Historic England

GREAT SHELFORD NEOLITHIC CAUSEWAYED ENCLOSURE

Fiona Small

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SUMMARY
In July 2015, Damian Grady of the Historic England Aerial Reconnaissance team recognised and photographed cropmarks of a possible Early Neolithic causewayed enclosure, near Great Shelford in Cambridgeshire. Given the age and rarity of this class of monument, a detailed survey was undertaken using recent and historical aerial photographs, lidar images and maps. The survey assessed the character, extent and potential of the site in local and national contexts.

The analysis demonstrated the cropmarks indicate a causewayed enclosure surviving as sub-surface features in modern arable, and with the potential for surviving components in adjacent pasture. Other features nearby include cropmarks indicating buried remains of probable Iron Age or Roman settlement enclosures and earthworks of medieval and post-medieval features.

CONTRIBUTORS
Survey, research and report by Fiona Small with input from Damian Grady.

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ARCHIVE LOCATION
The Historic England Archive
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DATE OF SURVEY
31/08/2015

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INTRODUCTION

In July 2015, during Historic England aerial reconnaissance, Damian Grady recognised and photographed cropmarks indicating a buried Early Neolithic causewayed enclosure, near Great Shelford in Cambridgeshire (Fig 1). The enclosure is in a slightly elevated position just north of the current course of the River Cam (Fig 2).

Figure 1 The causewayed enclosure showing as cropmarks on Historic England aerial photograph HEA 29632_019 10-July-2015

The enclosure is at TL 4528 5253, just west of the village of Great Shelford, Cambridgeshire, on a slight rise of about 20m above Ordnance Datum (OD). This raised area appears to be mainly Cretaceous chalk of the West Melbury Marley chalk formation (British Geological Survey 1:50,000 digital geological maps). There are deposits of river terrace gravel over the chalk to the north and south, and a band of alluvium flanks the course of the river (British Geological Survey online1:50,000 scale digital geological map, accessed 11/2015).

The survey described in this report used all available aerial photographs and airborne laser scanning data (lidar) to interpret and map the causewayed enclosure and archaeological features in the immediate environs. Other features nearby include enclosures and tracks of possible Iron Age or Roman date, plus boundaries, quarries and pits of medieval or later origin.

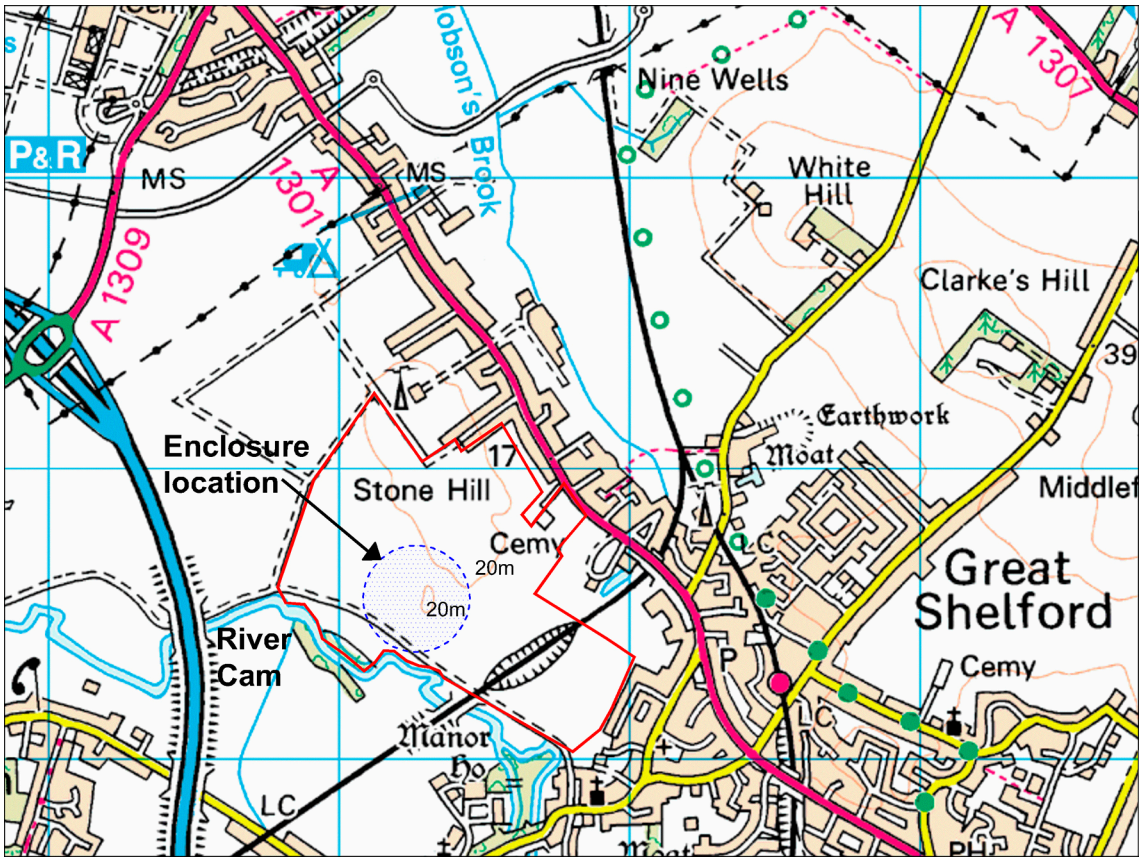

Figure 2 Location of survey area (outlined in red) and the enclosure (outlined in blue). 1:50,000 scale base map: © Crown copyright 2017, all rights reserved. Ordnance Survey Licence number 100024900.

Causewayed enclosures vary considerably in shape and complexity. They range from the simplest single small circuit of segmented ditches to large multi-circuited enclosures with annexes. The overriding common elements are the method of construction; topographical location; their probable functions; and their Early Neolithic date. Where there are regional clusters there often appears to be a lack of consistency in morphology between neighbouring sites. Analysis of plans and excavations of a number of sites also suggests some enclosures were modified during their lifetimes, with existing circuits being altered and new ones added, the final plan perhaps the result of decades, and perhaps centuries of modifications, thus making straightforward comparison between overall site plans too simplistic as a means of analysis.

Causewayed enclosures are typically complete or partial enclosures of an area of variable size – from less than 1ha to around 27 ha - by sub-circular or oval circuits of discontinuous ditch, usually accompanied by a bank. In some excavated instances, the bank has shown evidence of reinforcement or embellishment with a timber structure. Many enclosures appear to have little symmetry, while the segments of ditch and bank and the intervening causeways can vary in size throughout the site. The often considerable quantities of material culture encountered in excavation have led to discussion about the wide range of ritual and communal roles that these sites are believed to have performed, as well as providing

the means for connections to be drawn with other kinds of site, and other regions of the British Isles.

Causewayed enclosures are typically located in three broad topographical zones – river valley floor, river valley side and upland locations. Those located in lowland contexts are frequently located close to rivers or streams, or associated with springs and confluences of rivers.

The Neolithic enclosure at Great Shelford is one of a number identified near the rivers Cam (or Granta), Great Wilbraham, and Ouse (Fig 3). These include an uncertain example at Stapleford (3.7km from Great Shelford) and other slightly more distant sites at Great Wilbraham (10.2km), Landbeach (13km), Haddenham (21.5km), and Kedington (25km) (Oswald et al 2001). A site at Melbourn (13km) is now thought to be a different form of monument, more akin to late Neolithic henge monuments, and a possible site at Southwick has been dismissed a unlikely (Oswald et al 2001). Although each of these enclosures is thought to be Neolithic with segmented ditches, they vary widely in size, shape and number of circuits.

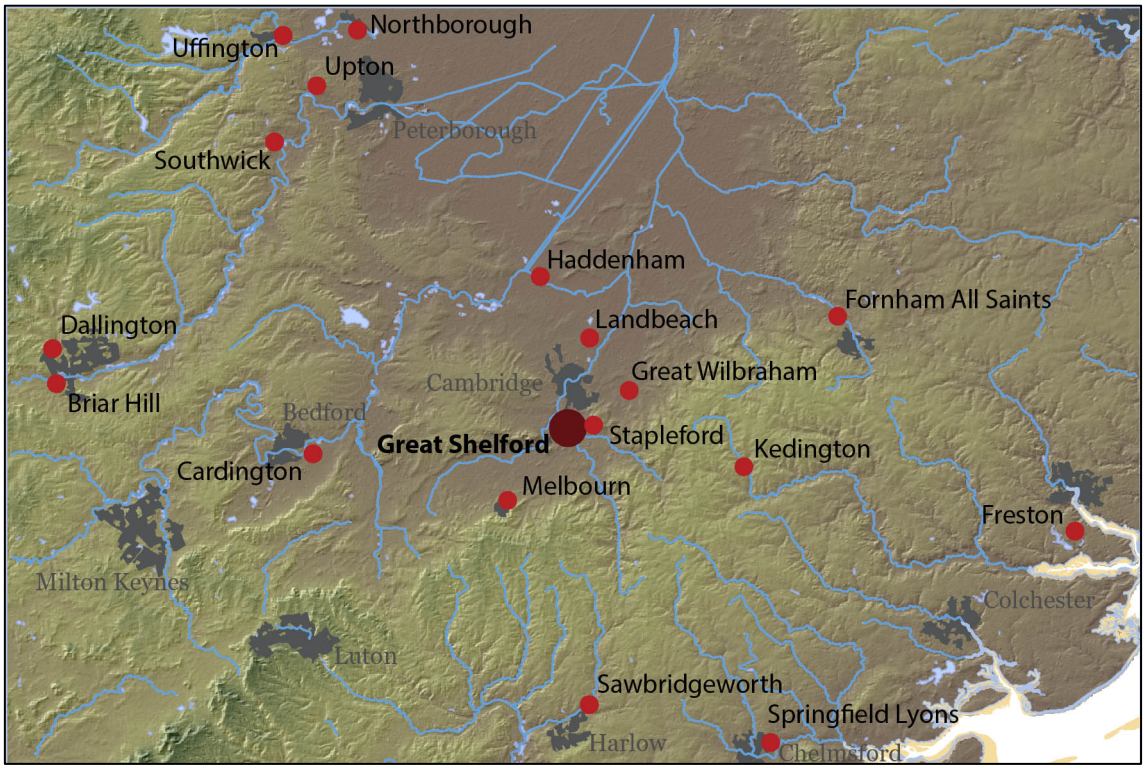

Figure 3 Neolithic enclosures near the rivers Cam (or Granta), Great Wilbraham and Ouse.

SOURCES, PREVIOUS WORK AND METHODS

Sources of aerial photographs included the Historic England Archive (HEA), Cambridge University Collection of Aerial Photography (CUCAP), images supplied to Historic England through the Air Photography for Great Britain (APGB) agreement by Next Perspectives, and online air photo mosaics such as Google Earth and Microsoft BING. The main sources for the causewayed enclosure were the 2015 Historic England oblique aerial photographs (Fig 1) and 2013 APGB vertical aerial photographs (Fig 4).

Figure 4 Part of the causewayed enclosure. Note the area of possible deeper soil indicated by the band of darker crop across the top-left to centre of the photo and the geological and archaeological cropmarks in the far top left of the photo. Air Photography for Great Britain (APGB) tile TL4552 19-July-2013.

There are HEA vertical aerial photographs of the area taken at intervals since the 1940s mainly for topographical mapping and planning purposes. Parts of the causewayed enclosure are recorded incidentally on these from 1969 to the present. The cropmarks indicating Iron Age and Roman features to the west of the causewayed enclosure were photographed from a light aircraft during archaeological prospection. There are oblique photographs of the area in the CUCAP collection taken from 1948 onwards and in the Historic England Archive taken from 1975 onwards. The causewayed enclosure was only noted on the 2015 HEA aerial photographs.

Multiple visualisations were created from 1m resolution Environment Agency airborne laser scanning data (lidar) from 2009 using the Relief Visualisation Toolbox (Kokalj et al 2011). The 16 direction hillshade was most useful for recording medieval earthworks across the survey area.

Previously the area, or part of it, has been the subject of desk based assessments to support various planning proposals but the causewayed enclosure was not recognised. An arc of five ditch segments (approximately in the location of the causewayed enclosure) are recorded on a composite sketch plot of archaeological features around Great Shelford. The sources for the plot are not known but may be photographs held by Cambridgeshire County Council. This composite plot was for a publication (Taylor 1997, 59) and subsequently incorporated into an archaeological evaluation report for a planning application for a small development to the north of the site (Smith et al 2008).

Relevant oblique and vertical aerial photographs were scanned and then georeferenced and rectified using the University of Bradford/John Haigh AERIAL 5.35 software. Ordnance Survey 1:2,500 MasterMap® vector data provided control information and use of Ordnance Survey 5m contour data corrected height differences across the survey area. The accuracy of rectified images is normally to within an average of ±2m of the source used for control. Archaeological information was traced from lidar data and rectified images in AutoCADMap 3D 2012.

All archaeological features were mapped including earthworks and buried remains seen as cropmarks within fields between the River Cam and the west of Great Shelford village (Fig 1). Archaeological features mapped included the buried remains of the Neolithic causewayed enclosure and Iron Age and/or Roman enclosures and tracks. The underling geology and soils also caused cropmarks in the area, sometimes confusing or masking the archaeological remains (Fig 3). Medieval and later features were seen as earthworks on aerial photographs and lidar data.

AERIAL INVESTIGATION AND MAPPING

The causewayed enclosure

The causewayed enclosure has three arcs of interrupted ditch (Fig 5). All three circuits extend towards a single line of segmented ditches to form a straight north-eastern side. Assuming that a complete enclosure circuit may once have existed, the cropmarks represent the northern part of a large sub-circular enclosure – perhaps between a third and a half of a site measuring up to 300m by 250m. Within and around all three circuits are faint traces of irregular linear marks and pits, many likely to be geological in origin. Although less well defined, they are similar to the geological markings visible to the west of the main enclosure.

As is common with causewayed enclosures, the individual ditch segments appear irregular in construction, with various lengths and widths. The ditch segments measure between 6m and 14 m long and between 2.5 and 5.5m wide, though they are typically 2.5-3.5m wide. The causeways between the ditches measure from 2m to 8m long.

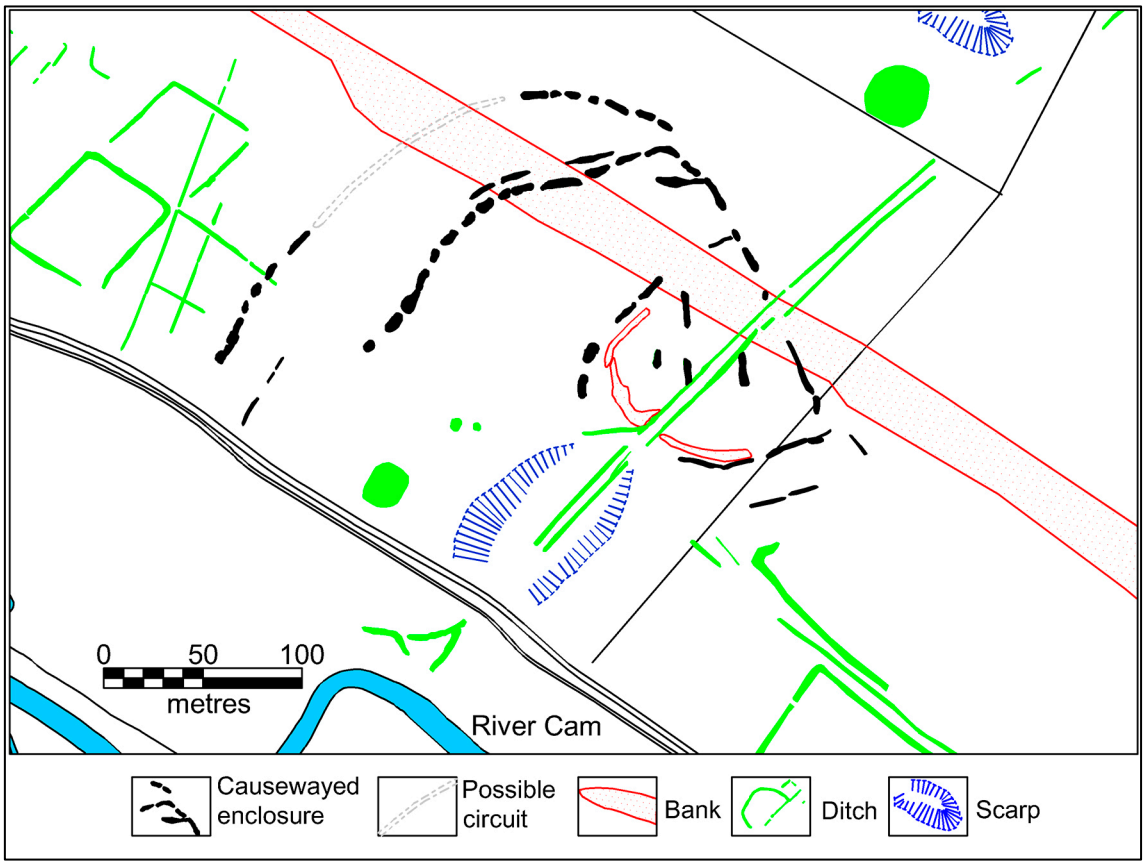

Figure 5 Plan of the causewayed enclosure and other archaeological features. 1:2500 scale base map © Crown copyright 2017, all rights reserved. Ordnance Survey Licence number 100024900.

The outer of the three interrupted ditches describes an arc of approximately 290m in diameter. The northern and south-western ends of this side of the enclosure comprise what appears to be short segments (5m to 10m long and c 3.5m wide) separated by small causeways of c 4m between them. The appearance of the middle section of this circuit is affected by an area of deeper soil where the archaeological cropmark is less well defined. A dashed line indicates this portion on the plan.

The middle ditch circuit follows a shallower curve and runs broadly parallel to the north-western part of the outer circuit for 190m. It joins the outer circuit just east of the apex of the curve of the outer circuit. There are three possible ditch segments extending parallel to the north of the middle circuit.

The inner circuit is also broadly parallel to the outer two but appears much shorter, at about 115m long. It forms part of a 'D' shaped enclosure attached to the straight north-eastern side of the causewayed enclosure. The D-shaped arrangement of interrupted ditches encloses an area measuring approximately 110m by 105m. The southern and eastern portions of this inner-most circuit are visible as very faint cropmarks, as are possible traces of an inner bank seen as a faint pale cropmark on a 1969 vertical aerial photograph (MAL 70069/014 22-JUL-1969). The same photograph show the faint traces of two further segments of ditch possibly the southern return of the inner circuit.

It is possible that the enclosure was never a complete circuit, but if it was then the south-western extent may lie within the narrow field between the present field boundary and the current course of the river with the possibility of parts of the circuit truncated by the meandering course of the river. This field has been under pasture since at least 1922 suggesting the possibility of enclosure remains surviving in the parts of this field unaffected by the erosion and deposition of riverine material since the Neolithic.

The enclosure bearing the closest resemblance to the Great Shelford example is at Briar Hill, Northamptonshire to the west on the River Nene (Oswald et al 2001, 56). This also has an enclosure attached to a larger outer enclosure, probably representing one or more phases of construction. Though there is the shared concept of enclosure with segmented ditches, the actual shape and size of these enclosures is however quite different.

Later prehistoric or Roman archaeological features

A double-ditched track extends from the north-east of the survey area towards the river and a possible crossing point (Fig 6). The track passes through the centre of the D-shaped central enclosure of the causewayed enclosure. This track is likely to be later prehistoric or Roman in date, post-dating the enclosure. Towards its south-western end it descends into an elongated hollow, possibly a natural gully which became enlarged with the passage of the track. This hollow way may have encroached on the remains of the causewayed enclosure at its southern extent. A second double-ditched track with fragments of associated rectangular ditched enclosures extends to the south-east of the causewayed enclosure. It is possible that

these double ditched features are fragments of a later prehistoric or Roman field system.

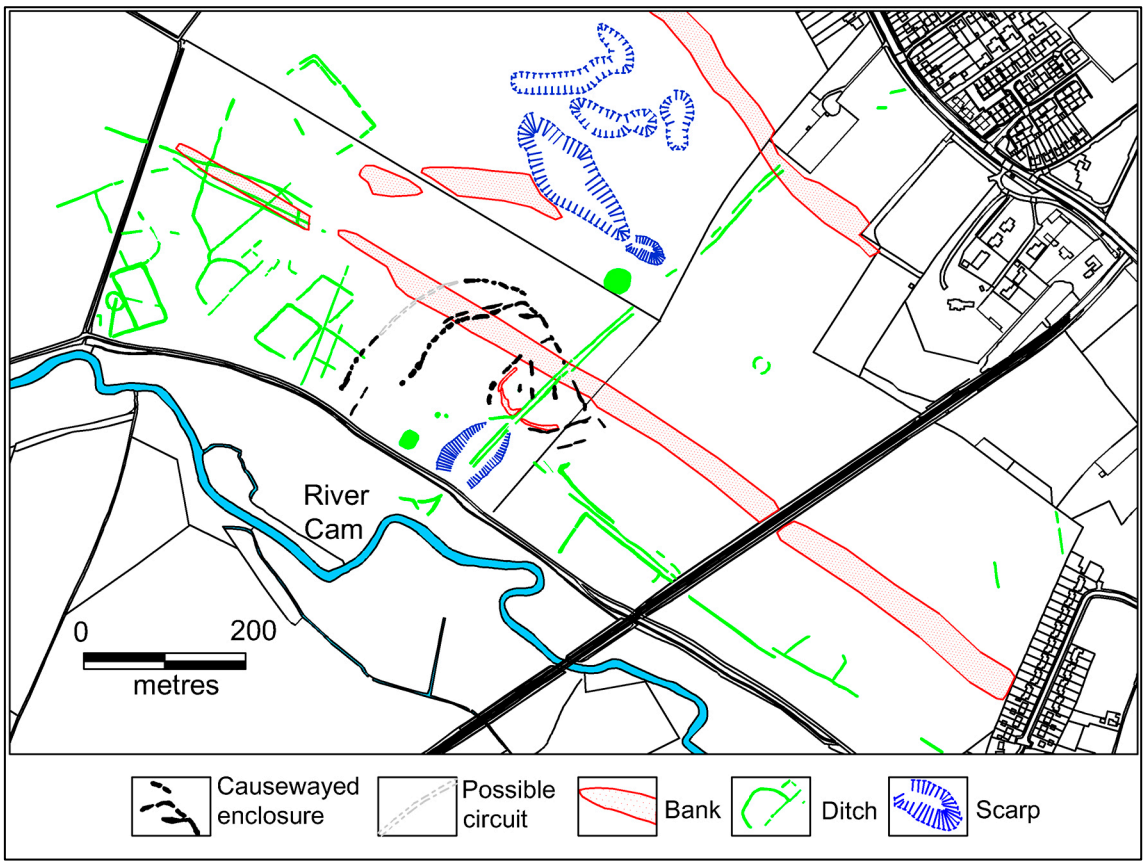

Figure 6 Archaeological remains visible as cropmarks and earthworks around the causewayed enclosure. 1:2500 scale base map © Crown copyright 2017, all rights reserved. Ordnance Survey Licence number 100024900.

There is an incomplete cropmark of a ring ditch measuring about 20m across in the field to the east of the causewayed enclosure. This may once have surrounded the mound of a Bronze Age round barrow, or other ceremonial or funerary monument. Alternatively, it may have been the drip gully of the roof of a large round house.

A similar more complete cropmark of another ring ditch is at the western end of the field with the causewayed enclosure. The ditched boundaries and enclosures indicated by cropmarks in the same area could have Bronze Age origins but it is difficult to date from the current evidence and they have a likely date range from the later prehistoric through to the Roman period. They probably indicate several phases of settlement and land use.

Excavations and fieldwork in adjacent fields to the west in the late 1970s and early 1980s confirmed the presence of intensive occupation along the banks of the River Cam or Granta from the prehistoric to the Iron Age/Roman period. There were a few finds of worked and waste flints along with a single polished Neolithic flint axe. Cropmarks indicated remains of settlement activity which when excavated proved to have numerous phases of occupation and development, most from the Iron Age

and Roman periods. Most finds were from the 1st to 4th centuries AD (Bradford 1968). Subsequent work on these enclosures to the west identified further 4th century ditches and traces of a building (Taylor 1982).

The cropmarks in these western fields were mapped from aerial photographs and incorporated into a number of publications and archaeological assessments (Palmer 1991, Taylor 1997, Whittaker et al, 2002 and Smith, 2008). Observations and fieldwork did not extend into the eastern half of the field containing the causewayed enclosure.

Medieval or later features

A long low bank extends WNW-ESE for over 1.2km across a number of fields (Fig 7). It is probably the remains of a medieval plough headland or an earlier boundary. There are similar long boundaries in west Cambridgeshire that may be vestiges of an early system of land division, possibly from the early medieval period. The bank is visible on nearly all the aerial photographs as a slight earthwork and chalky soilmark, and on lidar images as a long low spread earthwork. The bank extends across the north-east third of the causewayed enclosure and may provide additional protection to archaeological features beneath it.

There are several former chalk or gravel pits to the north and south of the causewayed enclosures. Those to the north are visible as slight earthwork depressions on the lidar image. Some are marked as gravel pits on the mid-19th century first edition Ordnance Survey maps. However, it is possible some relate to chalk extraction were they coincide with the West Melbury Marley chalk formation.

Figure 7 An extract of Environment Agency 1m lidar tiles TL 4452_DSM_1m.jpg and TL 4552_DSM_1m.jpg17-APR-2009 showing the linear earthwork of a possible headland bank aligned NW-SE and traces of gravel quarrying in the field to the north.

HISTORY OF LANDUSE

Aerial photographs indicate different land use at intervals from the 1920s. This information can demonstrate whether past farming regimes may have harmed sub-surface archaeological remains. There were three fields by the Cam in the mid-20th century (Fig 8). The 1886 Ordnance Survey 1st edition 2" map show fields 1 and 1a were a single large field. The earliest available aerial photographs of the area taken in 1922 show the field still as a single undivided parcel of land but under two cropmark regimes. In 1987, the division between fields 1 and 1a changed to a more perpendicular line from the corner of the field to the north. Between 1991 and 2000, a hedge made this boundary permanent. This is the alignment now recorded by the Ordnance Survey.

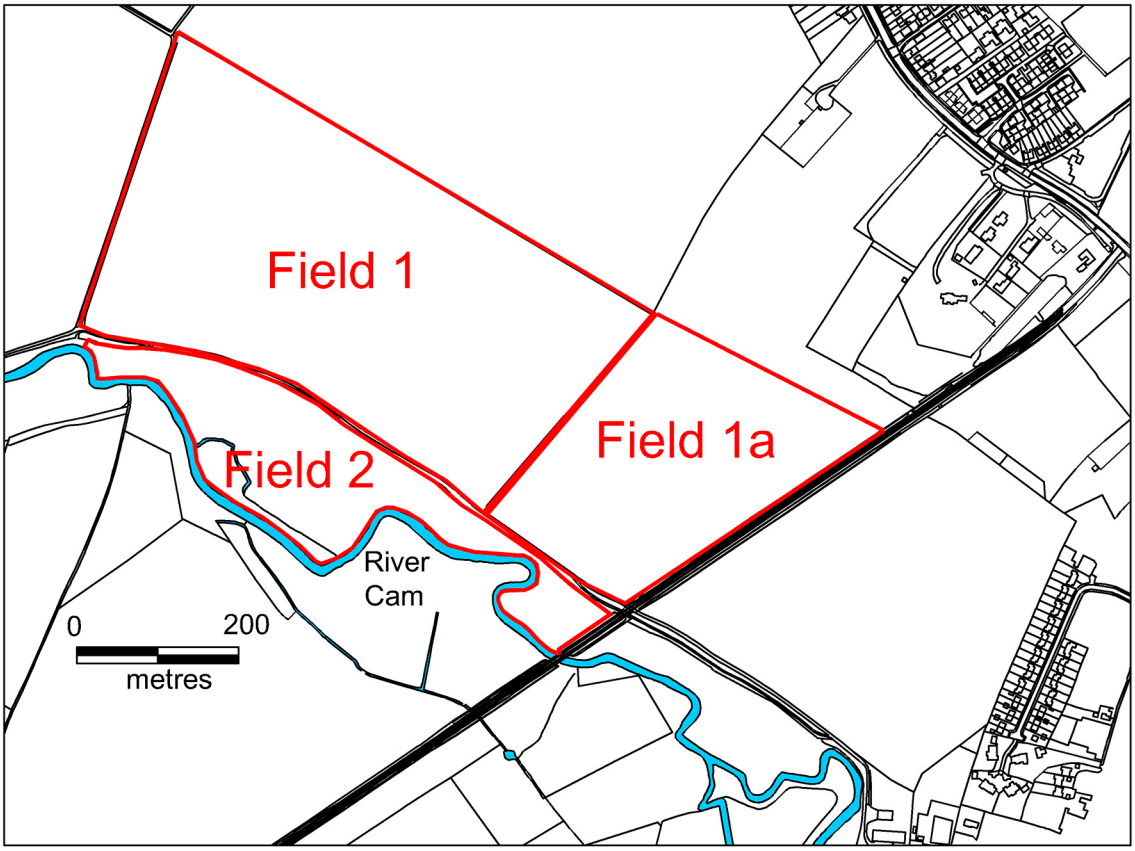

Figure 8 The current field layout. 1:2500 scale background mapping © Crown copyright and database right 2017, all rights reserved. Ordnance Survey Licence number 10002490

In 1922 fields 1 and 1a were cultivated under two regimes split between an unidentified combinable (cereal) crop and pasture. Since then both fields 1and 1a were planted with a range of combinable (cereal) crops. Field 1a was recorded on two occasions (July 1995 and July 2015) under a root crop thought to be potatoes. Potato cultivation is particularly damaging to underlying archaeology because of the deep planting methods and removal of large quantities of soil during harvest. This and any other unrecorded episodes of root crop cultivation on the site may have

caused disturbance to the upper levels of the surviving archaeological features on the south-eastern side of the causewayed enclosure.

In contrast, aerial photographs indicated that the field adjacent to the river (Field 2) was in pasture since the 1920s, with evidence of periodic mowing and grazing recorded on photographs from 1972. This absence of deep ploughing through the 20th and early 21st centuries suggests the potential for better survival of any buried archaeological remains here. This would include parts of the causewayed enclosure if it does extend into this field.

Figure 9 View of the area showing the potato cultivation in the field to the east of the causewayed enclosure (right foreground of the photo), pasture adjacent to the river and arable in the fields to the north of the river. HEA 29362_036 10-July-2015.

The cropmarks recorded in 2015 indicate that the causewayed enclosure survives as a sub-surface feature (Fig 9). There is no direct correlation between the preservation of buried archaeology and the clarity, and the frequency of appearance of cropmarks. It is therefore not possible to tell how deeply buried or well preserved the sub-surface remains of the causewayed enclosure are. The areas of potentially deeper soils indicated by the darker crops over the western parts of the causewayed enclosure may offer some protection from modern ploughing. The presence of the medieval headland or earlier boundary will better protect part of the site from modern ploughing but indicates that the area was probably ploughed during the medieval period.

CONCLUSION

The review of aerial photographs and lidar provided a detailed and accurate interpretation and mapping of the form and location of the causewayed enclosure and other archaeological features in the vicinity. The causewayed enclosure was not seen in the field adjacent to the river. This is mainly due to the field being under pasture since the date of the first available aerial photograph in 1922. Grass, particularly in a riverside location such as this, does not usually lend itself to the generation of cropmarks or parching except in drought conditions. However, if the enclosure ditches do form a complete circuit, or if – as in some examples – the enclosure is open towards the river, but the ditches do continue this far, it is likely that sub-surface preservation would be higher due to the absence of cultivation, while closest to the river the potential for waterlogged deposits perhaps needs to be considered. The 2015 cropmarks imply the survival of archaeological features below the surface, which in turn suggests the probable survival of the earliest phases of ditch fills, representing the period of construction and primary use of the enclosure.

Only a small number of Neolithic enclosures are known to survive as earthworks (15 known in 2001) and most survive as sub-surface features seen as cropmarks (Whittle et al, 2011). Ground survey, excavation and analysis has only been undertaken on around half of the known sites, with less than a dozen subject to modern excavation over a substantial area (Oswald et al 2001, 54). However, the considerable quantities of material culture and environmental remains often encountered in excavation allow assessment of date and function and connections can be made with other sites in the immediate and wider vicinity, as well as (potentially) further afield. A recent nationwide review of radiocarbon dates (Whittle et al 2011) showed causewayed enclosures in the British Isles first appearing in the 38th century BC, and flourished particularly in the 37th and 36th centuries BC. Construction and primary use tailed off towards the end of the 36th century BC, but some sites continued into the 34th and 33rd centuries BC.

Neolithic causewayed enclosures are among the oldest and rarest archaeological monument types in the British Isles. They are the earliest known enclosures and have a distinctive form. Given the rarity of examples of this class of monument, the enclosure at Great Shelford is worthy of further investigation.

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