A Flint Scatter at Nine Wells, Great Shelford

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A previously unknown flint scatter from Nine Wells, Great Shelford is described, representing activity from the Mesolithic through to the Early Bronze Age. The lithic assemblage comprised flint cores, scrapers, blades, flakes and waste, together with burnt stone. This is taken to represent numerous episodes of occupation and activity close to the chalk springs at the site. Aerial photography, Ground Penetrating Radar and boreholes are used to put the flint scatter into context within the surrounding landscape.

Nine Wells, Great Shelford, Cambridgeshire [TL 46145 54173] is a small spinney of beech, ash and maple woodland at the foot of White Hill, containing several fine chalk spring heads (Fig. 1). The source of Hobson's Conduit is located here, water rising from the Totternhoe Stone, a hard and fissured band within the Chalk bedrock. The site was formerly a Site of Special Scientific Interest (SSSI) scheduled for its rare aquatic macro-invertebrate fauna. It is currently scheduled as a Local Nature reserve (LNR) and a Local Geological Site (LGS). The site is important for wildlife, conservation, heritage, geomorphology and geology, but there is no record of any archaeological interest, although crop marks have been reported in the fields to the east (Evans *et al.* 2008). Recently (June 2017) Nine Wells was the focus for a BioBlitz organized by Hobson's Conduit Trust. It was at this event that one of us (JAB) first noticed worked flints lying on the freshly-ploughed surface at points along the southeastern boundary of the site. This was unexpected, since previous attempts to find archaeological evidence at the site over twenty-five years had failed. A 5m wide boundary strip had been deep-ploughed along the southeastern boundary of the Nine Wells enclosure to remove vehicle ruts caused during the installation of four boreholes associated with a springhead flow-support initiative, and this had brought worked flints to the surface.

Field-walking, flints, aerial photography, GPR and boreholes

In July and August 2017, a total of 89 carefully surveyed 5m x 5m quadrats were field-walked by two of us (SB and JB), attempting a total pick-up of surface finds. Each quadrat was walked twice, (once by each of us) in a perpendicular gridded search pattern. Finds from each quadrat were labelled and bagged, washed and identified by JAB, then passed to LB for detailed analysis. Initially, the *c.* 210m long and 5m wide boundary strip was investigated with 44 quadrats, one of which, towards the southern end, produced a 'hot-spot' with a scatter of 17 worked flints (a density of 0.68 finds/m^2). Following ploughing of the entire field, 45 additional quadrats were positioned adjacent to that spot to assess the extent of the surface spread.

Fig. 2 shows the density of worked flint recovered. A scatter of flints with a density of >0.3 finds/m^2 covering *c.* 150m^2 can be seen associated with the original 'hot spot'. A second concentration *c.* 15m to the east produced a scatter of 11 worked flints (a density of 0.44 finds/m^2). Elsewhere along the southeastern boundary of the Nine Wells enclosure worked flint densities were generally rather low (<0.2 finds/m^2), except for a few locations, which might be associated with the adjacent springheads. Fig. 3 shows the density of burnt flint and stone recovered from the quadrats. A broad area of *c.* 350m^2 adjacent to the original worked flint 'hot spot' had modest densities (> 0.1 finds/m^2) of burnt flint and stone. An adjacent area with similar densities was loosely associated with the second concentration of worked flint a few metres to the east. Along the southeastern boundary burnt flint and stone densities were often very low (<0.05 finds/m^2), again except for a few locations possibly associated with the adjacent springheads.

The Flint

Lawrence Billington

Introduction

The flint assemblage consists of 320 worked flints, together with 143 fragments of unworked burnt flint weighing 911g and 19 pieces of burnt stone weighing 810g (Table 1). The majority of the assemblage, 316 worked flints and all bar a single surface collec-

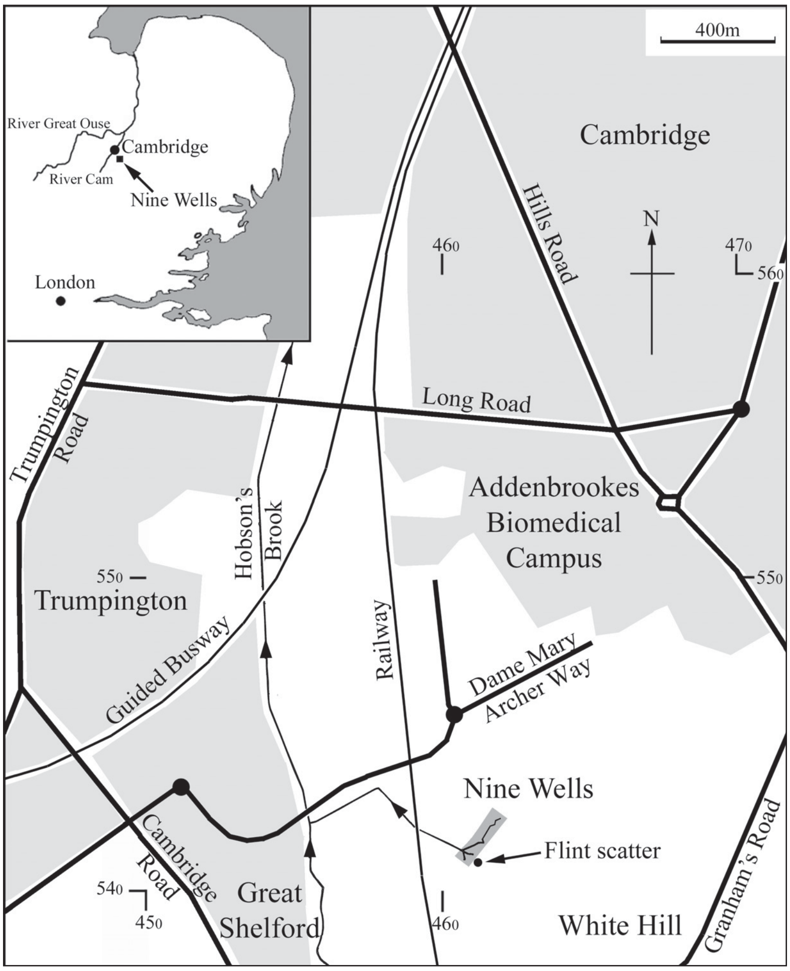

Figure 1. The location of Nine Wells in East Anglia (inset top left); The location of the Nine Wells flint scatter in relation to White Hill, Great Shelford, Trumpington and the Addenbrookes Biomedical Campus (main map). Map created using an Ordnance Survey Data Licence. Contains Ordnance Survey data © Crown copyright and database 2017.

tion fragment (17.6g) of the unworked burnt flint and stone, was recovered from gridded systematic field-walking.

Raw materials and condition

The worked flint is generally made from a fine-grained flint of good knapping quality. All of the worked flint bears relatively heavy recortication which masks the original colour of the material, but occasional recent breaks show that most of the flint is a semi-translucent dark grey/black colour. Surviving cortical surfaces are varied but are generally weathered and sometimes heavily abraded. Some of this material appears to derive from rounded-sub-rounded cobbles, which might be sourced from glacial/fluvial gravels, whilst others appear to derive from nodular flints, which probably derive from deposits directly eroded from the parent chalk. The condition of the worked flint is typical of material derived from surface collection, with frequent edge damage and rounding, some of which may have obscured traces of retouch or utilisation.

Table 1. *Quantification of the lithic assemblage from Nine Wells.*

Chip	18
Irregular waste	11
Primary flake	7
Secondary flake	103
Tertiary flake	119
Secondary blade-like flake	17
Tertiary blade-like flake	14
Secondary blade/let	1
Tertiary blade/let	15
Scraper	4
Core	11
Total worked	**320**
Unworked burnt flint count	143
Unworked burnt flint weight (g)	*810*
Burnt stone count	19
Burnt stone weight (g)	*809.6*

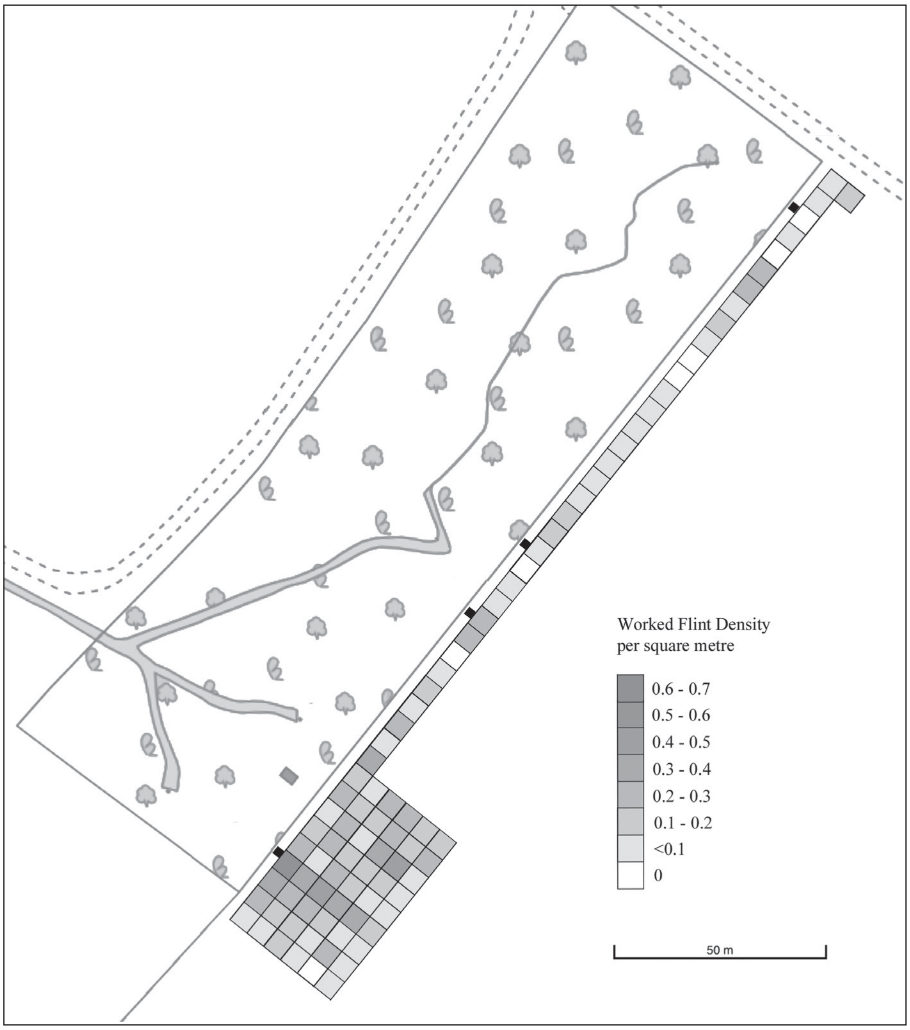

Figure 2. *Density of worked flint recovered at Nine Wells.Map created using an Ordnance Survey Data Licence. Contains Ordnance Survey data © Crown copyright and database 2017.*

Composition and characterisation

The assemblage is clearly chronologically mixed, representing activity from the Mesolithic through to the Early Bronze Age and, as such, represents a small sample of numerous individual episodes of occupation and activity. It is therefore perhaps unsurprising that the assemblage includes material from all stages of core reduction, including decortication flakes, small chips, irregular shatter, fine non-cortical removals and discarded tools and cores. The proportion of chips (pieces <10mm) and small flakes is unusually high for an assemblage derived from surface collection/fieldwalking. This indicates the thoroughness of collection and the good conditions under which the fieldwork was carried out. The proportion of retouched tools in the assemblage is low, with only four definitely retouched pieces recorded, all scrapers, making up little more than 1% of the assemblage as a whole. This low proportion should, however be interpreted with a degree of caution as it is likely that the recognition of some retouched pieces, such as those with minimal edge retouch or serration, has been hampered by post-depositional edge-damage. The low proportion of retouched tools can be contrasted with the relatively large number of cores.

A significant proportion of the assemblage derives from blade/narrow-flake based technologies characteristic of the Mesolithic and Early Neolithic. These are most obviously represented by 16 true blades and bladelets and 31 blade-like flakes, with these blade-based pieces accounting for 17% of unretouched removals. Whilst all of these pieces clearly derive from carefully structured blade-based core reduction strategies there is considerable variability in their morphology and technological traits. Thus there are examples of very fine, regular, prismatic bladelets, which are almost certainly Mesolithic in date, together with more irregular pieces, which would be more consistent with an Early Neolithic date. There is also substantial variability in the degree of platform preparation and differences in ventral features, suggesting the use of both hard and softer hammers, all consistent with the use of subtly different ap-

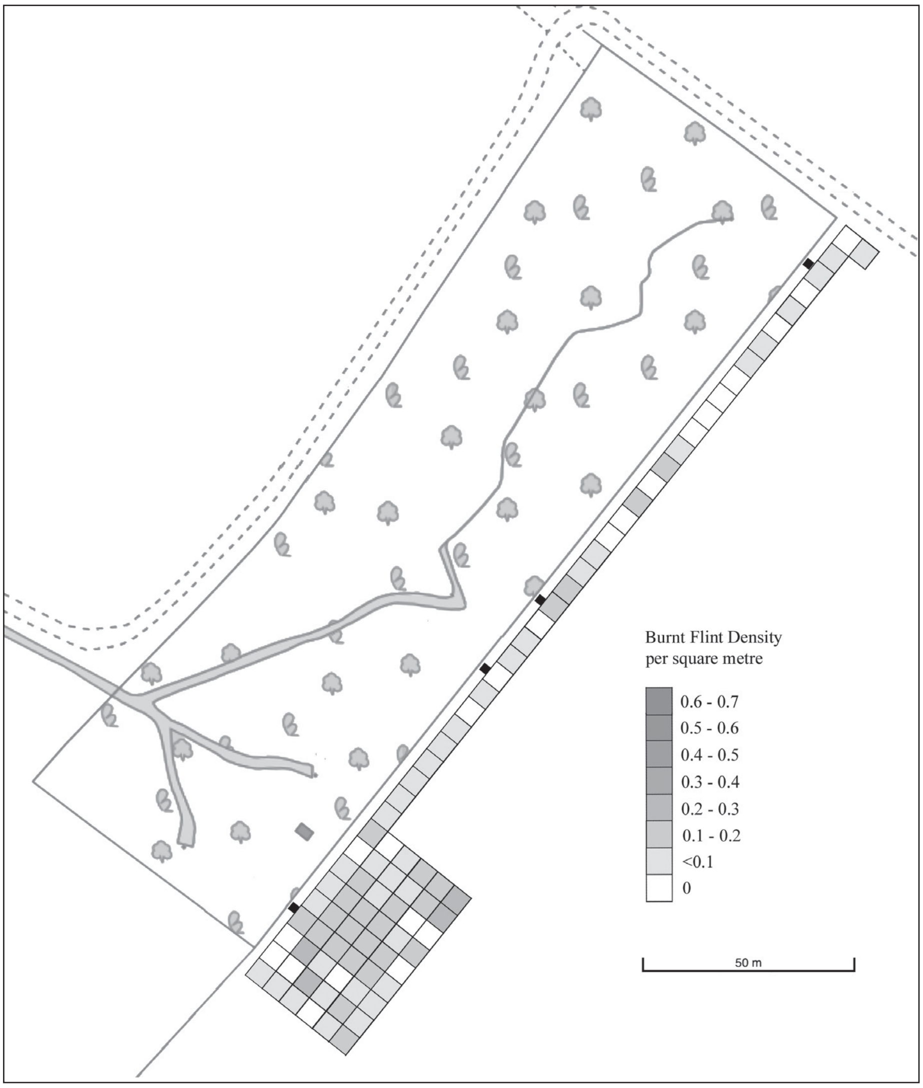

Figure 3. *Density of burnt flint and stone recovered at Nine Wells. Map created using an Ordnance Survey Data Licence. Contains Ordnance Survey data © Crown copyright and database 2017.*

proaches to core reduction probably partly reflecting chronological changes. As well as these blade-based removals are three cores which show clear evidence for the production of narrow flakes/blades. Two of these have been systematically worked from a single striking platform whilst the third has been heavily reduced and bears traces of multiple striking platforms.

Although it is difficult to determine exactly the total proportion of the assemblage which is likely to belong to these Mesolithic/Early Neolithic technologies, the proportion of blade-based pieces suggests that a fairly substantial part, perhaps up to half, of the total worked flint could relate to this broad period (cf. Ford 1987).

Apart from the blade-based material, the assemblage is dominated by more generalised flake-based flintwork. As intimated above, some of this is likely to represent the less diagnostic element of Mesolithic and Early Neolithic flint working, but the majority is characteristic of Later Neolithic/Early Bronze Age technologies. Again, there is substantial variability in this flake-based material. There are at least two pieces with finely faceted striking platforms which appear to derive from prepared platform Levallois-like cores of the kind used during the later Neolithic (Ballin 2011) and other flakes with regular dorsal scars and trimmed or abraded striking platforms suggestive of relatively systematic core reduction. Conversely there are more irregular flakes, often relatively thick and broad and struck from unprepared or natural striking platforms, which are the product of a far more expedient, ad-hoc technology. The products of Levallois-like cores clearly indicate a later Neolithic component to the assemblage whilst some the cruder material is likely to reflect Early Bronze Age, or perhaps even later, activity.

This impression is strengthened when the characteristics of the cores are considered. These include several minimally worked nodular fragments from which only a few removals have been made, alongside an exhausted multiple platform flake core and two centripetally worked discoidal cores, which are a characteristic element of later Neolithic assemblages. The four scrapers which comprise the only definite retouched tools in the assemblage are all consistent with a broad Neolithic to Early Bronze Age date. Two of these are relatively small and bear fine semi-invasive retouch, best paralleled by forms recovered from Early Bronze Age contexts.

Discussion

As noted above, the worked flint assemblage attests to activity over several millennia and it is only possible to assign much of it to very broad periods. However, the characteristics of the material strongly suggest that material dating from the Mesolithic through to the Early Bronze Age is represented. Mesolithic/Early Neolithic flintwork is estimated to make up somewhere between a quarter and a half of the assemblage, with the remainder representing both later Neolithic and Early Bronze Age activity.

The chronology and character of the lithic assemblage can be usefully discussed in relation to other lithic scatters in Cambridgeshire, most notably the well-known multi-period scatters from the fen-edge (Hall 1996; Edmonds *et al.* 1999; Gdaniec *et al.* 2007).The density of the scatter, with the 5m collection units yielding an average (mean) of 3.5 worked flints, ranging between 0 and 17 pieces, compares favourably with densities encountered in the major complex of lithic scatters in the Eye Hill environs, Soham (Edmonds *et al.* 1999, 56–62) and those recorded during surface collection of part of the extensive set of lithic scatters adjacent to the Cam in Lode and Swaffham Prior (Hall 1996; Billington 2016, 102–129). These densities are rendered yet more significant by the generally very low recovery of worked flint during large scale fieldwalking in the Addenbrookes environs, little more than a kilometre to the north of Nine Wells (Evans 2008, Fig 3.3), although substantial lithic assemblages and more robust traces of Mesolithic–Early Bronze Age activity have been recovered from excavations on the gravel terraces of the Cam further to the west, at Trumpington Meadows/Park and Ride, Glebe Farm and Clay Farm (Evans *et al.* 2018; Phillips and Mortimer 2012).

The location of the scatter at Nine Wells seems likely to reflect the affordances provided by the springs, particularly in terms of providing fresh water for humans, livestock and game. The attraction of springs for earlier prehistoric communities has been well rehearsed, especially in reference to the Mesolithic, where there is a well-known association between spring complexes and major long-lived sites such as Farnham Bourne, Surrey (Clark and Rankine 1936), Cherhill, Wiltshire (Evans *et al.* 1983) and Blick Mead, in the Stonehenge environs (Jacques *et al.* 2018). In the local context, an example of a springhead complex associated with Mesolithic/earlier Neolithic activity was investigated close to the River Cam as part of the Trumpington Meadows development (Patten 2012; Evans *et al.* 2018). As well as the more tangible and obvious opportunities presented by springs, such as providing fresh and varied plant and animal resources, several authors have emphasized that these features may have had an importance beyond such prosaic concerns, having been tied into mythological and religious understandings of the landscape (e.g. Davis 2012; Davies and Robb 2002).

Given the extremely long period over which the flintwork appears to have been generated and the relatively small size of the sample under discussion here it remains very difficult to offer any detailed interpretation of the activities undertaken at the site. There can, however be little doubt that at various points the site saw episodes of domestic occupation, as well as other shorter, task-based visits.

Aerial photography, Ground Penetrating Radar and Boreholes

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Figure 4 shows an aerial photograph of the ploughed field between White Hill and Nine Wells overlain by elevation contours (2m intervals) based on LIDAR data. The 2003 photograph is shown with enhanced contrast and isolines defining five areas of increasing lightness. Lighter shades are taken to represent thinner soil cover where the plough has incorporated chalky subsoil. These occur at higher elevations and in a zone that extends downslope towards the corner of the Nine Wells enclosure where the original flint scatter 'hot spot' was discovered. Note also the horseshoe shaped feature mid-slope between the 21 m and 23 m contour, which may be an undocumented chalk pit. Darker shades are taken to represent deeper areas of slope-wash and regolith, often towards the bottom of the slope. Ground Penetrating Radar (200 MHz GPR) transects along the southeastern boundary of the Nine Wells enclosure appear to confirm that increasing soil lightness is indeed correlated with decreasing soil depth and *vice versa*. The patchy nature of soil depth is most likely attributable to relic periglacial features resulting from freeze-thaw activity during the Last Glacial stage. This 'ridge and gully' (cf. Boreham & Rolfe 2009) or 'hummock and hollow' (cf. Boreham & Rolfe 2017) must once have been evident on the hillside, but has now been degraded upslope and buried downslope by colluvial (slope-wash) processes.

It seemed possible that the worked flint 'hot spot' was associated in some way with this type of subsurface topography. To investigate this idea, boreholes and Ground Penetrating Radar (400 MHz GPR) transects were undertaken across the worked flint scatter to determine the subsurface architecture. Figure 5 shows a geological cross-section with borehole F1 centered on the flint scatter, and a plot of 400 MHz GPR reflectors. It appears that the worked flint 'hot spot' might be associated with a slight 'ridge' in the

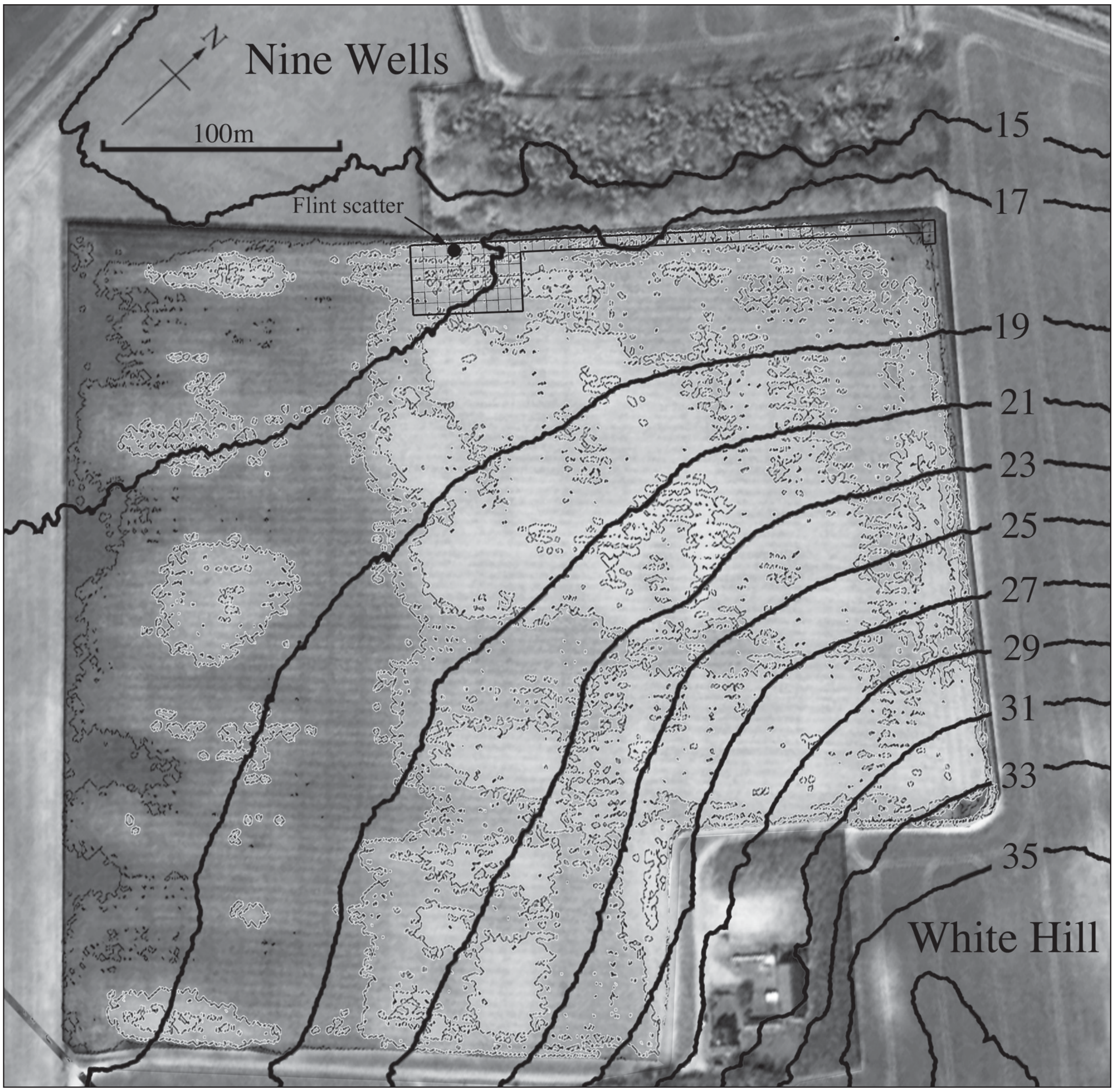

Figure 4. *Aerial photograph taken in 2003 of the ploughed field between White Hill and Nine Wells overlain by elevation contours (2m intervals) based on LIDAR (Light Detection And Ranging) data. Aerial photograph © University of Cambridge 2017.*

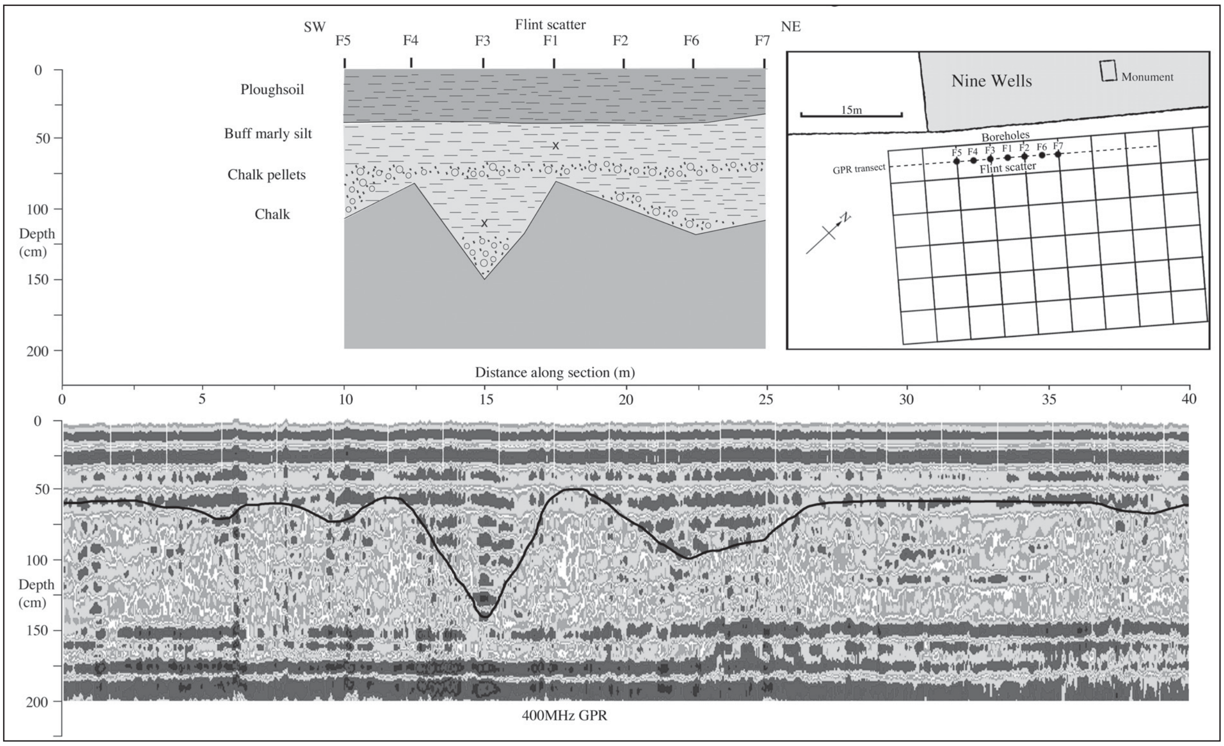

Figure 5. *The location of boreholes (F1-7) and a 400 MHz Ground Penetrating Radar (GPR) transect at the Nine Wells flint scatter (inset top right); Geological cross-section and a plot of 400 MHz GPR reflectors.*

underlying chalk topography.

In general the boreholes showed *c.* 40 cm of ploughsoil overlying *c.* 30 cm of buff marly silt, resting on a layer rich in chalk pellets. Beneath this, the undulating chalk surface rose to form a 'ridge' within *c.* 80 cm of the surface and fell to form a 'gully' filled with buff marly silt and chalk pellets. GPR reflectors confirm the undulating chalk surface discovered from the boreholes, and the 'gully' was encountered downslope by further boreholes within the Nine Wells enclosure. Colluvial (slope-wash) deposits are thought to derive from soil erosion in the early Holocene (Mesolithic), and from soil disturbance during the later Neolithic clearance of trees.

Flint flakes were recovered in boreholes both from above the chalk pellet layer (brought to the surface by deep-ploughing) and within the gully-filling below the chalk pellet layer. This implies that worked flints are present throughout the entire sequence of colluvial (slope-wash) deposits, and thus might be expected to span a considerable time period.

Conclusions

The flint scatter discovered at Nine Wells, Great Shelford, for the first time brings unequivocal evidence for archaeology to a site already rich with wildlife, conservation, heritage, geomorphology and geological interest. The high density of worked flint from Nine Wells leaves little doubt that this location, adjacent to the chalk springs, was of considerable importance throughout the Mesolithic, Neolithic and Early Bronze Age: an interval of some six thousand years. Imaging the sub-surface topography and stratigraphy at a variety of scales was attempted to provide context to the location of the flint scatter. The ongoing springhead flow-support initiative will provide further opportunities to investigate both the flint scatter and the subsurface during a planned excavation of a pipeline trench across the site.

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