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WYAS

**East Moor Pipeline  
North Yorkshire**

*Geophysical Survey*

*Volume I*

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# East Moor Pipeline, North Yorkshire

## *Geophysical Survey*

### *Volume I*

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#### **Summary**

*A geophysical survey covering approximately 9.5 hectares, on eight different sites was carried out along the projected route of the East Moor Pipeline. Sites 9B, 10 and 20 have no probable archaeological anomalies while on Sites 2, 9A and 24 only archaeological anomalies indicative of ridge and furrow ploughing were identified. However, on Sites 11 and 12 anomalies indicative of infilled archaeological ditches (on Site 12 these form probable enclosures) as well as discrete anomalies possibly indicative of pits or other features likely to be associated with occupation have been identified.*

## **1 Introduction**

- 1 1 Archaeological Services WYAS was commissioned by Mr P Abramson of Northern Archaeological Associates, to carry out a geophysical (fluxgate gradiometer) survey at selected sites along the proposed route of a water pipeline originating at the water pumping station at East Ness (SE 695 788), 11.5 km north-west of Malton (see Figs 1 and 2). A total of approximately 9.5 hectares was surveyed at eight different locations from Site 2 in the south (SE 6940 7886 site centred) to Site 20, north of Pockley (SE 6370 8796 site centred) in the north-west and Site 12, at Gillamoor (SE 6815 8970 site centred) in the north-east.
- 1 2 The geology of the area around Kirkbymoorside is described as Hambleton Oolitic Limestone of the Upper Jurassic with Middle Jurassic Calcareous Grit outcropping. These deposits are occasionally overlain by Pre-Ipswichian and Ipswichian interglacial deposits in the valley spurs to the north of Kirkbymoorside (Institute of Geological Sciences 1980).
- 1 3 At the time of survey, on days between May 8th and June 14<sup>th</sup>, the land use varied from permanent pasture to ripening semi-mature barley and wheat crops. No significant problems were encountered during the surveys.
- 1 4 The archaeological interest varied between areas and is discussed in detail on a site by site basis in Section 3.
- 1 5 The overall objectives of the geophysical surveys were to
- to establish the presence, extent and character of any archaeological magnetic anomalies within, and immediately adjacent to, the proposed route of the pipe corridor at the selected locations.

## **2 Methodology & Presentation**

- 2 1 The geophysical survey was carried out in accordance with English Heritage Guidelines (David 1995) with no survey block being less 40m wide, this being the minimum width recommended by English Heritage for reliable interpretation of geophysical data.
- 2 2 The sites selected for survey were determined by Northern Archaeological Associates and the site numbering system used in this report reflects the numbers used by N A A in an earlier report.
- 2 3 A local site grid was initiated for each site with Site 11 comprising four survey blocks each of which was on a different grid system. Details on grid lay-out, tie-in and co-ordinate use and accuracy are given in Appendix 2.
- 2 4 The sites covered by the geophysical survey are shown in Figure 1 on a 1:50000 Ordnance Survey map. The extent of the survey blocks are shown at

a larger scale (1:30000) in Figure 2 on an Ordnance Survey digital map base. This map base was provided by Mott MacDonald and shows the routes of water, gas, and electricity services as well as the proposed routes of the East Moor water pipeline as of May 2000. It is understood that the route of the pipeline is subject to change and that Figure 2 may not show the eventual route.

- 2.5 The gradiometer data is presented at a scale of 1:1250 in greyscale format superimposed on a digital map base, with accompanying interpretations, in Figures 3 to 18. Large scale, 1:500, greyscale and X-Y trace plots of the data, are presented in Volume II of the report. Details on the data processing are given in Appendix 1.
- 2.6 All figures reproduced from Ordnance Survey mapping are done so with the permission of the controller of Her Majesty's Stationary Office. © Crown copyright. West Yorkshire Archaeology Service licence 076406.

### **3 Results & Discussion**

#### **3.1 General Trends/Anomalies**

- 3.1.1 Ubiquitous across all the sites are 'iron spike' responses (see Appendix 1) which are indicative of modern ferrous material in the topsoil or subsoil. These responses might be caused by archaeological artefacts but without supporting evidence they are assumed not to be of archaeological significance. Only the largest 'spike' responses are shown on the interpretation figures.

#### **3.2 Site 2 (Figs 3 and 4)**

- 3.2.1 This area was selected for survey because of the presumed proximity of the deserted medieval village of East Ness.
- 3.2.2 The strongest anomaly present is the dipolar, linear anomaly running from north-west to south-east at the eastern end of the survey block. This type of response is indicative of a ferrous service pipe. Figure 2 shows an existing water pipe along the same alignment as the linear anomaly which confirms this interpretation.
- 3.2.3 There are a series of parallel, linear anomalies, aligned from north to south, which are visible in the western half of the survey block. These anomalies are created by the practice, begun in the early medieval period, of cultivating fields in a series of relatively narrow strips with a plough which used a moulder board rather than a share to turn over the sod. Over many years, if the exact form of the original strip was maintained, a characteristic ridged topography resulted comprising parallel ridges and furrows with a perpendicular headland marking the limits of the strips. Even when modern ploughing has destroyed any visible earthworks a sub-surface magnetic

component often remains and this can be identified as linear/curvi-linear magnetic anomalies

- 3 2 4 In the eastern part of the survey block there are a number of broadly parallel, linear anomalies, aligned east to west that may indicate the presence of another phase of ridge and furrow. These anomalies are not as coherent as the anomalies in the west of the block
- 3 2 5 Two discontinuous, negative linear anomalies can be seen cutting the ridge and furrow on a north-east to south-west alignment. These anomalies are probably caused by a relatively modern intrusive feature, such as a non-ferrous pipe, the installation of which has destroyed the sub-surface (magnetic) remains of the ridge and furrow
- 3 2 6 In the north-western part of the survey block there are two positive, isolated anomalies and a discontinuous, positive, linear anomaly. The positive isolated responses might be indicative of archaeological features, such as pits or areas of burning, but could also be caused by natural sub-surface variations in the bedrock/subsoil. Alternatively, these responses may be associated with the possible drainage feature immediately to the west. The positive, linear response may indicate the presence of an infilled archaeological ditch underlying the ridge and furrow but again it might also have a natural origin. As there is no supporting evidence suggesting archaeological activity in the immediate vicinity a non-archaeological origin is considered the most likely interpretation
- 3 3 Site 9A (Figs 5 and 6)
  - 3 3 1 This site was selected for survey because of the extant ridge and furrow earthworks which were thought to be the outfields of the medieval village of Welburn
  - 3 3 2 Broadly parallel with the north-eastern field boundary, and adjacent to it, is a dipolar, linear anomaly that indicates the presence of a ferrous service pipe. The very strong dipolar, isolated response along the line of this linear anomaly is caused by a ferrous service cover
  - 3 3 3 Also parallel with the field boundary are a series of strong, positive/negative linear anomalies, approximately 7m apart, that are caused by the extant ridge and furrow earthworks. These earthworks terminate in a headland, which does not show as a magnetic anomaly, about 8m from the southern edge of the survey block
  - 3 3 4 A negative linear anomaly can be seen cutting the ridge and furrow on a north to south alignment at the northern end of the block. This anomaly is probably caused by a modern feature, such as a non-ferrous pipe, going from or to the adjacent farm outbuildings

#### 3 4 Site 9B (Figs 7 and 8)

3 4 1 This site was selected for survey for the same reasons as 9A outlined above (Section 3 3 1)

3 4 2 The data is again characterised by a series of broadly parallel, positive linear anomalies that are aligned north-east to south-west. These anomalies are suggestive of agricultural activity probably being either the weak remnants of ridge and furrow ploughing or a more modern ploughing regime, or possibly field drains.

3 4 3 There is also one anomaly that comprises either five strong, positive, isolated responses or one positive, linear anomaly that has five magnetically stronger components. The response and strength of these anomalies suggests that they could be of archaeological origin although the regularity of the responses suggests that a more recent anthropogenic origin, possibly relating to drainage, is more probable.

#### 3 5 Site 10 (Figs 9 and 10)

3 5 1 Site 10 was surveyed because of the proximity to a ring cairn, 80m to the east of the pipe corridor, the location of which is shown in Figure 10. However, there is no evidence for features relating to this cairn in the magnetic data.

3 5 2 In the north-western part of the survey block there are two dipolar, linear anomalies indicating the presence of ferrous service pipes. Figure 2 shows an existing water main on the same alignment as the anomalies and given the location of a reservoir to the north of the site it is reasonable to suggest that both anomalies are caused by water pipes.

3 5 3 There are also two positive, linear anomalies on a north to south orientation. These anomalies do not relate to the current ploughing regime but they may be due to earlier agricultural regimes or drainage features.

#### 3 6 Site 11 (Figs 11 and 12)

3 6 1 Artefacts, primarily pot sherds, of probable Romano-British date, recovered from the field immediately north of Cockpit Service Reservoir, suggested archaeological activity in the immediate vicinity of the pipe corridor. For this reason four discrete blocks were surveyed surrounding the covered reservoir.

3 6 2 In the north-western corner of Block 1 there is a broad dipolar, linear response. This is caused by ferrous material in the field boundary immediately to the west of the survey block.

3 6 3 In the south of the survey block are a series of parallel, positive, linear anomalies, on a north-east to south-west alignment, that are suggestive of

ridge and furrow ploughing. There are two, broadly parallel, linear anomalies in the north of the block aligned on a more north to south bearing than the first series of anomalies. These may be caused by ridge and furrow or more recent ploughing regimes or possibly by drainage features.

3 6 4 In the south-eastern corner of the survey block anomalies indicative of infilled archaeological ditches can be seen. These anomalies appear to form two sides of an 'enclosure' with a weaker, less well-defined, curvilinear anomaly to the south possibly forming a third side. Six isolated anomalies within, or adjacent to, the 'enclosure' are also likely to be archaeological in nature. A single short linear anomaly in the extreme south-eastern corner of the block might also be associated with the postulated enclosure.

3 6 5 Block 2 has several vague, positive curvilinear trends with a north to south orientation that are probably caused by recent agricultural activity.

3 6 6 With the exception of a single isolated response on the northern edge of the block, which may be an archaeological pit, there are no other probable archaeological anomalies in Block 3. The broad, dipolar response along the western edge is again caused by ferrous material in the field boundary.

3 6 7 The data in Block 4 again shows anomalies whose responses strongly suggest anthropogenic activity. In the southern part of the survey block there is a strong, positive linear anomaly aligned from south-east to north-west with several adjacent positive, isolated responses. These anomalies are probably infilled archaeological features such as ditches and pits.

3 6 8 To the north of these anomalies there are positive, linear anomalies that appear to describe three sides of an 'enclosure'. These anomalies are relatively weak but are consistent with the expected response from infilled archaeological ditches. There are two weak, positive isolated anomalies adjacent to this enclosure that are again suggestive of isolated archaeological features such as pits.

### 3 7 Site 12 (Figs 13 and 14)

3 7 1 Aerial photographs of the area show a cropmark immediately west of the projected pipe corridor that was thought to be caused by a square enclosure of unknown date. It was thought that there might be additional features in the immediate vicinity that would be impacted upon by the groundworks for the pipeline scheme.

3 7 2 The most noticeable anomalies on this site are the strong, regular, positive linear anomalies, which are caused by infilled ditches, that describe parts of two probable rectilinear enclosures. The first, on the western edge, locates three sides of the enclosure which is visible as a cropmark on aerial photographs. Interestingly the magnetic response is equally strong either side of the current field boundary despite the drop of about 1m from the northern

into the southern field. The second possible enclosure was not visible on the aerial photographs and was initially thought to be the infilled remnants of a relatively recent field boundary, the western edge of the 'enclosure' aligns exactly with a current hedge boundary. This may still be the cause, although the similarity of the magnetic response from both features might suggest that if the cropmark feature is archaeological the likelihood is that the second feature is also.

- 3 7 3 Between both 'enclosures' the magnetic background shows a degree of variability or enhancement. This is particularly noticeable because the magnetic background in the 40m wide strip at the northern end of the site is extremely flat. Whilst it is acknowledged that this observed variation could be due to changes in the depth of topsoil or the composition of the parent bedrock it might also reflect archaeological activity across a fairly wide area inside and around the two 'enclosures'. Some of the more well defined areas are highlighted on Figure 14, two of these areas nearest the road are possibly caused by fairly recent ground disturbance or small scale quarrying. In addition to this several isolated, positive, magnetic anomalies have also been interpreted that could be caused by infilled pits or large post-holes.
- 3 7 4 A series of parallel, positive, linear anomalies can be seen in both halves of the site. The anomalies are aligned north-east to south-west, parallel with the modern field boundaries. It is possible that some, or all, of these anomalies are caused by ridge and furrow ploughing but the closeness of some of the linears suggests that the anomalies probably reflect a more recent ploughing regime.
- 3 8 Site 20 (Figs 15 and 16)
- 3 8 1 This site was selected for survey because of the proximity of other known archaeological sites.
- 3 8 2 No anomalies have been identified that have anything other than a geological or agricultural origin with the exception of one extremely weak, intermittent subcircular anomaly that might possibly be archaeological in origin.
- 3 9 Site 24 (Figs 17 and 18)
- 3 9 1 This site was selected for survey because of the upstanding ridge and furrow earthworks which represent the outfields of the deserted medieval village of Muscoates.
- 3 9 2 The magnetic background on this site is particularly low and flat. This is probably due to the presence of alluvium deposited during the periodic flooding of River Riccal, a tributary of the River Rye, which forms the southern site boundary.



- 3 9 3 The low magnetic susceptibility of the alluvium probably explains the very weak and intermittent responses from the well preserved ridge and furrow earthworks, including headlands, that cover all parts of the site
- 3 9 4 The stronger more regular anomalies that can be seen, aligned from west to east, in the central part of the survey area, are probably caused by field drains
- 3 9 5 The areas of magnetic enhancement and disturbance are thought likely to be either geological or relatively modern in origin

#### **4 Conclusions**

- 4 1 Of the eight sites on which the geophysical survey was carried out only Sites 10, 20 and 9B have no anomalies of probable archaeological interest
- 4 2 Sites 2, 9A and 24 have magnetic evidence for ridge and furrow ploughing having taken place, on the latter two sites well preserved earthworks including headlands were still visible
- 4 3 However, the two most interesting sites are 11 and 12 On Site 11 anomalies indicative of infilled ditches of an irregular and intermittent pattern, together with probable discrete features, have been identified This irregularity, and the previously noted surface finds in the vicinity, could indicate occupation The anomalies identified on Site 12 are much more regular and are thought to be two enclosures, one of which has been identified as a cropmark Again the magnetic background and the probable presence of discrete anomalies adjacent to the enclosures could indicate further archaeological activity in the area

*The results and subsequent interpretation of geophysical surveys should not be treated as an absolute representation of the underlying archaeological and non-archaeological remains Confirmation of the presence or absence of archaeological remains can only be achieved by direct investigation of sub-surface deposits This can be undertaken by means of targeted trial trenching*

## ***Bibliography***

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