Data Overview and Correlation

The geophysical survey conducted over the 5 fields of the ALSF Focus area has produced many geophysical anomalies. One goal of the geophysical survey was to determine if the mapped crop marks could be detected through non-invasive methods. The geophysical data definitively mapped part of the 'sunburst' crop mark in Field B and almost the entire group of crop mark features in Field F. Field A has produced some interesting results, but they are not as conclusive as Fields B and F in confirming the existence and accurate position of the previously mapped crop marks.

In addition to mapping the existing crop marks, the geophysical survey was able to identify additional anomalies that may be related to the crop mark features, as well as anomalies that may prove to be new archaeological features.

Though results from the geophysical survey have been reviewed and presented in detail they must not be considered as separate bodies of information. These data sets must be combined in order to extract the most information and provide the greatest insight to the buried landscape of the ALSF focus area.

This section looks at each field separately, with different geophysical methods combined in overall plan views.

Different anomaly types are compared across data sets. For example, a low resistance anomaly may correspond to a high amplitude reflector in the GPR data (as we see in Field A). Considering the properties of the soil that would provide these responses we can hypothesise that the anomaly could be a pit that has retained more water than the surrounding area due to a difference in soil type or texture. Occurrences such as these will be discussed in the text below.

Field A

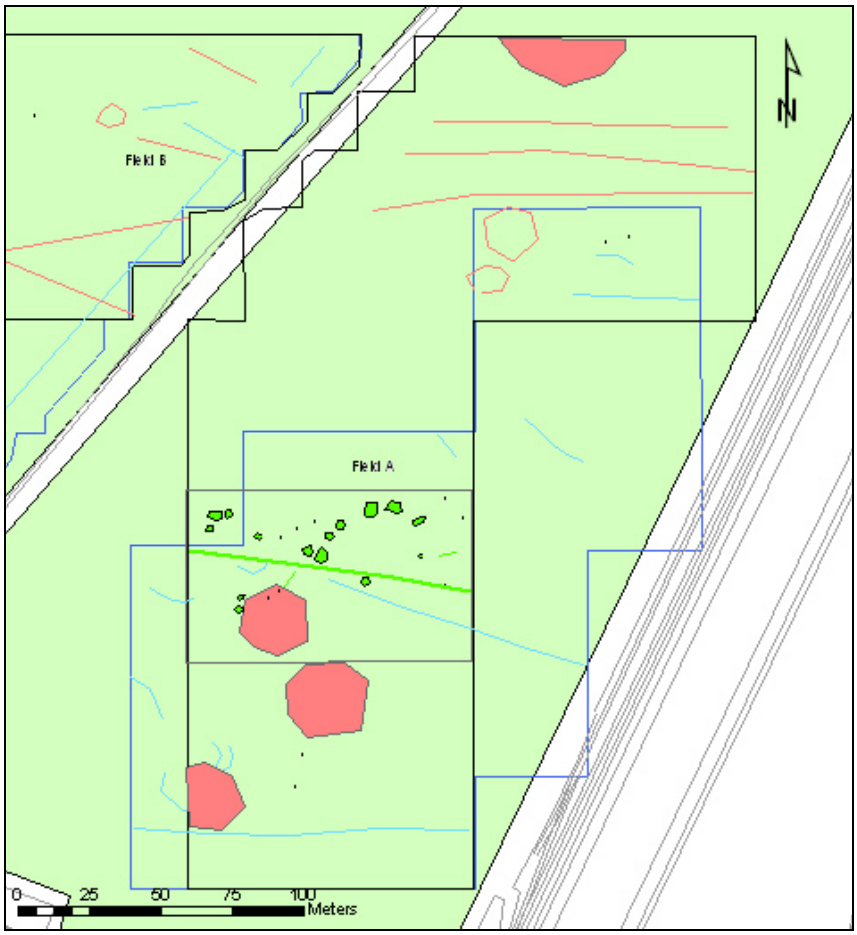

Figure 87 Field A Geophysical anomaly overview.

The anomalies identified through the various geophysical methods span the entire survey area. The primary concentration of anomalies lies within the area of the crop marks.

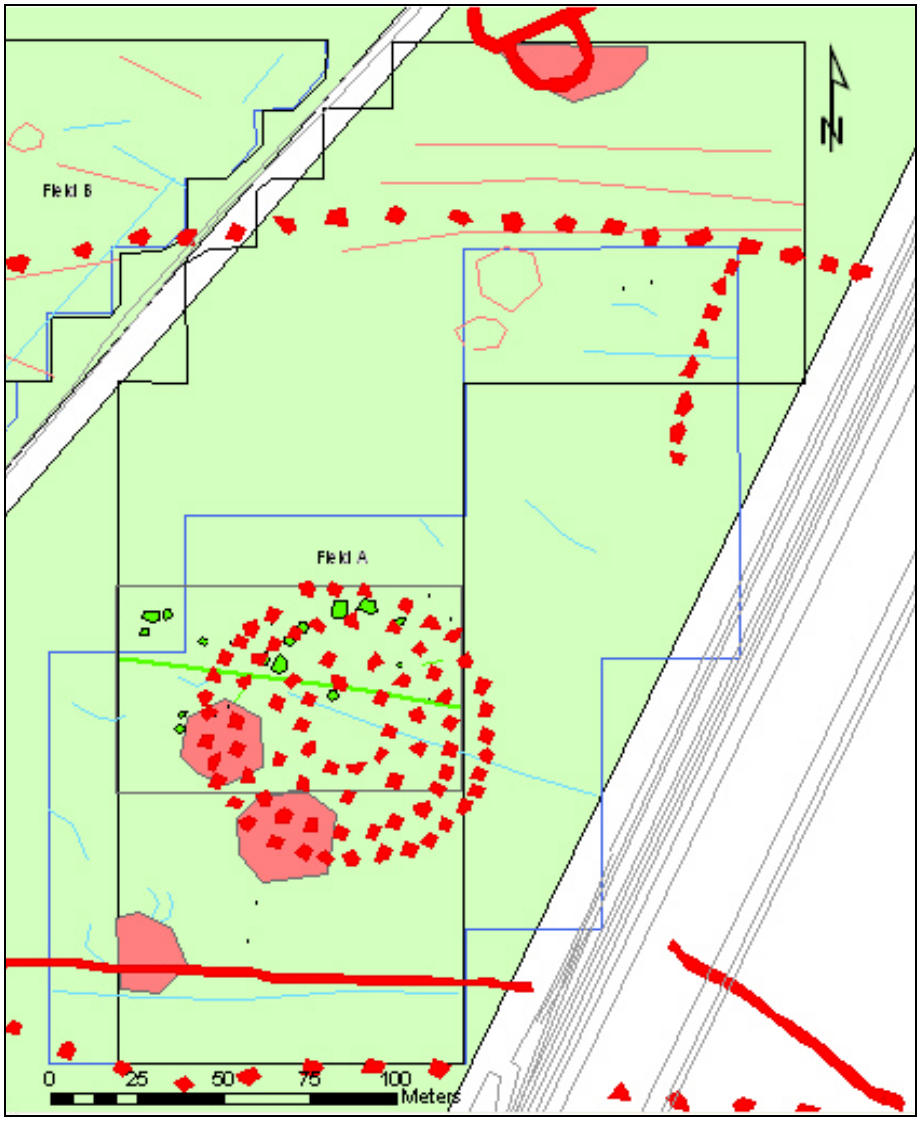

Figure 88 Field A Geophysical anomaly overview with mapped crop marks.

Correlation between different geophysical anomalies can be seen in the area at the northern edge of the ‘woodhenge’ crop mark.

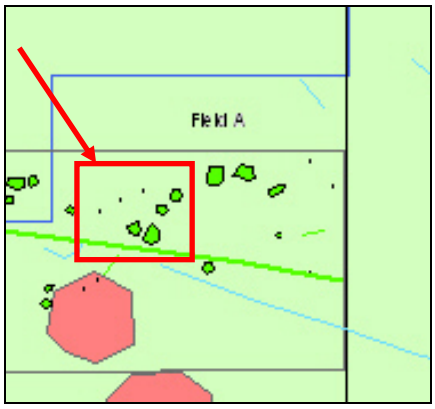

Figure 89 Detail of resistance and GPR anomalies that may correspond to 'woodhenge' crop mark.

The resistance survey has three distinct low resistance anomalies (recorded as points because of their size) that are located in the same area as a string GPR high amplitude

anomalies (the position offset between the two is 6-9 m). As mentioned above, theoretically, a higher saturation level in a distinct area of soil would generate a lower resistance reading and a higher amplitude GPR reflector. Further speculation of the correlation between these features and what their true nature may be can only be established through excavation.

In the same area, magnetic gradient survey and GPR mapped a linear anomaly passing diagonally through the centre of the 'woodhenge' feature. This is probably a deep plough furrow. The same anomaly has not been identified in the resistance survey GIS layer because plough furrows were not annotated. The fact that this furrow in particular is an anomaly that stands out in the magnetic gradient and GPR data suggests that it is deeper or more prominent than other plough furrows in the area.

Field B

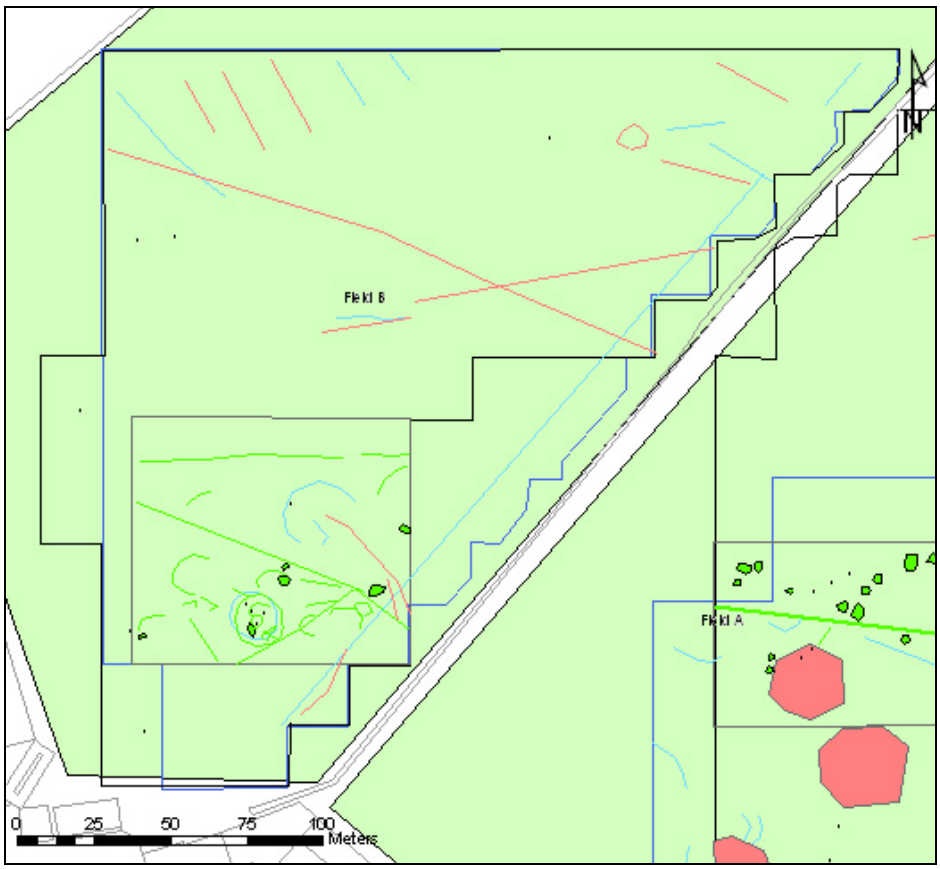

Figure 90 Field B Geophysical data correlation.

The magnetic gradient and GPR surveys mapped the same anomaly that is probably the central circle of the 'sunburst' crop mark in Field B. Resistance survey mapped a possible ditch feature of the 'sunburst' crop mark and a possible pit alignment that extends into Field A.

A closer look at the area of the crop mark shows the main area of overlapping magnetic and GPR anomalies.

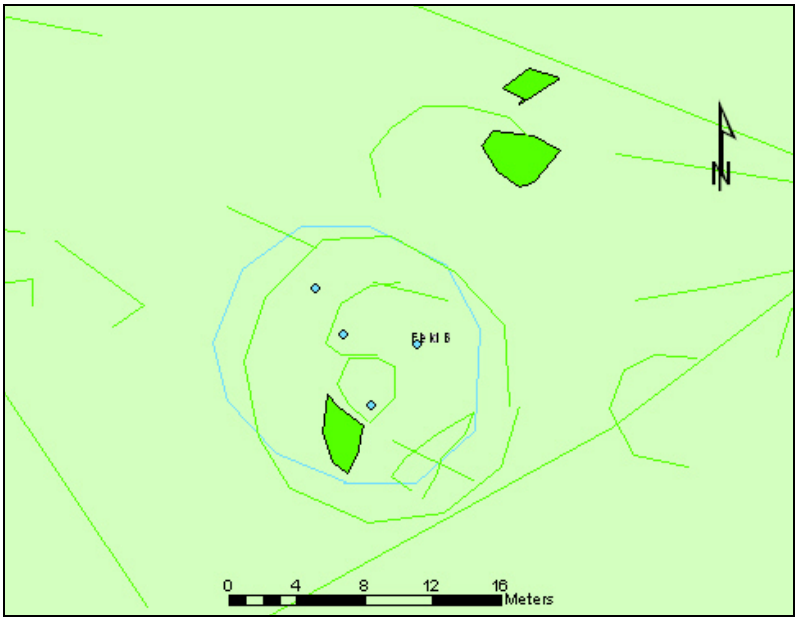

Figure 91 Field B detail of magnetic gradiometer and GPR anomalies in the area of the 'sunburst' crop mark.

The above image is a good example of the issue of spatial accuracy in mapping. The features have a 2-3m offset along the northwest to southeast axis. The methodology of grid mapping may contribute to the offset of these two anomalies. The magnetic survey followed the methodology described in the beginning of this report with 50m grid points established by GPS and 20 m grid points then surveyed in with a total station. The GPR data grids were all established at a later data by GPS with an expected spatial accuracy to a few centimetres.

Additional factors that contribute to data offset include human error during data collection, data processing techniques, interpolation algorithms, and rectification into the GIS.

Spatial accuracy for mapping is best exemplified by the difference (+/- 10-20 m) in the location of the crop mark mapped from the aerial photographs and the actual location of the feature in the field.

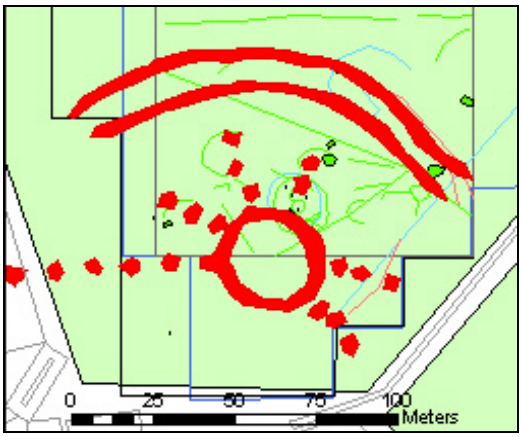

Figure 92 Field B crop mark displacement example.

Apart from offset issues, the fact that these two geophysical methods mapped the same feature confirms the success of this approach to not only mapping crop mark features, but also confirming that they are still present in the ground.

Because GPR so clearly mapped this feature, one may be surprised that resistance did not map the same feature. The GPR data suggests this anomaly is not much deeper than 0.5 m, well within range of the resistance metre's sensitivity. The presence of water in the soil is a property considered important in both GPR and resistance survey. The degree of ground saturation will effect features that are mapped or not mapped. The resistance and GPR data were collected at different times over this feature. The level of ground saturation was certainly different as the resistance data was collected in the summer 2003 and the GPR data was collected in February 2004, during a much wetter period.

Field F

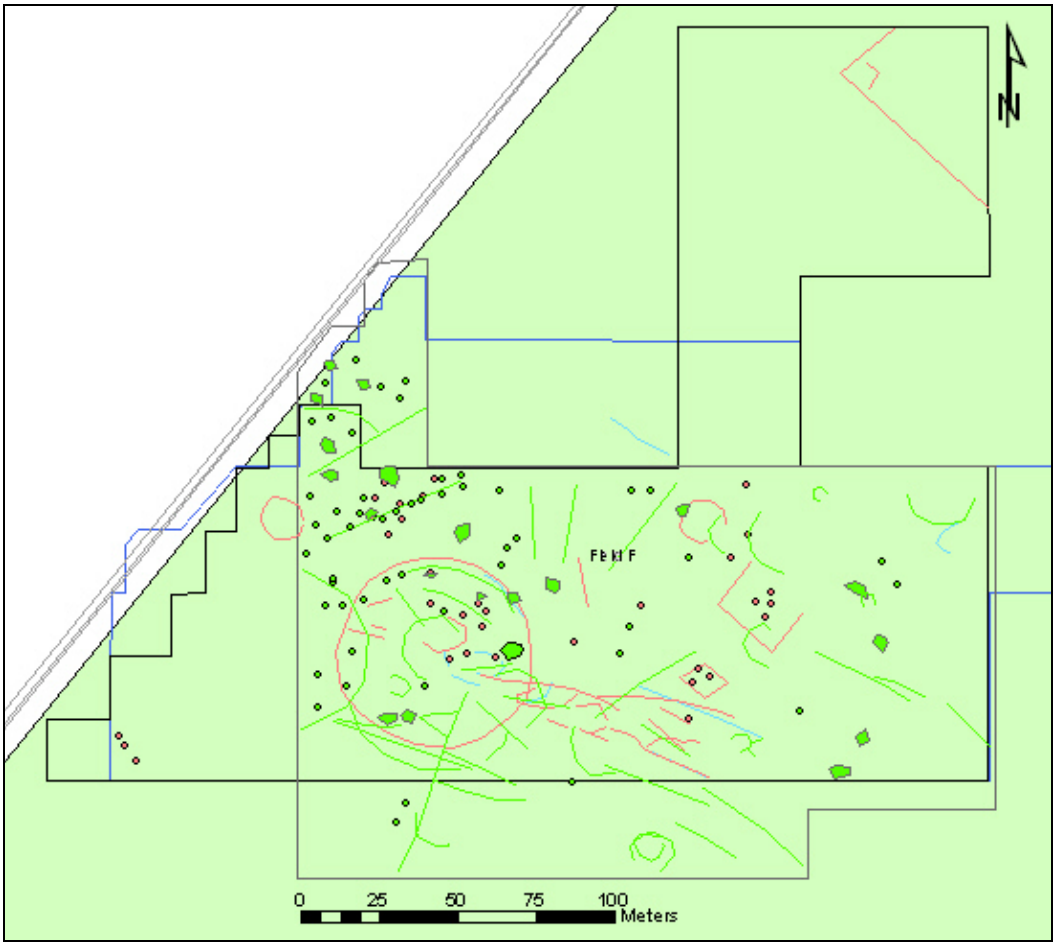

Figure 93 Field F Geophysical data correlation.

Resistance and GPR surveys have successfully mapped the main crop mark feature of Field F. This 60 m diameter circle with two 80 m linear features easily dominates both data sets. Surprisingly, this feature did not appear clearly in the magnetic gradient survey results, only glimpses of the feature can be seen (in blue).

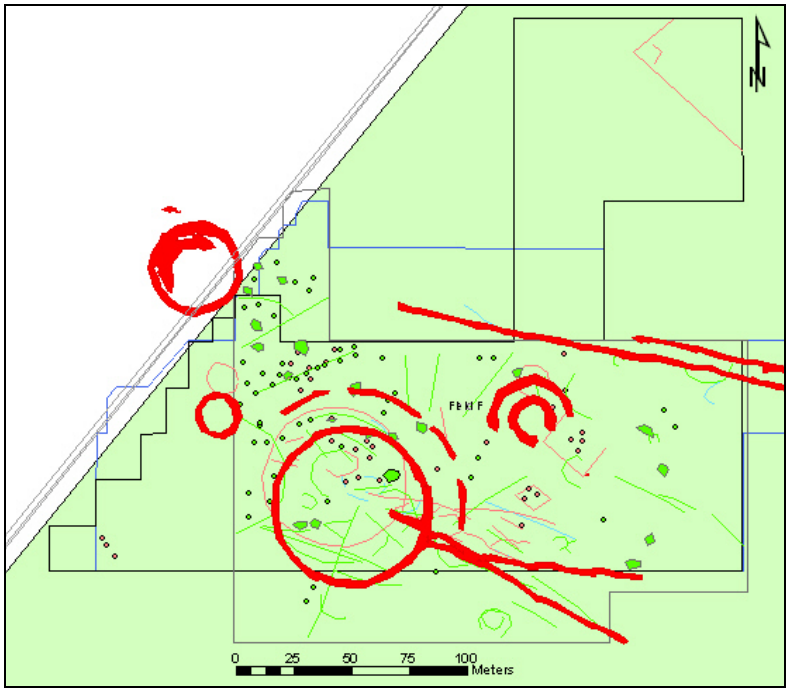

Figure 94 Field F geophysical data correlation with mapped crop marks.

The offset between the interpreted circular anomaly in the resistance and GPR data sets ranges between 1 to 5 m. The offset between the geophysical anomalies and the mapped crop mark range between 7 and 20 m.

The abundance of geophysical anomalies in Field F concentrated in and around the main circular crop mark suggest this is the best preserved feature in the ALSF Focus area survey and may retain important information regarding the Prehistoric occupation and activities on this site.

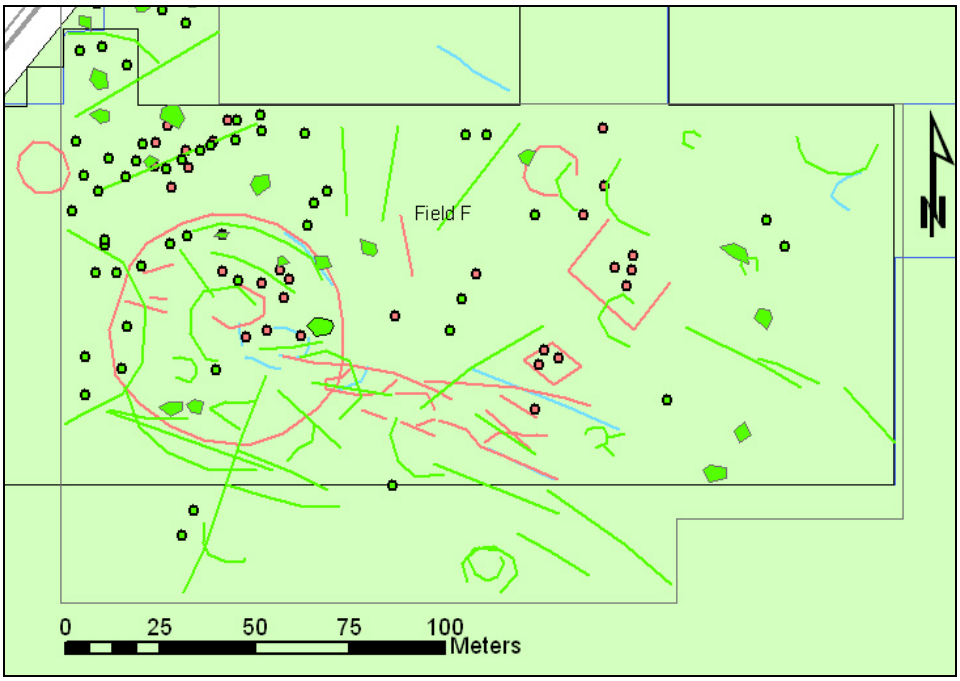

Figure 95 Field F detail of geophysical anomalies in and around the main crop mark.