

# Archaeological geophysical survey of the proposed Midway Park development site at M1, Junction 16 Northamptonshire April to May 2015

Report No. 15/86

Author: John Walford

Illustrator: John Walford



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# Archaeological geophysical survey of the proposed Midway Park development site at M1, Junction 16 Northamptonshire April to May 2015

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## **OASIS REPORT**

PROJECT DETAILS	Oasis No. molanort1-212497				
Project name	Archaeological geophysical survey of the proposed Midway Park				
	site, M1 Junction 16, Northamptonshire				
Short description	MOLA was commissioned to carry out a detailed magnetometer				
	survey of the proposed Midway Park development site adjacent to				
	Junction 16 of the M1. The survey identified undated ring ditches, a				
	probable late Bronze Age to early Iron Age pit alignment, an Iron				
	Age to Roman settlement and field system, medieval ridge and				
	furrow, a post-medieval watermill and a possible post-medieval lime				
	kiln. A probable palaeochannel of the River Nene was also				
	detected.				
Project type	Geophysical survey				
Site status	None				
Previous work	Desk-based assessment (Crothers forthcoming)				
Current Land use	Arable and pasture				
Future work	I rial trench excavation				
Monument type/ period	Possible Neolithic to Bronze Age ring ditches.				
	Late Bronze Age to early Iron Age pit alignment				
	Iron Age to Roman settlement				
	Nedleval ridge and furrow				
Cignificant finds	Post-medieval watermili and possible lime kiln				
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Sludy area					
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	C 70-85m aOD				
Organization	MOLA Northampton				
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Project brief originator	Lesiey-Ann Matner, Northamptonshire County Council				
Director/Supervisor					
Director/Supervisor					
Project Manager	Adam rales				
	widway South Liu				
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End date	20 April 2014				
	Location	Contont			
Physical					
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# Archaeological geophysical survey of the proposed Midway Park development site at M1, Junction 16 Northamptonshire April to May 2015

# ABSTRACT

MOLA was commissioned to carry out a detailed magnetometer survey of the proposed Midway Park development site adjacent to Junction 16 of the M1. The survey identified undated ring ditches, a probable late Bronze Age to early Iron Age pit alignment, an Iron Age to Roman settlement and field system, medieval ridge and furrow, a post-medieval watermill and a possible post-medieval lime kiln. A probable palaeochannel of the River Nene was also detected.

### 1 INTRODUCTION

MOLA was commissioned by Midway South Ltd to conduct a geophysical survey of the proposed Midway Park development site to the east of Junction 16 of the M1 (NGR SP 681 596; Fig 1). The total area of the proposed development area was c 47ha, of which c 45 ha were pasture and arable fields suitable for survey.

A magnetometer survey was undertaken from 20th April to 1st May 2015 in order to identify and map any archaeological remains likely to be affected by the proposed development. The work was undertaken in consultation with Lesley-Ann Mather, the Northamptonshire County Archaeological Advisor, and was recorded on the Northamptonshire Historic Environment Record under event number ENN107956.

### 2 BACKGROUND

### 2.1 Topography and geology

The proposed development area lies immediately east of Junction 16 of the M1, approximately 5km west of Northampton. It comprises an elongated block of arable and pasture fields to the south of the A4500 Weedon Road and a small corner of land in an arable field to the north of this road (Fig 2). The greater part of the area lies in Harpole parish, but its two westernmost fields lie in Upper Heyford.

The topography of the proposed development area comprises a gentle south-facing slope which is largely encompassed between the 70m and 85m contour lines. The River Nene defines part of the southern boundary of the area, and a minor tributary of the Nene flows across its western half. Geological mapping indicates that a broad swathe of alluvium lies alongside these two watercourses that and strata of the Dyrham Formation (Middle Lias) underlie the rest of the area (BGS 2015).

The area of land to the north of the A4500 was under a well-developed oil-seed rape crop at the time of the fieldwork and could not be surveyed (Fig 2). The westernmost field and some small areas alongside the M1 to the south were similarly unsurveyable, being derelict and badly overgrown. The survey also excluded the grounds of the Red Lion truckstop, which is located south of the A4500 towards the centre of the proposed development area (Fig 2). However the remaining land, which was all under pasture or low crop, was surveyed without difficulty.

#### 2.2 Historical and archaeological background

An archaeological desk-based assessment of the proposed development area is presently underway and will provide a comprehensive discussion of the archaeological background to this project (Crothers forthcoming). To avoid needless repetition, the following summary highlights only the few most relevant facts.

Prior to the present survey there was little evidence for prehistoric archaeology within the proposed development area. In contrast, Roman settlement had been attested by the discovery in 1846 of a Roman villa with mosaic floors. The site of this discovery is thought to be about 300m east of the Red Lion, under the present line of the A4500. A geophysical survey was undertaken in 'Harpit Field', immediately north of this location, in 2008 and revealed a complex of rectilinear enclosure ditches over an area of at least 2ha (Butler 2008) (Fig 2).

The eastern part of the proposed development area incorporates several pasture fields in which there are earthworks of a medieval to early post-medieval ridge and furrow field system. The site of the former Harpole Mill lies at the south-eastern corner of the area, alongside the River Nene (Fig 2). The presence and layout of the mill buildings in the nineteenth century is well-attested by early editions of the Ordnance Survey map, but earlier historical evidence is sparse (Crothers forthcoming).

### 3 METHODOLOGY

The magnetometer survey was conducted with Bartington Grad 601-2, twin sensor array, vertical component fluxgate gradiometers (Bartington and Chapman 2003). These are standard instruments for archaeological survey and can resolve magnetic variations as slight as 0.1 nanoTesla (nT).

An independent network of 30m grid squares was established across each of the fields to be surveyed. These grids were set out with a tape measure and optical square and were tied in to the Ordnance Survey National Grid by means of a Leica Viva RTK GPS. The gradiometers were carried at a brisk but steady pace through each grid square, collecting data along 1m spaced traverse lines. Measurements were automatically triggered every 0.25m along the traverses, giving a total of 3600 measurements per square. All fieldwork methods complied with the guidelines issued by English Heritage and by the Chartered Institute for Archaeologists (EH 2008; CIfA 2014) and with a method statement approved by Lesley-Ann Mather the County Archaeological Advisor.

The survey data were visualised in Geoplot 3.00v and were largely processed using the same software. Striping, caused by slight imbalances between the sensor probes, was removed where possible with Geoplot's 'Zero Mean Traverse' function, although some data grids had to be de-striped separately, using an Excel spreadsheet based routine, in order to preserve linear anomalies lying parallel to the traverse direction. The 'Destagger' function in Geoplot was used as necessary to correct reading displacements caused by an uneven survey pace.

The processed data is presented in this report as a greyscale plot (range +10nT to -10nT / black to white), rotated and scaled for display against the Ordnance Survey base mapping (Figs 3 and 5). Detailed interpretative plots are provided as Figures 4 and 6, and a labelled plot of the main archaeological features as Figure 7. Plots of the unprocessed data are presented in Figures 8 and 9.

#### 4 SURVEY RESULTS

#### 4.1 General comments

The results of the survey indicate that a complex of archaeological remains extends across *c* 9ha of land in the eastern half of the proposed development area, between the A4500 and the River Nene. This site contains remains of probable prehistoric to Roman date, and incorporates four foci of activity interspersed with other areas where the remains are less dense. The remains of the post-medieval Harpole Mill, which formerly stood in the south-eastern corner of the development area, have also been detected.

Ridge and furrow cultivation of medieval to early post-medieval date has been detected across virtually all of the eastern and central parts of the survey area. It overlies and sometimes obscures the earlier archaeological remains, hindering their detailed interpretation. In particular the ridge and furrow has resulted in some features having an interrupted appearance, producing much stronger and clearer anomalies where they are well preserved on the ridges and much weaker anomalies where they have been truncated by furrows. This effect is particularly apparent in those eastern fields where the ridge and furrow still survives as earthworks.

As well as archaeological features, the survey has detected various modern features and geological ones. Of particular note are the pipelines and electricity cable which cross the eastern half of the survey area and the large feature, interpreted as an abandoned river channel, which extends across two of the western fields.

#### 4.2 Archaeology

#### Iron Age to Roman settlement and field system

The majority of the archaeological anomalies represent a large, multi-focal settlement and associated field system of Iron Age to Roman date occupying the sloping ground above the Nene floodplain. The settlement has three main foci of activity (Fig 7 A, B and C), each with its own distinct character. Between these there are relatively open areas which may represent fields and stock enclosures contemporary with the settlement.

At the western end of the settlement, south-east of the Red Lion truckstop, a closelyspaced chain of weak positive anomalies marks the course of a pit alignment (Fig 7 D). This feature is at least 160m long, but its southern terminal cannot be identified as the anomalies become progressively weaker and less distinct as they head southwards towards the Nene floodplain. Pit alignments such as this are common features in the Nene valley and typically represent boundaries of late Bronze Age to early Iron Age date.

The pit alignment is joined from the east by a linear anomaly representing a ditch, and these two features partly delimit one of the foci of settlement (Fig 7, A). At their junction there is a concentric pair of sub-square enclosures, the outer of which has a funnel entrance from the east. Further north and east the survey has detected less coherent sets of ditches which seem to represent parts of several other overlapping enclosures. The overall form and layout of these features would be consistent with an Iron Age date, as would their apparent association with the pit alignment.

The second focus of settlement (Fig 7, B) is located against the northern edge of the proposed development area. It contains a dense set of poorly resolved of magnetic anomalies which appear to represent a rectilinear pattern of ditches defining small enclosures. These are partially obscured by the unusually strong ridge and furrow anomalies which overlie them. The enhancement of ridge and furrow anomalies is a commonly observed phenomenon, arising when magnetic debris (ceramics, slag, burnt

soil, etc) from settlement features becomes incorporated into the topsoil and distributed along the direction of ploughing. It seems reasonable to suggest that the particular enhancement occurring in Area B may be due to materials deriving from the Roman villa which is believed to lie just to the north, beneath the A4500.

The third and largest focus of settlement (Fig 7, C) extends across the two eastern fields of the proposed development area. It contains a palimpsest of anomalies representing rectilinear enclosures and associated settlement features. The enclosures exhibit a degree of regularity in their layout, especially in the southern half of the area, and this suggests an origin in the Roman period is most likely.

On the eastern edge of Area C there is a weak but distinctive curvilinear anomaly which represents part of the footings of a roundhouse (Fig 7, C1). It has small south-east facing entrance gap flanked by terminals that show a slight magnetic enhancement. Whilst no other certain roundhouses have been detected, it is possible that examples may be represented by some of the small curvilinear anomalies that occur within this area.

Another possible structure is represented by a row of three small, discrete positive anomalies in the south-eastern part of Area C (Fig 7, C2). These would be consistent with large postholes or hardcore foundation pads. A short linear anomaly extending at right angles to these might mark another side of a putative building and, on detailed inspection, seems to be composed of closely-spaced discrete anomalies suggestive of further postholes (Fig 5, inset).

To the south and south-west of the Iron Age to Roman settlement there are a series of weak linear anomalies, some of them paired and all of them following more or less parallel east - west alignments. The significance of these is uncertain, but one plausible interpretation would be that they represent traces of strip fields associated with the settlement. They have thus been indicated as archaeology on the interpretation plot (Fig 6). However, the evidence is equivocal and alternative interpretations, such as modern field drains, cannot be fully excluded.

#### Other pre-medieval remains

A cluster of positive magnetic anomalies occurs near to the south-eastern corner of the proposed development area, slightly apart from the Iron Age to Roman settlement (Fig 7, E). The two main elements of the cluster are an annular and a penanular anomaly which represent slightly overlapping ring ditches with diameters of approximately 22m and 13m. These could represent Neolithic to Bronze Age monuments (round barrows or small henges) or an enclosure and a roundhouse of Iron Age to Roman date.

Around the two ring-ditches the survey has detected a very disjointed and fragmentary set of magnetic anomalies indicating the presence of other ditches and pits, possibly including further ring ditches. It is not known why the outlying anomalies should appear so weakly relative to the main ring ditches, but it is possible that they are partially masked by a thin layer of alluvial overburden whilst the main ring ditches stand very slightly proud of the alluvium on the crest of a gravel island.

Two hundred metres north-west of the ring ditches, on the edge of the Iron Age to Roman settlement, the survey has detected an oval-shaped feature which measures  $c 9m \times 13m$  across and has a possible small gap in its western end (Fig 7, F). As with the ring ditches, this is open to various interpretations and can only be dated broadly as prehistoric or Roman.

A positive linear anomaly aligned north-west to south-east has been detected in the westernmost field, distant from the main concentration of archaeological remains (Figs 3-4). It is likely to represent a ditch and, as it bears no obvious relation to the modern landscape or the medieval ridge and furrow, it may prove to pre-date the medieval period. To its south, there is a small group of localised positive anomalies which probably have a geological origin but could conceivably represent pits.

#### Medieval ridge and furrow

The survey has detected widespread sets of parallel linear anomalies representing ridge and furrow cultivation of medieval to early post-medieval date. These are most apparent in the eastern fields, where the ridge and furrow survives as earthworks, and become very indistinct in the western part of the survey area. This may be partly a reflection of different states of preservation, but it may also indicate that the soils in the western part of the site are less favourable for magnetic survey than those to the east.

The furrows are predominantly oriented north to south, following the direction of slope and the majority exhibit characteristic elongated 'reversed-S' curves, where the plough team would have turned slightly on approach to the headlands. Some complexity is apparent in the arrangement of the furrows, with areas of overlapping anomalies where furrows have been lengthened and headlands over-ploughed. There is also a small area in the eastern field where two perpendicular sets of furrows cross each other, demonstrating a shifting of the boundary between two adjacent furlongs.

In the second field from the east there is an elongated zone of irregular form in which no furrows have been detected (Fig 7, G). This appears to be a genuine feature of the medieval field system rather than a product of later destruction, as the furrows which abut the 'empty' zone show signs of turning and tapering to a deliberate end rather than being abruptly truncated. Its interpretation is uncertain but one possibility is that it represents a belt of meadow ground that was never subjected to ploughing.

#### Harpole Mill and potentially associated features

The survey has detected a sub-rectangular zone of small, densely clustered, dipolar anomalies and data spikes ('magnetic noise') which corresponds closely to the position of the buildings of Harpole Mill as depicted on the first edition Ordnance Survey map (Fig 7, H). The cause of this noise is likely to be a spread of magnetic debris, including brick rubble and scrap metal overlying the remaining foundations of the buildings. A narrow curvilinear band of magnetic noise extending east from the former buildings corresponds to the former access road, and probably represents a residual deposit of hardcore.

To the east of the former mill buildings there are two positive anomalies, one linear and the other forming a sub-rectangular loop. These do not correlate with any features on the available nineteenth-century mapping but could represent a boundary and an enclosure ditch of earlier date, either associated with the mill or with the much earlier ring ditches and other features that lie to the west.

Various linear anomalies have been detected in the small pasture fields south-west of the mill, on the floodplain of the Nene (Figs 5-6). They divide into two distinct categories, narrow positive linear anomalies and broader negative linear anomalies, with the former perhaps most plausibly interpreted as man-made channels and the latter as drains. It is possible that some of the putative channels relate to water management associated with mill. Alternatively, an interpretation as elements of a water meadow could be suggested.

#### Other post-medieval archaeology

Approximately 150m west of Harpole Mill, the survey has detected a moderately intense (45 - 50nT) tadpole-shaped positive anomaly which overlies a plough-headland of medieval to early post-medieval date (Fig 7, I). The form of the anomaly is reminiscent of the firing chamber and stoke-hole of a lime kiln, and the intensity of the response is consistent with a concentration of scorched earth and ceramic debris. On these grounds, an interpretation as a post-medieval lime kiln is suggested.

The survey has detected three small areas of magnetic noise (Figs 5-6) which correlate with barns of presumed nineteenth-century date depicted on the first edition Ordnance Survey map. As with the mill buildings described above, the 'noise' can be attributed to residual scatters of brick rubble and scrap metal deriving from the demolition of these former structures.

The survey has not detected certain evidence for any of the former field boundaries which can be identified from the first edition Ordnance Survey map. However, one example may possibly be represented by a very weak negative linear anomaly which extends part of the way across the westernmost field surveyed.

#### 4.3 Modern features

The survey has detected several anomalies relating to modern utilities (Figs 5-6). The most conspicuous are a pair of very large and intense linear anomalies of alternating magnetic polarity which pass across the eastern half of the survey area. One of these corresponds to a high pressure gas main and the other is thought to represent a chalk-slurry pipe operated by Cemex UK. Two much smaller linear anomalies with similarly alternating polarity occur in the far south-east of the survey area and are suspected to represent pipes associated with the former buildings at Harpole Mill. Furthermore, the survey has detected a weak linear anomaly which corresponds to an electricity cable crossing the field to the east of the Red Lion truck stop.

Intense dipolar anomalies occur widely across the survey area. Most are small and will relate to fairly insignificant pieces of scrap iron (horseshoes, ploughshares, *etc*) within the ploughsoil but a group of larger examples have been detected to the west of the Red Lion. Two of these were observed to arise from water troughs and a third from metal fencing around a tree. The causes of the others were not observed but they are likely to relate to similarly modern objects.

In the westernmost field of the survey area (Figs 3-4) a series of negative linear anomalies have been detected. These run parallel to the eastern and western field boundaries and probably represent modern furrows where the cultivated ground gives way to strips of set-aside.

#### 4.4 Geology

At the western end of the survey area a broad curving positive anomaly *c* 200m across has been detected. This is strongly indicative of a former river meander; possibly one which persisted as an oxbow lake for some time after ceasing to be an active channel. Various other amorphous positive anomalies in the southern half of the survey area are also likely to have a fluvial or alluvial origin, but are not diagnostic enough to interpret more specifically.

A substantial number of small discrete positive anomalies are distributed widely across the western fields of the survey area. Such anomalies are often associated with Lias geology, and very similar examples were found on a previous survey c 3km to the east

at Upton (Butler 2006). Their precise cause is unknown, but it is possible that they relate to pockets of iron pyrites or other magnetic minerals.

#### 5 CONCLUSION

The survey has identified archaeological remains covering *c* 9ha of land in the eastern half of the proposed Midway Park development site. These include ring ditches, enclosures, a field system and a pit alignment of probable prehistoric to Roman date as well as medieval ridge and furrow earthworks, a post-medieval watermill and a possible post-medieval lime kiln. Relatively little of archaeological interest has been detected in the western half of the proposed development site, although the survey results indicate that a former river channel is probably present.

The results from the eastern and central parts of the site are thought to provide a fairly reliable indication of the presence and layout of the archaeological remains, although some small and ephemeral features will inevitably have escaped detection (*cf* EH 2008, 14). The reliability of the results from the two westernmost fields may be slightly lower as the weakness of the ridge and furrow anomalies in this area suggests that soil conditions are not entirely favourable for magnetic survey.

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MOLA 9 June 2015





Scale 1:25,000

Site location Fig 1



Scale 1:10,000

Site overview Fig 2



Scale 1:2500

Magnetometer survey results (west) Fig 3



Magnetometer survey interpretation (west) Fig 4



Scale 1:2500

Magnetometer survey results (east) Fig 5



Magnetometer survey interpretation (east) Fig 6





Unprocessed magnetometer data (west) Fig 8



Scale 1:2500

Unprocessed magnetometer data (east) Fig 9

# MOLA







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