SECTION 42 REPORT: Geophysical Survey at the West Kennet Palisade Enclosures (June 2019) in advance of Excavations by the Living with Monuments Project.

Scheduled Monuments Affected:
West Kennet Palisade Enclosures, Avebury UID1015157
Case No. SL00206677

Introduction:
Since Alasdair Whittle’s campaign of excavations between 1987 and 1992, aerial photographic transcription at the site of the West Kennet Palisade enclosures (Figure 1) has revealed new elements of the monument complex as well as adding detail to our understanding of existing features (Barber 2003; 2013). Fieldwalking has identified flint scatters to the immediate south of the main enclosures (Harding and Lord 2017), and a new programme of radiocarbon dating has raised important questions regarding the chronology of the site (Bayliss et al. 2017). In order to better understand the phasing and development of the complex, the AHRC-funded Living with Monuments Project plans to excavate three trenches across key junctures and features within the Scheduled area of the palisades (Figure 2). The work will be undertaken alongside investigations of the recently discovered lithic scatters and features belonging to the outlying Structure 5. Given uncertainties in the precise geo-referencing of the cropmark transcription, a programme of geophysical survey was deemed essential in enabling the project to optimise the placement of its trenches. In practice three 40 x 40m survey areas (the last of which was truncated by the road to leave a 40 x 28m area) were centred upon the intersections to be investigated – areas 1, 2 and 3 on Figure 3. These comprise the junctions between Enclosure 2 and Outer radial 1, and Outer radial 2 and Enclosures 1 and 2.

The solid geology here is recorded by the British Geological Survey as New Pit Chalk Formation (https://www.bgs.ac.uk/), overlying which are deposits of Coombe Rock (Whittle 1997, 57) and localised lenses of gravel within the valley floor.

The original intention was to employ a combination of fluxgate gradiometer, soil resistance and GPR survey. However the extremely wet conditions meant that the dense meadow grass covering the site made both soil resistance and cart-based GPR survey impossible. The former was attempted but the thick mat of wet grass made it impossible to reliably log readings and as a result this method was abandoned. Fortunately, the gradiometry worked extremely well, enabling all of the required intersections to be identified.

The survey was undertaken between the 18th and 20th June 2019 by Jeremy Taylor and Mark Gillings.

Method:
In total 0.432 hectares was surveyed using a Dual Sensor Bartington Grad 601-2 with a traverse separation of 1m and reading interval of 0.125m. Data processing was carried out using Terrasurveyor 3.0.34.10 with data manipulation limited to de-striping, clipping and interpolation only. Geo-referencing of the survey grids was carried out using survey-grade GPS (SmartNet enabled Leica GS15 receiver) enabling any anomalies to be located on the ground with a high degree of accuracy.

Results
The results are presented with interpretations in Figure 4. In all cases the fluxgate gradiometer detected the lines of the palisades (especially the soil and charcoal-rich fills of the post-pipes), along
with additional structural features. In area 2 this included a rectangular feature (D) not recorded as a cropmark. In the interpretation plots the approximate locations of the 1987-92 excavation trenches have been indicated (broken grey lines) as best as can be reconstructed from the published site plan (Whittle 1997).

Area 1
The arc of Palisade Enclosure 2 has been detected (A) along with the line of Outer radial ditch 1 (B). The former gave a higher and more emphatic response which confirms the morphological differences between the enclosure ditch and radial recorded in excavation by Whittle (1997: 81-83). Although faint, the results do raise the possibility that rather than a discrete junction, the line of the radial continues into the enclosure. This raises the possibility that it either linked to (or passed close by) the western edge of Structure 1, the very bottom of which falls within the surveyed area (C). This would suggest a similar relationship to that of Outer radial 1 and Structures 2 and 3 (Figure 3). The fainter response of the radial within the interior of Enclosure 2 may suggest a different fill to the post-pipes here, potentially indicating posts were withdrawn. The way the signature of the Enclosure 2 palisade seems to overrun that of B (Outer radial 1) would imply the latter is earlier. This could suggest the complex begins as a set of smaller circular monuments joined by radial palisade lines, subsequently elaborated through the creation of Enclosures 1 and 2.

Area 2
Once again the arc of Enclosure 2 has clearly been detected (A), as has the junction it forms with Outer radial ditch 2 (E). The very similar magnetic response and neat way in which they abut one another could be taken to indicate that radial E (Outer radial 2) and Enclosure 2 are contemporary. In the far southwest corner the arc of Structure 1 is also evident (C). In the northeast quadrant in the angle formed by A and E is a rectangular anomaly (D) approximately 15 x 11m in maximum dimension. Not visible as a cropmark, this offers an interesting parallel to the rectangular cropmark recorded in area 3, which appears to be symmetrically disposed (H – see below). There are suggestions of possible breaks in the line of E and the southern and northern boundaries of D which may indicate the presence of a passage through at this point.

Area 3
This area was truncated by the modern road (Gunsight Road) which was bordered by metal fencing. Both Outer radial ditch 2 (E) and the line of the outer palisade of Enclosure 1 (F) have been detected. The relationship between Outer radial ditch 2 and Enclosure 1 is more ambiguous than that observed with Enclosure 2, as it appears to run over the outer circuit of the former. Its relationship to the inner circuit of enclosure 1 is currently uncertain. In addition, the unusual rectangular (H) cropmark and pit or post circle (G) lying between the inner and outer palisade lines of Enclosure 1 have also been recorded. Once again there is a suggestion of a possible break in the line of E at its southwest end.

Summary:
It is clear that even in less than ideal survey conditions, the features making up the West Kennet Palisades are well suited to detection by Fluxgate Gradiometer (Figures 4 and 5). They would undoubtedly respond extremely well to Caesium Magnetometry and a full and detailed magnetometer survey of the entire scheduled area should be considered a management priority. This is particularly important given that a useful body of ground-truthing data is available from the 1989-92 and 2019 excavation projects.

In conclusion, the surveys were successful in the goal of refining excavation trench placement. They have also confirmed the veracity of the features identified through cropmarks (Figure 6) and have
identified wholly new components of the Palisade complex. As is clear from figures 5 and 6, the gaps in Outer radial ditch 2 (E) fall either side of the rectangular feature (D) and suggest that we may have a very similar cellular, funnel-like entrance arrangement between Enclosures 1 and 2 to that seen on the eastern side of Enclosure 2 (Figure 6 – directly above area 2). This is also the centre of the valley floor, so an obvious route through the complex. Together with the cropmark evidence this points to the presence of a very elaborate graded entrance from the south.

Acknowledgements:
The survey was only made possible by the kind support of Mr. Mark Hues. The work was carried out as part of the AHRC-funded Living with Monuments Project.

Bibliography:


![Figure 1. Location of the West Kennet palisades in relation to other key sites and monuments of the Avebury complex (from Cleal & Pollard 2016)](image-url)
Figure 2 – Planned excavation trenches within the Scheduled area (T6 – T8)
Figure 3 – the geophysical survey areas centred upon T6-T8 (after Barber 2013)
Figure 4 – the survey results. Lower case letters and dotted lines indicate trenches excavated between 1987-92 by Whittle (1997).
Figure 5 – the combined survey results - (Incorporates data (c) Crown Copyright/database right 2007. An Ordnance Survey/(EDINA) supplied service).
Figure 6 – combined survey results with cropmarks (after Barber 2013) - (Incorporates data (c) Crown Copyright/database right 2007. An Ordnance Survey/(EDINA) supplied service).
Historic England Geophysical Survey Summary Questionnaire

Survey Details

Name of Site: West Kennet Palisade Enclosures

County: Wiltshire

NGR Grid Reference (Centre of survey to nearest 100m): SU10736810

Start Date: 18th June 2019       End Date: 20th June 2019

Geology at site (Drift and Solid):

The solid geology here is recorded by the British Geological Survey as New Pit Chalk Formation (https://www.bgs.ac.uk/), overlying which are deposits of Coombe Rock and localised lenses of gravel within the valley floor.

Known archaeological Sites/Monuments covered by the survey
(Scheduled Monument No. or National Archaeological Record No. if known)

West Kennet Palisade Enclosures: Monument No. 220883

Archaeological Sites/Monument types detected by survey
(Type and Period if known. "?" where any doubt).

Neolithic Palisade Slots.

Surveyor (Organisation, if applicable, otherwise individual responsible for the survey):

Dr. Mark Gillings & Dr. Jeremy Taylor

Name of Client, if any:

N/A
Purpose of Survey:

Establish the accurate ground position of palisade junctions identified through cropmarks, in order to precisely locate excavation trenches.

Location of:

a) Primary archive, i.e. raw data, electronic archive etc:

School of Archaeology & Ancient History, University of Leicester

b) Full Report:

Copies have been deposited with Historic England (Amanda Gardham; Hugh Beamish; Paul Linford); the HER; OASIS; The Alexander Keiller Museum, Avebury.
Technical Details

(Please fill out a separate sheet for each survey technique used)

Type of Survey (Use term from attached list or specify other):
Magnetometer

Area Surveyed, if applicable (In hectares to one decimal place):
0.432

Traverse Separation, if regular: 1m  Reading/Sample Interval: 0.125m

Type, Make and model of Instrumentation:
Bartington Grad 601-2

For Resistivity Survey:

Probe configuration:

Probe Spacing:

Land use at the time of the survey (Use term/terms from the attached list or specify other):

Grassland - Pasture
**Additional Remarks** (Please mention any other technical aspects of the survey that have not been covered by the above questions such as sampling strategy, non-standard technique, problems with equipment etc.):

The survey was originally planned to include soil resistance and GPR survey. However, torrential rain throughout June meant that the landowner was unable to cut the meadow. Knee height, thick, saturated grass and meadow plants made the area impossible to survey using the GPR cart and caused excessive logging issues when trying to carry out twin-probe soil resistance survey. As a result, we were only able to carry out fluxgate gradiometry.

**List of terms for Survey Type**

- Magnetometer (includes gradiometer)
- Resistivity
- Resistivity Profile
- Magnetic Susceptibility
- Electro-Magnetic Survey
- Ground Penetrating Radar
- Other (please specify)
List of terms for Land Use:

Arable
Grassland - Pasture
Grassland - Undifferentiated
Heathland
Moorland
Coastland - Inter-Tidal
Coastland - Above High Water
Allotment
Archaeological Excavation
Garden
Lawn
Orchard
Park
Playing Field
Built-Over
Churchyard
Waste Ground
Woodland
Other (please specify)