water management mechanisms where necessary, to enable localised management of groundwater.
- Encouraging winter flood storage on appropriate areas of land, ensuring appropriate management and control of any water resource created, in accordance with Water Level Management Plans, promoting the reversion of existing flood-storage washlands to permanent grassland with extensive grazing regimes, and promoting the creation of new multi-functional washlands.
- Ensuring that sustainable flood risk management for the Fens is delivered through close partnerships.
- Promoting and establishing strategic, appropriately sized areas for biodiversity across the Fens to mitigate the impacts of local, summer storm-related catchment flooding, and to develop robust populations.
- Integrating and developing water resource management within flood management works and land management regimes, particularly at break point areas along the edge of the fen.
- Ensuring that the soils remain adequately hydrated to prevent erosion and maintain soil chemistry, especially where these soils could form ochre and become extremely acidic if dried and re-wetted.
- Promoting the creation of permissive and definitive access to increase opportunities for people to visit the Fens using sustainable transport methods; identifying the strategic gaps in the network and providing public transport in association with employment, heritage, education and recreation initiatives for local people and neighbouring towns and cities; and ensuring that existing projects with capacity such as Fens for the Future and the Fens Waterway Link address recreational and access issues.
- Identifying the strategic access gaps in the network and providing public transport in association with employment, heritage, education and recreation initiatives for local people and neighbouring towns and cities.

SEO 3: Plan for the creation of new coastal landscapes in the Wash area that are adapted and resilient to the impact of climate change, for the benefit of people and wildlife.

For example, by:

- Seeking opportunities to reinstate intertidal salt marshes through realignment from arable to extensively grazed salt marsh, in line with the Wash Shoreline Management Plan.
- Seeking opportunities to create grazing marsh, reedbed and salt marsh throughout the Fens to compensate for losses of these habitats at the coast as a result of climate change and associated isostatic adjustment-induced sea-level rise, or where work carried out has damaged habitat.
- Seeking opportunities to identify and monitor key coastal active process sites.
- Replacing habitat lost from the coast through the East of England Regional Habitat Creation Programme.
- Planning for provision of permissive and definitive access (including the coastal access path) to increase opportunities for people to visit the Fens using sustainable transport methods.



Realignment at Freiston Shore.

SEO 4: Conserve, manage and enhance the Fens landscape and increase educational opportunities to access its geodiversity, archaeology and cultural heritage to enhance enjoyment and understanding for those who live and work in and visit the Fens.

For example, by:

- Protecting and appropriately managing the historic environment, for its contribution to local character and sense of identity and as a framework for habitat restoration and sustainable development.
- Improving the condition of heritage assets through appropriate measures and seeking to reduce conflicting or unsympathetic management regimes, while recognising the high potential in this landscape for undiscovered remains.
- Providing a wider understanding of the geological record of environmental change held within the peat and associated Quaternary sediments, and supporting demonstration projects and sites that illustrate the cultural history, successional fenland habitats and geodiversity of the Fens.
- Managing and conserving the geological exposures throughout the Fens by the removal of undergrowth and the prevention of fly-tipping on these sites, in addition to identifying and protecting new (key) sites as they are discovered.
- Making links between geodiversity, archaeology and cultural heritage, building towards an integrated approach with the surrounding natural environment/landscapes.
- Conserving and monitoring buried geological and archaeological remains that are under threat through erosion of peat, increased or inappropriate cultivation, drying out from dewatering for irrigation, and pressures from development.
- Conserving historic landmark buildings and earthwork sites together with their setting, especially on the settled fens and clay islands.
- Using understanding of the area's traditional and historic architecture, and its distinct patterns of settlement, to inform appropriate conservation and use of historic buildings and farmsteads, and to plan for and inspire any environmentally beneficial new development that makes a positive contribution to local character.
- Promoting understanding of the benefits and potential adverse impacts of wind farms and associated electricity transmission pylons, which are an increasing feature of the fenland landscape.

Additional opportunity

1: Seek partners to aid in the development and future provision of new, distinctive, Fenland economies.

For example, by:

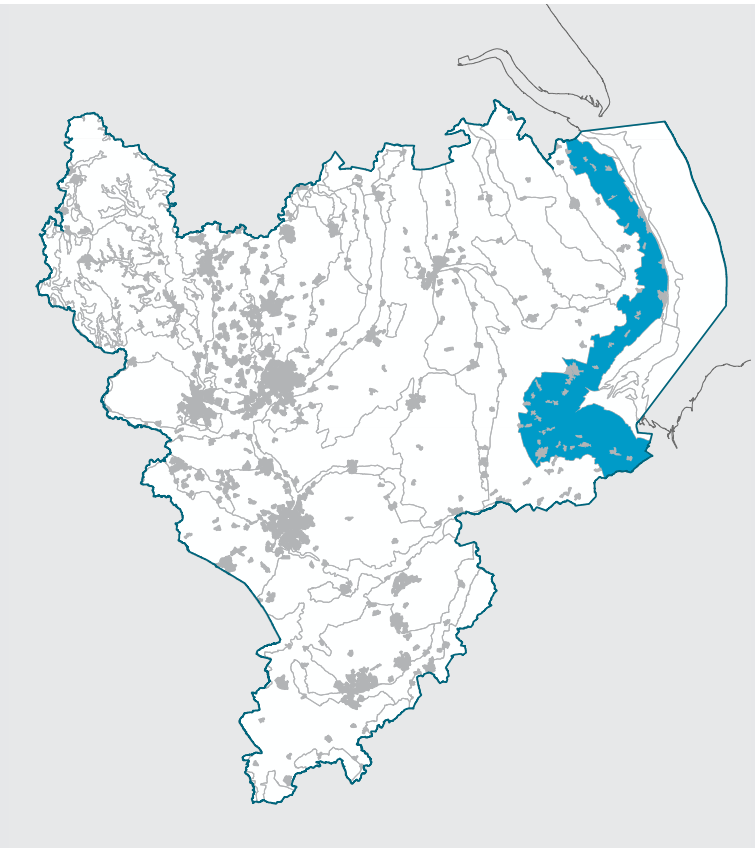
- By promoting fenland cuisine and food preparation using local ingredients.
- Promoting natural art and craft production (such as baskets, woven reed mats, screens and fences for garden or poultry/animal management purposes) in order to diversify the economic opportunities and output from Fenland resources.

2A:

SETTLED FENS AND MARSHES



Fertile soils support arable farming and horticulture (© Wash Estuary Strategy Group/A Lambert)



KEY CHARACTERISTICS

- Low lying, flat and open landscape with wide horizons and panoramas encompassing vast skies;
- Fertile soils supporting highly productive arable farming with limited biodiversity interest;
- Successive periods of enclosure creating local variations in character from organic late Saxon enclosures to rigid 19th and 20th century geometric field systems towards the coast;
- Field boundaries predominantly defined by wet dykes, sea walls, roads and canalised rivers; few hedgerows, hedgerow trees and woodlands;
- Large farm buildings and glass houses often associated with industrial scale agricultural and horticultural operations; and
- Coastal seaside resorts with large areas of static caravans and associated facilities contrast to productive farmland and remote countryside elsewhere.

LANDSCAPE CHARACTER

The Settled Fens and Marshes is a complex Landscape Character Type that has been strongly influenced by various episodes of enclosure and settlement of former saltmarsh and fen.

Lying beyond the limits of the Roman's first sea defences that ran between Peterborough and Lincoln further to the west, the area was first drained and settled by the Saxons. The organic pattern of enclosure boundaries and roads of the 'Townlands' provide a tangible link to the origins of the well settled agricultural landscape. Here, ancient villages and outlying hamlets mark the first of several successive waves of drainage, enclosure and settlement, culminating in the more geometric patterns associated with 19th and 20th century enclosures towards the coast.

Land use is typically arable, the area being particularly fertile and productive. This has resulted in only small areas of land being noted for their habitat value. Wide areas are well settled and busy, notably coastal resorts during the summer months. Elsewhere, the scarcity of settlement and access means that wide areas are remote and isolated, with perceptions enhanced by featureless horizons and vast skies.



Grazing Marshes and Pasture, Saltfleetby, Settled Fens and Marshes. (© Neil Pike, Natural England)

PHYSICAL INFLUENCES

The underlying geology is largely Quaternary tidal flat deposits of clay and silt, which give rise to naturally wet, fertile loamy and clayey soils. Landform is generally flat and low lying, typically between sea level and 5m AOD, although some areas lie below sea level.

From the 4th century rising sea levels led to the deposition of a band of marine silts which in turn led to the creation of intertidal salt marshes with localised areas of slightly higher ground. Prior to improvement, the river systems, along with tidal inundations, caused widespread seasonal waterlogging of the area. Centuries of drainage and water management have created artificial, canalized river channels which run straight for several kilometres and are flanked by high embankments to protect the adjacent lower lying fields. Elsewhere smaller streams appear to occupy more natural winding courses. However, these too are part of a highly managed water management system to maintain the viability of agricultural areas.

With the flat landscape and no geological exposures, there is very limited potential for the application of practices for the care, maintenance and management of features of geodiversity interest and the promotion of their educational and interpretational interest. However, the former river channels beneath the fenland deposits often produce raised ground and form excellent geomorphological features worthy of preservation.

Land cover is dominated by productive agriculture comprising predominantly wheat, barley, legumes and brassicas. However, some pasture is evident in smaller hedged fields close to villages and along seabanks. Bulb growing is also notable, with fields of flowers providing seasonal colour and visual interest. Intensive agriculture has resulted in only limited retention of semi-natural habitats, but with the close proximity of internationally important coastal and marine habitat, this highlights the importance of good agricultural practices across the landscape.

Woodland cover is generally sparse. However, some areas fringing the Lincolnshire Wolds retain higher levels of woodland cover, a significant proportion of which is ancient woodland. The predominant pattern across the Settled Fens and Marshes is of small plantations of young trees, often arranged in geometric shelter belts and plantations close to farms or along field boundaries in an otherwise open, agricultural landscape. Hedgerows are also largely absent, giving visual prominence to trees found along roadsides, in belts around farms and clustering on the fringes of villages.

CULTURAL INFLUENCES

The Settled Fens and Marshes display a complex history of land drainage, settlement and agriculture. In a landscape that displays a simple unity in the underlying physical influences of geology, soils, landform and land use, the local variations in landscape character are significantly influenced by the age and type of land reclamation and more recent patterns of settlement and agricultural land management.



River Eau at Saltfleetby, Settled Fens and Marshes (© Neil Pike, Natural England)

During the prehistoric and Roman period the landscape would have been coastal in character characterised by intertidal salt marsh and areas of marginally higher ground. However, rather than being beyond settlement and practical use, the landscape would have been a rich wetland environment exploited by local communities for wildfowl and an important base for salt manufacture.

In the mid Saxon period, cattle ranches were set up on the higher ground, linked to inland areas by drove roads. However, it was during the medieval period that the coastal fens and marshes began to be comprehensively drained and settled. The 'Townlands', located in a broad arc inland from The Wash form the historic core of the landscape and represent a period of drainage and enclosure from at least the late Saxon period. A string of nucleated medieval market towns and villages lie along winding arterial routes running parallel to the coastline, with several having outlying satellite settlements, often sharing the name of the parent community. The villages and towns of the Townlands are characterised by ancient stone churches and post medieval brick structures, set within a framework of winding rural roads and sinuous enclosures.

The seaward edge of the Townlands is defined by the Roman Bank, constructed around 1300, beyond which lay areas of coastal saltmarsh that were reclaimed in later centuries. The land was initially used for wildfowling and seasonal grazing, with livestock being driven between extensive areas of common saltmarsh and drier areas inland close to the villages. During the post medieval period (between 1660 and early 19th century) the common saltmarsh was drained for farming with field patterns becoming more regular and geometric as time progressed. Here, settlement tends to be dispersed, strung out along roads with older properties tending to be of red brick and dating from the 1750s onwards, interspersed with modern agricultural buildings, some of which are on an industrial scale. Windmills remain a common sight, which along with church towers, are iconic

and prominent landmarks in an otherwise flat, open landscape. A fine example can be seen at Moulton, where the early 19th century tower mill mirrors the scale of the nearby medieval church spire.

Further towards the coast, a network of active and relict earthen sea banks is evident, along with continuation of agricultural land uses, associated with 19th and 20th century reclamation and enclosure. When compared to inland areas, the coastal enclosures display a more rigid and geometric character and a lower settlement density, with large areas retaining a remote and inaccessible character.

Boundaries throughout the Settled Fens and Marshes generally comprise narrow, shallow wet dykes interspersed with modified river channels. The characteristic organic pattern of roads and enclosures is a dramatic contrast to the rigidly geometric patterns evident across the neighbouring fens. These variations are often a good indication of the period of time that the land was reclaimed and settled. However, even within the organic framework of Saxon and medieval boundaries, reorganisation has occurred including field amalgamation and sub divisions, often as a result of post 1950s agricultural reform.

Several towns served as coastal ports during the medieval and post medieval period. As rivers and havens became silted up and coastal sand bars grew, a number of ports such as the historical settlement of Boston, which was associated with the European wool trade, could only function as navigations after rivers were straightened and widened to decrease upstream flooding. Other settlements such as Wainfleet, which was important for the herring and salt industries, could no longer function as ports.

During the 19th century several coastal settlements benefited from a significant influx of people and money. One example is Skegness, a former fishing village which grew rapidly in the late 19th century. Initially its prosperity was a result of the local middle classes indulging in the new fashion for sea bathing. However, in the later 19th century the railway arrived, bringing day trippers from the industrial cities. The subsequent decades saw planned growth and expansion, including the construction of piers, promenades and parks. The continued popularity of coastal resorts has resulted in their expansion throughout the 20th century, with recent decades seeing the growth of large static caravan parks.

The Lincolnshire Coastal Grazing Marshes Project has undertaken a detailed study of the 'outmarsh' that forms part of this landscape type. The area is rich in archaeological remains that contribute to the landscape character of the area, including prehistoric archaeology, ridge and furrow and abandoned settlements.



Settled Fens and Marshes (© Carol Paterson, Natural England)

AESTHETIC AND PERCEPTUAL QUALITIES

Whilst superficially there is a great unity of character across the Settled Fens and Marshes, largely as a result of its simple landform and intensive arable land use, there is great contrast in the way the landscape is perceived at local level. The sinuous and ancient character of the Townlands is evocative of a long and continuous settlement history stretching back over a thousand years, whereas elsewhere the geometric field patterns and industrial scale farm complexes creates an altogether more modern character.

Similarly, wide areas appear remote and tranquil, particularly in inaccessible areas around the coastal fringe, where the vast skies and broad, sometimes featureless horizons add to their isolated character. By contrast, in close proximity to the Townlands villages and arterial roads, tranquillity is all but lost and the landscape is perceived as well settled, busy and active. Across much of the landscape, many long views are foreshortened by tree belts. Whilst not extensive, these merge in views at ground level to form a backdrop to many panoramic views to the wide horizon.

Whilst there is a strong, simple unity of land cover features, great variation in colour and texture is created by various agricultural regimes, the absence of hedgerows allowing wide vistas across a geometric pattern of contrasting colour and texture.

LANDSCAPE CHANGE AND MANAGEMENT

BUILT DEVELOPMENT

Forces for Change

Modern built development is affecting the Townlands villages, eroding their architectural and historic character. Development on settlement margins can be particularly damaging, creating visual intrusion, resulting in the loss of surrounding landscape features and increasing the risk of coalescence. Proliferation of smaller, unplanned residential development along arterial roads is also changing the landscape, reducing the sense of remoteness and enclosing views.

Rising sea levels associated with climate change, and future changes to the coastal morphology is likely to affect the availability of land for future development with severe restrictions on growth and the longer term prospects for settlements, such as the historic settlement of Boston.

Shaping the Future Landscape

The aim should be to protect the distinctive character of settlements throughout the landscape and consider the visual impact of any new development. Specific mechanisms include Village and Town Design Statements, guiding the design of new development and ensuring the appropriate use of vernacular styles and building materials; and planning guidance for settlement coalescence, ensuring strategic gaps between settlements are maintained. As well as Village and Town Design Statements, Conservation Area Appraisals can also be important tools.

Best practice innovative architectural ideas and planning solutions utilising eco-friendly and high quality design that minimise impact on local landscape and townscape character should also be encouraged, along with limited tree planting around settlement fringes to help integrate new development into the landscape.

INFRASTRUCTURE

Forces for Change

Road improvements are commonplace, including straightening of existing routes and new 'by-pass' schemes designed to alleviate congestion within the Townlands villages. This has an urbanising effect and brings a degree on standardisation to the countryside.

Windmills are a common feature of this landscape, acting as distinctive local landmarks. However, while no new windmills are being built, some existing windmills are in poor condition. This can affect scenic quality and create an impression of disrepair.

Shaping the Future Landscape

The aim should be to protect the existing character of the rural road network, whilst having regard to safety requirements. Any new roads should be carefully planned and designed to provide positive environmental and landscape enhancements and strengthen prevailing character.

The aim should be to protect existing windmills, ensuring they positively contribute to the landscape character and enhance legibility in an area. Opportunities should be explored to manage and promote deteriorating windmills, providing recreational and educational benefits.

ENERGY PROVISION

Forces for Change

Wind energy schemes are a common feature of this landscape due to the strength of prevailing winds off the North Sea. Given the Government's commitment to increasing energy from renewable sources, there is likely to be continued pressure to accommodate new wind energy schemes. Indeed, further schemes are under construction, consented or in planning. New wind energy schemes will create visual landmarks in this predominantly flat landscape and reduce the sense of remoteness and isolation.

Shaping the Future Landscape

The aim should be to protect the historic character of villages and the open character of the surrounding landscape by siting wind energy schemes away from visually prominent locations. The impact on long distance views from the coast and areas inland should also be considered. There is potential for strategic regional and sub regional guidance on commercial wind energy schemes, including cumulative impact, informed by the EMRLCA and other studies. In addition, planning guidance for the siting and design of wind energy schemes should be produced at the county and/or district level where necessary, establishing the most appropriate sites for development and setting out the criteria against which new applications will be assessed.

AGRICULTURE AND LAND MANAGEMENT

Forces for Change

There is marked evidence of agricultural intensification and farm amalgamation, accompanied by a move towards arable production. This has resulted in the loss or damage of many typical landscape features, including traditional patterns of field boundaries and remnants of ridge and furrow, contributing to a more homogenous landscape. Soil erosion associated with the large and exposed open fields is an ongoing problem and may be exacerbated by further agricultural intensification and also the effects of climate change. The loss of pasture is particularly evident around settlements, where grazing animals and smaller field sizes contribute to the setting and structure of several villages.

There is also a proliferation of new large scale agricultural buildings, reflecting the loss of small holdings and the general increase in farm size. The popularity in bulb growing is also notable, with an increase in the number of poly-tunnels and glass houses. Such structures can reduce the sense of remoteness in rural areas and cause visual intrusion, enclosing previously open views.

Shaping the Future Landscape

The aim should be to protect existing rural landscape features, whilst encouraging positive management of those features lost or under threat. In particular the restoration of hedgerows should be given priority around urban areas, along with an increase in grassland and pasture, creating a stronger and more mixed pattern of land use, whilst helping to integrate new development into the landscape. This will also help to limit the occurrence and effects of soil erosion. However, care should be given not to disrupt the characteristic wide horizons and panoramas in more remote locations.

The aim should be to protect the distinctive open character of the landscape and consider the visual impact of any new structures. New, large scale agricultural buildings should be carefully sited, away from visually prominent locations and located amongst existing buildings where possible. The opportunity to conserve and upgrade existing barns and buildings should also be explored.

FORESTRY AND WOODLAND

Forces for Change

Woodland cover is generally sparse; however, there is evidence of more recent tree planting close to settlements or along field boundaries in an otherwise open agricultural landscape. Coniferous shelterbelts are particularly common around isolated farm buildings. While trees can be used to screen or soften views of buildings and create opportunities for recreation and nature conservation, new planting can introduce inappropriate and visually intrusive elements in this flat and open landscape.

Shaping the Future Landscape

The aim should be to protect the distinctive open character of the landscape by ensuring the type, scale and location of new woodland and tree planting is appropriate. Tree planting should generally be limited to roads margins or ditches where trees are already a local feature or in and around established settlements as part of mechanisms for visual containment of new built development. Instead priority should be given to managing more characteristic habitats and features, such as saltmarsh and drainage ditches as part of enhanced habitat reserves.

TOURISM AND LEISURE

Forces for Change

The continued popularity of coastal resorts has resulted in their expansion, with recent decades seeing the growth of large static caravan parks. This is particularly evident around towns such as Skegness and Mablethorpe. As with any new development on settlement margins this can be particularly damaging, causing visual intrusion, and resulting in the loss of surrounding landscape features and increasing the risk of coalescence. Static caravans tend to homogenise the landscape, creating a repetitive pattern of similar sized and shaped units.

Shaping the Future Landscape

The aim should be to protect the distinctive open character of the landscape and consider the visual impact of any new or extended caravan parks. Planning guidance for the siting and design of static caravan sites should be produced at the county and/or district level where necessary, establishing the most appropriate sites for development and ensuring strategic gaps between settlements are maintained. The management of native tree and hedgerow planting should also be encouraged, containing the edges of sprawling resorts.

ENVIRONMENTAL PROCESSES AND CLIMATE CHANGE

Forces for Change

Along the coast is a network of sea banks, protecting against tidal flooding and inundation. In an effort to combat the growing threat associated with sea level rise linked to the effects of climate change, new engineered flood defences are being created and parts of the existing sea bank are deliberately being breached. This process is resulting in a new line of defence and the loss of some productive agricultural land.

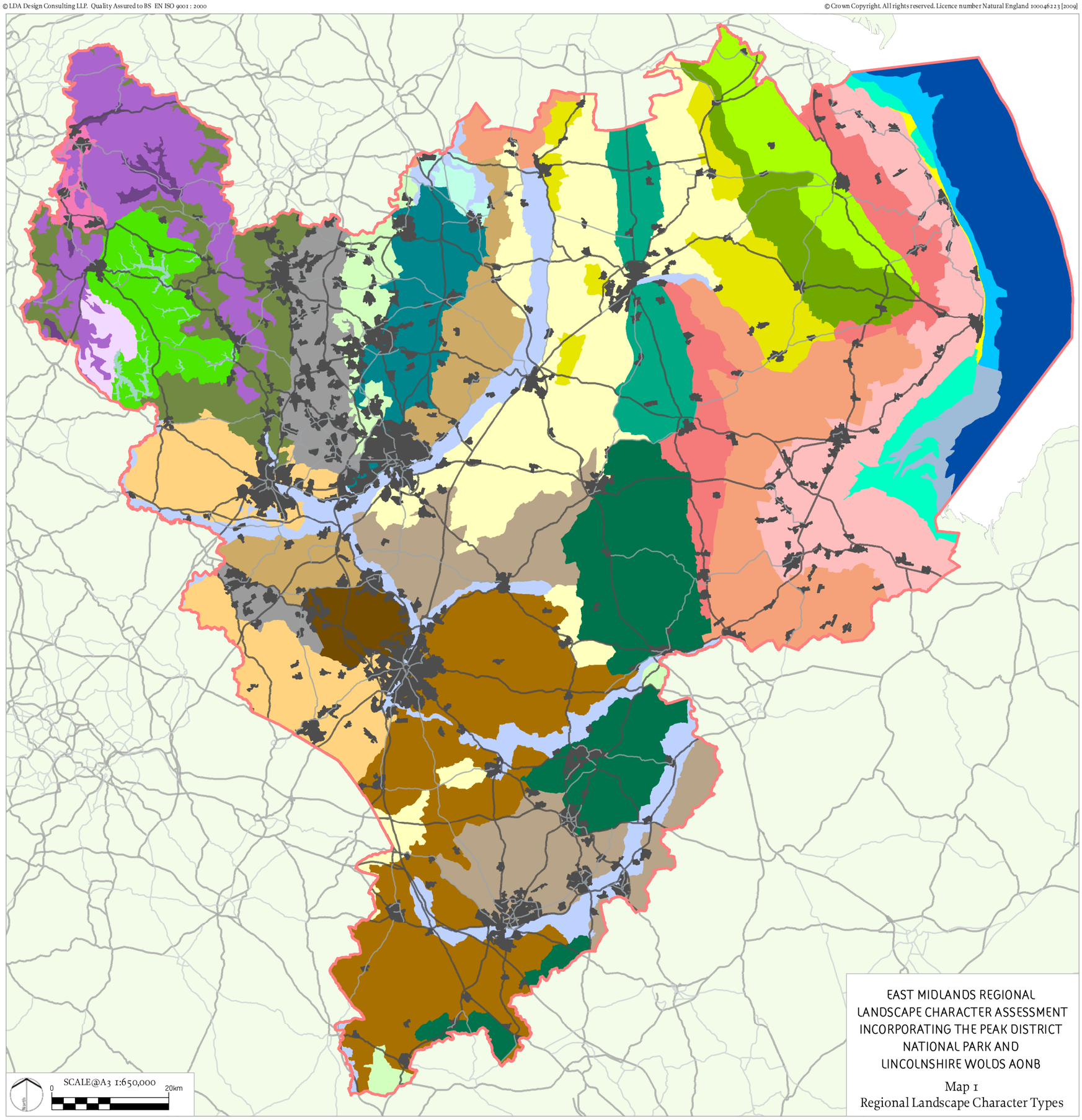
Shaping the Future Landscape

The aim should be a planned process for the future sustainable management of the coast, conserving areas further inland and creating new areas of saltmarsh along the coast. New or realigned flood defences should attempt to not compromise existing recreation, nature conservation or heritage features. The management of new and existing salt marshes should also be considered, including the re-introduction of grazing.

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No dimensions are to be scaled from this drawing. All dimensions are to be checked on site. Area measurements for indicative purposes only.



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EAST MIDLANDS REGIONAL LANDSCAPE CHARACTER ASSESSMENT INCORPORATING THE PEAK DISTRICT NATIONAL PARK AND LINCOLNSHIRE WOLDS AONB

Map 1
Regional Landscape Character Types

Legend

- Study Area Boundary
- Built Up Area

Group 1: Coast and Sea

- 1a: Coastal Saltmarshes and Mudflats
- 1b: Coastal Dunes, Beach and Intertidal Sand Flats
- 1c: Shallow Coastal Waters
- 1d: Shallow Inlet Bay
- 1e: Offshore Industries, Fisheries and Navigations

Group 2: Fenland and Fenland Margins

- 2a: Settled Fens and Marshes
- 2b: Planned and Drained Fens and Carrlands
- 2c: Fen and Marsh Margin Farmlands

Group 3: River Valley Floodplains

- 3a: Floodplain Valleys
- 3b: Sandland Farmlands

Group 4: Lowland Vales

- 4a: Unwooded Vales
- 4b: Wooded Vales

Group 5: Village Farmlands

- 5a: Village Farmlands
- 5b: Wooded Village Farmlands
- 5c: Undulating Mixed Farmlands

Group 6: Limestone Farmlands

- 6a: Limestone Scarps and Dipslopes
- 6b: Upland Limestone Pastures
- 6c: Limestone Dales
- 6d: Limestone Farmlands

Group 7: Chalk Wolds

- 7a: Chalk Wolds
- 7b: Wolds Scarps, Ridges and Valleys

Group 8: Clay Wolds

- 8a: Clay Wolds

Group 9: Coalfields

- 9a: Settled Coalfield Farmlands

Group 10: Woods and Forests

- 10a: Forest Hills and Ridges
- 10b: Sandstone Forests and Heaths
- 10c: Wooded Slopes and Valleys
- 10d: Forested Ancient Hills

Group 11: Gritstone Moors and Fringes

- 11a: Open Moors and Inbye Land
- 11b: Moorland Valleys
- 11c: Settled Valleys and Enclosed Gritstone Uplands
- 11d: Upland Pastoral Hills and Valleys

LDĀDESIGN

DWG.NO 2757/Map 1 CHECKED IH
DRAWN CM APPROVED SC
Source: Ordnance Survey

above broad distinctions within South Holland District. These are classified as *Landscape Character Types*, as follows:

- The Settled Fens Landscape Character Type
- The Peaty Fens Landscape Character Type
- The Wash Marshes Landscape Character Type

The essential characteristics of these Landscape Character Types are summarised below. This model of field assessment follows that used in the Salisbury Plain Army Training Estate Landscape Character Assessment carried out for Defence Estates by ERM. [8]

4.4 The Settled Fens Landscape Character Type

Topography: flat

Dominant Land Cover and Landscape Elements:
Buildings: farms, masts, poles, pylons, industrial, commercial, settlements, urban
Heritage/vernacular: buildings, country houses, field systems, ecclesiastical
Farming: hedges, fields, fences, arable, market gardening, orchards
Woodland and trees: deciduous, mixed, shelterbelts, hedgerows, orchards, clumps and alien coniferous screens
Hydrology: rivers, drainage channels, ditches
Communication: roads, railways, airfields, pylons, masts.

Description:
Predominantly flat topography, dissected by main roads, rivers, drainage channels and drainage ditches often on raised banks(1-3m). Primarily nucleated settlements with associated mature trees. Church spires and towers often rise above the mature vegetation to provide prominent landmark features. Medium to large fields with intensive market garden crops. Locally strong hedgerow elements. Views are restricted or foreshortened by shelterbelts and woodland or mature hedgerows.
This contributes to a sense of enclosure with a more open feel between settlements. The main visual detractors are the 440kV and 132 kV overhead lines on towers, electricity sub stations and power stations and urban fringe visual clutter (dominated by light industry and glasshouse horticulture).
Note that within the larger settlements, there are no views of adjacent fenland and this introspective quality reduces the awareness of place within the wider fenland landscape.
Key characteristics: flat landform, nucleated settlements with mature vegetation and church spires; organic lines dominate, e.g. winding roads
Condition: average, but ranges from good (farmland) to poor (urban fringe clutter)

Visual Assessment criteria:
Pattern: strong
Scale: medium-large
Texture: textured[9]

[8] *Ibid.*, p.31
[9] Texture is determined by land cover, e.g. trees, hedges and crop types and their scale or size within the landscape

Colour: muted-colourful[10]
Complexity: diverse
Remoteness: active
Unity: fragmented
Form: curved
Enclosure: open-enclosed

Perception:
Security: comfortable
Stimulus: bland
Tranquillity: vacant
Pleasure: pleasant

Architecture:
New-build around traditional (medieval-Victorian) core, with the church as the primary node. Building materials are predominantly brick and a combination of brick and stone. The settlement form is primarily nucleated, interspersed with some linear settlement.

Three representative photographs of the Settled Fens Landscape Character Type are shown below.

The Settled Fens Landscape Character Type



Gosberton church viewed over open fields

[10] Colour is the dominant colour of the constituent elements, e.g. fields, built form



Sutton Bridge power station viewed from the A17



Power distribution infrastructure south of Holbeach

the setting of a Listed Building would be a necessary part of the approach to site selection by a prospective wind energy developer.

4.19 The *Landscape Capacity Values Map* is included as Appendix 3 to this report.

CONCLUSIONS & RECOMMENDATIONS

5.1 Reference to the *Landscape Capacity Values Map* at Appendix 3 to this report shows that, assessing the landscape at the Local Authority scale using the methodology described above, much of the South Holland District's landscape is classified as either unsuitable or highly unsuitable for locating wind energy developments, based upon the model of 8 turbines at 100 metres high to blade tip. These areas have been thus classified on the basis of their inherent landscape characteristics, the presence of key sensitivity indicators such as conservation areas and the need to conserve open views of prominent churches, and the setting of Scheduled Ancient Monuments.

5.2 However, there are some tracts of land within the Settled Fens Landscape Character Type which have been classified as moderately suitable for such developments, typically those affected adversely by the landscape and visual impact of high voltage electricity transmission lines and associated infrastructure, urban fringe clutter and large scale industrial and commercial developments. This has occurred to such an extent that the integrity of the landscape has been compromised and there is consequently a reduced sensitivity to change.

5.3 In addition, and of note, are two clusters of grid squares which have been classified as suitable. One of these – on the former Wingland Aerodrome site south east of Sutton Bridge – has a square classified as highly suitable. This is as a consequence of the dominating visual effects of the Sutton Bridge power station and the plethora of high voltage lines in the vicinity, linking to the major installation south of Walpole Marsh. This site has very few residential receptors nearby. Those present benefit from a high degree of adjacent screening by vegetation – a factor cited as important by the Inspector in his decision to uphold the Deeping St Nicholas Wind Turbines Appeal. [13] This is reinforced by dense belts of recent planting associated with the programme for the development of the Wingland Industrial Estate

[13] *Appeal Decision APP/A2525/A/02/1099738; paragraph 22, p.5*

by South Holland District Council. Extensive earth banks with mature vegetation along the River Nene and the northern side of the A17 provide considerable visual containment.

5.4 The smaller cluster lying to the west of the A16 to the north of Spalding has a very low incidence of residential receptors, some of which benefit from low-level screening by vegetation, and the developments to the northern, western and southern edges are predominantly industrial, commercial or form commercial horticulture production units. To the east, the raised banks of the River Welland provide visual containment.

5.5 The cluster of four grid squares in the Peaty Fen Landscape Character Type covering the Deeping St Nicholas Wind Turbines site and its immediate environs has been classified as being moderately suitable. This is based upon the reasoning that the development of the 8 wind turbines at this location has already adversely affected the open landscape and reduced its quality, thus increasing its capacity for further turbine development of up to 8 turbines of the same configuration without detrimental loss to the remaining local landscape quality.

5.6 It can be inferred that those areas classified as being highly unsuitable are the most sensitive to detrimental loss of landscape quality as a consequence of wind turbine developments, on the basis of the model used in this study. It is recommended that this factor be reflected in emerging Local Plan policies in that it should become the accepted measure of *'acknowledged importance in the local environment'* referred to in Policy E17 of the current South Holland District Local Plan. [14] It is also recommended that these areas should not be considered as suitable for any scale of wind turbine development other than for very carefully sited *individual* turbines in exceptional circumstances. Any such scheme would also need to be rigorously assessed entirely on the basis of its individual attributes.

5.7 In certain circumstances, those areas classified as being unsuitable on the model used for this study could be open to consideration as being moderately suitable, provided that no detrimental effects on landscape quality could be properly demonstrated, in the event of the following factors being taken into account:

- less than 8 100-metre high turbines being proposed in any one development

[14] *South Holland District Local Plan* (Adopted October 1998); p.50

LANDSCAPE CHARACTER & KEY ELEMENTS

SOUTH HOLLAND DISTRICT

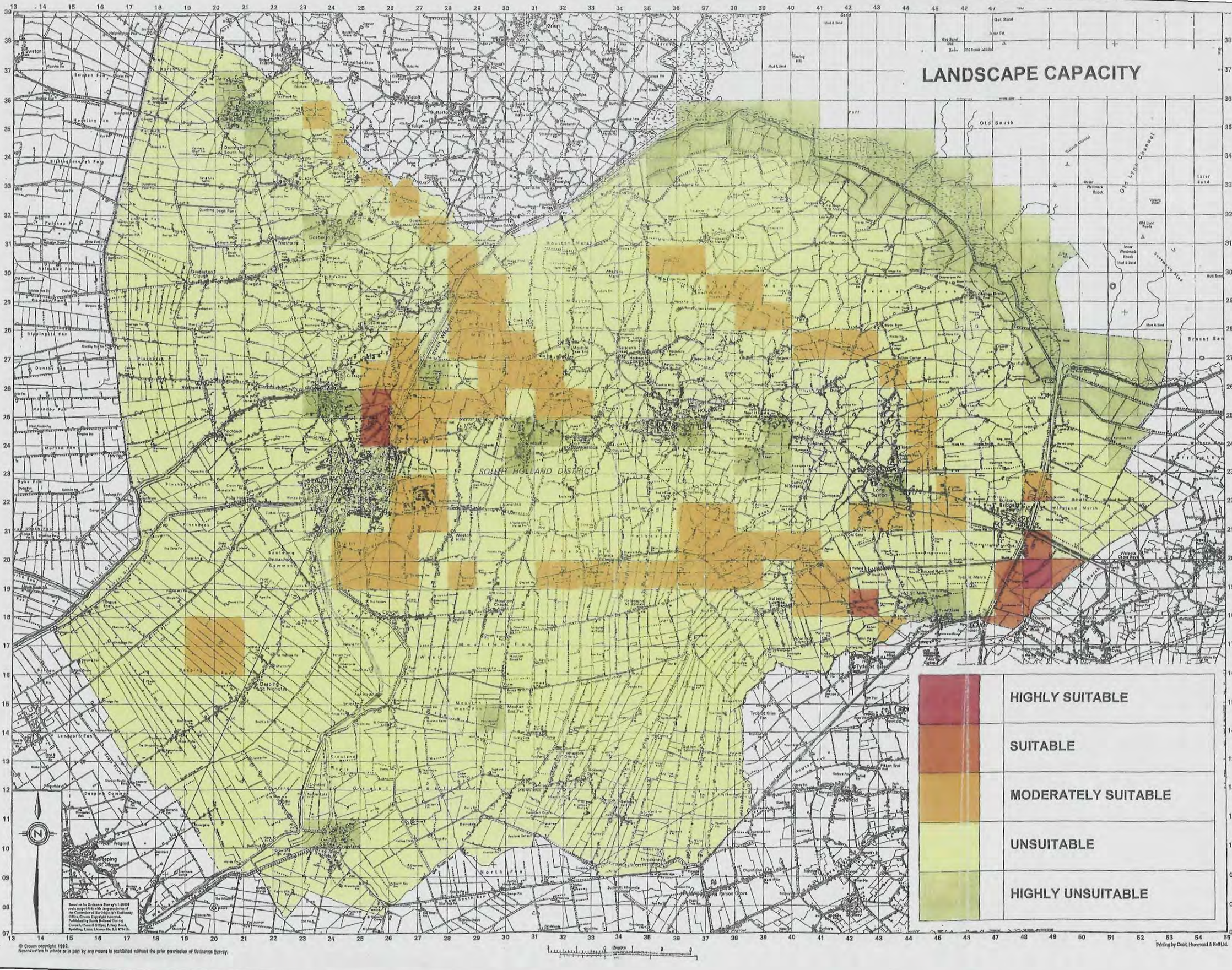
	SETTLED FENS LANDSCAPE CHARACTER TYPE
	PEATY FENS LANDSCAPE CHARACTER TYPE
	WASH MARSHES LANDSCAPE CHARACTER TYPE
	Conservation Areas
	Scheduled Ancient Monuments*
	National Cycle Route
	District Boundary

** Where Scheduled Ancient Monuments coincide with Conservation Areas, for clarity of representation, the SAM symbol has been omitted*

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LANDSCAPE CAPACITY



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Character Zone WSH6

Townlands
within The Wash Character Area

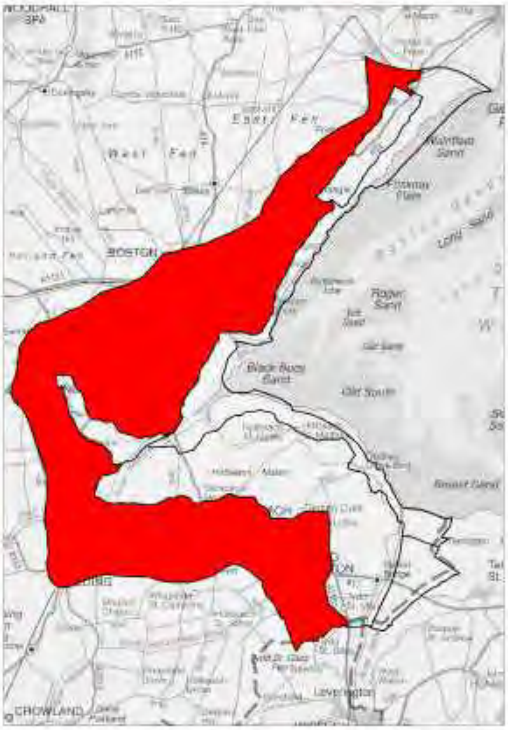
ARS sub-provinces:
EWASHW
CLNSC

Countryside Agency Countryside Character Areas:
46 The Fens

Total area: 379.7 km^2

Percentage of Regional Character Area: 57.5%

Percentage of Overall Project Area: 5.44%



Description
The greater part of this area is made up of arable fields, which are used to cultivate a variety of food and cash crops. There are some areas of pasture most of which is found in close proximity to historic settlements. Grazing animals are often allowed onto fields that have been harvested, where they devour the stubble and stalks.

Although predominantly agricultural, this character zone encompasses most of the nucleated settlements in the wider Wash region. The two largest settlements, Boston and Spalding, have markedly different roles within the local area. Boston, a medieval port, retains a strong maritime character, with working docks and associated infrastructure. Spalding, although possessing a roughly equivalent proportion of industrial types, is very much the hub of the food production industry in the region, with an assortment of processing plants, canneries and distribution centres. The smaller settlements in the area are primarily residential, although there are several examples of smaller industrial areas on the outskirts of these towns.

The zone is largely agricultural in character. Field morphology consists of a combination of irregular enclosures of early medieval origin, subdivided by straight field boundaries along the seaward edge of the zone. Most of the zone's seaward edges are defined by the 'Roman Bank', a medieval sea defence constructed in about 1300.

Field patterns in more inland parts of the zone comprise series of thin parallel strips within large irregular fields. Many of which have been amalgamated through extensive boundary removal in the mid to late twentieth century.

The pattern of settlement in the zone is distinct, with a string of nucleated medieval market towns and villages running roughly parallel to the coastline. Several small hamlets bridge, or lie adjacent, to the 'Roman Bank', some of which are satellite communities of the larger market towns. Settlements are of late Anglo-Saxon origin, with later medieval and subsequently twentieth-century expansion.

The main market towns and villages retain minor roads through their centres, however, peripheral road infrastructure has been upgraded to single carriageway 'A' roads which bypass the settlements. Remaining road infrastructure consists of an organic network of minor roads and trackways. Roads towards the inland parts of the zone are arranged more perpendicular to the coastline, and tend to form less of a network than those nearer the medieval sea-bank.

The zone is divided by large straight embanked river channels, mainly canalised during the nineteenth and twentieth centuries. Minor rivers and sewers are more sinuous in character, but nonetheless have been straightened and embanked from the at least the sixteenth century.

Large scale drainage infrastructure includes the early nineteenth-century Cowbridge and Hobhole Drains, north and east of Boston, and the modern relief channel of the river Welland. Standing water features in the zone are infrequent, and where apparent they are small ponds and embanked agricultural reservoirs. The latter are often associated with large glass houses. A number of small fishing lakes in the north-east of the zone have developed during the late twentieth century. Some small water features are associated with former brickwork sites, or moated houses.

Tree cover is the zone is sparse, comprising deciduous and non-deciduous, small scale, nineteenth- and twentieth-century plantations located in field edges and corners, around settlements and as shelter belts around farmsteads.

Historic Landscape Evolution

During the Prehistoric and Roman periods the zone was coastal in character, consisting of an areas of intertidal saltmarsh with localised areas of marginally higher ground. Early occupation would have been based around the manufacture of salt and hunting of wildfowl.

Falling sea levels from the mid Anglo-Saxon period allowed settlement on drier areas in the form of isolated ranches and salt manufacturing sites. By the late Anglo-Saxon period a landscape of small villages within an irregular field pattern was established on a long curve of higher silt land running from King's Lynn to Wainfleet. The linear pattern widened at Kirton, where a broader band of marginally higher silt land enabled the settlement pattern to be more dispersed. By 1086, the modern day settlement pattern of market towns had been established.

During the early medieval period, fields comprised a mixture of arable and meadow land. Common meadows, known as 'ings,' and open fields for grazing and arable were in use during the medieval period. Fields were irregular in nature, with many subdivided into selions, or strips, divided by thin dykes, allotted to individual land owners or tenants. The pattern of fields created by this method of allotment appears fossilised in the modern landscape and is more prevalent in, although not entirely restricted to, the inland areas of the zone bordering the freshwater fen.

Population expansion during the twelfth and thirteenth centuries occurred at the same time as reclamation of saltmarsh and freshwater fen on both sides of the established settlement zone. Land was protected from inundation by raising flood banks both in the fen and on the saltmarsh. Banks such as the Hurdletree Bank and 'Roman Bank' (that dates to about 1300). Droveways and trackways, which would later influence the modern day pattern of infrastructure, would have developed alongside this reclamation.

In the Middle Ages villages became more urbanised, developing into towns, many of which had both a market and fair licensed by the Crown. Burgage tenements were also laid out in port centres such as Boston and Wainfleet. Satellite villages developed along the flood

banks, allowing increased access to marsh and fen grazing lands and meadows. Flocks and herds from as far away as Ireland and Scotland came to graze on fen pastures, before moving onto London to be sold. Several of the settlements were small port towns, with access to The Wash via navigable creeks. During the late medieval period, many of the creeks serving the small ports warped up resulting in their abandonment or relocation further downstream.

Drainage was a continual preoccupation of all communities within this zone, as the onus on digging, embanking, and maintaining drains and watercourses rested on local inhabitants and landowners. During the Middle Ages the enclosure of marginal meadow and grazing land, which allowed marsh and silt fen to be ploughed, resulted in the laying out of thousands of miles of field drainage. Medieval works also included the embankment and canalisation of small watercourses, the creation of navigable drains and the diversion of river and sewer outfalls into major river estuaries such as the Welland and the Nene. Later post medieval and modern works consisted more massive engineering works, tackling the difficult tidal outfalls of major rivers and cutting large man-made drains from the peat fens through to the canalised river outfalls.

Throughout the post medieval period fields were amalgamated and re-enclosed through piecemeal agreements between individual landowners and tenants. The resulting sub-division and re-organisation of the land divided the organic pattern of fields and curvilinear arrangement of parallel strips with straight and geometric boundaries.

During the second half of the twentieth century, the zone has experienced considerable field boundary loss, resulting in an increased enclosure size that has dissipated the earlier field morphologies. Market towns within the zone have undergone large scale peri-urban residential and commercial expansion, coupled with the creation of new road infrastructures.

Legibility
The area is the oldest character zone within the reclaimed marsh and fen landscapes and, as such, displays the greatest range of time depth. Economic trends, climatic changes and ever more ambitious drainage engineering works since the late Anglo-Saxon period are visible within the fabric of the historic landscape.

The zone is distinct from other zones around The Wash due to the higher density of settlement, and more irregular field boundary morphology. The ‘island-like’ colonisation of the zone and its subsequent prosperity through the exploitation of surrounding marsh and fen is clearly manifested in the landscape, giving the area a national distinct historic character.