



*A Geophysical Survey of a Roman Tile Kiln*

*Dell Quay, Chichester, West Sussex*



*Neville Haskins  
Chichester District Archaeology Society  
April 2007*



## **Summary**

A fluxgate gradiometer survey was carried out in a field near Dell Quay which was believed to contain a Roman tile kiln. This was undertaken on the 13<sup>th</sup> April 2007 by a team from Chichester District Archaeology Society (CDAS) with magnetometers borrowed from English Heritage. Results located the Kiln and will allow for further investigation later this year. Some photographs of the days activities are appended.

## **Introduction**

The site was known from the Chichester District monuments record. The earliest record was in 1943 when tile and brick were noted for a distance of about 40 yards along the foreshore near Copperas Point, Dell Quay. Two small trenches were excavated and broken tile found a foot or so beneath the surface (1). The site was noted by OS investigators in 1952 and 1962 (2). A small excavation was carried out by D.Rudling in 1984 but this failed to discover the kiln itself (3). This was discovered by a magnetometer survey in 1986 by the Ancient Monuments Laboratory which showed a major response (to be expected from a kiln) but the site in general was regarded as unresponsive (3). Various visits since then to the site (2) have shown that the pile of tile and bricks weathering out from the bank is being badly eroded and substantial quantities of material have been lost.

The site of tiles weathering out is the tree on the foreshore at this point (NGR SU 83215 01925) which has the remains of the pile of tile wasters in its exposed roots. Approximately 20m. inland from this tree more Roman tile and brick was seen outcropping on the surface of the ploughed field (March 2007). The location of the kiln itself (identified by the earlier geomagnetic survey somewhere in this area) was uncertain.

The current survey was undertaken on an unusually warm and sunny day. The field had been ploughed about six months previously but had then been subjected to a period of prolonged rainfall. The surface was well washed and compact. Bands of red clay underlie this area and the soils of the field have high clay content with low magnetic response (3). The red clay beds (the Reading Clay Formation) are 2-3m below the surface and undoubtedly provided the raw material for the tilery. The field itself is used as arable and normally ploughed before growing food crops such as maize, lettuce etc. The site of the kiln is therefore at risk from further erosion of the sea bank and the extensive ploughing used here.

## **Method**

An area of 120 metres by 60 metres was divided into 30 metre grids set out with the long edge roughly centred on the tree with the tile wasters in its roots. The NGR references for three points along the northern baseline were determined using a Garmin eTrex GPS. Lines for walking were laid out in rough NW-SE directions at 2 metre

intervals. Walkers started walking SE down the eastern side of the line then returning NW on the other side and completing the grid in a zig-zag fashion. Data were acquired using Geoscan FM36 fluxgate gradient magnetometers (loaned by English Heritage for this survey) with a sensitivity setting of 0.1nT and a sampling interval of 0.25 metre. These were zeroed and balanced at a 'quiet' spot on the field. The data collected were downloaded to a laptop computer (Steatite model R15D loaded with Geoplot 3 program (Geoscan Ltd.)) on site and checked for quality before leaving site. Full processing was carried out later.

Sufficient CDAS members attended so that the survey was undertaken using both magnetometers simultaneously. The four eastern blocks were surveyed by one team and the remainder by the second. The surveying was carried out in such a manner that at least 30m distance was maintained between the magnetometers at all times.

Views of the data collection are shown in Appendix 1.

Whilst this survey was undertaken other members of CDAS carried out a separate task burying three permanent markers near the bank to the foreshore as an aid for monitoring the rate of coastal erosion. These markers were at the edge of our survey grid and gave a response to the magnetometers which enabled us to further check the exact position of the grid.

The availability of the base lines and walking lines from English Heritage allowed CDAS to make up their own grid lines using Orient clothes line from James Lever & Sons, Bolton and the EH lines as models. Two sets were prepared comprising 2x30m baselines and 2x30m walking lines in each set. These will be available for future surveys.

## **Results**

The survey is shown in figure 1.

The intense response to the right of top centre is probably due to the kiln itself. It can easily be relocated on the ground by its relative position to the permanent marker pegs (figure 2). To the south east of this there are tile and brick wasters apparent on the surface of the field, presumably dragged up by the plough. These gave no response to the magnetometers.

Other features include a second response just to the west of the kiln which could be investigated at the same time as the kiln and a series of responses in a marked N-S line to the east. These latter could represent an old fence line or the like and probably require no further investigation. A scattering of further responses also may represent pieces of iron in the top soil such as bits from ploughshares or discarded metal objects.

A shadow on the eastern side is due to the presence of parked cars within 20m.

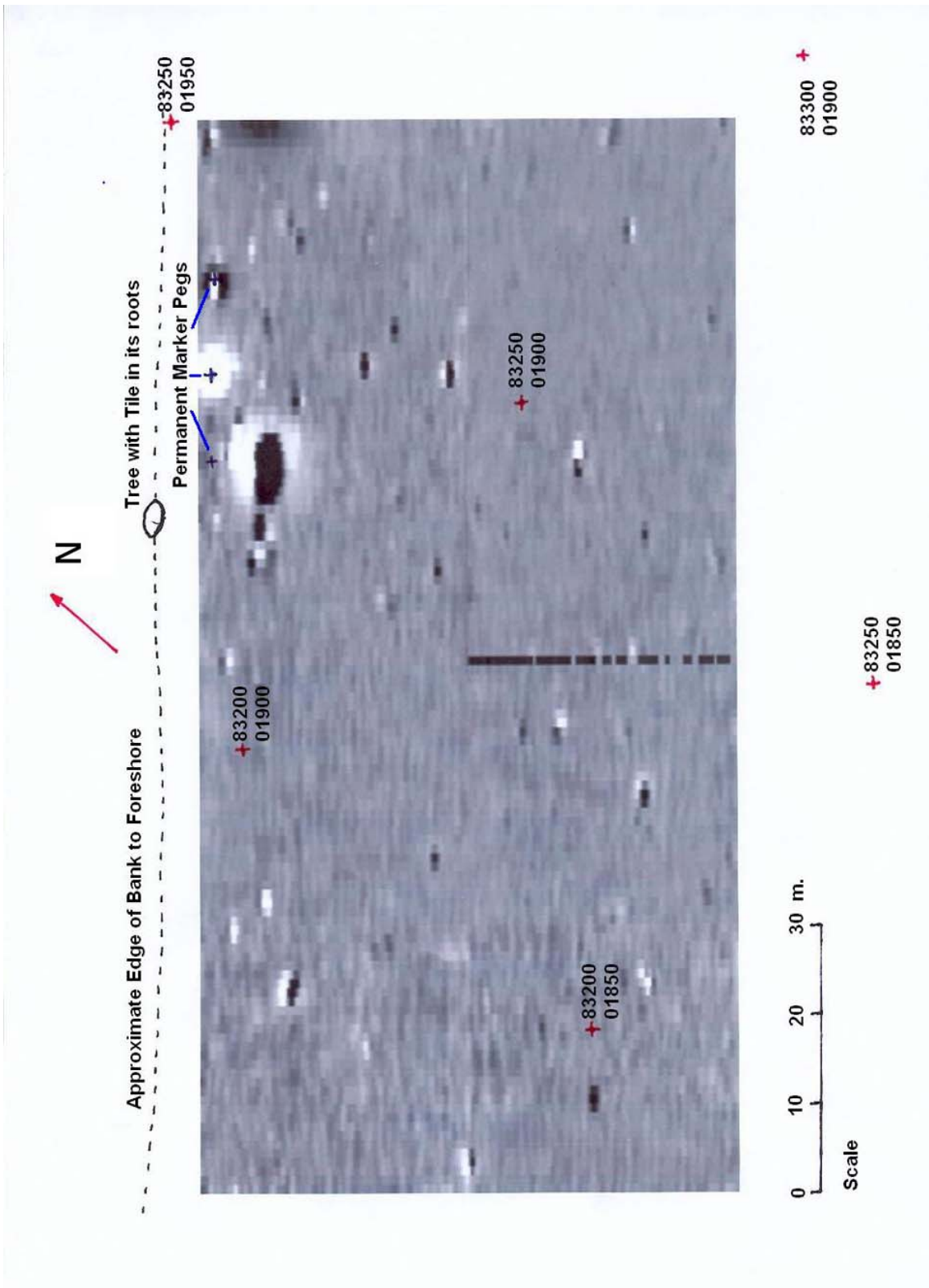


Figure 1. The Geomagnetic survey carried out over the Kiln

As noted in the earlier AML survey the remainder of the site is unresponsive although the western side does show some disturbance over an area. This is most likely due to the effects of ploughing.

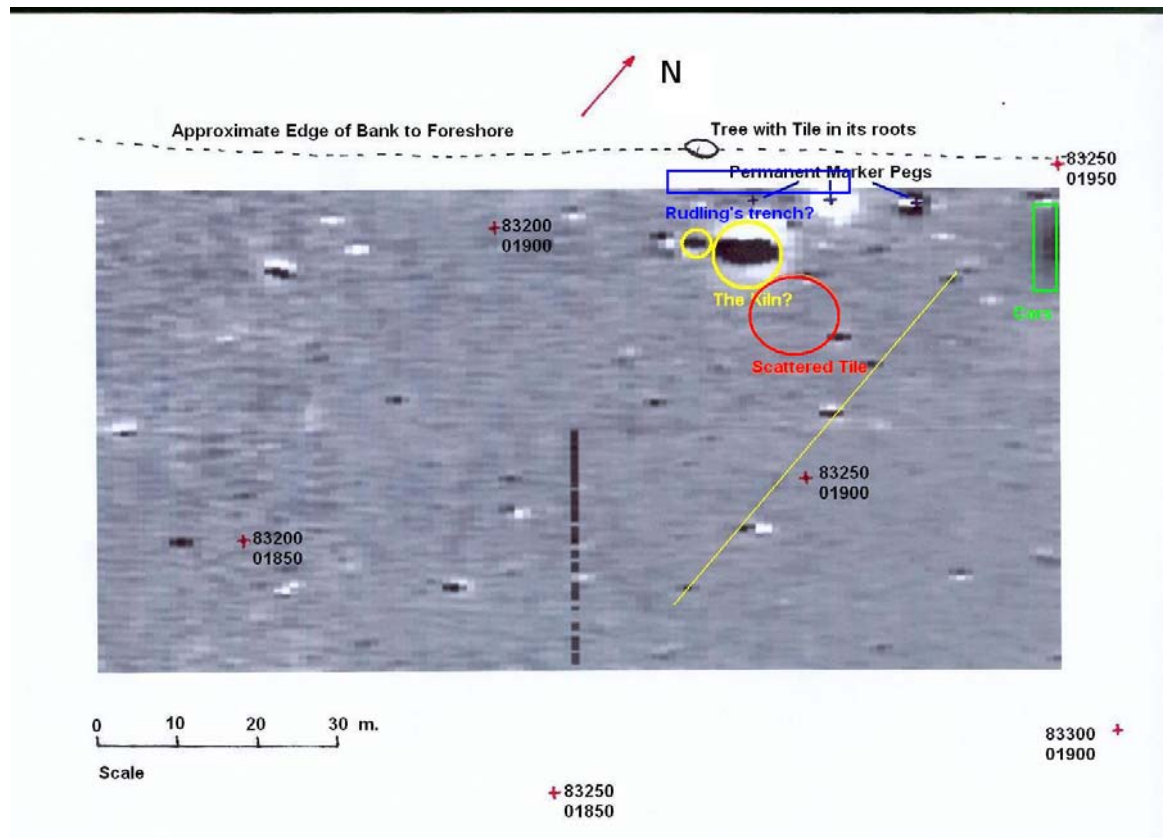


Figure 2. The survey showing positions of the Kiln, scattered tile and linear feature

## Discussion

The small excavation of 1942 described the finding of tile wasters at Dell Quay by W.H.C.Frend (1). Frend found box and flanged tiles below about one foot of topsoil. Although no tiles were found in a survey of the area in 1982, considerable quantities were observed by Rudling in 1983 weathering out of the bank at NGR SU 8321 0192 (3). It was recognised that the site was at risk from ploughing and continuing erosion of the bank. Surface collection and a small excavation were carried out in 1984 (3). Subsequently a geophysical magnetometer survey was carried out by the Ancient Monuments laboratory (AML) in 1986. These results were described by Rudling in 1987 (3). Rudling's published plans show that the trial excavation (a 3m x 20m trench along the top of the bank) probably ran close to the northern edge but outside our current survey and the site is now under the modern footpath. The earlier geophysical survey comprised two 30m square grids and covered roughly the area of the northeastern quadrant of our survey area. Rudling collected approximately 265 kg of tile, bricks and 'unclassified' from the foreshore and a further 90kg from the excavation. Interestingly he stated that little or no tile was found on the surface of the field in contrast to our observations which

showed considerable amounts had been brought up by the plough. Most of the tile from Rudling's excavation came from a dump toward the eastern end of his trench which appears to coincide with the area next to the tree which is disgorging tiles from its roots. In the northwestern corner of his trench a shallow 'scoop' was discovered whose fill comprised large quantities of burnt clay. The excavation was very close to the Kiln itself which from our survey would be 3 – 5 m to the south east of Rudling's trench.

The magnetometer survey clearly showed the Kiln and corresponds with the site of the Kiln in our current survey. AML's survey estimated the size at 2.5 x 6 m. (3). This also corresponds with our survey which showed an anomaly approximately 3 x 8 m. Our survey also shows a smaller response to the west which may also be associated with the Kiln.

## **Conclusions**

The site of the probable kiln near Copperas Point, Dell Quay, has been established by a geomagnetic survey. This will enable the later excavation to be accurately sited. A second magnetic response alongside the major one should be investigated at the same time. Other responses detected are probably not archaeologically significant. The remaining area of the survey shows no intense magnetic response.

## **Acknowledgements**

The survey was carried out with the support and cooperation of the landowner Matt Sawday and we are most grateful for his assistance. We are also grateful to English Heritage (Andy Payne and Paul Linford) for the loan of the magnetometers and advice and discussion about the results, as well as the training in their use and the use of the software to interpret the results. The financial support of the Chichester Harbour Conservancy helped provide the Geoplot software necessary for necessary to interpret the raw data. Purchase of the ruggedised laptop used was facilitated by 'Awards for All', part of the Heritage Lottery Fund.

The following members of CDAS carried out the survey and many thanks to them for a job well done:

Jeff Bigmore, Colin Christison, Sheila Clark, Matt Coumbe, Jonathan Dicks, Darren Fry, Mary Haskins, Neville Haskins, Dayle Kaltenborn, Robert Kaltenborn, Rod Matthews, Tim Pullan, Peter Ross, Caroline Scott and Alan Stanley.

## **References**

1. Anon. 'Roman Britain in 1942' *J. of Roman Studies*, **33**, p76 (1943)
2. Chichester District SMR No. CD2042
3. David Rudling 'The Investigation of a Roman Tilery at Dell Quay, West Sussex' *Sussex Archaeological Collections*, **125**, pp81-90 (1987)

**Appendix**

**Some views of the day. Photos by Nev. & Mary Haskins or (\*) Matt Coumbe**



**The Geoscan fluxgate magnetometer Model FM36 \***



**Setting out the base lines and walking lines \***



**Tile wasters weathering out from the roots of the tree \***



**Carrying the magnetometer**



**Simultaneous data collection with adjacent survey blocks**



**A perfect location!**





**Tile wasters appearing on the surface of the field**



**Making up a set of lines for CDAS using the EH one as a model**