Chapter 4.
A Digital Field Survey: Wychnor Deserted Medieval Village Case Study

INTRODUCTION

One of the central aims of the '*Where Rivers Meet*' (WRM) Project is the systematic assessment of the archaeological importance, state of preservation, current and preferred future management regime for sites and monuments within the study area.

Archaeological mapping and geoarchaeological modelling can result in the identification of a list of known and potential archaeological 'sites', here defined to include upstanding remains, earthworks, crop-marks, buried features, palaeoenvironmental evidence and artefact scatters (English Heritage Archaeological Division Research Agenda 1997, 25).

In order to manage the archaeological resource, relevant data needs to be researched and recorded. This includes, the current condition of these sites, present landuse, potential threats, a process undertaken, where possible, by inspection on the ground. In as far as is practical, all sites and potential sites within the study area requires inspection and categorisation according to importance or potential importance as follows:

- Sites of national importance, usually Scheduled Ancient Monuments (SAM).
- Sites of regional importance.
- Sites of local importance.
- Sites of limited importance, including those sites so badly disturbed or poorly documented, that too little now remains to justify their inclusion at a higher grade.

By necessity this element of the project must follow and be informed by all other parts of the *Where Rivers Meet* project, which includes evidence recovered from excavation. However, in preparation for the full programme of assessment, a pilot study has been carried out on a subset of the data. The aims of this pilot are broken down into three parts outlined as follows:

> **Part 1:** The examination of the potential use for the use of LiDAR data in recognition and recording of standing earthworks.
>
> **Part 2:** The development of a suitable methodology for incorporating the data gained from the earlier GIS investigation into a field based assessment exercise.
>
> **Part 3**: The assessment of the archaeological content of the survey study area of this project to the criteria tabulated below (table 1).

CRITERIA	HIGH	MEDIUM	LOW
Rarity			
Documentation			
Group value			
Survival/condition			
Fragility/vulnerability			
Diversity			
Potential			
Amenity value			

Table 1: Assessment criteria

The criteria that is stated in table 1 is based on the Secretary of State for the Environment's published Non-statutory Criteria for the Scheduling of Ancient Monuments (PPG16: Annex 4 1990) and the English Heritage Guidance on the New Approach to Appraisal (1998).

The primary product of the pilot assessment will be the devising and testing of a system to more closely integrate the Light, Distance and Ranging (LiDAR) survey and Geographic Information System (GIS) element of the research with the field assessment element. This work, in turn, relates to the primary product of the full site assessment exercise. This will be a list of both potential and archaeological sites within the overall study area, with data on their importance, condition, vulnerability, potential, etc, in accordance with established national criteria. The list will form an appendix to the Historic Environment Management Plan (below) and the relevant data will be incorporated into the county Sites and Monuments Record.

BACKGROUND: A SUITABLE STUDY AREA. THE MEDIEVAL SETTLEMENT OF WYCHNOR

The Catholme Focus area centred at NGR [SK 419327 315835] at the confluence of the Trent and the Tame, although rich in sub-surface archaeological remains, contains no recognisable surface archaeological features. Whilst this area has provided important evidence for aerial photographic interpretation and the geophysical work described elsewhere in this report, these features are not relevant to the work undertaken in the LiDAR survey here and a separate area was chosen for investigation. The area selected lies in the Trent Valley, adjacent and west of the focus area and comprises a rectangle approximately 2.5 square kilometres in area, straddling the course of the river Trent (figure 1). On the river terrace, probably under alluvium and with a largely permanent pasture agricultural regime, the pilot area encompasses seven archaeological sites recorded within the SMR, these are tabulated below (table 2).

PRN	NGR	TYPE	SAM
00128	SK17781625	Earthworks	114 22436
00918	SK17531583	Earthworks	114 22436
01466	SK18131554	Findspot	
01467	SK18431524	Cropmark	
03978	SK16741544	Findspot	
04009	SK17791613	Cropmark	
04505	SK17631523	Cropmark	

Table 2: Known sites in pilot area

The range of known sites within the pilot area usefully includes both substantial and complex earthworks, as well as a range of cropmark sites, so facilitating the evaluation of the LiDAR survey data over a representative range of archaeological site types. The two primary targets are the extensive and complex medieval settlement of Wychnor (PRN 128), and the probably associated moated site (PRN 918). The latter is identified in the SMR as a manorial site, in the holding of the Somerville Family by 1164, passing to the Griffith family by marriage in 1328. Both sites have the status of Scheduled Ancient Monuments (SAM) and exhibit varying levels of survival as visible on aerial photography, with some areas recorded by ground survey and appearing on Ordnance Survey (OS) mapping. Due to the preservational qualities of the earthwork sites, they provide useful targets for assessing the LiDAR data against more conventional recording methods. The three cropmarks provide the opportunity to explore the possibility of surface remains of features associated with the cropmarks being recorded by the LiDAR survey.

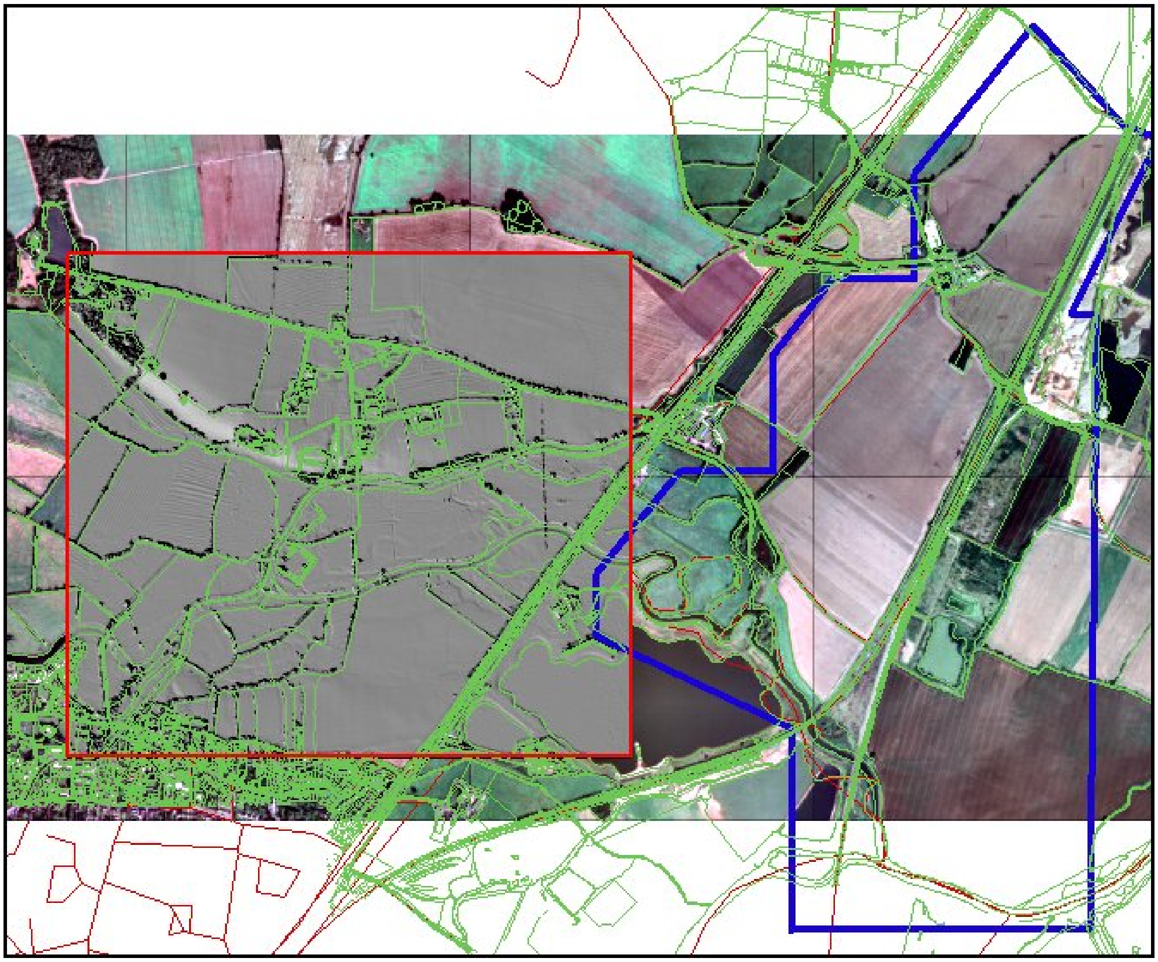

Figure 43: The pilot area outlined in red adjacent to geophysical focus area outlined in blue

PART 1: THE POTENTIAL OF THE LIDAR DATA FOR THE RECOGNITION AND RECORDING OF STANDING EARTHWORKS.

Mapping using LiDAR equipment is providing a relatively new source of topographic information, whereby data is collected by airborne laser scanning devices to provide elevation data with a vertical accuracy of +/- 0.2m (rmse). After suitable processing the LiDAR data can be used to create highly detailed Digital Elevation Models from which subtle topographical features, such as palaeochannels and archaeological earthworks, can be mapped. The LiDAR data can also be compared and integrated with other cartographic products such as OS mapping and aerial photographs.

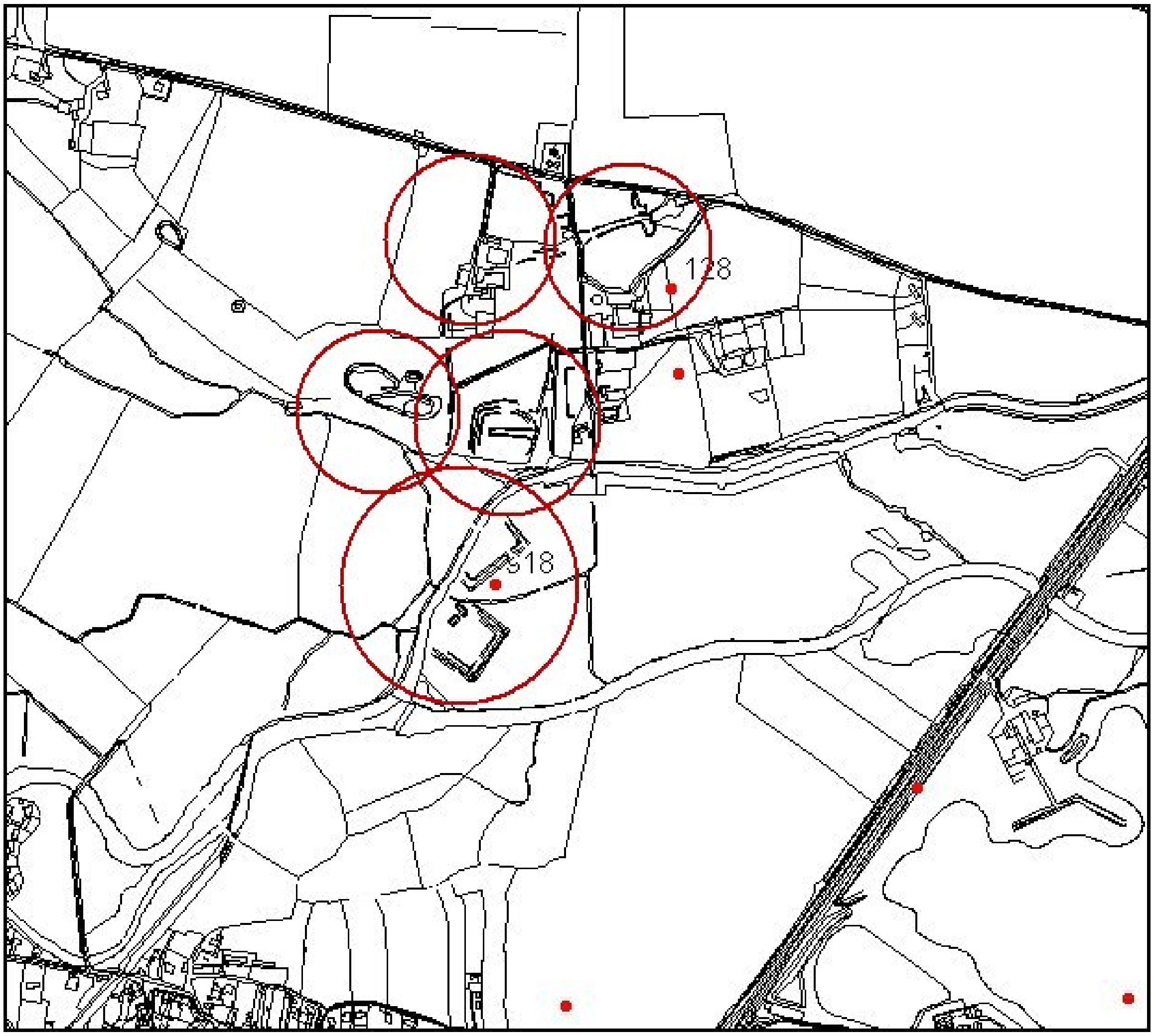

Figure 44: The Ordnance Survey depiction of earthwork monuments

An examination of the Ordnance Survey Landline digital mapping of the area shows the two moated enclosures of PRN 918 centred at [SK 417498 315798] depicted by a line convention representing the top and bottom of slopes (figure 2).   Elements of PRN 128, the 'Deserted Medieval Settlement', is represented by a series of trackways, boundary features and extractive hollows are similarly depicted in the areas centred on [SK 417552 316364]; [SK 417726 316344]; [SK 417537 316083] and [SK 417376 316111].

When this is compared with available aerial photography it is apparent that the elements recorded as discrete monuments on OS are in reality component parts of a more extensive relic landscape. This also includes extensive areas of ridge and furrow, particularly well preserved at an area centred on [SK 417127 315930] (figure 3). A series of fossilised open fields, now enclosed, can also be recognised both on OS and on the aerial photographs (AP's), centred at [SK 417387 315310]. On top of this an extensive water management system of interconnecting ditches can be seen in the proximity of, and north-east of, the moated enclosures PRN 918. The series of photographs used had no overlap and so stereoscopic viewing was not possible. Had this been possible it is probable that more archaeological information would be available from this source.

Figure 45: Aerial Photograph mosaic of area showing clearly visible ridge and furrow and less distinctive drainage system

Both the OS mapping and the aerial photography did not show anything at any of the cropmark or find spot sites. The aerial photography did however reveal that the site of a cropmarked Ring Ditch (PRN 01467) now falls within a flooded quarried area (figure 3).

It was clear that considerable additional archaeological information could be collected from the aerial photography, by an on-screen digitisation of the visible archaeological features within a GIS. This would place the already existing mapped structures into a more complete landscape complex, although a level of skill in aerial photographic interpretation would be required to extract the maximum available archaeological information.

To initiate the pilot survey of this project an image of a sub-set of the LiDAR data relating to the study area was obtained from the full WRM project GIS. The data was limited to an image in ‘tif’ format rather than a full 3-D data set for ease of transfer and manipulation (figure 4). The reasoning behind this being that it would be required to be accessible by a basic GIS programme such as ESRI’s (The Environmental Systems Research Institute) ArcView or ArcPad softwares running on a field compatible mobile computer.

Figure 46: The LiDAR subset ‘tif’, here produced as a ‘jpg’ format, the resolution of subtle earthwork features such as ridge and furrow and rectilinear drainage system remain clearly visible.

Examination of figure 4 clearly demonstrates that survival of the ridge and furrow (R/F) field system is considerably more extensive and in a far better level of preservation than is apparent from the aerial photography. The block of R/F noted on the aerial photography as centred at [SK 417127 315930] is now visible in enhanced resolution and can be seen to comprise several blocks of R/F lying roughly at right angles to each other. The more westerly of the larger visible blocks being orientated roughly north-east to south-west with an average width from furrow to furrow of 8m. The easterly extent of this block is marked by the headland of a series of slightly broader ridges lying on a roughly WNW-ESE alignment. The southern portion of this block is similar in ridge width to the western block with an average width again of 8m. Ridges become broader towards the centre of the block, up to 11m wide before again becoming narrower, 8m in the north. These blocks of R/F are clearly visible in the AP but are not sufficiently well defined for dimensions to be obtained with the level of confidence obtainable from the LiDAR image.

The advantages of interpretation offered by the LiDAR are more apparent to the south-west [SK 416865 315744] and north-west [SK 417019 316156] of this main block. At these locations other blocks of R/F are clearly visible, again lying at right angles to their adjacent blocks. Further north, centred at [SK 417506 316535] is a further distinct block of R/F. Once again this is visible on the AP but the enhanced visualisation offered by the LiDAR data allows dimensions to be readily obtained, here giving an average width from furrow to furrow of 8.0m. Figure 5 shows a direct comparison of the survey data and an aerial photograph.

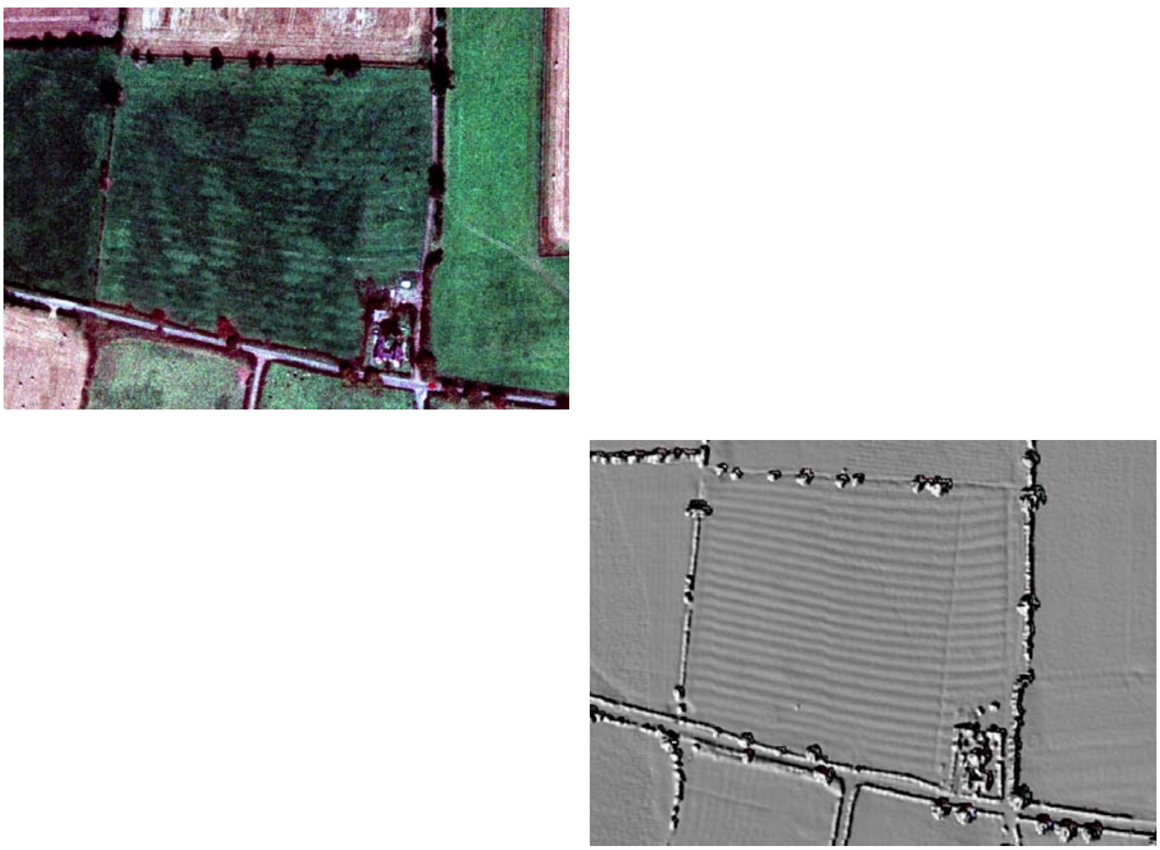

Figure 47: Comparison of area of ridge and furrow seen in AP and in LiDAR

Nevertheless, the clearest survey sample provided by the LiDAR is the area of rectilinear ditches which lie to the east of the moated enclosures (PRN 918) and offers even more substantial advantages to interpretation. At this location, centred at [SK 417784 315857] a distinct and well-preserved water management system is revealed, spreading across the floodplain between the twin channels of the river (figure 6). Channels in the west of the system appear to link with the moat and fishpond complex centred at [SK 417512 315820] and may be associated within this complex. If this is the case it seems likely that they were adapted, and added to – probably sometime in the 17th Century – to create the grid drainage pattern visible on the LiDAR today. The Ordnance Survey first edition of 1884 shows a number of drains and irrigation ditches existing in this area pointing to an episode of intense cultivation of this area, possibly as a system of water meadows.

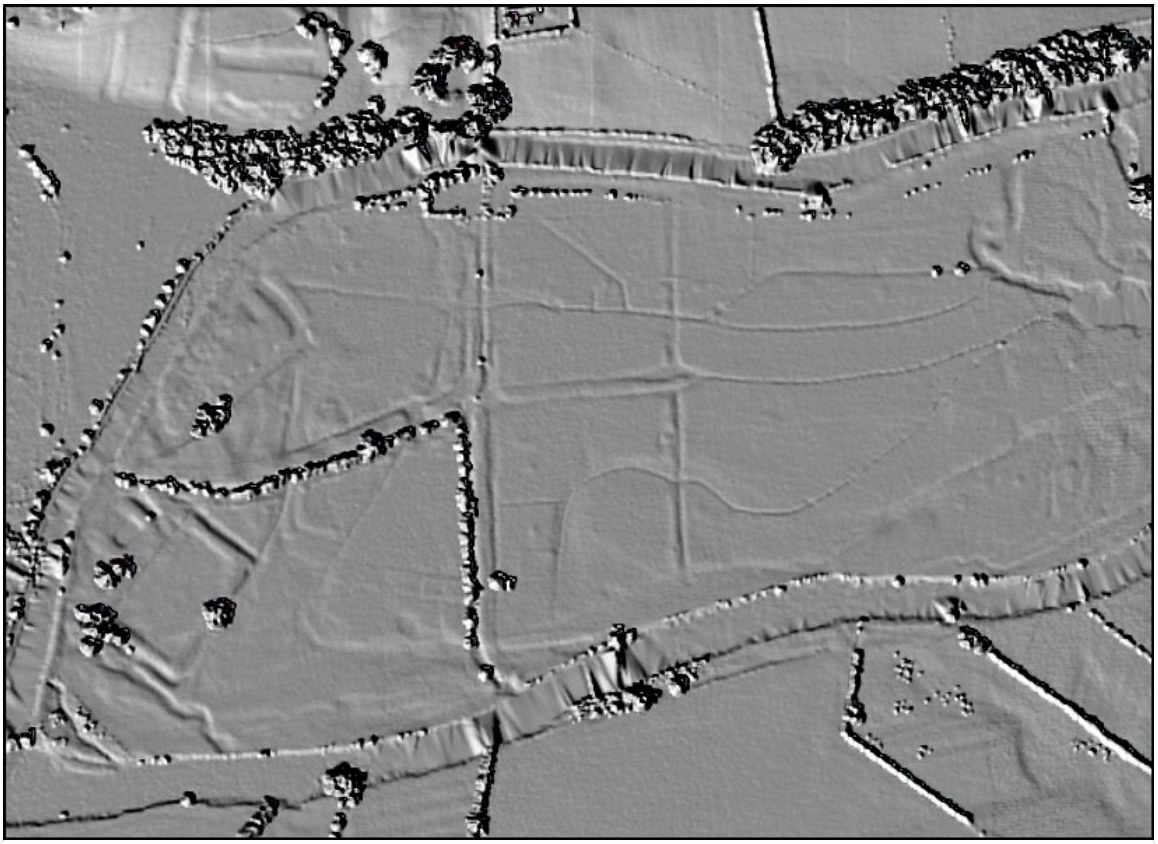

Figure 48: Showing the moated enclosures and later drainage system

Further north, in association with the deserted medieval settlement itself (PRN 128), a series of small rectangular fields centred at [SK 417855 316327] can be recognised (figure 7). These are not recorded on the OS mapping and are barely visible on the aerial photograph. Three small fields are distinctly visible lying side by side on an ENE-WSW alignment. The largest most easterly field has the dimensions of 91m east to west by 20m transversely. To the north, and west, of these three fields lie a series of less distinct rectangular enclosures of similar proportions. This whole complex is flanked by a hollow way to the north-west and by a further block of ridge and furrow to the south.

To the west, centred at [SK 417550 316193] further small blocks of ridge and furrow interspaced with a series of hollow ways can be observed. The principle components of this complex, (hollow way rectangular enclosure, pond and extraction hollows) are mapped by the OS. Though here again the LiDAR adds to the context of the site by providing the outline and form of the infield systems of open and enclosed fields.

Figure 49: Medieval deserted settlement remains, LiDAR overlain with OS Landline

It seems clear that even at this superficial level, the use and analysis of a 2-D image of the LiDAR data offers a considerable advantage over more conventional remote sensing methods of recording (see figure 8 for full detail plot from LiDAR). It is clear a detailed field based survey of the area would provide a more intensive interpretation of the monuments, but at a considerable expense of time and cost. A further examination of the area using the full 3-D LiDAR set is planned to test the opportunity offered to archaeological interpretation by this extra dimension. This testing however, is beyond the immediate scope of this pilot.

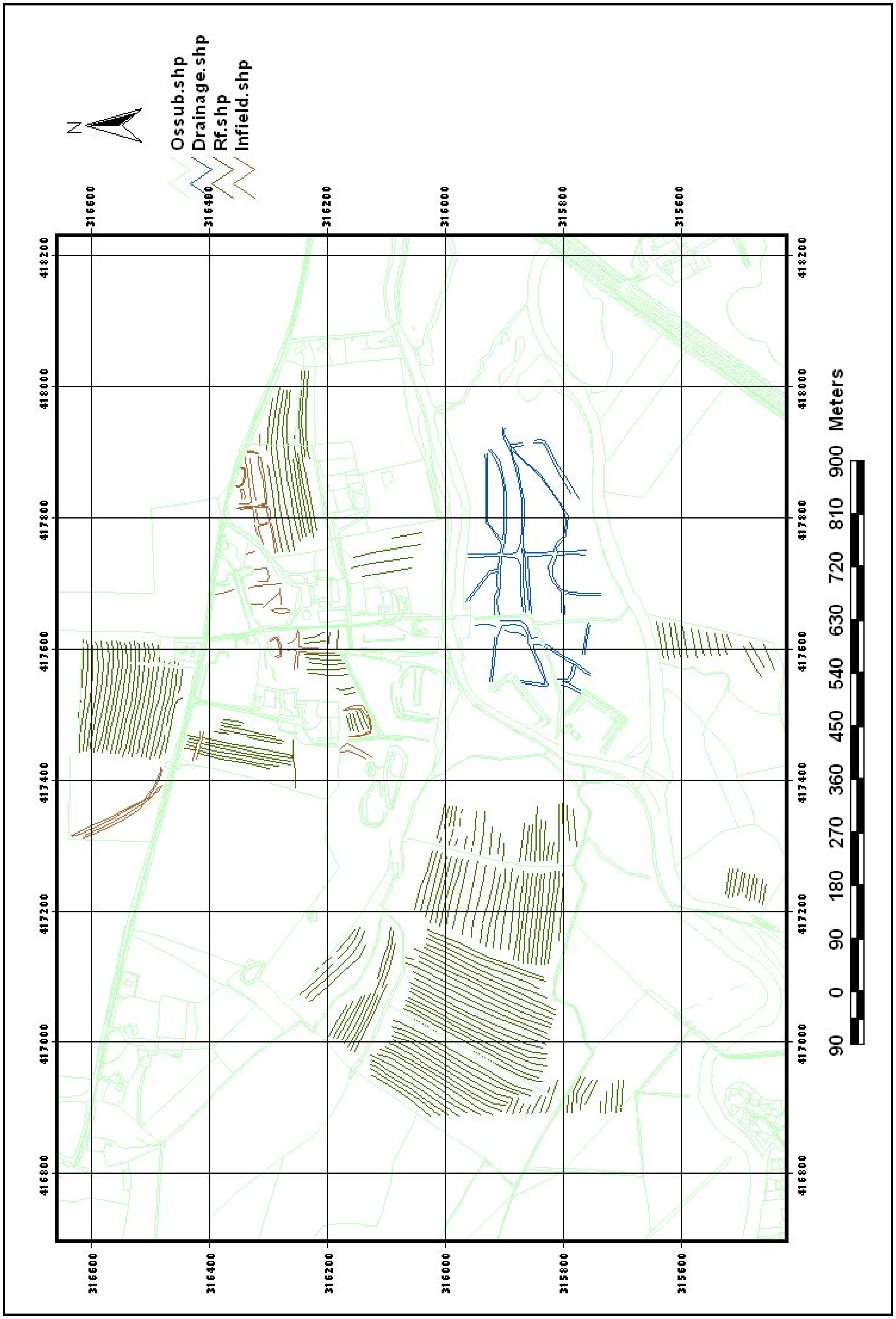

Figure 50: Showing transcription of information digitised from LiDAR

PART 2: THE DEVELOPMENT OF A SUITABLE METHODOLOGY FOR INCORPORATING ELEMENTS OF THE EARLIER GIS INVESTIGATION INTO A FIELD BASED ASSESSMENT EXERCISE.

This section takes as its starting point from the traditional method of field assessment as employed by English Heritage fieldworkers such as Monument Protection Programme (MPP) investigators or Field Monument Wardens (FMW). When personnel undertake a site visit the information is provided by access to the conventional SMR record, that is to say the fieldworker would have in the field a paper based record of the site. This information may well incorporate extracts of OS mapping of various ages, possibly aerial photography and, perhaps, increasingly deliverable products from a GIS. Site visits during the time of the WRM project have been undertaken using paper copies of the LiDAR images, transcriptions from AP, LiDAR or geophysics. A textual record informed by the SMR record, SAM record, possibly early OS records or perhaps reports of past fieldwork interventions (J. Mariott pers. comm.), would augment this visual record.

While this is a tried and tested method of site investigation, increasingly the archaeological record of a site is being maintained digitally. It therefore makes sense to explore the possibilities of making the full digital record (or at least a relevant part of it) available in the field, to the field archaeologist. With a view to exploring these possibilities two digital based systems to take GIS based information into the field have been explored within this survey project. Both methodologies use ESRI products though with different design characteristics.

- System 1. Based on the ESRI ArcView GIS system, which is a tried and tested GIS which has been readily assimilated into the SMR community, now being phased out by ESRI in favour of the more modular ArcGIS. This full GIS based system used a ruggedised field PC platform, *Walkabout HH XRT*.

- System 2. Based on the ESRI ArcPad product, designed fundamentally as a GIS field viewing platform and was based on a simple PDA *Compaq iPAQ*.

⇒ System 1.

In this application, a field GIS was created which was composed of all of the available data themes relevant to the survey area. The list of data themes is tabulated below (table 3) but included an SMR based database of all sites in the wider study area, full OS Landline mapping, available aerial photographic tiles of the pilot area, LiDAR images and AP transcriptions. All of the data sets were transferred to the hard drive of the Walkabout HH XRT and a project created within ArcView. This created a field GIS with similar functionality to a comparable desk-top based GIS. The field GIS was particularly useful as it gave access to all of the image information while in the field for both AP cover and LiDAR images. On-screen digitising in the field was possible via the pen interface, as was the creation of constraint area themes where necessary as well as on-screen notation. In addition, other available programmes allowed text to be drafted in the field. This full functionality and complete data set was possible due to the specification of the field computer used:

- Hardware: Walkabout HH XRT Mobile Intel (R), III CPU – M 800 MHz, 512 MB RAM
- Software OS, MS Windows XP Tablet PC edition 2002

THEME	DATA TYPE	FORMAT	FILE SIZE
Focus Area extent	Polygon	shp	1 kb
Pilot Area extent	Polygon	shp	1 kb
OS Landline	Line data	shp	6058 kb
OS Meridian	Line data	shp	513 kb
SMR	Database	dbf	20 kb
SMR	Point data	shp	19 kb
Cropmark Transcriptions	Line data	shp	1713 kb
AP 41603160	Image	img	53641 kb
AP41603150	Image	img	53641 kb
AP41903160	Image	img	53641 kb
AP41803150	Image	img	53641 kb
AP41703160	Image	img	53641 kb
AP41703150	Image	img	53641 kb
LiDAR	Image	Tif	10350 kb

Table 3: XRT data sets used in field GIS

It can be seen from table 3 that considerable storage space was required to accommodate the image information. There was also a need for sufficient processing power to allow manipulation. High-resolution images were used to maximise the potential for detailed interpretation. A compression facility such as LizardTech softwares 'Mr SID' could have been used but in this case the ample storage space of the field computer removed any such necessity. Functionality in the field was, as expected, more than adequate for the requirements of the field investigation of this survey area. One problem that was encountered was the poor visibility of the screen in bright spring sunlight this made using the digital based imagery in the field difficult. This loss of visibility in high ambient light conditions is a recurring problem with field computers. Water proofing however was not a problem, the XRT functioning happily in wet conditions thanks to its sealed waterproof casing.

There remains, however, one fundamental problem with this system. The high costs of the hardware with the XRT Walkabout computer close to £4000 in price. This is reinforced by a second, smaller problem, with the need for the operator to be at least proficient with the basic operations of ArcView GIS.

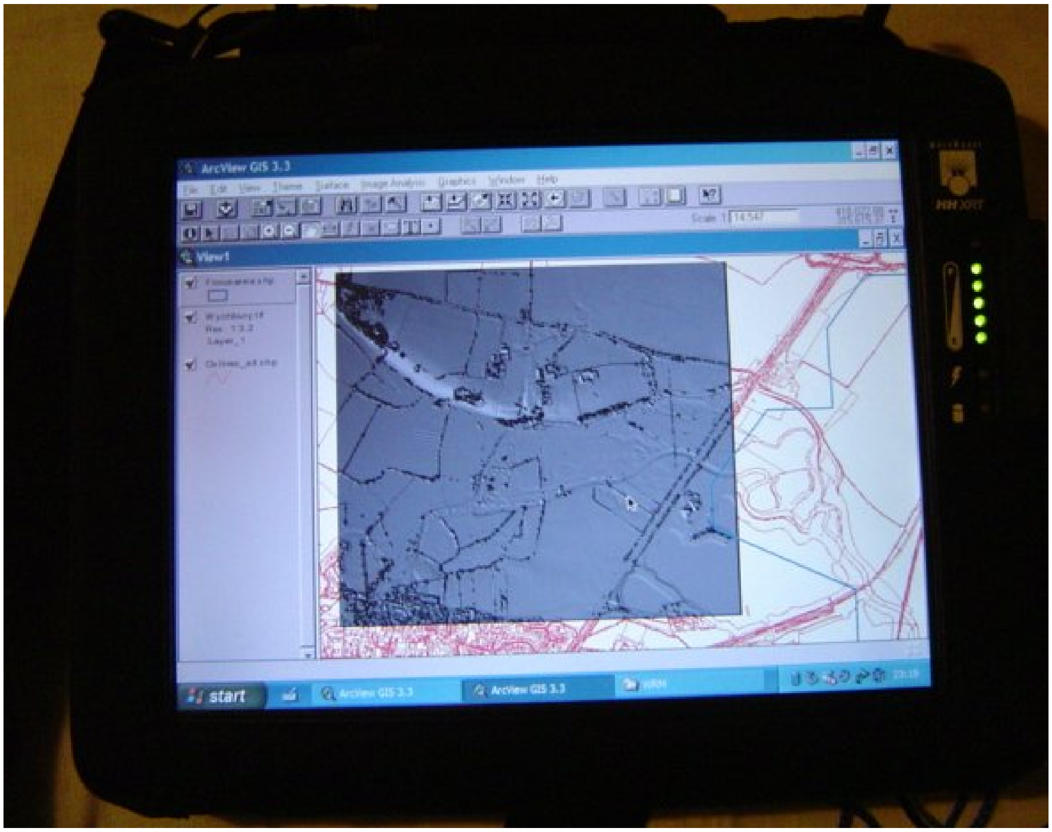

Figure 51: The Walkabout HH XRT field computer showing LiDAR image theme over the top of OS Landline

⇒ System 2.

The second system explored was based on PDA (Personal Digital Assistant) technology using a Compaq iPAQ PDA. These small handheld pocket sized computers have become extensively used within the survey profession in recent years to provide inexpensive platforms for data capture, often linked to either a Total Station survey instrument or to a global positioning system (GPS). ESRI's ArcPad software is designed as a field GIS to run on such computers as the iPAQ on a Windows CE operating system. ESRI describe ArcPad software as a mobile mapping and GIS technology. ArcPad provides database access, mapping, GIS, and GPS integration to users out in the field via handheld and mobile devices.

Within ArcPad it is possible to:

- Use existing data—ArcPad supports industry-standard vector and raster image display.
- Add data from the Internet—Data can be provided from the Internet via wireless technology.
- Move around the featured map—ArcPad includes a number of map navigation tools including zoom and pan, spatial bookmarks, and centre on the current GPS position.
- Query relevant data—Identify features, display hyperlinks, and locate features.
- Measure distance, area, and bearings on an ArcPad map.
- Navigate with a GPS—Connect to a GPS.
- Edit data—Create and edit spatial data using input from the mouse pointer, pen, or GPS.

For this application a simplified and more compact data set was assembled within a desktop based ArcView GIS and ported to the iPAQ using the Pocket PC Microsoft ActiveSync communication software and a USB cable. Although ArcPad does allow the use of image information it was felt that given the limited storage capacity of the unit, 64Mb only, and the small size of the screen, image information would be of less use in the field. Accordingly all files were in vector (line) format transferred as shape ('shp') files. The information available on the AP's and LiDAR image was digitised into vector format on the parent PC before transfer to the iPAQ. A tabulation of the assembled data sets is shown below.

THEME	DATA TYPE	FORMAT	FILE SIZE
Focus Area extent	Polygon	shp	1 kb
Pilot Area extent	Polygon	shp	1 kb
OS Landline	Line data	shp	6058 kb
OS Meridian	Line data	shp	513 kb
SMR	Database	dbf	20 kb
SMR	Point data	shp	19 kb
Cropmark Transcriptions	Line data	shp	1713 kb
Ridge & furrow	Line data	shp	36kb
Enclosures	Line data	shp	36kb
Hollow Ways	Line data	shp	32kb
Drainage system	Line data	shp	34kb

Table 4: iPAQ/ArcPad data sets used in field GIS

While this system did not have the power and flexibility of the XRT based field GIS, it did function well within the parameters of the hardware and software, providing a useful reference tool in the field. The zoom function allowed details of the assembled themes to be examined, the measuring tool dimensions to be obtained, and the query facility allowed the SMR database to be accessed.

Here again constraint areas could be added comparatively simply and notes could be taken in the notation software provided with the iPAQ, which included a dictaphone type recording facility. Here again problems of viewing the screen were experienced in bright sunlight and battery longevity also proved rather limited, though it is possible to extend this using additional batteries. The big plus of this combination however was the price, which was in total only £600, making it very affordable for the functionality offered. The software also proved relatively easy to assimilate; though onboard help is somewhat limited though documentation is available by download from the ESRI web site in pdf format.

No attempt was made to use the GPS facility of ArcPad though it is intended to explore this facility through later experimentation. Similarly no attempt was made to use the web browser capability. ArcPad 6, the version of software used includes wireless data acquisition and can act as a client to ArcIMS (ESRI's Internet mapping and GIS software). The proposed use of this software within WRM (Where Rivers Meet) is described elsewhere in this paper. Using a TCP/IP connection such as a wireless local area network, cellular phone or wireless modem data can be loaded to ArcPad while in the field. Using this facility the amount of data stored on the iPAQ is kept to a minimum. Implementation of such a facility has the potential to considerably assist field assessment of monuments by making relevant map tiles, images and database information available in the field over such a cellphone link. It is proposed to fully explore this functionality when the WRM ArcIMS server is operational.

Figure 52: iPAQ running ArcPad showing digitised Rig and furrow over OS Landline

In conclusion both systems functioned well with few glitches other than the odd software crash which was easily recoverable. Each in its own way provided a useful field tool to the extent that further fieldwork within the WRM programme will incorporate at least one of the systems. Given that each application was a simple off-the-peg solution this is an encouraging initial experiment using such technology within a Culture Resource Management (CRM) type role. Further work will be undertaken to refine the methodology set out in this report.

PART 3: AN ASSESSMENT OF THE ARCHAEOLOGICAL CONTENT OF THE PILOT STUDY AREA.

The problem with the Wychnor pilot area in terms of conservation, preservation and presentation is one not uncommon to such complex sites. Wychnor is a collection of sites which do not exist in isolation of each other but are rather each in some way related to each. Together they form an overall context of a past landscape surviving still, to a large extent, intact. At present, two elements of this landscape enjoy protection as scheduled monuments. The deserted medieval village (PRN 128 – SAM 114) which has three constraint areas located at [SK 1782 1644], [SK 1784 1629] and [SK 1757 1618]. The extent of these constraint areas was not available at the time of the field visit though it seems certain that parts of the settlement identified from the LiDAR image will fall outside of these constraints. Similarly the moated complex (PRN 918 – SAM 22436) is probably separated from the other landscape elements that it is related to by the constraint area being limited to the immediate vicinity of the moats themselves. Though here again the extent of the SAM constraint was not available, it seems certain that the drainage system east of the moat will not be within the constraint. This system is somewhat later but nevertheless, some elements may relate to the moats themselves and it represents an important episode in the historical development of this area of landscape. The elements of the earthworks currently beyond the protection of the scheduling are described above in part 1 and are therefore not reproduced here

A field visit to the site showed that, in general, the site survives in very good condition lying largely under permanent pasture (figure 11). However, one problem noted was a large area of surface poaching in the field to the west of the church and centred at [SK 417543 316119] (figure 12). Here a concentration of winter fed stock had quite severely damaged the surface of the earthworks over an extensive area. It is not known if this area, is within one of the schedule constraint areas.

Figure 53: Wychnor settlement earthworks, looking SW from church

Figure 54: Area of poaching west of church

Overall the Wychnor complex provides an unusually complete example of a deserted medieval settlement, comprising a very complete set of associated remains. In particular the infield system surrounding the settlement and the surviving portions of ridge and furrow are considered as important and integral parts of the monument as a whole, and equally deserving of protection.

Considered as a whole it seems clear that this is an important landscape which should be regarded as such and managed accordingly. Viewed as such it is scored as follows below in table

CRITERIA	**HIGH**	**MEDIUM**	**LOW**
Rarity	*		
Documentation	*		
Group value	*		
Survival/condition	*		
Fragility/vulnerability		*	
Diversity	*		
Potential	*		
Amenity value	*		

Table 5: Scoring of the Wychnor landscape

Based on this scoring it is clear that the Wychnor complex is an important survival which may be regarded

- as a site of national importance
- of regional importance
- and of local importance

CONCLUSION

The pilot project described above, while limited in its scope to only a small area of the overall study area, raises several interlinking theme in relation to the use of digital media within the fieldwork side of CRM (Cultural Resource Management). It seems clear that the use of LiDAR based data has the potential to be as revolutionary to the assessment and recording of standing earthwork archaeological sites as has been aerial photography in the post war period. The wealth of information available to an investigation of the pilot area, even in the 2-D derived product used here, was beyond any remote sensing technique previously used by the researcher and quite clearly approached the level obtainable by ground based recording. It should be stressed that this data set was only 2-D, the full 3-D data would surpass all but a detailed Level 4 type recording which would enjoy the enhancement of interpretation only available from intimately working on the ground recording the earthworks over a substantial period of time. Such recording is extremely expensive in terms of time and funds and can only be justified for very few sites. It is also worth noting here that the skill level necessary for such recording is high and few archaeologists working in the field will have the level of interpretive and recording experience necessary for such an assessment. It seems therefore that the use of LiDAR data will become an important part of archaeological investigation as the data becomes increasingly available and reference archives are established.

The use of some means of taking such data or derived products into the field is by necessity closely linked to the above. It has long been an anachronism that fieldworkers such as, for example EH FMWs [English Heritage Field Monument Wardens] who visit sites on the ground and feed information into digital databases of one form or another, have no access to such information, critically when in the field. The limited experiment outlined above, in the case of the iPAQ based application using inexpensive and off-the-shelf hardware and software, clearly shows that this would be easy and inexpensive to achieve. The probability being that time lost in photocopying maps etc. would overall save in time and costs. Clearly some work would be required to design and implement a fully functional system and access to base mapping would be required but certainly it would seem to be an avenue worthy of exploration.

Finally, the adequacy of scheduling is challenged as an appropriate method for the conservation of such landscape survivals as the Wychnor complex. The present regime of separating out elements of the complex and placing constraints around them is certainly inadequate in terms of the protection of the site as a whole and may indeed be counter productive. By placing the value of ‘Nationally Important’ on specific parts of the site there is a danger of devaluing other parts of the site, which as a result may be placed in peril.

In July 2003 Dr Simon Thurley, Chief Executive of English Heritage, launched “Ripping Up History”, within that document it is pointed out that since 1945 many sites have been destroyed or seriously damaged by the increasingly powerful farm machinery employed in ever more intensive agri-industry. To the extent that “modern ploughing has done more damage in six decades than traditional agriculture did in the preceding six centuries”. The document continues to outline three key actions that may “help secure a future for our past”:

- over-haul of current laws, which are ineffective in protecting scheduled monuments from cultivation. While this does not mean ploughing on all of them must stop, we do need a plan for each site which is based on a clear understanding of the risk that they face;
- no additional important and well-preserved site should be turned over to the plough
- greater emphasis on protecting archaeology in the new generation of agricultural schemes that will reward farmers who care for the landscape and environment.

It is probably in the third of these that the future of such complex and extensive sites as the Wychnor settlement lies. In recent years English Heritage has accepted the concept of landscape within archaeology and has promoted and carried out valuable work within the Landscape Characterisation Programme. By necessity this was a broad-brush approach to landscape. Perhaps from that programme will grow a finer grained approach to such relic landscapes as that described above. Perhaps then such landscapes will be more fully understood in order that they may be adequately protected within the agricultural schemes of the future. If this is the case it seems certain that LiDAR data will have a role to play.