SURVEY RESULTS

2001 / 37 Castleford, West Yorkshire

1. Survey Areas

1.1 Three areas in Castleford were investigated geophysically: GPR was employed in Area 1, south of the river; GPR, resistivity and magnetometry were used north of the river, in Area 2; and Area 3, the river itself, was investigated using GPR. The location is shown in Figure 1, at a scale of 1:2500.

1.2 The survey grid was set out by **GSB Prospection** and tied in by tapes to existing boundaries. Plastic pegs were left *in situ* and the client tied these in with an EDM. **GSB** tie-in information has been lodged with the client.

2. Display

2.1 The results from the gradiometry and resistance survey are displayed as greyscale images with accompanying interpretation diagrams at a scale of 1:500 (Figures 6 and 7).

2.2 The data from the GPR survey are displayed in two formats. In some of the diagrams individual traverses are displayed as *radargrams*. These represent vertical sections through the ground and the direction of the trace is shown on each diagram. One vertical axis is in nanoseconds (ns) and indicates the length of time required for the transmitted pulse to travel down to an interface and return to the receiver. This is referred to as a two-way-time. The other vertical axis displays the approximate depth of these reflectors below the surface. Selected radargrams are shown in Figures 4 and 9 while the Appendix contains all the transects as archive plots. The results are also displayed as *time slice maps.* This form of display combines the data from all the traverses and provides plan views of the results at different times or depths.

2.3 These display formats are discussed in the *Technical Information* section at the end of the report. Numbers in parentheses in the text refer to anomalies highlighted on diagrams.

3. General Considerations - Complicating Factors

3.1 Ground conditions were generally suitable for survey; Area 1 comprised a grass / bare earth carpark, while Area 2 was a playing field.

3.2 Survey in Area 3 was carried out by placing the GPR antennae in a flat-bottomed fibreglass boat; however it was difficult to accurately track both position and speed.

3.3 Where there is a strong electromagnetic contrast the GPR signal can be inter-reflected or reverberated and this produces a delay in the reflection of the signal. This is termed 'ringing'. This happens, to some extent, with all reflections and results in a greater apparent depth than actually exists. As a result, it is often not possible to detect the base of features; only the tops of buried features/deposits are detected.

3.4 A combination of large amounts of clay and wet conditions can result in a marked attenuation of the radar energy with depth. Depths have been indicated on the radargrams. The conversion from time to depth depends on the velocity of the electromagnetic signal through the ground. This can vary markedly over a small distance and as a result any depth conversion is only an approximation.

4. Results of Survey

Area 1 – British Legion Car Park (Figures 2 and 3)

4.1 The aim of this survey was to investigate a strip of land lying next to a known Roman road.

4.2 Initial reports suggested that Victorian buildings which once stood along the road frontage did not have cellars, yet the GPR results clearly suggest possible structural remains surviving as deep as 2 metres below the ground surface. It was believed, therefore, that deep archaeological deposits were likely to be surviving *in situ*, and although excavation confirmed this fact, substantial cellars were also unearthed. In such circumstances it is very difficult, if not impossible, to interpret which reflections indicate archaeological foundations as opposed to modern features. There is, however, a clear divide between the western half of the car park, adjacent to the road, and the eastern half of the site, which comprised the backyards of the houses. These yards appear to be devoid of major archaeological features. Well defined reflections at (A) indicate a presumed substantial cellar.

Area 2 – Playing Fields (Figures 4 to 7)

4.3 To the north of the River Aire the line of a Roman Road (Margary 28b, also known as Roman Ridge) is marked on maps as crossing a playing field before heading north towards Tadcaster. The purpose of the survey was to try to pinpoint the road.

4.4 Initial magnetic and resistance survey proved inconclusive. A series of parallel magnetic linear responses (B) crossing diagonally through the grid squares suggested the presence of land drains below the sports field. Other areas of magnetic disturbance coincided with the metal goal posts (and former goal posts) (C), floodlight stanchions (D) and buried electric cables(E). The latter also had a severe effect on the resistance results. Anomalies (F) of potential interest were located in the southern half of the survey area. However, excavation demonstrated that these were associated with an area of modern disturbed ground.

4.5 Reflections (G) thought to be of potential archaeological interest in the GPR data were also found to be a result of made-up ground below the playing field. Pockets of ash and gravel produced strong reflections in an otherwise homogenous alluvial deposit. These reflections were misinterpreted in the field as being the result of more substantial features. The time slices show numerous responses in the southern half of the survey area; augering demonstrated that the made-up ground was concentrated in this part of the field.

4.6 Long ‘search’ traverses across the line of the road failed to provide any indications in the GPR traces of a buried road surface (the data from which are not reproduced). Given the strong responses from thin layers of gravel and ash, then a substantial road surface should have produced clear GPR reflections. Again a series of auger holes along the same transect as the radar failed to find any evidence for a road.

Area 3 – River Aire

4.7 Various reports, believed to be unconfirmed, refer to sightings of a Roman bridging point across the River Aire (Stewart Ainsworth *pers. comm.*). GPR was carried out by placing the antennae in the bottom of a fibre-glass boat and traversing back and forth across the projected line of the bridge / ford.

4.8 Despite attempts to utilise GPS to keep track of the location of the boat, major problems were encountered, particularly when the outboard motor failed after a couple of trial traverses. Thereafter the boat was pulled by persons using ropes on either side of the river bank, though it was impossible to register the speed with any accuracy.

4.9 As a consequence, only a cursory survey could be carried out, though the results indicate that in theory a full, controlled survey would be beneficial. Clear reflections (H) were obtained at the same point, approximately 2 and 3 metres away from the southern bank of the river. These suggested a solid 'structure' that could be stone blocks in situ on the surface of the river bed. While it was impossible to be more specific about the origin of the reflections, these were the only responses observed during a dozen traverses, each of approximately 50m in length. The fact that the reflections coincide with the postulated location of the bridging point adds weight to an archaeological interpretation for the GPR results. Clearly more work would have to be carried out to fully verify these preliminary findings.

5. Conclusions

5.1 The geophysical work demonstrated some of the difficulties and pitfalls of interpreting results from what are archaeologically complex sites. For example, in Area 1, while the GPR evidence clearly indicated substantial features at depth, these were partly mis-interpreted as being deep archaeological deposits simply because of the reports that there were no cellars on the site. Yet the GPR results were clearly indicative of substantial cellars and excavation confirmed their presence. Similarly, in Area 2, compacted areas of ash and gravel in otherwise homogenous wet deposits produced far stronger reflections than anticipated which led (because of archaeological expectations) to a false belief that more substantial buried deposits would be present.

5.2 By contrast, the survey on the river had a relatively simple target: stone blocks at the base of a mass of water. In this instance it was easy to identify the reflections associated with the expected remains, however, the logistics of carrying out the survey and collecting the data proved far more fraught.

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SITE SUMMARY SHEET

2001 / 37 Castleford, West Yorkshire

NGR: SE 426 263 (Playing fields north of town)

Location, topography and geology

The areas under investigation lie within Castleford, West Yorkshire: one area lies south of the River Aire; one area to the north and the third occupies a stretch of the actual river. Each survey area was flat and devoid of earthworks and major obstructions, though occasional trees, floodlights and goal posts were present on the playing field. The first area occupies made up ground over demolished Victorian houses while the playing field lies on riverine deposits.

Archaeology

Numerous archaeological excavations in and around the town have been carried out in recent years, largely under the supervision of **West Yorkshire Archaeological Services**, and these have established the importance of the town in Roman times.

Aims of Survey

The three aims of the survey were:

1. To identify the nature of any archaeological remains below the British Legion car park.
2. To try to pinpoint the course of the Roman Road north of the Aire.
3. To identify the Roman bridging point over the Aire.

The work forms part of an archaeological assessment being undertaken by **Time Team** on behalf of **Channel 4** television.

Summary of Results *

GPR survey confirmed the presence of both intact cellars and deeply stratified archaeology in the western half of Area 1. Geophysics (magnetometry, resistivity and GPR) failed to find any evidence for the Roman Road in Area 2 – excavation and borehole investigation suggested that the road may have been lost to surface excavation of clays.

The GPR survey on the river identified three clear reflections that coincided with the suspected Roman crossing point and as such are likely to indicate either a surviving stone ford, or pier bases for a bridge. A lack of time and a faulty outboard motor on the boat precluded a full systematic survey.

*** It is essential that this summary is read in conjunction with the detailed results of the survey.**

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