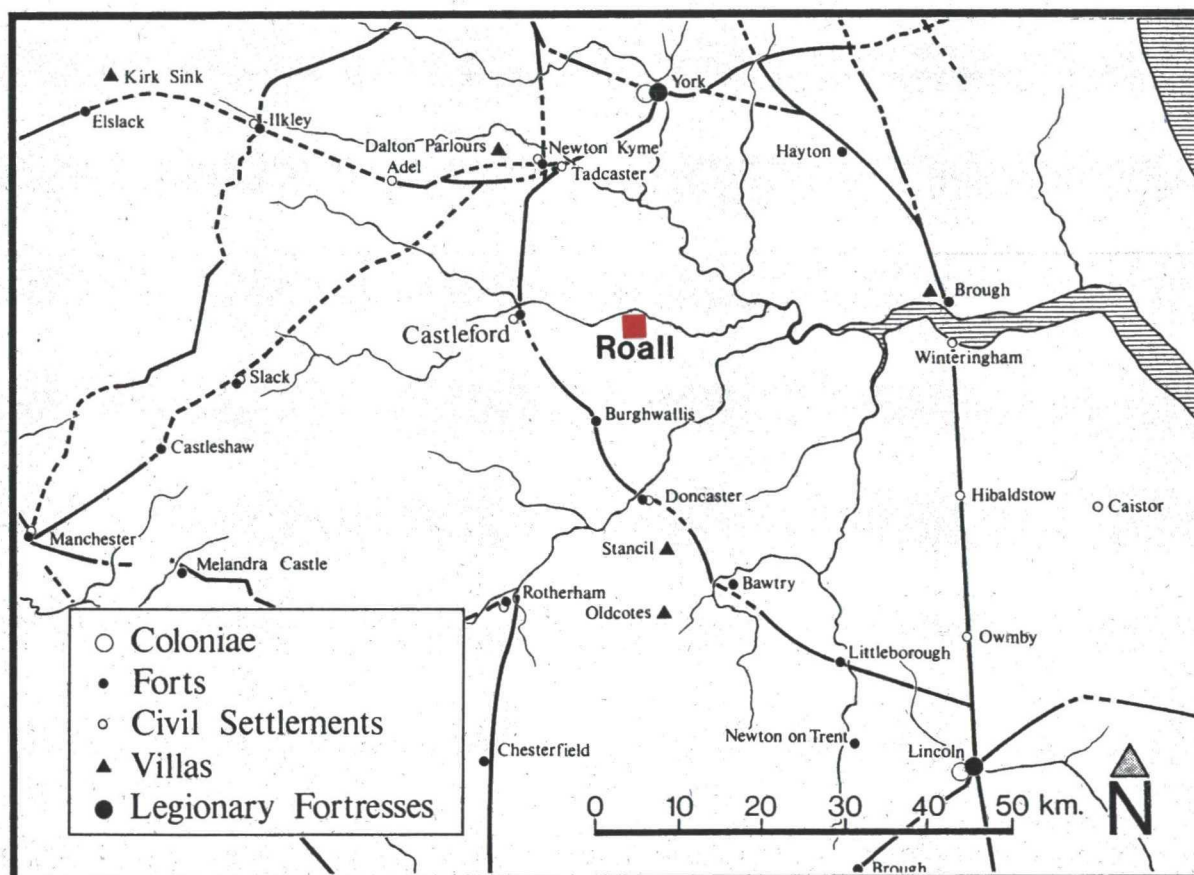


NYCC HER	
SNY	2147
ENY	1295/1296
CNY	
Parish	8053
Rec'd	?1992

## Roall – Roman Fort



### Lower Aire–Calder Valley Survey

#### *Interim Report No. 2*

8/053

NYS 2147  
NYE 1295 (GEO)  
NYE 1296 (FW)

# **Roall – Roman Fort**

## **Geophysical Survey and Fieldwalking Results and Considerations for Further Investigation**

(December 1991 – March 1992)

B. Yarwood, J. Marriott (May 1992)

*Lower Aire–Calder Valley Survey*

*Interim Report No. 2*



**West Yorkshire  
Archaeology Service**

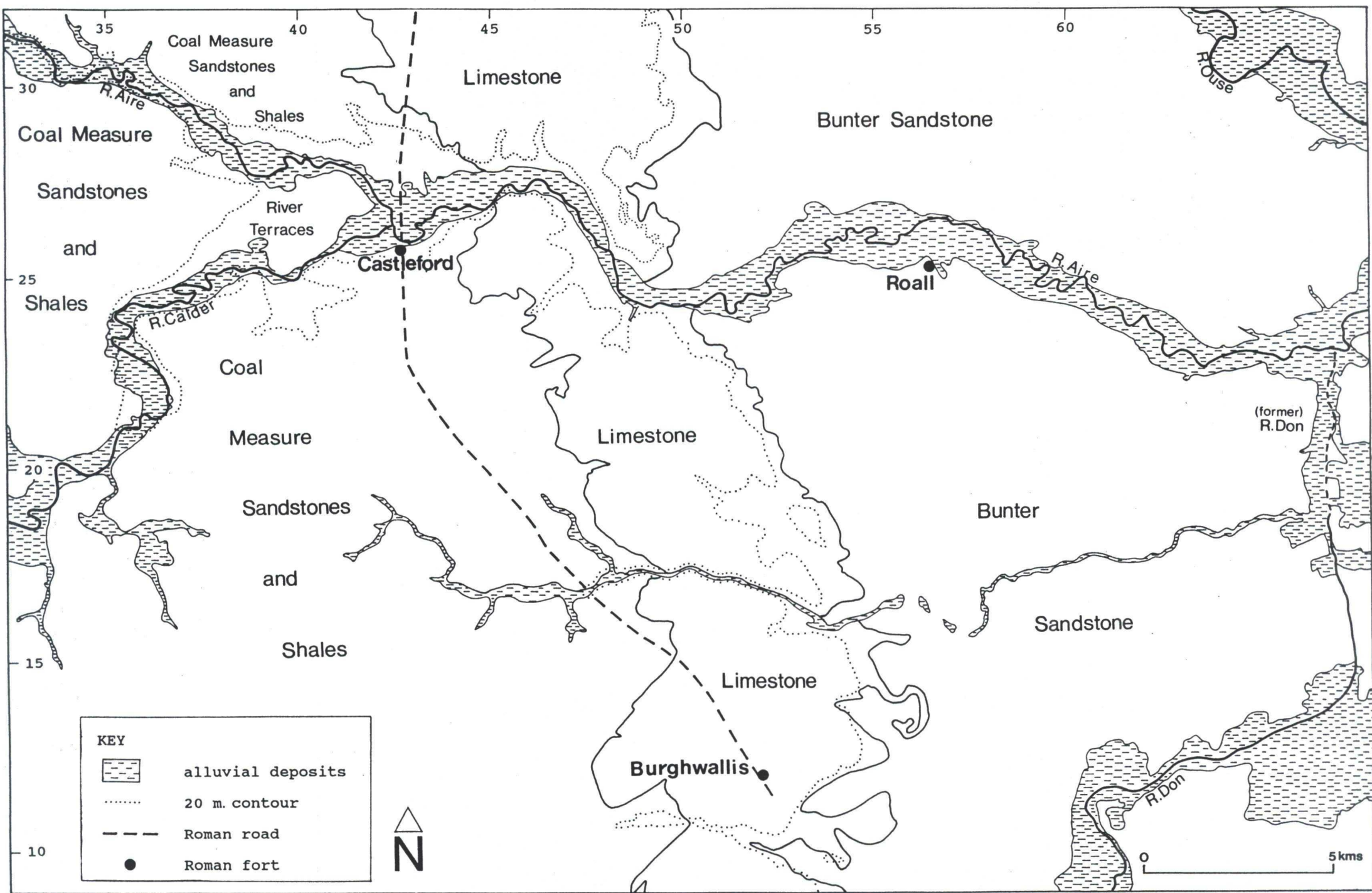


Fig.1: Lower Aire and Calder valleys - geology and topography (simplified; see text for further details).



# Preface

## *The Lower Aire–Calder Valley Survey*

The geophysical survey reported here is part of a broader investigation of early settlement and land use in the Lower Aire and Calder valleys in West and North Yorkshire. The corridor of interest extends from the Coal Measures west of the Aire–Calder confluence, through a narrow belt of limestone, and onto the Bunter sandstones of the Vale of York eastwards as far as the former course of the River Don. No precise boundaries have been defined for the study area and, in particular, it is not intended to limit the study to the fluvial deposits of the river valley. In the longer term it may be that this study will form part of a longer, west-east transect from the Pennine plateau as far as the east coast, although much of the archaeological work already reported will need critical appraisal and elaboration before this can be achieved. One of the most important aspects of such a study will be the way in which man's achievements and exploitation of natural resources have been dictated by the diverse range of micro-environments encountered along such a transect.

A much simplified geological and topographical map of the area is shown in Figure 1, which has been extended southwards to include the Roman fort at Burghwallis for the purposes of this report. The 20m contour usefully divides the lower, almost flat ground of the Vale of York from the higher and more undulating terrain to the west. Apart from the alluvium and the river terraces west of the Aire–Calder confluence, the geology shown is that of the underlying solid rock; drift cover is fragmentary on the higher ground and includes areas of marl on the limestone; much of the Bunter sandstone, however, is covered by the so-called 25 ft Vale of York drift comprising extensive areas of sand and of silt and clay.

Evidence of prehistoric remains in the study area is predominantly in the form of cropmarks. Geophysical survey, trial excavation and, to a limited extent, fieldwalking over the last six years have begun to elaborate on the detail seen in the cropmarks. Survey work so far has been concentrated on the area west of the Aire–Calder confluence. In addition, there have been significant excavations by the West Yorkshire Archaeology Service in Roman Castleford, on and near the henge at Ferrybridge, and on Iron Age (and earlier?) sites on the river terraces at Methley; some of these investigations continue. A detailed description and interpretation of the prehistoric archaeology of the study area will appear in the synthesis to be compiled from this series of interim reports.



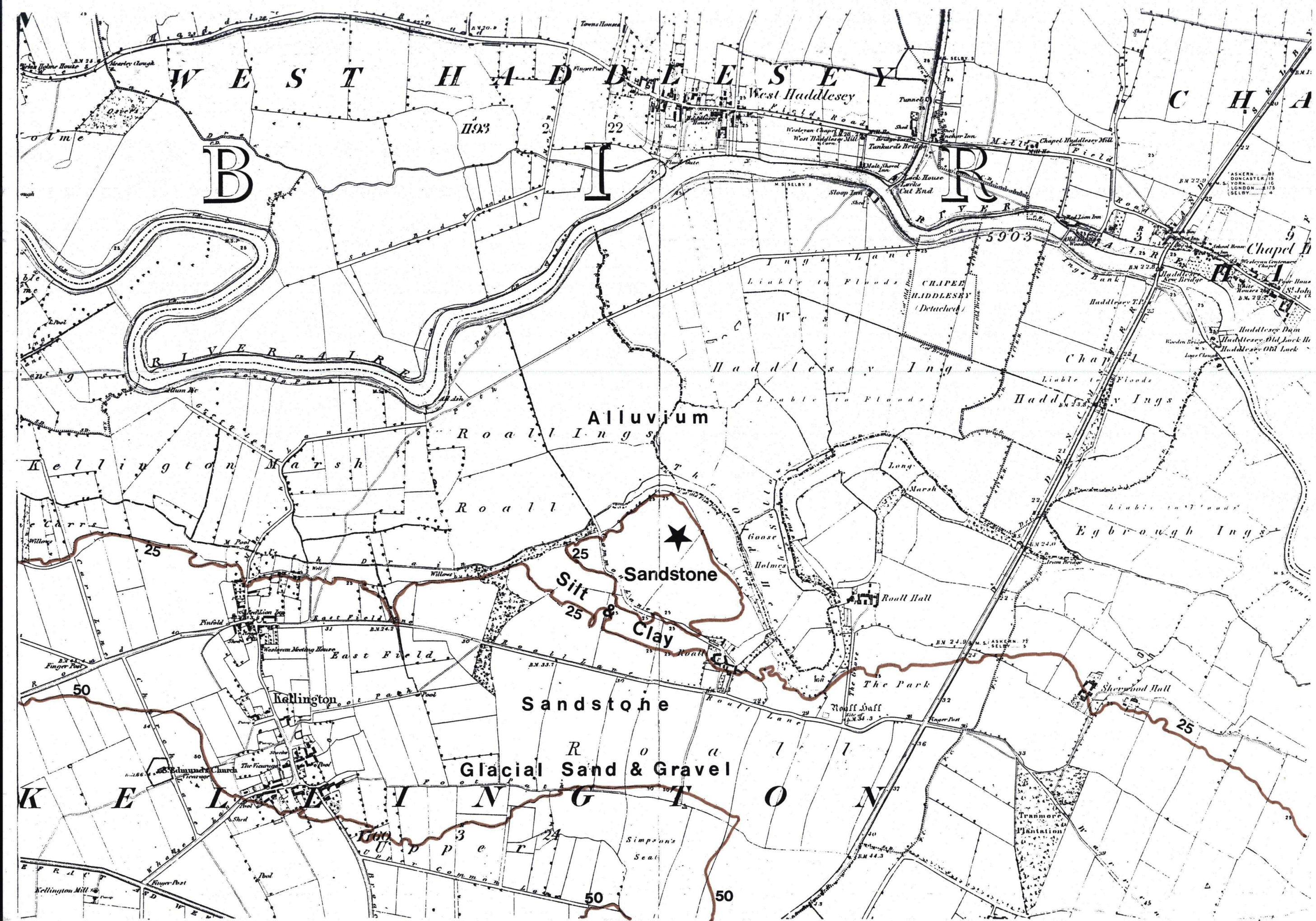


Fig.2: The environs of Roall as shown in c.1850 (O.S. first edition 6", sheets 235 and 236, with additions). Asterisk marks site of Roman fort.



# Roall – Roman Fort

## **1     *Introduction/Summary***

**1 1** This report is confined to presentation and brief discussion of the results of one geophysical survey of c 12 hectares at Roall, North Yorkshire. Cropmarks of a Roman auxiliary-type fort and other features were recorded here for the first time in summer 1991 by staff of RCHM(E) (York Office). Although the general outline of the fort was indisputable, the quality of the cropmarks was too poor to allow a detailed description either of the fort itself or of the nature and relationship of the surrounding archaeological landscape. The site, therefore, presented an opportunity to survey a complete fort and its context, an exercise of potential value not only for its own sake but also for its relevance to the Roman military occupation of a wider region, and in particular, to the fort at Castleford from which it is only 13.7km distant.

The exercise was also viewed as a part of the Aire–Calder valley study, it being of particular interest to identify the nature and extent of pre-Iron Age sites along the transect defined above (see Preface).

As might be expected from the use of remote sensing techniques (amongst which we class fieldwalking as well as geophysical methods) the results are not unequivocal. Whilst a fuller picture of the below ground archaeological features was obtained than was apparent on the air photographs, many points of detail remain unclear. In this respect, the present survey results may be of greatest value in providing a basis for selective, more detailed investigation by other techniques. Equally the fieldwalking results, although positive in their identification of flint material on the site, raise the problem of how the earlier prehistory of the area should be pursued.

## **2     *Site Location and Nature***

### **2 1     Topography and Geology**

The survey area is centred at SE 564252 at Roall in the former township and present civil parish of Kellington, Selby District, North Yorkshire. The site lies on a small outcrop of Bunter sandstone just above the 25' (7.6m) contour (Fig 2, where only those contours south of the River Aire are highlighted), and just above the present day, normal flood level of the River Aire. It is bounded on the north west and north east sides by a pronounced scarp falling to the alluvial deposits of the floodplain, and on the south side by a narrow stretch of silt and clay below 25', separating it from the slightly higher, broad expanse of Bunter sandstones (some covered with glacial sand and gravel) to the south. Figure 2 shows that the site forms a small promontory jutting northwards into the river floodplain, and it



is conceivable that the fort site would be more or less cut off from the higher ground to the south by very high floodwaters

The alluvial deposits of the Aire are very broad in this region and it is clear that the river has meandered considerably in the past. Although the river is now more than a kilometre north of the Roall site, one former river course, still partly water filled, lies just beyond the foot of the scarp and less than 100m beyond the fort. Comparison of Figures 2 and 3, which show this feature in c. 1850 and today, suggests that it is gradually silting up at its eastern end. Although it was labelled 'Site of Old Fish Pond' in c. 1850 (Fig. 2) it has none of the characteristics of purpose built fishponds and its true nature can be in little doubt. It is noted that the ancient township boundary between West Haddlesey and Kellington (dotted on Fig. 3) partly follows this former river channel and, by analogy with similar documented examples elsewhere, it may be reasonably surmised that the river was flowing in this channel during the early medieval period and/or earlier, when the majority of such boundaries were established and fixed. Whether the river was flowing on this same course in the Roman period is still a matter for speculation and requires further investigation.

The topographical nature of the Roall site, on the edge of the floodplain and at the junction of two contrasting resource areas, is paralleled many times along the river valley within the Lower Aire–Calder study area, although many such locations lie on the upper or second sand and gravel terraces of the river valley rather than on the older rock formations. A high proportion of these locations investigated so far have produced evidence of at least transient, if not more permanent, occupation from the Mesolithic onwards.

## **2.2 Soils**

The Bunter sandstone in the survey area is reportedly covered with a deposit of wind-blown sand up to c. 1½m in depth (note 8.1). The true depth is unknown and is likely to be variable as the farmer reports ploughing up more clayey material on part of the north-east side of the site. Wind-blown sand is likely to have arisen from the presence of unplanted arable in the direction of the prevailing wind and may not therefore have been deposited at a uniform rate over the last one and a half millennia. The ploughsoil was observed to be very sandy, and in parts almost clean sand had been turned up by the plough.

At the foot of the scarp the soils derive from the alluvial deposits, as this spot is at the edge of the floodplain (and is still subject to flooding today), it is assumed that there may have been a net deposition of material here also.

## **2.3 Land use**

Land use in the period immediately following the Roman occupation is unknown. The recovery of a thin scatter of square rimmed pottery, dating to the late 12th or early 13th century, and of later medieval and post-medieval sherds, suggests that the land has been arable more or less continuously since the early Middle Ages. This is substantiated by the remnants of ridge and furrow detected in the magnetic survey. The site continues as arable today, with little change other than the removal of one field boundary shown on the 1850

map (Fig 2) the insertion of field drains in two areas, and the laying of a ring main with hydrants (Fig 2 shows the hydrants, that indicated by (H) being sealed off below ground level, the hydrants and the water main are discernible on the magnetic survey in Fig 4), a line of seven wooden electricity poles, luckily without metal stanchions also traverses the site (Fig 2)

### **3      *Survey Objectives***

**3 1** Several objectives were defined prior to the geophysical survey the foremost being the acquisition of a full and detailed plan of an undisturbed(?) Roman fort to elaborate on the rather meagre detail apparent from the existing cropmark photographs. Ideally, such a plan together with information from a sufficient quantity of pottery and other finds from fieldwalking, would provide at least a tentative dating of the site and so allow a discussion of the fort in the context of Roman military activity in the region. In the event, there was a paucity of finds on the ploughsoil and the geophysical survey did not provide as detailed a plan of the fort as one could have wished. In order to achieve fully this first objective, therefore, the survey must be used principally as a basis for closer investigation by other means

**3 2** The second objective was to recover all possible information (as constrained by the techniques used) regarding the relationship of the fort to its immediate surroundings. To this end, the survey was set up to encompass a considerably larger area than the fort alone. In the medium term it is hoped that this might be extended to investigation of the relationship between the military site and a broader area of the surrounding landscape within which there are a number of cropmark sites some possibly contemporary with the fort or nearly so (some cropmarks had also been recorded in the very close vicinity of the fort when the latter was first observed in 1991)

**3 3** The third objective within the context of the Lower Aire–Calder valley study was to identify, if possible, any evidence of pre Iron Age activity in this area. It is already established that similar locations higher up the valley have been utilised since the Mesolithic period and it is of interest to determine whether the same pattern of activity (so far as it can be deduced from the techniques used) extends out onto the Vale of York

**3 4** Fourthly, the Roall site provided an opportunity for us to extend our experience and investigation of magnetic survey techniques onto a different geological terrain to those encountered further to the west

### **4      *Techniques and Methodology***

#### **4 1      Survey grid**

The survey grid of 20m squares was laid out with tapes and canes resulting in an estimated maximum error of +/- 0.6m between the most distantly separated parts of the survey area. The brick pumping station (the small rectangular building almost at the northern extremity of the site in Fig 3) three water



hydrants and five of the seven electricity poles were accurately measured into the grid. The top and bottom of the scarp around the north west and north east sides of the site were also surveyed by projecting grid lines as necessary to allow an adequate representation at 1:2500 scale (note 8.2). The outline of the survey area and the other features surveyed are shown in Figure 3, redrawn from the 1:2500 O.S. There is a slight discrepancy between the Ordnance Survey and the current survey along a 150m stretch of the north east side of the field: the current survey is taken to be correct.

## **4.2 Fieldwalking**

Fieldwalking was not carried out as a separate exercise, but artefacts were recovered and labelled with the relevant grid square number during the course of the gradiometer survey. All flint finds and definite or possible Roman pottery were saved but medieval and later pottery was noted and rejected.

## **4.3 Gradiometer survey**

Magnetic survey was carried out with an FM18 gradiometer with ST1 trigger. Readings were taken at 0.5 m stations on 1 m spaced parallel traverses, nominally at 1 nT (actual readings to 0.5 nT). Zero drift was logged after each 400 readings (but a zero drift correction was not always applied, see 4.4). Dummy readings were inserted as necessary as obstacles (including the edge of the field) were met.

In view of the low magnitude of the magnetic signals from the site, a small trial area was subjected to higher resolution survey with readings at 0.5 m intervals in both directions using the nominal 0.1 nT range and with the sensor tube very close to the ground surface (but see note 8.3).

Data was dumped in the field to an Epson portable computer using Geoplot software. A small number of soil samples was taken across the field for magnetic susceptibility determinations, but these have yet to be measured.

## **4.4 Data processing and illustration**

All magnetic data (except those from the high resolution survey) were interpolated with an equal number of readings to produce a 0.5 m spaced square array of figures, and spikes were removed using Scollars' darning algorithm for small areas (this leaves some small areas of dummy readings on large obstacles such as the water hydrants and at the edge of the survey). Subsequent data treatments used for this report were dictated to a large extent by the low magnitude of the signals from the archaeological features (not much larger than the soil noise) and by the need to communicate the results visually and clearly to a broad readership. For these reasons it was determined by experiment that the most useful pictures for this report were obtained by using the difference between individual readings and the column average (for each column of 20 readings). This means that, for the illustrations shown here, there was no point in applying zero drift corrections (as applied by Geoplot software) nor in adding bias to produce matched data blocks; however, it also means that any linear features closely aligned with the direction of traverse will have been suppressed (note 8.4). For the same reasons, it was also decided to use images which have been subjected to a small amount of smoothing (by application of a 3 x 3 box filter) in order to produce a clearer picture without too much degradation of the principal archaeological features. Linear and non-linear contrast adjustments were also used as necessary. Data treatment was effected primarily using Magclean and Magplot software (B. Yarwood); screen images and hard copy (with some contrast adjustment) were obtained with Contort software (J.B. Haigh, Bradford University).

## **4.5 Additional data treatments**

Although it may not be directly relevant (or at least difficult to apply) to the Roall data, this series of *Interim Reports* will continue to report on investigations of frequency domain techniques to aspects of geophysical survey image treatment (see note 8.5). Of particular interest is the suppression of regularly spaced, minor linear (or slightly curvilinear) anomalies arising from cultivation practice (e.g. ridge and furrow). Progress has been slow because of time limitations, but we have now obtained the two-dimensional Hartley transforms of a number of model systems and identified the harmonic signals

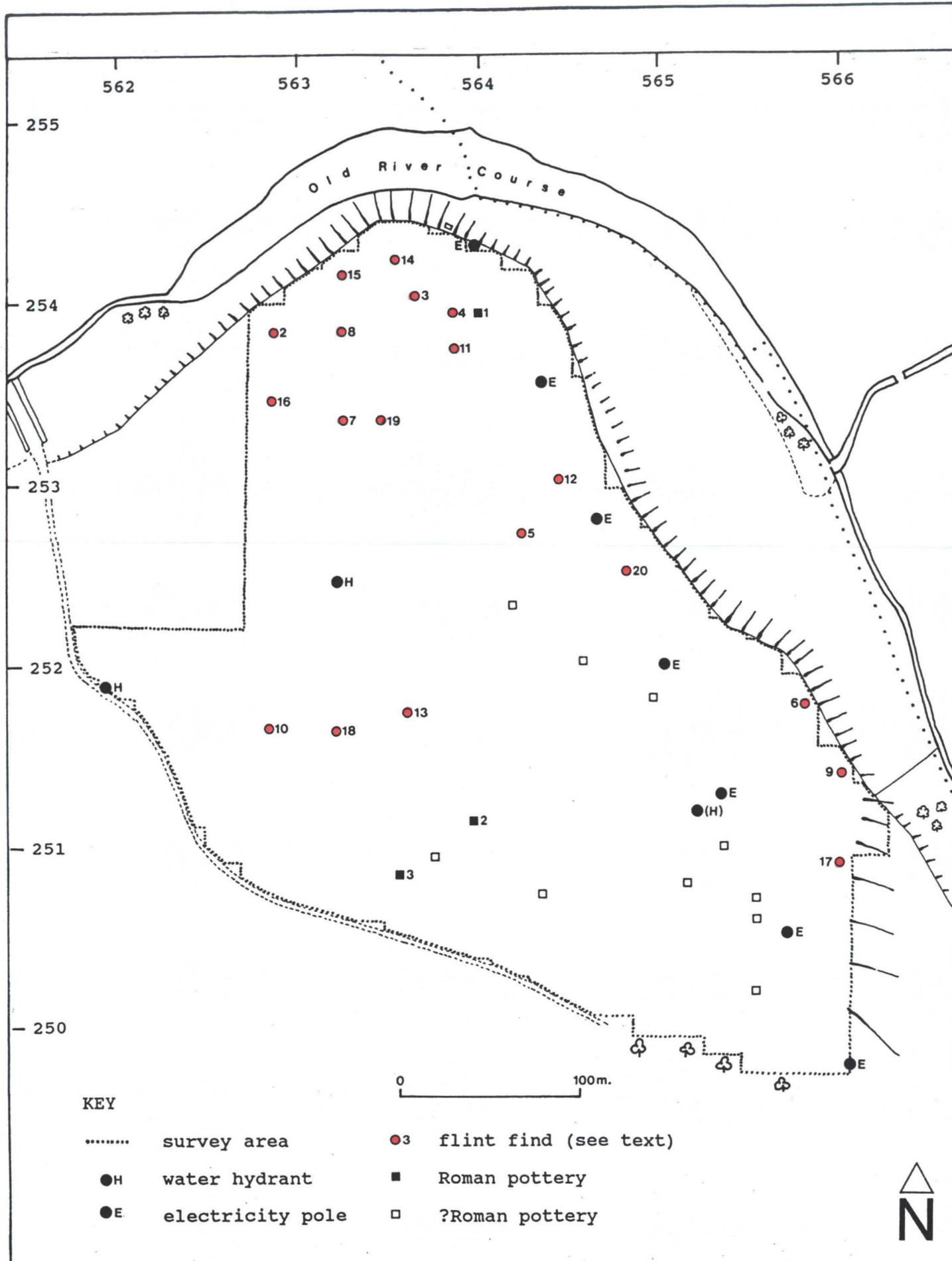


Fig.3: The Roall site adapted from the modern 1:2500 O.S., showing outline of the survey area, findspots, water hydrants and electricity poles.



arising from the periodicity of the original image this may point the way towards a filter design to suppress the unwanted signals. Suppression of the ridge and furrow on the images of the Roall site will be difficult to achieve without loss of some of the other archaeology as the ridge and furrow is aligned closely to the major axis of the fort (this is not to imply that the open field was laid out on the visible remains of the fort rather both are probably dictated by the topography in being aligned roughly perpendicular to the scarp on the north east side of the field)

## 5 *Results*

### 5.1 Fieldwalking

The survey took place on a young crop of barley when the shoots were 10-15cm high. Although the soil was well weathered it is estimated that only c. 30-40% of the surface was visible. The so called fieldwalking exercise comprised systematic retrieval of finds observed during the geophysical survey and it is judged that the field was evenly covered in this way. Undoubtedly more material would be retrieved from a bare weathered ploughsoil but the increase is predicted to be only in proportion to the increased area of bare soil.

The following flint items were retrieved (see Fig. 3 for locations of all but No. 1) all being brown or black some heavily patinated

- 1 waste
- 2 waste
- 3 waste
- 4 waste
- 5 broken scraper (Mesolithic type)
- 6 waste
- 7 waste (trimming flake)
- 8 core fragment
- 9 waste
- 10 broken blade
- 11 waste
- 12 waste
- 13 waste
- 14 waste (trimming flake)
- 15 rod microlith (Mesolithic narrow blade type)
- 16 waste flake
- 17 flake (unretouched Mesolithic type)
- 18 waste
- 19 two waste fragments one a trimming flake
- 20 waste

Only three sherds of definite Roman pottery were recovered (locations on Fig. 3)

- 1 grey ware
- 2 samian
- 3 samian

Eleven other sherds were predominantly of a sandy fabric of a type not known to us. They are marked on Figure 3 as possibly Roman but a more definitive report is awaited from RCHM(E).

A thin spread of medieval and later pottery was noted more or less across the whole field and is interpreted as manuring scatter. The earliest recognisable forms were square rimmed believed to be of late 12th or early 13th century date.





Fig.5: Key line drawing based on figure 4 (same scale and orientation). Areas containing readings greater than +4 nT are shown in red; modern features are dotted; uncertain and conjectural features are dashed; the direction of ridge and furrow is marked by a dot-dash. For letters see text.



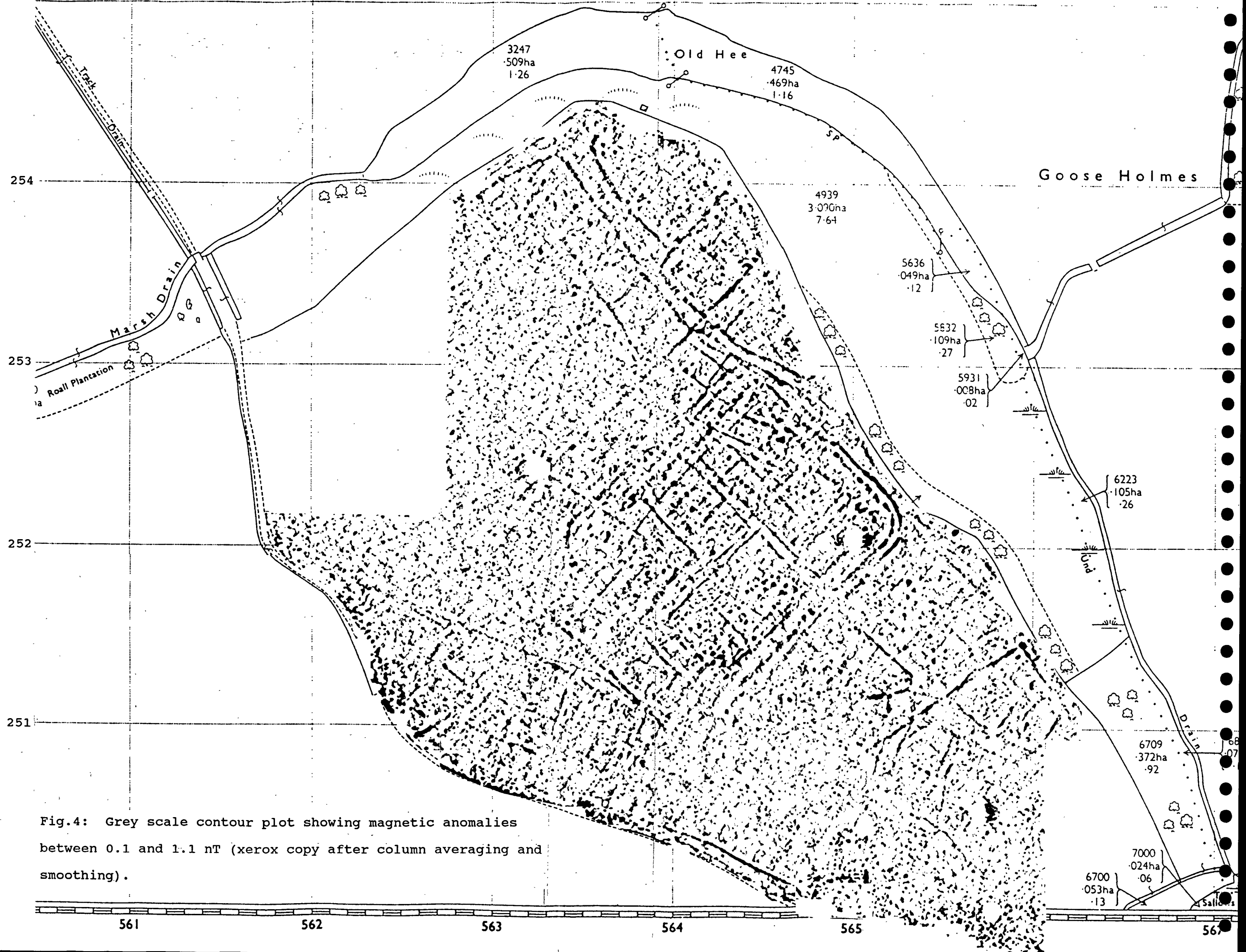


Fig.4: Grey scale contour plot showing magnetic anomalies between 0.1 and 1.1 nT (xerox copy after column averaging and smoothing).



## 5.2 Gradiometer survey

A total of c. 237,000 magnetic readings was logged, with a similar number being interpolated at the data treatment stage. Unfortunately, the magnitude of the signals recorded from the buried archaeological features (particularly linear features) was extremely low, typically less than 1.5 nT and rarely more than 2 nT. This was compensated for to a small extent by the relatively smooth background; with the exception of an area adjacent to the south side of the survey area, which produced many 'spikes' (significantly, that part of the field closest to the farm), there was very little major disturbance (apart from the recognisable water main, etc.) over much of the field. Nevertheless, the general 'noise' level recorded (from all other sources, but in particular from the ploughsoil) was significant when compared to the low signals from the archaeological features. It was this factor most of all which led to the inspection of many different data treatments to try and produce a clear image.

A grey-level contour plot of the positive anomalies for the whole field is shown in Figure 4, with a line drawing (Fig. 5) to aid description (note 8.6). The line drawing is not to be taken as a definitive interpretation of the data, nor as a comprehensive representation of all the magnetic anomalies. Its primary purpose is to allow labels to be attached so that reference may be made in the text to component parts of the display. Uncertain or conjectural features are shown by dashed lines and modern features by dotted lines. The anomalies which included readings greater than c. +4 nT, and which are interpreted as probable archaeological features rather than 'spikes', are shown in red.

## 6. Discussion

### 6.1 Prehistory

Although the amounts of material recovered in fieldwalking were extremely small (even allowing for a c. threefold hypothetical increase had no crop been on the field), the density of the flint scatter was quite similar to that recovered from many sites further up the valley (e.g. Park Lane, Methley; note 8.5). It is difficult to judge whether these results might have been affected by the deposition of wind-blown sand at Roall. Certainly, as with previous sites, there is clear indication of activity in the area as early as the Mesolithic period, but insufficient evidence to identify 'sites'. The locations of the 20 flint finds, shown on Figure 3, suggest a possible clustering towards the northern end of the area but no analysis has yet been undertaken to substantiate this. It may be of some value to undertake systematic fieldwalking several more times after ploughing merely to increase the sample of flint and permit an objective analysis of the distribution, especially if information on the depth of sand cover is forthcoming. Even then, in the absence of dense concentrations of flint waste, indicative of workshops or similar, the problem of 'site' identification remains. It cannot be expected that the post-holes, shallow pits and gullies, typical of many excavated early prehistoric sites, will necessarily be recognised as such on either air photographs or geophysical surveys. It is entirely feasible, however, that some of the isolated pit-like features, shown in Figures 4 and 5, may belong to some phase of activity on the site earlier than the Roman military occupation. Excavation, too, poses problems, as demonstrated elsewhere (note 8.7); features are typically not visible in plan on these sandy sites until both ploughsoil and a substantial depth of subsoil are removed and if this is done by machine stripping then a significant proportion of the archaeological evidence may also be lost. The only way round this dilemma would be to adopt a much slower and systematic (and expensive) method of investigation, which might include sieving, phosphate analysis

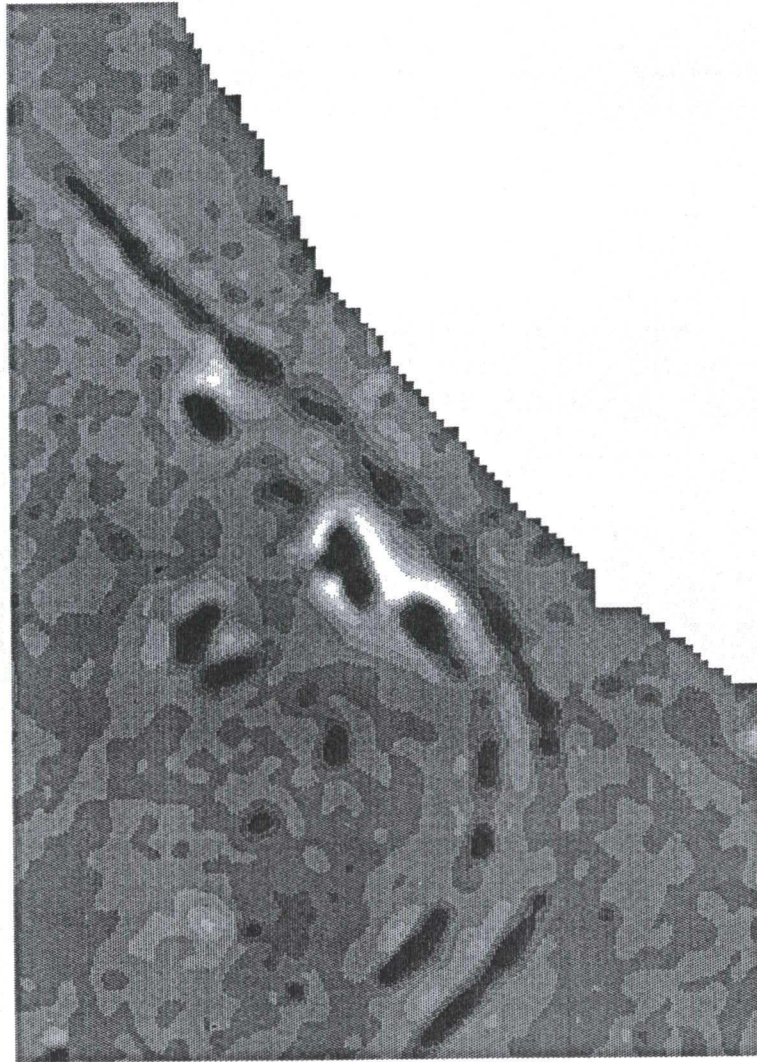


Fig.6: East corner of fort showing segmented nature of the two ditches. Magnetic data from -8 to +12 nT (after column averaging and smoothing); scale 1:500; (xerox copy).



and repeated geophysical prospecting (including magnetic susceptibility measurements) during and after removal of ploughsoil.

## 6.2 The Roman fort

The clarity and detail of the fort and its internal features are generally poor, perhaps largely due to a variable depth of sand cover rather than differences in the nature of the archaeological features and their fills. This is substantiated by observations of more clayey material being turned up during ploughing in the approximate area of the east corner of the fort where the magnetic signals are clearly stronger (Fig. 4). The following observations are made with reference to Figures 4 and 5:

### 6.2.1 Dimensions and area

The outer dimensions to the nearest metre are: major axis 154m; minor axis 139m (estimated at south-west end) to 137m (at north-east end). The overall area is 2.1ha (5.2 acres).

The inner dimensions (within and excluding the *intervallum*) are 128m by 101m (as far as these can be estimated given the lack of detail on all but the south-east side). The inner area is therefore c. 1.3ha (3.2 acres). These figures and the ratio of the minor to major axis all fall within a range typical of a large group of auxiliary forts in Britain.

### 6.2.2 Defences and *intervallum*

The defences are not of uniform character around the whole perimeter. The outer ditch is clear for much of its course but appears to be markedly segmented in parts (see the example in Fig. 6); its nature is unclear near the south corner. On either side of the south-east gate its alignment is discontinuous and only c. 3m separate this outer ditch from an inner 'ditch', which is even more segmented than the first. The possibility that this inner 'ditch' marks the back of a rampart (or the side of a *via sagularis*) is tentatively rejected; timber-revetted ramparts may be as narrow as 3.3-4.0m, and the widths of turf ramparts are concentrated in the range 5.5-7.6m (there being a few more in the range 4.6-9.1m; note 8.8). Three metres is therefore barely adequate to contain a rampart of this type, especially if a berm between the rampart and outer ditch is to exist in the same space. The odd character of this inner 'ditch' is striking; can it be unfinished?

The distance from the inner 'ditch' to the built area on the south-east side of the fort is c. 10.5m; this is therefore to accommodate a possible berm, the rampart and the *intervallum* (with a road and with other features such as ovens along certain stretches). Standardisation of fort interiors does not seem to be sufficient to dictate that this dimension should be constant round the whole perimeter. The line of small discrete anomalies, well inside and parallel to the inner 'ditch' on the north-west side (in the northern half), might point to the presence of ovens and other domestic facilities near or set into the back of the rampart. The distances from the inner 'ditch' to the outer and inner sides of these features are c. 6m and c. 9.7m respectively – adequate space for a berm and rampart. The *intervallum* here, excluding these oven-like features, varies from 7.5 to 4.5m.



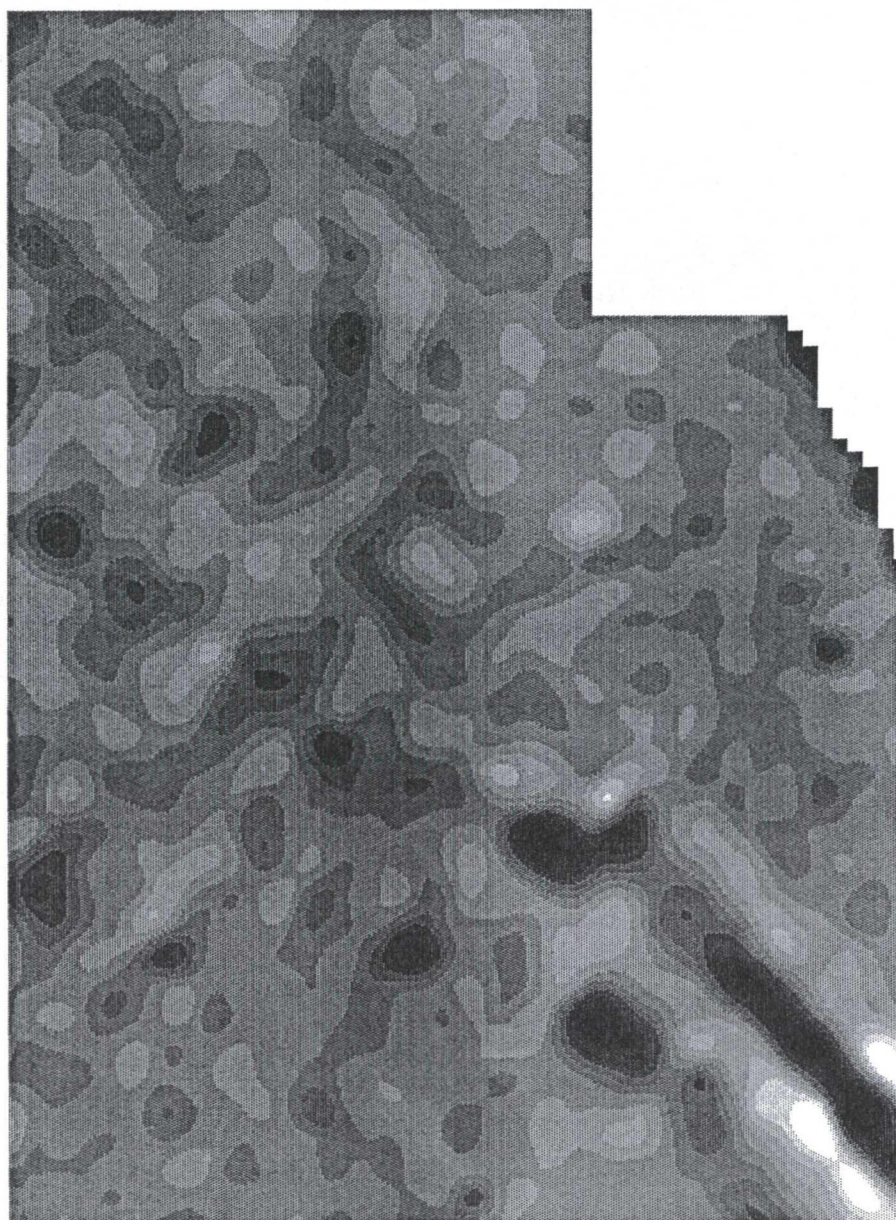


Fig.7: North-east gateway (porta praetoria). Magnetic data from -3 to +5 nT (after column averaging and smoothing); scale 1:250; (xerox copy).

### 6.2.3 Gates

The quality of the magnetic data is too poor to provide any interpretable detail of gates H, J and K. That there *are* gates at these points is clear enough from the internal plan and from the breaks in the outer ditches, and they may be identified as the *porta decumana* (H), *porta principalis sinistra* (J) and *porta principalis dextra* (K). The *porta praetoria* (G) is shown at a larger scale and with a more comprehensive range of magnetic data in Figure 7. Although it looks as if the more obvious positive pit-like anomalies may be interpreted as the remnants of structural features associated with the gate, none of the well-known simple post patterns of gateways can be clearly discerned. The small rectangular feature at G is also spatially associated with the gate; if it were a part of the actual gate structure, it appears to be most unusual in standing proud of the outermost line of the defences (unless of course, there is another line of the defences, a smaller ditch not detected in the magnetic survey). It seems certain that the magnetic data are not showing all the expected major post-pits commonly associated with fort gates; the width of the apparent gap in the defences, and the position of the putative *via praetoria* in relation to this, raise the question of whether the gate has been rebuilt at least once (in a slightly different position?) or, as has been suggested, was of double portal form.

### 6.2.4 Roads

The only internal road which can be identified with certainty is the *via principalis* (L), with a width of 4.5m between the ditches. A band of slight negative readings (I) might reflect the *via praetoria*, and the *via decumana* cannot be identified with certainty amongst the linear features running parallel to the major axis, although there is no reason yet to doubt its existence.

### 6.2.5 Buildings

A marked group of discrete high anomalies towards the south corner of the built area deserves comment. The magnetic profiles are suggestive of ovens, furnaces or similar (industrial?) activity; can this be a candidate area for a *fabrica* (workshop)? The *principia* and *praetorium* are normally found adjacent to the *via principalis* on the side away from the *porta praetoria* (south-west side in the case of Roall), the *principia* being centrally placed along the minor axis (and over the major axis). Whilst this general location is feasible at Roall, it appears that the *principia* cannot be centrally placed over the major axis, whichever side of the *via principalis* it occupies. In this respect, the layout of Roall may well not conform to the 'standard' plan of auxiliary forts (note 8.9).

It is not possible to distinguish the functions of other built areas and one can only be roughly guided by analogies with excavated examples.

### 6.2.6 Other features

In addition to the uncertainties arising from the low magnetic readings, there are two further sources of confusion:

- a) the later ridge and furrow, although aligned at an angle to the fort geometry at the south of the survey (as marked by rf in Fig. 5), appears to curve slightly so that in the area of the fort itself it is very closely aligned with the major



axis (view Fig. 4 obliquely to see the ridge and furrow). This may mask some of the fort features on the same alignment; we have not attempted, therefore, to depict all these lines on Figure 5 but one line, UV, is shown as an example. The curvature towards the south of UV points to this being ridge and furrow but whether the projected line towards the north (V) belongs to the fort or to cultivation practice cannot be decided.

- b) a number of curvilinear features (WX and two lines south of it) which cross the north corner of the fort and which do not conform to the rectilinear geometry of the fort. Their nature cannot be decided but it is observed that they are approximately parallel to the road EF; if the road is contemporary with the fort, these features may post-date the fort.

#### 6.2.7 Date

The date of the fort is currently speculative although, within the constraints imposed by the quality of the survey information, a possible Flavian or Hadrianic date has been mooted. The identification of the fort in the classical sources is also speculative. Should further investigation prove it to have been occupied in the later Roman period, then attention is drawn to the possible relevance of the name 'Praesidium', listed between "Eboracum" (York) and 'Danum' (Doncaster?) in the *Notitia Dignitatum* (note 8.10).

### 6.3 Features directly associated with the fort

Of all the other features shown on the magnetic survey, some appear to be more certainly associated with the fort than others. The first group is described here and the remainder in section 6.4.

#### 6.3.1 Road EF

A road or track, EF, runs from a putative road along the scarp to the north-west towards the north-east gate of the fort (G). It varies in width from 5.6-12.7m and the side ditches were clearly not dug as single continuous features. The relationship with the northern corner of the fort itself is not clear and its southern ditch appears to turn to the south-west for a distance, (heading towards the north-west gate?). The possible road along the scarp is further discussed in section 7.6.

#### 6.3.2 Enclosures R and S

Although it is conceivable that the above road pre-dated the fort and that the latter was sited to take advantage of it, this conjecture is tentatively rejected on the grounds of improbability, thereby allowing the further suggestion that enclosure R and the 'paddocks', S, were also contemporary with, and a part of, the military occupation (note 8.11). There are traces of features within R and it must be regarded as a good candidate for the bath house area but this is by no means proven. The function of the small enclosed areas, S, is unknown but they appear too small and discrete to be part of a field system. Some ancillary aspect of the fort's daily life, such as stock pens or similar, may be postulated; certainly, they are different in character to the areas of small features to the east and south of the fort.



### 6.3.3 *Ditch KM*

The alignment of ditch KM on the south-east gate and its possible continuation on a slightly different alignment, indicated by two parallel lines to the east through area N, may indicate another road line.

### 6.3.4 *Ditch ABQ(CD)*

It is noted that ditch ABQ is strikingly parallel to the fort defences; although it nearly fades out at B (indicated by a dashed line in Fig. 5), it was just discernible on some screen images. A ditch running south-west from D is also clear and it has been conjectured that this continues, turning at C to join ABQ. It must be emphasised however, that the stretch through C (also dashed in Fig. 5) is most dubious on the magnetic images. Indeed, it seems that ABQ, rather than continue to C, may turn to the south just beyond Q. Whether ABQ or ABQCD is considered as an entity, each possibility shows a marked affinity with the fort, although their functions are unknown (note 8.12).

### 6.3.5 *Area immediately south-east of the fort*

A ditch running parallel to ditch KM, between the eastern corner of the fort and D, appears to be aligned with the fort and it may be that some or all of the features in the area bounded by this ditch, ditch KM and the fort are also contemporary with the fort.

## 6.4 **Other features**

The remaining features fall into two separate groups:

### 6.4.1 *Area south-west of the fort*

To the south-west of the fort, and beyond ditch ABQ, is an area of small linear ditches or gullies bounded on one side by ditch PQ (the opposite side may extend beyond the modern field path into an area not yet surveyed). There is a suggestion that PQ may change alignment slightly as it approaches BQ in order to avoid the latter. If this conjecture is true and if BQ is contemporary with the fort, as argued above, then this area of small features may also be contemporary or later than the fort. The scale and nature of the features are suggestive of occupation or related activity.

### 6.4.2 *Area N south-east of the fort*

To the south-east of the fort (area N) and on either side of a putative road (indicated by two parallel slightly curving ditches), is a similar area of small scale features indicative of occupation.

Either of these two areas could represent vicus-type settlement, that in area N, having a road through it, possibly being a better candidate.

Other dashed lines in Figure 5 depict very faint features in the magnetic images, whose reality is in some doubt. The nature of two faint, nearly parallel lines, FT, is unknown.

## **7. Further Investigation**

A precursor to any further work should be the production of a composite site plan based on both the cropmark and geophysical evidence. It is our intention to liaise with RCHM(E) in the immediate future to achieve this and to modify points 7.1-7.9 as necessary.

The survey information now available for the Roall site highlights a number of questions which warrant further attention. In general terms these are:

### **7.1 Early prehistory of the site**

The problems attached to identification of the nature and location of any early prehistoric occupation or other activity on the site have been discussed above (para. 6.1).

Repeated fieldwalking may provide a sounder basis for other methods of investigation. As an interim measure, however, it is recommended that, on areas known to have produced surface flint and particularly on those sites near and just above the floodplain (shown elsewhere to have produced more positive evidence of occupation or related activity), consideration be given to some sample sieving of ploughsoil and subsoil in the course of other programmed excavation exercises as resources may allow. Whilst such measures may appear tedious and extreme, without them we are convinced that many of the early prehistoric occupation sites of the lowland river valley will be lost without record when the land is removed wholesale for quarrying, etc. We attach much importance to the identification of such sites for comparison with known upland sites higher in the Pennines to the west (note 8.13). The identification of palaeo-environmental deposits (para. 7.7 below) is also pertinent in this respect.

### **7.2 Dating and state of preservation of the Roman fort**

In the absence of good evidence from fieldwalking, the period(s) of occupation of the fort remains one of the most pressing questions. Only with this information can discussion of the fort in the context of the Roman military occupation of the region go beyond speculation. This question can only be sensibly pursued by excavation and this should be designed as far as possible to ensure maximum recovery of information whilst keeping disturbance of the archaeological remains to an acceptable minimum. Given the survival of the area of a complete fort and its immediate environs, together with the survey evidence now available, there are currently strong arguments for preserving as much as possible of the site intact for the foreseeable future. Any excavations designed to pursue the dating question should capitalise on the opportunity to determine the actual state of preservation of the archaeology below ground in the areas examined.

The location and extent of excavation trenches is naturally difficult to decide, not least because of the possibilities of rebuilding, resulting in an unresolvable complex of features in any one trench, and of purposeful removal of datable debris to some area outside the fort during the period of occupation. The following possibilities have been mooted *inter alia*:



### 7.2.1 Gates

A section of the defences incorporating at least one half of a gateway; an abundance of rubbish has been noted at the butt end of extra-mural ditches in some such locations but this certainly cannot be guaranteed. Similarly, such an investigation, designed to record the form of the gateway (if this is in any way diagnostic of period), is all too likely to be confounded by rebuilding. In the case of the *porta praetoria* at Roall, the magnetic picture of this feature and the possible line of the *via praetoria* (Fig. 4; I in Fig. 5) do not even allow an unequivocal identification of the gate location (because of rebuilding?); it would therefore be difficult to site the trench without first stripping a wider area. The two side gates at the ends of the *via principalis* may be more certainly located by extrapolating the lines of the ditches presumed to delineate this road.

### 7.2.2 Defences

A section of the defences away from a gateway; this is perhaps even less likely than 7.2.1 above to contain rubbish deposits. It would be impractical to make a trench broad enough to be certain of including an interval tower (although the chance of this might be increased at the corners), and, with the current state of knowledge of such features, there is likely to be no advantage gained by doing so, (see also 7.3 below). On the other hand it may be considered that excavation through the defences or (halves of) gateways constitutes a more acceptable level of disturbance to the archaeology, as the exercise is theoretically repeatable in a new location.

### 7.2.3 Principia

A trial area of the *principia* on the assumption that this will have been in use throughout the life of the fort and will always have occupied the same location; this exercise again may be confounded by rebuilding and by paucity of finds, quite apart from the slight uncertainty of the precise location of the building on the magnetic survey. The *principia* is unique within the fort and it may be considered that this constitutes too great a level of disturbance to the site.

### 7.2.4 Barracks

A substantial part of a barrack block has been suggested as a further possibility; the likelihood of finds is at least no less than many other areas of the fort and the exercise is theoretically repeatable. Once a barrack block is located, a small open area covering a part of the building sufficient to identify its form and any rebuilding phases, rather than a narrow trench across it, would be required.

### 7.2.5 Other features

Attention is also drawn to the line of high magnetic anomalies along the inside of the north-west defences (whether they represent ovens (or similar) or pits), as being indicative of an area within which accumulations of domestic debris might be more likely than many other areas of the fort.

We believe that the practical way forward with this question is to seek specialist advice and to reach a consensus opinion without delay (note 8.14).



### **7.3 Elaboration of the form and plan of the fort**

Much detail is lacking from the plan of the fort as shown by magnetic survey, although more might be conjecturally interpolated if assumptions are made about the extent of standardisation of fort interiors. Further investigation might be directed towards both the nature of the defences and the plan of the interior.

#### **7.3.1 Form of defences**

Investigation of the defences would be primarily to ascertain whether they were revetted by turf or timber or whether they were stone built; although the latter may appear contextually less likely, the question cannot be unequivocally decided on the basis of the existing survey. Stone defences may point to a later date of construction than a turf or earthen rampart. Such an exercise, by means of an excavation trench, might coincide with the considerations discussed in 7.2 above. Such trenches should perhaps extend from the innermost side of the *intervallum* to a point considerably beyond the clearly visible outer ditch (see comments in Jones 1975, 119-123; note 8.8).

#### **7.3.2 Interior layout**

The plan of the interior layout might be accorded lower priority than other questions; nevertheless, it would be of interest to explore the use of other remote sensing techniques to elaborate on the detail already visible. This exercise may also serve to acquire data which may allow further investigation of the superimposition of datasets obtained by different methods; the use of both resistivity and radar equipment has already been mooted. In this respect, attention is drawn to the greater(?) likelihood of stone buildings on the site of the *principia*, (see also 7.4 below). Although the existing magnetic survey is accurately located with respect to the electricity poles on the site, the possibility of small error exists between that survey grid and any grids to be laid out in future; consideration should therefore be given to repeating the magnetic measurements on the grid used for any other remote sensing survey. This may also allow more experiment to increase the resolution of the magnetic survey.

### **7.4 Nature of extra-mural features which may be directly associated with the fort**

#### **7.4.1 Within the survey area**

The association with the fort of various features visible on the magnetic survey is discussed above (para. 6.3). Of particular concern are: the identification of the bath house; the relationship with the fort of the road or track approaching the north-east gate; the date, function and relationship to the fort of the conjectural outer enclosure (ABQCD in Fig. 5) or at least of ditch ABQ, which clearly parallels the fort defences. Further survey and excavation trenches should take these points into consideration together with the points made in 7.5 below. Although enclosure R cannot be identified as the bath house area, it must be regarded as a candidate and warrants further investigation; stone features are to be expected in the bath house and the application of other remote sensing techniques may be particularly relevant here. If not a bath house area, then it certainly appears to be some

sort of annexe in direct association with the fort and its function should be determined as far as the limited scale of investigation may allow.

#### *7.4.2 Outside the survey area*

Attention is also drawn to the archaeological potential of the scarp and the area between the scarp and the river channel. Although the alluvial flats may have been subject to flooding as they are now, the possibility of archaeological features here cannot be totally dismissed; further geophysical survey may be considered here but difficulties may be encountered because of the masking effect of silt deposits. The possible use of the river as a transport facility also leads to the speculation that a river front development could have existed in this general area (including the area to the south-east of the field in the direction of the possible road through area N; earthworks have been noted in the grass field adjacent to the south-east side of the survey area; although more likely to be medieval or later in date, these may warrant closer inspection). Such features, if identified, are likely to be accorded a high priority for preservation or more detailed investigation (see also comments on a conjectural river crossing, para. 7.6 below).

The identification of an extra-mural rubbish dump would be of great value. Although this could lie almost anywhere, the attraction of the scarp just beyond the north-east gate for convenient disposal of rubbish is noted; the loose sand resulting from animal burrows on the scarp has been cursorily examined with negative results and consideration may be given to more intensive trials on the scarp immediately opposite the north-east side of the fort (if the existing tree cover permits this).

### **7.5 Date, nature and relationship to fort of other features in the immediate vicinity**

The magnetic survey shows that there are two additional major areas of activity, one to the south-west of the fort and one to the south-east. The group of features in the first area may respect the fort site as noted above (section 6.4) and may be contemporary or later. The second area (N) appears to contain at least one ditch which cuts or is cut by ditch DC and which could pre-date or post-date it. The possibility that area N could pre-date, post-date and/or be contemporary with the fort must nevertheless still be allowed; certainly it would appear that some of the features are likely to be contemporary with the fort because of the alignment of the possible road through the area with the south-east gate. Whether any of these extra-mural areas represents *vicus*-type settlement cannot be decided with certainty from the existing survey, but area N with its possible road is perhaps the more likely candidate. It is important to establish the presence or absence of a *vicus* and the use of phosphate and/or magnetic susceptibility survey, as well as trial trenching may be relevant in both these areas of activity. The likelihood of retrieving datable material from a *vicus* area may be good but it cannot be guaranteed that the period of occupation was necessarily the same as that of the fort.

### **7.6 Investigation of the broader landscape context of Roall**

A prerequisite for this aspect of the work will be the plotting of all relevant cropmark information within a radius of several kilometres. Existing air photograph cover should be



searched for any trace of possible road lines in the close vicinity of Roall particularly in the directions of York, Brough on Humber, Doncaster, Burghwallis, and Castleford. Thereafter, the investigation falls into two broad themes:

#### *7.6.1 Communications and the place of Roall within the pattern of military activity in the region*

Currently the only good candidate for an access road to the fort is that apparently running along the scarp on the north-west side of the field. Whilst the side road from this into the fort is clear, an element of doubt remains about the feature along the edge of the scarp. This feature should be confirmed (or otherwise) by further geophysical survey to the south-west and if necessary by excavation. The putative continuation of this road to the north-east, beyond the intersection with the side road into the fort, is more difficult. If a road ever existed between Roall and the direction of York, then it must have included a river crossing (close to the fort on the old river course shown, if that is where the river flowed at the relevant time). The identification of such a crossing, with the possibility of good preservation in the alluvial deposits, would be of importance. There is no guarantee, that such a conjectural road and river crossing would be formed as a direct continuation of the road along the scarp edge; the latter could equally well finish above the river and a new line towards York run from some point closer to the fort. Nevertheless, this aspect of the roads associated with the fort might be considered further, with the possibility of further investigation of the scarp edge road towards the north-east. The additional possibility of other road lines, as yet quite unrecognised, should not be ignored.

#### *7.6.2 Native settlement and the farming landscape*

Cropmark evidence points to a number of native settlements or farm sites in the 'hinterland' of Roall. To our knowledge, none of these have yet been excavated and very few have been investigated in the broader area of the Lower Aire-Calder valley. Within West Yorkshire (in the 'hinterland' of the Castleford Roman fort) examples are known both of sites apparently abandoned before the Roman occupation and of sites occupied during the early Roman period. The evidence is, however, too meagre to attempt an assessment of changes induced by the military occupation in settlement continuity or in farming practice. As the fort site at Roall still lies in a predominantly rural landscape, the opportunities for pursuing this question may be rather greater than for sites such as Castleford which lie in semi-urbanised or industrial landscapes.

Of the cropmark sites near Roall, particular attention is drawn to one (if it is indeed a settlement site) lying only c. 100m west of the survey area. Investigation of this site, at least by geophysical survey, may be considered at the same time as work on the fort. It will be of interest to examine, *inter alia*, its relationship to (the projected line of) the road along the edge of the scarp. If excavation is considered, attention is also drawn to the general paucity of pre-Roman finds in this region and the consequent difficulties of retrieving useful evidence from small scale trenches on such sites if they happen to be pre-Roman in date.

## **7.7 Palaeo-environmental investigations**

The identification of any stratified and datable palaeo-environmental deposits on or very close to the Roall site, would considerably enhance the potential value of the site itself (note 8.15). Consideration should be given to trial investigation (boring?) in the silt and clay channel immediately south of the site, in the alluvial deposits between the scarp and the former river channel, and on the projected line of the channel itself (Figs 2 and 3). Attention is also drawn to an apparent earlier scarp in the east corner of the field (depicted in Fig. 3); might this be indicative of another former river course pre-dating that already described? If so, trial boring to the east of this feature may be considered. It is recommended that analysis of any deposits, identified as being potentially suitable and pertinent to the prehistory or early history of the area, be accorded some priority.

## **7.8 The historical environment**

The most important aspect of the historical environment, pertaining to the remains of the fort today, is perhaps the deposition of a layer of sand over the site. A knowledge of the depth of sand cover across the field, in particular, the identification of areas where such cover may not exist, would provide a sounder basis for any management programme designed to ensure the preservation of the remains. Consideration may therefore be given to acquiring this information by boring(?) and during any excavation exercises.

It is possible that the original edge of the scarp on the north-west and north-east sides of the field has been obscured to some (varying) extent by deposition of sand and by movement of ploughsoil at points where there may be a slight slope downwards towards the scarp. The need to establish whether this is so should be considered, particularly just beyond the north-east side of the fort.

## **7.9 Future management**

The chance survival of the area of a complete Roman fort, together with its immediate environs, already provides a strong argument for continued preservation of the site. Further small-scale investigation of the site, as discussed above, may cause this view to be refined, but assuming that preservation *in situ* continues as the desirable course, then this should be borne in mind in drawing up a project brief for further site work. In particular, every effort should be made to assess the below-ground soil conditions (pH, etc.) and the extent of preservation of different materials encountered during any excavation exercises.

## **7.10 Work in summer 1992**

The above points include a range of possible short projects which may be refined following wider discussion. It is not envisaged that all these will necessarily be implemented and certainly not in the space of one short season on site. The actual work undertaken will be dictated to an extent by the differing interests or concerns of the organisations involved. Both English Heritage and the North Yorkshire County Archaeologist may be concerned *inter alia* with investigation which may facilitate future care for the monument. The interest of the West Yorkshire Archaeology Service is directed primarily towards the relationship of this fort with that at Castleford and the question of dating is paramount. Work undertaken



by the York Environs Project may be dictated to some extent by the need to train students in aspects of archaeological excavation and fieldwork.

## 8. Notes

8.1 Information from Mr R. Longbottom, the farmer, based on observation for c. 50 years. It is not clear whether sand has been blown *off* this field in the past, but certainly there has been a net deposition up to the present day.

8.2 Detailed survey information (including the location of known land drains), the location and numbering of the data grids, and disc copies of the raw magnetic data files are filed as ancillary information in the West Yorkshire SMR where they are available to any bona fide researcher for consultation and reprocessing as relevant. (It is intended that the data files will also be stored as hard copy very shortly).

8.3 '*Cuiusvis hominis est errare*', in other words, we got it wrong ... clearly, the signals from the well-buried archaeological features being only slightly greater in magnitude than those arising as random 'noise' from the topsoil (at the normal gradiometer position), the sensor tube should perhaps have been held at a *greater* distance from the surface. This arises from the inverse power relationship between magnetic field strength and distance; naturally a compromise should be reached between the rates of decrease with distance of the signals from both topsoil and buried features and the sensitivity of the gradiometer. It is debatable whether a useful improvement in resolution might have been obtained in this case; that can only be determined by experiment.

8.4 The data have also been processed with and without zero drift corrections, without column averaging, with biasing as necessary, and with various single pixel transformations. It is on the basis of viewing the results of all such treatments that the illustrations in this report were chosen. On the same basis it may be added that no major linear features, aligned with the direction of traverse, are lost by column averaging; we reiterate the point of note 8.2 – original data are available to any bona fide researcher for reprocessing.

8.5 J. Marriott and B. Yarwood 1992, 'Methley – Park Lane, Geophysical Survey', *Lower Aire–Calder Valley Interim Report* No. 1, para. 4.4.

8.6 Grey-scale images of the magnetic data in this report are all of relatively small scale. Larger scale images of parts and/or the whole of the site, with any contrast stretching or adjustment achievable with the Contort software, and with accurate plotting of the survey reference points (electricity poles, water hydrants, etc.), will be supplied to any intending bona fide investigators of the site.

8.7 B. Yarwood and J. Marriott 1988, *Methley, Willow Grove; Rescue Excavation 1988, Interim Report* (typescript). The same problems are being encountered in current excavations on the St Aidan's site, also in Methley.

8.8 M.J. Jones 1975, *Roman Fort-Defences to AD 117, with special reference to Britain*, British Archaeological Reports 21 (perhaps outdated?)

8.9 See for example the plan in A. Johnson 1983, *Roman Forts*, 35

8.10 B. Jones and D. Mattingly 1990, *An Atlas of Roman Britain*, 34-6; A.L.F. Rivet and C.C. Smith 1979, *The Place-names of Roman Britain*, 442

8.11 '*Entia non sunt multiplicanda praeter necessitatem*' – although our work should not be constrained by the 'Law of Parsimony', it does have an application here. At *this* stage in the investigation

there is little point in pursuing the least likely interpretations of the existing evidence, unless they may radically alter the nature of further work.

**8.12** The ABQCD alternative forms a complete enclosure of c. 5ha. It has been speculated that this might be a marching camp pre-dating the fort, although no entrances are visible; also, as pointed out in the text, the very existence of a part of this line is in doubt.

**8.13** This is a more serious problem, where the sites lie on the sand and gravel terraces, or above coal accessible by opencasting. Within the study corridor, apart from the more obvious site of the henge and associated features at Ferrybridge, only four good candidates for such early sites have yet been identified: a probable Mesolithic and Neolithic occupation area in Thorpe Stapleton, SE 342308, now gone in opencast; an area with considerable numbers of flint, a little prehistoric pottery, post-holes and pits at St Aidan's, SE 390273, currently being excavated prior to destruction; an area of Iron Age occupation which also produced Mesolithic flint, Peterborough ware and features unrelated to the Iron Age occupation at Willow Grove, SE 411266, now quarried away; an area of pits, post-holes and gullies, possibly an unenclosed occupation or industrial area, apparently respected by a system of Iron Age ditches, at SE 387266; this last may of course be earlier Iron Age in date.

**8.14** The authors of this report claim no specialist knowledge of Roman military archaeology; we are grateful to Graham Eyre-Morgan and (at second hand) Barri Jones for their first comments on this question and on aspects of the fort layout, which have been incorporated as best we can into the comments made here. See also Jones 1975, 119-123 (note 8.8). We recommend that these comments be combined with any other specialist views (including those of the County Archaeologist of North Yorkshire, and of English Heritage) which might be sought in the near future and that a consensus be reached well before the projected start of further investigation.

**8.15** Much information directly relevant to a prehistoric site in a similar topographical location, at Willow Grove, Methley, was obtained from a peat core in an adjacent former river channel. In this case it was fortunate that the channel had been cut off in the late glacial period and peat growth appears to have been more or less continuous from then up to the early Middle Ages.

## Acknowledgements

The site was first observed and recorded by staff of RCHM(E) and we are grateful to them for making their information available, and in particular to Bob Bewley for his approach to the farmer on our behalf in December 1991, enabling the survey to be carried out.

The landowner and farmer, Mr R. Longbottom, was not only kind enough to provide access but also supplied much useful information on the nature and recent history of the survey area as noted in the report. His enthusiasm and interest in the slowly emerging detail of the site was matched by that of Becky Cuttle of Roall Manor Farm, who assisted with field walking and various survey tasks. We hope that their interests may be rewarded with more material evidence and information from the site, following an intended programme of survey and exploratory excavation in the summer of 1992.

We are grateful to Mary Lakin, County Archaeologist for North Yorkshire for providing large-scale map coverage of the site.