Cotswold Archaeology

Goddards' Green Solar
Burgess Hill
West Sussex

Archaeological strip, map and sample excavation

for
INRG Solar Ltd

CA Project: 779014
CA Report: 17047

January 2017

Andover Cirencester Exeter Milton Keynes

Goddards' Green Solar
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West Sussex

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SUMMARY

Project Name:	Goddards' Green Solar
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An archaeological strip, map and sample excavation was undertaken by Cotswold Archaeology in January 2016 at Goddards' Green, Burgess Hill, West Sussex. The excavation area was located in the south-western part of the development site, targeted on Roman features identified in a previous evaluation of the site (CA 2015a).

The excavation identified archaeological features dating to the Early to Middle Roman and late medieval to early post-medieval periods. The Early to Middle Roman activity comprised boundary ditches, pits, postholes and ovens. A large assemblage of pottery was recovered; the majority is broadly Roman in date, with more closely-dated pottery forms suggesting an Early to Middle Roman date for the assemblage as a whole. It comprises mostly locally manufactured East Sussex grog-tempered ware, with identifiable forms including jars and coarseware dishes/bowls. Plant macrofossils recovered from the ditches indicate that crop processing was taking place nearby.

Late medieval to early post-medieval activity comprised the excavation of four kilns. No artefacts were recovered from these features and radiocarbon dating was undertaken to confirm the dating of these features. Large amounts of bracken and beech charcoal was identified from the bulk soil samples, suggesting the use of these kilns for potash/lye production. Place names on historic mapping suggest that lye industry was prominent within this area and the potash/lye produced may have been for tasks such as soap production, textile bleaching, glass-making, lead-smelting and/or as a constituent of fertiliser.

The excavation results are of local significance and merit publication. The evidence for the location of, and activities undertaken within, Roman farmsteads/settlement is of interest as there are few examples across the Weald. During the late-medieval to early post-medieval

period, place names on historic mapping suggest that lye industry was prominent within this area. The kilns recorded provide the first excavated evidence to support this assertion. such, the excavation results are of local significance and merit publication.

1. INTRODUCTION

1.1 In January and February 2016, Cotswold Archaeology (CA) carried out an archaeological investigation at the request of INGR Solar at Goddards' Green Solar, Burgess Hill, West Sussex (centred on NGR: TQ 2904 2117; Fig. 1).

1.2 Planning permission (Planning ref: DM/15/1518) for the development comprising the installation of a solar farm with associated infrastructure, was granted by Mid Sussex District Council (MSDC) conditional (condition 6) on a programme of archaeological work. The archaeological condition was requested by Alexandra Egginton, Archaeological Officer; Surrey County Council (AOSCC) and it recommended the controlled excavation (strip, map and sample excavation) of an area (measuring 3443m^2) within the south-western part of the development site, due to the presence of features dating to the Roman period which had been identified within the preceding archaeological evaluation (Fig. 2) (CA 2015a).

1.3 The excavation was undertaken in accordance with a detailed *Written Scheme of Investigation* (WSI) produced by CA (2016) and approved by AOSCC. The fieldwork also followed *Standard and Guidance: Archaeological Excavation* (CIfA 2014); *Sussex Archaeological Standards* (ESCC 2015), the *Management of Research Projects in the Historic Environment (MORPHE): Project Manager's Guide* and accompanying *PPN3: Archaeological Excavation* (HE 2015). It was monitored throughout the project by Alex Egginton (AOSCC), on behalf of MSDC.

The site

1.4 The development site as a whole is approximately 12ha in extent and located within the Low Weald, located 1.25km north-west of Burgess Hill. The site comprised an irregular parcel of land, occupied by agricultural fields and was being used as pasture. It is bounded on all sides by farmland, with two ponds (Pond Lye to the north and Mill Pond associated with Leigh Mill to the north-west) located to the immediate north-west of the site, both surrounded by dense vegetation (Fig. 1). The site lies at approximately 30m above Ordnance Datum (aOD) in the north, sloping gently down to approximately 20m aOD along its southern boundary.

1.5 The underlying geology is mapped as mudstone of the Weald Clay Formation in the south of the site, with bands of sandstone of the Horsham Stone Member recorded

to the north, both formed during the Cretaceous Period. In the south-eastern part of the site, mudstone is directly overlain by Quaternary River Terrace deposits, comprising sand and gravel. No overlying superficial deposits are recorded across the remainder of the site (BGS 2017).

2. ARCHAEOLOGICAL BACKGROUND

Introduction

2.1 A small number of archaeological discoveries have been recorded within the environs of the development site. The site area was subject to a desk-based assessment prepared by Cotswold Archaeology (CA 2015b). The results of this work are described below in sections 2.2 to 2.10. An archaeological evaluation was also undertaken by Cotswold Archaeology in 2015 (CA 2015a) and a summary of these results are presented sections 2.11 To 2.13 below.

Prehistoric (pre AD 43)

2.2 Historic Environment Record data has recorded flint tools of Mesolithic origin during archaeological investigations, approximately 910m to the south-west and *c*. 870m to the south-east of the site. In the wider landscape, worked flint of Mesolithic date is recorded approximately 2.7km to the south of the site, at Burgess Hill, Maltings Farm and Innovation Drive. Further assemblages were recorded during a watching brief at Ditchling Pumping Station. The assemblages recorded within the landscape of Burgess Hill may have been associated within an extensive area of Mesolithic activity recorded on the Lower Greensand Ridge at Hassocks, *c*. 5km south of the site (CA 2015b).

2.3 Deforestation of land for farming is thought to be evidenced at Maltings Farm, *c*. 2.7km to the south of the site; hollows from burnt tree roots contained sherds of Early Bronze Age pottery. Neolithic and Bronze Age worked flints have been also been recovered in the vicinity of the site (CA 2015b).

Romano-British (AD 43 – AD 410)

2.4 Prior to the archaeological evaluation (CA 2015a), no archaeological finds or features of Romano-British date had been recorded within the site.

2.5 The site is situated approximately 2.3km west of the line of the London-Hassocks Roman road, which crosses Burgess Hill. Buried remains of the Roman road have been investigated on a number of occasions, including in Church Road, Burgess Hill (Harris 2005). Across the Weald, few Roman farms are recorded, possibly due to poor soils, woodland cover or the presence of an Imperial estate controlling the important ironworking industry in the Weald area. This could also be a reflection of the limited number of archaeological investigations undertaken in the area (Archaeological Services and Consultancy 2009). The excavations in Innovation Drive in Burgess Hill, approximately 2.7km south of the site, did however reveal evidence for permanent or semi-permanent Roman settlement, including a possible corn-drying oven and six hearths (Harris 2005).

Early medieval (AD 410 – 1066) and medieval (AD 1066 – 1539)

2.6 There is no archaeological evidence for early medieval activity within the wider area of the site; however, the parish of Hurstpierpoint, within which the site is located, is of early medieval origin. Before the Norman Conquest of 1066, the manor of Hurstpierpoint was held by Earl Godwin and after the Conquest, it was granted to Robert de Pierpoint who held it from William de Warenne. The *Domesday Survey* of 1086 records *Hurst* as a very large estate, with a church and three mills. The place-name *Hurst* derives from an Old English phrase meaning a 'wooded hill' which suggests that the parish was at this time at least to some extent covered with woodland.

2.7 The available data suggests that the medieval period saw a sparse scattering of farmsteads across the landscape surrounding the site. Two historic farmsteads of likely medieval origin include the Listed Buildings at Legh Manor (*c.* 920m north of the site) and Paynes Place (*c*. 470m east of the site). There is no evidence to suggest settlement activity during the medieval period within the site, with the site itself was probably utilised for agriculture by this date.

Post-medieval to modern (1540 to present)

2.8 During the post-medieval and modern periods, the site continued to comprise farmland. The earliest cartographic depiction of the site consulted as part of the DBA (CA 2015b) is the 1809 map of the Cuckfield Place Estate. The site is illustrated to have been composed, in the early 19th century, of four agricultural fields and a central 'belt' of woodland, with the ponds to the north (Pond Lye) and north-west

(Mill Pond) of the site already extant (Fig. 3). The field names recorded reflected the features within the landscape surroundings the site and included Pond Bay Gate field (parcel 27, to the north-west), Winter Wood Field (parcel 30, to the south-east) and Mill Pond Field (parcel 31, to the south-west). Also of note, adjacent to the north of the site, was Kiln Field (parcel 23) which may indicate industrial activity in this area.

2.9 The development within the site and in its surroundings in the later 19th and early 20th century is recorded in detail on the 1842 Hurstpierpoint Tithe map (Fig. 4) and Ordnance Survey maps which show that the current layout of the fields on site was created as a result of the removal of the woodland and the majority of the internal boundaries within the site by 1879.

2.10 There is no evidence for any development within the site in the early 20th century and activity within the site appears to have been limited to agricultural practices. Aerial photographs show several small structures at the boundaries of the site. These do not appear on later photographs or any Ordnance Survey maps and are considered to represent temporary features associated with agriculture.

Archaeological Evaluation

2.11 An archaeological evaluation was undertaken by Cotswold Archaeology in November 2015 (CA 2015a) and comprised the excavation of 40 trenches (Fig. 2) evaluating a 2% sample of the proposed development site. Archaeological remains dating from the Roman period to the modern era were identified, concentrated within the south-eastern part of the site. Although some of the pottery from the evaluation provided Late Iron Age to Early Roman spot dates (CA 2015a), these were revised to broadly Roman when the pottery was fully analysed (Appendix B)

2.12 The only remains dated by artefacts were encountered in Trenches 26 and 30, located in the western corner of the site (Figs 2 and 5). These comprised small ditch 2608/2614 (relabelled as ditch 1016 during excavation), and pits 2604, 2611 and 3004. Pottery was recovered from all four features, broadly dating to the Roman period with the exception of that from pit 3004 which dates to the Early to Middle Roman period.

2.13 In addition, the remains of a post-medieval to modern field system was recorded within the south-eastern part of the site. Ditches identified within Trenches 7, 8, 9

and 15 (Fig. 2) correspond with former field boundaries first depicted on the 1809 Cuckfield Place Estate Map (Fig. 3) and still extant at the time of the 1842 Hurstpierpoint Tithe Map (Fig. 4). The boundaries had been removed prior to the 1897 First Edition Ordnance Survey Map. An undated, but most likely modern ditch was identified within Trench 28 in the northern field.

3. AIMS AND OBJECTIVES

3.1 The objectives of the archaeological mitigation were to:

- allow the preservation by record of the archaeological remains;
- record the nature of the main stratigraphic units encountered;
- assess the overall presence, survival, condition, and potential of structural and industrial remains;
- assess the overall presence, survival, condition, and potential of artefactual and ecofactual remains.

3.2 The specific aims of the work were to:

- record any evidence of Late Iron Age/Early Roman date settlement or other land use;
- recover further artefactual evidence to date this past settlement and land use;
- sample and analyse environmental remains to create a better understanding of past land use and economy.

4. METHODOLOGY

4.1 The fieldwork followed the methodology set out within the WSI (CA 2016). The location of the strip, map and sample excavation area was agreed with Alex Egginton (AOSCC), informed by the results of the archaeological evaluation (CA 2015a). The excavation area measured 3443m^2 and targeted the Roman ditches and pits recorded in the preceding evaluation (CA 2015a). Site works also entailed the monitoring of the access road running west to east across the site, where no remains of archaeological significance were recorded (Fig. 5).

4.2 The excavation area was set out on OS National Grid (NGR) co-ordinates using Leica GPS and surveyed in accordance with CA Technical Manual 4: *Survey Manual*. The excavation area was scanned for live services by trained CA staff using CAT and Genny equipment in accordance with the CA *Safe System of Work for avoiding underground services*.

4.3 Fieldwork commenced with the removal of topsoil and subsoil from the excavation area by mechanical excavator with a 1.8m-wide toothless grading bucket, under archaeological supervision. The archaeological features thus exposed were hand-excavated to the bottom of archaeological stratigraphy. All features were planned and recorded in accordance with CA Technical Manual 1: *Fieldwork Recording Manual*.

4.4 Deposits were assessed for their environmental potential and 17 features considered to have potential for characterising the earlier phases of activity were sampled in accordance with CA Technical Manual 2: *The Taking and Processing of Environmental and Other Samples from Archaeological Sites*.

4.5 All artefacts recovered from the excavation were retained in accordance with CA Technical Manual 3: *Treatment of finds immediately after excavation*.

5. RESULTS (FIGS 5–9)

5.1 Archaeological work focused on an area of strip, map, sample excavation, located in the south-west of the development area and revealed ditches, pits, postholes and an oven dating to the Early to Middle Roman period and a series of late medieval to early post-medieval kilns. This section provides an overview of the excavation results; detailed summaries of the contexts, finds, environmental samples (biological evidence) and radiocarbon dating results are to be found in Appendices A–I.

5.2 The pottery assemblage comprised 673 sherds of pottery from 27 deposits. The majority of the pottery dates broadly to the Roman period, although small amounts of pottery dating to the mid 1st to 2nd century AD, alongside the absence of any forms/vessels dating to the later Roman period, point towards an Early to Middle Roman date for the assemblage. The late medieval to early post-medieval dates were ascertained by scientific dating. Features have been assigned to periods on the basis of spot dates available from recovered artefacts, radiocarbon dating,

feature morphology and the spatial/stratigraphic relationships to those featured containing dated artefacts.

5.3 Stratigraphic analysis of the features has indicated two distinguishable phases of activity:

- Period 1: Early to Middle Roman (Mid 1st to Late 2nd centuries AD)
- Period 2: Late medieval to early post-medieval (15th to 17th centuries)

Geology

5.4 The natural geological substrate, 1002 consisted of light orange-brown sandy silty clay across the excavation area. Natural was sealed by subsoil, 1001, a firm grey-brown clayey silt measuring 0.1m in depth. The subsoil was in turn sealed by a grey-brown clayey silt topsoil, 1000, measuring 0.2m in depth. The acidic nature of the topsoil was evident by the complete absence of animal bone, and the moderate to substantial degree of surface loss recorded on the pottery (Appendix B).

Period 1 Early to Middle Roman (Mid 1st to Late 2nd centuries AD) (Fig. 5)

5.5 The Romano-British phase of activity comprised three ditches, nine pits, four postholes and two ovens all located towards the eastern side of the excavation area.

Boundary Ditches 1003, 1081 and 1016

5.6 Three distinct segments of north-east/south-west-aligned ditches were identified at the eastern limit of the site. The southernmost ditch, 1003, measured 10m in length and was 1.2m wide and 0.4m deep. The ditch contained two fills, a lower silt-derived fill and an upper charcoal-rich fill incorporating a large assemblage of pottery dating from the 1st century AD and a fragment of fired/burnt clay. This material is indicative of dumps of domestic waste.

5.7 Ditch 1081 was located 3.6m north of, and on approximately the same alignment as, ditch 1003. It is possible the 3.6m gap between ditches 1003 and 1081 represent some form of entrance or access between the areas to the east and west of the ditch line. Ditch 1081 measured 18m in length, averaged 1.1m wide and was between 0.34m and 0.54m deep. The ditch contained a single silt-derived fill (1092)

along its length, with the exception of one section (cut 1091) where a charcoal-rich dark brown-grey sandy clay upper fill (1093) was identified (Fig. 6 , Section AA and photograph). This fill contained a large dump of crop processing waste comprising mostly emmer/spelt wheat cereal chaff, alongside a small number of cereal grains and weeds and charcoal identified as oak, birch, alder and maple. Small amounts of broadly Roman pottery and a residual flint flake/blade were recovered from the basal fill of the ditch, with higher quantities of pottery recovered from charcoal-rich fill 1093.

5.8 The northernmost ditch, 1016, although on broadly the same north-east/south-west-alignment, was offset by *c.* 15m and located approximately 19m to the north-east of ditch 1081. The ditch terminated close to the southern-edge of the excavation area and ran for 43m north-east, and continued beyond the excavation area. This ditch had originally identified as ditch 2608/2614 in evaluation trench 26 (CA 2015a).

5.9 Ditch 1016 averaged 1.2m wide and 0.5m deep and contained a silt-derived basal fill (1063) and a charcoal-rich upper fill (1065) (Fig. 6, Section BB). The upper fill of ditch 1016, like the charcoal-rich upper fills of ditches 1003 and 1081, contained a large assemblage of pottery dating to the Middle to Late Roman period alongside a small amount of fired clay and industrial waste. A bulk soil sample from this upper fill contained two fragments of cereal chaff and five hazelnut shells, alongside a large assemblage of charcoal dominated by oak.

Oven 1080

5.10 Located 13m west ditch 1016, and in the centre of the excavation area, was oven 1080. The oven was linear, measuring 4.6m in length, 0.9m wide and was excavated to a depth of 0.47m. The oven had a funnel-shaped profile with steeply sloping, transitioning to straight, sides and a flat base. The straight edges at the base of the oven cut exhibited scorching and oven itself contained four fills (Fig. 7, Sections CC and DD and photograph).

5.11 The basal fill consisted of a layer of heat-affected stones (1067), possibly put in place to allow air to circulate at the base of the oven. Surrounding, and above, these stones was a 0.07m deep charcoal-rich deposit (1068) attributed to a significant burning event and suggesting the fire had been lit above the basal stone layer (Fig. 7, photograph). A soil sample recovered from this charcoal-rich deposit contained a

large assemblage of charcoal identified as oak and ash alongside a single immature acorn.

5.12 Sealing this, was a slump of material, (1069), comprising a brown-red clay interpreted as scorched natural. It is possible that the oven originally had a rectangular-shaped profile, and at some point after it had gone out of use, the burnt upper edges of the cut weathered and slumped into the feature, creating the funnel-shape recorded on site. Covering these fills were two silting deposits comprising light to mid-grey-brown silty clays (1070 and 1071) most likely derived from disuse silting of the feature. These fills contained a small amount of pottery dating from the 2nd century AD, as well as two residual prehistoric worked flint blades and a residual flint core.

Pits and postholes

5.13 A series of pits, postholes and tree-throws were located adjacent to ditches 1003, 1081 and 1016, and clustered close to oven 1080.

5.14 Pits 1034 and 1055 were located 2.6m west and 0.83m north of oven 1080 (respectively). Pit 1034 was approximately 0.25m in diameter and contained a single 0.13m thick charcoal-rich fill and a single sherd of pottery dating broadly to the Roman period. Oval pit 1055 was slightly larger, measuring 0.58m by 0.4m and the fill comprised a single brown-grey silty clay that also similarly contained broadly Roman pottery.

5.15 Irregular-shaped tree-throws 1051 and 1053 were located 1.9m and 5.3m north-west of oven 1080 (respectively) and both contained two sherds of pieces of broadly Roman pottery. A residual prehistoric flint flake fragment was also recovered from tree-throw 1051.

5.16 Pit 1020 was located 3.1m south-west of where ditch 1016 terminated and posthole 1031 was located 5.7m west of ditch 1016 (respectively). Circular posthole 1031 was 0.36m in diameter and 0.13m deep and contained two fills. The basal fill contained a moderate quantity of small stones and may represent the remnants of a packing fill disturbed after the post had been removed. The upper fill comprised a grey-brown silty clay indicative of silting, perhaps after the post had been removed. A small amount of Roman pottery was recovered in this feature.

5.17 Located 3.2m south of posthole 1031, linear pit 1020 measured 1.8m long by 0.5m wide and 0.3m deep and contained two distinct fills (Fig. 8, Section EE). The lowest of these was a black-grey charcoal-rich silty clay which contained a large quantity of pottery dating broadly to the Roman periods and a small amount of burnt/fired clay. A bulk soil sample from this feature included a large amount of oak and alder charcoal alongside three fragment of emmer/spelt wheat cereal chaff which may have originated from ovens 1080 or 2604. The upper fill has been interpreted as a silting deposit accumulated after the feature had gone out of use.

5.18 Pits 2611 and 2604 and posthole 1096 were located in close proximity to ditch 1016. Pit 2611 was located immediately west of ditch 1016 and measured 0.3m in diameter and 0.1m deep and contained two fills. Six sherds of Roman pottery were recovered from the upper fill.

5.19 Feature 2604 was located 0.5m east of ditch 1016. It had been interpreted as a ditch terminus during the evaluation (CA 2015a), however further stripping of the site did not reveal any continuation to the feature. It measured 0.5m wide and 0.2m deep with a reddened 'halo' of heat affected natural clay surrounded the feature, indicative of *in situ* burning and as such, the feature has been re-interpreted as a small oven. The oven (2604) contained two fills, the upper of which contained charcoal flecking, although it appears that oven had been cleaned out after its final use and backfilled. A single sherd of broadly Roman pottery was recovered from the upper fill.

5.20 Posthole 1094 was located 4.8m south of oven 2604. It measured 0.2m in diameter and 0.17m deep and contained a single grey-brown silty clay fill derived from natural siltation. No dateable artefacts were recovered from this feature, but it has been phased as Early to Middle Roman based on its proximity with other Roman features.

5.21 Pits 1077, 1083 and 1087 and posthole 1096 were all located between 0.3m and 1.2m east of ditch 1081. Broadly oval pit 1077 measured 1.69m long and 0.4m wide, appearing to be of similar form and function to that of pit 1020. It contained a basal charcoal-rich fill sealed by a mid-grey silty clay possibly made up of firing debris from ovens 1080 or 2604. No artefacts were recovered from this feature; however, given its similarity in form to pit 1020, it has been phased as Early to Middle Roman. A bulk soil sample revealed a large assemblage of charcoal identified as oak.

5.22 Circular pit 1083 was located 4.2m south-west of pit 1077. Pit 1083 measured 0.69m in diameter and 0.07m deep and contained a single charcoal-rich fill, possibly

composed of firing debris from ovens 1080 or 2604. It also contained a large quantity of broadly Roman pottery and a small amount of burnt/fired clay. A bulk soil sample contained a small amount of cereal chaff and charcoal. This pit had been cut on its south-eastern edge by small circular posthole 1085. Posthole 1085 measured 0.2m in diameter and 0.2m deep, containing a single grey-brown silty clay fill, with occasional charcoal flecks. A single sherd of Roman pottery was recovered from its fill.

5.23 Pit 1087 was located approximately 3m south-west of posthole 1083. It measured 0.24m wide, but had been heavily truncated and only 0.02m deep. Despite its truncation, the feature contained 44 sherds unfeatured bodysherds of three different fabrics broadly dating to the Roman period.

5.24 Posthole 1096 was located 3.5m east of the northern terminus of ditch 1003. It measured 0.18m in diameter and 0.16m deep. Two fills were present, one comprising a grey-brown silty clay packing fill and post pipe represented by a dark grey silty clay, suggesting the post had decayed *in situ*. A soil sample recovered included a moderate amount of oak birch and hazel charcoal, alongside small amounts of cereal chaff. The function of this isolated post is uncertain, although it may represent some form of marker associated with the gap between ditches 1003 and 1081.

5.25 A group of intercutting pits (1008, 1010, 1012 and 1014) was located towards the centre of the site and 11.2m north-west of ditch 1081. The relationship between the larger pits 1008 and 1010 was unclear, but smaller pit 1014 cut pit 1008 and pit 1012 truncated pit 1010. Pits 1008 and 1010 measured 0.9m and 0.7m in diameter (respectively) and were both approximately 0.25m deep. Smaller pits 1012 and 1014 measured 0.5m and 0.3m in diameter (respectively) and were both 0.07m deep. Each pit contained a single grey or red-brown silty clay fill with occasional charcoal flecking. No artefacts were recovered, although bulk soil samples recovered from pits 1012 and 1014 produced charcoal identified as oak. Given their proximity to other Roman features these have been phased as Period 1 Early to Middle Roman.

5.26 One final isolated pit was recorded in evaluation trench 30 (CA 2015a) outside, and to the west of the excavation area. Pit 3004 was located 17m west of ditch 1081 pit and measured 0.9m wide and 0.3m deep. It contained a single brown-grey silt sand clay fill, which contained six sherds of mid 1st to 2nd century AD pottery, although

the absence of any other artefactual material means the function of this pit is unclear.

Period 2 Late medieval to early post-medieval (15th to 17th centuries) (Fig. 5)

5.27 Located at the western edge of the excavation area were kilns 1023, 1036 and 1043. The edge of a fourth kiln (1049) was also recorded in section (not illustrated). No dateable artefacts were recovered from the kilns and a radiocarbon date from kiln 1036 was submitted, returning a late medieval to early post-medieval date.

5.28 Kiln 1023 was located 3.7m east of the western edge of the excavation area. It was keyhole-shaped in plan and broadly east/west-aligned measuring 3.92m in length, between 0.77m and 1.4m wide, 0.24m deep and contained six fills (Fig. 9, Section FF and photograph). The basal fill comprised a dark orange-yellow layer (1024) interpreted as a burnt clay lining. Sealing this was grey-black silty clay deposits (1025) and (1027) containing frequent charcoal inclusions. The interface between the two deposits was difficult to ascertain, with fill 1027 within recut 1026 representing a second phase of use of the feature. The final deposits were three separate small circular patches of burnt/fired clay (1028, 1029 and 1030), each measuring about 0.25m in diameter and likely represent burnt natural which has collapsed into the kiln.

5.29 Kiln 1036 was located 4.5m north-east of kiln 1023. Like kiln 1023, kiln 1036 was broadly keyhole-shaped in plan and similar in size, measuring 3.97m long, between 1m and 1.5m wide and 0.23m deep. It contained a similar fill sequence to kiln 1036, including a slightly heat-affected clay base and five brown-black charcoal-rich use fills, which most likely representing raking out and re-use of the kiln. A pink-orange burnt/fired clay upper fill was also recorded. A single intrusive fragment of modern glass was recovered from this feature. A fragment of beech charcoal (roundwood fragment) from fill 1039 was radiocarbon dated to 1489–1652 cal AD (SUERC-69659; 95.4% probability) (Appendix I).

5.30 Immediately north of kiln 1036 was kiln 1043. This was broadly oval in shape and smaller than the other two, measuring 1.7m long, 1m wide and 0.14m deep. Kiln 1043 also contained a similar fill sequence with a lightly heat affected clay basal layer, a brown-black charcoal-rich mid fill and a pink-orange burnt clay upper fill.

5.31 Kiln 1049 was recorded in section at the western edge of the excavation, 3.8m north-west of kiln 1023 (not shown on plan). It measured 1.2m long and 0.06m deep and contained a brown silty clay basal layer and a black charcoal rich upper fill. Although the full extent of the feature was not revealed, it appears to have been similar in form to the other kilns.

5.32 No dating evidence was recovered from kilns 1023, 1043 or 1049, however, given the similar form and fill sequences within these features, they are all presumed to be late medieval to early medieval in date as per the radiocarbon date obtained from kiln 1036. Seven bulk soil samples were processed from various fills within kilns 1023, 1036 and 1043. Large amounts of charcoal were recovered from these fills, all identified dominantly as beech, with smaller amounts of oak, birch and hornbeam also present. Of note within the charred plant assemblage were large numbers of bracken/fern fronds and moderate numbers of beech nuts/cupules and hornbean nuts, alongside a small numbers of free-threshing wheat grains/chaff.

6. THE FINDS

6.1 Finds recovered are listed in the table below. Details are to be found in Appendices B to F.

Type	Category	Count	Weight (g)
Pottery	Roman	673	7385
Fired/burnt clay		*c.* 1000	4.096
Glass		1	0.15
Industrial waste		4	109
Worked flint		7	211

6.2 The Roman pottery assemblage consists almost entirely of locally manufactured coarsewares, with East Sussex grog-tempered ware most commonly represented. A small amount of south Gaulish samian was also identified. Identifiable forms included mostly jars, alongside a small number of flat-rim dishes, a platter and a shouldered bowl. The majority of the pottery dates broadly to the Roman period, although small amounts of pottery dating to the mid 1st to 2nd century AD, alongside the absence of any forms/vessels dating to the later Roman period, suggest an Early to Middle Roman date for the assemblage.

6.3 Other finds include a small amount of industrial waste from an indeterminate process, a large assemblage of amorphous fired/burnt clay, a small number of residual flint flakes, blades and a core and an intrusive fragment of modern glass.

7. THE BIOLOGICAL EVIDENCE

7.1 Biological evidence recovered is listed in the table below. Details are to be found in Appendices G and H.

Type	Category	Count
Samples	Environmental	17

7.2 Charred plant remains were generally low in abundance, with the exception of a large assemblage of crop processing waste within Period 1 Early to Middle Roman ditch 1081 and a moderate number of beech nuts and bracken within Period 2 late medieval to early post-medieval kilns 1023, 1036 and 1043. Charcoal was abundant and identified dominantly as oak within the Period 1 Early to Middle Roman features and beech within the Period 2 late medieval to early post-medieval samples.

8. DISCUSSION

8.1 The strip, map and sample excavation confirmed the results of the previous archaeological evaluation (CA 2015a), which had identified a ditch and two pits dating to the Roman period, suggesting an area of domestic and/or industrial activity. The excavation area, which was located within the south-western part of the development site, revealed a range of ditch, pit, posthole and oven features indicating domestic and industrial activity and dating to Roman period. In addition, , evidence for industrial activity during the late medieval to early post-medieval period was also identified that had not been revealed during the archaeological evaluation.

Environmental and geographical setting

8.2 The site was located on the western slope of a hill, which is typical of the gently undulating wider landscape of the Low Weald. There are numerous small watercourses within the area feeding into, and draining, Pond Lye to the north and Mill Pond (associated with Leigh Mill) to the north-west of the site. The local soils

were found to be acidic in nature, which is expected of soils formed from the Weald Clay Formation (BGS 2017).

8.3 A series of field boundary ditches identified within the archaeological evaluation correspond with former field boundaries first depicted on the 1809 Cuckfield Place Estate Map (Fig. 3) and still extant at the time of the 1842 Hurstpierpoint Tithe Map (Fig. 4). The boundaries had been removed prior to the 1897 First Edition Ordnance Survey Map. During the 20th century, the site had been used as pasture and lies within a largely agricultural landscape, with the towns of Haywards Heath 4.5m to the north-east and Burgess Hill 1.25km to the south-east.

Period 1 Early to Middle Roman (1st to 2nd centuries AD)

8.4 The excavation revealed features dating to the Early to Middle Roman period, all located towards the eastern side of the excavation area and comprised three ditches, two ovens, nine pits and four postholes.

8.5 Although some of the pottery from the evaluation provided Late Iron Age to Early Roman spot dates (CA 2015a), these were revised to broadly Roman when the pottery was fully analysed. The majority of the pottery dates broadly to the Roman period, although small amounts of pottery dating to the mid 1st to 2nd century AD, alongside the absence of any forms/vessels dating to the later Roman period, point towards an Early to Middle Roman date for the assemblage. Closely dated forms/vessels include sherds of south Gaulish samian, one of which was identified as a base sherd from a Drag. 18 platter, recovered from ditch 1003 dating to the mid to late 1st century AD. Sherds from five flat-rim dishes (various fabrics) from ditch 1016 and oven 1080 were also recovered, dating from the 2nd century AD.

8.6 Three lengths of ditch were identified on site, all broadly north-east/south-west-aligned. Ditches 1003 and 1018 to the south of the excavation area appear to represent a continuous ditch line, with the 3.6m-wide gap providing access between the areas to the east and west of the ditches. The northern ditch, 1016, is located 19m north-east ditch 1081, and offset to the east by approximately 15m.

8.7 The pottery dating from these features provides no conclusive evidence to suggest northern (and offset) ditch 1016 can be attributed to an earlier or later phase of Roman activity. As such is it difficult to ascertain the function of these ditch boundaries. One suggestion is that the ditches make up the eastern and western

boundaries of a trackway, although this is unlikely given there was no evidence for the continuation of ditch 1016 recorded within evaluation trench 29 (CA 2015a). It also seems unlikely these are agricultural divisions, which are usually continuous, and they may represent segmented land boundaries for settlement and/or industry.

8.8 The pits, oven and postholes were all located within about 20m of ditches 1003, 1081 and 1016. Other than pottery, no artefacts were recovered that could help interpret the types of activity taking place on site. The pottery was utilitarian in nature, consisting of jars and coarseware dishes/bowls. Few drinking/serving vessels were represented although a small amount of fineware was indicated by the south Gaulish samian. Taken together this assemblage is typical of that found associated with rural habitation/settlement (Evans, 2001) although there is no evidence of features directly associated with settlement such as roundhouses/other structural remains). This suggests that the habitation/settlement was located somewhere outside the development site.

8.9 The environmental samples recovered from the ovens, pits and postholes do however provide some interpretative information. Fill 1091 recovered from ditch 1081 contained a large assemblage of charred crop processing dominated by cereal chaff, which comprised over 3000 fragments compared to only 31 cereal grains and 48 weed seeds. This deposit is characteristic of the waste obtained from the parching and de-husking of emmer and spelt wheat spikelets and is typically seen within pits/ditches close to a corn drier.

8.10 The origin of this charred processing waste is difficult to ascertain. The only two ovens of Roman date were 1080, located towards the centre of the site and oven 2604 immediately east of ditch 1016. Unfortunately it was not possible to discern the function of oven 2604 as it had been cleaned out prior to backfilling. Oven 1080 is equally enigmatic as the samples recovered revealed only a large assemblage of oak charcoal with no other archaeobotanical or artefactual evidence indicative of its use.

8.11 It is possible that oven 1080 did previously function as a corn drier. This theory is proposed by van der Veen (1989), who suggests that corn driers often had more than one use, and as such it is entirely possible this feature had functioned as a corn drier and had been cleaned out before being reused. This being the case both ovens 1080 and 2604 could have provided the source of firing debris (charcoal and wind-blown plant remains) found in other pit/posthole features across the site.

8.12 Other functions for 1080 could include cooking or industrial activities such as metalworking, although the absence of material culture means this is entirely speculative. The construction of the oven, as excavated, included the layer of stones at the base, which would have allowed the circulation of air, and together with the use of oak (a highly calorific and efficient fuel) suggests the activity taking place, would have required high, and long lasting, temperatures.

8.13 Across the Weald, few Roman settlements/farmsteads have been recorded, which may be due to the acidic poor soils, woodland cover or simply the absence of archaeological investigations. The quantity and utilitarian nature of the pottery, together with the quantity of cereal processing waste within ditch 1081 and indications of other domestic/industrial processes does however suggest some form of settlement or farmstead within the locality, but beyond the current area of archaeological investigation.

8.14 The site lies 2.3km west of the London-Hassocks Roman road (CA 2015b) and Cuckfield Road, immediately west of the site, shares the same alignment. Evaluation and excavation work at Chalker's Lane, Hurstpierpoint (PCA 2015 and UCL 2015) revealed an Early Roman settlement located 7km south of the site, adjacent to Cuckfield Road. This may suggest that Cuckfield Road, whilst not a listed Roman road, may have been a route utilised for movement between these smaller settlements to the west of the London-Hassocks Roman road.

8.15 Other nearby sites include Innovation Drive in Burgess Hill, approximately 2.7km south of the site, where a possible corn drying oven and six hearths were recorded (Harris 2005). Early and Late Roman settlement was identified at Land West of Burgess Hill between Eastlands Farm and Locks Manor, located just over 2km south-east of the site, which included a corn drier, hearths, ditches and pits (Sawyer 1999) and Early Roman settlement and associated field system were identified at Theobalds Road, Wivelsfield, East Sussex (Powell 2015) located 2.25km south-east of the site. These comparative examples suggest that, despite the absence of settlement-related features (roundhouses/structures), the activity undertaken at Goddards' Green is typical of that seen in the wider landscape and adds to the corpus of material recording a picture of rural Romano-British activity in the Lower Weald area.

Period 2 late medieval to early post-medieval

8.16 Late medieval to early post-medieval activity included the excavation of three kilns (1023, 1036, 1043) at the bottom of the hill, towards the western edge of the excavation area. Evidence for these had not been revealed during the previous field evaluation.

8.17 No artefactual material was recovered from the kilns, but radiocarbon dating of a fragment of beech roundwood from kiln 1036 returned a date of 1489–1652 cal AD (SUERC-69659; 95.4% probability). There were no other medieval features located within the excavation area, however a fourth kiln 1049 (not illustrated), recorded in section at the western extent of the excavation area, does indicate the presence of at least one additional kiln to the west of the site towards Cuckfield Road and in closer proximity to Leigh Mill/Mill Pond.

8.18 Detailed environmental and charcoal analysis of the three kilns has revealed a predominance of beech roundwood alongside a large assemblage of bracken/fern fronds. It is difficult to ascertain what type of activities were taking place and various suggestions have been considered. One possible use is food production activities, although this is unlikely given the absence of any other features indicative of settlement. Other possible industrial processes include charcoal production, the extraction of tar from burning wood to produce wood-ash which is used in the production of potash and lye.

8.19 Given the combination of both beech wood and bracken/fern fronds, both of which are historically known to have been used in the potash and lye industry (Gale and Cutler 2000, 110 and 405), the latter of these possibilities seems most plausible. Bracken and beech when burnt both provide potassium-rich plant ashes. The beech would have been burnt as branches or larger timbers and the bracken would typically have been burnt whilst green to capture the highest concentration of potassium. The ash produced would then have been soaked in water to produce liquid potash/lye (caustic potash/potassium hydroxide). Potash/lye had many uses including to produce soap, textile bleaching, glass-making, lead-smelting and as a constituent of fertiliser.

8.20 Looking at the wider medieval to post-medieval landscape, the lye industry seemed to be prominent within this area suggested by place names such as Lye Mill on the 1842 Hurstpierpoint Tithe Map (Fig. 3) (which later changes to Leigh Farm on the

1897 Ordnance Survey Map). In addition, the large pond to the north of the development site (Fig. 1) was recorded as Pond of Lye on the 1896 and 1873 Ordnance Survey Maps, Leigh Pond on the 1897 Ordnance Survey Map, and is known today as Pond Lye on modern mapping. Lye's Farm is also located approximately 1.5km east of the development site.

8.21 Also of note on the 1809 map of Cuckfield Place Estate is Kiln Field (parcel 23) adjacent to the north of the site (Fig. 3), which may indicate the further location of potash kilns. In addition the woodland to the south of Pond Lye/Leigh Pond and the central part of the site may have formed a source of timber for the kilns, with the bracken sourced from scrub on the woodland edges.

8.22 It is difficult to ascertain what which type(s) of industry the potash/lye was being used within. Castagnino (2013) notes that the burning of wood for glassmaking was banned in 1615, which led to the end of the Wealden glass industry. Perhaps a reflection of other competing demands for wood, charcoal and ash and dominance of other industries.

8.23 There does not appear to be any archaeological or historical evidence of local industries for the production of soap, glass, textile processing or lead smelting in the area. It is however possible that potash/lye was being produced in this location and transported for use elsewhere. Alternatively, given absence of evidence for later industrial processes, it is possible the potassium-rich ash was being utilised a component of fertiliser which would have been necessary to farm the naturally acidic nature of the soils in the Weald area.

9. STATEMENT OF POTENTIAL

9.1 The excavation results are of local significance and merit publication. The evidence for the location of, and activities undertaken within, Roman farmsteads/settlement is of interest as there are few examples across the Weald. During the late-medieval to early post-medieval period, place names on historic mapping suggest that lye industry was prominent within this area. The kilns recorded provide the first excavated evidence to support this assertion. such, the excavation results are of local significance and merit publication.

9.2 A summary of this excavation report will be produced, incorporating the stratigraphic analysis and specialist reports, within a six page publication in Sussex Archaeological Collections. The journal article will signpost the full excavation report, which will be held on the ADS, and the Cotswold Archaeology website.

10. CA PROJECT TEAM

9.1 Fieldwork was undertaken by Andrew Whelan, assisted by Kostas Papagiannakis, Mike Hughes, Sam Dixon, Ralph Brown, Cullum Ruse and Anna Moosbauer. The report was written by Andrew Whelan. The pottery, industrial waste, fired/burnt clay, glass and worked flint reports were written by Jacky Sommerville, the charred plant remains report by Wendy Carruthers and the charcoal report by Sheila Boardman. Radiocarbon dating was undertaken by SUERC, Glasgow. The illustrations were prepared by Esther Escudero and Aleksandra Osinska. The archive has been compiled and prepared for deposition by Emily Evans. The fieldwork was managed for CA by Stuart Joyce and the post-excavation was managed by Sarah Cobain.

11. STORAGE AND CURATION

10.1 The archive is currently held at CA offices in Milton Keynes whilst post-excavation work proceeds. Upon completion of the project, and with the agreement of the legal landowners, the site archive and artefactual collection will be deposited with Lewes Museum, or closest accepting museum. A summary of information from this project, set out within Appendix J, will be entered onto the OASIS online database of archaeological projects in Britain.

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1809 Map of Lower Little East farm and Mill, part of Cuckfield Place Estate, surveyed by W. Budgen (WSRO ref. Sergison 526/14)

1842 Hurstpierpoint Tithe Map (WSRO ref. TD/E29)

APPENDIX A: CONTEXT DESCRIPTIONS

Context number	Context type	Fill of	Feature type	Context description	Feature label	Period
1000	Layer		Topsoil			Geology
1001	Layer		Subsoil			Geology
1002	Layer		Natural			Geology
1003	Cut		Ditch	Cut of ditch	1003	1
1004	Fill	1003	Ditch	Basal fill of ditch	1003	1
1005	Fill	1003	Ditch	Upper fill of ditch	1003	1
1006	Cut		Ditch	Cut of ditch terminus	1003	1
1007	Fill	1006	Ditch	Upper fill of ditch terminus	1003	1
1008	Cut		Pit	Cut of pit		3
1009	Fill	1008	Pit	Fill of pit		3
1010	Cut		Pit	Cut of pit		3
1011	Fill	1010	Pit	Fill of pit		3
1012	Cut		Pit	Cut of pit		3
1013	Fill	1012	Pit	Fill of pit		3
1014	Cut		Pit	Cut of pit		3
1015	Fill	1014	Pit	Fill of pit		3
1016	Cut		Ditch	Cut of ditch	1016	1
1017	Fill	1016	Ditch	Basal fill of ditch	1016	1
1018				Void		
1019	Fill	1016	Ditch	Upper fill of ditch	1016	1
1020	Cut		Pit	Cut of pit		1
1021	Fill	1020	Pit	Basal fill of pit		1
1022	Fill	1020	Pit	Upper fill of pit		1
1023	Cut		Kiln	Cut of kiln	1023	2
1024	Fill	1023	Kiln	Basal fill of kiln	1023	2
1025	Fill	1023	Kiln	Fill of kiln	1023	2
1026	Cut		Kiln	Kiln recut	1023	2
1027	Fill	1026	Kiln	Fill of Kiln	1023	2
1028	Fill	1023	Kiln	Upper fill of kiln	1023	2
1029	Fill	1023	Kiln	Upper fill of kiln	1023	2
1030	Fill	1023	Kiln	Upper fill of kiln	1023	2
1031	Cut		Posthole	Cut of posthole		1
1032	Fill	1031	Posthole	Basal fill of posthole		1
1033	Fill	1031	Posthole	Upper fill of posthole		1
1034	Cut		Pit	Cut of pit		1
1035	Fill	1034	Pit	Fill of pit		1
1036	Cut		Kiln	Cut of kiln	1036	2
1037	Fill	1036	Kiln	Basal fill of kiln	1036	2
1038	Fill	1036	Kiln	Fill of kiln	1036	2
1039	Fill	1036	Kiln	Fill of kiln	1036	2
1040	Fill	1036	Kiln	Fill of kiln	1036	2
1041	Fill	1036	Kiln	Upper Fill of kiln	1036	2
1042	Fill	1036	Kiln	Upper fill of kiln	1036	2
1043	Cut		Kiln	Cut of kiln	1043	2
1044	Fill	1043	Kiln	Basal fill of kiln	1043	2
1045	Fill	1043	Kiln	Fill of kiln	1043	2

Context number	Context type	Fill of	Feature type	Context description	Feature label	Period
1046	Fill	1043	Kiln	Upper fill of kiln	1043	2
1047	Fill	1036	Kiln	Fill of kiln	1043	2
1048	Cut		Kiln	Cut of kiln	1048	2
1049	Fill	1048	Kiln	Basal fill of kiln	1048	2
1050	Fill	1048	Kiln	Upper fill kiln	1048	2
1051	Cut		Tree-throw	Cut of tree-throw		1
1052	Fill	1051	Tree-throw	Fill of tree-throw		1
1053	Cut		Tree-throw	Cut of tree-throw		1
1054	Fill	1053	Tree-throw	Fill of tree-throw		1
1055	Cut		Pit	Cut of pit		1
1056	Fill	1055	Pit	Fill of pit		1
1057	Cut		Oven	Cut of oven	1080	1
1058	Fill	1057	Oven	Basal stone layer within oven	1080	1
1059	Fill	1057	Oven	Fill of oven	1080	1
1060	Fill	1057	Oven	Fill of oven	1080	1
1061	Fill	1057	Oven	Upper fill of oven	1080	1
1062	Cut		Ditch	Cut of ditch	1016	1
1063	Fill	1062	Ditch	Basal fill of ditch	1016	1
1064				Void		
1065	Fill	1062	Ditch	Upper fill of ditch	1016	1
1066	Cut		Oven	Cut of oven	1080	1
1067	Fill	1066	Oven	Basal stone layer within oven	1080	1
1068	Fill	1066	Oven	Fill of oven	1080	1
1069	Fill	1066	Oven	Fill of oven	1080	1
1070	Fill	1066	Oven	Fill of oven	1080	1
1071	Fill	1066	Oven	Upper fill of oven	1080	1
1072	Cut		Oven	Cut of kiln	1080	1
1073	Fill	1072	Oven	Basal stone layer within oven	1080	1
1074	Fill	1072	Oven	Fill of oven	1080	1
1075	Fill	1072	Oven	Fill of oven	1080	1
1076	Fill	1072	Oven	Upper fill of oven	1080	1
1077	Cut		Pit	Cut of oval pit		1
1078	Fill	1077	Pit	Basal fill of pit		1
1079	Fill	1077	Pit	Upper fill of pit		1
1080	Group		Oven	Feature label (oven cuts 1057, 1066, 1072)	1080	1
1081	Cut		Ditch	Cut of ditch	1081	1
1082	Fill	1081	Ditch	Fill of ditch	1081	1
1083	Cut		Pit	Cut of pit		1
1084	Fill	1083	Pit	Fill of pit		1
1085	Cut		Posthole	Cut of posthole		1
1086	Fill	1085	Posthole	Fill of posthole		1
1087	Cut		Pit	Cut of pit		1
1088	Fill	1087	Pit	Fill of pit		1
1089	Cut		Ditch	Cut of ditch	1081	1
1090	Fill	1089	Ditch	Fill of ditch	1081	1
1091	Cut		Ditch	Cut of ditch	1081	1
1092	Fill	1091	Ditch	Basal fill of ditch	1081	1
1093	Fill	1091	Ditch	Upper fill of ditch	1081	1

Context number	Context type	Fill of	Feature type	Context description	Feature label	Period
1094	Cut		Posthole	Cut of posthole		1
1095	Fill	1094	Posthole	Fill of posthole		1
1096	Cut		Posthole	Cut of posthole		1
1097	Fill	1096	Posthole	Fill of posthole (packing)		1
1098	Fill	1096	Posthole	Fill of posthole (post pipe)		1
1099	Fill	1006	Ditch	Basal fill of ditch terminus	1003	1
1100	Cut		Ditch	Cut of ditch	1016	1
1101	Fill	1100	Ditch	Basal fill of ditch	1016	1
1102	Fill	1100	Ditch	Fill of ditch	1016	1
1103	Fill	1100	Ditch	Upper of ditch	1016	1
1104	Cut		Ditch	Cut of ditch	1081	1
1105	Fill	1104	Ditch	Basal fill of ditch	1081	1
1106	Fill	1104	Ditch	Fill of ditch	1081	1
1107	Fill	1104	Ditch	Fill of ditch	1081	1
1108	Fill	1057	Oven	Fill of oven	1080	1
1109	Fill	1072	Pit	Fill of pit		1
1110	Fill	1104	Ditch	Upper fill of ditch	1081	1
1111				Void		

APPENDIX B: POTTERY

By Jacky Sommerville

Introduction and methodology

A total of 673 sherds (7385g), all of Roman date, was recorded from 27 separate deposits from the evaluation and excavation stages. Of these, 40 sherds were recovered from the bulk soil sampling of two deposits. The assemblage was sorted by fabric per context, and quantified by sherd count, weight and rim EVEs (estimated vessel equivalents). In addition, vessel form, rim morphology and any evidence for vessel use were recorded.

Provenance and condition

All of the pottery was recovered from Period 1 Early to Middle Roman features. The largest groups were retrieved from fills of ditches 1003 (32% by sherd count) and 1016 (19%).

The majority of the pottery exhibited a moderate to substantial degree of surface loss. This is more likely to be a result of soil conditions and fabric properties, rather than post-depositional movement. Evidence for use was present on a small number of sherds: an internal carbonaceous (burnt food) residue on 14; internal 'limey' deposits on five; and external sooting on one.

Fabrics and forms

The assemblage consisted almost entirely of coarsewares (Table 1), of relatively local manufacture. East Sussex grog-tempered ware (ESG) was the most commonly represented, at 508 sherds (75%). This ware type was widespread in East Sussex, and extending into the eastern part of West Sussex (Green 1980, 83, fig. 32e), from the 1st to 4th centuries. Goddards' Green lies within the Roman ceramic zone east of the River Adur, which

continued the Late Iron Age tradition of handmade grog-tempered wares (now often wheel-finished). West of the Adur finer, sandier fabrics predominated (Lyne 2003, 141). Sandy fabrics in reduced-firing (BS, GWC, GWF, GWM, GWO; 98 sherds/15%) and oxidised (BUF, OX, OXF, 52 sherds/8%) fabrics made up the bulk of the remainder of the assemblage. The Hardham kilns to the west are a probable source of a proportion of the greywares (*ibid.,* 142). Wiggonholt Whiteware (WIG WH), which was produced very near to Hardham, was represented by eight unfeatured bodysherds from ditches 1003 and 1016 (Tomber and Dore 1998, 187).

Identifiable forms were mostly jars (eves value of 3.85), the majority of which occurred in fabric ESG and consisted of necked classes or neckless vessels with everted rims (Table 2). Those with pulled bead rims were also represented. Lid-seated jars, which date to the mid 1st to 2nd centuries, were retrieved in fabric ESG from fill 1065 of ditch 1016 and fill 2609 of ditch 1016 (evaluation ditch cut 2608). Five flat-rim dishes were recorded in a range of fabrics from ditch 1016 (fills 1019 and 1065) and oven 1080 (fill 1061). Their presence implies a 2nd century or later dating for these deposits, the form being derived from Dorset Black-burnished ware vessels current in this period (Seager Smith and Davies 1993, 232–3). Large storage jars in fabric ESG were recovered from fills 1005 and 1007 of ditch 1003. Less common forms included: a platter, with an internal groove below the rim, in fabric ESG, from ditch 1003 fill 1007; a lid in fabric BS and a shouldered bowl in fabric BUF, both from ditch 1016 fill 1065. Three bodysherds in fabric ESG (two of which joined), from fill 1019 of ditch 1016 (Fig. 10) featured a decorative motif in the form of elongated bosses.

The only continental import on the site was south Gaulish samian (LGF SA). This was exported to Britain during the mid 1st to early 2nd centuries AD (Webster 1996, 1–2) and was the most common continental import in early Roman Sussex (Lyne 2003, 141). A total of seven sherds was retrieved from fills of ditches 1003 and 1016. Included was a rimsherd from a Drag. 35 cup, which is typically late 1st century in date, from ditch 1016 fill 1019 (Webster 1996, 46). It displayed two post-firing perforations, indicating that it had been repaired. A base sherd from a Drag. 18 platter was recovered from fill 1005 of ditch 1003: this form was exported from south Gaul during the mid to late 1st century AD (*ibid.*, 35).

Discussion

The dateable elements of the assemblage all point to dating in the earlier Roman period (1st to 2nd centuries AD). The fabrics represented were typical of Roman Sussex and were mostly of relatively local manufacture (with the exception of the samian). The assemblage was primarily utilitarian, consisting mostly of jars and coarseware dishes/bowls. Drinking/serving vessel classes were largely absent, although some access to finewares is suggested by the presence of south Gaulish samian. A similar assemblage breakdown (but with the addition of Spanish amphorae) was recorded at Theobalds Road, Wivelsfield, East Sussex, approximately 5km to the east (Powell *et al*. 2015, 55). The assemblage also compares to the early Roman material from Hassocks, West Sussex approximately 5km south-southeast of Goddards' Green (Biddulph 2010, 29–31).

Illustration catalogue (Fig. 10)

1. Three bodysherds (refitted) of East Sussex grog-tempered ware featuring decoration in the form of elongated bosses.

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Table 1 Pottery fabrics summary

Period	Code*	Description	Count	Weight (g)	EVEs
Roman	BS	Black-firing, sand-tempered fabric	11	122	0.44
	BUF	Buff firing sandy fabric with grey core	35	89	0.14
	ESG	East Sussex grog-tempered ware	508	6287	4.27
	GWC	Slightly coarse sandy greyware	10	59	
	GWF	Fine greyware	3	7	
	GWM	Medium grained sandy greyware	71	577	0.93
	GWO	Medium grained sandy greyware with oxidised surfaces	3	13	
	LGF SA	South Gaulish samian	7	37	0.08
	OX	Sandy oxidised fabric	16	57	0.06
	OXF	Fine oxidised fabric	1	13	0.03
	WIG WH	Wiggonholt Whiteware	8	124	
		Total	**673**	**7385**	**5.98**

* code in bold correlates with the National Roman Fabric Reference Collection types (Tomber and Dore 1998)

Table 2 EVEs value by vessel types and major coarseware fabric type

	East Sussex grog-tempered ware	Medium greyware	Buff-firing fabric	Total
Bowl			0.14	0.14
Dish	0.16	0.25		0.41
Jar	2.15	0.38		2.53
Platter	0.07			0.07
Total	**2.38**	**0.63**	**0.14**	**3.15**

APPENDIX C: INDUSTRIAL WASTE

By Jacky Sommerville

Four fragments (109g) of industrial waste, from an indeterminate process, were recovered from fill 1065 within Period 1 Early to Middle Roman ditch 1016 (cut 1064).

APPENDIX D: FIRED/BURNT CLAY

By Jacky Sommerville

Approximately 1,000 fragments of fired/burnt clay, totalling 4.096kg, were retrieved from 12 deposits: all but one was recovered via bulk soil sampling. All were soft-fired with no visible inclusions. Most of the fired/burnt clay was pale orange or buff in colour and some was partially grey. All of the fragments were amorphous and 99% derived from fills of Period 2 late medieval to early post-medieval kilns 1023, 1036 and 1043.

APPENDIX E: GLASS

By Jacky Sommerville

Soil sampling of fill 1039 of Period 2 late medieval to early post-medieval kiln 1036 produced one fragment of clear, modern glass (0.15g), which is likely to be intrusive.

APPENDIX F: WORKED FLINT

By Jacky Sommerville

Introduction and methodology

A very small lithic assemblage was hand-recovered from excavation, totalling seven items (211g) from five deposits.

The artefacts were recorded according to broad artefact/debitage type and catalogued directly onto a Microsoft Access database. A reduced level of recording was carried out due to the very small assemblage size. Attributes recorded included: raw material; weight; colour; cortex description; degree of edge damage (microflaking), rolling (abrasion) and recortication; and the presence of breakage and/or burning.

Raw material and provenance
The raw material was flint in all cases. It was black or grey in colour and mostly fine-grained. Cortex was present on four items and was chalky on all of these, suggesting a chalk or clay-with-flints source. Three fine-grained, black/dark grey flints, all retaining chalky cortex, may have been mined. The Neolithic flint mines at Cissbury Ring and Church Hill, Findon are both located just over 20km south-west of Goddards Green (Barber *et al*. 1999, 74). All of the flints were retrieved as residual finds in deposits dated to the Early to Middle Roman period.

Range and variety
The assemblage comprised: four flakes, two blades, and one core. The blades are most likely of Mesolithic or Early Neolithic date: one was thin, narrow and missing the tip; the other was relatively large and thick. The flakes were not chronologically diagnostic.

The slightly burnt core was a multi-platform type (with at least four platforms) which had been used to produce flakes. Several recorticated flake scars indicated that this core had also been reduced in an earlier period of prehistory.

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APPENDIX G: CHARRED PLANT REMAINS

By Wendy J. Carruthers

Introduction

A total of 17 bulk soil samples were recovered from a series of ditches, pits and an oven dating to the Early to Middle Roman period and three kilns dating to late medieval to early post-medieval period, for the recovery of environmental and economic information. The samples were processed using standard methods of flotation. A

250 micron mesh was used to catch the flots and a 1mm mesh was used to retain the residues. Charred plant remains were sorted from the residues by eye. The flots and sorted charred material from 17 contexts were sent to the author for analysis.

Methodology

In most cases the flots were 100% sorted under an Olympus SZX7 stereoscopic microscope. However, sample 19 was so rich in hulled wheat chaff fragments that it was impossible to extract all of the smaller, unidentifiable emmer/spelt chaff fragments within a reasonable time frame. For this reason the flot was 100% sorted for more identifiable items such as cereal grains, emmer and spelt chaff fragments and weed seeds but the less-useful unidentifiable emmer/spelt chaff fragments were quantified by fully sorting a 20% sub-sample and extrapolating the data. This data is marked with an asterisk in Tables 3 and 4. Sample 24 from kiln 1080 containing a large amount of oak charcoal, but very little else, was also sub-sampled. A 50% sub-sample was sorted from this context.

Nomenclature follows Zohary and Hopf (2000) for the cereal remains and Stace (2010) for all other items. Other texts consulted were Hill *et al.* (1999) for ecological information and Cappers *et al.* (2006) for identification purposes. The author's own reference collection was also consulted.

Results

The results of the analysis are presented in Tables 3 and 4 (with the exception of samples 7, 13, 14 and 18, which contained no charred plant remains). Sample volumes and concentrations of charred plant macrofossils are given at the bottom of the tables. Concentrations of charred plant remains have been calculated using the total number of charred fragments divided by the processed soil volume in litres, giving a 'fragments per litre' (fpl) value for each sample.

Period 1, Early to Middle Roman

Boundary ditches 1016 and 1081

Ditch 1016, context 1019, recut 1018 (sample 1) produced a trace of cereal processing waste (a spelt glume base and an emmer/spelt glume base) and five small, poorly preserved fragments of hazelnut shell (*Corylus avellana*). This material, like that from the two pits described above, had probably been trampled around the site for some time before ending up in the ditch. The low concentration of charred material (0.39 fpl) suggests that it represents background waste.

Ditch 1081 context 1093, cut 1091 (sample 19) – A rich deposit of cereal processing waste was recovered from the top fill of ditch 1091, representing an episode of dumping charred material into the ditch. The high concentration of 231 fpl is probably a gross under-estimate, as much of the chaff was in a poor state of preservation so was difficult to accurately quantify. The dominant cereal represented by glume bases and spikelet forks was spelt wheat, making up 88% of the identifiable chaff fragments. The remaining 12% was from emmer wheat. It is uncertain whether this represents two separate crops whose chaff later became mixed in the base of a corn drier or hearth, or a spelt crop where emmer was growing as a relict from previous sowings.

In total over three thousand fragments of chaff were recovered from context 1093, in comparison to 31 cereal grains and 48 weed seeds giving a ratio of grain to chaff to weed seeds of approximately 2 : 200 : 3. Although

only hulled wheats (emmer and spelt) were positively identified amongst the grain, one short grain was recovered which could have been from free-threshing wheat. Alternatively it may have been a sporadic variant of spelt. In addition, seven fragments of tough-rachis probably from free-threshing wheat (cf. *Triticum aestivum/turgidum*) were present suggesting that bread wheat (the most likely of the two species) may have been cultivated in small amounts but was under-represented in the charred assemblage due to its free-threshing properties. A trace of oat awn suggests that some oats may have been growing as weeds (*Avena* sp.). Weed taxa were scarce and were limited to general weeds of disturbed and cultivated places, including (starting with the best represented) dock (*Rumex* sp.), brome grass (*Bromus* sect. *Bromus*), pale persicaria/redshank (*Persicaria lapathifolia/maculosa*), black bindweed (*Fallopia convolvulus*), fat hen (*Chenopodium album*), orache (*Atriplex patula/prostrata*), lesser stichwort (*Stellaria graminea*) and grass (Poaceae). Almost all of these taxa are grouped into the closely associated ecological classes of Chenopodietea by Ellenberg (1988), 'weeds of waste ground, arable and gardens', and Secaliatea, which are 'weed communities of cereal fields'. None of the weeds are indicative of specific soil types although fat hen and orache are typical of nutrient-rich places. The local soils are only moderately rich so their presence could suggest that manuring was taking place. The only weed not from these general categories was the single lesser stitchwort seed which is more typical of moist, manured pastures and meadows. It may have been growing along field margins or field ditches, or could have been introduced amongst grassy kindling used when the hulled wheats were being parched.

Oven

Oven 1080, context 1074, cut 1072 (sample 24) produced only a single immature acorn (*Quercus* sp.) alongside a large assemblage of oak charcoal. This acorn was most likely attached to a branch which had later been burnt. Since the structure appears to be Early to Middle Roman in date it is surprising that no cereal processing waste was recovered from the sample, especially as the sample from ditch 1081 (sample 19) a short distance to the south of oven 1080 was rich in chaff. The absence of any discrete dumps of charred plant material means it is not possible to ascertain the function of this feature.

Oven 1080, context 1058, (sample 14) – Similar to context 1074 from oven 1080 discussed above, this 8 litre soil sample produced a large amount of oak-dominated charcoal but no other plant remains. The absence of any discrete dumps of charred plant material means it is not possible to ascertain the function of this feature.

Pits and postholes

Pit 1034, context 1035 (sample 9) - A 17 litre soil sample from this feature contained frequent charcoal fragments but no other charred plant macrofossils.

Pit 1020, context 1021 (sample 2) produced a small assemblage (0.25 fpl) of charred cereal processing waste. A possible emmer spikelet fork (*Triticum* cf. *dicoccum*), a spelt glume base (*T. spelta*), and an emmer/spelt glume base and spikelet fork (*T. dicoccum/spelta*) were recovered. Large fragments of oak charcoal were common in the fill (Appendix H), suggesting that the feature may have been associated with oven 1080 a short distance to the north-west of pit 1020.

Pit 1077, context 1078, (sample 18) produced abundant large charcoal fragments but no other charred plant remains were recovered.

Pit 1083, context 1084 (sample 20) produced a small amount of cereal processing waste (0.43 fpl) from a 7 litre soil sample. A spelt glume base and spikelet fork and an emmer/spelt glume base were present. The small

assemblages in pits 1020 and 1083 probably represent background levels of burnt processing waste that would have been trampled or blown around a settlement site (see discussion below).

Posthole 1096, context 1098, (sample 21) – Although the soil sample from this 0.18m posthole was only 1 litre in volume, eight charred plant macrofossils were recovered from the flot, making it the fifth most productive sample in terms of charred fragment per litre of soil processed (concentration= 8fpl). The remains consisted of emmer/spelt chaff fragments and a small fragment of cf. brome grass (cf. Bromus sect. Bromus), a common weed of arable fields. Five poorly preserved emmer/spelt glume bases were recovered plus one glume base that was probably emmer, although too little of the glume survived to be certain of the identification. A single emmer/spelt spikelet fork was also present. The assemblage appears to represent a small amount of cereal processing waste that had trickled down into the postpipe fill of the posthole during the occupation of the site. The character of the assemblage strongly suggests that the posthole dates to the Roman period. It also suggests that crop processing was taking place fairly close to the posthole. Alternatively, if processing was taking place on a large scale, rather than a low-level piecemeal scale in each household as the deposit in ditch 1091 suggests, small, light burnt fragments of chaff could have been blowing around the site and accumulated in the posthole over the period of occupation.

Pit 1012, context 1013 (sample 7) produced no charred plant remains although flaky charcoal fragments were present, in addition to burnt clay.

Pit 1014, context 1015 (sample 8) produced just two charred plant remains from a small flot containing a smamm amount of oak charcoal (Appendix H). A very small, thin fragment of hazelnut shell (*Corylus avellana*) and a poorly preserved, probable vetch/tare fragment (3.5 mm diameter *Vicia/Lathyrus* sp.) were the only charred items recovered. They provide no clues as to the possible age of the feature as hazelnuts have been consumed in all periods and a number of native vetches and tares produce seeds of this size, in addition to cultivated vetch.

Period 2, late medieval to early post-medieval

Samples recovered from three of the kilns (1023, 1036, 1043) clustered on the western edge of the excavation area produced very similar, unusual assemblages. Their possible function is described in the discussion below.

Kiln 1023, context 1025, cut 1023 (sample 3) and context 1027, cut 1026 (sample 4) – Two samples from this kiln were analysed; one from context 1025, the main charcoal-rich fill of the kiln and the other, 1027, within a later recut 1026. Although 1027 cuts 1025 the assemblages recovered from both samples were very similar so they have been described together below. Both samples produced large quantities of charcoal (Appendix H) but the later sample was less productive in terms of plant macrofossils (sample 4 produced 2.29 fpl compared with 12.75 fpl from sample 3).

Numerically, the main component was small fragments of bracken pinnules, and possibly also some from ferns (*Pteridium aqulinum*/fern) but this was impossible to determine as the preservation was not always good (some were 'melted' by the heat into tarry concretions). Secondly, beech (*Fagus sylvatica*) nut fragments were recovered including occasional charred nuts and more frequent fragments of the surrounding spiny cupules (broken off 'valves' and basal fragments). Hornbeam (*Carpinus betulus*) nuts were also present in both samples, as were several poorly preserved small indeterminate fragments of charred probable tree leaves. These items may have been accidentally charred amongst the wood, or the 'brash' (the waste from preparing timber, i.e. branch wood) could have been deliberately included in the firing.

The small number of other plant macrofossils from herbs rather than woody taxa might have been burnt amongst kindling materials, or, in the case of cleavers (*Galium aparine*) may have been scrambling into the lower tree branches when the wood was cut. They consist of weeds/wild plants of disturbed, cultivated and grassy places, including dock, buttercup (*Ranunculus acris/bulbosus/repens*) and spike-rush (*Eleocharis* subg. *Palustres*). Spike-rush is a plant of wet to damp, marshy places such as the margins of ponds and rivers. Its presence is discussed further below.

Kiln 1036, context 1041 (sample 10), context 1039 (sample 15) and context 1042 (sample 17) – of the three fills, sample 17 from context 1042 produced the highest concentration of charred plant remains at 113 fpl. This sample was taken from the latest deposit (possibly representing the last firing of the kiln), located towards the rake-out end of the kiln (northern end). Only 1 litre of soil was processed but frequent small bracken/fern pinnule fragments, several beech nut fragments (one fragment of nut and six fragments of cupule) and three hornbeam nut fragments were recorded, in addition to several weed/wild plant seeds. As in kiln 1023, the wild plant taxa included a scrambling plant, this time bramble (*Rubus* sect. *Glandulosus*), grasses (two small-seeded Poaceae) and two seeds from a wetland plant, in this case cf. greater spearwort achenes (*Ranunculus* cf. *lingua*). Greater spearwort grows in base-rich, often eutrophic marshes, fens and pond margins in still or standing water and is now a declining species due to loss of habitats (IUCN, 2017). The two achenes are only tentatively identified because some of the small-seeded, semi-aquatic buttercups are difficult to tell apart when they are preserved in a poor condition, and charring causes shrinkage making comparisons difficult. However, this species most closely matched the charred remains.

Sample 15 (context 1039) from the central area of the firing chamber was the next most productive sample at 9.89 fpl. This deposit underlies contexts 1042 and 1041 so is the earliest of the three. Bracken/fern pinnule fragments were again frequent, as were fragments of beech nut (one nut and 45 fragments of cupule). Three hornbeam nut fragments were also present. A thorn of a Rosaceous shrub (*Prunus* sp.-type), some angular, flattened leaf galls, an unidentified immature catkin, a possible immature male flower of beech or hornbeam and a bramble seed represent other items burnt amongst the wood. Remains of weeds possibly burnt as tinder included six dock seeds, three large Poaceae seeds (possibly *Bromus/Avena* sp.) and two cleavers nutlets.

Sample 10 (context 1041) from the southern end of the firing chamber produced 0.94 fpl including small amounts of bracken/fern pinnule, only two fragments of beech cupule and one fragment of hornbeam nut. As in sample 17, a seed of cf. greater spearwort was present. In addition, single seeds of dock, cleavers and brome grass (*Bromus* sect. *Bromus*) were present.

All three samples were very similar in character, suggesting that repeated very similar operations were taking place, involving the use of the same sorts of materials. The slight difference between this kiln and the other two is that traces of free-threshing wheat were recovered from two of the samples (samples 10 and 15) along with an unidentified cereal grain in sample 17. Sample 10 contained a fragment of plump, rounded free-threshing wheat grain (*Triticum aestivum/turgidum*) and an unidentified wheat grain (*Triticum* sp.). Sample 15 produced a rachis fragment of bread wheat (*Triticum aestivum* s.l.). The very small amount of cereal evidence is unlikely to indicate periodic use for drying cereals, particularly in the post-medieval period in southern England when there would have been little need to dry free-threshing cereals. It is more likely that the workers disposed of food waste in the kiln from time to time.

Kiln 1043, context 1045 (sample 12) and context 1046 (sample 13) - context 1045 (sample 12) produced few charred plant macrofossils (0.8 fpl) but frequent beech charcoal (Appendix H). As with the other two kilns in this group, beech nut remains (including an under-developed nut and six cupule fragments) and hornbeam nut fragments were present. Only a trace of bracken/fern was recovered and the only wild plant seed was a cleavers achene. A three litre soil sample from context 1046 (sample 13), the main charcoal-rich fill of the kiln, produced no charred plant macrofossils apart from several large fragments of beech charcoal (Appendix H).

Discussion

Period 1, Early to Middle Roman crop processing

Most of the features dated to the Roman period produced very low concentrations of spelt and emmer processing waste. These included two pits (1020, 1083), a ditch (1016) and a post hole (1096) in the southern and eastern areas of the excavation area. While this could be the result of small scale de-husking of hulled wheat that had been stored in spikelet form prior to consumption, an alternative suggestion could be put forward depending on the function of oven 1080. This feature produced no charred plant remains although a large amount of oak charcoal was recovered (Appendix H). Therefore from an archaeobotanical viewpoint there was no evidence to suggest that it had functioned as a corn drier. The dominance of oak charcoal indicates that it was more likely to have been used for industrial purposes (Appendix H). However, it is possible that at different times the oven was used for a variety of purposes, as suggested by van der Veen in her review of Roman corn driers (1989). Most corn driers date to the Late Roman period, but a few listed in van der Veen's table (*ibid*. p.308) date to the second/third century, including Wendens Ambo, Essex which, unusually, contained both spelt and bread wheat (Jones *et al.* 1982).

The use of oven 1080 as a corn drier at some point in its history, although not for its final use, could explain the presence of a high concentration of cereal processing waste in the top of ditch 1081. These types of chaff-rich deposit are typically found in and around corn driers, as was found at Stansted Airport where a ring gully around a corn drier contained abundant spelt chaff (Carruthers 2008). Similarly, at East Anton and Finkley, Andover, Hampshire a ditch close to eight late Roman corn driers produced a concentrated chaff-rich deposit that appeared to represent material cleaned out from a corn drier (Carruthers forthcoming). The deposit at Goddards' Green was characteristic of waste from the de-husking of hulled wheat spikelets in that it contained abundant small, light chaff fragments but few weed seeds. Spelt and emmer chaff dominated the assemblage (glume bases, spikelets forks and rachis fragments) at a ratio of roughly 7 to 1 spelt to emmer wheat. Weed seeds were infrequent with a low species diversity, consisting of general weeds of cultivated and disturbed soils such as brome grass, dock and black bindweed. A few weeds of nutrient-rich soils (fat hen and orache) suggested that manuring may have been taking place. Since the local soils are only moderately fertile, slightly acidic loamy and clayey it would have been necessary to have used a regular manuring regime in order to obtain reasonable yields of spelt over a period of time, as spelt is quite demanding of nutrients.

It is also possible that another demanding crop, bread wheat was being grown at this time, but the evidence was slight and tentative. Although seven tough-rachis fragments of wheat were found in addition to a short, rounded wheat grain, both items are problematic in terms of securely identifying free-threshing wheat. Short grains can occur as an occasional variant of spelt wheat, and it is not possible to differentiate between the basal rachis nodes of hulled and free-threshing wheat (Campbell in press). However, the rachis nodes from this site did not appear to be basal. In addition, non-basal bread wheat-type rachis fragments from Canterbury and plump free-threshing wheat-type grains have recently been radiocarbon dated to the Roman period (*Carruthers in*

preparation; Giorgi forth) so more secure evidence is gradually building up for the consumption of bread wheat in the British Isles at this time. Nevertheless it is still uncertain whether these records represent local cultivation or importation, particularly as both Canterbury and Goddards' Green are in the south-east of the country, close to continental Europe. A large deposit of bread wheat and spelt in the 3rd century granary at South Shields, close to Hadrian's Wall, was thought to have possibly been imported in order to supply the Roman army but no 'alien' weed seeds were found to confirm this suggestion (van der Veen 1989). As noted above, all of the weed seeds were common ruderal weeds that are native to the British Isles. This topic requires further investigation.

Because only one productive sample was recovered from the site it is not possible to be certain that the data is representative of the Roman arable economy as a whole. Although the use of negative data is problematic, it is unusual that no barley was found in the samples as small amounts of barley are common and widespread in Roman assemblages. This could be because barley was being used primarily for fodder and so did not become preserved by charring. However, if crop rotation was taking place some volunteer plants are likely to have grown up with the spelt and emmer crops. The local Weald clay soils and sandy Hastings Beds may not have been well suited to barley cultivation. The trace of oat awn probably indicates that wild oats were growing as crop weeds, although very small fragments of this kind can easily trickle down the soil profile from later periods of activity.

The continued presence of emmer amongst the spelt in ditch 1081 (sample 19) at a small but significant level is of interest. Campbell (*ibid*.) notes that there are small regional differences in southern England in the continued presence of emmer amongst the dominant crop, spelt. While emmer persists in low quantities in the Upper Thames Valley, on the Hampshire Downs emmer is rarely recovered and may simply have been a contaminant in this area (Campbell 2008). Emmer also continued to be cultivated at a significant level in the earlier Roman period in Kent (Campbell in press). The closest comparative site known to the author is Selhurst Park Farm, East Dean, West Sussex (on the edge of the chalk) where both emmer and spelt were recovered from Iron Age and Roman contexts (Vitolo 2011 in Campbell in press). Campbell (in press) suggests that the decision to continue to grow emmer in addition to the more robust crop, spelt, may be a combination of matching the suitability of crops to soil types and local tradition. Emmer can cope with acidic soils better than spelt (van der Veen and Palmer 1997) so at Goddards' Green a mixture of emmer and spelt may have suited the local, slightly acidic sandy loams and clays.

Period 2, late medieval to early post-medieval kiln use

The three kilns located on the western side of the trench were similar in form and contents. Kiln 1036 produced traces of cereal grains and a chaff fragment from bread wheat (described above) but none were found in the other two kilns. These sparse remains were unlikely suggest that the kilns had any association with corn drying, rather that the workers may have occasionally used the kilns to dispose of the waste from their lunches. (Appendix H) describes in detail the charcoal content of the kilns - the material that made up a vast majority of the preserved charred material. The plant macrofossils (fruits and seeds, plus occasional vegetative structures that have survived charring in an identifiable form) add a little detail to the picture but were a very minor component in terms of volume and possibly in terms of significance.

Numerically, the main components of the macrofossil assemblages were fragments of bracken and/or fern frond - the pinnules that make up the very divided leaf shape. The term bracken/fern has been used in Table 4 because some of the fragments were too poorly preserved to be sure that ferns were not present, but where preservation was good the inrolled, spore-bearing margins of the pinnules indicated that bracken was the main species present. For this reason the term 'bracken will be used henceforth. All six samples from the three kilns contained

bracken fragments, although in comparison with the charcoal, very little material was preserved in total. However, this is not surprising considering that bracken was probably used for fuel in the green condition, as is traditional, so little would have survived the flames. Bracken kilns have been used for many centuries in the production of potash and the structures can still be found in some rural regions, such as in Wales and Cumbria (e.g. Industrial History of Cumbria 2017).

The remaining charred plant macrofossils can be placed into three groups;

1. Identifiable macrofossils that were burnt incidentally due to being present amongst the gathered wood. These mainly comprise tree fruits including beech nuts and fragments of their discarded spiny cupules and hornbeam nuts which were sometimes whole but often fragmented. The papery three-lobed bracts that hold the hornbeam nuts on the tree presumably did not survive burning in a recognisable form. Beech cupules break into four 'valves' at maturity and these robust structures preserve well under charring, although the soft spines mostly burn away leaving mounds with short points. In addition to tree fruits a few scrambling herbaceous/scrub plants may have become charred due to being entwined in the branches. These include bramble seeds and cleavers nutlets. Other items in this group include a few small angular but flattened leaf galls, a sloe-type thorn (*Prunus* sp.), an immature unidentified catkin, a possible unidentified immature male flower and several unidentifiable probable tree leaf fragments that were poorly preserved. Group 1) taxa were present in all three kilns.

2. The second group of taxa consist of weeds/wild plants of grassy and disturbed places, including buttercup achenes, grass seeds (indeterminate Poaceae), dock seeds, a bome grass seed and two poorly preserved brome grass or oat caryopses. Several indeterminate tuberous fragments may fall into this group. It is likely that these few remains were charred amongst grassy vegetation used for kindling, or perhaps they were caught up in the timbers when they were being dragged into the kiln. Group 2) taxa were present in kilns 1023 and 1036.

3. A third small group present in kilns 1023 and 1036 consisted of two taxa found in marshy bankside locations, such as on the margins of ponds or slow-flowing rivers. A semi-aquatic buttercup thought to be greater spearwort was present in two samples from kiln 1036 (three achenes in total). A spike-rush nutlet was recovered from kiln 1023. These few remains could be placed in group 2) if the vegetation used as tinder was gathered from marshy ground. It is possible that one of the two nearby ponds, was the source of this material and that the water from this pond was integral to the activities taking place in the area, as described below.

All three kilns appeared to have been carrying out the same type of operation over a period of time, since successive fills in kilns 1023 and 1036 produced very similar assemblages. The complete absence of cereal remains and abundance of charcoal fragments rules out their use as corn driers, at least around the time that they were abandoned.

A number of other possible uses for large quantities of charcoal could be suggested, for example to produce charcoal to be used as fuel, to extract tar from the burning of wood and to produce wood-ash in the production of potash or lye. The production of charcoal can be ruled out due to the scarcity of roundwood and because very different structures are used for this very specialised industry. The production of tar for medicinal use or other purposes is possible, but very little tarry material was recovered from the samples and it seems likely that at least some larger lumps of tar would have been present. The production of potash or lye by leeching wood-ash is a

further possibility that becomes more attractive when the local maps are consulted and a nearby pond is seen to be called Pond Lye. Lye (caustic potash, potassium hydroxide) was used in the textile industry for making soaps needed to de-grease wool prior to spinning it and for bleaching textiles. Potash is also used to make glass and is an important constituent of fertilisers (particularly potassium carbonate). This subject is discussed in more detail in Appendix H.

The recovery of at least 14 hornbeam nuts from the late medieval to early post-medieval kilns is of interest as this tree is fairly limited in its distribution across the British Isles. As the nuts are not edible charred plant macrofossils are rare in archaeobotanical assemblages. Hornbeam is mainly found in south and south-east England and is better adapted to continental climates than the temperate maritime climate of the British Isles. It is slow growing, shade tolerant and cold hardy but does not tolerate exposure. It also cannot tolerate peaty soils or very nutrient-poor soils (Forestry Commission 2017). In Sussex, hornbeam is relatively common in mixed oak/hazel/hornbeam woods on the Weald. It grows well on the damp clay soils and there is often a rich flora of spring flowering herbs on the woodland floor (Sussex Biodiversity Partnership 2017).

Another item found in these samples that is surprisingly rare in archaeobotanical samples is the outer casing or 'cupule' (Stace 2010) of beech nuts. It may be that these are hard to recognise when present in small numbers and when highly fragmented. The nuts themselves, although edible in small amounts when roasted, do not appear to preserve well, being thin-skinned and easily burnt up. When charred, the thick-walled fruits often fragment into valves (also called involucres) and basal fragments and lose most of their spines on combustion, so they may be hard to recognise in small numbers and mixed assemblages.

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Table 3 Period 1 Plant macrofossil identifications

CONTEXT NUMBER	1015	1019	1021	1074	1084	1093	1098
CUT NUMBER	1014	1016	1020	1072	1083	1091	1096
FEATURE LABEL		1016		1080		1081	
SAMPLE NUMBER	8	1	2	24	20	19	21
PERIOD	1	1	1	1	1	1	1
GRAIN							
Triticum aestivum/turgidum (free-threshing wheat grain)							
Triticum aestivum/turgidum/spelta (free-threshing wheat grain or short-grained spelt)						1	
Triticum dicoccum/spelta (emmer/spelt grain)						12	
Triticum dicoccum/spelta (sprouted emmer/spelt grain)						1	
Triticum sp. (indeterminate wheat grain)							
Indeterminate cereal grain						17	
CHAFF							
cf. Triticum aestivum/turgidum (cf. free-threshing wheat rachis frag.)						7	
Triticum dicoccum Schübl. (emmer glume base)						52	cf.1
Triticum dicoccum Schübl. (emmer spikelet fork)			cf.1			17	
Triticum spelta L. (spelt glume base)		1	1		1	644	
Triticum spelta L. (spelt spikelet fork)					1	7	1
Triticum dicoccum/spelta (emmer/spelt glume base)		1	1		1	1937*	5
Triticum dicoccum/spelta (emmer/spelt spikelet fork)			1			880*	1
Triticum dicoccum/spelta (emmer/spelt rachis frag.)						71*	
Avena sp. (oat awn frags)						+	
WEEDS & WILD PLANTS							
Vicia/Lathyrus sp. (c. 2-3mm small vetch seed)	cf.1						
Quercus sp. (immature acorn)				1			
Corylus avellana L. (hazelnut shell frag.) HSW	1	5					
Persicaria lapathifolia/maculosa (pale persicaria/redshank achene) CDw						5	
Fallopia convolvulus (L.) A.Love (black bindweed achene) CD						5	
Rumex sp. (dock achene) CDG						15	
Stellaria graminea L. (lesser stitchwort seed) Gd						1	
Chenopodium album L. (fat-hen seed) CDn						3	
Atriplex patula/prostrata (orache seed) CDn						2	
Bromus sect. *Bromus* (brome grass caryopsis) AD						12	cf.1f
Bromus/Avena sp. (brome/oat caryopsis)						4	
Poaceae (indeterminate grass seed)						1	
TOTAL	**2**	**7**	**4**	**1**	**3**	**3696**	**8**
Volume of soil processed (litres)	7	18	16	16	7	16	1
Charred fragments per litre of soil processed (fpl)	0.29	0.39	0.25	0.13	0.43	231	8
% flot sorted	100	100	100	50	100	100	100

Table 4 Period 2 Plant macrofossil identifications

CONTEXT NUMBER	1025	1027	1039	1041	1042	1045
CUT NUMBER	1023	1023	1036	1036	1036	1043
FEATURE LABEL						
SAMPLE NUMBER	3	4	15	10	17	12
PERIOD	2	2	2	2	2	2
GRAIN						
Triticum aestivum/turgidum (free-threshing wheat grain)				1f		
Triticum sp. (indeterminate wheat grain)				1		
Indeterminate cereal grain					1	
CHAFF						
Triticum aestivum-type (bread-type wheat rachis frag.)			1			
WEEDS & WILD PLANTS						
Pteridium aquilinum (L.) Kuhn/indeterminate fern (bracken/fern frond fragment) EGWa	161	25	110	7	96	1
Ranunculus cf. *lingua* L. (cf. greater spearwort achene) MPw				1	2	
Ranunculus acris/bulbosus/repens (buttercup achene) DG	1					
Rubus sect. *Glandulosus* (bramble seed) DHSW			1		1	
Prunus-type thorn			1			
Fagus sylvatica L. (beech nut) HSWd	1 & 1f		1		1f	1i
Fagus sylvatica L. (beech cupule valve) HSWd	23f	8f	41f	2f	3f	5f
Fagus sylvatica L. (beech cupule base) HSWd	9f	2f	4f		3f	1f
Quercus sp. (immature acorn)						
Carpinus betulus L. (hornbeam nut) HSWh	3	1	3	1f	3	3
Rumex sp. (dock achene) CDG	3		6	1		
Galium aparine L. (cleavers nutlet) CDSH		1	2			1
Galium sp. (indeterminate bedstraw nutlet)	1f			1f		
Eleocharis subg. *Palustres* (spike-rush nutlet) MPd	1					
Bromus sect. *Bromus* (brome grass caryopsis) AD				1		
Bromus/Avena sp. (brome/oat caryopsis)			cf.3			
Poaceae (indeterminate grass seed)					2	
Indeterminate tuber/rhizome fragment		2	1		1	
small flattened leaf gall			2			
indeterminate leaf fragments	++	++				
cf. moss fragment			1			
Indeterminate immature catkin			1			
cf. immature beech or hornbeam male flower			1			
TOTAL	**204**	**39**	**178**	**16**	**113**	**12**
Volume of soil processed (litres)	16	17	18	17	1	15
Charred fragments per litre of soil processed (fpl)	12.75	2.29	9.89	0.94	113	0.8
% flot sorted	100	100	100	100	100	100

HABITAT and SOILS KEY: C=cultivated; D=disturbed; H=hedgerow; M=marsh/bog; P=ponds, ditches etc.; S=scrub; W=woods; d=dry, well-drained soils; h=heavy, clay soils; n=nutrient-rich soils; w= wet/damp soils

APPENDIX H: CHARCOAL

By Sheila Bordman

Introduction

A total of 17 bulk soil samples were selected for wood charcoal assessment and analysis from a series of ditches, pits and an oven dating to the Early to Middle Roman period and three kilns dating to the late medieval to early post-medieval period. It was hoped that the wood charcoal would shed light on use of these features, contemporary fuel use practices and the local woodland in the different periods.

Methodology

The soil samples were processed by standard flotation methods. Only charcoal fragments greater than 3 mm in size were examined. These were randomly selected, fractured by hand and sorted into groups based on features observed in transverse section, at magnifications of x10-x45. The fragments were then fractured along their radial and tangential planes and examined at magnifications of up to x400, using a Brunel SP400 metallurgical microscope with brightfield/darkfield illumination. Identifications were made using keys in Hather (2000), Gale and Cutler (2000) and Schweingruber (1990), and by comparison with modern slide reference material. One hundred or more charcoal fragments were generally examined for each of the richer fills, but where there were fewer remains (as in samples 1, 20 and 21), all fragments were examined. For four lower priority samples (nos. 8, 10, 13 and 17), the aim was to identify 50 plus fragments but sample 8 had only 13 fragments, so again these were all identified. In total, 1415 charcoal fragments were examined and 12 taxa groups were identified. Plant nomenclature follows Stace (2010).

Results

These are listed in Tables 5 and 6

Period 1 Early To Middle Roman

These samples were dominated by oak (*Quercus*), largely from heartwood timber fragments. Small amounts of oak roundwood were present in four samples. Nearly a quarter of charcoal fragments in sample 24 (context 1074) from oven 1080, were ash (*Fraxinus excelsior*), and they included mature timber and roundwood fragments. Sample 2 (context 1021) from pit 1020, also had moderate amounts of alder (*Alnus glutinosa*). The other taxa represented in these samples were birch (*Betula*), willow/poplar or aspen (*Salix/Populus*), elder (*Sambucus*) and holly (*Ilex aquifolium*), and there were single fragments of blackthorn/cherry (*Prunus*), beech (*Fagus sylvatica*) and field maple (*Acer campestre*) charcoal.

Sample 7 from pit fill 1013 had oak charcoal only. In sample 21 from posthole fill 1098, there was a small concentration of birch (*Betula*) and a couple of hazel (*Corylus avellana*) fragments. There was a single roundwood fragment of blackthorn/cherry (*Prunus*) in sample 8 from pit fill 1015, and one of field maple (*Acer campestre*) in sample 18 from pit 1077 (fill 1078).

The Early to Middle Roman samples had the widest range of tree and shrub taxa overall. The samples and features are discussed further below.

Period 2 late medieval to early post-medieval

Kiln 1023

This was the large keyhole-shaped east-west-aligned feature and context 1025 (sample 3) was an accumulation of burnt material and ash within the stokehole and firing chamber of the kiln, interpreted on site as debris from repeated firings. As noted above, the wood charcoal in samples 3 (from fill 1025) and 4 (fill 1027) was largely composed of beech (*Fagus sylvatica*) timber fragments. Between a third and a quarter of beech fragments in samples 3 and 4 respectively, were roundwood fragments. In both samples, roundwood sizes and ages were very mixed. Growth rings on individual fragments varied from 8 to 30 plus, and the diameters (where these could be measured) varied from 8 to 22 mm. Sample 4 (fill 1027) had several roundwood fragments of holly (*Ilex aquifolium*). A single fragment of holly was present in sample 3 (fill 1025) and there were one or two fragments of oak (*Quercus*), birch (*Betula*) and hornbeam (*Carpinus betulus*).

Kiln 1036

Three contexts were analysed: 1039 (in sample 15), 1041 (sample 10) and 1042 (sample 17). Most of the charcoal in all three samples was made up of beech timber fragments. Around 10% and 20% of these were roundwood, with 3 to 20 growth rings. It was not possible to measure most of these as they were incomplete. There were three fragments of holly charcoal in sample 17 (fill 1042) and one of hornbeam in sample 10 (fill 1041). Thus, as in kiln 1023, the main kiln fuel appears to be beech timber. Beech roundwood and immature wood of other taxa (and the macrofossil remains) may indicate that 'brash' was added to the kilns, possibly to increase temperatures rapidly, or to bulk out the ash or charcoal produced (see below). Brash may include 'tops and lops' left over from the preparation of timbers to be burnt and other, low value trees, shrubs, and trimmings, as were available locally.

Kiln 1043

Samples from two contexts were analysed: 1045 (sample 12) and 1046 (sample 13). The remains in both samples were very similar to each other, and to samples from the other kilns (above). Most of the charcoal fragments were beech, 13% and 8% of which were roundwood fragments in samples 12 and 13 respectively. There were occasional fragments of oak and a single fragment of hornbeam (in sample 13).

Discussion

Period 1 Early to Middle Roman fuel use

The Roman period remains are presumed to represent fuel refuse which was dumped in the pits and ditches, together with other waste such as cereal processing debris (Appendix G). The pit and ditch samples were the most mixed ones from the site, with an average of 5 charcoal taxa per sample (see Table 5). This probably reflects post-depositional mixing of fuel debris from different sources, rather than ad hoc fuel selection. In contrast, the two Roman oven 1080 (fills 1074 (sample 24) and 1108 (sample 14)) each had just one or two charcoal taxa each. In sample 24 (fill 1074) from oven 1080, more than three quarters of charcoal fragments were of oak (mostly heartwood). The remainder were ash (*Fraxinus excelsior*) and they included fast and slow grown timber, and roundwood fragments. Only oak was present in sample 14 (context 1108) from oven 1080. The main purposes of these ovens are unknown. As in industrial installations of all ages, oak seems to be the main fuel due to its unique thermal properties (Gale 2003).

Period 2 late medieval to early post-medieval fuel use

In addition to beech timber and roundwood, and a little oak, holly, hornbeam and birch, the smaller charred remains in these samples included beech nuts and cupule fragments, hornbeam nuts and a range of other remains (leaf fragments, an immature catkin, a beech/ hornbeam flower and a *Prunus*-type thorn) (Appendix G). Many of the smaller charred remains would therefore appear to have arrived with (and possibly attached to) the woody material. Overall, the beech roundwood was very variable in both size and maturity, so there is no evidence for the collection of roundwood from woodlands managed on regular coppicing cycles.

The presence of charred wood in the medieval kilns may indicate a range of possible activities, even charcoal production. However, all the kiln samples also had notable quantities of frond fragments of bracken (*Pteridium aquilinum*) (Carruthers *infra*), and it is the combination of beech charcoal and charred bracken which is so intriguing, as these are two of the main plant species used in historic potash and lye production. The medieval kilns at Goddards' Green may have played a role in a number of lesser known Wealden industries, including glass making, soap manufacture and fulling/textile production.

Potash, lye, and historic uses

Potassium-rich plant ashes were an important source of alkalis in pre-modern Northern Europe, used in variety range of industries including soap making, textile bleaching and fulling, glass-making and lead smelting. Potash derives its name from pot and ash and this term is used both for the plant ashes and the liquid potash obtained from soaking these. In Cumbria, plant ashes were packed and soaked in large iron pots with a hole and plug on their undersides. After several days, the plug was removed, allowing the liquid potash to drain into containers. For soap, animal fat (normally pig fat) was added and this was boiled for several days before being poured off and allowed to set (Davies-Shiel 1972).

Potash was used in industrial soaps, to bleach textiles prior to dyeing, and as a thickening when fuller's earth was unavailable. Potash kilns were often located close to fulling mills and some kilns been found through researching old field names on early maps. The locations of former fulling mills may also be reflected in old place names. For example, Tenter hill may refer to a place where the cloth was hung out on tenterhooks, and Walk Mill Brow, to an area where cloth was trampled (Davies-Shiel 1974). While lye is sometimes used interchangeably with potash, lye may be a solution of potassium hydroxide or sodium hydroxide. Sodium rich lye makes harder soaps than potash rich ones. Both solutions may be boiled or evaporated to increase concentrations (Open University 2007; Davies-Shiel 1972).

Silica melts at temperatures above 1700°C so fluxes were added during glassmaking to enable this to melt at achievable temperatures, of 1000°C or less. Types of fluxes varied over time and were dependent on the objects being made, but potassium rich plant ashes were a major source of fluxes in medieval and post medieval glassmaking in Britain. Bracken (*Pteridium aquilinum* (l.) Kuhn) and other fern species are potash rich. Bracken is thought to be the main ingredient in medieval forest glasses while ashes from trees such as beech and oak, which have more lime, were thought to have been used more in post medieval lime rich HLLA glasses (English Heritage 2011; Crossley 2012).

The weight of the ashes recoverable from burning wood and bracken is typically low (2% or less in bracken) (Welham 2001). Both analytical and experimental work have indicated that ashes from both sources may have been mixed together in the past, and they were also possibly supplemented with material from other sources, such as domestic hearths (Welham 2001). While there were undoubtedly competing demands for wood, charcoal

and ash, glassmaking in the Weald in the late medieval period seems to have placed particular pressure on woody resources. The burning of wood for glassmaking was banned in 1615, leading to the end of the Wealden glass industry (Castagnino 2013).

Conclusion

The Roman period deposits at Goddards' Green produced a reasonably typical wood charcoal assemblage for this period and area (Smith 2002). All samples were dominated by oak, suggesting this tree was not in short supply by Roman times. Most of the other charcoal is also from woodland trees. Moderate amounts of alder and willow/poplar charcoal indicate some damper conditions locally. The presence of birch in several Early to Middle Roman samples (e.g. samples 1, 19, 20 and 21) may point to one or more periods of woodland regeneration. Elder may have grown on the Roman settlement.

In contrast, the medieval kiln samples seem to provide some good evidence for the burning of wood and bracken, both possibly to produce ashes for use in one or more local industry. The functions of the three medieval kilns seem to have been similar. Two or more samples were analysed from each kiln, and both wood charcoal and charred plant remains were investigated. All the samples had similar remains, with both bracken and beech wood present in each. It is probable, therefore, that beech wood and bracken were intentionally burned together these kilns. In northern Britain, distinct kiln types seem to have been built and used to produce potash from wood or bracken (Davies-Shiel 1972, 1974). The intended uses of any ash or charcoal from the Goddards' Green kilns are unclear. This material may be simply the fuel debris from other (unknown) heating operations. Nevertheless, it would be interesting if further examples of these structures emerged, or if any new evidence was discovered for textile manufacture, glassmaking, soap production or and other local industries, in future.

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Table 5 Period 1 Charcoal identifications

	Context number	1013	1015	1019	1021	1074	1078	1084	1093	1098	1108
	Cut number	1012	1014	1016	1020	1072	1077	1083	1091	1096	1057
	Feature label			1016		1080			1081		1080
	Sample number	7	8	1	2	24	18	20	19	21	14
	Period	1	1	1	1	1	1	1	1	1	1
Rosaceae											
Prunus	blackthorn/cherry		1r	1r							
Fagaceae											
Fagus sylvatica	beech timber								2		
Quercus	oak timber	65hs	12h	48hs	88sh	78hs	87hs	13h	97hs	38hs	104hs
Quercus	oak roundwood	2			5	6	13		1		2
Betulaceae											
Betula	birch			1				8	1	18	
Alnus glutinosa	alder			2	18			1r	5		
Corylus avellana	hazel									2	
Alnus/Corylus	alder/hazel							2r			
Salicaceae											
Salix/Populus	willow/poplar							5r			
Sapindaceae											
Acer campestre	field maple						1		1		
Oleaceae											
Fraxinus excelsior	ash				1	26hr					
Aquifoliaceae											
Ilex aquifolium	holly								3		
Caprifoliaceae											
Sambucus	elder							5			
cf. *Sambucus*	cf. elder								1		
	Indet. charcoal fragments	1		1	6b	3b	3b	3b	4b	12b	2b
	No. of fragments examined	**68**	**13**	**53**	**118**	**113**	**104**	**37**	**115**	**70**	**108**
	Volume of soil processed (litres)	8	7	38	36	30	36	7	36	1	8
	% charcoal identified (by wt.) (approx.)	90%	100%	100%	50%	20%	35%	100%	10%	100%	7.50%

Table 6 Period 2 Charcoal identifications

	Context number	1025	1027	1039	1041	1042	1045	1046
	Cut number	1023	1023	1036	1036	1036	1043	1043
	Sample number	3	4	15	10	17	12	13
	Period	2	2	2	2	2	2	2
Fagaceae								
Fagus sylvatica	beech timber	65	86	83	44	51	93	44
Fagus sylvatica	beech roundwood	35	28	23	9	4	14	4
Quercus	oak timber	2hs	1h				1h	3h
Betulaceae								
Betula	birch		1					
Carpinus betulus	hornbeam	1			1			1
Aquifoliaceae								
Ilex aquifolium	holly	1	12r			3		
	Indet. charcoal fragments	4b	1b	4b	1b		1b	5br
	No. of fragments examined	108	128	110	55	58	109	57
	Volume of soil processed (litres)	36	37	18	37	1	15	3
	% charcoal identified (by wt.) (approx.)	25%	10%	45%	80%	10%	60%	95%

Key
h- heartwood, s - sapwood, r - roundwood, b - bark

APPENDIX I: RADIOCARBON DATING

By Sarah Cobain

Radiocarbon dating was undertaken in order to confirm the date of kiln 1036. The sample was analysed during October 2016 at Scottish Universities Environmental Research Centre (SUERC), Rankine Avenue, Scottish Enterprise Technology Park, East Kilbride, Glasgow, G75 0QF, Scotland.

The uncalibrated dates are conventional radiocarbon ages. The radiocarbon ages were calibrated using the University of Oxford Radiocarbon Accelerator Unit calibration programme OxCal 4.2 (Bronk Ramsey 2013) using the IntCal13 curve (Reimer *et al.* 2013).

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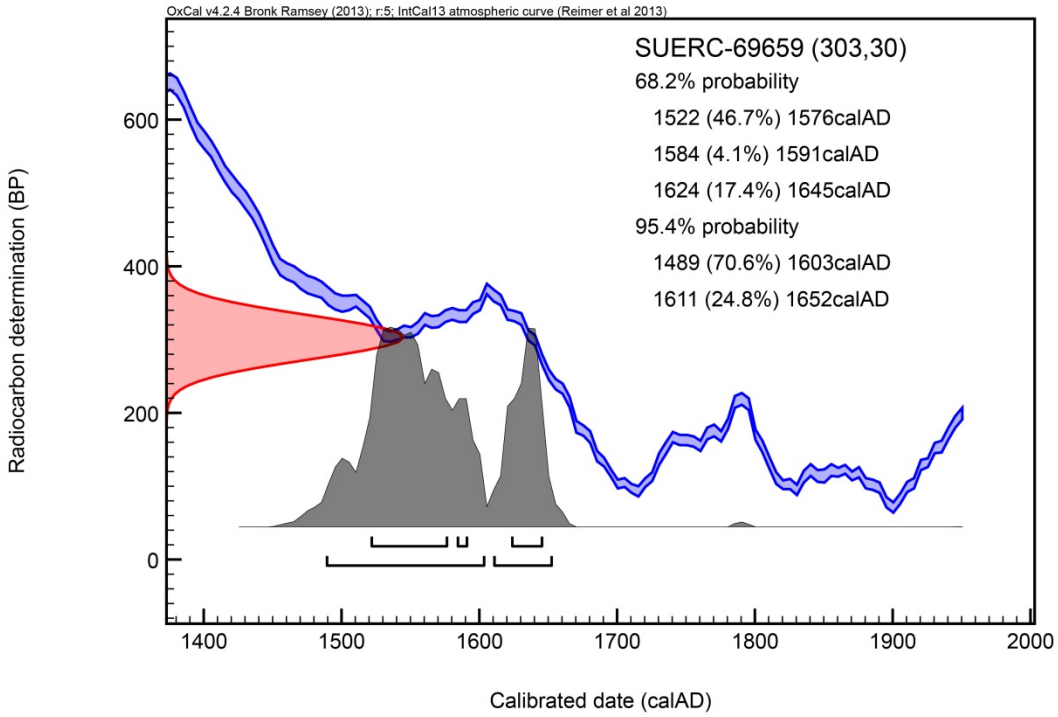
Table 7 Radiocarbon dating results

Feature	Lab No.	Material	δ ^{13}C	Radiocarbon age	Calibrated radiocarbon Age (95.4% probability)	Calibrated radiocarbon age (68.2% probability)
Context 1039 Kiln 1036	SUERC-69659	Charcoal - *Fagus sylvatica* (beech, roundwood)	-23.8‰	303 ± 30 yr BP	1489–1603 cal AD (70.6%) 1611–1652 cal AD (24.8%)	1522–1576 cal AD (46.7%) 1584–1591 cal AD (4.1%) 1624–1645 cal AD (17.4%)

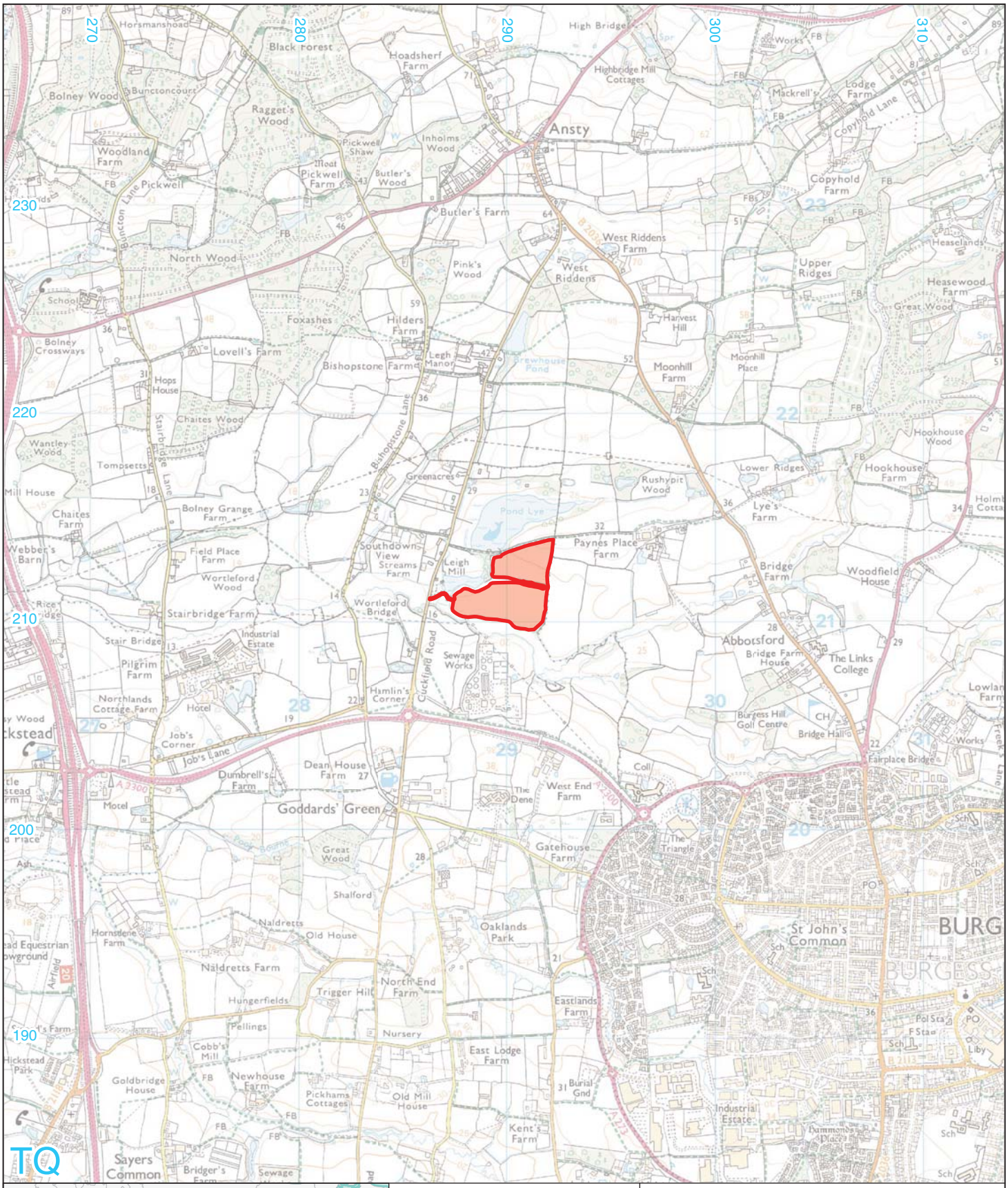
Graph 1 Calibrated radiocarbon date



APPENDIX J: OASIS REPORT FORM

PROJECT DETAILS	
Project Name	Goddards' Green Solar, Burgess Hill, West Sussex
Short description	An archaeological strip, map and sample excavation was undertaken by Cotswold Archaeology in January and February 2016 at Goddards' Green, Burgess Hill, West Sussex. The excavation area was located in the south-western part of the development site, targeted on Roman features identified in a previous evaluation of the site (CA 2015a). The excavation identified archaeological features dating to the Early to Middle Roman and late medieval to early post-medieval periods. The Early to Middle Roman activity comprised boundary ditches, pits, postholes and ovens. A large assemblage of pottery was recovered, the majority is broadly Roman, with more closely-dated pottery forms suggesting an Early to Middle Roman date for the assemblage as a whole. It comprises mostly locally manufactured East Sussex grog-tempered ware, with identifiable forms including jars and coarseware dishes/bowls, and is consistent with assemblages found in association with rural settlements. Plant macrofossils recovered from the ditches indicate that crop processing was taking place nearby. Late medieval to early post-medieval activity comprised the excavation of four kilns. No artefacts were recovered from these features and radiocarbon dating was undertaken to confirm the dating of these features. Large amounts of bracken and beech charcoal was identified within the bulk soil samples, suggesting the use of these kilns for potash production, as part of the wider potash/lye industry in the area.
Project dates	25 January to 12 February 2016
Project type	Strip, map and sample excavation
Previous work	Desk-based Assessment (CA 2015) Field evaluation (CA 2015)
Future work	Unknown
PROJECT LOCATION	
Site Location	Goddards' Green Solar, Burgess Hill, West Sussex
Study area (M^2/ha)	Site:12ha Excavation Area: 3443m^2
Site co-ordinates	TQ 2904 2117
PROJECT CREATORS	
Name of organisation	Cotswold Archaeology
Project Brief originator	Surrey County Council
Project Design (WSI) originator	Cotswold Archaeology

Project Manager	Stuart Joyce	
Project Supervisor	Andrew Whelan	
MONUMENT TYPE	None	
SIGNIFICANT FINDS	None	
PROJECT ARCHIVES	Intended final location of archive (museum/Accession no.)	Content (e.g. pottery, animal bone etc)
Physical	TBC	Pottery, worked flint, fired/burnt clay, glass, industrial waste
Paper	TBC	Context sheets, sample sheets, registers (context, drawing, photograph), sections, matrices
Digital	TBC	Reports, site survey, database, digital photos
BIBLIOGRAPHY		
CA (Cotswold Archaeology) 2017 *Goddards' Green Solar, Burgess Hill, West Sussex: Archaeological strip, map and sample excavation* CA Report **17047**		



N

0 1km

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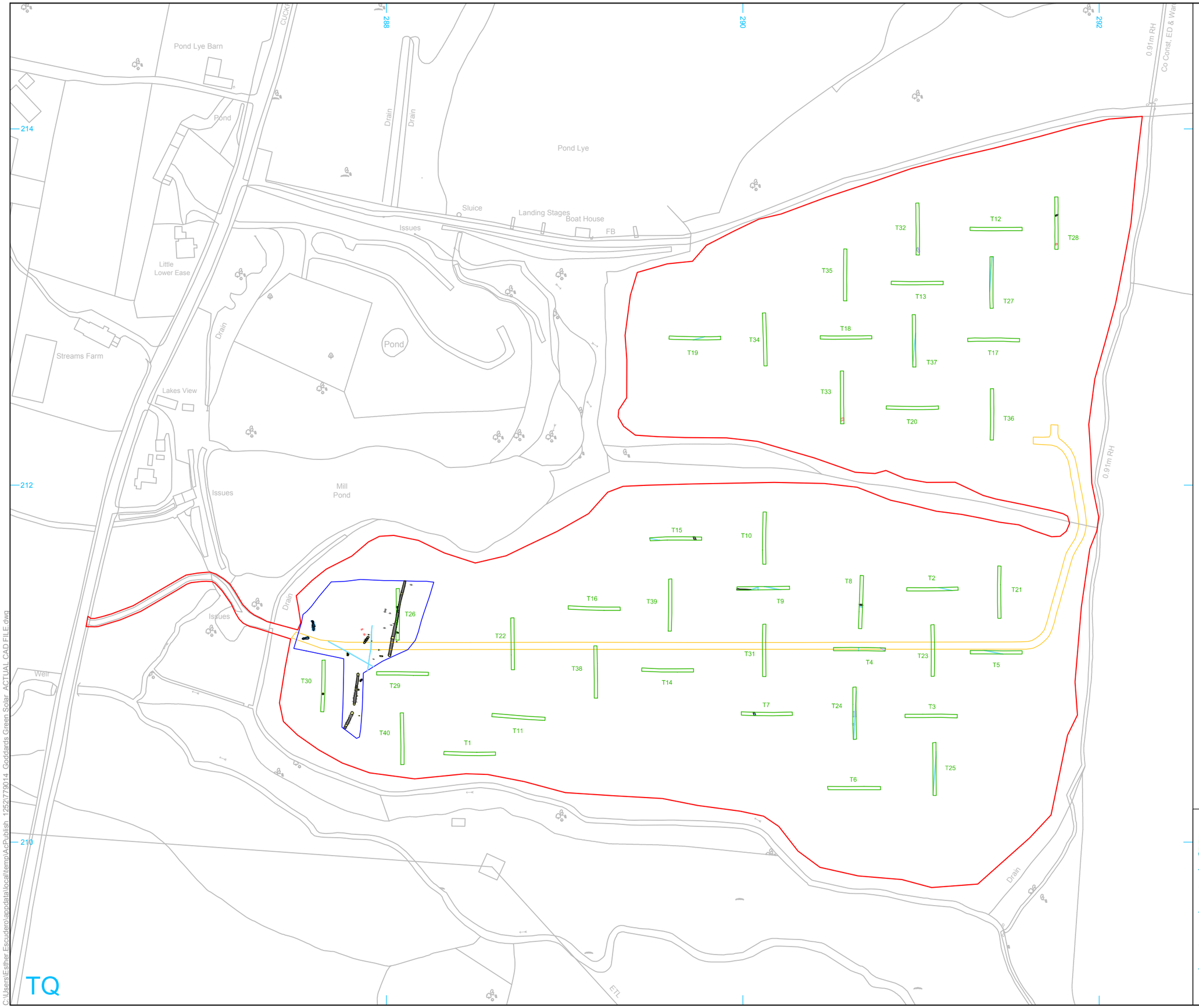
PROJECT TITLE

Goddards' Green Solar, Burgess Hill
West Sussex

FIGURE TITLE

Site location plan

DRAWN BY	**EE**	*PROJECT NO.*	**779014**	*FIGURE NO.*
CHECKED BY	**DJB**	*DATE*	**14/11/2016**	**1**
APPROVED BY	**SLC**	*SCALE@A4*	**1:25,000**	



N

- site boundary
- excavation area
- evaluation trench
- access road
- archaeological feature
- field drain
- treethrow

0 100m

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PROJECT TITLE

Goddards' Green Solar, Burgess Hill West Sussex

FIGURE TITLE

The site, showing excavation area, archaeological features and evaluation trench locations

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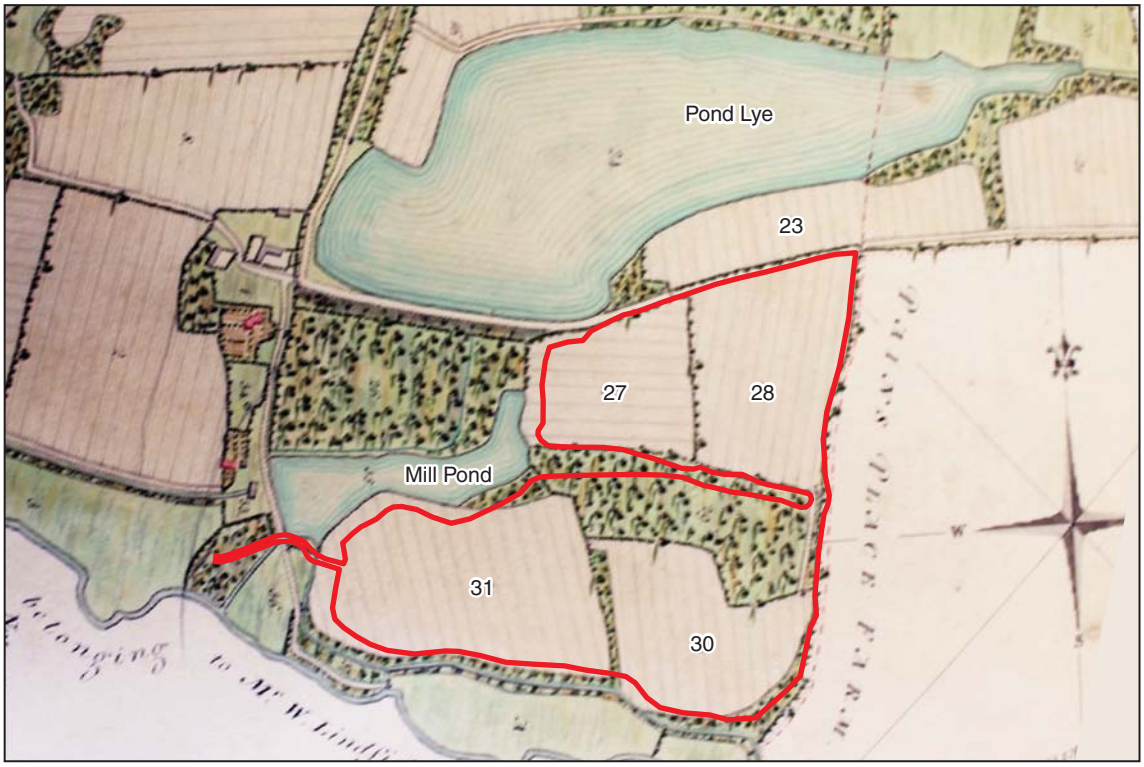
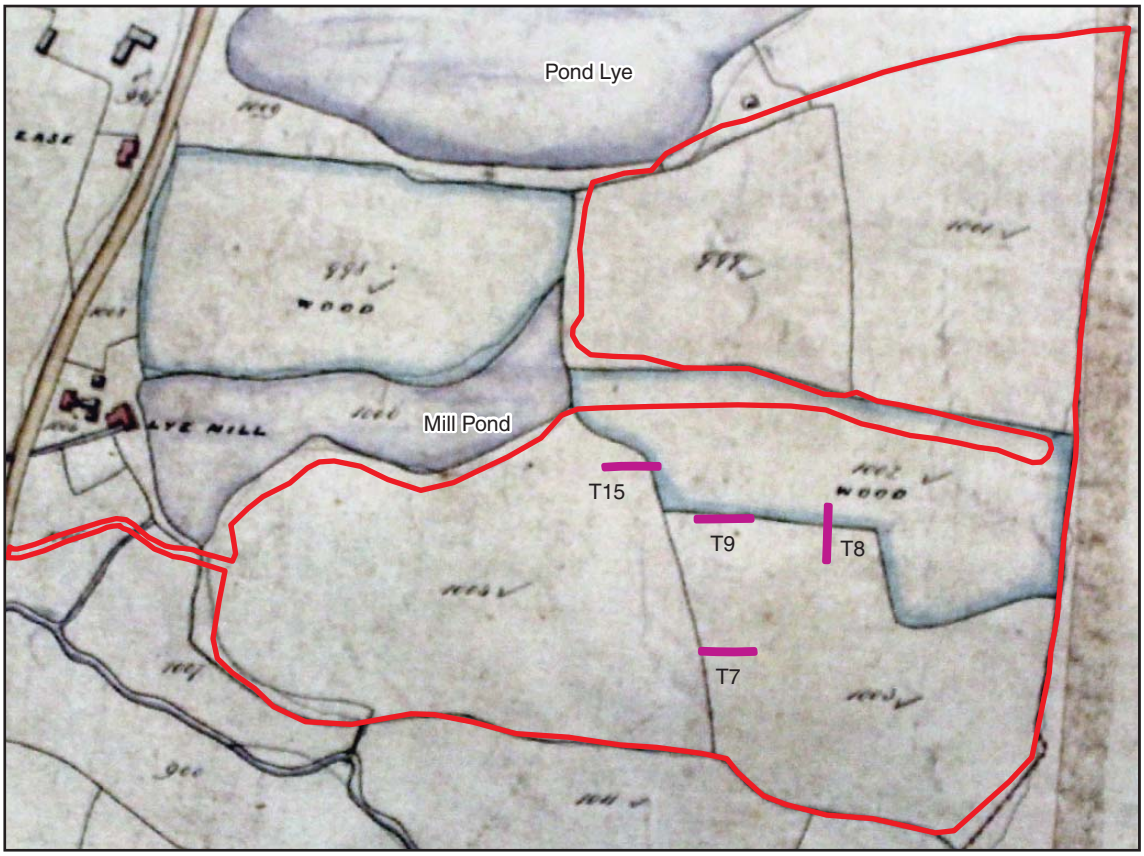
APPROVED BY	SC	SCALE@A3	1:2000	

3



Extract from the 1809 Cuckfield Place Estate Map

4



Extract from the 1842 Hurstpierpoint Tithe Map overlain by evaluation trenches 7, 8, 9 and 15

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PROJECT TITLE
Goddards' Green Solar, Burgess Hill
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FIGURE TITLE
Historic maps

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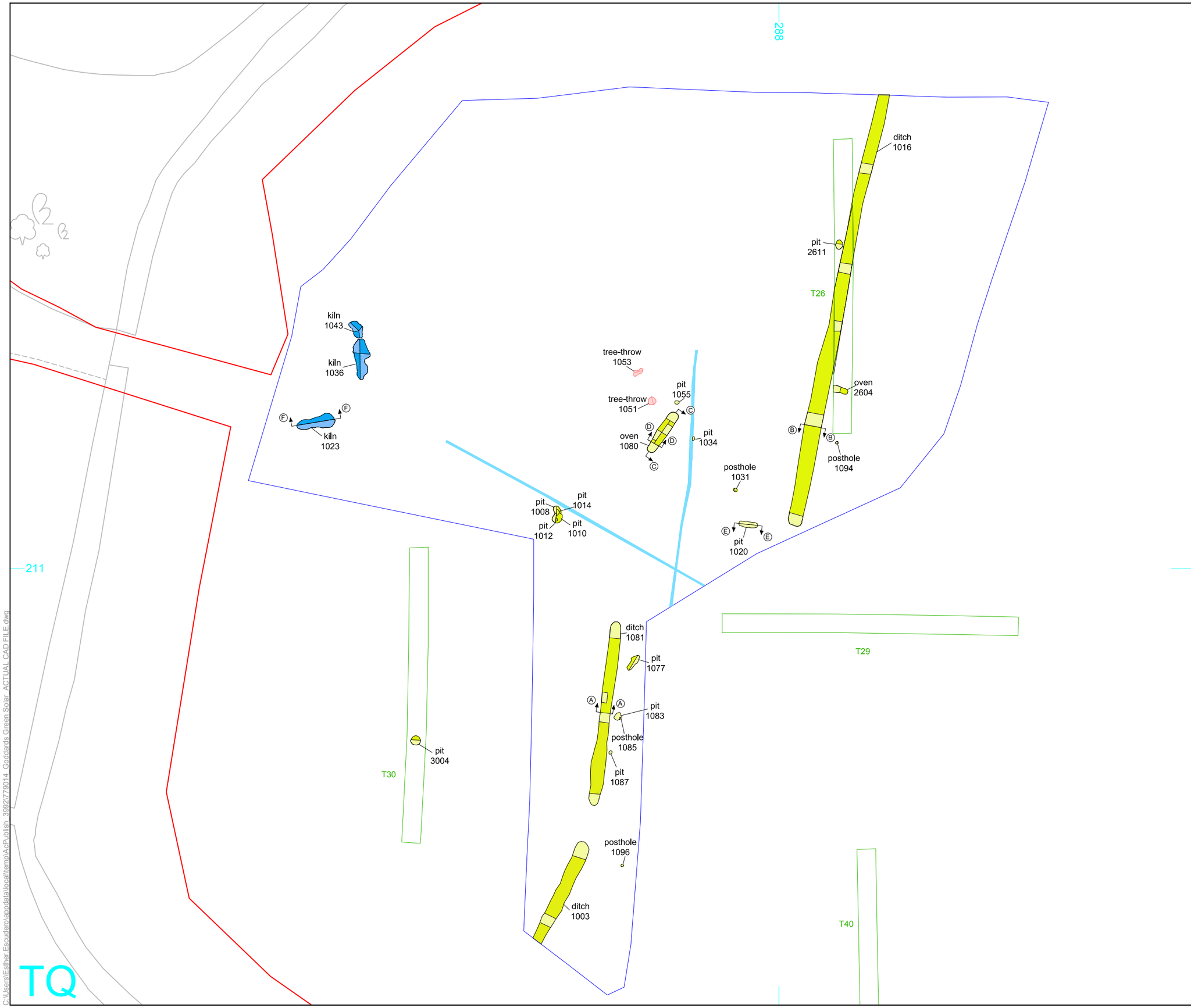
CHECKED BY	DJB	DATE	25/01/17	3 & 4
APPROVED BY	DC	SCALE@A4	approx. 1:7000	



N

site boundary
excavation area
evaluation trench
archaeological intervention
field drain
treethrow
section location

Period 1 - Early to Middle Roman
Period 2 - Late medieval to early post-medieval

0 15m

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PROJECT TITLE
Goddards' Green Solar, Burgess Hill, East Sussex

FIGURE TITLE
Excavation Area, showing archaeological features

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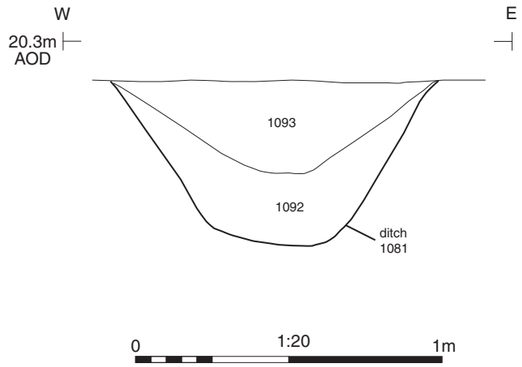
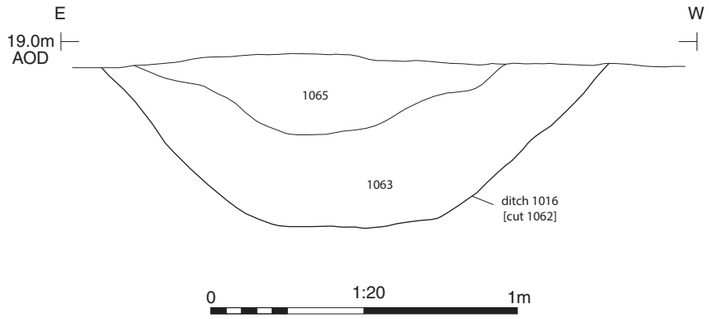
APPROVED BY	SC	SCALE@A3	1:350	

C:\Users\Esther.Escudero\appdata\local\temp\AcPublish_3992\779014_Goddards Green Solar_ACTUAL CAD FILE.dwg

Section AA



Section BB



South-facing section of ditch 1081, (scale 0.50m)

North-facing section through ditch 1016, cut [1062] (scale 1m)

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FIGURE TITLE

Sections and photographs

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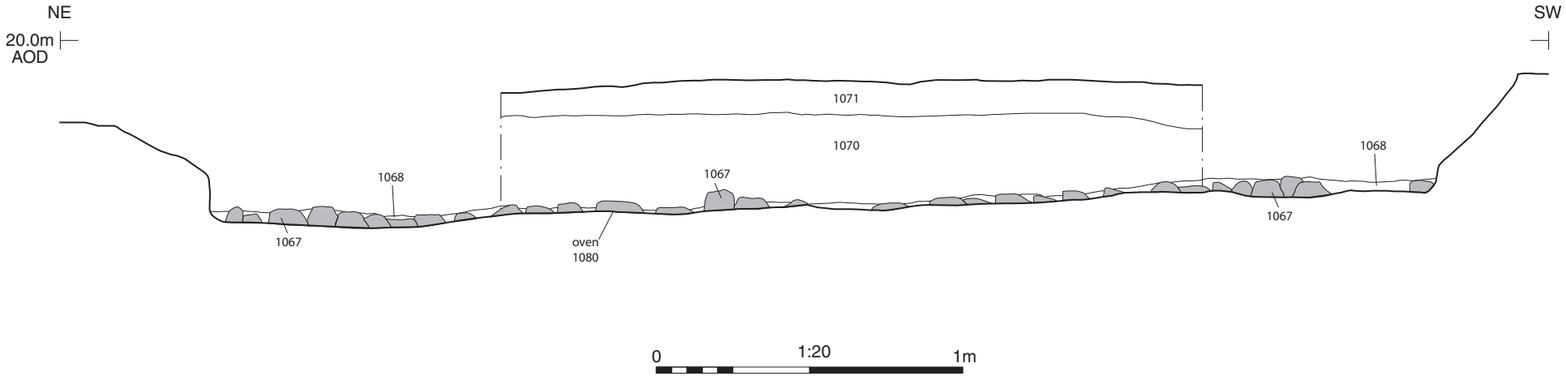
Section CC



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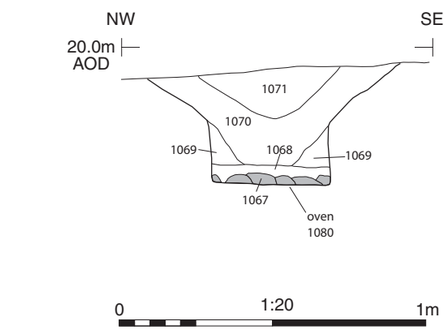

South-west facing section through oven 1080, (scale 0.50m)

stones

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PROJECT TITLE

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East Sussex

FIGURE TITLE

Sections and photograph

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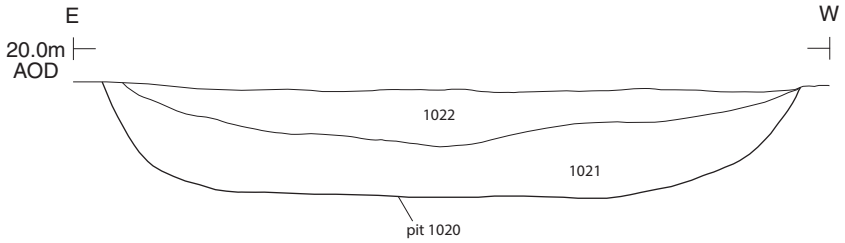
Section EE



North-facing section of pit 1020, (scale 1m)

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PROJECT TITLE

Goddards' Green Solar, Burgess Hill
East Sussex

FIGURE TITLE

Section and photograph

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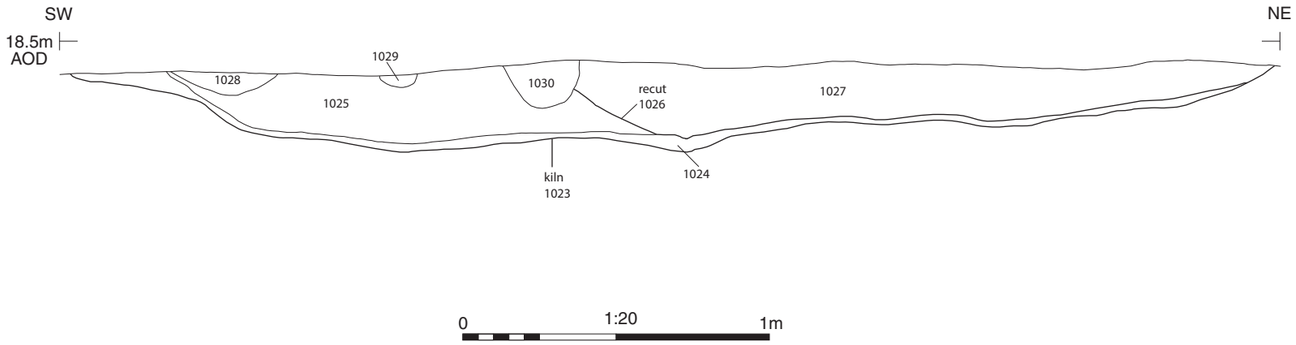
Section FF



South-east-facing section of kiln 1023, (scale 1m)

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FIGURE TITLE
Section and photograph

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0 1:4 150mm

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PROJECT TITLE

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FIGURE TITLE

Pottery Illustration

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