YORK ARCHAEOLOGICAL TRUST

COMMUNITY GEOPHYSICAL SURVEY OF A ROMAN MARCHING CAMP AT HUNTINGTON SOUTH MOOR, YORK

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GEOPHYSICAL SURVEY REPORT

Report Number 2015/41 October 2015

YORK ARCHAEOLOGICAL TRUST

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NON-TECHNICAL SUMMARY

A resistivity survey was conducted over the earthworks of a scheduled Roman Camp, SAM 1020976, at Huntington South Moor, under a Section 42 Licence granted by Historic England. This survey was part of a Community Archaeology project to excavate the unscheduled remains of this camp beneath the former Ryedale Stadium pitch. This camp is one of two Roman camps identified by aerial survey in this part of York in 2002.

The survey identified the well-preserved remains of the Roman ditch and bank features at the western corner of the camp and provided comparative data for the excavation and interpretation of the camp remains found under the neighbouring stadium pitch.

KEY PROJECT INFORMATION

Project Name	Community Geophysical Survey at Huntington South Moor
YAT Project No.	5791
Report status	Draft for Section 42 Licence discharge
Type of Project	Geophysical Survey
Client	York City Council
Planning Application No.	14/02933/FULM
NGR	SE 6209 5469
Museum Accession No.	N/A
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REPORT INFORMATION

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1 INTRODUCTION

York Archaeological Trust was commissioned by York City Council to deliver a community project to survey and excavate the remains of the Roman Marching Camp on Huntington South Moor, located beneath the pitch of the former Ryedale Stadium, Monks Cross, York (Figure 1). This work was undertaken in advance of the proposed redevelopment of the stadium.

As part of this project, YAT were asked by the City of York Archaeologist John Oxley to include a geophysical survey of the extant, scheduled earthwork remains of the camp located in the field immediately west of the stadium (SE 6209 5469)(Figure 2). This earthwork, Scheduled Ancient Monument (SAM) 1020976, was identified during aerial survey by English Heritage in 2002 (Horne and Macleod 2002, 3), along with a second camp to the south-east that was excavated by YAT in 2004 (Johnson, 2004). It was obvious that the scheduled camp earthworks had previously extended into the field now occupied by the stadium, and the purpose of the geophysical survey was to provide comparative data for the survey and subsequent excavation of the stadium pitch, alongside delivering a training opportunity for community volunteers.

YAT applied to English Heritage for a Section 42 licence in February 2015, which was granted (Case no. SL00098596). The original project programme of April-May 2015 was subsequently delayed to June, and the 6 month reporting condition of the licence was extended by the Inspector of Ancient Monuments, Dr Keith Emerick.

The geophysical survey of SAM 1020976 took place in March 2015 and during the excavation of the adjacent pitch between 8th and 16th June 2015. The survey was led by Community Archaeologist Dr Jon Kenny and carried out by a team of volunteers recruited by YAT for the Community Stadium project.

2 METHODOLOGY

22 grid squares measuring 20m X 20m were laid out over the 0.9ha area of the SAM (Figure 2) using handtapes. The baseline was surveyed by GPS.

The geophysical techniques employed were magnetometry and resistivity. Magnetometry was carried out using an FM256 Fluxgate Gradiometer at 0.5m sample intervals and 1m traverse intervals, using parallel surveying. Unfortunately, the FM256 developed a fault that rendered the survey data unusable and there was no more time available to re-survey the area. Consequently, no magnetometry data is available.

Resistivity was carried out using an RM15 and an RM85. The probe configuration was dual fixed with 0.5m spacing for both instruments, and samples were taken at 1m intervals with traverse widths of 1m by the zig-zag survey method. The raw data was processed in Geoplot 3.00 using standard despiking, edge match and interpolation techniques as detailed in the available Historic England guidance (Historic England, 2008, 43). Both raw and processed greyscale plots are presented in this report (Figures 4 and 5) alongside interpretative images (Figures 6-8).

3 LOCATION, GEOLOGY & TOPOGRAPHY

The survey was located in three fields immediately west of the Huntington Stadium, centred on SE 6209 5469 (Figure 2). Each field was demarcated by post and wire fences along former hedge lines. To the north the fields are bordered by housing, to the west by New Lane and to the south by further fields.

The underlying drift geology consists of glaciolacustrine silts and clays, and the solid geology is part of the Sherwood sandstone group.

http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html accessed 09/09/15

The fields are generally level and currently in grass pasture. The bank of the SAM and the traces of ridge and furrow are visible on the ground as earthworks and vegetation traces in the central field, whilst in the two fields either side it is clear that the remains have been reduced by modern ploughing.

4 ARCHAEOLOGICAL BACKGROUND

This section has been adapted from the forthcoming YAT report 2015/24 on the Community Stadium project by JM McComish.

Please note that the scheduled camp SAM 1020976 is universally referred to as 'Camp 2' in previous work in this area, with 'Camp 1' referring to the camp to the south-east that was excavated by YAT in 2004.

4.1 Archaeological background

4.1.1 Prehistoric

Various features of prehistoric date are known from the vicinity; excavations in the area of Camp 1 uncovered a Neolithic pit and curvilinear ditch (possibly from an enclosure), together with part of a Bronze Age or Iron Age pit alignment that formed a major boundary. This boundary was later redefined by a ditch. In addition, there were two small ring-gullies, possibly hay-rick gullies, and a cluster of twelve undated pits and post-holes that were interpreted as being of possible prehistoric date (Johnson 2004, 89). Extensive excavations to the south-east of Camp 1 yielded a low-density of undated pits, post-holes and gullies that were interpreted as being of possible prehistoric origin; there was also a ditch containing a Bronze Age arrowhead (Johnson 2012, 1). A circular ditch of possible Iron Age date is known from Hopgrove Farm approximately 1.75km north-east of the present site (Macnab 2000, 6), while Iron Age ditches and possible hut circles are known from Rawcliffe Moor 3km north-west of the present site (Hunter-Mann 1992a, 23-4).

4.1.2 Roman

The site lies approximately 4km north-east of the Roman legionary fortress of *Eburacum* and its associated urban settlement, and the site is approximately 450m north-west of a postulated Roman road to Malton (RCHM 1962, Figure 2). William Stukeley and Francis Drake writing in the 18th century noted that there were 'seven or eight' camps in the York area, but they did not record their precise locations (Ottaway 2002, 22). Two of these camps on Bootham Stray 2.5km north of the legionary fortress have been identified in recent times

(RCHM 1962 47; Welfare and Swan 1995, 135-6), and it is likely that the two Huntington Moor camps were also originally among these eight sites (Horne and Macleod 2002, 11).

Several Roman sites are known within a 3km radius of the present site. (The archaeological investigations of Camp 1 are detailed in section 4.2 below). Second to fourth century pottery derived from occupation, rather than burials, was discovered in the 1940s near 210 Stockton Lane, approximately 1km south of the present site (YAJ 1943, 424). Roman remains including Roman tile, pottery, and three coins were recorded by P. Wenham in the Ashley Park Estate area in 1959, approximately 1.5km south-south-east of the present site (Macnab 2000, 6), while at Bad Bargain Lane a cremation and part of a Roman road were recovered (Macnab 2000, 6). Also in 1959 mechanical diggers cut through an oak lined grave containing a gypsum-filled lead coffin and an un-inscribed stone coffin at grid reference SE 6310 5310, with a further uninscribed gritstone coffin containing gypsum and a skeleton being found at grid reference SE 6325 5322 (Macnab 2000, 6).

Apple Tree Farm, approximately 2km south-south-east of the present site, yielded various Roman features, including evidence of pottery manufacture of late 1st century to mid-2nd century date (Lawton 1993). Earlier work in the same area in 1959 had recorded the discovery of two stone sarcophagi together with numerous pottery and tile fragments (Macnab 2000, 6). A Roman cremation, ditches and a cobbled surface were found on the northern side of Bad Bargain Lane in the late 1950s (ibid., 6). Features of Romano-British date, probably relating to a farmstead, have been located 2.5km to the east at Stockton Moor West (YAT site archive code 1996.390). Two further Roman camps are known 2.2km and 2.4km west-north-west of the present site at Bootham Stray; both camps were 'playing-card' shaped, the first camp being 150m x 85m in size, and the second 107m x 81m; these camps had at least two and at least three entrances respectively, all of which had in-turning *claviculae* entrances (RCHM 1962, 47). These camps are sited on low-lying land at an elevation of *c.* 14m AOD. Parts of a Romano-British field system are also known from Rawcliffe Manor 3km north-west of the present site (Hunter-Mann 1994a, 23; Hunter-Mann 1992b, 29; Hunter-Mann 1994a, 10; Hunter-Mann 1994b, 16; Hunter-Mann 1994c, 26).

4.1.3 Medieval

Very little archaeological evidence of medieval activity has been recovered in the vicinity, but this is hardly surprising given that this area was forest or grazing-land during these periods. No evidence of Anglian or Anglo-Scandinavian activity was found during excavations on the site of Camp 1, or in the area to its immediate south-east (Ottaway 2002, 20; Johnson 2012, 36). An Anglian cremation urn from a cemetery on Heworth Moor was recorded in 1879 (RCHM 1975, xxvii). Evidence of later medieval activity in the immediate vicinity of the camps is also sparse, though a few sherds of 11-16th century pottery were recovered from Camp 1 (Ottaway 2002, 20).

4.1.4 Post-medieval

Archaeological evidence for the post-medieval period from the area primarily relates to agriculture. Various gullies and land-drains of 18th century date were present in the area of Camp 1, together with ridge and furrow of 19th century date and some modern ceramic field drains (Ottaway 2002, 21; Johnson 2004, 91). The area to the south-east of Camp 1 also contained modern ceramic field drains (Johnson 2012, 13 and 22). A geophysical survey of

Camps 1 and 2 also showed evidence of ploughing probably dating to the 19th-20th century (Ottaway 2002, 21). Post-medieval plough-marks were also present at the site of Annamine Nursery some 350m to the north-west of the present site (Dean 2004, 20).

4.2 Previous archaeological investigations into the Roman camps at Huntington Moor

See Figure 3

4.2.1 Archaeological evaluation in the vicinity of Camp 1 in 2000

An evaluation comprising eight 10m x 10m trenches was undertaken in 2000 in the area of Camp 1 (Figure 3; Macnab 2000). No conclusive evidence of prehistoric activity was recovered during this excavation, but there were hints of Roman activity in the form of ten sherds of Roman ceramic building material and some possibly truncated Roman features (Macnab 2000, 20). No evidence for Anglian, Anglo-Scandinavian, or later medieval activity, was present in this excavation, but post-medieval plough-scars were visible in several of the trenches (ibid., 20).

4.2.2 Aerial photography in 2002

Routine aerial reconnaissance by English Heritage in 2002 identified two rectangular enclosures characteristic of Roman temporary camps (Horne and Macleod 2002, 3). The north-westernmost of these camps had been partially destroyed by the Ryedale Stadium, while the area of the south-easternmost camp was at that time destined for development, making investigation of the visible remains a matter of some urgency. The sites were re-photographed, and earlier photographs within the English Heritage archives were re-examined.

This process showed that Camp 1 comprised a ditch and internal rampart of rectangular plan with rounded corners, which measured 123m x 108m in size and was aligned with the long axis north-west to south-east (ibid., 7). A possible entrance was visible on the north-eastern side of the camp, approximately one third of the way along the side, with what was thought to be an in-turning *clavicula* entrance (ibid., 9). Dark patches visible within Camp 1 on the aerial photographs were interpreted as being due to the ponding of surface water in the post-Roman period (ibid., 9).

Camp 2 (the present site) was visible as a right angled ditch and associated bank in the fields to the immediate west of the Ryedale Stadium, though no remains were visible within the stadium itself, the size of the camp was therefore unclear from the aerial photographic survey.

Exceptionally straight ridge and furrow marks, spaced approximately 5m apart, were visible on the aerial photographs in the area of both the camps; these were interpreted as being of 19th or 20th century date, relating to land-improvement. Some of the furrows were more broadly spaced at 8m apart, and these were interpreted as being of an earlier date (ibid., 7).

4.2.3 Geophysical survey of the camps and archaeological evaluation of Camp 1 in 2002

Following the discovery of the camps in the aerial photographic reconnaissance further evaluation work was undertaken, comprising a geophysical survey of both camps and an archaeological evaluation of Camp 1 (Ottaway 2002).

A combination of magnetometry and resistivity survey revealed not just the Camp 1 defences but also a number of linear features some of which were on the same alignment as the camp both within and outside the camp perimeter (ibid., 9). Two of these features parallel to the south-east defences proved on excavation to be shallow ditches (ibid., 9). A number of areas of high resistivity within the camp proved on excavation to be natural deposits of iron-rich soils (ibid., 9). The geophysical survey also suggested that the bank of Camp 2 was better preserved than that of Camp 1 (ibid., 21).

The excavation comprised thirteen trenches of various sizes (Figure 3). No evidence of prehistoric features was present, but a number of flints were recovered from the excavations suggestive of prehistoric activity in the area (ibid., 20). The excavation confirmed the presence and location of Camp 1's defences, which comprised a ditch, 1m-1.1m in breadth and 0.75m deep, and the vestigial remains of an internal rampart composed of the clay dug out of the ditch (ibid., 26). The excavations confirmed the presence of an entrance on the north-eastern side of Camp 1, but the existence of a *clavicula* style entrance could not be proved (ibid., 20). It was noted that evidence for any other entrances had probably been destroyed in the post-Roman period. There was evidence that the rampart was deliberately slighted when the camp was abandoned, with sections of decayed turf identified in all of the excavated cross-sections through the ditch (ibid., 20). Soil samples from two of the ditches contained charred heather, which could have originated from burnt turves or from peat used as fuel (ibid., 20). No internal features relating to the camp were present in the excavated areas, and no dateable artefacts were found to clarify the date of the camp, indeed the lack of artefacts suggested that the camp was only occupied for a few weeks or months at most (ibid., 20-1).

4.2.4 Archaeological excavation of Camp 1 in 2004

Further extensive archaeological investigations on Camp 1 were undertaken in 2004 (Figure 3). This excavation showed that the camp ditch had been accurately surveyed-in to precise measurements in Roman feet or *pes Monetalis* (0.296m = 1pM); the intended size was 450pM and 400pM or a 9:8 ratio for the length of the side, while the actual size was only fractionally different being 451.225pM north-west/south-east by 400.151pM north-east/south-west (Johnson 2004, 3 and 42). While the overall layout of the camp had been carefully surveyed in, there were gross ditch cutting irregularities, suggesting that these inaccuracies had occurred once the surveyor's task had been completed, (ibid., 43).

A total of 34 segments were excavated through the camp ditch, and cross-sections of the badly eroded bank were also excavated (ibid., 29). The ditch ranged from 0.49m to 1.72m in width and 0.44m to 0.83m in depth, with gross changes in width apparent even over short distances (ibid., 30). Differences in the depth of the ditch overall were less pronounced (ibid., 30). The ditch profile was similarly varied, with only a minority of the sections having a basal slot, and this also varied considerably in size ranging from 0.07m to 0.3m in width and from 0.05m to 0.25m in depth; these slots usually ran for only a few metres (ibid., 30).

A narrow gully was present parallel to and immediately outside the south-eastern side of Camp 1, which may have represented a marking out trench, or the line that should have been followed when digging the ditch (ibid., 32).

Two entrances were present within the excavated area, both of which were simple gaps in the camp ditch, the north-eastern entrance was 5.5m wide and the south-eastern entrance was

7m wide (ibid., 31). The termini ditches had oblique ends, making the entrance slightly narrower on the inner side (ibid., 31). There was no evidence for elaboration of the entrances with timber gateways, but there were traverse ditches opposite and exterior to both entrances, separated from the main ditch (ibid., 31). The traverse ditch at the north-eastern entrance was 8m long, 2.2m wide and 0.66m deep and it was located 11.5m north-east of the main camp ditch, while the traverse ditch opposite the south-eastern entrance was 6m long, up to 1.45m wide, 0.57m deep and was separated from the main camp ditch by 12m (ibid., 31).

The line of the rampart was just visible prior to the stripping of the site (ibid., 89). On excavation there was evidence that turf and topsoil had been stripped prior to the construction of the rampart (ibid., 89). The rampart seemed to have been 4.5m wide originally, with a 1m wide gap (*berm*) between the bank and ditch, but poor survival made it impossible to estimate the original height of the rampart (the bank only survived to a height of 0.2m at most); it is possible that the rampart was wider near the entrance ways, but the rampart was so degraded this is by no means certain (ibid., 31, 89). Two sherds of early to mid-2nd century Ebor ware pottery were recovered from within the rampart.

The absence of surviving archaeological remains from within the camp suggests that any accommodation comprised leather tents rather than more permanent structures (ibid., 43).

Evidence that the camp was both short-lived and deliberately slighted was present (ibid., 3). The camp ditch had begun to silt up and suffered from some slumpage, before being deliberately backfilled with material derived from the rampart (ibid., 39). The limited nature of the initial silting is suggestive of a short time-frame for any occupation of the camp. The ditch infill resultant from slighting included 29 sherds of Roman pottery dating from the first half of the 2nd century AD (ibid., 39). Further silting took place after the camp had been slighted, and this later silting incorporated Roman pottery of 2nd to 4th century date (ibid., 41).

4.2.5 Archaeological evaluation in the area to the south-east of Camp 1 in 2012

Thirty-one evaluation trenches were excavated in the area to the south-east of Camp 1 in 2012. These revealed a low density of undated features thought to be of prehistoric date and a ditch containing a Bronze Age arrowhead (Johnson 2012, 1 and 36-7).

4.2.6 Earthwork survey of Camp 2 in 2013

An earthwork survey on Camp 1 and on the surviving portions of Camp 2, undertaken in 2013, found that the surviving remains were consistent with the description of the monuments given in the Scheduled Ancient Monument Record (Pinnock 2013, 3). In the case of Camp 2 the bank was seen to be 6-8m wide, with evidence of the ponding of water in a 10m wide area immediately inside the bank and in a 2-4m wide area to the exterior of the bank (Pinnock 2013, 10).

4.2.7 Geophysical survey and excavation of the sports stadium pitch in 2015

A geophysical survey of the rugby pitch was undertaken in March 2015 prior to excavation. The results showed no discernible features, due in all likelihood to the 450mm thick layer of sand and gravel that lay under the pitch and masked the extensive Roman features subsequently identified by excavation and discussed together with the geophysical survey of the SAM in Section 6.

5 RESULTS

5.1 Magnetometry

As stated above, the FM256 instrument suffered a fault that rendered the survey data irretrievable.

5.2 Resistivity

The resistivity survey results are presented here as an unprocessed plot (Figure 4) and a processed plot (Figure 5). The survey is interpreted in Figure 6 and can be compared with the excavated features within the stadium in Figures 7-8.

The features visible on the plot are present as areas of relatively high resistance and represent the western corner of the Roman marching camp bank and ditch, along with later east-west aligned ridge-and-furrow cultivation.

It is immediately apparent that the degree of greater plough-truncation in the two flanking fields, evident in the surviving earthworks, is also suggested by the survey results. In the central field, the western corner of the Roman camp bank is clearly visible as an 8m wide band, with the fainter traces of the 6-7m wide ditch outside it. In the flanking fields, only the outside of the bank is clearly visible, with the remainder much less distinct, whilst the traces of the ditch are barely apparent.

Unless the scheduled remains of the camp are excavated and suggest otherwise, it must be assumed that the bank appears as a high-resistance anomaly due to the packed clayey material it is constructed with. The relatively high-resistance signal of the ditch may relate to the deliberate in-filling of the ditch with clayey material slighted from the bank; this interpretation is suggested by the excavation of the Roman features in the neighbouring stadium pitch (McComish, 2015, 18) and is discussed below.

The ridge and furrow is tightly spaced and may relate to 18th and 19th century ploughing during the agricultural improvement of the moorland surrounding York. The excavation of the neighbouring stadium pitch also suggested that earlier, broadly spaced medieval cultivation may also be present, and this may be masked beneath the more recent ploughing in the survey area.

6 DISCUSSION

The width of the bank supports the dimensions ascertained in an earlier earthwork survey of the SAM (Pinnock 2013, 10), which measured the surviving height at only 0.25m and corroborated the effect of differential ploughing identified in the geophysics.

The outline of the Roman camp as surveyed by geophysics relates very clearly to the outline of the ditch as revealed by the excavation of the former Ryedale stadium pitch (Figures 7-8; McComish 2015). No trace of the bank was apparent during the excavation as the pitch area was truncated to a depth of at least 600mm during the construction of the stadium in 1989.

Despite this, the surviving ditch was still between 1.75m to 3.6m wide and 0.79m to 1.19m deep (McComish, 2015, 12), suggesting that the 6-7m wide ditch revealed by resistivity may be in excess of 2m deep within the scheduled area. Very little dating material was recovered during the excavation save a small assemblage of abraded 2nd-3rd century Roman pottery (McComish, 2015, Appendix 4).

Combining both the geophysical survey and the neighbouring excavation allows an assessment of the camp dimensions by projecting the exterior lines from the identified corners. This provides dimensions for the ditch, with the short axis measuring 122m and the long axis measuring 162m, enclosing an area of *c.* 1.98ha. The precise Roman surveying of the corners during construction, evident in both survey and excavation, along with the recorded dimensions of the bank and ditch demonstrate that the construction of the camp reflect the criteria stipulated in the 1st or 2nd century Roman military treatise entitled *De Metatione Castorum* (McComish, 2015, 17). No entrances were identified in the SAM; the excavation suggested a simple 5.2m wide gap forming an entrance on the north-eastern side slightly south-east of the central point, and a possible *clavicula* along the south-eastern side.

The excavation established from the relatively uneroded ditch sides and the vertical tip-lines in the backfills that the camp ditch had been purposefully and rapidly infilled shortly after its construction (McComish, 2015, 18). The backfills of the ditches were very clay-rich, with tiplines suggesting that the bank was the primary source of material. This may explain the relatively high-resistance presentation of the ditch in the geophysics, as the clayey fills mixed with the topsoil during ploughing and provided a denser contrast with the cleaner, less dense topsoil deposits either side of the ditch.

Camp 2 as explored by geophysics and excavation bears many similarities to Camp 1, where the ditch and bank were surveyed with similar precision, there were no demonstrably contemporary internal features and the ditches appear to have been rapidly infilled by slighting the bank. However, the ditches of Camp 2 were far more regular in size and profile than the highly irregular ditches of Camp 1, and consistently contained the narrow 'ankle-breaker' slot at the base. The positioning of Camp 2 on slightly higher ground hinted at a more strategic location than Camp 1 (McComish, 2015, 20).

Despite their apparent differences in quality, it is difficult to definitively identify either Huntington Moor camp as a 'practice' or 'marching' or 'labour' camp *per se.* The 2-3rd century dates preclude an association with garrisoning and labour camps during the building of the fortress and therefore peace-time 'practising' seems likely, although troop movements up to Hadrian's Wall from the early-mid 2nd century, Antonius Pius' campaigns against the Scots in the mid 2nd century (McComish, 2015, 22) or even Septimus Severus' occupation of *Eboracum* in the early 3rd century (Ottaway, 2004, 79) may provide an active military context for the Huntington Moor camps.

The ridge-and-furrow visible in the geophysics and as extant earthworks was identified as of probably 19th century date by the original aerial survey (Horne and Macleod 2002, 7). Similarly narrow-gauged cultivation was present across the entire Camp 2 excavation and produced 18th and 19th century pottery and artefacts; this matched the results of the Camp 1 excavation and

corroborates the interpretation that this is evidence for the early modern agricultural improvement of Huntington South Moor (McComish, 2015, 26).

7 COMMUNITY INVOLVEMENT

Alongside the archaeological benefits of the geophysical survey, the opportunity for community volunteers to take part was taken up by 23 people, many of whom went on to be involved in the excavation project. Although some of these volunteers were experienced amateur geophysicists from established local societies, many were new to archaeology and to geophysics in particular, and the surveys of both the SAM and the pitch therefore leave a legacy of training in the community. In total, the Community Stadium project engaged with over 800 members of the public either as active participants or visitors to the site, and as the first element of the fieldwork undertaken, the geophysical surveys were an integral part of the whole project.

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FIGURES

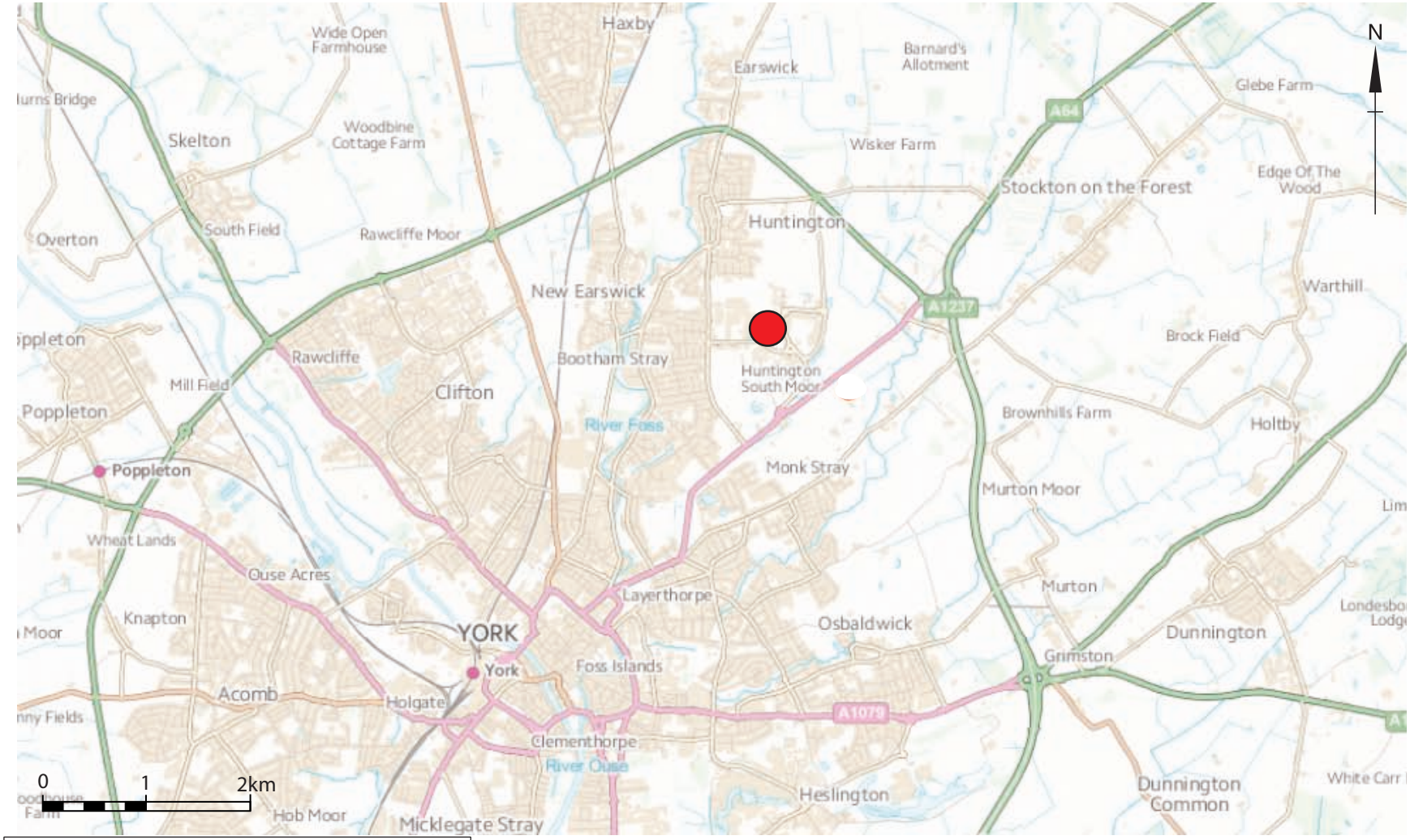

Figure 01: Site location

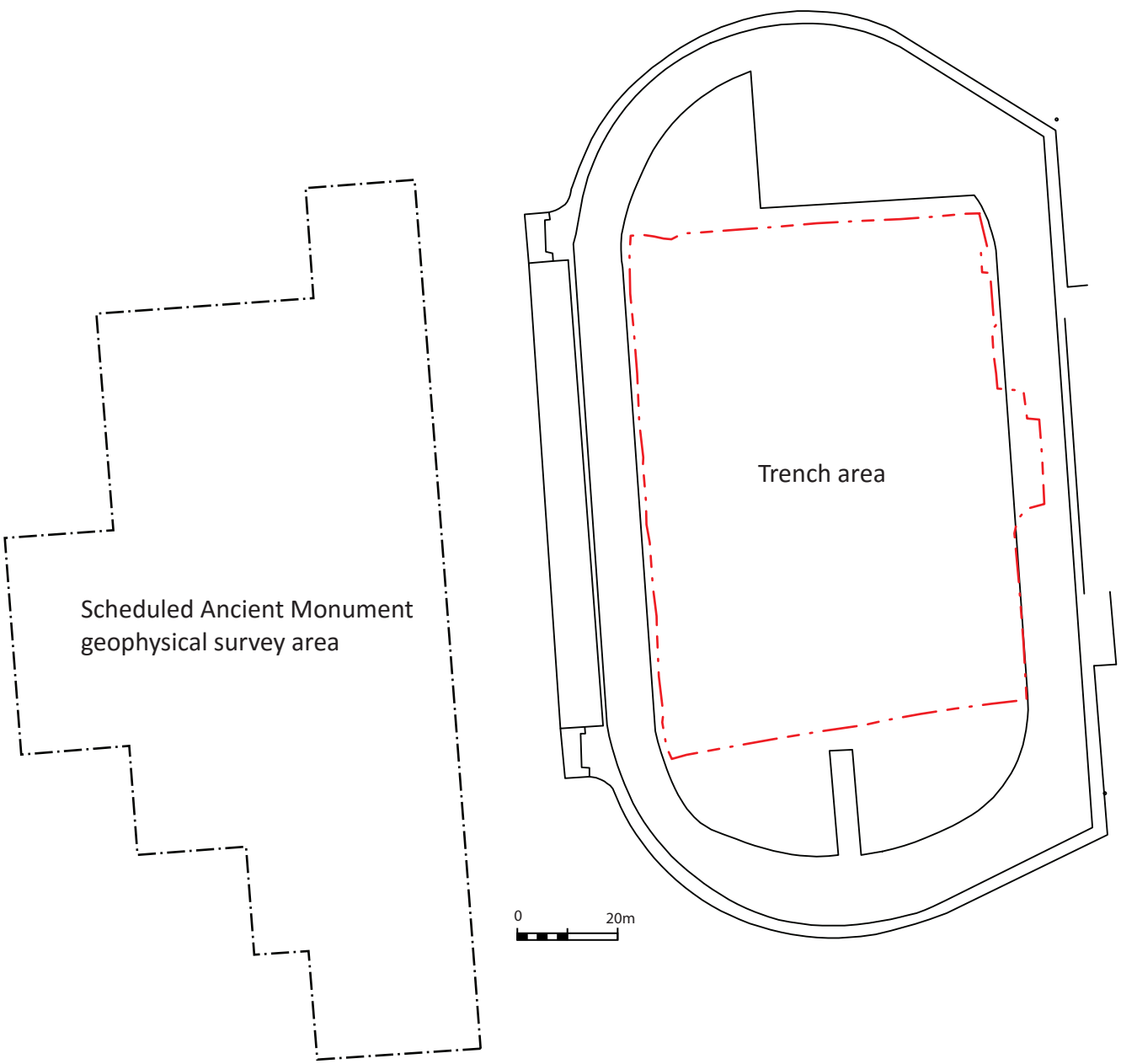

Figure 02: Location of trench and SAM geophysical area

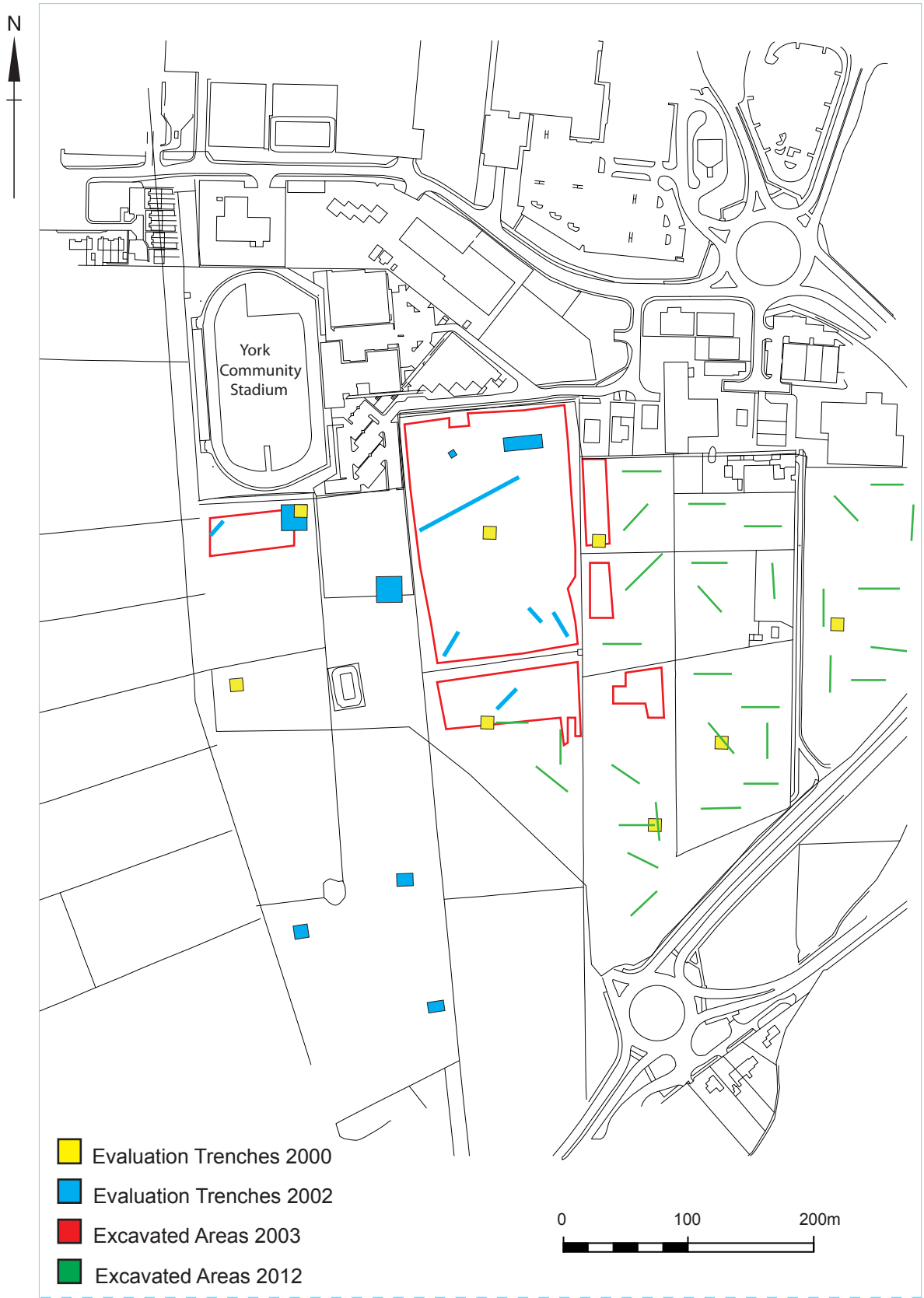

Figure 03: Previous excavations and evaluations

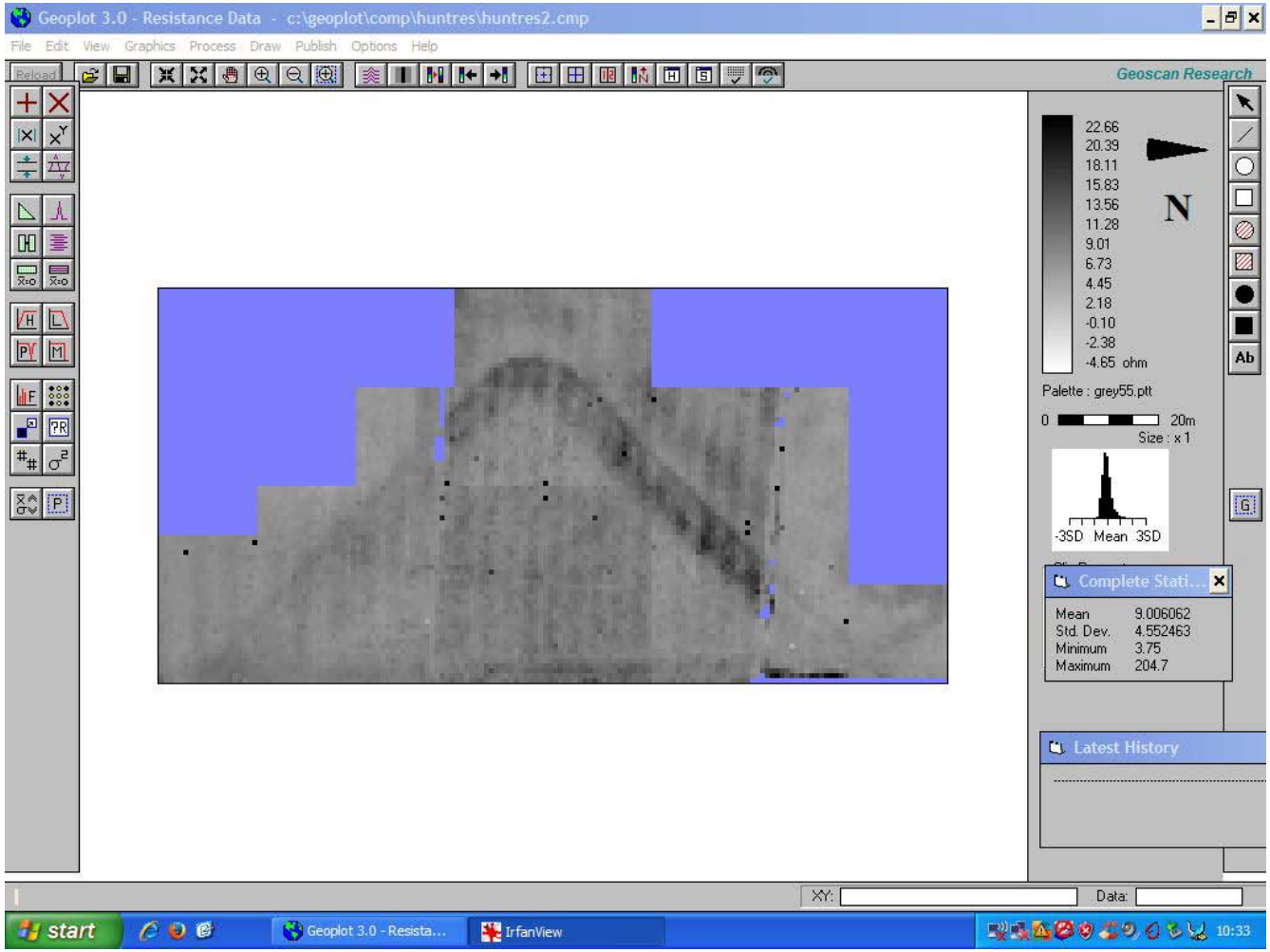

Figure 04: Unprocessed resistivity SAM plot

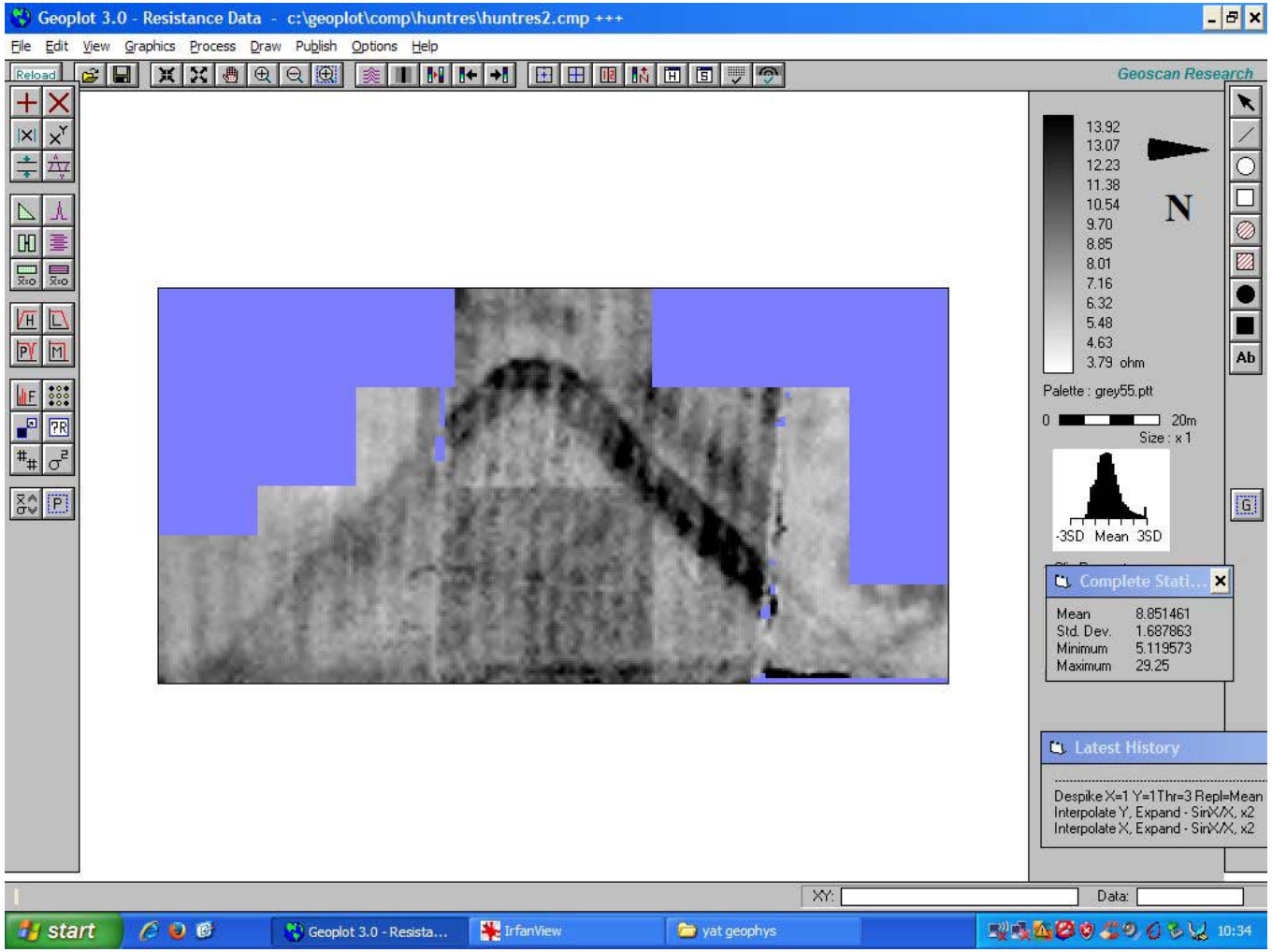

Figure 05: Processed resistivity SAM plot

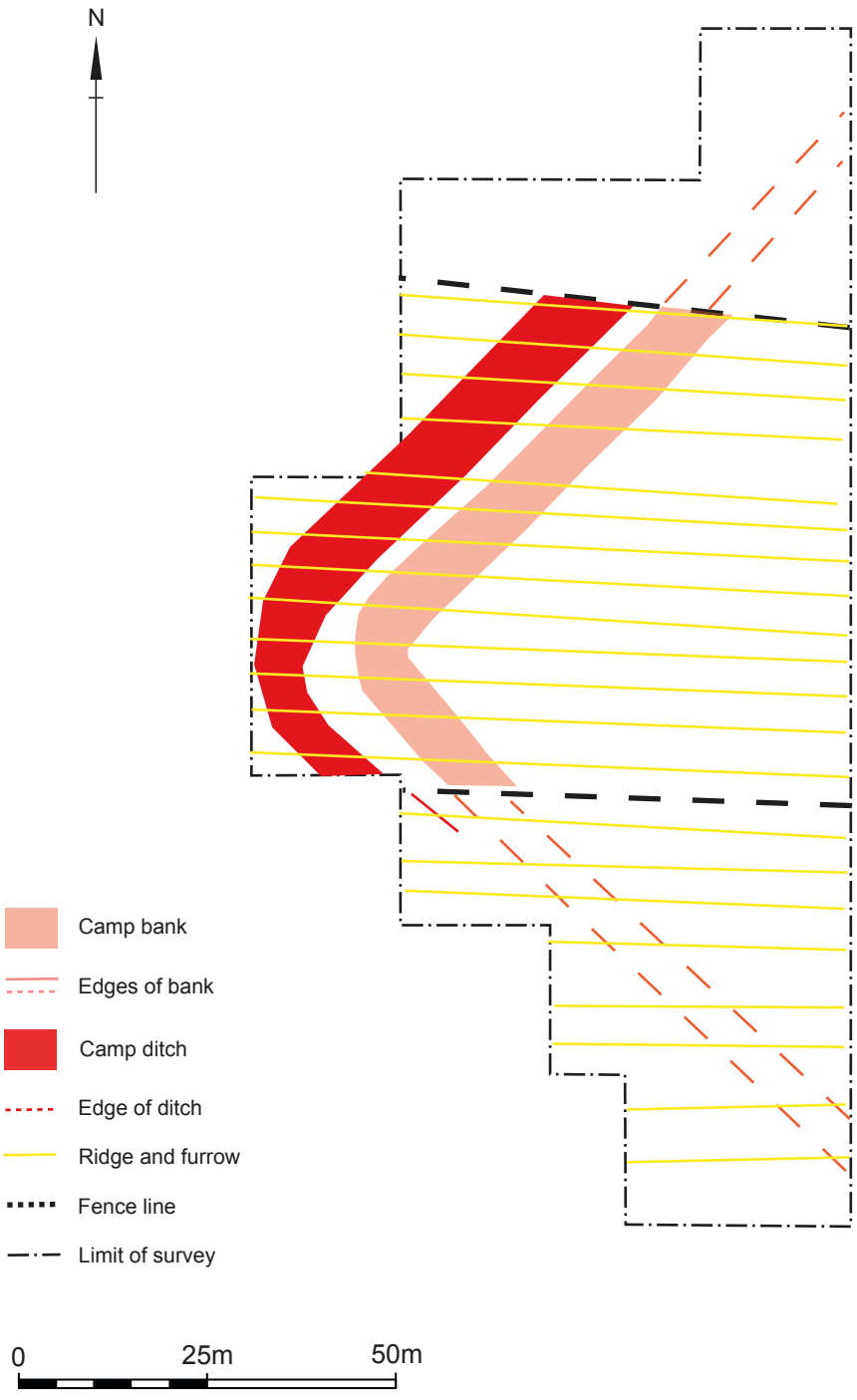

Figure 06: Interpretation of SAM resistivity

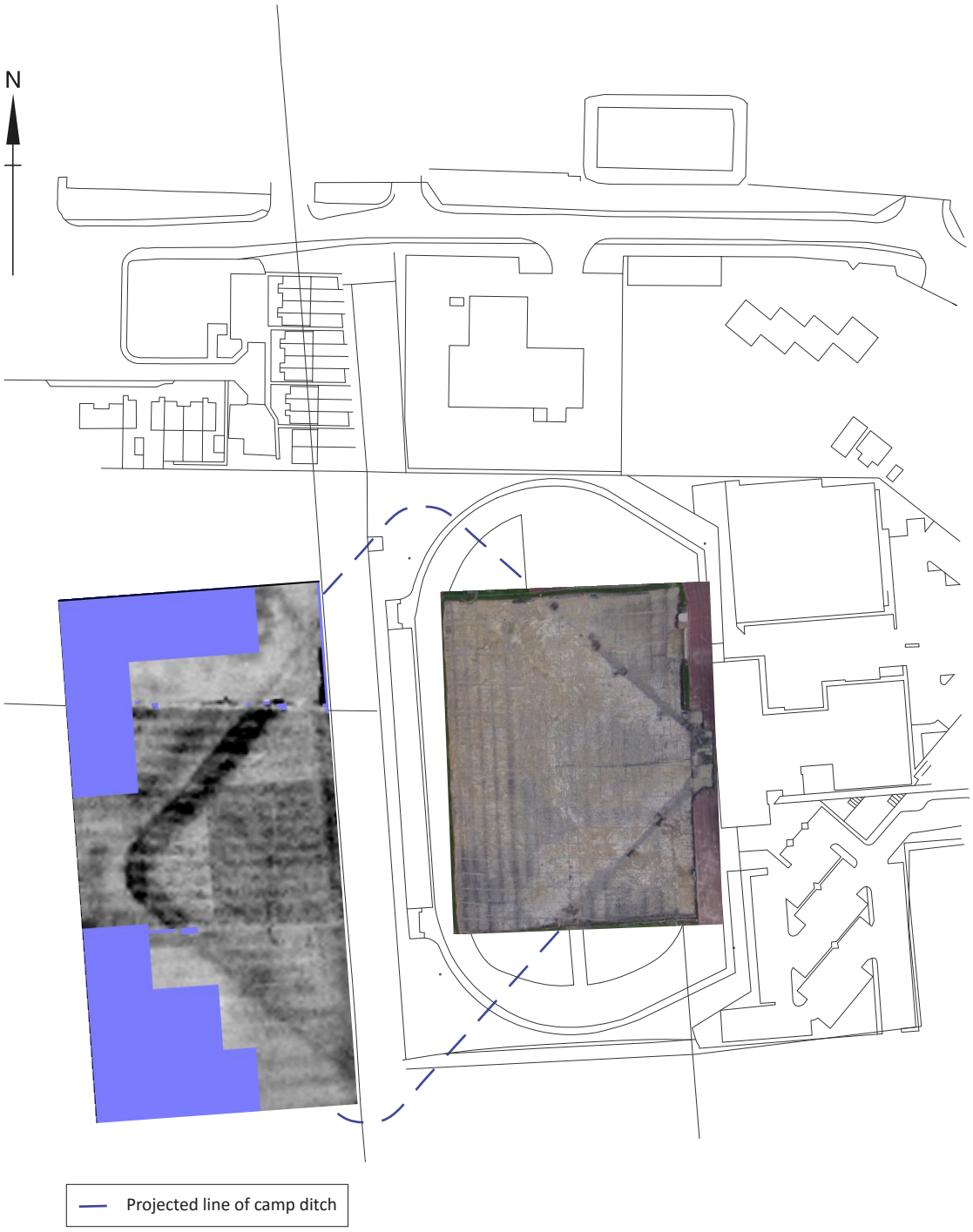

Figure 07: Excavation photograph and processed SAM resistivity survey

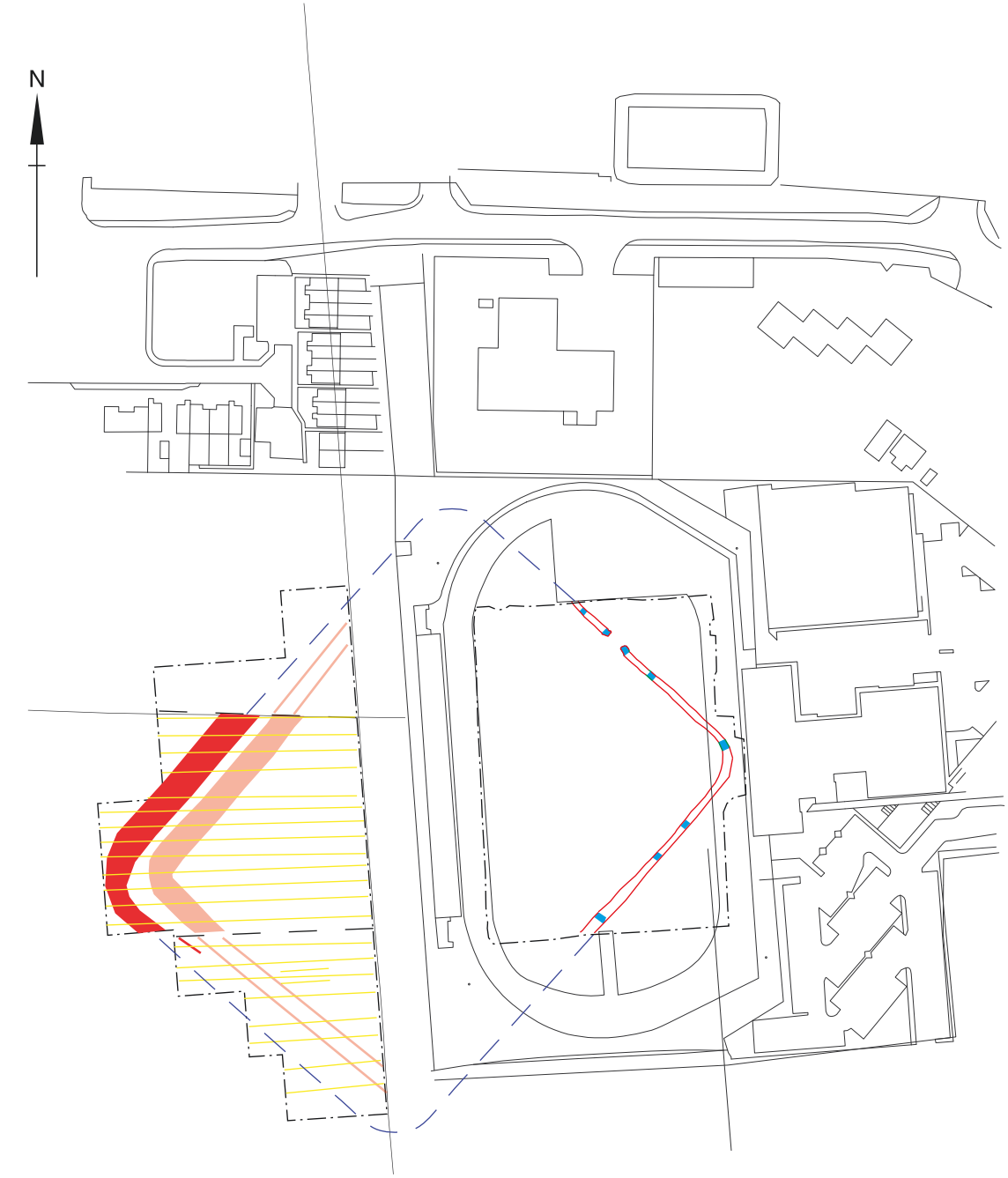

Figure 08: Geophysical interpretation and excavation plan