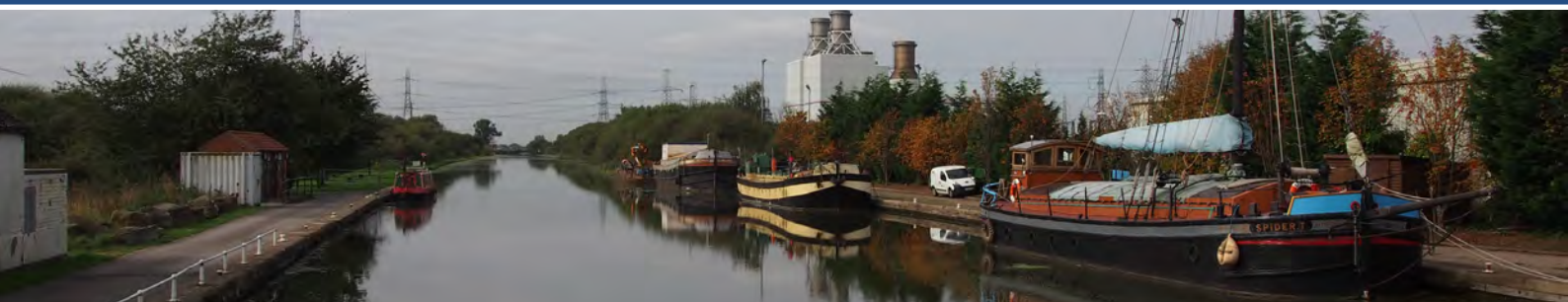


LANDSCAPE CHARACTER ASSESSMENT

Final Report

December 2014

Prepared by **Fiona Fyfe Associates,**
with **Countryside**
and **Steven Warnock**



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All photographs in this document have been taken by Fiona Fyfe.

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EXECUTIVE SUMMARY

This project was commissioned in September 2014 by the Isle of Axholme and Hatfield Chase (IoAHC) Landscape Partnership. It was completed between September and November 2014 by Fiona Fyfe Associates, with Countryside and Steven Warnock. The project brief lists four key objectives for the project, as follows:

- Inform the preparation of the full Landscape Conservation Action Plan.
- Provide evidence to support the second stage bid to HLF.
- Provide practical detail to assist project partners in preparing final project plans.
- Assist with guidelines for the future management of the landscape and a framework for future work.

The IoAHC area is located in the Humberhead Levels, between the M18 and the river Trent, and covers land in North Lincolnshire and Doncaster local authority areas. The largest settlements within the IoAHC are Thorne, Crowle, Epworth, Keadby and Haxey. Much of the area is within the Humberhead Levels Nature Improvement Area (NIA), and it is also within the Humber River Basin District under the EU Water Framework Directive.

The IoAHC area contains landscapes which are nationally and internationally important ecologically, and as cultural landscapes. However, the area is not renowned nationally, or even regionally. Thorne and Hatfield Moors contain some of the largest expanses of raised bog habitats in Britain, but are less well known than other similar sites (e.g. Chat Moss). Hatfield Chase was the first area in Britain to be drained by the 17th Century Dutch engineer Cornelius Vermuyden, and this was the start of an ongoing process of land drainage and improvement which has led to the creation of some of the most productive agricultural land in Britain. The Isle of Axholme contains one of the most extensive surviving medieval strip field farming systems in England (and the social organisations needed to manage them), but is relatively unknown compared to other surviving strip field systems. This Landscape Partnership scheme therefore offers a unique and valuable opportunity to raise awareness of the area's important ecological and cultural landscapes; to engage local people with the rich and varied landscapes on their doorstep, and to raise the area's profile nationally so that its landscapes can be understood and appreciated.

This document tells the story of the IoAHC landscape from geological times to the present day, with particular reference to the forces and events which have influenced that which we see today. This is an ongoing process as the landscape is dynamic and continues to change in response to environmental and man-made factors.

The IoAHC contains unique traditions of work and play which connect groups of local people with their landscapes (for example the strip field farming system and the 'Haxey Hood' game). However, some traditional landscape features (particularly the strip fields) are vulnerable, and there is much which could be done to encourage more local people to engage with, and value, the landscapes where they live. There are many opportunities for landscape-based projects to be taken forward by the IoAHC Landscape Partnership, including projects to enhance landscape character and sense of place; landscape archaeology and landscape history based projects; nature conservation based landscape projects; projects to enable people to understand and explore the landscapes on their doorstep, and projects related to landscape research and connections with similar landscapes elsewhere.

The methodology for undertaking this Landscape Character Assessment is in accordance with the current best practice guidance, and reflects the holistic approach to landscape set out in the European Landscape Convention. Eight Landscape Character Areas (LCAs) have been identified within the IoAHC area. Each has its own unique identity and 'sense of place' resulting from the combinations of natural, cultural and perceptual elements within it. Each LCA is described in terms of its location, context, key characteristics, natural and cultural influences and sites, perceptual qualities, threats and forces for change, and opportunities for landscape projects.



Crowle Common

PART 1: INTRODUCTION

1.0 BACKGROUND

1.1 Commissioning and objectives

1.1.1 This project was commissioned in September 2014 by the Isle of Axholme and Hatfield Chase (IoAHC) Landscape Partnership. It was completed between September and November 2014 by Fiona Fyfe Associates, with Countryside and Steven Warnock.

1.1.2 The project brief lists four key objectives for the project, as follows:

- Inform the preparation of the full Landscape Conservation Action Plan.
- Provide evidence to support the second stage bid to HLF.
- Provide practical detail to assist project partners in preparing final project plans.
- Assist with guidelines for the future management of the landscape and a framework for future work.

1.2 Format of report

1.2.1 Following this background section, the report is set out as follows: Section 2.0 describes the story of the IoAHC area, including the geological and historical processes that have shaped the landscape seen today. Section 3.0 continues the story, looking at the threats and forces for change affecting the landscape. Section 4.0 explores how local people relate to the surrounding landscape in terms of traditional landscape-based activities, and how they think about and engage with the landscape. Section 5.0 outlines potential landscape-based projects (including community-based activities to enhance the landscape and encourage local people to engage positively with it). Section 6.0 introduces the landscape character of the area, including an outline of existing relevant landscape character assessments, the landscape character assessment methodology, and a map showing the eight landscape character areas identified through this study. Part 2 of the report contains descriptions for each landscape character area, including their location and context, a summary description, photographs, key characteristics, natural, cultural and perceptual qualities, forces for change and potential projects. Appendix A contains a list of acronyms used in the report, Appendix B contains references and sources of further information, and Appendix C contains a technical methodology.

1.3 Location

1.3.1 The IoAHC Landscape Partnership Scheme is located in the Humberhead Levels (See fig. 1). It includes parishes in North Lincolnshire and Doncaster Metropolitan Borough areas, with the historic county boundary between Lincolnshire and Yorkshire running through the middle. A small part in the north-west of the IoAHC area is within the East Riding of Yorkshire, and a small area in the south is in Nottinghamshire. The IoAHC area extends as far as the river Trent in the east, and the M18 in the west. It encompasses the ecologically-rich raised mires of Thorne and Hatfield Moors, the raised ground of the Isle of Axholme, and extensive surrounding areas of flat alluvial farmland which has been drained and improved over several centuries. The largest settlements within the IoAHC area are Thorne, Keadby, Epworth, Crowle and Haxey. There are also a number of smaller villages. The M180 runs east-west across the IoAHC area.

1.3.2 At the time of writing this Landscape Character Assessment, the precise boundaries of the IoAHC Landscape Partnership Scheme had not been defined. The final LPS boundary will either follow or run inside the IoAHC study area shown on the maps in this document.

1.4 Landscape Context

- 1.4.1 The Isle of Axholme and Hatfield Chase contain landscapes which are nationally and internationally important ecologically, and as cultural landscapes. However, the area is not renowned nationally, or even regionally. Thorne and Hatfield Moors contain some of the largest expanses of raised bog habitats in Britain, but are less well known than other similar sites such as Chat Moss and Borth Bog. Hatfield Chase was the first area in Britain to be drained by the 17th Century Dutch engineer Cornelius Vermuyden. Vermuyden's subsequent and more famous English drainage schemes such as the Fens and the Somerset Levels utilised many of the lessons learnt through the drainage of Hatfield Chase. Through its historic and continued drainage, the area also has strong cultural connections with the Netherlands. The Isle of Axholme contains one of the most extensive surviving medieval strip field farming systems in England (and the social organisations needed to manage them), but is relatively unknown compared to other surviving strip field systems (Braunton and Laxton, for example) and is under threat. The Isle of Axholme's more well-known 'claim to fame' (albeit to a specialist audience) is as the birthplace of John Wesley, founder of the Methodist Church, who was born in Epworth Rectory.
- 1.4.2 Perhaps one of the reasons why the Isle of Axholme and Hatfield Chase are relatively unknown outside the local area is their peripheral position on the fringes of both Yorkshire and Lincolnshire. Topographical and historic socio-political factors also combine to create a sense of 'apartness' on the Isle of Axholme.
- 1.4.3 This Landscape Partnership scheme therefore offers a unique and valuable opportunity to raise awareness of the area's important ecological and cultural landscapes; to engage local people with the rich and varied landscapes on their doorstep, and to raise the area's profile at a national level so that its landscapes can be understood and appreciated more widely, and recognised in their national landscape context.



Hatfield Moors



Wind pump, Candy farm



Strip fields, Isle of Axholme

1.5 European and legislative context

1.5.1 The European Landscape Convention

The European Landscape Convention (ratified by the UK in 2006) defines 'landscape' as *An area, as perceived by people, whose character is the result of the action and interaction of natural and human factors*. An holistic approach to landscape is a key principle of the thinking behind the European Landscape Convention, which acknowledges:

- That landscape has an important public interest role in the cultural, ecological, environmental and social fields, and constitutes a resource favourable to economic activity...
- That landscape contributes to the formation of local cultures...

- That the landscape is an important part of the quality of life for people everywhere: in urban areas and in the countryside, in degraded areas as well as in areas of high quality.
- That developments... planning... and infrastructure... are in many cases accelerating the transformation of landscapes.
- That the landscape is a key element of individual and social wellbeing and that its protection, management and planning entail rights and responsibilities for everyone...

1.5.2 *Natura 2000*

Special Protection Areas are sites that link to the *European Network of protected Natura 2000*, meaning that these sites have not only significant wildlife value nationally but are also significantly and strategically important across Europe. Thorne and Hatfield Moors are designated Special Protection Areas, and legal requirements for their protection are defined in accordance with Regulation 13 of the Conservation of Habitats and Species Regulations 2010. Thorne and Hatfield Moors are also designated Special Areas of Conservation, Sites of Special Scientific Interest and National Nature Reserves.

1.5.3 *Water framework directive (WFD)*

The *EU Water Framework Directive (2000)* requires the preparation of strategic plans for water management on a catchment scale. The Management Plan for the Humber River Basin District covers the IoAHC area. It focuses on the protection, improvement and sustainable use of the water environment, and provides a co-ordinated approach to protection and improvement of the water environment for the benefit of people and wildlife.

1.5.4 *Nature Improvement Area*

The Humberhead Levels Nature Improvement Area (NIA) includes parts of Yorkshire and Humber, Lincolnshire and Nottinghamshire. Its aim is to deliver a more connected environment for people and wildlife and a more valued and robust natural environment. It is based around key areas of the inner section of the river Humber, and the mosaic of sites clustered around the Humberhead Levels National Nature Reserve (the UK's largest lowland raised mire system, which includes Thorne and Hatfield Moors).



Active management of vegetation on Thorne Moor

2.0 THE STORY OF THE IoAHC LANDSCAPE

2.1 Geology and geomorphology

- 2.1.1 The bedrock underlying the IoAHC area was laid down during the Triassic period (approx. 250-200 million years ago). The western half of the area is underlain by Sherwood sandstones and the eastern half by Mercia mudstones. In today's landscape, the most obvious feature of these solid rocks is the band of more resistant mudstone containing gypsum (known as the Claborough Beds) which forms the Isle of Axholme. This relatively resistant rock was not eroded as much as the surrounding rocks, and so forms an area of higher land. The gypsum was known locally as 'chicken chalk', and was used as a fertiliser, soil sweetener (it is an agent in fixing ammonia, and therefore reduced bad smells in stables, cowsheds etc.) and as a building material. The gypsum found on the Isle of Axholme is of relatively poor quality and therefore not used as building material where strength was required, but it was ideal for flooring and non-load-bearing work, especially as it was fire and vermin proof, odour-free and cheap. John Leland describes the gypsum on the Isle in Vol. 1 of his 'Itinerary' (1535-43): *The upper part of the Isle hath plentiful quarries of alabaster, communely caullid plaster...ly yn the ground lyke a smothe table; and be bedded one flake under another; and at the bottom of the beddes of them be roughe stones to build withal.*
- 2.1.2 Much of the character and variation in today's landscape derives from the overlying drift geology, i.e. the deposits and soils which were laid down by a variety of processes in the more recent past. At the end of the last glaciation (approx. 11,500 years ago), water trapped by glaciers created Lake Humber, which extended from near York in the north to Nottingham in the south. Areas of raised ground (such as the Isle of Axholme) formed islands within this lake. At the bottom of Lake Humber, layers of fine clay particles (known as lacustrine clays) were deposited, up to 20m thick. Once the ice impounding the lake had melted, the lake drained. Windblown sand was deposited on parts of its surface (above the clay), and in places also collected against areas of raised ground such as the Isle of Axholme. Today these areas are often characterised by free-draining sandy soils.
- 2.1.3 During early post-glacial times, a warmer and relatively dry climate enabled the growth of thick vegetation and widespread woodland. However, as sea levels began to rise, lower-lying coastal areas were flooded by the sea, and rivers started to deposit alluvial clay soils in their floodplains. A combination of wetter climatic conditions, poorly-draining soils and waterlogging (initially with alkaline groundwater) caused a deep layer of fen peat to form. In places (e.g. Thorne and Hatfield Moors) continued growth of the peat above the groundwater level allowed the development of raised mires. The area's many bog oaks provide evidence for a buried forest near the base of the peat. These can still be found in places today, and in 1662, local peasants were recorded as removing 2000 cart loads of buried timber.
- 2.1.4 In areas where peatland soils do not occur (e.g. along the Trent Valley), alluvial drift has given rise to fertile silty soils. At times of flood, further fertile alluvial material is deposited in the floodplain. This has occurred extensively within the floodplain of the Trent, and to a lesser extent along smaller rivers such as the Torne.

2.2 Early inhabitants

- 2.2.1 Sediment and pollen analysis indicates that between c.8000-c.4000BC the area contained meandering rivers in incised channels surrounded by areas of drier ground, with forests of pine and birch on the lighter sandy soils, and oak and elm on the heavier clay soils. Archaeological evidence for human occupation during the Mesolithic period is extensive, comprising scatters of flint flakes, often located in association with watercourses (for example the old river Don east of Thorne Moors, and the river Torne south of Hatfield Moors). Worked flint of this period has also been found on the old ground surface where the overlying peat has been removed.
- 2.2.2 During the Neolithic and early Bronze Age periods (c.4000BC-c.1500BC) environmental conditions changed significantly, with rising sea levels and increased rainfall creating the conditions for mire formation. The growing peat mire 'drowned' the earlier woodland but preserved it *in situ*. It has also preserved wetland archaeology from this period, including a Bronze Age timber trackway on Thorne Moor and a late Neolithic trackway leading to a timber platform on Hatfield Moor. Finds of worked flint from both periods are mainly confined to the high grounds of the Isle, although small scatters on the low grounds and the moors demonstrate human presence there, even as the peat began to form. A small circular cropmark at Beltoft may be a Neolithic hengiform monument. There is very limited evidence for Iron Age communities within the IoAHC area. The main evidence for settlement comes from sites and pottery scatters at Belton and Epworth, although some cropmarks at Sandtoft may be of Iron Age date.

2.3 The Roman period

- 2.3.1 Major Roman sites and roads lie just outside the study area: Doncaster (Danum) and Rossington to the west, and along Ermine Street to the east. Nevertheless it is likely that Roman influence would have been felt within the study area, and evidence has been found for a sizeable linear settlement along the Old Don river near Crowle, as well as a series of Roman finds on high land on the Isle of Axholme. A small Roman military site was excavated at Sandtoft in the 1970s.



Bog oaks near Hatfield Moor



Neolithic trackway, Hatfield Moor
(Chapman and Geary, 2013, p.137)



Runic stone, Crowle Church

2.4 The early medieval period

- 2.4.1 This period saw waves of settlement from Germanic and Scandinavian immigrants, including Anglo-Saxons (one of the earliest incoming peoples) and Vikings. The river Trent was used by armies, traders and settlers, and the range of influences on the area is shown in the place names. Old English names (implying Anglo-Saxon settlement) include Thorne, Idle, Wroot and Crowle. Other place names (e.g Hatfield and Owston) are a mixture of Old English and Scandinavian. Others, including Haxey, Axholme, Keadby, Sandtoft and Althorpe are likely to be Scandinavian in origin.

PART 1

There is relatively little archaeological evidence dating from this period, although an Early Saxon settlement site south of Belton was excavated in 1999. It is likely that the present-day pattern of villages and parishes was largely established by the 11th century.

- 2.4.2 The area was close to the border of the Anglo-Saxon kingdoms of Mercia (occupying the central part of England) and Northumberland (to the north of the Humber). Bede describes battles taking place in 617AD (near the river Idle), 633AD (at Hatfield) and 642AD (tenuously linked to the Isle of Axholme, but more likely Shropshire or Gloucestershire). In the latter battle, Oswald (King of Northumbria) was killed, and the churches at Crowle and Althorpe are both dedicated to St Oswald.

2.5 The medieval period

- 2.5.1 As mentioned above, most of the villages and parishes were in place by the 11th Century, and the majority of today's villages are recorded in the Domesday survey of 1086. Today's landscape and place names reveal many surviving features from the medieval period, including castles, churches, monastic sites, villages, farms and roads. Many of these sites represent the rise of increasingly powerful social, military and religious institutions.
- 2.5.2 The early medieval period saw the development of planned market towns at Epworth (by local landowning family the Mowbrays) and at Crowle (by the Abbot of Selby). The Mowbray family's seat was Kinaird Castle at Owston Ferry, although they also had a house at Epworth. Kinaird Castle (a Scheduled Monument) was a motte and bailey castle located above the river Trent, with excellent views across the river and surrounding levels. It was destroyed in the revolt against Henry II in 1147. A further motte and bailey castle (also Scheduled) is located at Peel Hill, Thorne. The tower of this castle was still standing in 1534, when it was used as a prison, and it may have been a smaller version of Conisborough Keep. Like Conisborough, it was held by the De Warenne family, and is one of a group of castles commanding the Don valley.
- 2.5.3 Many medieval churches survive within the area, including the Norman church at Crowle. The site of a monastery founded by the Mowbray family at Melwood is a Scheduled Monument, and one farm building has medieval origins. Other sites with religious associations include Hirst Priory (south of Crowle) and a Camera of the Knights Templar at Temple Belwood. Following the dissolution of the monasteries, these sites became country houses in landscaped grounds. Modern maps show many 'Grange Farms', which were formerly associated with monastic/church lands. In the 12th century, Selby Abbey and St Mary's Abbey in York became major landowners in the northern part of the Isle of Axholme and the surrounding marshland, and the Abbot of Selby established Crowle as a market town.
- 2.5.4 Transport in medieval times would have been along the ridge-top roads (for example the route of today's A161 which runs north-south through the Isle of Axholme) and also by boat. The Trent was a major waterway used by sailing vessels, but smaller boats would also have been used on smaller rivers such as the Torne and the Idle.



Motte of Peel Castle, Thorne



*Melwood Priory,
painted by Karl
Wood, early C.20th*



*Possible painting of Royal Hunt, probably
on Thorne Mere, 1609, artist unknown.
(Cory, 1985, frontispiece)*

- 2.5.5 Within the landscape there are also traces of the different land uses and patterns of agricultural husbandry which developed in different parts of the area, described in more detail below.

The Isle of Axholme

- 2.5.6 On the Isle of Axholme, an agricultural economy developed, with meat, dairy produce, leather, wheat and hemp as its main products. Vegetables, pulses, and oats were also grown. Efficient traditional land uses utilised fertile upland soils for arable production, and lower land for pasture. In common with other parts of England at this time, land in the fields around the villages was allocated in strips, with each farmer allocated strips in different fields. This ensured the fair division of the best and worst land, and of land suitable for different crops. Very unusually, this system has survived on the Isle of Axholme up to the present day, and many fields still display characteristic stripes in their cropping patterns. Some strip fields also survive alongside the bank of the Trent. Hemp and flax provided raw materials for a thriving linen, canvas and sack-making industry, and canvas and sack-making were important additional incomes for peasant families in the early 16th Century.
- 2.5.7 The extensive areas of common land were generally on the lower ground, and much of it was underwater during the winter months. However, this was seen as a positive thing by the local people, who described the ‘thick, fatt water’ which fertilised the land and made it capable of supporting large numbers of cattle, sheep and pigs in the summer months. As well as using common land for grazing, commoners also had fishing and fowling rights, and were allowed to take turves (cut peat) and wood for fuel and building.
- 2.5.8 From the medieval period onwards, small-scale enclosure of land took place, often around the edges of settlements. These fields may have originated as back gardens or paddocks for stock, or as land taken from the edges of the commons, or (occasionally), enclosed strips from larger open fields. The end result (still seen today) is a landscape of small-scale hedged fields, often irregular in shape, which is generally seen on elevated land around settlements. It is described in the Historic Landscape Characterisation as ‘Early Enclosed Land’, although it actually encompasses land enclosed in a piecemeal way over many centuries.

Hatfield Chase

- 2.5.9 A chase was unenclosed parkland used for hunting animals (usually deer). Hatfield Chase was initially in private ownership, but became a royal hunting forest from 1374 until 1629. At its peak it

was the largest deer park in England, covering 72,850ha. It extended from the river Don at Thorpe-in-Balne in the west (outside the IoAHC Partnership area) to the edge of the Isle of Axholme in the east. It included Thorne and Hatfield Moors, plus the surrounding land. Half the area was wetland-described as ‘meres and marshland’, and the winter flooding ensured good supplies of wildfowl to hunt. The three large meres included Thorne Mere (south west of Thorne village); Tudworth Mere (south of Thorne village) and Messic Mere (between Hatfield moor and Epworth). All these meres, and most of the surrounding land, have subsequently been drained, and no obvious traces remain in today’s landscape.

- 2.5.10 Major hunts were infrequent, but in 1541, 200 deer were killed in a single day. The last recorded royal hunt took place in 1609. Deer were rounded up and driven towards a mere, where the hunting party waited in over 100 boats. The antlers of the deer sticking above the water were described as representing a small floating wood. The hunters then moved their boats into the herd, killing the animals of their choice. According to a contemporary diary, a Dutch drainage engineer was one of the hunting party. In the 1620s the deer were moved elsewhere to accommodate Vermuyden’s drainage works, and Hatfield Chase was disafforested (ceased to be a hunting forest) in 1629.

The Moors

- 2.5.11 In medieval times, Thorne and Crowle Moors (and the land to the north) were known as Inclesmoor, and were shared by several parishes. As on Hatfield Moors, commoners could use the moors for rough grazing and small-scale extraction of peat. Modern maps show ‘Inkle Moors’ north-east of Moorends, and this area may be one of the oldest relics of original peat land.

2.6 Post-medieval drainage of Hatfield Chase

- 2.6.1 In 1626, the Dutch Engineer Cornelius Vermuyden was commissioned to undertake drainage of the Hatfield Chase basin to the west of the Isle of Axholme. The project was a speculative one, in which Vermuyden and his fellow 56 ‘Participants’ raised capital through loans which they intended to repay through the increased agricultural productivity of the land. The ‘Participants Lands’ to be drained and put into arable use included part of the former Royal Forest, and parts of the common lands of adjacent villages. For this reason the scheme was very unpopular with local people. Vermuyden’s ‘headquarters’ for the scheme was at Sandtoft (then an island in the old river Idle). The site included 200 houses for the Dutch, Flemish and French workers, and both materials and workers could be brought by boat from the Netherlands via the Humber and the Aire.
- 2.6.2 Vermuyden’s scheme for drainage relied on gravity rather than pumping. However, the Trent’s tides and high embankments created difficulties in discharging into the Trent at times of high tide. These difficulties were compounded by the flat landscape and lack of natural fall between the area to be drained and the river Trent. Vermuyden’s solution was to intercept the area’s existing rivers, and divert them to points where continuous discharge into the Trent/ Aire was more reliable: The river Idle was diverted at ‘Idle Stop’, and probably discharged into the Trent at West Stockwith; the eastern arm of the river Don was blocked, and water diverted north into the river Aire, and the river Torne (together with the waters of the central marshy area) were diverted via new watercourses to discharge into the Trent at Althorpe.

- 2.6.3 The impacts on the landscape of the scheme were huge, and can still be seen today. Rivers which had previously run in sinuous courses now ran straight between high banks. Areas of former lakes, marshland and unenclosed common pasture were replaced by regularly-shaped fields. Ruler-straight roads replaced winding tracks following higher land. The works were completed within 18 months, but were not entirely satisfactory due to the lack of gradient on the main channels, and the lack of floodwater storage areas. Disputes with local people (particularly regarding the loss of common pasture, and the flooding of previously dry areas) lasted for many years and caused much social unrest.

2.7 1750-1900

- 2.7.1 This period saw huge changes in levels of industrialisation, and accompanying social and agricultural change. These all impacted on the landscape of the IoAHC which we see today.

Enclosure of common land

- 2.7.2 Between 1750 -1850, common land in all parishes within the IoAHC area was enclosed by Act of Parliament. Surveyors divided previously common land into rectilinear fields which were apportioned to individual land owners. Because of the low-lying and seasonally-flooded nature of much of the common land, enclosure also required significant drainage works. The resulting landscape of rectilinear fields, straight roads and drainage ditches is not dissimilar to that created by the Dutch engineers over 100 years earlier. It is therefore also categorised as ‘Recently Enclosed Land’ within the Historic Landscape Characterisation.
- 2.7.3 Isolated farms were constructed on the newly-enclosed land, often located on slightly raised ground, and with names like ‘Newlands Farm’ and ‘Common Farm’. These farms are usually constructed in the local vernacular style using red brick and pantiles. Many contemporary farm buildings also survive from this period, although some are falling into disrepair.



The new river Torne near Tunnel Pits



Epworth Turbary, now a nature reserve



The Warpings, Crowle Common

Turbaries

- 2.7.4 Following parliamentary enclosure of common lands, parishes on the Isle of Axholme were allocated 'turbaries' as compensation for loss of traditional common rights. They comprised the poorest quality land and were to be used for obtaining 'land, soil, earth, peat, turves, sand, whins or sods' within strict limits. From the 19th Century, small plots of land on the turbaries were rented out cheaply to the poor of the parish, who constructed small cottages and used the land for smallholding or market gardening. This resulted in a distinctive settlement type characterised by small vernacular cottages set in small plots of land. Other parts of the turbaries remained unsettled but became gradually overgrown as the need for peat cutting ceased. Several are now nature reserves, with a similar character to the larger moors.

Warping

- 2.7.5 Warping is a process of improving agricultural land through the application of fertile silt. Sediment-rich river water is diverted onto fields at high tide using a system of drainage channels, and the sediment is allowed to settle. Earth banks around the area to be warped, and a network of drainage ditches, ensure that the water is returned to the river at the end of the process. Following warping, the ground level could be raised by up to 1m. Where it was not possible to flood the land in this way, alluvium was spread manually in a process known as 'cart warping'.
- 2.7.6 By 1850, all the peat lands within 5km west of the river Trent had been warped. The process was often undertaken in conjunction with the enclosure of land, and warping drains were constructed to enable the movement of sediment-rich water to where it was needed. Existing river channels were also used for warping purposes. Today's maps still show many references to warping: 'Swinefleet Warping Drain'; 'The Warpings'; 'Warp Farm' etc. However, its greatest legacy in the landscape is the productivity of the soils for arable agriculture; today much of the area is grade 1 or 2 agricultural land and capable of intensive cultivation.

Moorland allotments

- 2.7.7 A distinctive field pattern can be seen in the landscape surrounding Thorne Moors, comprising long, narrow strips which extend from a road back towards the moors and are known as 'The Cables'. Farmhouses are generally situated along the road, at the front of each plot. These areas are described in the Historic Landscape Characterisation as 'Moorland allotments'. Following the disafforestation of Hatfield Chase, it is likely that inhabitants with commoners' rights laid out narrow plots into the moors (which had been left unimproved by Vermuyden's drainage works). They cut the turf for sale (working backwards towards the centre of the moors) and farmed the land exposed by the peat cutting. This process of land use is unique to the Humberhead levels. Good examples can be seen at Ribbon Row (Crowle Moor, on the eastern side of Thorne Moor) and Moor Edges Road, east of Thorne village.

Duck Decoys

- 2.7.8 From the 17th Century, ducks and other wildfowl were trapped in special ponds called decoys. The ponds consisted of a central circular area, with between 2-8 flooded 'arms' radiating from it. The arms narrowed towards their ends and were covered by net tunnels. Dogs were used to entice the ducks along the arms, and the ducks' escape was prevented by the nets overhead. The ducks were gathered into the nets at the ends of the arms and killed. Several duck decoys are known to have existed within the IoAHC area, and can be seen on 19th Century maps.

Increase in population

- 2.7.9 During the 18th and 19th Centuries the population of the area (particularly on the Isle of Axholme) increased considerably, and much building took place. Timber-framed buildings were replaced with brick-and-tile, and the majority of the surviving vernacular buildings within the IoAHC area date from this period. In the late 19th Century, small numbers of new Dutch settlers came to work in the peat cutting industry. The terrace north of the railway line at Moorends is still known as ‘Dutch Terrace’.

Communications and industry

- 2.7.10 Up until this period, communications with the surrounding area were fairly poor, particularly as several rivers traditionally used for transport had been affected by Vermuyden’s drainage scheme. The construction of the Stainforth and Keadby Canal in 1792 linked the industrial areas of South Yorkshire with the river Trent and the Humber ports. The tidal lock at Keadby where the canal meets the Trent is now a Scheduled Monument. Keadby developed in the second half of the 19th Century as a port town, moving goods between canal, railway and the river Trent. In the west of the IoAHC area, the village of Thorne developed as a canal town, and ocean-going yachts were brought here for over-wintering and repair. The canal is still used today by recreational craft, and the traditional sailing barge ‘Spider T’ can be seen at Keadby.
- 2.7.11 The railway network in the area gradually expanded throughout the 19th Century to carry passengers and export agricultural produce. It reached its maximum extent in 1905, when all villages were within 3 miles of a station. Although most of the branch lines closed in the 1960s, sections of the Crowle-Haxey line are now a cycle route, and the bridges and embankments remain visible features in the landscape. The southern part of the line is also a Local Nature Reserve.
- 2.7.12 Roads on the Isle were improved relatively late (from the 1830s onwards), but there were no turnpikes within the IoAHC area.
- 2.7.13 The technological development which had the greatest impact on the IoAHC landscape was the introduction of steam-driven pumps. The first within the IoAHC area was installed at Butterwick South moor in 1837, and more quickly followed. Mechanical pumps (later replaced by diesel or electric power) enabled water to be lifted from drains into rivers flowing at a higher level and – more importantly - to be discharged into the Trent at all stages of the tide. Such pumping systems greatly reduced the frequency of floods and increased the reliability of arable crop yields.



Stainforth and Keadby Canal at Keadby, with sailing barge ‘Spider T’



Dirtiness Pumping Station and South Soak Drain



King George V lifting bridge, Keadby (constructed 1916)

2.8 The twentieth century onwards

- 2.8.1 The past 120 years or so have seen many further changes in the IoAHC landscape. Settlements of all types have increased in size, and housing estates have been constructed on the peripheries of many villages and market towns including Haxey, Epworth and Crowle. Smaller villages (such as Wroot) have seen modern houses infilled between older farms, and scattered modern houses (often large) occur throughout the area. The distinctive local vernacular style of the area has been eroded through many small changes to buildings, for example replacement of traditional wooden windows and doors with unsympathetic plastic ones, coating brick buildings in cement render, and replacing traditional clay pantiles with concrete roof tiles.
- 2.8.2 The largest settlement within the IoAHC area is Thorne. Thorne was still a small market and canal town in the 1920s, but expanded greatly in the mid-twentieth century following the opening of Thorne Mine at Moorends in 1925. Moorends village (with its associated community buildings and sports ground) was constructed to house mine workers. The colliery closed in the 1990s after several decades of problems, and its winding gear (which had been prominent in the flat landscape) was removed in 2002. Today, many buildings in Thorne town centre are in a poor state of repair, and the Conservation Area is under threat.
- 2.8.3 The coal-fired power station at Keadby was constructed in the mid-20th Century. The large building - and the pylon lines which converge on it- dominate the surrounding landscape. Within the past ten years, large windfarms have been constructed within the IoAHC area at Keadby and Tween Moors, and there are further turbines outside the IoAHC area. The turbines are exceptionally prominent within this flat landscape, and the concentration of windfarms in the area has resulted in significant cumulative impacts.
- 2.8.4 The combined road and rail lifting bridge at Keadby (The King George V Bridge) was constructed in 1916, and improved access to the new industrial town of Scunthorpe. It remains the lowest crossing point of the Trent. The M180 was constructed east-west across the area in the 1980s, connecting Scunthorpe and the east coast ports with the wider motorway network. The M180 runs on raised embankments for most of the way across the IoAHC area, and the associated bridges, planting, moving vehicles and noise have an impact on the landscape and perceptual qualities of the area. Associated with the motorway are industrial land uses and a large vehicle distribution depot on parts of the WW2 airfield at Sandtoft. Parts of the airfield are still in use.
- 2.8.5 Agricultural production of arable and vegetable crops has continued to intensify, with the most obvious landscape change being loss of hedgerows (resulting in a loss of landscape structure) in the areas of Early Enclosed Land located around the edges of settlements. Elsewhere, especially in open strip field areas, the landscape is traditionally open, without hedgerows or field trees. In these areas, the planting of hedgerows, or erection of other field boundaries such as fences, erodes the traditionally-open character of the landscape. Horse pasturing is a particular problem in this regard, especially where paddocks are demarcated in former strip fields. The surviving areas of strip fields (both on the Isle of Axholme and alongside the Trent) are relatively small today compared to their medieval extents. The perpetuation of traditional strip-field farming is dependent on the willingness of younger generations of farmers to follow the traditional methods, as well as the continuation of suitable agricultural grants (see also section 3.3).

- 2.8.6 Changes in agricultural practices (particularly amalgamation of holdings into larger farms) have resulted in the construction of many new large agricultural sheds which are often prominent in the landscape. Many traditional farm buildings which are no longer required for their original purpose have fallen into disrepair. The proportion of land used for horse pasture (with associated stables, fencing etc) has also increased in recent years.
- 2.8.7 Pumping has lowered the groundwater table and caused peaty soils to desiccate, resulting in a lowering of ground levels, and an increased risk of inundation by floodwater. The risk of flooding in these low-lying areas is compounded by rising sea levels and climate change (See section 3.1). In the second half of the 20th Century, lowering of the groundwater table, combined with industrial-scale extraction of peat from Thorne and Hatfield moors (using milling machines), has resulted in the extensive loss of ecologically-rich raised bog and heathland habitats. Peat extraction has now ceased, and today the areas are in positive management to restore their raised mire habitats.
- 2.8.8 Other extractive industries in the area included clay pits on the Isle of Axholme (associated with brick and tile manufacture) and sand and gravel quarries (generally in lower-lying areas). Some of the sand extraction quarries are still in operation, whilst others are now flooded and have become fisheries or nature reserves.
- 2.8.9 During the Second World War, airfields were constructed at Sandtoft (in the centre of the IoAHC area) and Lindholme (just to the west of the IoAHC area). Sandtoft airfield is still partially in use, although an industrial estate and vehicle distribution depot have been constructed on its northern part. The site of Lindholme airfield is now a prison.



Horse pasture and large houses on edge of village, Beltoft



Flooded aggregate extraction site, Haxey



Sandtoft airfield

2.9 Landscape Designations

2.9.1 Many of the sites described above have been designated as a result of their environmental or cultural value. Fig. 2 shows the sites designated at a national or international level, which are also set out in table 1 below.

<i>Environmental Designations</i>	
Special Protection Area (SPA)	Thorne and Hatfield Moors
Special Area of Conservation (SAC)	Thorne Moor
	Hatfield Moor
	Humber Estuary
Site of Special Scientific Interest (SSSI)	Thorne, Crowle and Goole Moors
	Hatfield Moors
	Epworth Turbary
	Hatfield Chase Ditches
	Haxey Turbary
	Haxey Grange Fen
	Belshaw
	Crowle Borrow Pits
	Humber Estuary
	Rush Furlong
	Hewson's Field
National Nature Reserve	Humberhead Peatlands
<i>Cultural Designations</i>	
Scheduled Monument	Keadby Lock
	Melwood Priory
	Kinaird Castle (Owston Ferry)
	Peel Hill Castle (Thorne)
	Market Cross (Haxey)
	Mowbray Cross (Haxey)
	The 'Hood Stone' (Haxey)

Table 1: Nationally and Internationally-designated sites within the IoAHC area

3.0 FUTURE THREATS AND FORCES FOR CHANGE IN THE LANDSCAPE

3.1 Introduction

3.1.1 Landscapes are dynamic, constantly changing as a result of natural processes and human influences. These processes of change are ongoing, and will continue to affect landscapes in the future. The themes identified below follow on from the recent forces for change described in section 2.0 above. They describe their possible implications on the IoAHC landscape and its associated environmental and cultural heritage. The text below provides a summary of the key themes across the IoAHC area; more place-specific detail is provided in the Landscape Character Area profiles in Part 2. It reflects the findings of existing Landscape Character Assessments and the Historic Landscape Characterisation, as well as other literature, and observations in the field.

3.2 Climate change and sea level rise

- 3.2.1 One of the potentially most serious and far-reaching forces for change in the landscape (but also one of the most difficult to accurately predict) is climate change. It is likely that climatic changes such as increased temperature and changes in weather patterns will affect the types of plant species able to grow, whilst increased storm events will also potentially leave trees and woodlands vulnerable to physical damage. Climate change may also increase the vulnerability of trees and other plants to pathogens and other diseases.
- 3.2.2 As demonstrated by the flooding of villages alongside the Trent, Ouse and Humber in December 2013, low-lying estuarine areas such as the IoAHC are particularly vulnerable to flooding, both from rivers (following heavy rain/ storm events) and from rising sea levels. The lowering of the ground surface through constant pumping of ground water exacerbates the risk of flooding and, potentially, leads to a risk of salinization of ground water due to contamination by salt water.
- 3.2.3 A programme of restoration and re-wetting the raised mires of Thorne and Hatfield Moors may help to ameliorate flood risk by enhancing capacity for water storage during wet periods. This is currently being discussed by a number of organisations, e.g. the River Catchment Area groups.

3.3 Agriculture and land management

3.3.2 The IoAHC contains unique examples of historic farming patterns, including the Isle of Axholme strip field systems, extensive former warplands, and the Moorland Allotments on the edges of the raised mires. Strip field farming is a joint exercise, and its perpetuation is dependent on collective social determination, and the willingness of younger generations of farmers to follow the traditional methods. Although this is one of the largest surviving strip field systems in the country, the extent of land farmed as strip fields today is smaller than in medieval times. Where strips survive in blocks (e.g. Belton Field) most original narrow strips have been amalgamated into wider landholdings, although their curving boundaries help to retain the medieval landscape character. The survival of the strip field system is also dependent on the availability of suitable agricultural grants. Narrow strips at Ellers Field, Low Burnham and High Burnham (as photographed for this report) are mainly recent recreations, sustained by Higher Level Stewardship payments from a Special Project which has now ceased. Their future existence therefore hangs in the balance.

- 3.3.3 A new system of agricultural grants known as the *Countryside Stewardship Scheme* will be introduced in 2016, to replace the Environmental Stewardship Scheme. Changes in the categories of supported projects, and in the eligibilities of sites for funding are likely to have implications on the future management of the landscape.
- 3.3.4 After decades of neglect and damage from commercial peat cutting, we are now at the start of a positive era of nature conservation management of raised mire and peatland sites, supported by NIA, WFD and other schemes mentioned in section 1.5. Positive management includes establishing a mosaic of habitats, re-wetting abandoned peat workings to encourage the re-growth of raised mire, and encouraging public access and education.

3.4 Energy and infrastructure

- 3.4.1 As described above, the IoAHC area has a long history of exploitation for energy: peat, coal (from the early 20th Century) and now wind, with associated electricity transmission lines. It is likely that exploitation of the area's energy resources will continue in the future, with potential further cumulative impacts. Because of the flat landscape and long views, schemes outside the IoAHC area can still have a relatively large impact. Proposed solar farms in the area would also introduce new elements into the landscape.

3.5 Buildings and development

- 3.5.1 Development pressure on towns and villages is likely to continue, resulting in increased settlement sizes, and infill between existing buildings. It is important that any settlement expansion occurs sensitively and with regard to the settlements' landscape context.
- 3.5.2 The historic built environment remains under threat, partly because its importance may not always be appreciated. Erosion of the local vernacular building styles remains a risk due to insensitive modernisation of historic buildings. In Thorne, the long-term neglect of buildings within the town centre Conservation Area has led to calls for their demolition. Thorne and Crowle Conservation Areas are both listed on English Heritage's *Buildings at Risk Register 2014*. The Register describes the condition of both as 'very bad', but the trend in Crowle is 'improving', whereas Thorne is 'deteriorating'. Within the IoAHC there are also many examples of abandoned traditional farm buildings, which will be lost unless alternative viable uses can be found for them.



Wind farm and power lines, Keadby



Neglected buildings in Thorne Conservation Area



Abandoned traditional farm buildings, East Lound

4.0 LOCAL PEOPLE AND THE LANDSCAPE

4.1 Landscape-related traditions

- 4.1.1 The IoAHC contains unique traditions of work and play which connect groups of local people with their landscapes. The most well-known of these is the perpetuation of the medieval strip-field farming system by farmers on the Isle of Axholme. The main area of strip field farming is spread across the parishes of Epworth, Belton and Haxey. The open strip field areas are arranged in two-to-four large fields for each parish. Each of these fields, which are farmed or pastured as a whole, are surrounded by hedges or ditches to prevent stock escaping. The fields are divided into strips (known as 'lands') and each farmer is allocated lands in the various fields. The process of allocation and the resolution of disputes are undertaken (as they have been since medieval times) by locally-appointed 'reeves' or 'townsmen'. The boundaries of the strips are not usually marked by physical features but the resulting 'striped' appearance of the landscape is very distinctive. Areas of strip fields also occur alongside the river Trent, with particularly clear examples around West Butterwick.
- 4.1.2 Haxey Hood is a traditional rugby-style game played on 6th January each year in the fields between Haxey and Westfield. In the game a leather tube known as the 'sway' is passed between players to reach one of four pubs. It has been played for several hundred years, with traditional origins in the recreation of farm labourers' chase to retrieve and return the lost riding hood of Lady Mowbray (Lady of the Manor in the 1350s). It is a popular but fairly violent event, and anything in the path of the Sway is likely to be damaged or trampled- people, hedges, cars, or even the pub doors.
- 4.1.3 Older members of the community may remember other traditions which have left their mark on the landscape, such as warping, or the raising of the lifting bridge at Keadby to accommodate sailing ships on the Trent.

4.2 Results of community consultation

- 4.2.1 The *Audience and Community Development Strategy* prepared by Resources for Change in parallel with this Landscape Character Assessment provides detailed explanations of how local people use and relate to their surrounding landscapes, and provides suggestions for enhancing their engagement with the landscape.
- 4.2.2 In summary, the local people interviewed engage with the IoAHC landscape in a variety of ways. Walking (alone and with dogs) is popular, along with wildlife and bird watching, photography and sports such as jogging and cycling. People enjoy the views and the scenery, and amongst some respondents there was an awareness of the area's history of drainage and its historic connections, (for example with the river Trent).

4.2.3 Positive responses to the question ‘What words come to mind when you think of your local landscape?’ fell into three categories:

Physical features of the landscape	Landscape history and human interaction	Landscape character and people’s responses to it
<ul style="list-style-type: none"> • ‘Marshland area with unique geology, different types of soil leading to different cropping.’ • ‘A well-drained and farmed landscape’ • ‘Local fields and woods’ • ‘parks, moors’ • ‘I think of it as flat. I appreciate that the loA is not flat, in general its flat with bit of a hill’ 	<ul style="list-style-type: none"> • ‘Seventeenth century drainage, the land before and since. Now there are conflicting opinions, will it become free from flooding or not?’ • ‘History and rural’ • ‘Engineered environment’ • ‘Heavily managed water environment’ 	<ul style="list-style-type: none"> • ‘Flat with wonderful skylscapes - good cycling country.’ • ‘beautiful’ • ‘Peaceful’ • ‘Open sky’ • ‘Wild, flat, hidden, unknown’ • ‘Wildlife ‘ • ‘Flat, fields, pretty, nice trees’ • interesting wetlands’ • ‘A time to admire and relax’ • ‘Diverse: beautiful’ • ‘wet, muddy flood area’

Table 2: Positive responses to landscape expressed in community consultation

There were also a small number of negative responses, as follows:

- ‘Too many buildings everywhere’
- ‘Flat, littered with windmills and pylons’
- ‘Neglected, underdeveloped, lack of overall planning and cohesion, no easy-access database of accessible areas’

One comment encapsulates the character of the area and response to it:

- ‘I want to get across that it is all one, the drainage, the peat, the landscape is all one fit - not them against us - it is one story of a really interesting unique landscape - landscape scale drainage, peat winning, restoration and living in a wetter climate all bound together with people and communities - so people can have a feel about where they live and how important and unique it is’

5.0 POTENTIAL PROJECTS

5.1 Introduction

- 5.1.1 The IoAHC Landscape Partnership scheme potentially encompasses a very wide range of projects. This section refers only to projects relating to landscape and landscape archaeology, which have emerged through the process of preparation of this Landscape Character Assessment. Other reports (for example the *Audience and Community Development Strategy*) will contain additional potential projects. The Landscape Partnership will be able to select which projects to take forward.
- 5.1.2 The landscape-based projects described in this section have a variety of sources, including: issues raised in existing landscape character assessments and the Historic Landscape Characterisation; literature published by a variety of organisations, including conservation groups; lists of potential projects provided by the Steering Group, and original ideas stemming from our observations during fieldwork and research.
- 5.1.3 The general themes below provide a useful vision and categorisation for the landscape-based projects, but inevitably some projects will fall outside or overlap different themes. It is important that as many projects as possible are people-based, working with local communities to generate interest and pride in local landscapes. Some of the projects are practical whilst others (e.g. oral histories) are about building up pictures of how the area's landscapes have changed, and understanding its rich landscape history. Table 3 shows suggested landscape-based projects within the IoAHC. Where projects relate to a specific Landscape Character Area they are mentioned in the appropriate profile in Part 2.

5.2 Enhancing landscape character and sense of place

- 5.2.1 Within the IoAHC there are distinctive landscapes and buildings, and these projects are focussed on enhancing variations in landscape character and creating a stronger sense of place. For example, the 'Early Enclosed Lands' traditionally found around villages could be locations for projects to restore hedgerows and enclosure patterns (helping to screen intrusive development in the process). Other areas such as the Ancient Open Strip Fields could be the target of projects to keep the landscape open and in traditional management (for example through the encouragement of local understanding of the strip field farming system, and the necessary skills and organisations to perpetuate it). The turbaries, and the unique Moorland Allotment areas could also be the subject of a project to research, retain and enhance their distinctive history and features, and to encourage local awareness of the landscape history and pattern of these areas.
- 5.2.2 There are also potential projects based around the recording and restoration of distinctive historic buildings which make a strong contribution to the area's sense of place. These may be in towns, villages, or the open countryside. They could include (for example) the recording/ survey of historic farms and/ or vernacular buildings by trained local volunteers.

5.3 Landscape archaeology and landscape history-based projects

- 5.3.1 As described above, the IoAHC area has a rich landscape history spanning several millennia, and there is great potential to explore this history through Landscape Partnership projects. Potential projects cover the full chronology of the area: prehistoric trackways and bog oaks found in the Moors; research and management of medieval sites such as Kinaird Castle (Owston Ferry) and the

retting pits at Lound; post-medieval sites such as warping drains, canals, duck decoy sites; industrial heritage of transport and the peat industry, and projects to record landscape history within living memory (such as wartime airfields, and major floods). Projects could also focus on training in traditional landscape-related skills such as ploughing and reed cutting, and on the recording of family and village histories where these have a direct landscape connection.

5.4 Nature conservation-based landscape projects

- 5.4.1 These projects are likely to be centred on Thorne and Hatfield Moors, although there are other sites within the IoAHC area which would also benefit from conservation management, including (for example) turbaries, waterways and woodlands. It is likely that many of these projects would be undertaken in partnership with Natural England, Wildlife Trusts etc. to deliver positive management objectives for these sites such as the restoration of raised mire. There are also exciting opportunities to enhance public access to nature conservation sites and to increase local awareness of them.

5.5 Enabling people to explore and enjoy the landscapes on their doorstep

- 5.5.1 For long-term landscape benefits to be realised, it is vital that local people understand and appreciate the richness of the landscapes on their doorstep. However, in many parts of the IoAHC area, access into the landscape is poor, and often restricted to straight, fast roads with no footpaths. Projects should therefore encourage access into the countryside through routes (e.g. the Isle of Axholme greenway), circular walks from villages/ parking places, and possibly a 'trail' around the different landscape character areas within the IoAHC area. Ideally these would all be off-road, family friendly, and with suitable interpretation. Broad encompassing themes (e.g. 'drainage') could also be a good starting-point for wider projects across the IoAHC area. Existing sites such as nature reserves could also be a focus for access-related projects. Engaging local children through projects in schools could be a good way in to reach the wider community.

5.6 Landscape research and connections

- 5.5.2 Further projects could involve research into landscape-related topics (for example the work of locally-based artists, or archive research into the area's landscape history using tithe maps etc.). Public displays of the findings can further local people's interest and potentially encourage them to take up their own research. There is also potential to link with similar projects nationally and internationally, for example projects based around strip fields, wetlands or drained landscapes. Such links would help to raise the profile of the IoAHC area, and enable its significance to be more widely appreciated.



Derelict traditional cottage, Belton. An ideal subject for a building recording project.



Recently-constructed viewing platform, Hatfield Moors



West Butterwick windmill, by local artist Karl Wood, early C.20th. Note the chimney, and boat sails on the Trent.

<i>Area-wide projects</i>	
<ul style="list-style-type: none"> • Explore and explain different phases and methods of drainage. • Create a design guide for sensitive restoration/ modernisation of historic buildings. • Minimise further loss of vernacular buildings, finding suitable alternative uses for farm buildings which are no longer required for their original purposes. • Canal/ river-based projects. 	<ul style="list-style-type: none"> • Provide a series of landscape-based interpretation points so people can visit, learn about and explore the varied landscapes within the IoAHC. • Manage intensively-farmed land in a way which is sympathetic to wildlife, and encourage uptake of conservation-based management grants. • Celebrate the area's long industrial history and connections with the river Trent.
<i>The Moors and other wetland sites</i>	
<ul style="list-style-type: none"> • Positive management of the Moors and farmland. • Enhance the diversity of habitats including raised mire, and restore lagg fen habitats at the edges of the raised mire. • Investigate sites of duck decoys. • Develop projects related to prehistoric archaeology, bog oaks and the industrial archaeology of the peat industry. • Improve public access and extension of routes around the Moors, and provide additional interpretation. 	<ul style="list-style-type: none"> • Construct additional viewing towers. • Connect with other raised mire projects in the UK and further afield. • Conserve surviving distinctive turbarry cottages and smallholdings, and historic farm buildings. • Develop conservation-based projects at local nature reserves. • Enhance the conservation value of aggregate extraction and fisheries sites.
<i>Isle of Axholme</i>	
<ul style="list-style-type: none"> • Celebrate and retain histories and traditions of the strip fields, and connect with other places with similar surviving farming systems. • Retain / develop local landscape-related skills such as traditional ploughing. • Sensitive restoration/ management of hedgerows and field trees in areas of early enclosed land. • Conservation management plans for historic parkland estates. 	<ul style="list-style-type: none"> • Manage local SSSI sites, e.g. semi-improved grasslands and hay meadows. • Manage Owston Castle site. • Investigate sites and buildings associated with the local textile industry. • Projects relating to Haxey Hood. • Record and research historic village features. • Record vernacular buildings. • Circular walks from villages. • Isle of Axholme Greenway.
<i>Drained farmlands</i>	
<ul style="list-style-type: none"> • Manage waterways and ditches to retain their practical function and enhance their ecological value. • Provide parking places for people to stop and appreciate the landscape. • Improve access into the landscape, including circular walks from local villages. • Develop projects relating to warping drains and industrial heritage. 	<ul style="list-style-type: none"> • Celebrate and retain the surviving medieval strip field system alongside the Trent. • Research historic buildings. • Introduce interpretation describing how the landscape has been shaped by centuries of farmers, and work with farmers to develop further projects. • Connect with other drained landscapes, e.g. the Somerset Levels, or the Netherlands.
<i>Settlements</i>	
<ul style="list-style-type: none"> • Living landscape history projects, exploring village, family and oral histories. • Work with local communities to encourage them to visit and learn about local landscapes. • Restore derelict buildings and enhance the area's distinctive townscapes. 	<ul style="list-style-type: none"> • Put former Moorends colliery site into positive use, perhaps in conjunction with the adjacent National Nature Reserve. • Conservation and community-based projects around local nature reserves.

Table 3: Potential landscape-based projects (as at November 2014)

PART 2: LANDSCAPE CHARACTER ASSESSMENT

6.0 LANDSCAPE CHARACTER ASSESSMENT CONTEXT, METHODOLOGY AND RESULTS

6.1 What is landscape character assessment?

6.1.1 As mentioned in section 1.5 above, the European Landscape Convention describes 'landscape' as *an area, as perceived by people, whose character is the result of the action and interaction of natural and human factors*. This holistic approach encompasses natural landscape factors (e.g. geology, soils and ecology) cultural landscape factors (e.g. archaeology, settlement patterns, land uses etc.), and perceptual and aesthetic qualities of landscape (e.g. views, scale, and the feelings which the landscape evokes).

6.1.2 Landscape character can be described as a *distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse*. Landscape Character Assessment is a *tool for identifying and describing variation in landscape character*. It highlights the unique combination of elements and features which make each Landscape Character Area (LCA) distinctive, and also provides information to assist in the management of landscape change.

6.2 National landscape character context

At a national scale, the entire area is included within National Character Area 39: The Humberhead Levels. The key characteristics of the Humberhead Levels relevant to the IoAHC are:

- A low-lying, predominantly flat landscape, with large, regular and geometric arable fields without hedges but divided by ditches and dykes, many of which form important habitats and key corridors for species movement.
- Much of the land is at or below mean high-water mark and maintained by drainage, with fertile soils giving rise to one of the most productive areas for root crops and cereals.
- Variations in underlying deposits create differences within the overall flat farmed landscape, including lowland raised mires and lowland heathland, many of which are of international ecological and historical importance.
- Sandy deposits give rise to lowland heath, which in places supports remnant birch and oak woodlands, with some conifer plantations.
- Important historic landscapes include the Isle of Axholme, with evidence of mediaeval open fields, the warps (land enriched by regular silting) near Goole and cables (long thin strip fields) around Thorne. Widespread evidence of drainage history, in particular the extensive drainage from the 17th century, revealed through canalised rivers, dykes, old river courses, canals, bridges and pumping stations.
- Views to distant horizons are often long and unbroken, with big expansive skies, and vertical elements like water towers, power stations and wind turbines are very prominent.
- Floodplains, washlands and traditionally grazed alluvial flood meadows (or ings) associated with the major rivers and canals that cross the Levels give rise to important wetland habitats, supporting large numbers of wetland birds and wildfowl, especially over winter.
- The waterlogged soils hold internationally important archaeological and palaeo-archaeological deposits.

- Despite settlements, motorways and main roads, there is still a sense of remoteness to be experienced on the Levels, in particular on Thorne and Hatfield Moors and along the Lower Derwent Valley.

6.3 Existing Local Authority Landscape Character Assessments

6.3.1 The IoAHC area is currently covered by two existing Landscape Character Assessments:

- *North Lincolnshire Landscape Character Assessment and Guidelines* (Estelle Warren Landscape Architects, for North Lincolnshire District Council, 1999)
- *Doncaster Landscape Character and Capacity Assessment* (ECUS, 2007)

The two assessments were undertaken at different times, by different consultancies, and at different scales. There is a very abrupt line where they join at the County boundary. The North Lincolnshire Assessment was undertaken in 1999 and is now slightly out of date (for example it does not include any references to wind turbines within the IoAHC area). It has been undertaken at a greater level of detail than the Doncaster Assessment. Within the IoAHC area there are six landscape types (all with diffused boundaries) described within the North Lincolnshire Assessment, and three landscape types described within the Doncaster assessment. These are listed in the table 4 below.

<i>North Lincolnshire Landscape Character Assessment</i>	Flat drained farmland
	Flat drained treed farmland
	Flat open remote farmland
	Open island farmland
	Flat wooded farmland
	Industrial landscape
<i>Doncaster Landscape Character and Capacity Assessment</i>	Thorne and Hatfield peat moorland
	East Don and Dun River carrlands
	Blaxton to Stainforth sandland heaths and farmland

Table 4: Landscape Character Types from existing Landscape Character Assessments within the IoAHC area

6.3.2 For the purposes of this Landscape Character Assessment for the IoAHC Landscape Partnership, it was necessary to assess the whole Landscape Partnership area at a consistent and appropriate scale, and to make the assessment seamless across the County boundary. Because of the lack of consistency between the previous assessments, it was not considered appropriate to re-use their boundaries. However, the existing assessments were referenced during the preparation of this study, and this assessment should complement them, providing additional detail and bringing them up to date where necessary. To aid compatibility between this study and existing landscape character assessments, a table is provided in each LCA profile showing which previously-identified landscape character types are present.

6.4 Methodology

6.4.1 The methodology for this landscape character assessment is in line with current best practice guidance: *Landscape Character Assessment Guidance for England and Scotland* (Countryside Agency and Scottish Natural Heritage, 2002). The process of preparing this landscape character assessment has three key phases, as follows:

6.4.2 Desk Study

This stage involved the gathering and review of a wide variety of data sets and other sources of information, including GIS data sets, books, leaflets, historic maps, aerial photographs, information on designations, and web-based information. Key references consulted were the Isle of Axholme Historic Landscape Characterisation (Keith Miller for the Countryside Commission, 1997) and the existing Landscape Character Assessments for North Lincolnshire and Doncaster Local Authority Areas described above.

6.4.3 The IoAHC study area was initially sub-divided into a series of *Land Description Units* (LDUs). LDUs are distinct and relatively homogenous units of land which define and describe the natural (physiography and ground type) and cultural (landcover and settlement) dimensions of the landscape. GIS-based maps showing geology, landform, soils, landcover and historic patterns were used to produce LDU maps for the study area. A detailed methodology for LDU mapping is provided in Appendix C. The LDUs were used to generate landscape types within the IoAHC study area (mapped at 1:25,000 scale), shown on Fig. 3. These then formed a basis for the process of identifying draft Landscape Character Areas.

6.4.4 Fieldwork

A week was spent on site in the IoAHC area, enabling the consultants to get a good feel for the area's landscapes and sense of place. During the fieldwork the draft LCA boundaries identified during the desk study stage were checked and amended as necessary. Features and sites of historic or conservation interest were visited, and a photographic record taken of the landscape. Also recorded during the fieldwork stage were notes on landscape condition, forces for change, perceptual qualities of the landscape, and potential landscape-based Landscape Partnership projects.

6.4.5 Writing up and Consultation

The writing-up stage of the landscape character assessment involved capturing the essence of the landscape and its development through text, maps and photographs. Members of the IoAHC Steering Group were consulted on the draft report, and their comments were incorporated into the final report.

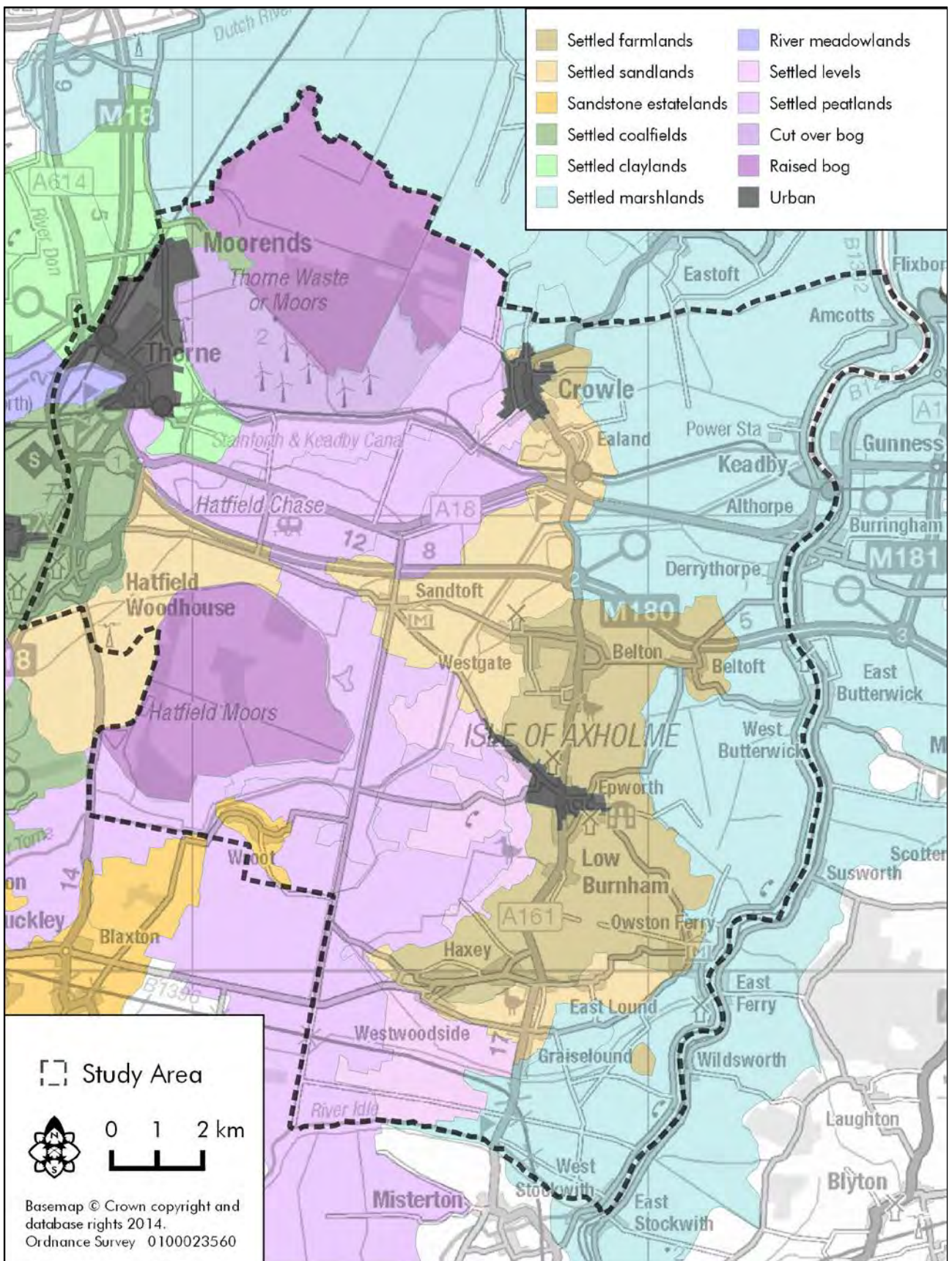


Fig. 3: Landscape Types within the IoAHC study area

6.5 Landscape character areas identified in this study

6.5.1 Following the process outlined above, eight Landscape Character Areas were identified within the IoAHC area, as follows:

LCA 1	Thorne and Crowle Moors
LCA 2:	Hatfield Moors
LCA 3:	Hatfield Chase Levels
LCA 4:	Isle of Axholme North
LCA 5:	Isle of Axholme South
LCA 6:	Trentside North
LCA 7:	Trentside South
LCA 8:	Thorne and Moorends

6.5.2 These LCAs are shown on fig. 4. It is important to note that although the map shows clear boundaries between the LCAs, in reality there is generally a gradual transition in character between LCAs. This is particularly true for the IoAHC area because of the subtlety of the landscape, and the gradual variations in topography, tree cover, field patterns, soils, views and land uses which create the variations in landscape character.

6.5.3 Part 2 of this Landscape Character Assessment comprises a series of profiles, one for each of the LCAs identified. Each profile covers the following sections:

- Parishes within the LCA
- Location and context
- Summary description
- Key characteristics
- Representative photo
- Landscape types identified within existing assessments
- Natural influences and sites
- Cultural influences and sites
- Visual and perceptual qualities
- Threats and Forces for change in the landscape
- Project opportunities

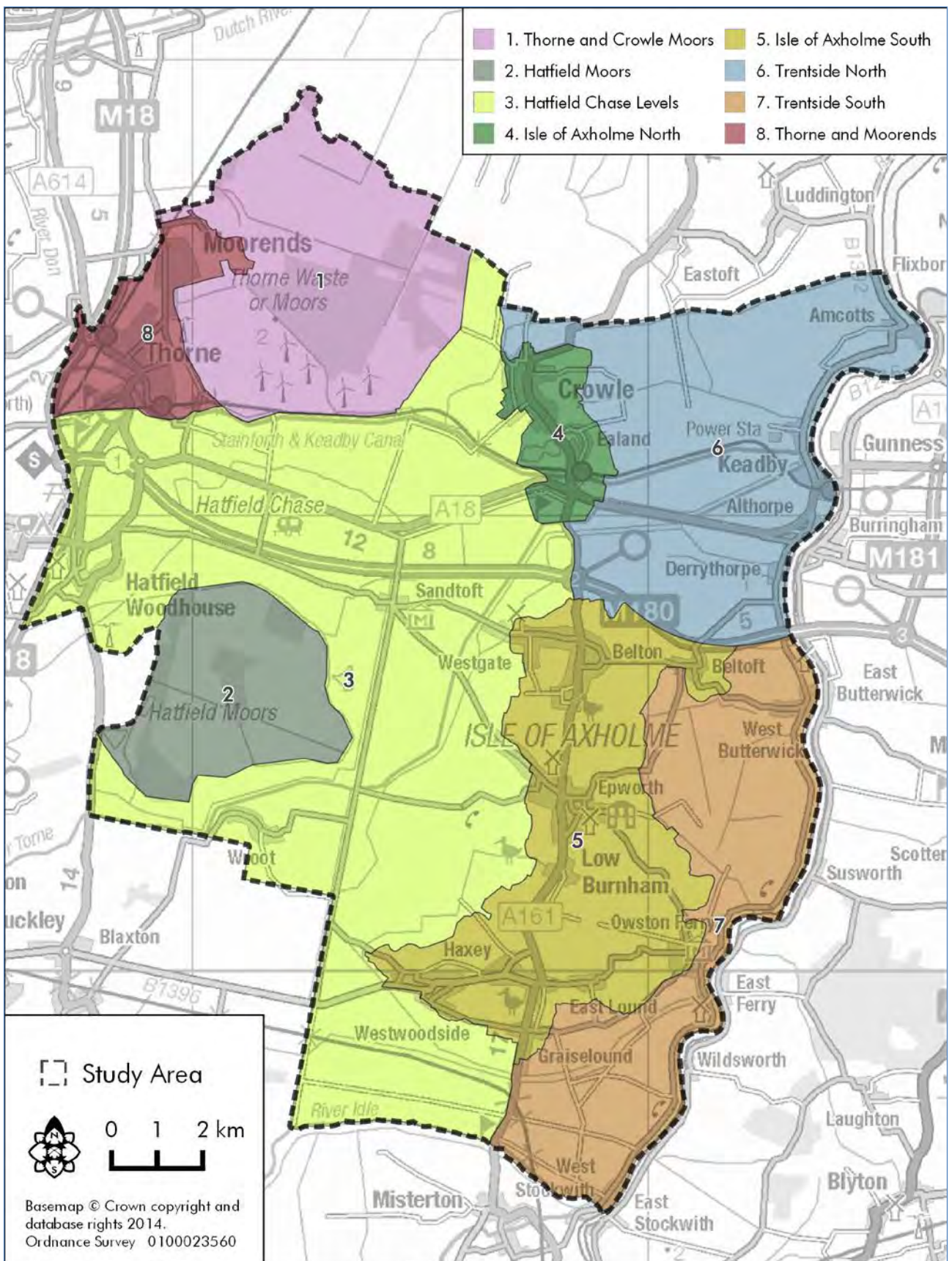


Fig. 4: Landscape Character Areas within the IoAHC study area

LANDSCAPE CHARACTER AREA 1: Thorne and Crowle Moors

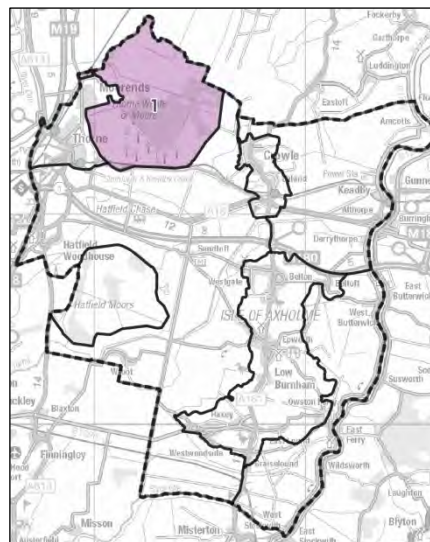
Parishes within this LCA:

Goole Fields, Rawcliffe, Snaith and Cowick, Thorne

Description

Location and Context

This LCA is located in the north-west of the IoAHC area. It includes the raised bog of Thorne, Crowle and Goole Moors, and the 'moorland allotments' around the periphery. Its northern boundary follows the IoAHC study area. Its eastern and southern boundaries follow watercourses marking the edge of the 'moorland allotments', namely the 'Moor Middle Drain' to the east, and the Stainforth and Keadby canal to the south. Beyond these is the *Hatfield Chase Levels LCA*. To the west is *Thorne and Moorends LCA*.



Summary Description

This LCA contains the extensive raised bog landscape of Thorne Moor, Crowle Moor and Goole Moor, together with surrounding areas of former moorland which are now farmland. The Moors (a National Nature Reserve, internationally-designated for their important raised bog habitats) contains areas of stripped peat, open wet heath, fen meadow, willow and birch scrub, mature woodland, reed-fringed dykes and small pockets of open water and growing mire. Together with Hatfield Moors to the south, it is one of the largest lowland raised bogs in Britain. Although today it feels remote, peaceful and largely inaccessible, Thorne Moors has been exploited for peat at least since the medieval period.

Approximately half of Thorne Moors is re-grown abandoned peat workings, criss-crossed by drainage ditches. In the 1960s, a network of railway lines ran through the Moors to aid peat extraction, and these can still be seen as clinker paths. The adjacent colliery (in LCA 8) was developed in the early twentieth century. Today, peat and coal extraction have ceased, and the colliery land is abandoned, gradually reverting to a vegetated state. A new form of energy production now takes place in the LCA in the form of the Tween Bridge windfarm, which is visually prominent over much of the area.

Settlement is very limited within the LCA, but to the east of Thorne a rare historic settlement pattern survives in the form of the 'Moorland Allotments'; a series of linear farms with land stretching back towards the Moors.

Landscape character types identified in existing Landscape Character Assessments located within this LCA

North Lincolnshire	N/A
Doncaster	<i>Thorne and Hatfield Peat Moorlands</i>

Key Characteristics

- Underlying geology of Sherwood sandstones, overlain by clays, sandy deposits and peat mire.
- Flat landform. The natural dome shape of the raised mire has been reduced by peat extraction.
- Stainforth-Keadby canal runs along the southern edge of the LCA. A network of ditches and dykes run through the LCA, and parallel ditches separate the moorland allotments.
- Land use includes a mixture of raised mire and heathland habitats, farmland and wind farm.
- 'Compartments' within the Moors, and Moorland Allotments on the peripheries, are divided by straight ditches.
- Wide range of semi-natural habitats, including raised mire, scraped peat, wet and dry heathland, woodland and open water. Designated nationally and internationally for its nature conservation value, and managed as National Nature Reserve.
- Trees and woodland densest around the southern and eastern parts of the Moors.
- Historic features include unique Moorland Allotments, sites of duck decoys, and remains of centuries of peat extraction.
- Buried archaeology includes Bronze Age trackway and a rich palaeo-environmental research resource.
- No roads within the Moors, although there are cinder paths of former railway lines. Settlement limited to linear farms associated with peripheral Moorland Allotments.
- A rich and seasonally-changing mosaic of habitats, with a wide range of colours, patterns and textures.
- Within the Moors, the landscape has a sense of wildness, remoteness and tranquillity, but this is reduced when nearby wind turbines are visible.



View east from viewing tower across former peat workings on Thorne Moor

Natural influences and sites

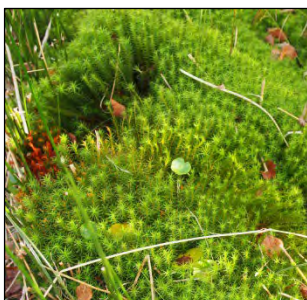
- Development of dome-shaped raised peat mire, which rises and falls as it absorbs water.
- Growing raised mire inundated existing trees and preserved them *in situ*, revealed today as bog oaks. It also preserved pollen and other environmental data, enabling building of an understanding of past environments and a picture of how the mire developed, although peat extraction has resulted in a loss of some environmental data.
- Natural variations in environmental conditions, historic variations in peat extraction methods, and processes of re-colonisation of areas worked for peat, have led to a rich mosaic of vegetation and habitat types.
- Designated nationally (Site of Special Scientific Interest) and internationally (Special Protection Area and Special Area of Conservation) for its ecological importance: raised mire, wetland, heath and woodland habitats, and associated species.
- Part of one of the largest areas of surviving lowland raised mire in Britain.
- Together with Hatfield Moors, Thorne Moors is home to 5000 species of insects (including 250 nationally rare species and six species known in no other sites). 250 bird species have been recorded, and many plants, including insectivorous round-leaved sundew.
- Part of the Humberhead Levels National Nature Reserve, with a limited number of paths (including the Peatlands Way), a central elevated viewing tower, and permissive access over most of the area.

Cultural influences and sites

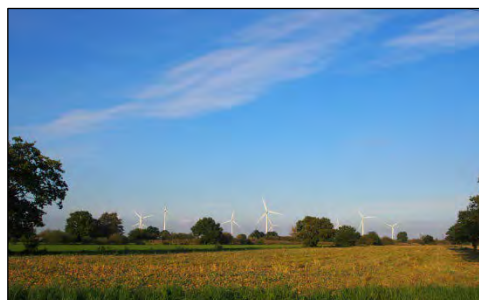
- Mesolithic flint has been collected from areas where the peat has been removed, including two rare tranche axes from the Nun Moors area.
- Neolithic worked flint and a polished axe have been found in the same area.
- Wetland archaeology includes a mid- late Bronze Age timber trackway in the south-west of the LCA (partially excavated in 1972), and antiquarian reports of bog bodies in 'Saxon' clothes.
- From 1374-1629 part of Hatfield Chase royal hunting forest, and subject to Forest Law.
- Moorland Allotments landscape pattern (unique to Humberhead Levels) occurs along Ribbon Row (Crowle), Moor Ends Road (Thorne) and Goole Fields to the north of the LCA. Commoners were allocated narrow strips of common land which they cut for peat (working back towards the centre of the Moor) then farmed the exposed peat soils.
- Mid-20th Century saw industrial-scale extraction of peat on parts of the Moors using milling machines. Railways with horse-drawn and later diesel-drawn trucks removed the cut peat.
- Historic maps show duck decoy ponds at 'New Zealand' east of Nun Moors, Crowle Moor and Moorends.

Visual and perceptual qualities

- Treed horizons are characteristic within the LCA and when viewing it from outside.
- Changing senses of space and enclosure within the LCA depending on vegetation.
- Diversity of colours, patterns and textures resulting from the mosaic of vegetation.
- Moors retain a sense of relative remoteness, wildness and tranquillity, although parts are affected by the presence of nearby wind turbines.
- Presence of wind farms to south, north and east diminishes the sense of the Moors being unlimited, particularly when seen from the elevated viewing tower.



Sphagnum moss



Moorland allotments



Woodland clearing, Crowle Moor

Threats and forces for change in the landscape

Past and present

- Industrial scale peat extraction (mid-late 20th Century) leading to loss of raised mire habitats.
- Construction of Tween Bridge windfarm in southern part of LCA in 2013.
- Relatively recent cessation of peat extraction, designation of the site for its ecological value, and commencement of positive management.

Future

- Together with Hatfield Moors, the LCA now forms a focus for a number of conservation-based initiatives, including the Humberhead Levels Nature Improvement Area, and the Humberhead Levels National Nature Reserve. It is also a European Natura 2000 site. The site is hopefully now entering an era of positive management which will see restoration of its valuable habitats, including controlled re-wetting of its raised mire.
- Healthy raised mires can absorb large quantities of water, and therefore have the potential to contribute to flood and drought amelioration. They therefore have an important role to play in responding to climate change.
- Management of the site as a Nature Reserve also means that there are opportunities to increase public awareness of the site and to improve public access.
- Opportunities to work with residents of the nearby settlements of Thorne and Moorends, and in the ecological restoration of the former Moorends Colliery site, which is adjacent to the Moors.

Project opportunities

Enhancing landscape character and sense of place	<ul style="list-style-type: none"> • Work with partners to continue positive management of the Moors and associated farmland. • Enhancing the diversity of habitats within the site, including raised mire, to enhance landscape character.
Landscape archaeology and landscape history-based projects	<ul style="list-style-type: none"> • Investigate sites of duck decoys. • Projects relating to prehistoric archaeology and bog oaks, • Industrial archaeology of the peat industry.
Nature conservation-based landscape projects	<ul style="list-style-type: none"> • Working with partners to continue positive management, including restoration of raised peat mire and other valuable habitats. • Restoration of lagg fen (the transition zone at the edge of a raised bog where runoff collects from the raised bog and adjacent mineral soils, creating unique habitats).
Enabling people to explore and enjoy the landscapes on their doorstep	<ul style="list-style-type: none"> • Working with local communities to encourage them to visit and learn about the LCA. • Improvement of public access and extension of routes around the Moors. • Additional interpretation describing the ecology and the development of the landscape.
Landscape research and connections	<ul style="list-style-type: none"> • Connect with other projects and Landscape Partnerships working in raised bog and peatland sites.

LANDSCAPE CHARACTER AREA 2: Hatfield Moors

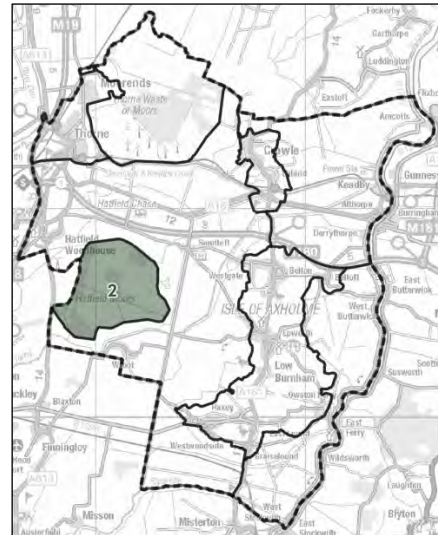
Parishes within this LCA:

Hatfield

Description

Location and Context

This LCA is located in the south-west of the IoAHC area, and includes the raised mire and former aggregate extraction areas of the Hatfield Moors. Part of the western edge of the LCA is adjacent to the IoAHC study area boundary, and the remainder is surrounded by the *Hatfield Chase Levels LCA*.



Summary Description

This LCA is an extraordinary ‘secret’ landscape of former peat workings, surrounded by trees and woodland which physically and visually separate this LCA from the surrounding levels. The southern and western peripheries of the LCA have been mined for aggregate in the past, creating a series of tree-fringed lakes. These lakes, associated woodland, and the area of raised peat mire which makes up the majority of the LCA are a National Nature Reserve, and are internationally-designated for their habitats and the rare species which they support. Together with Thorne and Crowle Moors to the north, Hatfield Moors is one of the largest areas of lowland raised mire in Britain, although it has been damaged by peat extraction.

Much of the upper peat layer has been mechanically stripped relatively recently (peat extraction ceased in 2004) leaving a ground surface of exposed lower peat, dark in colour and bouncy to walk on in dry weather. The flat expanse of peat, with patches of open water and vegetation, stretches into the distance until it meets the surrounding trees. The north-eastern part of the LCA is not designated and is in arable use, but it is still hidden from the surrounding area by the encircling belt of woodland.

There are few paths or tracks within the LCA, creating a strong sense of remoteness. There is no settlement except for Lindholme Hall in the centre of the LCA which is screened by surrounding trees and is not open to the public. Lindholme is a sandy ‘island’ within the moor, and contains important heathland habitats. It is also a focus for archaeological sites, including a Neolithic timber trackway. Although there is an active peat distribution works at the northern edge of the area, the vast majority of the LCA has a strong sense of wildness and tranquillity, occasionally broken by aeroplanes using the nearby airport.

Landscape character types identified in existing Landscape Character Assessments located within this LCA

North Lincolnshire	N/A
Doncaster	<i>Thorne and Hatfield Peat Moorlands</i>

Key Characteristics

- Underlying geology of Sherwood sandstones, overlain by deposits of sand, clay and peat.
- A flat landform which has been lowered in height in the late 20th Century through removal of peat. Lindholme forms a sandy 'island' of slightly raised land.
- Artificial deep lakes following aggregate extraction around the western edge. Straight drainage ditches cross the LCA.
- Former extractive industries (aggregate and peat) took place over much of the LCA. These have now ceased and the majority of the area is managed as a nature reserve.
- Straight drainage ditches demarcate compartments within the Moors.
- Extensive semi-natural habitats, including raised mire, peatlands, woodland, wetland and open water. Nationally & internationally designated for its nature conservation value, and a National Nature Reserve with some public access.
- A belt of woodland/ trees including birch and oak surrounds the LCA. Ornamental and native pine trees grow on sandy soils on Lindholme Island.
- Significant buried archaeology including Neolithic timber trackway and platform. Peat mire is an important palaeo-environmental research resource.
- Bog oaks often found buried in the peat. Historical findings of 'bog bodies'.
- Very limited road or footpath access over much of the LCA. Settlement limited to Lindholme Hall in the centre of the LCA.
- Surrounding trees give the central part of the LCA a sense of secrecy and screen views out of the LCA.
- Mosaic of exposed peat, standing water, heathland and raised mire create a rare and distinctive combination of colours, patterns and textures in the landscape.



View over mosaic of peat, heathland and open water habitats in the centre of Hatfield Moor, with Lindholme Island and woodland on the horizon.

Natural influences and sites

- Raised mire naturally creates a dome shape, which rises and falls seasonally as it absorbs water.
- Past growth of raised mire 'drowned' existing trees and preserved them *in situ* as bog oaks. Pollen and other environmental data preserved within the peat deposits is an important resource for understanding past environments, although extraction of the surface peat layers has resulted in the loss of much of the most recent environmental data.
- Designated nationally (Site of Special Scientific Interest) and internationally (Special Protection Area and Special Area of Conservation) for its ecological importance: raised mire, wetland, heath and woodland habitats, and associated species.
- Part of one of the largest areas of surviving lowland raised mire in Britain.
- Together with Thorne Moors, Hatfield Moors is home to 5000 species of insects (including 250 nationally rare species and six species known in no other sites). 250 bird species have been recorded, and many plants, including insectivorous round-leaved sundew.
- Part of the Humberhead Levels National Nature Reserve, with public access to some parts of the LCA, and permissive access over other parts.

Cultural influences and sites

- The earliest find from the IoAHC area is a very rare Lower Palaeolithic hand axe from the south-west of Hatfield Moor. Found during gravel quarrying in 1993, it was c. 300,000 years old.
- Small amounts of Neolithic worked flint found on Lindholme Island, and within the surrounding moors.
- Buried archaeology including a late Neolithic timber trackway accessing a contemporary timber platform to the north of Lindholme Island, thought to have a ritual rather than a practical purpose.
- Historic accounts of bog bodies found preserved in peat.
- Lindholme Island traditionally the site of a medieval hermitage.
- From 1374-1629 part of the royal hunting forest of Hatfield Chase, and subject to Forest Law.
- From the medieval period until the 20th Century much of the LCA was common land, with small-scale extraction of peat for domestic use.
- Small country estate and gardens centred on Lindholme Hall, now a Buddhist retreat centre.
- WW2 aeroplane crash sites, including a Wellington bomber with a Polish crew which crashed on return to Lindholme airfield (to the west of the LCA). A memorial now stands nearby. At least one other Wellington crash site, north of Wroot.
- Mid-20th Century saw industrial-scale extraction of peat using milling machines until 2004. 1966 map shows railway lines within the Moor to transport extracted peat. Sand and gravel deposits revealed underneath peat were also extracted, creating large lakes.

Visual and perceptual qualities

- An visually enclosed landscape, with open views from within the LCA limited by the surrounding trees, and a strong contrast between the open ground in the centre and the surrounding woodland.
- A strong sense of remoteness, wildness and tranquillity, particularly in central parts of the LCA.
- Although dominated by dark, peaty soils, there is a rich diversity of patterns, textures and colours.
- Appears in views from the Hatfield Chase Peatlands LCA as a low wooded backdrop.



Lake in former quarry area



Exposed peat surface



Woodland boardwalk

Threats and forces for change in the landscape

Past and present

- Commercial-scale peat extraction in second half of 20th Century resulting in removal of much of the former dome shape of the raised mire.
- Sand and gravel extraction, particularly around the western edges of the LCA creating large lakes, now managed for nature conservation.
- Relatively recent cessation of peat extraction, designation of the site for its ecological value, and commencement of positive management.

Future

- Together with Thorne and Crowle Moors, the LCA now forms a focus for a number of conservation-based initiatives, including the Humberhead Levels Nature Improvement Area, and the Humberhead Levels National Nature Reserve. It is also a European Natura 2000 site. The site is hopefully now entering an era of positive management which will see restoration of its valuable habitats, including controlled re-wetting of its raised mire.
- Healthy raised mires can absorb large quantities of water, and therefore have the potential to contribute to flood and drought amelioration. They therefore have an important role to play in responding to climate change.
- Management of the site as a Nature Reserve also means that there are opportunities to increase public awareness of the site and to improve public access.

Project opportunities

Enhancing landscape character and sense of place	<ul style="list-style-type: none"> • Enhancing the diversity of habitats within the site, including raised mire, to enhance landscape character.
Landscape archaeology and landscape history-based projects	<ul style="list-style-type: none"> • Improved public awareness of the prehistoric trackway and platform. • Projects around ancient bog oaks. • Industrial archaeology of the peat industry.
Nature conservation-based landscape projects	<ul style="list-style-type: none"> • Working with partners to continue positive management, including restoration of raised peat mire and other valuable habitats. • Restoration of lagg fen in the north of the LCA. Lagg fen is the transition zone at the edge of a raised bog where runoff collects from the raised bog and adjacent mineral soils, creating unique habitats.
Enabling people to explore and enjoy the landscapes on their doorstep	<ul style="list-style-type: none"> • Construction of elevated viewing towers, giving a new perspective on the landscape. • Improvement of public access onto the Moors (possibly considering improved access from the east and north). • Improved interpretation describing the development of the raised mire and how the landscape has been changed.
Landscape research and connections	<ul style="list-style-type: none"> • Connect with other projects and Landscape Partnerships working in raised bog and peatland sites.

LANDSCAPE CHARACTER AREA 3: Hatfield Chase Levels

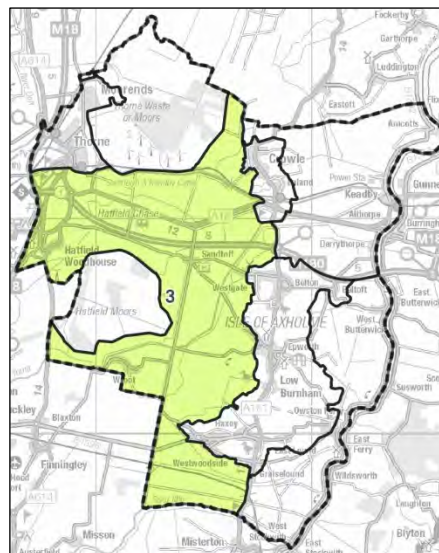
Parishes within this LCA:

Belton, Crowle, Epworth, Hatfield, Haxey, Misterton, Thorne, Wroot

Description

Location and Context

This extensive LCA occupies much of the central part of the IoAHC area, to the west of the Isle of Axholme. 'Fingers' of the LCA extend to the IoAHC study area boundary to the north, south and west, wrapping around the *Thorne and Moorends*, *Thorne and Crowle Moors* and *Hatfield Moors* LCAs. To the east, the LCA is bounded by the Northern and Southern parts of the Isle of Axholme. A short section of this LCA (containing the motorway corridor) between the two parts of the Isle of Axholme adjoins the *Trentside North LCA*. A short section in the south adjoins the *Trentside South LCA*.



Summary Description

This LCA is characterised by its flat topography, geometric fields, embanked straight rivers and ditches, straight roads and big skies. This is a low-lying landscape, with the majority of the LCA between sea level and the 5m contour. It is the product of centuries of artificial drainage and agricultural improvement, including the works of the Dutch engineer Cornelius Vermuyden in the 1620s. Although the general impression of the landscape is one of openness, much of it is also well-treed, due to the presence of the surrounding wooded Moors, and the influence of the wooded turbaries, shelter belts, quarry site planting and motorway planting within the LCA. The Isle of Axholme forms the eastern horizon, and its associated water towers, windmills and church towers form distinctive landmarks.

The settlement pattern is one of scattered farms (often including large agricultural buildings) and linear villages. The villages (e.g. Wroot, Sandtoft, Hatfield Woodhouse and the lower parts of Epworth and Belton) are generally sited on slightly raised ground. They often contain farms, and are surrounded by the small hedged fields of the 'ancient enclosures'.

Land use is predominantly open arable farmland, but there are some pockets of industrial development, particularly around Sandtoft. There are also areas of former and current sand/ gravel extraction, often containing open water and fringed by trees. The M180 motorway has a localised impact in the northern part of the LCA.

Landscape character types identified in existing Landscape Character Assessments located within this LCA

North Lincolnshire	<i>Flat drained treed farmland</i>
	<i>Flat open remote farmland</i>
Doncaster	<i>Thorne and Hatfield Peat Moorland</i>
	<i>East Don and Dun River Carrlands</i>
	<i>Blaxton to Stainforth Sandland Heaths and Farmland</i>

Key Characteristics

- Underlying geology of Triassic Mercian mudstones and Sherwood Sandstones, overlain by clay, patches of sandy deposits and peaty soils.
- Flat topography with very little variation, between 0m and 5m above sea level.
- Natural drainage system of sinuous rivers and shallow lakes replaced in the 1620s by a network of straight drainage ditches and canalised rivers with high banks.
- Majority of the area is in arable use, with pockets of industrial use (around Sandtoft), airfield, aggregate extraction and woodland. Some flooded quarries are used as fisheries.
- Field boundaries are hedged in some parts of the LCA (particularly around settlements), but are generally formed of straight, well-maintained ditches.
- Semi- natural habitats include turbaries, wet woodland, wetlands, open water and rivers/ ditches. Several are designated SSSI and turbaries are also Local Nature Reserves.
- Trees cover varies within the LCA, but tree belts, pockets of woodland, and the surrounding wooded Moors combine to create a relatively well-treed landscape.
- An important historic landscape, being a former royal hunting forest transformed through drainage by Dutch engineer Cornelius Vermuyden in the 1620s.
- Roads from 1620s scheme generally bumpy, straight and following watercourses, with abrupt 90 degree bends. The later M180 runs east-west across the LCA. Few footpaths.
- Apart from scattered farms, settlements are linear in form and located on slightly raised areas. Rare historic settlement pattern and buildings associated with turbaries.
- A strongly geometric landscape, dominated by big skies and with a marked sense of space.
- Ridge-top features on the Isle of Axholme and the wind turbines at Tween Moors provide a sense of orientation.



Typical scene near Wroot, looking north towards Hatfield Moors

Natural influences and sites

- Underlying fertile peat soils and sandy deposits continue to influence the landscape and land uses, despite its transformation from a wetland to drained farmland.
- Several Hatfield Chase ditches designated SSSI for their habitats supporting aquatic and emergent plants. Haxey Grange Fen SSSI is one of best local examples of primary fen habitat.
- Haxey and Epworth turbaries designated SSSI and Local Nature Reserves. Comprise areas of relict peat vegetation partially covered in blown sand, with woodland, wet and dry heathland and fen habitats. Langholme Wood also designated Local Nature Reserve.
- Wetlands/ open water created through sand and gravel extraction.

Cultural influences and sites

- Prehistoric worked flint has been found throughout the area. A particular concentration of Mesolithic flint is known from north of Wroot, indicating a seasonal camp. Early Bronze Age 'Beaker' pottery found on the low grounds west of Crowle.
- Extensive cropmarks provide evidence of Roman and Iron Age settlement around Sandtoft. Many finds of Roman material from Crowle Common indicate that Old River Don was an important means of access.
- Former Royal Forest of Hatfield Chase, including three meres used for hunting from boats (See 2.5.9-10).
- Prior to drainage, large parts of the LCA were the common lands of surrounding villages (used for winter pasture, fowling and fishing) and fertilised by 'thick fatt water' during winter floods.
- LCA includes the 'Participants Lands' allocated to Vermuyden and his fellow 'Participants' for drainage in the 1620s (See Section 2.6 for more detail). The courses of existing rivers Don, Idle and Torne were diverted into new straight channels which discharged into the Trent at Keadby, and the resulting farmland was divided up into straight-sided fields accessed by straight roads. Widespread social unrest followed because the loss of common pastureland greatly impacted on traditional local farming systems.
- Vermuyden's drainage system was not entirely successful because of the lack of fall in the new rivers, so later features to improve drainage can also be seen in the landscape.
- 17th Century antiquarian Abraham de la Pryme grew up at Crow Farm and is buried in Hatfield church.
- Warping of the land (spreading with silt-laden water) took place from 18th- early 20th Century, with cart warping in some areas (See section 2.7.5).
- Villages are linear, often including historic farms on the main street, infilled with more recent development. Villages are often surrounded by more irregular fields of early enclosed land, and green lanes. Isolated 'hidden' hamlets also occur within the LCA, often surrounded by shelter belts of trees.
- Turbaries granted to parishes in the 18th and 19th centuries following Parliamentary enclosure of remaining common land. Small plots of land were granted to poor of the parish, leading to a distinctive settlement style of small vernacular cottages and smallholdings.

Visual and perceptual qualities

- Wooded horizons to north and south formed by trees surrounding Thorne and Hatfield Moors.
- Isle of Axholme forms the eastern horizon, with landmark water towers, windmills and churches.
- Pockets of variation within the LCA: Some areas feel more open due to reduced vegetation (e.g. Dirtiness Levels), and others (especially around Sandtoft) feel more developed.
- LCA is usually experienced from a vehicle on a fast road. Footpaths are limited and there are few places to stop and appreciate the landscape.



Straight road along Idle Bank



Woodland at Haxey Turbary



Sandtoft, with Isle of Axholme forming horizon.

Threats and forces for change in the landscape

Past and present

- A landscape shaped by nearly 400 years of drainage.
- Intensive arable production resulting in new large agricultural buildings, and limited wildlife value of farmland.
- Use of farmland for 'horseculture', especially in the vicinity of villages.
- Large modern houses prominent in the open landscape and on the edges of villages.
- M180 constructed across the area in the 1970s. Associated embankments, planting and moving vehicles have a localised effect on the landscape and tranquillity is reduced.
- Industrial development (including vehicle distribution depot) associated with WW2 airfield (still partially in use) at Sandtoft.
- Sand and gravel extraction, resulting in a change in landscape character to open water, often fringed by trees.
- Several fishing lakes in former aggregate extraction sites.
- Introduction of non-native tree species, particularly in shelterbelts.
- Recent construction of Tween Moors windfarm (immediately to the north of the LCA) has a significant visual impact, especially in the northern part of the LCA.
- Loss/ neglect of vernacular buildings, especially turbarry cottages.

Future

- Potential risk of flooding as a result of sea level rise and climate change.
- Continued pressure for industrial and residential development, and for aggregate extraction.
- New developments affecting the area's distinctive horizons.
- Changes in agricultural management as a result of changing grant schemes and potential climatic changes.
- Potential impacts of climate change and plant diseases on ecologically-rich semi-natural habitats.

Project opportunities

Enhancing landscape character and sense of place	<ul style="list-style-type: none"> • Conserve surviving distinctive turbarry cottages and smallholdings.
Landscape archaeology and landscape history-based projects	<ul style="list-style-type: none"> • Farmsteads and turbaries project. • IoAHC-wide project focussing on different phases and methods of drainage.
Nature conservation-based projects	<ul style="list-style-type: none"> • Conservation-based projects based around local nature reserves. • Potential to enhance the appearance and conservation value of aggregate extraction and fisheries sites. • Use of agri-environment grants to manage waterways and ditches, to retain their practical function and conservation value.
Enabling people to explore and enjoy the landscapes on their doorstep	<ul style="list-style-type: none"> • Provide parking places for people to stop and appreciate the landscape, rather than simply driving through it. • Improve the public rights of way network, for example creating circular walks/ cycle rides from local villages avoiding fast roads.
Landscape research and connections	<ul style="list-style-type: none"> • Connect with other projects (including LPS) based around drained landscapes (e.g. Somerset Levels, Cambridgeshire/ Norfolk fens. • Foster links with the Netherlands through cultural connections.

LANDSCAPE CHARACTER AREA 4: Isle of Axholme North

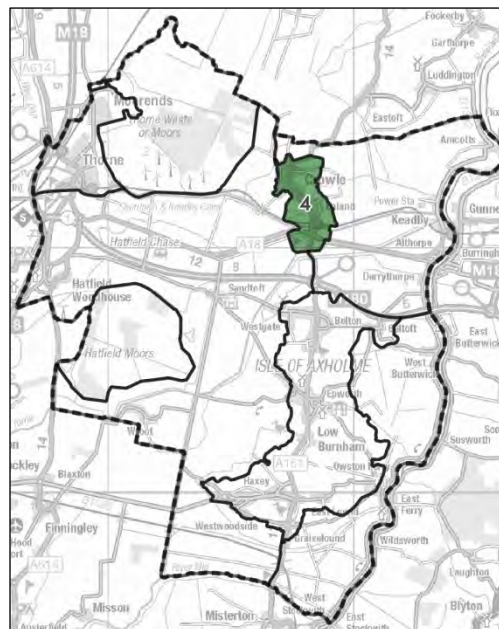
Parishes within this LCA:

Belton, Crowle

Description

Location and Context

This LCA is located in the north-central part of the IoAHC area, including the villages of Crowle and Ealand. It forms an 'island' of raised land between the *Trentside North LCA* to the east, and the *Hatfield Chase Levels LCA* to the west. The boundary on the eastern side of this LCA follows the 5m contour and the embankment of the dismantled railway line. On the western side, the boundary follows the edges of Crowle village and the parkland estates to the south.



Summary Description

This comprises an area of subtly raised land which forms the northern part of the Isle of Axholme. Although it rises to 15m above sea level on the top of Crowle Hill, much of the LCA is lower than this. When viewed from the surrounding levels, the land appears very wooded due to the trees associated with Crowle village, and the parkland estates of Tetley Hall, Crowle Park and Hirst Priory in the south of the LCA. The water tower on Crowle Hill is a local landmark.

From elevated land around the village there are views across the surrounding levels, in which the windfarms at Keadby to the east and Tween Moors to the west are very prominent.

The A161 runs north-south through the LCA, with a radial pattern of smaller lanes leading from Crowle down onto the lower land. It passes through the centre of Crowle village, originally a planned Norman settlement. It subsequently became a market town with some handsome brick buildings, and has expanded in recent years. To the south is the village of Ealand, with its wharf on the Stainforth and Keadby Canal. To the north of the canal is an extensive area of wetlands and lakes on the site of a former brick and tile works.

Landscape character types identified in existing Landscape Character Assessments located within this LCA

North Lincolnshire	<i>Open island farmland</i>
	<i>Flat wooded farmland</i>
Doncaster	N/A

Key Characteristics

- Underlying geology of relatively resistant Mercian mudstone, overlain by areas of clay and sandy soils.
- A low, smooth-profiled 'island' rising up to 20m above the surrounding lower land.
- Stainforth-Keadby canal, and Vermuyden's Hatfield Waste Drain run east-west across the southern part of the LCA. Extensive areas of lakes at former brick and tile works at Tetley.
- Varied land uses, including arable and pastoral agriculture, built-up areas, golf course, parklands and wetlands.
- Field boundaries generally hedged (with some ditches) with most of the LCA early enclosed land.
- Semi- natural habitats include woodland, parkland, wetland, open water, alder carr and aquatic habitats associated with rivers.
- Many trees/ woodlands, with historic parkland sites at Hirst Priory, Tetley Hall and Crowle Park.
- Historic influence of Selby Abbey. Surviving historic features include buildings in Crowle, Crowle wharf and site of swing bridge on Stainforth-Keadby canal, historic estates and parklands, and part of the dismantled railway between Crowle and Haxey.
- Isle of Axholme ridge road (now A161) runs through LCA and the centre of Crowle village, with a radial pattern of roads leading out to lower land. Crowle village is nucleated with a historic centre, whereas Ealand is linear in form, with some modern infill.
- LCA appears as a raised wooded mound when seen from the surrounding area, with its water tower forming a local landmark.
- Views out from the LCA are dominated by nearby windfarms to the east, west and north-west.



Crowle 'island' and village as seen in view looking east from Crowle Common.

Natural influences and sites

- Underlying geology of relatively hard rocks containing gypsum has created an 'island' above the surrounding lower land.
- Crowle Borrow Pits SSSI designated for variety of habitats (including alder carr, scrub, fen and open water) and the locally uncommon species they support, including nationally-rare marsh fern.
- North Engine Drain is part of Hatfield Chase Ditches SSSI, designated for rich assemblage of aquatic and emergent plants.
- Wetland/ open water habitats on site of former brick and tile works.
- A relatively well-treed landscape, including historic parkland trees.

Cultural influences and sites

- Location on raised land means that the LCA has a long history of use for settlement and transport. The earliest finds are worked flints of Mesolithic, Neolithic and Bronze Age date.
- Concentration of Roman sites/ findspots on Crowle Hill.
- Two late Saxon pits, west of Crowle Market Place, were excavated in 2010.
- Carved Runic stone in Crowle church is likely to date from pre 1000AD. The church (recorded in the Domesday book) is dedicated to St Oswald, king of Northumberland reputedly killed in battle on Axholme in the 7th Century.
- Historic links with Selby Abbey from the Norman Conquest until the Dissolution. In 1305 the Abbot of Selby was granted a charter to hold a weekly market and annual fair in Crowle.
- Historic buildings in Crowle village, mostly in red brick with slate or pantile roofs.
- Traditional land use within the LCA of arable farming, with surrounding lowlands used for common grazing, and Crowle Moor used for peat extraction.
- 18th and 19th Centuries saw improved east-west transport links following construction of the Stainforth-Keadby canal (with a wharf at Ealand) and later railway line along the bank of the canal. A north-south railway line was constructed in the early 20th Century.
- Concentration of parkland estates in the south of the LCA, including Hirst Priory (now a golf course), Tetley Hall and Crowle Park.
- Access to Crowle Moors and the Peatland Way from Crowle village.

Visual and perceptual qualities

- LCA appears as a low wooded ridge in views from the surrounding lowlands, with the water tower on Crowle Hill a local landmark.
- Expansive views out from the LCA over surrounding lowlands, with wind turbines and pylons prominent.
- Deciduous trees create seasonal changes in colour and texture.



Vernacular buildings in Crowle



Hirst Priory walled garden



View eastwards from Crowle

Threats and forces for change in the landscape

Past and present

- Nearby windfarms are very prominent in views from the LCA to the east and west, resulting in cumulative impacts.
- Traffic on A161, particularly lorries through Crowle village centre.
- Loss/ poor management of hedgerows in areas of early enclosed land, and loss of mature parkland trees, particularly in Crowle Park.
- Closure of brick and tile works and re-use of site as a mobile home park.
- Neglect of Crowle village centre has led to its inclusion on the 2014 English Heritage 'Register of Buildings at Risk'. Its condition is described as 'very bad', but its trend is 'improving'.

Future

- Further developments in adjacent LCAs (and beyond the IoAHC area) may impact on views from the LCA and affect its setting.
- Development pressure within the LCA could lead to further loss or fragmentation of the landscape structure around settlements.
- Neglected Conservation Area in Crowle either restored, or in continued decline.

Project opportunities

Enhancing landscape character and sense of place	<ul style="list-style-type: none"> • Prepare conservation management plans for historic parklands (if not already in place) to ensure that parkland trees and associated habitats continue to be a feature of the landscape. • Encourage sensitive restoration/ management of hedgerows and field trees in areas of early enclosed land. • Restore buildings in Crowle village centre, enhancing the character of the village and securing a long-term positive trend for the Conservation Area.
Landscape archaeology and landscape history-based projects	<ul style="list-style-type: none"> • Living history projects, exploring family and oral histories relating to the landscape. • Developing local landscape-related skills such as traditional ploughing.
Nature conservation-based landscape projects	<ul style="list-style-type: none"> • Managing local SSSI sites, possibly with community involvement.
Enabling people to explore and enjoy the landscapes on their doorstep	<ul style="list-style-type: none"> • Potential to develop circular walks from Crowle village, enabling local people and visitors to access, understand and enjoy the landscape. • Potential connection with the southern part of the Isle of Axholme using disused railway line (Isle of Axholme Greenway).
Landscape research and connections	<ul style="list-style-type: none"> • Research work of local artists (e.g. Karl Wood) and assemble a record of his historic landscape paintings.

LANDSCAPE CHARACTER AREA 5: Isle of Axholme South

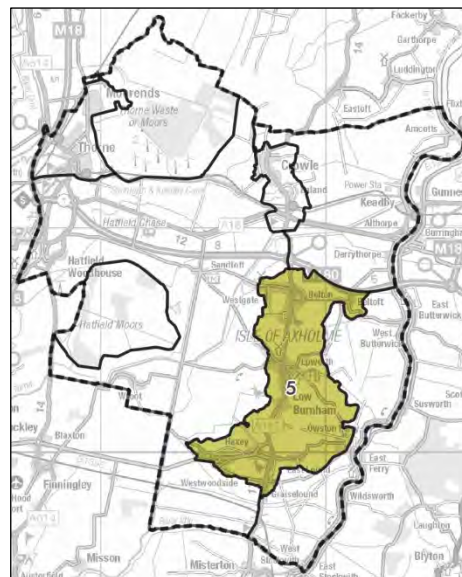
Parishes within this LCA:

Belton, Epworth, Haxey, Owston Ferry

Description

Location and Context

This LCA includes elevated land towards the south-east of the IoAHC area, containing the settlements of Epworth, Belton, Haxey, Westwoodside, East Lound, Low Burnham and Owston Ferry. Its boundary roughly follows the 5m contour, and it forms an 'island' surrounded by lower land on all sides: the *Hatfield Chase Levels LCA* to the west; the *Trentside South LCA* to the south-east and the *Trentside North LCA* to the north-east.



Summary Description

This LCA has a very distinctive character and a strong sense of place. It is distinguished from the surrounding lower land by its relative height (generally between 5 and 40m above sea level) and rolling landform. It has a strongly rural character, and its elevation gives it long and varied views across the adjoining flat levels.

The LCA is renowned nationally for the survival of its medieval strip field farming system, which is still in place today. It makes a strong contribution to the character of the area through the distinctive stripes in many of the large fields, especially those along the ridge top and surrounding the villages. On the side slopes of the Isle, fields are generally 'ancient enclosures', with a smaller and more irregular pattern and surrounded by hedges.

The strong sense of history in this landscape is enhanced by the presence of historic settlements, churches, farms, roads, field patterns and sites such as the motte and bailey castle at Owston Ferry, and the medieval priory at Melwood. The old ridge road (now the A161) links a series of historic villages (including Haxey and Belton) and the market town of Epworth. Other parts of the Isle are accessed by a network of winding tree-lined lanes and tracks which contrast with the straight roads on the levels below. Prominent ridge-top buildings such as windmills, water towers and churches provide landmarks within the LCA and are also features in views from surrounding LCAs.

Landscape character types identified in existing Landscape Character Assessments located within this LCA

North Lincolnshire	<i>Open Island Farmland</i>
Doncaster	N/A

Key Characteristics

- Underlying geology of relatively hard Mercian mudstones containing gypsum, overlain by fertile sandy and clay soils.
- A gently undulating landform, generally between 5-40m above sea level forming an 'island' above the surrounding lower land.
- Narrow streams/ ditches (often forming field boundaries).
- Predominantly arable agriculture (including historic strip fields) on fertile soils, with some pasture and small areas of woodland.
- Hedged field boundaries occur on the early enclosed land around the edges of the LCA. Hedges or ditches may occur around the perimeter of strip fields, but strips are generally open, without physical boundaries.
- Semi- natural habitats include small areas of woodland, and remnant unimproved grassland/ hay meadows.
- Occasional woodland blocks and shelterbelts. Some trees along field margins, particularly at edges of the LCA.
- Many historic sites and buildings, with a concentration of medieval and post-medieval settlement and religious sites.
- Settlement pattern of larger nucleated villages (including former market town of Epworth) with newer linear development on village edges, surrounded by scattered farms and smaller villages/ hamlets.
- Historic route (now A161) follows ridge of higher land, with a network of winding lanes and tracks connecting farms and smaller villages.
- Distinctive hilltop structures of windmills, water towers and churches are very prominent landmarks over a wide area.
- Long views from the Isle out and down over surrounding flat landscape, and a strong sense of elevation.
- Strip fields create a distinctive 'striped' pattern in the landscape.



Windmill, strip fields and long view, as seen from the A161 north of Epworth

Natural influences and sites

- Relatively resistant rocks containing gypsum creating a ridge of high land. It would have been an island in Lake Humber in the last ice age, and subsequently an island of dry land above surrounding wetlands.
- Naturally fertile and free-draining soils supporting arable agriculture.
- Small areas of semi-improved grassland/ hay meadow at Rush Furlong and Hewson's Field, designated SSSI.
- Local Nature Reserves at Rush Furlong and Axholme Line disused railway at Haxey.

Cultural influences and sites

- Raised land with easy access to wetland resources has been an obvious choice for settlement since the Mesolithic period. Seasonal sites of that date are known from Beltoft and Owston Ferry.
- A possible Neolithic 'hengiform' cropmark near Beltoft.
- Evidence for Roman occupation at Belton, Beltoft, Epworth, Low Burnham, High Burnham, Owston Ferry and Haxey.
- An Early Anglo-Saxon settlement south of Belton, partially excavated in 1999.
- Numerous medieval settlement sites, including Kinaird motte and bailey castle at Owston Ferry (seat of the de Mowbray family), market crosses (all scheduled monuments), manors and villages. Epworth developed as a market town in the 12th/13th Century by landowner Lord Mowbray.
- Medieval religious sites include village churches, site of Carthusian Charterhouse Priory at Melwood (Scheduled Monument) and site associated with Knights Templar and Knights Hospitallers at Temple Belwood. Following dissolution, Melwood and Temple Belwood became country estates.
- Nationally-significant survival of medieval strip field farming system in central part of the Isle, creating a very distinctive landscape.
- Traditional agricultural pattern of arable land use on raised land, complementing summer grazing of animals on lower-lying and seasonally-flooded common pastures. Social unrest followed loss of common grazing land through Vermuyden's drainage of Hatfield Chase.
- Site of steam-powered gypsum mill at Low Burnham.
- Rich built heritage, including numerous examples of vernacular building in villages and farms, usually constructed in red brick and tile, with casement windows, although there are also some older timber-framed buildings behind more recent facades.
- Cultural connection with John Wesley, founder of the Methodist church, and his brother, hymn writer Charles Wesley, both born in Epworth Rectory.
- Influences of historic hemp and flax industries, including buildings and retting pits.
- Traditional 'Haxey Hood' game starts at Haxey Church and is played in the fields between Haxey and Westwoodside on 6th January each year.

Visual and perceptual qualities

- Strong sense of elevation, with long views across and down over surrounding lower landscapes.
- A strongly rural feel to the landscape, and a very distinctive sense of place.
- Ridge-top windmills, water towers and church towers form prominent landmarks.
- Large open strip fields create distinctive 'striped' patterns in the landscape, which contrast with the smaller hedged fields of early enclosed land around the peripheries of the LCA.



Epworth village market place



Strip fields near Low Burnham



Early Enclosed Fields, East Lound

Threats and forces for change in the landscape

Past and present

- Pylon lines crossing high land near Owston Ferry are very visually prominent.
- Prominent development outside the LCA (e.g. windfarms and large buildings) affecting views.
- Loss of vernacular building features as a result of insensitive modernisation.
- Insensitively-sited recent development (particularly large detached houses and abrupt estate edges) can be visually intrusive and result in a loss of village setting.
- Changes in distinctive landscape structure, including loss of hedgerows in traditionally enclosed areas of early enclosure, and the creation of new boundaries in traditionally open fields. The latter are often associated with horse pasturing. Strip field systems have declined in extent and are currently vulnerable to amalgamation and loss of management grants.

Future

- Long views from the Isle mean that it is vulnerable to visual intrusion from new developments over a wide area.
- Any proposed solar farms on surrounding lower land would be viewed from an elevated position, and would therefore potentially be more visually prominent when seen from the Isle.
- Changes in agri-environment grant schemes, and social changes, affecting the survival of the Isle's traditional strip-field farming system.

Project opportunities

Enhancing landscape character and sense of place	<ul style="list-style-type: none"> • Celebrate and continue histories and traditions of the strip fields, including traditional ploughing skills. • Restoration of lost field boundaries (hedgerows and trees) in areas of early enclosure. • Creating a design guide for sensitive restoration/ modernisation of historic buildings.
Landscape archaeology and landscape history-based projects	<ul style="list-style-type: none"> • Village living history projects relating to the history and use of the landscape. • Management of Owston castle. • Investigation of medieval retting pits at Lound, and buildings associated with the local textile industry. • Projects relating to Haxey Hood. • Recording and researching village-based sites, e.g. Haxey pinfolds. • Recording vernacular buildings.
Nature conservation-based landscape projects	<ul style="list-style-type: none"> • Management of semi-improved grassland sites.
Enabling people to explore and enjoy the landscapes on their doorstep	<ul style="list-style-type: none"> • The Isle of Axholme Greenway, utilising the disused railway line which runs north-south through the LCA • Creation of circular walks from villages into the surrounding landscapes.
Landscape research and connections	<ul style="list-style-type: none"> • Create connections with other areas of surviving strip fields, e.g. Laxton, Braunton and Rhossili (latter is within the Gower LPS area). • Create connections with other flax-growing areas, including in Europe. • Research and compile the works of historic local landscape artists.

LANDSCAPE CHARACTER AREA 6: Trentside North

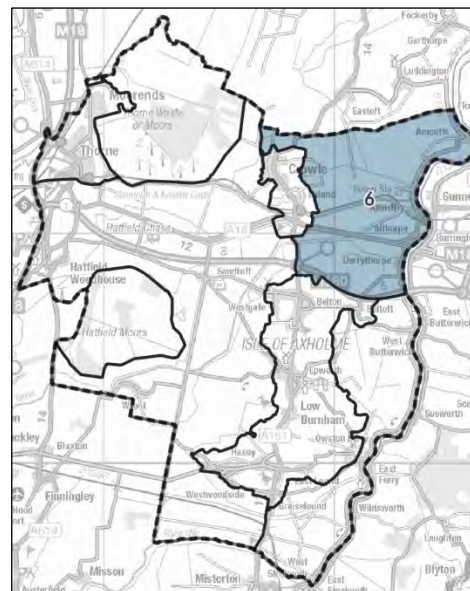
Parishes within this LCA:

Amcotts, Belton, Crowle, Eastoft, Keadby with Althorpe, Liddington and Haldenby, West Butterwick

Description

Location and Context

This LCA is located in the north-east of the IoAHC area, and includes the settlements of Keadby, Althorpe and Amcotts. The northern and eastern boundaries of the LCA follow the IoAHC study area boundary. To the west it is bounded by the *Isle of Axholme North LCA*, with short sections in the south-west and north-west abutting the *Hatfield Chase Levels LCA*. To the south are the *Isle of Axholme South LCA* and the *Trentside South LCA*.



Summary Description

This LCA has an exceptionally flat landform in the floodplain of the river Trent, but views are contained by the wooded northern part of the Isle of Axholme to the west and the river cliff beyond the river Trent to the east. Views south are contained by the southern part of the Isle of Axholme, and the raised embankments of the M180. Within the LCA, views are generally very open, except for some woodland blocks in the south, and the raised landfill site on Keadby Common.

This LCA is differentiated from the southern part of the Trentside LCA by its increased levels and proximity of industrialisation. Much of the landscape is dominated by Keadby windfarm, with Keadby Power Station and its associated pylon lines also very visually prominent. Other industrial features visible along the river Trent include Keadby lifting bridge, and wharves, cranes and industrial buildings on both banks of the river.

The LCA has a long history of drainage and water management, and these make important contributions to its character. As well as numerous drains and ditches, the Stainforth and Keadby Canal runs east-west across the area, terminating at the historic tidal lock gates at Keadby. To the south of the canal are the 'Three Rivers', comprising large drainage channels (including the canalised river Torne) which carry much of the water from the surrounding levels. They run adjacent on parallel straight courses across the LCA before discharging into the Trent at Keadby.

Landscape character types identified in existing Landscape Character Assessments located within this LCA

North Lincolnshire	<i>Flat drained Farmland</i>
	<i>Industrial</i>
	<i>Flat wooded farmland</i>
Doncaster	N/A

Key Characteristics

- Underlying geology of Mercian mudstones, overlaid by alluvial soils deposited naturally by the river Trent, and through warping.
- An exceptionally flat landform, with the exception of a raised landfill site on Keadby common.
- The river Trent (tidal) forms the eastern boundary of the LCA. Both the Stainforth and Keadby Canal and the Three Rivers discharge into the Trent at Keadby. There are also numerous straight ditches and warping drains.
- The majority of the area is used for arable agriculture. There are also extensive industrial areas, particularly around Keadby Power Station.
- Field boundaries are generally straight, well-maintained ditches, although there are some hedges alongside roads.
- Semi-natural habitats include woodland blocks and canal/ river banks.
- Trees are limited to occasional shelterbelts or roadside trees. There are some blocks of deciduous woodland in the southern part of the area, and planting associated with the M180.
- Historic features include historic riverside villages (Amcotts and Althorpe), Keadby lifting bridge, and water-related features including Stainforth-Keadby canal, Vermuyden's rivers and warping drains.
- Roads very limited, following bank of the Trent to link villages and larger modern town of Keadby. A18 and M180 run east-west across the LCA.
- Extensive energy/ infrastructure development, including power stations, port, pylons, wind turbines, motorway and waterways.
- An exceptionally open and geometric landscape, visually dominated by vertical features including pylons, wind turbines, chimneys and gantries.



View north-east from A18 towards Keadby windfarm and power station.

Natural influences and sites

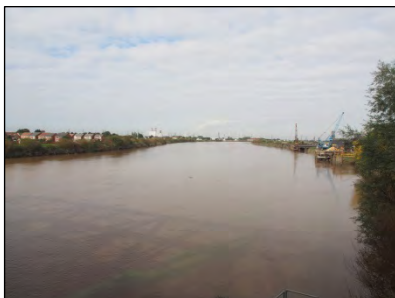
- River Trent within Humber Estuary SSSI and SAC, designated for its component habitats of intertidal mudflats, sandflats and coastal saltmarsh, and the birds which it supports.
- Trent Aegir is a popular spectacle. It occurs when the funnel shape of the river mouth exaggerates the effect of a high tide meeting the downstream flow of the river, creating a tidal bore.
- LCA is within the natural floodplain of the River Trent, and has flooded on a regular basis in the past, although high flood banks along the river now make such events less frequent.
- Numerous rivers and drainage ditches, either artificial or heavily modified.
- Small blocks of deciduous woodland in south of LCA, originally part of estate planting.

Cultural influences and sites

- Roman settlement sites along the Trent at Amcotts, Keadby and Derrythorpe.
- Several historically-significant waterways, including the river Trent, Stainforth-Keadby canal and Vermuyden's original drainage outfall channels (later modified into the parallel 'Three Rivers' seen today).
- Strong historic associations with industry/ transport alongside the river Trent, and historic interchange between river, canal, rail and (to lesser extent) road transport at Keadby.
- Tidal lock at Keadby (at mouth of Stainforth-Keadby Canal) designated a Scheduled Monument. Historic sailing barge *Spider T* is moored here, and a cycle route follows the canal to Thorne.
- Combined road and rail lifting bridge at Keadby (King George V Bridge, constructed 1916) still a striking feature in the landscape.
- Historic riverside villages contain a concentration of listed buildings.
- Historically, much of the area was low-lying common land, used for summer pasture and fertilised by seasonal flooding from the Trent. It was drained and enclosed relatively late through Parliamentary enclosure.
- Subsequent practice of 'warping' during 18th and 19th Centuries (controlled spreading of river-borne silt over farmland to improve productivity), with many warping drains surviving.
- Records of duck decoy site at Keadby. Site of 'Decoy cottage' shown on 19th century maps is now under power station.

Visual and perceptual qualities

- Flat landform and straight drainage channels create a strongly rectilinear landscape.
- Very strong industrial influences within the landscape, often incorporating prominent vertical features (wind turbines, power station chimneys, pylons, cranes etc).
- Long views, with wooded horizons to west (around Crowle), east (river cliff on east bank of Trent) and south (woodland blocks and motorway planting).
- Moving wind turbines and motorway traffic create many dynamic features within the landscape.



River Trent at Keadby



Three Rivers, looking east



Tidal lock at Keadby

Threats and forces for change in the landscape

Past and present

- Major change in landscape character in recent years as a result of construction of wind turbines, power station and pylons, all of which include tall vertical elements which are particularly prominent in this flat landscape.
- The M180, with its raised embankments and associated planting, and moving vehicles, is also visible within the landscape.
- Past drainage and flood amelioration schemes, including artificial watercourses and flood banks.
- Agricultural changes, including construction of large buildings, loss/ dereliction of traditional farm buildings, loss of hedges around settlements, and lowering of ground levels through pumping.
- Planting of tree belts of non-native species (especially dark-coloured conifers).
- Loss of industrial/ transport-related jobs in Keadby leading to social deprivation and loss of townscape quality (boarded-up buildings etc.)

Future

- Increased risk of flooding due to sea level rise and storm events.
- Changes in agricultural grants affecting land management practises, crop choices etc.
- Potential further energy and infrastructure developments.

Project opportunities

Enhancing landscape character and sense of place	<ul style="list-style-type: none"> • Minimise further loss of vernacular buildings, finding suitable alternative uses for farm buildings which are no longer required for their original purposes.
Landscape archaeology and landscape history-based projects	<ul style="list-style-type: none"> • Community-based industrial heritage projects at Keadby. • IoAHC-wide projects on different phases and methods of drainage.
Nature conservation-based landscape projects	<ul style="list-style-type: none"> • Managing rivers and watercourses to improve their ecological value as well as their role in drainage and flood prevention.
Enabling people to explore and enjoy the landscapes on their doorstep	<ul style="list-style-type: none"> • Celebrate the area's long industrial history and connections with the river Trent and other transport routes. • Improve access into the landscape, much of which is currently inaccessible, for example through the provision of a circular walk (with interpretation) taking in the Stainforth and Keadby Canal and the Three Rivers.
Landscape research and connections	<ul style="list-style-type: none"> • Create connections with other drained landscapes, e.g. in the Netherlands.

LANDSCAPE CHARACTER AREA 7: Trentside South

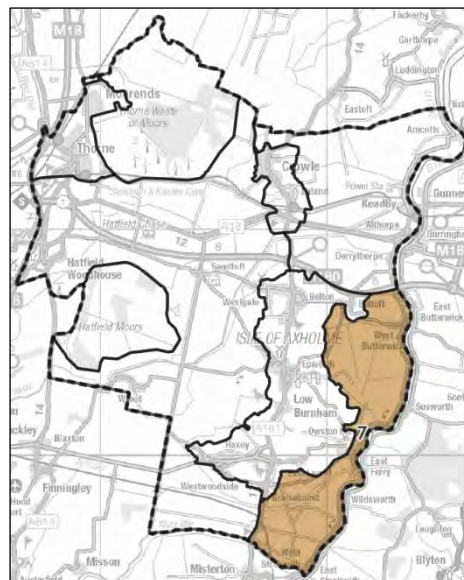
Parishes within this LCA:

Belton, Epworth, Haxey, Misterton, Owston Ferry, West Butterwick, West Stockwith

Description

Location and Context

This LCA is located in the south-east of the IoAHC area, east of the *Isle of Axholme South LCA*. Its northern boundary follows the M180, with the more industrialised *Trentside North LCA* beyond. The eastern boundary follows the IoAHC study area boundary along the Trent between the M180 bridge and West Stockwith. The southern boundary follows the IoAHC study area boundary along the river Idle as far as the A161, where it meets the *Hatfield Chase Levels LCA*.



Summary Description

This LCA occupies the flat, alluvial soils which have formed in the floodplain of the river Trent. The river Trent (tidal at this point) follows a sinuous course behind high embankments along the eastern edge of the LCA. To the west, the elevated land of the Isle of Axholme forms the horizon, with water towers, windmills and churches as landmarks.

This is a relatively open and unsettled landscape. With the exception of a few straight lanes, roads generally follow the course of the river, linking the riverside villages of West Butterwick, Kelfield, the lower part of Owston Ferry and West Stockwith.

In the past, this area was used by nearby villages as summer pasture, but it was drained and enclosed in the 18th and 19th Century following enclosure of commons by Act of Parliament, and its soil fertility improved by 'warping' with river silt. Today it is some of the best agricultural land in England, with arable fields divided by drainage ditches. Some medieval strip fields survive alongside the Trent and are still farmed in the traditional way, creating a distinctive striped pattern in the landscape.

Despite the presence of prominent pylons, the landscape retains a rural feel, although the M180 has a localised impact on the northern part of the LCA.

Landscape character types identified in existing Landscape Character Assessments located within this LCA

North Lincolnshire	<i>Flat drained farmland</i>
Doncaster	N/A

Key Characteristics

- Underlying geology of Mercian mudstones, overlain with clay and alluvial soils, subsequently improved by warping.
- Flat landform, generally between 2-4m above sea level.
- The tidal river Trent (flowing behind high flood banks) forms the LCA's eastern boundary. Ferry Drain discharges into the Trent south of Owston Ferry, and river Idle discharges into the Trent at West Stockwith. Elsewhere, a network of drainage ditches channel water to be pumped into the Trent.
- Predominantly arable land use, with a small amount of pasture. Traditional strip fields alongside the Trent.
- Occasional hedges, but most fields are bounded by straight drainage ditches. Field margins are minimal, with land ploughed up to the road in some places.
- Semi- natural habitats largely limited to waterways. River Trent designated Special Area of Conservation for its intertidal habitats.
- Trees limited to occasional isolated field trees and shelterbelts.
- Settlement comprises historic riverside villages (including ferry sites) linked by a road following the bank of the Trent. Also scattered farms accessed by tracks.
- Historic built features include church at West Butterwick, Dutch House at Kelfield and 19th Century pumping station. Strong historic connections with river Trent transport.
- The LCA is a good example of a landscape shaped by Parliamentary Enclosure of common land, artificial drainage and improvement.
- An open, simple rural landscape with largely uninterrupted views. Its rectilinear pattern is enhanced by strip fields alongside the Trent.
- Isle of Axholme creates a 'spine' along the western horizon, with water towers and windmills forming landmarks. Levees along the Trent limit views eastwards.



View west across the LCA, with strip fields in the foreground, and the Isle of Axholme forming the horizon

Natural influences and sites

- Strong influence of the river Trent, creating a flat floodplain with alluvial soils. The river has been embanked since medieval times.
- Trent Aegir is a popular spectacle. It occurs when the funnel shape of the river mouth exaggerates the effect of a high tide meeting the downstream flow of the river, creating a tidal bore.
- Other drains and rivers support a range of aquatic and emergent plants.
- Local Nature Reserve alongside the river Idle.

Cultural influences and sites

- Some indications of Roman activity in this area, including a 1st century AD coin of Vespasian.
- A lost medieval brick tower house of the Sheffields at West Butterwick, mentioned by Leland in the 16th century.
- Medieval strip fields survive in use alongside the Trent, emphasising the geometric pattern of the landscape.
- Historic villages associated with ferries across Trent.
- Dutch style house in Kelfield dated 1689 with likely connection to Vermuyden's workers or Participants.
- Strong historic connection with transport on the Trent. In the late 19th Century there were four boatyards on this stretch of the river, and the packet steamer SS Caledonian stopped at Owston Ferry on its journey between Gainsborough and Hull.
- Much of the LCA was formerly the common land of surrounding villages, used for summer grazing, fishing and catching wildfowl. It was enclosed by Act of Parliament in the 18th / 19th Century, drained (with assistance from mechanical pumps) and divided up for use by individual farmers. The process is reflected in today's farm names, eg. Newlands Farm and Common Farm. Steam pumps have been replaced by diesel and now electric pumps.
- Landscape of the area also shaped by warping: the practice of allowing silt-rich river water to flow onto land and settle, deepening and fertilizing the soil. Warping drains (used to channel the silt-rich water onto the fields) are still shown on Ordnance Survey maps.

Visual and perceptual qualities

- An exceptionally open, geometric landscape dominated by sky.
- The distinctive ridge of the Isle of Axholme to the west contributes to the sense of place.
- A strongly rural landscape, but with distant views of industry to the north and south. The M180 has a localised impact on the northern part of the LCA.



West Butterwick village



Dutch House, Kelfield



*On the Trent, Owston Ferry, by Gabell Smith, c. 1900**

Threats and forces for change in the landscape

Past and present

- Double line of pylons crossing the area north-south is visually intrusive in the flat, open landscape.
- Intensification and modernisation of agriculture has resulted in construction of new large farm buildings, and the loss of traditional farm buildings. Drainage through pumping gradually lowers land levels, increasing vulnerability to flooding.
- Gradual linear extension of villages, for example the western end of West Butterwick.
- Visual influence of energy/ infrastructure beyond the LCA boundary: power stations to north and south, wind turbines, motorway etc.
- Reduction in extent of medieval strip field systems.

Future

- Increased risk of flooding from sea level rise and more extreme storm events associated with climate change.
- Continued 'creep' of linear settlements and construction of large houses within the open landscape.
- Changes in agri-environment schemes potentially affecting farm/ land management practices. This could be a positive benefit resulting in improved management for nature conservation.
- Surviving strip fields alongside the Trent are vulnerable to changes in management grant schemes and to social changes.

Project opportunities

Enhancing landscape character and sense of place	<ul style="list-style-type: none"> • Celebrate and retain the surviving medieval strip field system within this LCA.
Landscape archaeology and landscape history-based projects	<ul style="list-style-type: none"> • Research (if not already undertaken) into the origins and history of the Dutch House. • Family and oral history projects relating to landscape history. • Research and recording of vernacular buildings, including farm buildings.
Nature conservation-based landscape projects	<ul style="list-style-type: none"> • Managing intensively-farmed land in a way which is sympathetic to wildlife, and encourage uptake of conservation-based management grants.
Enabling people to explore and enjoy the landscapes on their doorstep	<ul style="list-style-type: none"> • Improving access, for example circular walks from villages. • Introducing interpretation describing how the landscape has been shaped by centuries of farmers.
Landscape connections and research	<ul style="list-style-type: none"> • Creating connections with other drained landscapes (e.g. in the Netherlands). • Researching and compiling historic paintings of villages and other landscape features (e.g. paintings by Karl Wood and Gabell Smith).

*Reproduced from www.bbc.co.uk/arts/yourpaintings. From the collection of Owston Ferry Parish Council. Original can be viewed in Owston Ferry Coronation Hall.

LANDSCAPE CHARACTER AREA 8: Thorne and Moorends

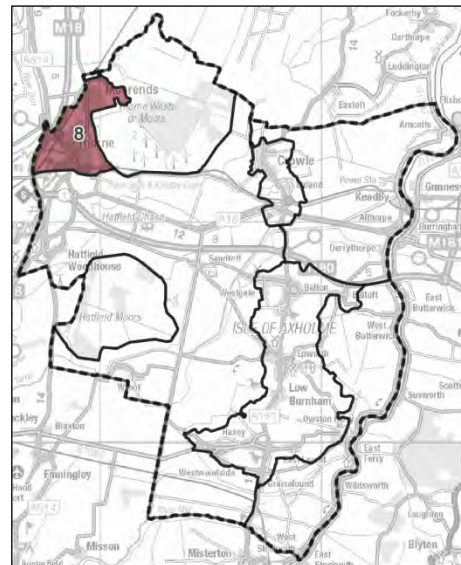
Parishes within this LCA:

Stainforth, Thorne

Description

Location and Context

This LCA is located in the north-west of the IoAHC area, between the Don valley and Thorne Moors. It includes the settlements of Thorne and Moorends, as well as the former Thorne Mine site at Moorends. Buntings Wood and Thorne Waterside are also within the LCA. Its western boundary follows the edge of the IoAHC study area. *Thorne and Crowle Moors LCA* adjoins to the north and east, and the *Hatfield Chase Levels LCA* is to the south.



Summary Description

This LCA is relatively developed, comprising the settlements of Thorne and Moorends, and adjoining land in the Don valley. The settlements have strong historic and cultural links with the surrounding landscapes, and visual and physical connections with the Moors remain a key part of their character and sense of place.

The character of the LCA has also been strongly influenced by the 20th Century exploitation of deep coal seams and the subsequent decline of the industry, leading to distinctive landscapes and settlements. Advances in transport have also influenced the LCA, with rivers, canals, railways and roads all contributing to its development and character over several centuries.

Thorne developed in the C.18th as a canal and market town serving a wide area. Some buildings survive from this era, although many are in a poor state of repair. The town subsequently expanded as a result of industrial development associated with coal mining and the M18 transport link. Moorends was a small farming community that began to expand in the 1890s when peat cutting was industrialised. It was developed further from the 1920s to accommodate workers at the Moorends colliery.

Despite its extensive development, the LCA has a well-treed appearance, and horizons are often wooded. This is due to the presence of garden and street trees in the towns, wet woodland and a golf course in the Don valley, regenerating vegetation on abandoned colliery land, and woodland associated with the nearby Moors.

Landscape character types identified in existing Landscape Character Assessments located within this LCA

North Lincolnshire	N/A
Doncaster	<i>Thorne and Hatfield Peat Moorlands</i>
	<i>East Don and Dun River Carrlands</i>

Key Characteristics

- Underlying geology of Sherwood sandstone, with coal seams. Overlying soils are generally clay, but there are also alluvial soils in the Don valley.
- Landform generally flat between 3-5m above sea level.
- West of LCA is within valley of river Don, and contains several channels and lakes. Stainforth and Keadby Canal runs through LCA connecting rivers Don and Trent.
- Majority of land is used for residential development, but other land uses include industry, transport, golf course, woodland and abandoned industrial land.
- Few surviving field boundaries within the LCA. Fields in the east of the LCA, between Thorne and the Moorland Allotments, are divided by straight ditches and thin hedgerows, with some hedgerow trees.
- Semi- natural habitats include wet woodland and open water in the Don valley and recolonising vegetation on abandoned land at site of Thorne Mine.
- Relatively extensive trees and woodland, including street and garden trees, wet woodland, golf courses, regenerating woodland on abandoned land and woodland associated with the adjacent Moors.
- Historic features include Thorne medieval motte and bailey castle and adjacent church, and features associated with the canal and river Don.
- Thorne has a historic centre reflecting its former importance as a market and canal town. Thorne and Moorends expanded in the mid-20th Century to accommodate miners.
- Strong influence of transport routes over several centuries: river, canal, railways, roads and motorways.
- Parts of Thorne town centre and the former colliery site feel neglected/ abandoned.
- The adjacent Moors and Don valley woodlands create distinctive treed horizons.



Moorends village. In the distance are the trees on the former colliery site, with the Moors beyond.

Natural influences and sites

- Buntings Wood wet woodland (west of Thorne) designated Local Nature Reserve, managed by Friends of Buntings Wood.
- Recolonising vegetation on extensive area of abandoned land at Thorne Mine site at Moorends.
- Popular fishing lakes at The Delves provide wetland and open water habitats.

Cultural influences and sites

- Medieval motte and bailey castle at Peel Hill, Thorne. One of a group of castles commanding the Don Valley, it was held by the De Warrene family, who also held Conisborough Castle. It was later used as a prison for violators of forest law in Hatfield Forest.
- Large parish church of St Nicholas, dating from 12th - 15th Centuries.
- Long history of peat working on adjacent Moors.
- Part of the Royal hunting forest of Hatfield Chase between 1374 and 1629.
- Market charter granted to Thorne in 1658. Several surviving buildings within the town centre from this time and later, designated Conservation Area (although currently 'at risk').
- Strong association with Stainforth-Keadby canal (constructed in 1792) and as a boatbuilding centre, which continues to the present day. Sea-going yachts were brought from the Trent for repair and overwintering at Thorne. Remains of quaysides on the river Don still visible at Waterside.
- Historically, the area had many windmills. Oates Mill survives in Thorne.
- Moorends developed from a farming hamlet in 1890s when peat cutting was industrialised. In 1920s it grew into a planned village to house mine workers, including houses, shops, leisure buildings, a church and sports ground. The area had a strong local identity and was hit hard socially and economically by the closure of Thorne Mine.
- Popular narrow-gauge railway in the Memorial Park.

Visual and perceptual qualities

- A relatively well-treed landscape, with woodlands in the Don valley and surrounding the adjacent Moors creating distinctive wooded horizons which are often visible from within settlements.
- Noise and visual impacts from motorways reduce tranquillity.
- Wind turbines at Tween Moors wind farm prominent in views to east.
- Some areas have a sense of abandonment and neglect.



Boatyard on Stainforth and Keadby Canal, Thorne



Thorne Waterside, with quaysides along former channel of river Don



Site of Thorne Mine at Moorends

Threats and forces for change in the landscape

Past and present

- Development, decline and subsequent abandonment of colliery site, resulting in extensive areas of abandoned land, and settlements with relatively high levels of deprivation.
- Construction of transport routes (specifically M18) on embankments, increasing their prominence within the landscape.
- Neglect of buildings in Thorne Conservation Area has led to its inclusion on the English Heritage 'Heritage at Risk' register. Its condition is described as 'very bad', and its trend is 'deteriorating'.
- Construction of wind farms in adjacent LCA, leading to significant visual impacts on views, especially from the eastern edge of Thorne.

Future

- Potential large-scale development associated with the motorway network.
- Continued deterioration of buildings within Thorne Conservation Area resulting in their eventual demolition. Alternatively, restoration plans may be successful.
- Opportunities to positively influence expansion and future development of settlements through Neighbourhood Plans.
- Potential future renewable energy schemes, including current solar farm application on former colliery site.

Project opportunities

Enhancing landscape character and sense of place	<ul style="list-style-type: none"> • Restore derelict buildings and enhance the LCA's distinctive townscapes. • Retain the settings of the settlements, including good management of agricultural land and the Moors.
Landscape archaeology and landscape history-based projects	<ul style="list-style-type: none"> • Village history projects focussed around the area's peatworking, mining, and canal heritage. • River and canal-based projects, potentially linking with projects in other parts of the IoAHC area, and beyond.
Nature conservation-based landscape projects	<ul style="list-style-type: none"> • Conservation projects (ideally with community involvement) focussed around Buntings Wood, the Moors, and the former colliery site.
Enabling people to explore and enjoy the landscapes on their doorstep	<ul style="list-style-type: none"> • Putting the Thorne Mine site into appropriate positive use, possibly as a gateway into the Thorne and Hatfield Moors NNR. • Working with local communities to encourage them to engage with their local landscapes, especially the Moors.
Landscape research and connections	<ul style="list-style-type: none"> • Connect with other projects in former mining communities (e.g. Dearne Valley LPS).



Thorn Bank, near Wroot

APPENDICES

APPENDIX A: ACRONYMS USED IN THIS DOCUMENT

ELC	European Landscape Convention
GIS	Geographic Information System
HLF	Heritage Lottery Fund
IoAHC	Isle of Axholme and Hatfield Chase
LCA	Landscape Character Area
LDU	Land Description Unit
LNR	Local Nature Reserve
LPS	Landscape Partnership Scheme
NIA	Nature Improvement Area
NNR	National Nature Reserve
SAC	Special Area of Conservation
SM	Scheduled Monument
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
WFD	Water Framework Directive

APPENDIX B: KEY REFERENCES AND SOURCES OF FURTHER INFORMATION

Published Sources

- Chapman, H and Geary, B (2013) *Modelling Archaeology and Palaeoenvironments in Wetlands: The hidden landscape archaeology of Hatfield and Thorne Moors, Eastern England* Oxbow Books, Oxford
- Cory, V. (1985) *Hatfield and Axholme, an Historical Review* Providence Press, Ely
- Countryside Agency and SNH (2002) *Landscape Character Assessment Guidance for England and Scotland* Countryside Agency
- ECUS for Doncaster Metropolitan Borough Council (2006) *Doncaster Landscape Character and Capacity Study* Doncaster MBC
- Estelle Warren for North Lincolnshire Council (1999) *North Lincolnshire Landscape Character Assessment and Guidelines* North Lincolnshire Council
- Heaton, A. (2001) *Duck Decoys* Shire Books
- Miller, K for the Countryside Commission (1997) *The Isle of Axholme Historic Landscape Characterisation Project* Countryside Commission
- Rotherham, I. (2009) *Peat and Peat Cutting* Shire Books
- Thirsk, J. (1953) *The Isle of Axholme Before Vermuyden* Agricultural History Review, 1.

Websites

Designated sites:

www.magic.gov.uk

Humberhead Levels National Landscape Character Area:

<http://publications.naturalengland.org.uk/publication/1843305?category=587130>

Doncaster Landscape Character and Capacity Study:

http://www.doncaster.gov.uk/sections/planningandbuildings/localdevelopmentframework/evidencebase/Doncaster_Landscape_Character_Assessment___Capacity_Study.aspx

North Lincolnshire Landscape Character Assessment:

<http://www.planning.northlincs.gov.uk/PlanningReports/LocalPlan/SPG5LandscapeCharacterAssessment.pdf>

Humber District River Basin Management Plan (Environment Agency 2009):

<https://www.gov.uk/government/publications/river-basin-management-plan-humber-district>

Yorkshire Wildlife Trust and Humberhead Levels Nature Improvement Area:

<http://www.ywt.org.uk/humberhead-levels-NIA>

The New Countryside Stewardship Scheme:

<https://www.gov.uk/government/publications/cap-reform-introducing-countryside-stewardship>

Maps

Ordnance Survey 1:25,000 Explorer Series sheets 279 and 280

Ordnance Survey 1:50,000 Landranger Series sheets 111 and 112

Cassini Historic Map sets 111 (Sheffield and Doncaster) and 112 (Scunthorpe and Gainsborough)

British Geological Survey 1:625,000 Bedrock Geology UK South

APPENDIX C: TECHNICAL METHODOLOGY

Defining LDUs:

The IoAHC study area was initially sub-divided into a series of *land description units* (LDU for short). LDUs are distinct and relatively homogenous units of land which define and describe the natural (physiography and ground type) and cultural (landcover and settlement) dimensions of the landscape. The process of LDU mapping involves a step by step procedure of data acquisition, processing and synthesis to produce a series of character based overlays incorporating the key factors that contribute to landscape character. These factors are summarised in the GIS database as a series of 2-digit definitive codes, supported by a 2/3 word phrase describing what the code means. GIS-based maps showing geology, landform, soils, landcover and historic patterns were used to produce LDU maps for the study area. The LDUs were drawn on a 1:25,000 base map, and used to generate landscape types (shown in fig. 3).

The definition of discrete LDUs provides a meaningful and structured spatial framework for gathering additional descriptive information about the landscape. The process of LDU mapping and subsequent characterisation with other descriptive data enables broad patterns to be distinguished, which in turn makes it possible to begin to understand the relationship between the many factors that contribute to landscape character. The iterative nature of this process greatly assists in the understanding of how a particular landscape has developed and in assessing the character of that landscape. Once the inherent character of the land has been described, and a landscape typology developed, it is much easier to understand and describe the more intangible aesthetic aspects of the landscape, such as scale, form and enclosure. Although these are the qualities which are most apparent to viewers on the ground, the fact that they are almost invariably controlled by either relief, or the surface pattern of vegetation and land use, explains why LDUs may be used as a basis for defining Landscape Character Types and/or Landscape Character Areas.

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