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Land South of Boxal Bridge, Wisborough Green, West Sussex

Geoarchaeological Desktop Survey and Mitigation Proposals

Prepared by

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This desktop survey is based on Ordnance Survey mapping, British Geological Survey records, Soils Survey mapping, and has been augmented and revised following a field visit on 10 December 2013.

Location and Topography

The proposed compound (thereafter, the Proposed Site) is a rectangular piece of land located in the northeast corner of a large arable field, to the northwest of Wisborough Green village in the Low Weald, and is centred at TQ 03718 26728. The land lies between 15m and 21m OD and slopes gently southwards on a north-facing slope of large low-lying hill. To the north the land drops moderately sharply into to the Boxal Brook valley. The Boxal Brook meanders in a narrow flat-bottomed small alluvial valley with at this point is heavily to moderately wooded. Although open to its north, south and east sides; the Proposed Site is bound to its west by a protruding piece of Northup Copse and the north the hill slopes down to a strip of woodland on the valleys sides of the Boxal Brook.

The area of the Proposed Site is gently sloping, but a clear, but subtle rise and gentle ridge to the south may represent the river gravel terrace (see below). The Proposed Site is adjacent to but wholly above the Boxal floodplain

Geology

According to the British Geological Survey (BGS geology of Britain Viewer), the geology of the Application Site comprises the sandstone facies of the Weald Clay Formation potentially on its north boundary with mudstone and sandstone facies of the Weald Clay Formation under most of the application area. A localised outcrop of sand and gravel of the Arun Terrace Deposits (terrace 3; 2 million years ago) overlying the mudstone to the south, and higher up the slope more extensive deposits of sand and gravel of the Arun Terrace Deposits (terrace 4; up to 2 million years ago) occur. Alluvium is mapped as present in the Boxal Brook. The geological mapping, however is only accurate within *c.* 1km, so site investigations will be needed to confirm this.

Superficial deposits

On the southern edge of the site a possible remnant of the 3rd River Arun terrace (comprised of sand and gravels) may exist, and to the north of the site Holocene overbank alluvium infills the Boxal Brook valley. The geoarchaeological significance of these is dealt with below

Superficial (Holocene and Quaternary) Deposits
Two major Quaternary superficial deposits have a direct geoarchaeological significance and are dealt with individually. These are the Holocene alluvium of the Boxall Brook, and the terrace gravels of the 3rd Arun terrace (Fig 1). In addition there is the possibility of a large lynchet and plateau edge deposits at the northern end of the slope, above the Boxal river cliff.

Alluvium

Alluvium may occur as thin veneers of finer-grained overbank floodplain deposits of deeply stratified deposits many metres thick (cf. Scaife & Burrin 1983; Wessex Archaeology 2007). Organic peat horizons may also be sealed stratified within or beneath these sequences. These alluvial sequences have the potential to bury, mask and contain evidence of human activity, including settlement, riverside structures and even boats etc. (cf. Needham & Macklin 1992). These areas often have high ground water-tables and are, in part, waterlogged, facilitating the preservation of waterlogged wood (e.g. Allen 2011), wooden structures (Greatorex 1995a; 1995b; 2003), artefacts and vessels.

Combined with this is the potential for containing long stratified and potentially datable palaeo-environmental sequences documenting long histories of vegetation change, land-use, human activities and phases of increased erosion relating to them (cf. Burrin 1985; Burrin & Jones 1991; Burrin & Scaife 1984; 1988; Jones 1971)

In particular long vegetation histories derived from pollen have been obtained from a number of the major Sussex rivers, e.g. Ouse (Scaife & Burrin 1983; Thorley 1971; 1981), Cuckmere (Scaife & Burrin 1985), Rother (Scaife & Burrin 1987), and pollen sequences have demonstrated that sedimentation was an indirect result of human activity such as deforestation and agriculture. The thickness of sediments can be appreciable (e.g. 8-12m) and even the smallest higher reaches of these rives such at Loxwood in the Arun (only 5-6km north of Boxal Bridge) where 5m of deposits covering accumulating over nearly 4000 years were recorded (Wessex Archaeology 2007). Even at Bramber, about 3m of alluvium had accumulated since the Norman period (Holden 1975), and appreciable changes in the hydrology and floodplains of these rivers has been demonstrated since the medieval period (Holden & Hudson 1981). Sediment accumulation was accelerated, if not caused, by human activity on the interfluves (Scaife & Burrin 1992) and perhaps facilitated by the possibility of substantial thickness' of loessal deposits in these areas (Burrin 1981, 1985) that were highly susceptible to erosion (Robinson & Williams 1983).

The depth of material seals and preserves such deposits so well also makes such evidence of human activity and buried sites elusive and difficult to prospect for without the use of deep coring. Geoarchaeological investigations of the minor rivers and upper tributaries in the Weald are rare and it has been assumed that these would have far shallower sequences than those of the major river valleys e.g. Cuckmere, Ouse, Adur and Arun. However, investigations at Loxwood demonstrated that deposits of 5m thickness can survive in even the higher stretches and more minor tributaries, and thus these seal at depth evidence of former riverside environments (Wessex Archaeology 2007). Although, as expected, no direct archaeological evidence was identified, given the limited nature of investigation using small diameter coring, the potential for such minor order rivers to contain deep alluvium with long palaeo-environmental histories is clearly demonstrated.

River Terrace deposits

The morphology and depth of the main river valleys is Sussex has been dramatically altered as a result of glacial and pro-glacial action. Beneath the Holocene deposits in many valleys are considerable thicknesses of clastic detritus infilling the major meltwater valleys. Associated with these are numerous raised river terrace gravels and raised beaches.

The classic and sedimentary records of these deposits provide indications of modes of deposition and palaeo-environments (e.g. Roberts & Pope 2001), as well as potentially containing lithics and bifaces. Some of these locations were clearly also favoured for Palaeolithic habitation and activity e.g. beach deposits at Boxgrove (Roberts *et al.* 1997) and Slindon (Pope 2001) and valley deposits such as at Valdoe (Pope *et al.* 2009). Wider scale surveys (Roberts & Pope in press; 2001) provide the wider landscape context in to which potential more local palaeo-environmental data and archaeological activity may be found, defined and recorded.

Plateau edge colluvium

At the northern end of the Proposed Site at the edge of the River Cliff, there is a levelling in the field potentially representing a plateau edge colluvium (*sensu* Bell 1981) or lynchet. This feature seems to be very broad and difficult to map. It may bury, seal and mask archaeological evidence (Allen 1988; 1991).

Summary of the current geoarchaeology and geoarchaeology potential

Any alluvium in the moderate flat Boxal Brook floodplain, and has the potential to seal and bury archaeological evidence including past settlement activity. The deposits themselves contain important palaeo-environmental data which provide the potential to examine changing land-use and define the nature of the river in the past (cf. Evans *et al.* 1993). Even shallow sequences can cover long and significant periods of time, and be of great antiquity. However, these do not occur within the proposed development area and are not impacted by construction proposals. Such deposits, however, do provide a major proxy off-site record, which could importantly augment any evidence of human activity found on-site.

River terrace deposits have the potential to provide important coxtextual information relating to the former Palaeolithic Arun valley (Roberts & Pope 2001), and remote possibility of the presence of lithics.

The presence of the plateau edge deposits/lynchet is important indicating accelerated erosion as a result of past (historic and potentially prehistoric) agriculture. If present it is has the potential to seal and mask evidence of past human activity (artefact distributions, features and any geophysical response relating to them). The geoarchaeologcal potential lies in defining its presence, character, nature and thickness/morphology, while the palaeo-environmental

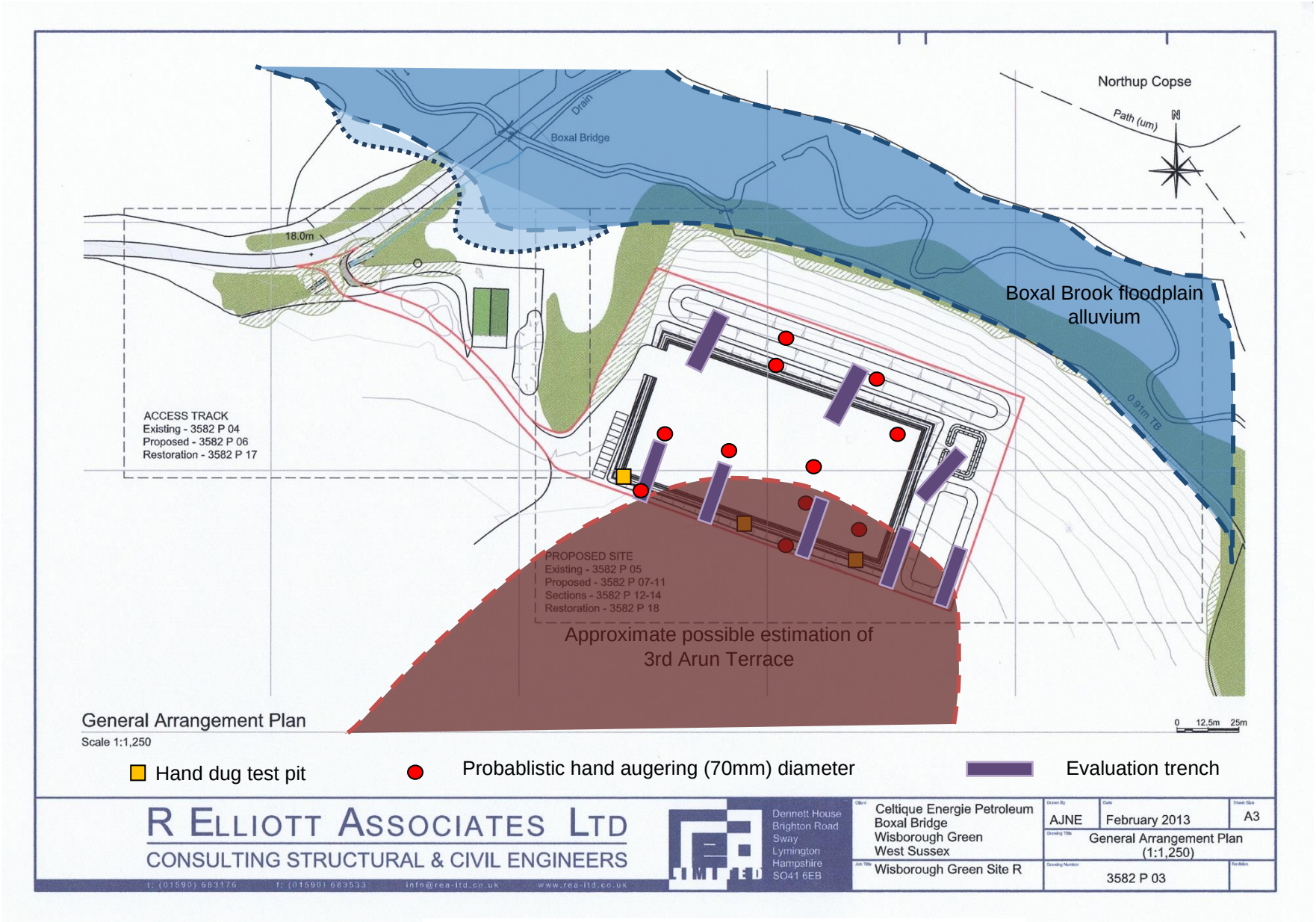

Figure 1. Outline generic location of test pit and auger

potential is very low as neither pollen nor snails are likely to be preserved in the non-calcareous and well mixed deposit.

Impact

Alluvium: there is no direct impact on any stratified sequences of alluvium. It is not clear whether alluvium (or colluvium) occur with the development area. The potential to recover colluvium, or an important colluvial/alluvial interface on the floodplain margins exists.

Terrace deposits: If these encroach on the development area they will be impacted by construction. The extent and nature of that impact is unknown due to the lack of precise evidence of the location, thickness and deposit nature.

Palaeo-environmental mitigation strategy

The following methodology is proposed to meet the primary objectives and to facilitate the recovery of geoarchaeological and palaeo-environmental record. All geoarchaeological works will follow the guideline outlined by English Heritage (2007) and the palaeo-environmental proposals conform to relevant sections of *Environmental Archaeology: a guide to the theory and practice of methods, from sampling and recovery to post-excavation* (English Heritage 2012).

Optional Stage 1: defining the presence of relevant deposits

The presence of plateau edge colluvium (*sensu* Bell 1981) and river terrace deposits can be defined by a programme of minimally intrusive works, or defined by evaluation trenching and recording on site by a geoarchaeologist. If present, the location and extent will be crudely defined and a programme of investigation and sampling agreed.

Option 1

Test pit excavation: hand-excavation of 1m x 1m test pits will define the presence of the Weald Clay or significant superficial deposits e.g. river terrae gravels and sands. The deposits will be recorded in the field by a geoarchaeologist, and the location of the test pits mapped. The precise location of the test pits will be defined in the field, but an indication of their typical location is given in figure 1.

Augering: hand augering with a combination of 4-7cm diameter Dutch combination augers and 3cm diameter gouge augers will assist in defining the presence and extent of both alluvial and terrace deposits. Augering will be conducted by, or under the supervision of, a geoarchaeologist. This provides some distributional evidence based on the test pit records of deposits occurred. A series of augerholes will be undertake on a probabilistic basis; i.e. their location will be informed in the field as result of examination of both the topography and the results of the test pits, but an outline of typical location is given in figure 1.

If no deposits of significance are present then no further geoarchaeological presence is necessary.

Stage 2: geoarchaeological investigation and sampling

Fieldwork
Evaluation trenches should be placed perpendicular to the potential deposits to reveal them in section (Fig. 1).

Plateau edge deposits/lynchet
These should be section by machine under archaeological supervision. The section cleaned back vigorously and searched for artefacts. The basal deposits should be examined for a potential re-worked buried soil and for features sealed by the colluvium. The sections should be drawn, and the then recorded on site by a geoarchaeologist.

Terrace deposits
The deposits will be investigated by a series of machine-cut trenches to expose the terrace deposits ideally to the Weald Clay Formation, or to just beyond the maximum development impact.

The exposed section will be cleaned and recorded in the field by the archaeologists with the assistance of a geoarchaeologists who will make all field descriptions.

Bulk samples for sieving and clast definition will be taken.

Palaeo-environmental and Geoarchaeological Assessment

Plateau edge deposits/lynchet
The colluvium will be described in the field by a geoarchaeologists to define the nature of sedimentary accumulation. This provides the basis of the geoarchaeological reporting and interpretation.

Terrace Deposits
Sediment and clast samples will be processed and described to augment field record and descriptions. Processing of other samples for the recovery of biological and artefact remains will be undertaken and the material appropriately assessed. Advice will be sought on the deposits and the significance of the remains from an appropriate local Palaeolithic geoarchaeologist (e.g. Dr M. Pope).

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