

Appeal by Redrow Homes Ltd, Land to east and west of Warburton Lane, Trafford

PINS reference APP/Q4245/W/19/3243720

LPA reference 98031/OUT/19

Rebuttal Statement – Geophysical Survey

Dr Kayt Armstrong, MCIfA

1. This rebuttal statement has been provided by Dr Kayt Armstrong MCIfA. I am a Director of Magnitude Surveys. My credentials are set out more fully in my previous statement, included in Ms Kelly's proof of evidence Appendix B (RH/1/C, page 23). I was commissioned by the Appellant to provide a Geophysical Survey of the Appeal site, which was undertaken in two phases during November 2019 and March 2020. In August 2020 I was asked to contribute a statement regarding the reliability of geophysical survey data in the North West of England and also the results of the survey at the Appeal site as a technical addendum to the archaeological proof of evidence (RH/1/C).
2. Following receipt of Mr Redhead's evidence and appendices, I was asked to provide a technical review of comments relating to the geophysical survey method and results. I set my rebuttal out below responding to specific points (referenced by paragraph number and quoted) in Mr Redhead's proof of evidence (TBC-1).
3. This rebuttal evidence has been prepared with due diligence and is my true and honest professional view.

Section 4.1 'GMAAS were not consulted on the survey's methodology and interpretation of the results.'

4. As outlined in my previous evidence, my recommendation for survey approach would have been magnetic gradiometry at 1m x 0.25 or better resolution, which is what we carried out. I am not convinced there is a better alternative geophysical evaluation approach for this particular site and environment.
5. It would be very unusual for us to consult with an outside body on the interpretation of our data. Our geophysical interpretations and reports are completed by experts in the sub-discipline of archaeological geophysics and are rigorously quality assessed before they are released to our clients. We take care to make assertions that can be supported by the data we have been commissioned to collect and do not rely on external sources of information for their conclusions. We are not experts in crop mark analysis, for example, or fieldwalking

studies, and therefore do not rely on non-geophysical sources of information to make our interpretations.

Section 4.2 *'GMAAS consider that the green linear features in the eastern part of site could represent archaeological features relating to early settlement.'*

6. Green anomalies in our interpretation drawings are anomalies we consider to be of natural origin, arising from variations in soil properties, texture or magnetisation that results from non-anthropogenic processes, such as fluvial action, or those involved in soil formation.
7. The reason for this classification in this instance is as follows: the anomalies are of a different magnetic character than those identified as resulting from the fills of cut features. Firstly, they are weaker and in some cases negative as opposed to positive. Secondly, their edges are diffuse and indistinct rather than sharply delimited, and finally, they are discontinuous and curvilinear in form, lacking right-angled returns or diagnostic shapes characteristic of field boundaries, enclosures or ring ditches.
8. Our report acknowledges that there is always more than one possible explanation for an anomaly within geophysical data, and that our interpretation is made on the balance of probability. In cases where there is no strong case for one interpretation over another, we will use an 'undetermined' classification as we have for the cluster of discrete strongly positive anomalies within our survey Area 3, which may be pits with enhanced fills, or which may be indicative of a localised superficial deposit or more magnetic sediments. So, these anomalies may be being caused by the enhanced fills of cut features related to settlement activity, but they are more clearly characteristic of natural variations in soil composition.

Section 4.3 *'The survey report states that there is no archaeological interest in Zone 2 west of Warburton Lane. GMAAS dispute this'*

9. This is not a clear representation of our report. Our report clearly states that 'No anomalies suggestive of significant archaeological features were identified.' This is somewhat different to stating that there is no archaeology on the site. Our report concludes that there are no anomalous geophysical signals that have been interpreted or characterised as substantial sub-surface archaeological remains, but the detail of our methodology and results sections explain the constraints and limitations of the magnetic method and thus the degree to which it is possible to infer an absence of archaeology from an absence of magnetic anomalies.
10. With regard to the two points made specifically about our survey Area 1 in this paragraph:

11. The two parallel linear anomalies classified in our interpretation drawing as ‘agricultural’ running alongside Warburton Lane have been classified as such because that is the strongest likely explanation for them. We often see examples of linear anomalies along field boundaries that relate to recent tractor movements and ploughing headlands. If these anomalies do not result from such recent activity, they are also similar in terms of their strength and morphology, to a pair of linear anomalies in the west of Area 1 which were interpreted as an unmapped former field boundary. This suggests that, if these are not related to recent plant movement, this pair of anomalies may indeed be previous iterations of the boundary along Warburton Lane, or a former route/road or indeed a Park boundary. In either of the latter cases, an ‘agricultural’ classification would still be appropriate as these sorts of landscape features all relate to the agricultural management of the landscape, and our classification schema would still therefore place them in the ‘agricultural’ category.
12. The ‘potential ditch’ picked out in the evidence submission within our Area 1, geophysically speaking has more in common with the ‘natural’ anomalies discussed above than the sorts of anomalies typically produced by cut features. The comparator shown in Appendix 5 is very different in character, even with the low quality of both the presented data and the resolution and scale of the image. Furthermore, the example ditch picked out in that dataset (some of which I am reasonably certain is earth resistance data rather than magnetic data) indeed has the sharp edges and strong enhancement characteristic of such features, and should have been recognised by the interpreter of that survey as such. In contrast, the example possible ditch picked out in our survey results was not drawn during our interpretation because it is so ephemeral as to not be ‘strong’ enough to be drawn. Rather it has just been considered to be part of the general background variation of the soils underlying the survey area, particularly as it is aligned with the stream to the north, outside the survey area, and is characteristic of sinuous variations in soil and sediment textures related to fluvial action.
13. I have also been asked to comment briefly about the cottages along the southern boundary of the survey area within our Area 2. Our report identifies (in the same location as a building shown in the 2nd edn OS maps) a spread of ‘ferrous debris’ – this is a classification used to describe spreads of magnetic material in the topsoil such as ceramic building materials. On examination of various extreme plotting ranges, there is no suggestion of an intact structure within or being obscured by that debris, though its proximity to the boundary of the surveyable area does reduce the certainty of the interpretation. There is a hint of some linear organisation to the material that seems to co-locate with the boundaries shown on the historic map, rather than the structures.

Section 4.4

14. I would broadly agree with this paragraph as I concur with GMAAS that geophysical survey only forms part of archaeological evaluation and is usually subject to verification by trenching. Where I would disagree is in the idea that there are specifically unknowable constraints on the interpretability or reliability of geophysical surveys in a particular region of the UK. I addressed this at length in my earlier statement. I would also, as discussed above, dispute that there are any diagnostically 'archaeological' anomalies within the survey area, as discussed above, that our report 'misses'. With the exception of the very ephemeral anomaly discussed in 4.2, all of the anomalies GMAAS express an interest in were identified by our report and categorised with their most likely interpretation. The dispute lies in the interpretation of these anomalies, not their identification. Geophysical interpretation for archaeology is a specialist exercise that does not provide absolute answers or certainty, and relies on a combination of the skills, knowledge and experience of the interpreter.