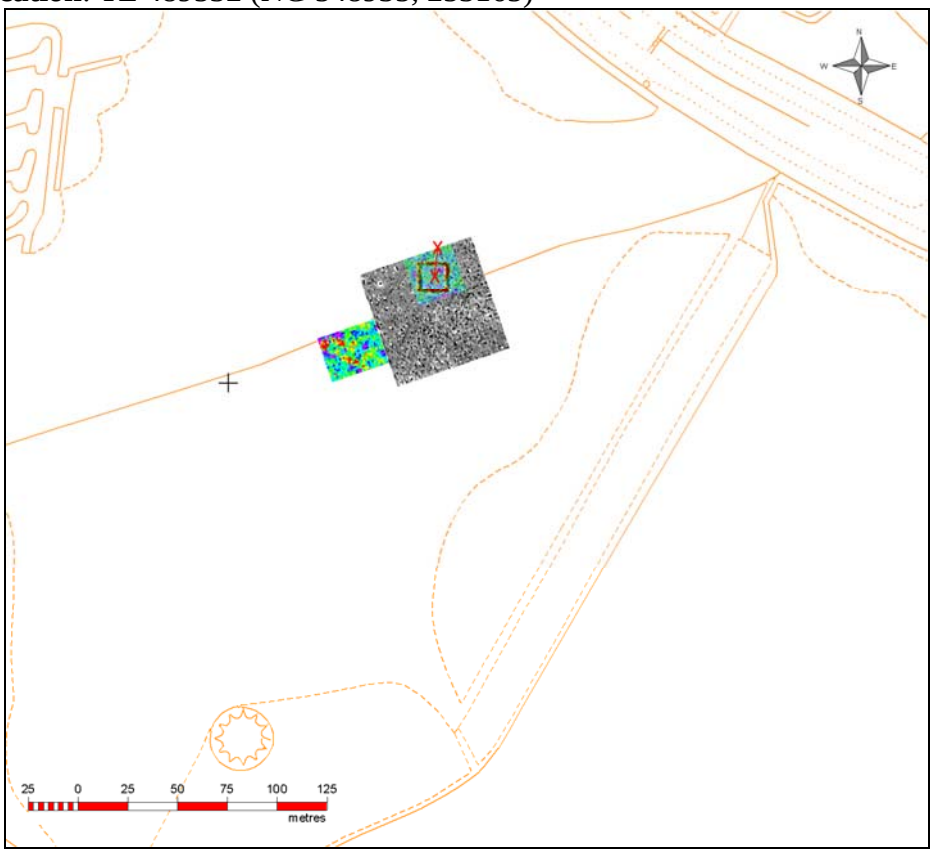
Magog Downs Report

On 3 Aug 2008 Archaeology RheeSearch carried out magnetometry and resistivity surveys on Magog Downs. On 17 Aug 2008 a second resistivity survey and a resistance section (Wenner array) survey were performed. The survey areas were sited so as to avoid the scheduled areas because the requested approvals had not been received prior to the survey.
Members participating: Brian Bridgland, Pat Davies, Liz Livingstone, Bruce Milner, Emily Sanderson, Ian Sanderson, Maureen Storey and Tony Storey.
Site coordinators: Kathleen Foreman and Lucy Evans for the Magog Trust.
Site conditions: Chalk downland, predominantly low cut grass, in a plateau area N of a small hill and E of the car parking area.
Weather: Warm with rain during preceding week.
Equipment: Bartington 601 gradiometer; TRCIA 50cm twin probe; TRCIA Wenner (alpha)

Area covered:	Magnetometry	four 30 m × 30 m grids day 1
	Resistivity	one 23 m × 30 m grid day 1
		one 25 m × 25 m grid day 2
	Wenner	one 15 m @ 0.5 m spacing day 2

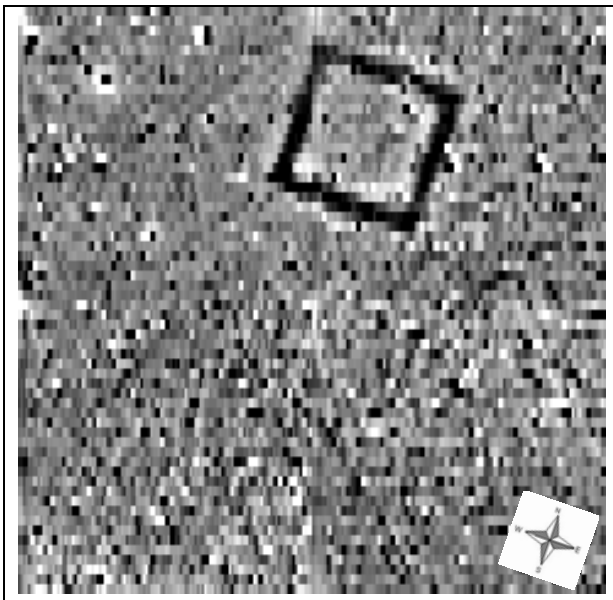
Location: TL 489532 (NG 548935, 253165)



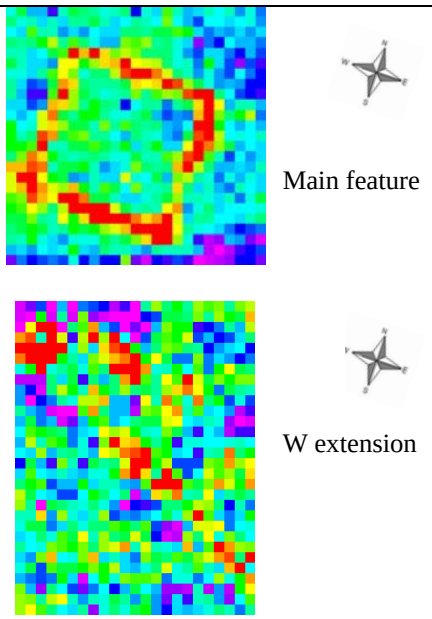
Location plan: Magnetometry survey area in grey scale; resistance surveys in colour scale with day 1 survey adjacent to magnetometry and day 2 survey within the magnetometry survey area. The Wenner array survey is shown as a red line across the major feature.

Purpose of survey: To locate and determine the magnetic and resistance characteristics of a reported crop mark.

Location on the ground *(m)*:
Carpark to field gate post N side of N gate, S side of S gate to interim point N 95.79, 100.24 respectively. Interim point S 100.09, 91.38 respectively. Separation 17.0. Interim N to mag NW 65.78 to mag N midpoint 85.66. Interim S to same points 66.76, 91.08 respectively. Marked tree points: N tree 41.75, 62.45. S tree (beech) 47.24, 56.2. 1st to mag SE corner.
Results:



Magnetometry survey, 60 m × 60 m.
(±2 nT, black is high, white is low.)

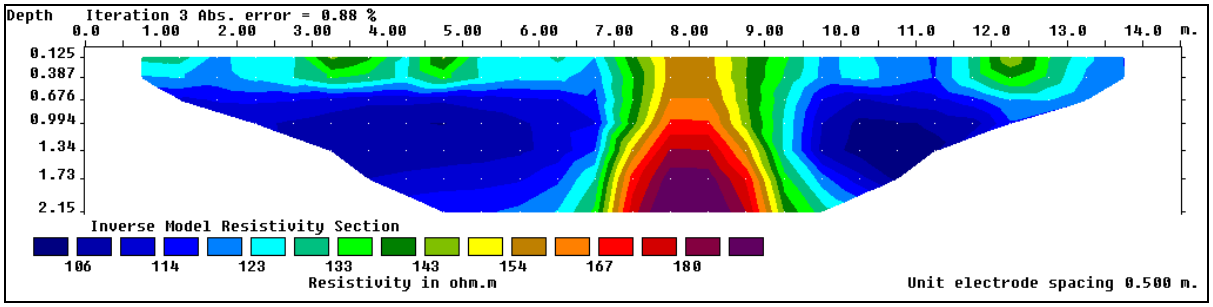


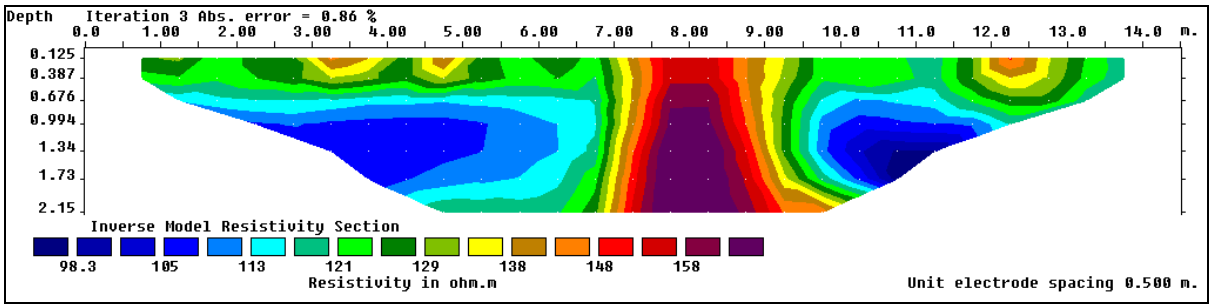
Resistivity surveys, 23 m × 30 m. and 25 m × 25 m.
(Red is high resistance, blue is low.)

Magnetometry results show a square feature with sides approximately 15.5 m (exterior), and orientated almost due NS or EW. The detected width of the response was approximately 1.8 m around the square except in the NW corner where it was about 1.5 m. There was a variation in response strength around the feature, and possibly small gap on the N side. The latter could be due to the discrepancy between the traverse direction and the orientation of the feature. More detail might be revealed by a survey carried out with the direction of travel orientated to the N side of the square.
Faint parallel linear features orientated NNE-SSW were apparent near to the main feature, with a spacing of 7-10 m. Another faint line ran approximately NW-SE passing about 14 m S of the nearest (SW) corner of the square feature.

Resistivity results show a square of high resistance values. Data collection at 1 m in both directions makes any estimate of small dimensions irrelevant, but the response centre–centre dimension was about 14 m. The square had a gap on the S part of the E side and a weaker response around the NW corner.
The resistivity results adjacent to the magnetometry survey area show a line of high resistance values running NW-SE across the survey area. Another less well defined line runs parallel to the first about 7 m to the N. A larger area of high resistance occurs towards the NW corner of the survey area.

Wenner array models.
This technique utilises a series of ground resistance measurements along a line with equal but progressively increasing separation between the measurements. The greater the separation between the measurement points, the greater the depth of the determination. The image generated is a model derived from the recorded data, and may be varied by the mathematical factors used in the model. The images below represent our estimate of the most plausible of the possible variations.





Discussion:
The Wenner array data indicate that the square feature detected by both magnetometry and resistivity comprises almost vertically sided deep (>2 m) trenches about 2 m wide. The feature is, within the limits of detection, square, with its sides oriented NS or EW. The orientation, vertical sides and depth suggests a relatively modern construction. No structure is shown in this position on any of the available maps from Inclosure (1812) onwards. This leaves the probability that it is associated with transient wartime activities. The location, without the present tree cover to the E, would provide excellent views along the Cambridge to Linton road which would have been useful in securing General Haig's defeat in the army manoeuvres of 1912. If so, the feature could represent an early experiment in the use of trenches prior to WWI, possibly following from published works on fortifications containing statements such as, *"The principal closed field work now in use is the square redoubt, either as a regular or an irregular quadrangle, closed by a ditch and parapet all round."* (Ripley 1864). The army manoeuvres of 1912 were one of the largest peace time mobilisations of the armed forces ever undertaken in this country reportedly involving 50,000 troops 2 airships and 4 aircraft. The scenario was an invasion from Kings Lynn moving towards London. The Cambridge Daily News of 18th September 1912 reported that *"The Blues (defending army) are sitting tight in the entrenched positions they have taken up on the Gog Magog Hills and to the eastwards are determinedly setting themselves to work to thwart the invaders object of making a dash to London....."*
And later

" but the Blues on the Gog - Magogs have contented themselves with holding and strengthening the position in which they have entrenched themselves... "

This feature could equally well be related to the other wartime activities such as the nearby tank defence line established in WWII. This is less likely as none of the older local residents questioned could recall any WWII activities in this field.

Two questions arise from the above speculation: why is there any geophysical trace of a temporary structure, and why is it apparently on its own? A mixed refill of presumably disrupted chalk and soil would produce better drainage and therefore potentially be detected by resistance measurements but there would be no reason for a strong magnetic signal. One explanation, which would also explain its apparent isolation, might be that the structure fulfilled a special purpose such as a command post. Perhaps having brick lined walls or a roof with sufficient dispersed ferrous content to produce a magnetic response. The remainder of the entrenchments being shallower and unfinished and thus leaving no appreciable geophysical traces after restitution. Only an exploratory dig will resolve the questions.

The fainter parallel lines in the magnetometry results are likely to be residual traces of strip farming. The line of higher resistance in the W survey area matches a recorded crop mark but exploration was constrained by the need to stay out of the scheduled area.

Note that estimates of small dimensions in geophysical surveys are limited by the data collection frequency, and with magnetometry by the dispersion of the signal away from its source.

Conclusion:
A square structure of approximately 15.5 m external side length and 1.8 m wide with sides orientated NS and EW with clear magnetic and resistance responses was detected. A Wenner section across one side indicated almost vertical sides to a depth of more than 2 m. This could be a trench/tunnel structure associated with pre WWI military exercises.

Reference
Ripley 1864 - The New American Cyclopaedia: A Popular Dictionary of General Knowledge edited by George Ripley, Charles Anderson Dana
Published by D. Appleton and company, 1864 Fortification p622

Cambridge Daily News research by Bruce Milner.
Thanks to all those members of Archaeology Rheesearch who helped to refine this report.

Dr Ian Sanderson 2008