

# FAIRFIELD LODGE, CARTMEL, CUMBRIA

## Archaeological Watching Brief



Client: Mrs Jill Culshaw and Mr David Culshaw

Planning Application Ref.:  
SL/2020/0337

SMC ref: S00240441

NGR: 337899 478955

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October 2021



<b>The Site</b>	
Site Name	Fairfield Lodge, Cartmel
County	Cumbria
NGR	337899 478955
Scheduled Monument name (number)	Cartmel Augustinian Priory medieval gatehouse and parts of the priory precinct (1020454)

<b>Client</b>	
Client Name	Mrs Jill Culshaw and Mr David Culshaw

<b>Planning</b>	
Previous phases of work	Archaeological desk-based assessment (2020) and evaluation (2020)
Pre-planning?	No
Planning Application No.	SL/2020/0337
Plans (e.g. conversion, extension, demolition)	New garage and associated access road
Condition number	10
Local Planning Authority	South Lakeland District Council
Scheduled Monument Consent ref:	S00240441
Planning Archaeologist	Andrew Davison, Historic England/Jeremy Parsons, Cumbria County Council
Groundworks subject to watching brief	Excavation for new access road and for footings of new garage

<b>Archiving</b>	
Relevant Record Office(s)/Archive Centre(s)	Barrow-in-Furness/Kendal
Relevant HER	Cumbria
Relevant Museum	Kendal Museum

<b>Staffing</b>	
Desk-based assessment	Dan Elsworth
Watching brief	Dan Elsworth
Report writing	Dan Elsworth
Report editing	Jo Dawson
Illustrations	Tom Mace
Date(s) site work carried out	29/07/21, 30/07/21, 02/08/21, and 06/09/21

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## Summary

Following to the submission of a planning application for the construction of a new garage and associated access road on land at Fairfield Lodge, Cartmel, Cumbria, a condition was placed on the Scheduled Monument consent for an archaeological watching brief on the associated groundworks. Greenlane Archaeology was commissioned to carry this out, the work being carried out in July and August 2021.

A preceding desk-based assessment had shown that the site had formed part of a single field to the south of Fairfield Lodge since at least the early 19<sup>th</sup> century, and had seen very little change. It is, however, located relatively close to Cartmel Priory church and therefore the core of the medieval priory, and is within the priory's precinct wall, which still remains to the north. The wider area has evidence for human occupation from at least the end of the last Ice Age; of particular significance to the site is the uncertain nature of Roman activity on the Cartmel Peninsula; earthworks were reported in the 19<sup>th</sup> century as having existed in the area around Fairfield, thought to be associated with an area to the north known as 'Castle Meadows' and assumed to be Roman in origin, although these were levelled during the construction of Fairfield. The priory at Cartmel was founded at the end of the 12<sup>th</sup> century and while there has been considerable speculation about the development of its core, archaeological and other investigation has been limited until relatively recently.

An archaeological evaluation was carried out prior to the submission of the planning application comprising the excavation of two trenches. The northernmost of these (Trench 2) revealed no archaeological features, although a collection of medieval pottery was recovered from the topsoil. The south-western trench (Trench 1) revealed a range of features and deposits, including an apparently deliberate raised area of redeposited clay and gravel, either side of which was a deposit containing some slag. There was also a pit of 19<sup>th</sup> century date containing building rubble, all of which was covered by a layer of stony topsoil, which was probably brought in to level the lower ground either side of the raised area.

The watching brief revealed a range of additional features, all of them probably or definitely post-medieval in date. These comprised a substantial ditch following the line of the boundary to the north, which probably represented a ha-ha, and a linear ditch, most likely a former field boundary. Service trenches for both gas and electricity were also present, cutting through earlier deposits, and the raised area of redeposited clay and gravel was found to have been truncated outside of the area of the original evaluation trench. More significant was a layer of redeposited material or subsoil in the area of the new driveway, which contained a collection of medieval pottery and an assemblage of iron working residue. Analysis of this confirmed it as smelting waste from the bloomery process, which had been reprocessed from its original location, and it is another example of such material recovered from the north-west part of the priory precinct. Other finds of interest include two unusual marked clay tobacco pipe stems.

The results add additional knowledge to the understanding of the development of Cartmel Priory, which has been growing in recent years due to various pieces of archaeological work. In particular it demonstrates the connection to the iron industry, with smelting activity evidently having taken place in the north-west corner of the Priory precinct. It is recommended that the iron working residue be subject to further analysis, ideally alongside that already discovered from nearby Priory Gardens.

## Acknowledgements

Greenlane Archaeology would like to thank Jill and David Culshaw for commissioning the project and for their help on site and their builder Dan Foy and colleague for their assistance during the project. Some of the finds processing was carried out by Emmie Elsworth, the iron working residues were assessed by Gerry McDonnell, and the marked clay tobacco pipes assessed by Peter Davey.

# 1. Introduction

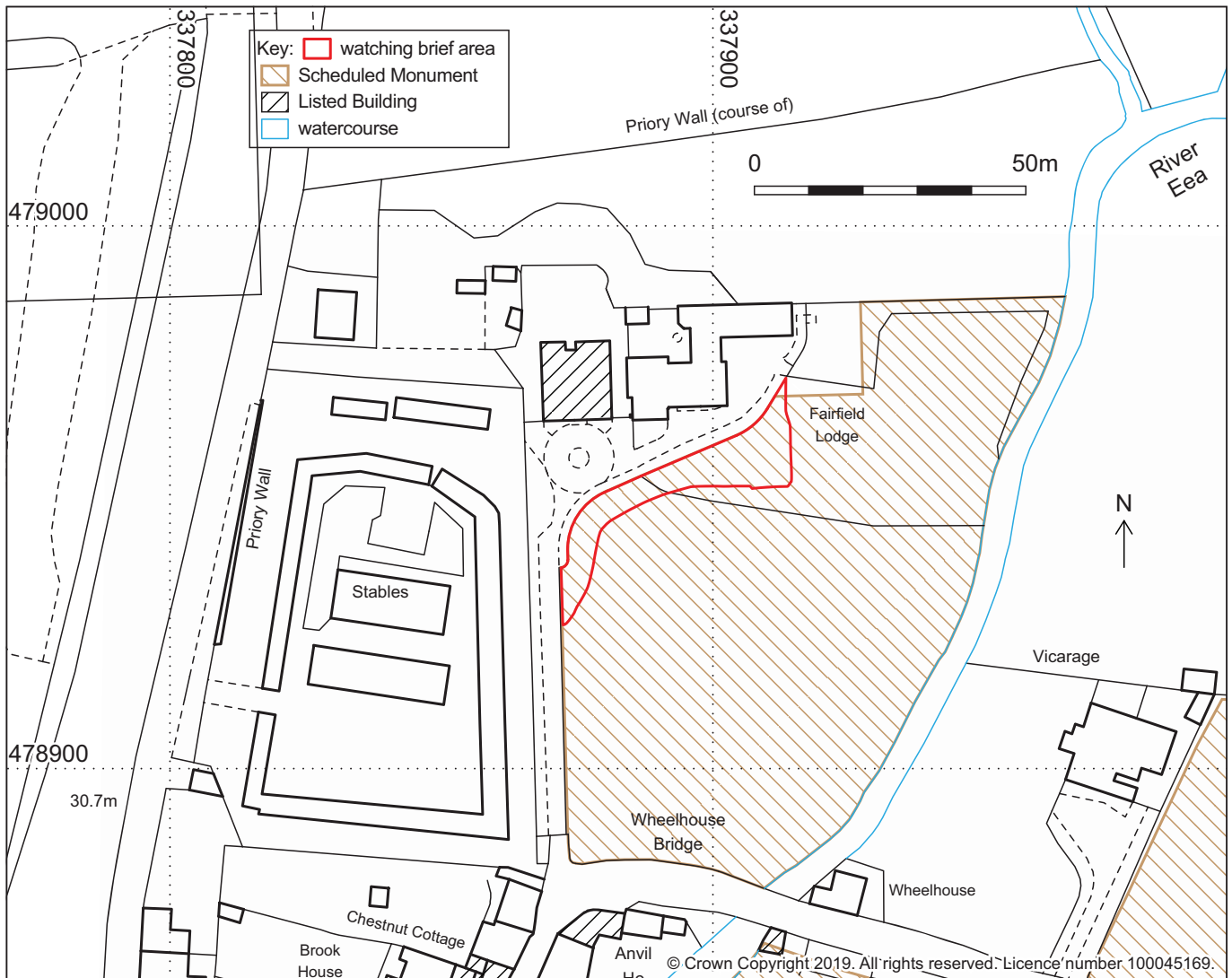
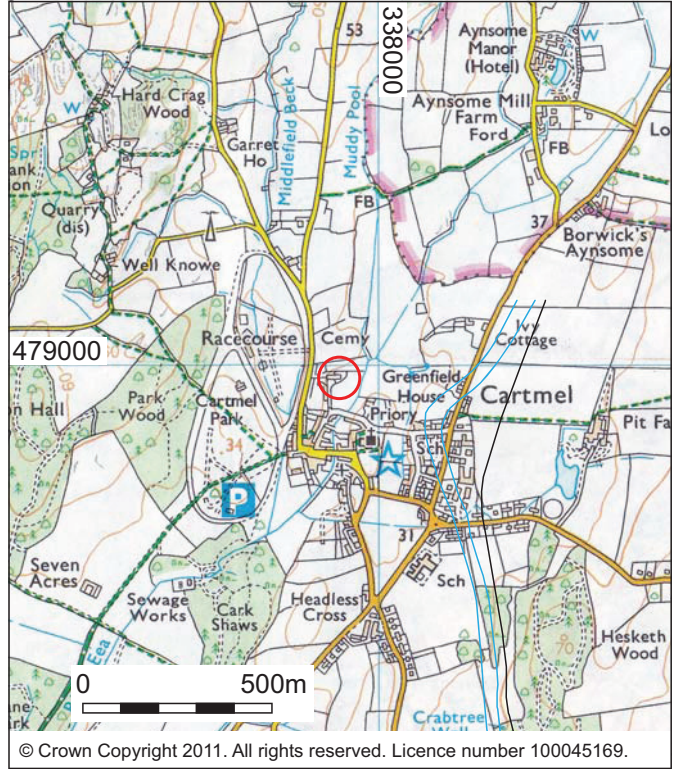
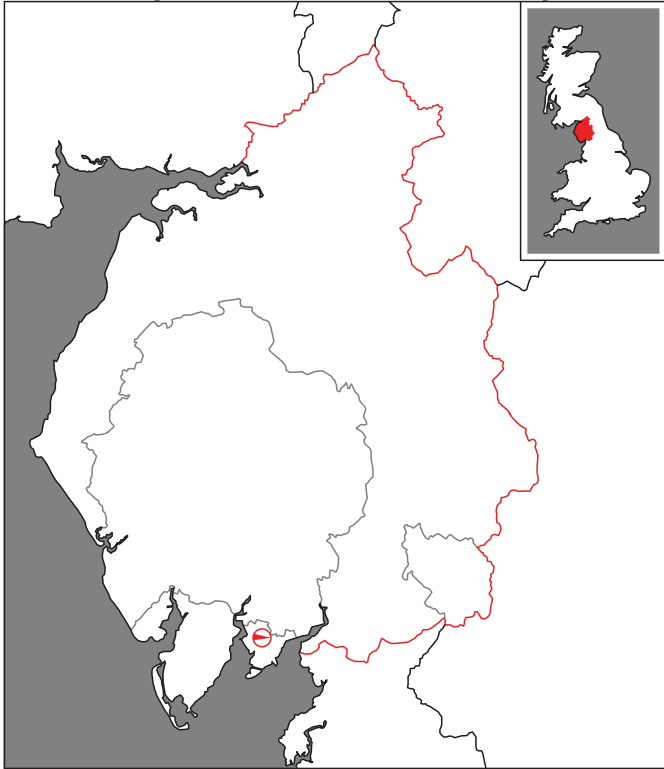
## 1.1 Circumstances of the Project

1.1.1 The circumstances of the project are set out in the tables on the inside cover of this report.

## 1.2 Location, Geology, and Topography

1.2.1 The site is located on the north side of Cartmel off Priest Lane, at approximately 30m above sea level (Figure 1; Ordnance Survey 2011). The 'exceptional' and 'largely unspoilt' village of Cartmel, situated approximately 3.5km north-west of Grange-over-Sands to the south of the South Cumbria Low Fells on the northern side of Morecambe Bay (Countryside Commission 1998, 69; Ordnance Survey 2011), is now protected by Conservation Area status (Countryside Commission 1998, 73).

1.2.2 Cartmel lies on the junction of a complex series of solid geology comprising Bannisdale Slates of Silurian age and carboniferous limestone, covered by thick glacial debris, including deposits of cobbles, pebbles and sandy material (Mitchell 1990, 43; Moseley 1978, plate 1). The local topography is typically that of improved undulating pasture set between areas of limestone, and more locally to Cartmel, slate outcrops.



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Figure 1: Site location

## 2. Methodology

### 2.1 Desk-Based Assessment

2.1.1 A desk-based assessment was carried out in accordance with the guidelines of the Chartered Institute for Archaeologists (CIfA 2020b). This principally comprised an examination of published secondary sources in order to produce a historical and archaeological background to the site and provide some context for the results. A number of sources of information were used during the compilation of the desk-based assessment:

- **Greenlane Archaeology:** Greenlane Archaeology's office library includes maps, local histories, and unpublished primary and secondary sources. These were consulted where relevant, in order to provide information about the history and archaeology of the site and the general area.

### 2.2 Archaeological Watching Brief

2.2.1 The watching brief monitored groundworks associated with the project set out in the tables on the inside cover of this report.

2.2.2 All aspects of the archaeological recording were carried out according to the standards and guidance of the Chartered Institute for Archaeologists (CIfA 2020a) and Greenlane Archaeology's own excavation manual (2007). The deposits encountered were recorded in the following manner:

- **Written record:** descriptive records of all deposits were made using Greenlane Archaeology's *pro forma* record sheets. A detailed description of the contexts encountered is presented in *Appendix 1*;
- **Photographs:** photographs in colour digital format (both 12 meg JPEG and RAW file format) were taken of the site as well as general working shots. A selection of the colour digital photographs is included in this report. A written record of all of the photographs was also made using Greenlane Archaeology's *pro forma* record sheets;
- **Drawings:** drawings were produced on site as follows:
  - i. a site plan was produced at a scale of 1:200, based on an existing plan of the site;
  - ii. a plan of the area of the garage footings was drawn by hand on site at a scale of 1:100.

### 2.3 Environmental Samples

2.3.1 No environmental samples were collected as no suitable deposits were encountered during the evaluation.

### 2.4 Finds

2.4.1 **Collection:** all of the finds were recovered by hand and stored in self-seal bags with white write-on panels on site before being removed for processing and assessment. The spoil was also checked with a metal detector and any non-iron finds retained.

2.4.2 **Processing:** all of the artefacts recovered from the watching brief were washed, with the exception of metal objects, which were dry-brushed. They were then naturally air-dried and packaged appropriately in self-seal bags with white write-on panels.

2.4.3 **Assessment and recording:** the finds were assessed and identified in the first instance by Jo Dawson (post-medieval pottery), Tom Mace (medieval pottery, animal bone, clay tobacco pipe) and Dan Elsworth (metal, CBM). Specialist assessment was also carried out by Gerry McDonnell of the industrial residue (iron working residue) and Peter Davey (marked clay tobacco pipe). The finds were recorded directly into the catalogue produced as part of this report (*Appendix 3*), with a specialist report on the marked clay tobacco pipe presented in *Appendix 4* and a specialist report on the ironworking residue presented in *Appendix 5*.



## 2.5 Archive

2.5.1 The archive of the project will be deposited with the relevant Record Office or Archive Centre, as detailed on the cover sheet of this report, together with a copy of the report. The archive has been compiled according to the standards and guidelines of the ClfA guidelines (ClfA 2020b). In addition, details will be submitted to the *Online Access to the Index of Archaeological Investigations* (OASIS) scheme. This is an internet-based project intended to improve the flow of information between contractors, local authority heritage managers and the general public. A copy of the report will be provided to the client and a digital copy of the report will be provided for the relevant Historic Environment Record, as detailed on the cover sheet of this report.

### 3. Rapid Desk-Based Assessment

#### 3.1 Introduction

3.1.1 A full desk-based assessment was completed as an earlier phase of work, and relevant sections have been taken from that report and are presented below. The desk-based assessment is used to produce two elements: a map regression showing the development of the site and a site history in order to present the results of the watching brief in their local historical and archaeological context.

#### 3.2 Map Regression

3.3.2 **Enclosure map, 1807:** this appears to show the buildings that comprise Fairfield and Fairfield Lodge as forming a large C-shaped block set back against the boundary to the north (CAC(K) WPR 89 Z3 1807). This is a considerably different arrangement to that shown on the later maps, especially with regard to Fairfield Lodge, although some caution has to be used as the scale means that it is not necessarily particularly accurate.

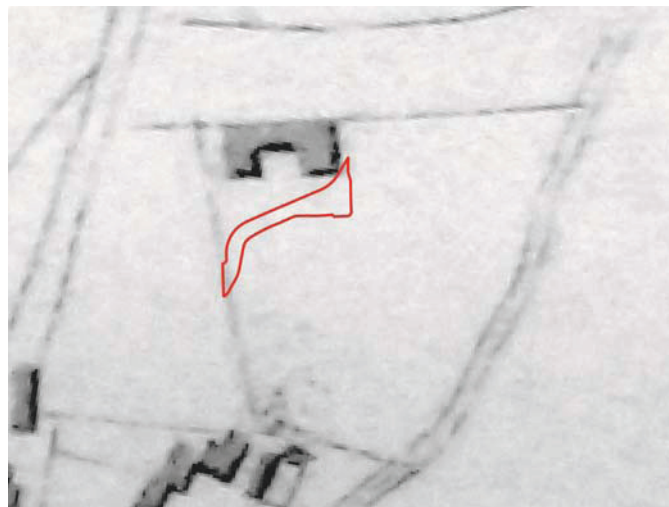


Plate 1: Extract from the enclosure map of 1807 showing the site

3.3.3 **Ordnance Survey, 1851:** a north/south aligned building is clearly marked on the site of Fairfield Lodge on the 1851 edition of the Ordnance Survey mapping, while Fairfield house is shown as a more square block although with outshuts to the rear (Plate 2; Ordnance Survey 1851b). A sweeping, curved field boundary divides the area, with the houses and gardens to the west and an open field to the east. There are also two small buildings marked against the north boundary.

3.3.4 **Ffolliott's Plan of 1854:** a similar arrangement is shown on Ffolliott's map as depicted on the first edition Ordnance Survey, certainly in terms of the field boundaries (Plate 3; cf. Plate 2). The buildings are depicted slightly differently: the north/south block is subdivided and appears slightly longer and there is only one building shown against the north boundary. Ffolliott was apparently the first person to attempt to depict the line of the precinct boundary of Cartmel Priory, although it is not clear how this information was ascertained and therefore how accurate it is.

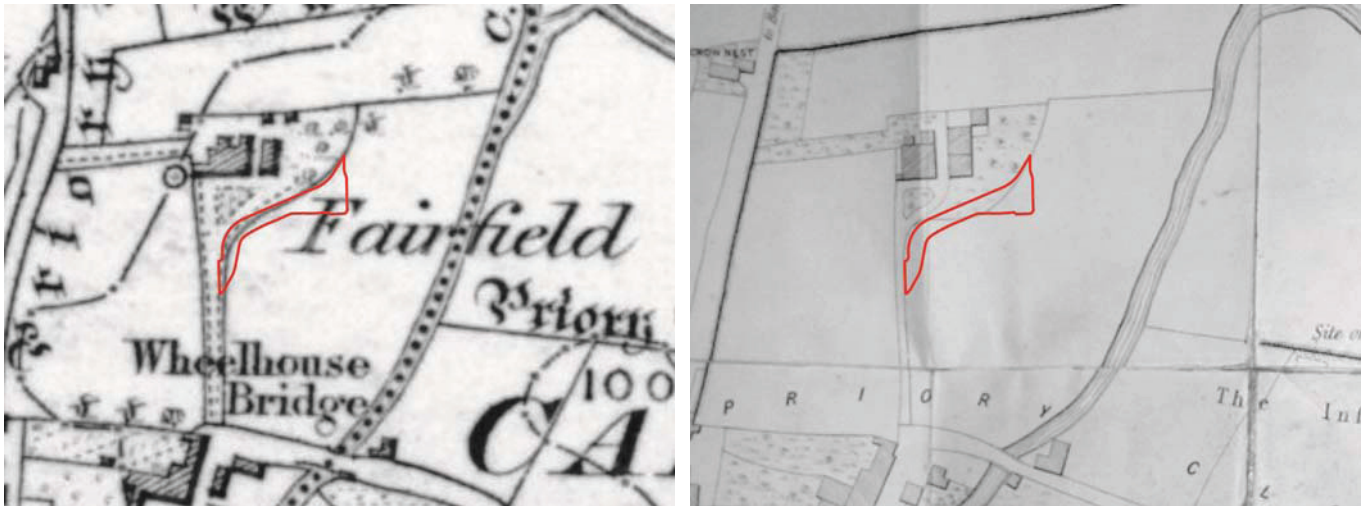


Plate 2: Extract from the Ordnance Survey map of 1851

Plate 3: Extract from Ffolliott’s plan of 1854 showing the precinct wall (the thick line to the north of the site)

3.3.5 **Ordnance Survey, 1890:** the 1890 edition of the Ordnance Survey map was surveyed in 1889 and shows much the same layout as the 1851 edition albeit it in more detail due to the differences in scale at which the two editions were produced (Plate 4). The dimensions of the north/south building as depicted on the two early editions of the Ordnance Survey maps are more similar than either is with the elongated version as it appears on Ffolliott's map. There are more paths shown and more buildings or enclosed areas marked along the north edge of the area by this point too, while the ‘Priory Wall’ is specifically named.

3.3.6 **Ordnance Survey, 1913:** the buildings or enclosed areas along the north site boundary have changed slightly and a porch appears to have been added to the east side of the north/south block (Plate 5; cf. Plate 4).

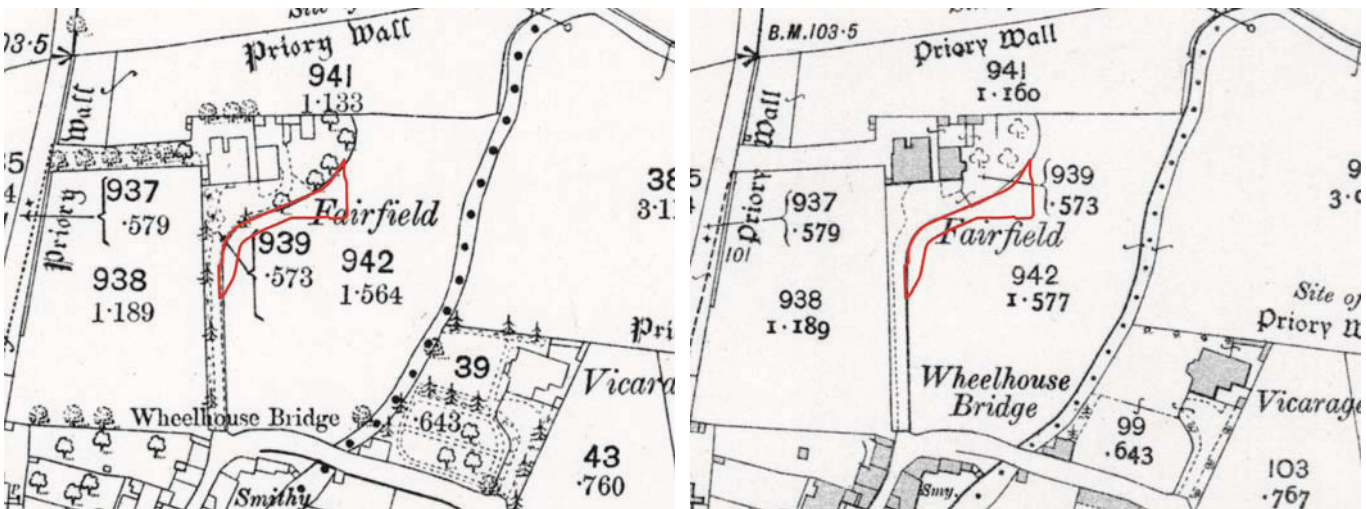


Plate 4: Extracts from the Ordnance Survey maps of 1890

Plate 5: Extract from the Ordnance Survey map of 1913

3.3.7 **Ordnance Survey, 1933:** a small east/west outbuilding is shown to the east of the north/south block, but the site otherwise remains the same (Plate 6; cf. Plate 5).

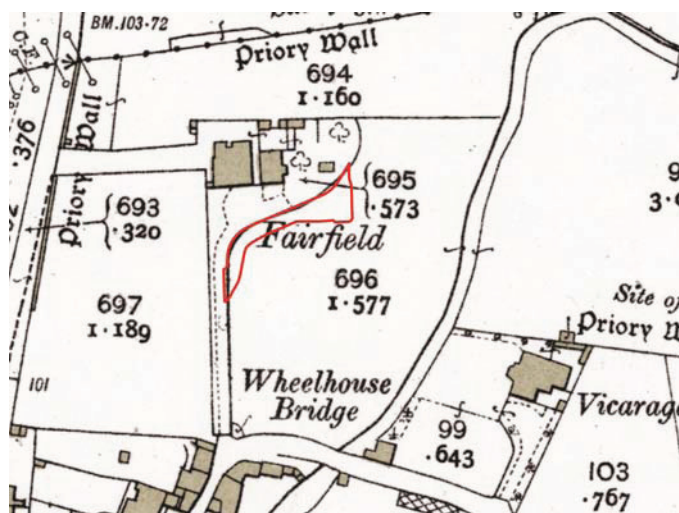
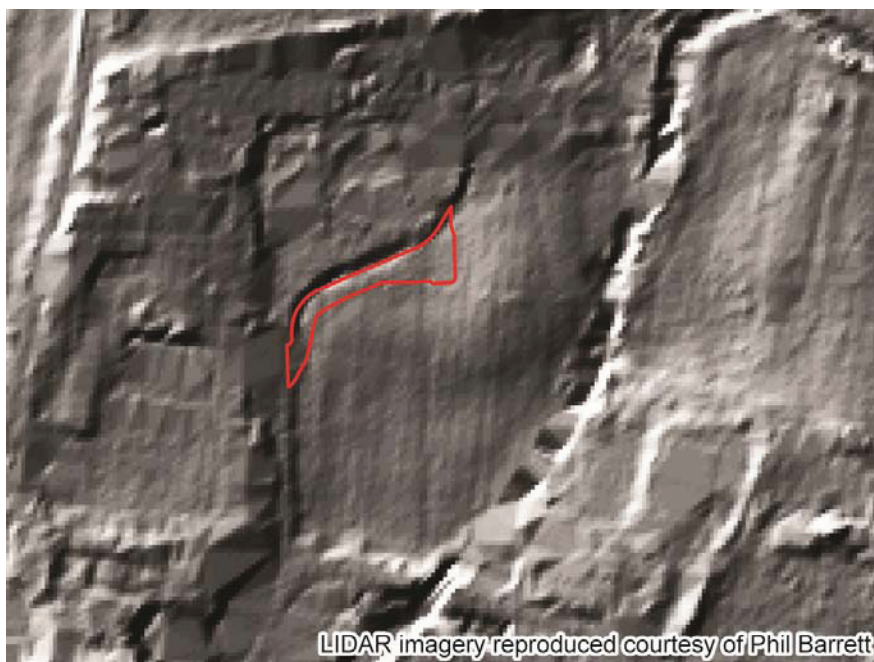


Plate 6: Extract from the Ordnance Survey map of 1933

### 3.4 Lidar

3.4.1 **Lidar**: the lidar imagery for the site shows two interesting details. Firstly, it is apparent that the meadow to the south of site has been improved and possibly ploughed as what is perhaps narrow and straight ridge and furrow, orientated north/south is evident. Secondly the boundary running through the centre of the site is apparently shown as including a substantial ditch, which appears to correspond to the possible ha-ha revealed during the watching brief.



LIDAR imagery reproduced courtesy of Phil Barrett

Plate 7: Lidar data for the site

### 3.5 Site History

3.5.1 **Prehistoric Period (c11,000 BC – 1<sup>st</sup> century AD)**: while there is limited evidence for activity in the county in the period immediately following the last Ice Age, this is typically found in the southernmost part on the north side of Morecambe Bay. Excavations of a small number of cave sites have found artefacts of Late Upper Palaeolithic type and the remains of animal species common at the time but now extinct in this country (Young 2002). The county was also clearly inhabited during the following period, the Mesolithic (c8,000 – 4,000 BC), as large numbers of artefacts of this date have been discovered

during field walking and eroding from sand dunes along the coast, but these are typically concentrated in the west coast area and on the uplands around the Eden Valley (Cherry and Cherry 2002). Slightly closer to the site, however, a large number of finds of this date were discovered during excavations carried out in the 1970s in the park belonging to Levens Hall, and, although largely ignored at the time, they were subsequently published (Cherry and Cherry 2000). In addition, a small amount of Mesolithic material has been found at the north end of Windermere during excavations on the Roman fort site (see for example Finlayson 2004). These discoveries, particularly those at Levens, demonstrate that further remains of similar date are likely to exist in the local area and that river valleys, lakesides, and coastal areas are a common place for such remains to be discovered (Middleton *et al* 1995, 202; Hodgkinson *et al* 2000, 151-152).

3.5.2 In the following period, the Neolithic (c4,000 – 2,500 BC), large scale monuments such as burial mounds and stone circles begin to appear in the region and one of the most recognisable tool types of this period, the polished stone axe, is found in large numbers across the county, having been manufactured at Langdale (Hodgson and Brennand 2006, 45). During the Bronze Age (c2,500 – 600 BC), monuments, particularly those thought to be ceremonial in nature, become more common still, and it is likely that settlement sites thought to belong to the Iron Age have their origins in this period. These are not well represented in the area around the site, although an enclosure on Hoad Hill near Ulverston perhaps has its origins in this period (Elsworth 2005), as might another one at Skelmore Heads near Urswick, although this was also associated with evidence for activity in the Neolithic (Powell 1963). Stray finds of Bronze Age date are found throughout the county and a number have been found in the Cartmel area. These include a stone axe hammer said to have been found at Aynsome, although the exact find spot of this is not known (Rigge 1885, 266). A bronze axe with a very pronounced stop ridge was also found in a peat moss near Cartmel, but again the find spot and current whereabouts are unknown (Clough 1969, 8). Sites that can be specifically dated to the Iron Age (c600 BC – 1<sup>st</sup> century AD) are very rare; the enclosures at Ulverston and Urswick may represent hillforts, a typical site of this period, but they have not been dated. Closer to the site, immediately to the east of Cartmel on Hampsfell, a group of over 50 structures identified as hut circles was reported in the late 19<sup>th</sup> century (Rigge 1885). No further details relating to these are known but it is possible that they represent the remains of a later prehistoric settlement or even a hillfort. At Levens, burials radiocarbon dated to the Iron Age have been discovered (OA North 2004), but these remain a rarity both regionally and nationally.

3.5.3 **Romano-British to Early Medieval Period (1<sup>st</sup> century AD – 11<sup>th</sup> century AD):** late 18<sup>th</sup> and 19<sup>th</sup> century antiquarians considered a Roman military presence in the Furness area, which included the Cartmel peninsula, beyond question, but by the 20<sup>th</sup> century there was a complete reversal of opinion (summarised in Elsworth 2007, 31-37). It is evident that in this part of the country, initially at least, the Roman invasion had a minimal impact on the native population in rural areas (Philpott 2006, 73-74), but ultimately the evidence suggests a strong Roman influence or “background” presence in the peninsula during the Roman period, which doubtless would have been attractive for its rich iron reserves (Shotter 1995, 74; Elsworth 2007, 37, 41-43). Traditionally, a Roman camp is thought to have been located somewhere in area adjacent to Fairfield, perhaps most likely in an area known as ‘Castle Meadows’ to the north of Fairfield Lodge (Stockdale 1872, 253), although at the present time there is scant evidence to support this theory. That said, Stockdale recalls having the suspected *agger* [cambered embankment of a Roman road] of this *castellum* [small fort] pointed out to him by an acquaintance (Stockdale 1872, 253). The site was held to stretch along the side of the River Eea, “*It was then not very traceable, but he said it had been levelled down and much of it taken away*” (*ibid.*). Elsewhere, in Stockdale’s unpublished manuscript notes, it is recalled that an ‘*oblong (parallelogram) mound in the meadows at Cartmel called Castle Meadows exactly in the shape of a Roman Camp – [was] destroyed partly by the encroachment of [the] River – the formation of the present road and chiefly [sic] by Mr Fell when he was building his house [at Fairfield] and improving his meadow*’ (CAC(B) DDHJ/4/2/1/8 1860s-1872). Unfortunately, the location of “Castle Meadows” is now slightly ambiguous. The issue is clouded somewhat by Stockdale who implies that both fields may have been called “Castle Meadows” (Stockdale 1872, 253), potentially owing to the former location of the fort thereabouts, while the first edition of the Ordnance Survey labels a large general area to the north-east of Fairfield as ‘Castle Meadows’ (Ordnance 1851a; 1851b). The will of Thomas Fell of Fairfield, written in 1838 but proved in 1840, states that his house had “*three fields*

*adjoining*” but does not give their name (CAC(B) BDKF/1/22 1840), while a later account states that Castle Meadows was “*a field on the right has side of the road which goes up to Green Bank from Cartmel*” (Women’s Institute Cartmel Branch 1928, 2).

3.5.4 Various finds of Roman coins and hoards of Roman coins have been found in or around Cartmel, dating from the first to the fourth centuries AD (Shotter 1988, 241; Shotter 1989). The exact find spots for these are unknown, but their presence perhaps points to the contemporary importance of the south Cumbrian coast and its integration into the economy of the Roman north-west and its links to other Roman centres such as Lancaster and Ravenglass (Shotter 1995). Further Roman sites may yet be discovered in the areas of Barrow and Cartmel, but firm evidence for a Roman military presence remains elusive (Shotter 1995, 77; 2004, 67; Elsworth 2007). A recent evaluation at Fairfield (Greenlane Archaeology 2011) recovered three sherds of what may be Roman pottery from a road surface, but these were not dated with certainty and may be medieval.

3.5.5 The origins of a Christian community in Cartmel and the wider Cartmel Peninsula are obscure. What is undoubted is that there was a British population in Cartmel following the demise of the Roman Empire’s control over the area, as they are referred to in a grant made by the Northumbrian King Ecgrith to St Cuthbert of land in Cartmel; historically this was translated as having included the British population, i.e. that the natives were given as chattels (Crowe 1984, 63), but more recently this has been reinterpreted as referring to the grant having been made by Ecgrith *and* the Britons that were in Cartmel, suggesting that there was a recognised native aristocracy in the area that were negotiating with the Northumbrians (Edmonds 2013, 20). Whether that means there was an existing British church estate within the block of land that was presented as part of this grant is difficult to say. No *eccles* place-names are recorded in the immediate vicinity of Cartmel itself, which would potentially indicate the presence of a British church, or at least land held or controlled by them (Elsworth 2011), although there is an ‘Eccleston Meadow’ in Flookburgh, which might be significant in this regard (Stockdale 1872, 125). Nevertheless place-names indicating the presence of Britons are found in the region, such as Walton, which derives from an Anglo-Saxon word *wealas* applied to native Britons, possibly especially those that thought of themselves as Romans (Woolf 2010, 231-232).

3.5.6 Of potential interest in understanding the origins of the church in Cartmel, and therefore the subsequent development of the priory, are other local place-names, which indicate the presence of a church. Kirkhead, near Allithwaite, demonstrates that when Norse settlers arrived in the area in the 10<sup>th</sup> century there was a church already in existence, or, more implausibly, that they constructed a church when they arrived. The names ‘Kirkepol’ and ‘Kirk Heys’ are also recorded nearby (Crowe 1984, 65), but there is no certainty that a church existed in the area around Kirkhead and, like *eccles* place-names, the element *kirk* could just refer to land controlled by a church. However, Stockdale records a ‘*tradition that there was a chapel near Kirkhead and Abbot Hall – some remains of which, even graves, it is said, existed in the last century*’ (Stockdale 1872, 505). Crowe also suggests that the place named as *Cherchebi* (meaning ‘church village’) in the Domesday survey corresponds with Cartmel, since it was known as ‘Cartmel Churchtown’ in later records (1984, 61), although this correlation is by no means definite. Complicating the issue further is the story regarding the foundation of the actual priory; according to a legend, first printed in 1821 (Atkins 1821), the monks came into Cartmel looking for a place for their new priory and found a suitable hill. Having marked out the site for building a voice spoke to them saying ‘*Not there, but in a valley between two rivers, where the one runs north, and the other south*’. Unable to imagine such a place they began searching across the north of England, but finding nothing matching this description they returned to the original hill. In doing so they crossed a valley where they found a stream running north and another running south, as predicted, and between them they built their priory. They also built a chapel on the original hill dedicated to St Bernard, which retains this name as ‘Mount Bernard’ to this day. Regardless of the speculation about the possibility of early churches being on different sites, the fact that the 12<sup>th</sup> century priory church was used as a parish church actually makes it entirely plausible that the priory actually, quite deliberately, located on the site of an earlier church. This would be more in keeping with other sites, where continuous use of the same site was relatively common, although this is normally only evident through archaeological excavation. A good recent and relatively local example of this is at St Michael’s Church Workington (Zant and Parsons 2019). Indeed, it is clear that a church did exist at Cartmel before the establishment of the priory

because there is a reference in 1135 to Willelmus, clerk of Cartmel, and in 1155 to Uccheman, parson of Cartmel (Stockdale 1872, 8-9). It is also interesting to note that a consideration of the geology of the site has concluded that the priory is actually built on an island of glacial debris in a post-glacial lake (Mitchell 1990, 44 and figure 2 on page 48); this would have been an ideal location for an early medieval 'celtic' church/monastery, which were often on isolated spots such as islands or peninsulas (see Thomas 1971, 10-47). In the wider area local place names indicate a complex mixture of social and ethnic groups during this period, including native Britons, Angles and Vikings.

**3.5.7 Medieval Period (11<sup>th</sup> century AD – 16<sup>th</sup> century AD):** the earliest forms of the place-name 'Cartmel', which are recorded from the 12<sup>th</sup> century, probably derive from the Old English "*ceart*" and "*mel*" from the Old Norse word "*melr*" (Crowe 1984, 61) and broadly mean "sand bank by rocky ground" (Dickinson 1991, 9) and may originally have applied to the Grange area (Dickinson 1980, 7). By 1168 the parish of Cartmel was a royal estate and in 1186 it was granted to the Marshall family, the Earls of Pembroke, by Henry II (Crowe 1984, 65). Much of the present village of Cartmel lies within the precinct of the Priory, which was founded with the legal permission of the future King John (who was at the time Count of Mortain) between August 1190 and 1196 by William Marshall, a wealthy and important Norman baron and Earl of Pembroke from 1189 to 1219, although the monastery may not have been established until 1202 (Dickinson 1980, 98; 1991, 10-11). The charter endowed the Priory "all my land of Cartmel" and a list of rights and privileges, which unusually included rights to iron mines (Dickinson 1980, 97; 1991, 10-11).

**3.5.8** Unfortunately, it is not possible to get a detailed view of the possessions acquired by the Priory due to the loss of its archives, although it evidently received a number of further grants in the 13<sup>th</sup> and 14<sup>th</sup> century and eventually acquired a number of comparatively large farms (Dickinson 1991, 14-19). Its ecclesiastical wealth was valued at £46. 13s. 4d. in 1291 in the *Taxation of Pope Nicholas* (Dickinson 1980, 15). However, like much of the north of England, it was subject to raids by the Scots throughout the 14<sup>th</sup> century (Dickinson 1991, 29-30); the raids of 1316 and 1322 'wrought immense damage in the area' and on the latter occasion the *Lanercost Chronicle* records that the Scottish raiders "*burnt the lands around the priory... and took away cattle and booty*" (Dickinson 1980, 13). The Priory was also affected by the Black Death, which may explain why, probably like many English monasteries, it is recorded as having fewer brethren than normal in 1381 (Dickinson 1980, 16). The defensive potential of the priory should not be overlooked (Hyde and Pevsner 2010, 268); the main priory gatehouse leading into the precinct was built between 1330 and 1340 and land surrounding the Priory was also enclosed by a precinct wall during the 14<sup>th</sup> century (Curwen 1920, 111). The gatehouse is the only remaining building associated with Cartmel Priory, although vestiges of other buildings are incorporated in later structures. Elements of the precinct wall evidently survived in reasonable condition into the early 19<sup>th</sup> century; Baines describes it as running west from the gatehouse, before running north past Fairfield where '*about one hundred yards of the wall exist of rough ragcoble [sic] stone*' before it turned east then south-east (Baines 1836, 725). What is probably the earliest plan delineating the presumed and known elements of the priory and its precinct wall, produced by Ffolliott in 1854, is of interest as it seems to have been used as the basis for determining the position of these features in subsequent accounts (e.g. Dickinson 1991, 83), although the manner in which these structures were positively identified is uncertain.

**3.5.9** In 1390 a papal mandate to the archbishop of York ordered an investigation of the prior of Cartmel, William, accused of simony in admitting canons to profession and of 'too frequent visits to taverns', to the extent that the monastery was falling into disrepair (Dickinson 1980, 13). This may have been the catalyst for a period of reputedly much needed reconstruction and restoration of the Priory, possibly begun in the final years of the 14<sup>th</sup> century (*ibid.*, 19). Hyde and Pevsner state, somewhat enigmatically, that '*something drastic [emphasis added] made it necessary for the canons to rebuild their monastic precinct on the [north] side*' in approximately the mid-15<sup>th</sup> century (Hyde and Pevsner 2010, 267) and the surrounding lofty precinct wall is also suggested to have been largely rebuilt and partly re-sited in the 15<sup>th</sup> century (Dickinson 1980, 18). It has elsewhere been suggested that rebuilding was needed as a result of the devastation wrought by the Scottish raids, which perhaps burnt the Priory buildings to the ground (Curwen 1920, 111-112), or else the relocation of the cloistral buildings became

necessary out of consideration for the underlying geological properties of the respective sides of the church (Mitchell 1990, 45-46).

3.5.10 The small field to the north side of Priest Lane (immediately to the north of the Priory Church) is called "farmery" field, which Dickinson interprets as a reference to the old word for infirmary, which in this case would have provided treatment for the sick and infirm brethren (Dickinson 1980, 21; 1991, 109). Subsequent archaeological work here has demonstrated the presence of burials and a range of structures, which would support this view (Wilson and Clare 1990; Abacus Archaeology 2012). In either case, its layout can apparently be determined from aerial photographs, which show that its main structure, most likely a large hall, with twin aisles and an open area at one end, ran north/south and it had a subsidiary block on its eastern side (Dickinson 1991, 109). The walling of the monastic precinct continues to the east and the area to the north, towards the beck, is low-lying and prone to flooding (Dickinson 1991, 109-110). The land between Farmery field and the beck to the west may have been gardens and orchards with fields to the north (Dickinson 1980, 21). The field immediately to the south-east of Fairfield Lodge formed part of the priory's outer court, which would have housed the agricultural and industrial buildings essential to the priory's economy, which potentially included barns, granaries, brew house, bake house, guesthouse, wool house, swine house, stables, mills, dovecots, tannery, and blacksmiths etcetera, and nowadays forms part of the Scheduled Monument area associated with the Priory (Scheduled Monument Number: 34796).

3.5.11 The value of the site of the Priory appears greatly diminished by 1535 when it was valued at £8. 16s. 8d. in a survey of English ecclesiastical revenue, the so-called *Valor Ecclesiasticus*, although it still received rents and similar income estimated at £91. 6s. 3d. net (Dickinson 1980, 15-16). Besides, Frith Hall grange was erected in the 16<sup>th</sup> century on the Leven Estuary where the Priory held fishing rights (Dickinson 1991, 16-17) and the valuation was raised to £212. 12s. 10½d., following protests by the priory that it had been undervalued, perhaps to avoid falling foul of the Act for the Suppression of the smaller English monasteries of 1536 (Curwen 1920, 113-114; Dickinson 1980, 21-22). It was to no avail - the Act for the Suppression of the smaller English monasteries of 1536 began the Dissolution of the monasteries, which, despite violent protest, led to the Priory being dissolved between 1536-7 (Curwen 1920, 113-114; Dickinson 1980, 21-22); however, following the unusual decision ordered by Mr. Chancellor of the Duchy that it should 'stand still' as it served a *parochial* as well as monastic purpose, the Priory church was preserved as being the only place of worship available for its parishioners (Curwen 1920, 114; Dickinson 1980, 24). After the Dissolution the Priory's assets became Crown property and ultimately became part of the Holker Hall Estate (Dickinson 1991, 40), some of which now forms part of the Scheduled Monument area associated with the Priory.

3.5.12 **Post-medieval Period (16<sup>th</sup> century AD – present):** by the early 17<sup>th</sup> century the Preston family, then at Holker, owned much of the land formerly owned by the Priory, and the church was further improved and refurbished under their benefaction (Curwen 1920, 115; Dickinson 1980, 25). Cromwellian soldiers stayed in the village on 1<sup>st</sup> October 1643, stabling their horses in the church after a minor battle in Furness (Dickinson 1985, 115). In 1660 came the re-establishment of Anglicanism and the church bells were re-cast in 1661 (Dickinson 1980, 25). Being on the edge of the core of the village the proposed development area is less obviously connected to the post-Dissolution of the priory. It is, however, in proximity to a number of areas connected to iron mining and smelting. A smithy operated at the north-east corner of Cavendish Street which can be seen on the 1890 Ordnance Survey map to the south of Wheelbase Bridge (Ordnance Survey 1890). In general, though, this is considered to have been a period of decline compared to the rapid development of the industry that took place at the beginning of the 18<sup>th</sup> century (Moseley 2010, 59-60).

## 3.6 Previous Archaeological Work

3.6.1 Although the site lies within the precinct wall of the medieval priory and within the associated Scheduled Monument, it is at some distance from the core of the priory buildings. Nevertheless, the wider history of the area and the map evidence, which demonstrates that it has not been subject to any obvious recent development, means that there is some considerable potential for archaeological remains from a range of periods, in particular the Roman and medieval, to be present.



## 4. Fieldwork Results

### 4.1 Introduction

4.1.1 The watching brief monitored two principal elements: the stripping to a depth of approximately 0.4m below the surface of the entire area of the proposed new driveway and garage, and subsequently the excavation of the footings for the new garage. All of the excavation was carried out by a tracked mechanical excavator over a period of four days, beginning at the south-west end of the new drive where it meets the existing one and following the removal of some tree stumps and part of a fence line towards the centre. The conditions at the time were very dry.

### 4.2 Results

4.2.1 A small section of c3m long by 0.3m wide and 0.5m deep trench had already been excavated within the central section of the new driveway, in an attempt to establish the location of a water pipe, although this was not revealed. This revealed a single deposit and had recovered some unstratified fragments of iron working slag and was subsequently shown to be within the area of deposit **1005**.

4.2.2 Otherwise, across the western part of the site, the uppermost deposit was a mid-brownish grey loose silty clay typically 0.1m thick, although thicker at the south-west end, with 30% rounded cobbles and some larger stones, with some dumped material including brick, roof felt, corrugated concrete sheeting and wall plaster against the fence at the south-west end (**1000**). At the south-west end this sat on a similar deposit running broadly parallel to the existing drive but with no modern material and more rounded stone content and some sub-angular boulders (**1001**) and only 0.1m thick but more at the very south-west end (Plate 8). To the north-east a mid-orange firmer clay (**1002**) was exposed, presumably the surface of the natural, suggesting that the ground slopes up slightly to the west. North of the south-west corner **1002** was covered by a firm and gravelly mid-brownish silty clay with 20% rounded pebbles and lots of iron working slag, and some coal and brick fragments (**1003**), and this extended across all of the central part of the site (Plate 9). Cutting through this was a complex of gas pipes forming a Y-shaped junction to the west then returning towards Fairfield Lodge on a north/south alignment and passing below the boundary wall in two places (Plate 10 and Plate 12). South of this was an electrical cable running approximately north-east/south-west along the west side of the site before also passing below the boundary wall (Plate 11 and Plate 12). This was cut into the fill of a large ditch, the cut of which ran parallel to the curving boundary wall and was at least 1.2m wide (**1005**). The fill comprised a soft dark grey silt with 10% cobbles and grit (**1004**) (Plate 12). **1005** evidently cut through **1003** and presumably the natural (**1002**) but was not bottomed. The line of the suggested road surface (**104**) revealed during the evaluation was not particularly obvious and evidently very shallow, although it must have been cut through at the north end by **1005** and to the south by the line of the gas pipe (Plate 13). Pit **103** revealed to the east of this during the evaluation was fully exposed and found to be c1.5m long (east/west) by 1m wide (north/south).



**Plate 8 (left): Deposits 1000 and 1001 revealed at the south-west end of the site, viewed from the east**  
**Plate 9 (right): Deposits 1002 and 1003 revealed at the south-west end of the site, viewed from the south**



**Plate 10 (left): Gas pipes exposed on the west side of the site, viewed from the south-west**  
**Plate 11 (right): Electrical cable on the south-west side of the site, viewed from the south**



**Plate 12 (left): Ditch 1005 showing gas pipe and electrical cable cutting across it, viewed from the south-east**

**Plate 13 (right): The position of the previous evaluation Trench 1 showing the road surface 104, viewed from the south-west**

4.2.3 At the east end of the site the deposits were found to be quite different, with an initial layer of topsoil comprising mid greyish brown soft silt with 10% rounded cobbles up to 0.2m thick (**1006**) on top of a slightly browner deposit of sandier clay with 20% rounded pebbles between 0.1m and 0.2m thick (**1007**) (Plate 14), on top of the natural, a dark orangey brown loose sandy clay with 50% rounded cobbles and gravel (**1008**). Again, against the curving boundary wall to the north a ditch, up to 1.5m wide, ran parallel to this (**1010**) filled with a mid-grey soft silt (**1009**) (Plate 15). This was evidently a continuation of **1005** although the adjoining wall was apparently revetted against its north side and of a much rougher and probably earlier build compared with that to the west. Running along the west side of the area of the garage footprint was a linear feature comprising a straight ditch up to 0.8m wide at the top running approximately north/south (**1012**), which was filled by a mid-greyish brown soft silty clay with 30% sub-angular cobbles (**1011**) (Plate 16 and Plate 17). This feature evidently ended before it reached ditch **1010**, a small part of which was exposed in the garage footings, and it is apparent that the deposits were different on either side of it.



**Plate 14 (left): Excavation at the east end of the site revealing deposits 1006 and 1007, viewed from the east**

**Plate 15 (right): Ditch 1010 revealed at the east end of the site, viewed from the east**



**Plate 16 (left): Ditch 1012 revealed at the east end of the site, viewed from the south**

**Plate 17 (right): Ditch 1012 revealed at the east of the site, viewed from the north**

4.2.4 The subsequent excavation of the garage footings, which comprised a rectangular trench between 1m and 1.2m wide and 0.7m deep (Plate 18 and Plate 19), revealed the natural (**1008**) to become more stony and yellow with depth, although it also included some areas of pale grey gritty silt, especially in the south-east corner (Plate 20). Ditch **1012** was also revealed on the edge of these footings and in section could be seen to become narrower with depth, to 0.2m-0.3m with a broadly U-shaped profile, and was at least 0.5m deep (Plate 21).



**Plate 18 (left): The excavated garage footings, viewed from the south-west**

**Plate 19 (right): The excavated garage footings, viewed from the east**



**Plate 20 (left): Grey natural (1008) exposed at the south-east corner of the garage footings**

**Plate 21 (right): Ditch 1012 revealed in the garage footings, viewed from the north**

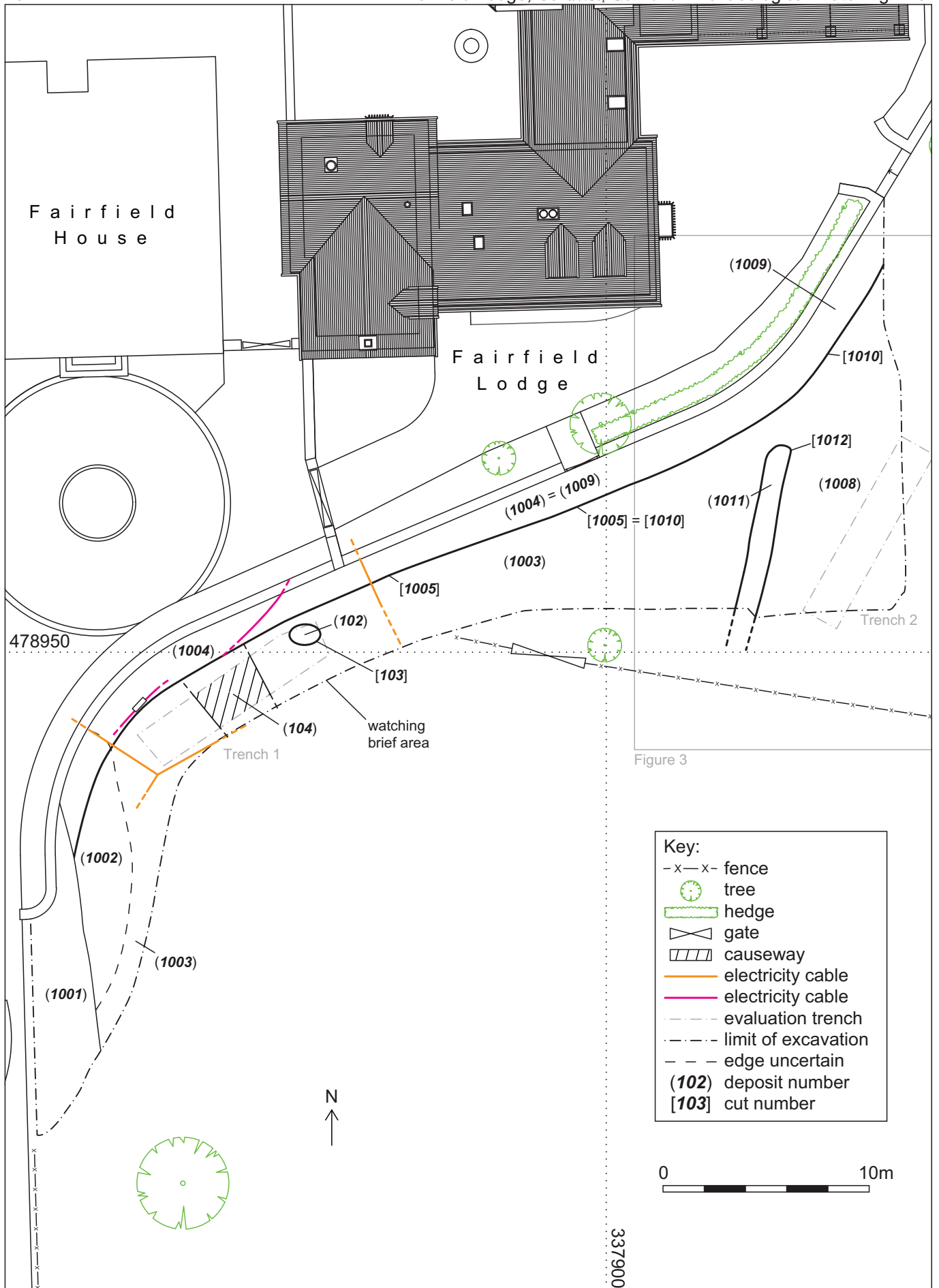


Figure 3

**Key:**

- x-x- fence
- tree
- hedge
- gate
- causeway
- electricity cable
- electricity cable
- evaluation trench
- limit of excavation
- edge uncertain
- (102) deposit number
- [103] cut number

Figure 2: Site plan

Client: Mrs Jill Culshaw and Mr David Culshaw

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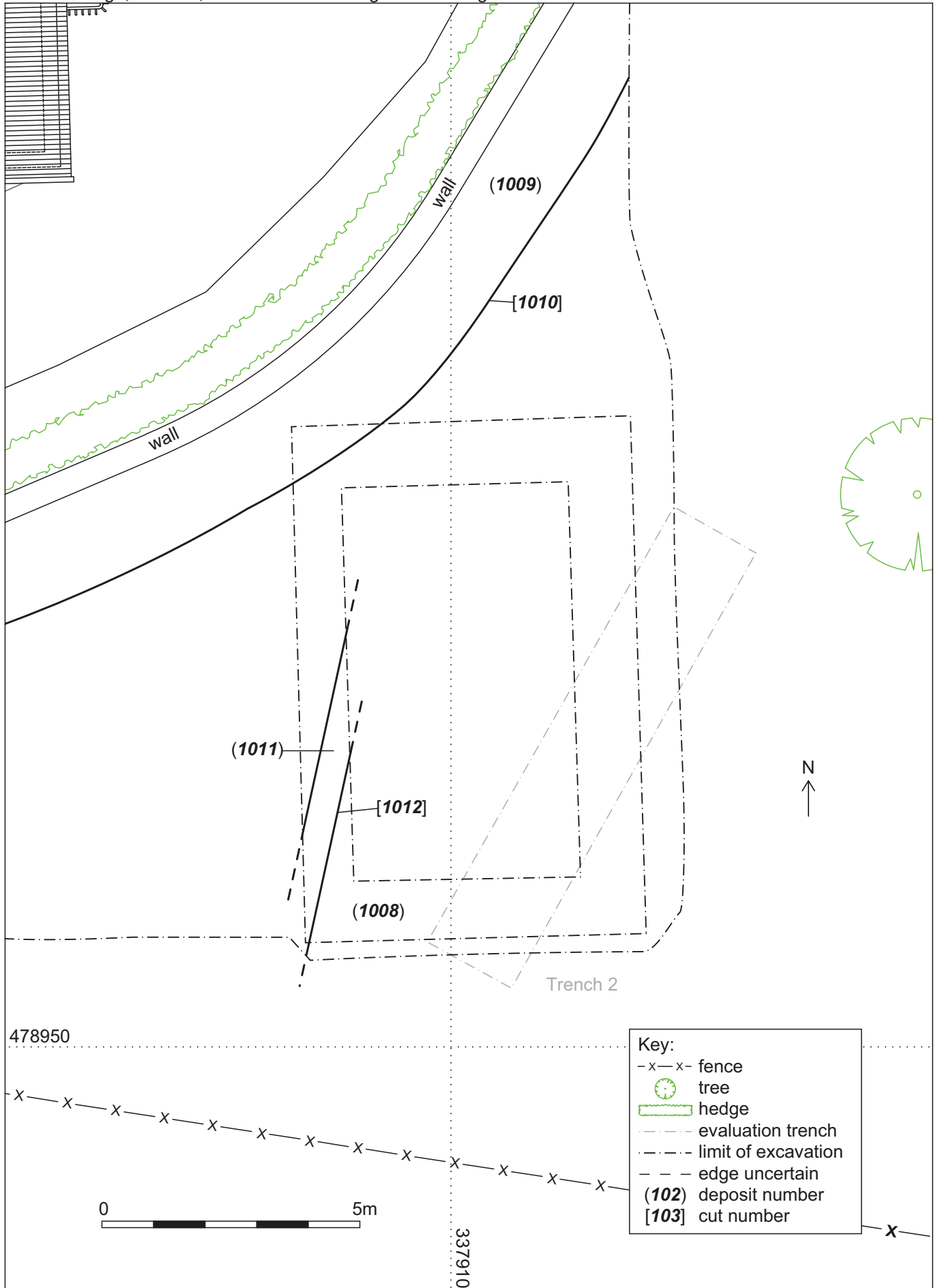


Figure 3: Excavation of footings

## 4.3 Finds

4.3.1 **Introduction:** in total, 409 finds were recovered by hand during the watching brief, of which the majority are of probable or definite post-medieval date, and the remainder are of probable or definite medieval date. A full list of the finds is presented in *Appendix 3* with a discussion below.

4.3.2 **Medieval Pottery:** the medieval pottery is described in generic terms (e.g. *gritty ware*) with no attempt to link to specific fabrics or specific sources. Brief descriptions of the sherds are given in *Appendix 3* following *Guidelines for the Processing and Publication of Medieval Pottery from Excavations* (Blake and Davey 1983) and *Pottery in Archaeology* (Orton *et al* 2008), using terminology provided by the *Medieval Pottery Research Group* (1998).

4.3.3 A total of 39 fragments of medieval pottery were recovered from three contexts: **1003**, **1006**, and **1011**. This includes a lump of fired clay from **1003**, with no external surfaces remaining, but does not include a fragment of possible 'transitional' ware from **1001**. The sherd of transitional ware is a low fired red earthenware with some attempt at glaze and is considered probably early post-medieval in date.

4.3.4 The medieval assemblage comprises gritty ware (56%) and lightly gritted sandy wares. The material is generally pale buff to light orange on the outer surfaces and a reduced light grey inner margin or core is less common, being better represented among the more lightly gritted and possibly later sandy wares. Around 44% of the sandy wares are glazed as opposed to only 32% of the gritty material.

4.3.5 Vessel forms could not be identified due to the generally small sherd size. Most of the material comprises body sherds from thin-walled vessels and the gritty material includes fragments of an obtuse-angled base fragment, simple everted rims, and two strap handles, and the sandy ware includes a clubbed rim and a collared rim fragment.

4.3.6 Within the individual contexts, **1003** contained 79% gritty ware whereas **1006** contained 86% lightly gritted and sandy ware, which might tend to suggest that **1006** is slightly later in date than **1003**. Gritty ware was the dominant pottery type in the 12<sup>th</sup> to 13<sup>th</sup> century and persists into the 14<sup>th</sup> century and lightly gritted sandy wares were introduced in 12<sup>th</sup> century and dominate late 13<sup>th</sup> to 14<sup>th</sup> century assemblages in the region (McCarthy and Brooks 1992; Bradley and Miller 2009, 663-664; Brooks 2000); however, there is considerable overlap in the period of circulation of gritty and sandy ware types. Later Reduced Grey ware, which became the dominant ware type throughout the region during the 15<sup>th</sup> and 16<sup>th</sup> century, is notably absent from the assemblage (Mace and Dawson 2013, 74).

4.3.7 It is perhaps noteworthy that only one fragment of the later Reduced Grey ware was recovered at Fairfield Lodge during the evaluation (Greenlane Archaeology 2020, 20, appendix 3). Similarly, a watching brief at Priory Gardens, Priest Lane yielded relatively little of the later medieval reduced wares (Greenlane Archaeology 2015, 33) and its absence from excavations at the priory in the 1990s has been taken to indicate 'a lull in activity' at that site from around the 15<sup>th</sup> century onwards (Wild and Howard-Davis 2000, 176). At the Priory Gardens site, early post-medieval wares, such as non-factory-produced stoneware, early brown-glazed red earthenware, and Blackwares (including Cistercian ware) were also absent (Greenlane Archaeology 2015, 33). Here too, there are no Blackwares present and none of the earthenware, apart from the one piece of possible transitional ware, is noted to be particularly early (see *Appendix 3*).

4.3.8 **Post-medieval pottery:** in total, 228 fragments of post-medieval pottery (56% of the total assemblage) were recovered, the majority from contexts **1003**, **1004** and **1011**, but with significant quantities from topsoil deposits **1000** and **1006**. These included a range of types including utilitarian wares such as brown- and black-glazed red earthenwares (for kitchenware such as crocks and pancheons), which can be broadly dated to the late 17<sup>th</sup> to early 20<sup>th</sup> century, including a large number of fragments from two vessels from context **1011**. This deposit also contained fragments from an unusual red earthenware vessel, probably a flower pot, with drainage holes perforating around the base. The finewares, which are more closely dateable, included tin-glazed earthenware, creamware, white salt-glazed stoneware, bone china, pearlware and white earthenware, much of it with blue transfer-printed patterns, and Staffordshire type slipwares. These typically range from the late 17<sup>th</sup> to the 19<sup>th</sup> century, although it was notable that the material from context **1003** was more consistently late 17<sup>th</sup> to 18<sup>th</sup>



century. All of these types are very common for the area and the period, and most likely represent waste from domestic settings, either deposited accidentally or as nightsoil. Of particular interest was a single sherd of possible transitional ware dating to the early post-medieval period from deposit **1001**.

4.3.9 **Clay tobacco pipe:** in total, 12 clay tobacco pipe stem fragments were recovered (see *Appendix 3*). Two of the fragments were marked and an assessment of these is presented in *Appendix 4*. The assemblage is small, so it is difficult to make chronological judgments with any degree of confidence in terms of stem-bore analysis; however, the group is fairly consistently 18<sup>th</sup> to 19<sup>th</sup> century in date, with one possibly late 17<sup>th</sup> century fragment (after Davey 2013). By comparison, the material recovered during the evaluation was fairly consistently early 18<sup>th</sup> to 19<sup>th</sup> century in date (Greenlane Archaeology 2020, 20).

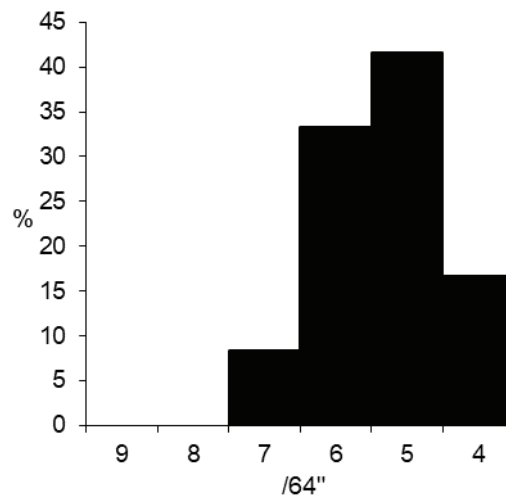


Figure 4: Histogram of bore diameters

4.3.10 The fragment from **1001** is marked 'SEPHTON LANCASTER'. This is most likely to have been made by John Sephton (1759-1833), who moved from Liverpool to Lancaster in about 1790 (White 1975, 62) and this pipe probably dates from the very end of the 18<sup>th</sup> century or beginning of the 19<sup>th</sup> century. Pipemakers at Lancaster certainly benefited in terms of both manufacture and distribution from the well-established port there, and retrieval of a Lancaster pipe from a context at Cartmel probably indicates trade via the 'oversands' route across Morecambe Bay (*op cit*, 60). The 'Sephton' pipe was probably manufactured between the late 18<sup>th</sup> and mid-19<sup>th</sup> century. John Sephton, pipemaker, worked in Lancaster from around 1790 until his death in 1833 (*op cit*, 62). His sons continued the business until it was sold in 1850, after which time the pipes were marked with the name Stork (*ibid*).

4.3.12 The fragment from **1009** has an oval stamped mark comprising a portrait of Queen Anne (reigned 1702-1714) with the letters A and R. Pipes of this type were manufactured in Chester.

4.3.13 **Glass:** fifty fragments or items of glass were recovered from six contexts (**1000**, **1001**, **1003**, **1004**, **1006** and **1009**), mostly dating from the 18<sup>th</sup> to 20<sup>th</sup> centuries, although some flat fragments from context **1003** could be earlier, although this is not easy to date and on the basis of other finds from the same deposit it is likely to be early post-medieval. Most of the glass recovered was fragmentary but a number of small complete items or more substantial pieces of late post-medieval date were recovered, particularly from contexts **1004** and **1009**. All of the glass undoubtedly resulted as domestic waste or window glass from buildings in the case of at least some of the flat panes.

4.3.14 **Ceramic building material:** seventeen fragments of ceramic building material were recovered from three contexts (**1001**, **1004** and **1006**), the majority (13) from **1004**. These predominantly comprised late post-medieval fragments of brick or drainage tile, although some probable floor tile and pieces of possible chimney pot were also present. Of particular interest were four large fragments of buff or cream coloured earthenware garden edging tiles all with the same distinctive decoration recovered from **1004** and a piece of probable floor tile of likely medieval date from **1006**.

4.3.15 **Animal bone:** given the small size of the animal bone assemblage, all fragments were rapidly scanned and assigned to taxa wherever possible, although lower-order categories were also used (e.g. sheep/goat, cattle-size). Animal bone was identified using Schmid's *Atlas of Animal Bones* (1972) and by reference to online resources, quantified and catalogued (*Appendix 3*). The material was solely collected by hand and this will have affected the size of the animal bones recovered from the site as retrieval of smaller animal bones, such as those of fish and microfauna, is less likely by this method. No minimum number of individuals has been calculated as this is unlikely to be either accurate or particularly informative. Most of the material by fragment count was recovered from **1004**.

4.3.16 Only a small quantity of the material has been identified to species level, however, almost two thirds of the material (66%) are cow or are considered cattle-size. Sheep and sheep-size bone are also present as are fragments of a pig jaw bone and teeth from **1004**. Over a third of the material showed signs of having been butchered (34%), specifically of having been sawn. The sawn material recovered from **1001**, **1004**, **1009** and **1011** is thought probably to be of post-medieval date and could conceivably derive from a nearby slaughterhouse, but none has been identified. Butchery marks were exclusive to the larger bone fragments, which suggests that these animals, presumably cattle, were being exploited for their meat. In addition, two bone fragments appeared to have had the marrow extracted and the relative smoothness of the split edges on one fragment suggest that the specimen was relatively fresh (Outram 2002, 54). The sheep and pig may well have been exploited for their meat too, but no butchery marks were noted. No obvious signs of gnawing were noted and only one fragment was noted to be burnt (from **1003**).

4.3.17 **Metal:** a total of 11 iron items from five contexts (**1001**, **1003**, **1006**, **1009** and **1011**) were recovered, the majority of which comprised likely fragments of nails of probable post-medieval date (Bodey 1983), although this is difficult to determine without conservation. Of particular interest were one or two fiddle-key type nails and a fragment of horseshoe from context **1003**, which are medieval or early post-medieval (Sparkes 1976; Ford and Walsh 1987). In addition, a single object, probably lead but perhaps another alloy such as pewter or spelter, was recovered from **1004**, which comprises a children's toy of probable early 20<sup>th</sup> century date.

4.3.18 **Stone:** two stone items were recovered; a pale fine-grained finger-sized object from context **1001** that is possibly a whetstone, and a fragment of possible lignite or shale from context **1006**. Neither of these can be easily dated and both could be entirely natural.

4.3.19 **Industrial Residue:** a total of 11kg of iron working residue was recovered during the watching brief, the vast majority from what is probably its primary context – **1003**, but with a smaller amount, undoubtedly residual, present in context **1001** and some unstratified. Small amounts were also present in contexts **1006** and **1007**, suggesting that this material has been spread over a relatively wide area from a concentration in context **1003**, between the raised causeway (**104**) and the probable former field boundary [**1012**]. A full assessment of this material is presented in *Appendix 5*.

## 5. Discussion

### 5.1 Results

5.1.1 Although only investigating a relatively small area the watching brief revealed a number of features and finds, ranging from the medieval period onwards. The features discovered during the original evaluation were found to not be as extensive as initially thought, having been disturbed by later features, but additional evidence for industrial activity was found, which is of particular interest. The results of the watching brief allow five phases of activity to be identified.

5.1.2 **Phase 1 (natural)**: the earliest deposits comprise the naturally occurring largely sandy clays **1002** and **1008**. These were evidently different from one side of the site to the next, although only the top of **1002** was exposed. The change in **1008** to a finer material of a greyer colour is perhaps suggestive of material that has been deposited by standing water, and might therefore coincide with the location of the former post-glacial lake that is thought to have filled much of the valley at one time; Fairfield House and Lodge seem to have been on a piece of higher ground on the edge of this but the land to the south-east gradually drops down towards the River Eea (Mitchell 1990).

5.1.3 **Phase 2 (medieval?)**: the evaluation revealed a raised area of redeposited natural (**104**), which stratigraphically pre-dated all of the subsequent deposits and features. This was not especially visible during the watching brief, probably because it had been cut through by the later ditch [**1005**] to the north and a modern gas pipe to the south. It seems likely that this deposit represents a deliberately raised causeway connecting the higher ground to the north-west with the main priory complex to the south-east, which would potentially confirm the suggestion that this area was very wet due to the presence of the post-glacial lake into the medieval period (Mitchell 1990). Although no intact features or primary deposits relating to medieval iron working were discovered it is apparent that iron smelting through the bloomery process was taking place in this area (see *Section 5.1.4* below). Indeed, the evidence from archaeological work carried out in Priory Gardens (Wild and Howard-Davis 2000; Greenlane Archaeology 2015) has revealed similar material, demonstrating that iron smelting was being carried out somewhere in the north-west corner of the priory precinct, perhaps on the higher ground now housing Fairfield and Fairfield Lodge.

5.1.4 **Phase 3 (medieval-early post-medieval)**: in both the eastern and western parts of the site there was a buried deposit between the Phase 1 natural and the overlying topsoil and later cut features, evidently different either side of ditch [**1012**]. To the east this comprised an evident subsoil (**1007**) with no finds, to the west a deposit, containing a large amount of medieval and early post-medieval (primarily 17<sup>th</sup>-18<sup>th</sup> century) pottery and also glass (**1003**). This deposit also contained large quantities of iron working residue comprising a mixture of materials associated with smelting in a bloomery furnace (see *Appendix 5*), which was concentrated in an area between the raised causeway (**104**) and the former field boundary [**1012**]. The nature of the material suggests it is a tertiary deposit, i.e. that it had already been processed and dumped on a slag heap and then removed and placed in its final deposit. The suggestion in the assessment report is that it had been deliberately collected and used as levelling material – the dating evidence would suggest this was in the 18<sup>th</sup> century, however, it is possible that it resulted from a slag heap being deliberately levelled and/or ploughed out and that is why softer material such as furnace lining was not present and why it was concentrated in one area.

5.1.5 **Phase 4 (early post-medieval)**: the origins of ditch [**1012**] are uncertain; it is not shown on any of the available mapping and so presumably pre-dates the beginning of the 19<sup>th</sup> century. It is clearly relatively early and formed a boundary in the landscape substantial enough to create a division that led to the different development of the Phase 3 subsoils. However, the finds from its fill (**1011**) are typically not closely dateable enough to provide an accurate indication as to when it went out of use, other than in the broadly post-medieval period. Similarly, the large ditch running alongside the current field boundary wall [**1005=1010**] probably belongs to a similar period, although the only dating evidence comes from the point at which it was finally filled, with the exception of the early 18<sup>th</sup> century marked clay pipe stem. It too is not shown on any available mapping but it seems likely to have formed a small ha-ha, that is a ditch intended to stop livestock from getting close to the house without interrupting the view. If this is the

case it is probably contemporary with the main house at Fairfield, which is thought to be of c1800 but incorporating 18<sup>th</sup> century elements (Historic England 2021). Again, this ditch was evidently completely filled and out of use by at least the late 19<sup>th</sup> century and the western side of the boundary wall is apparently built partly on top of it.

5.1.6 **Phase 5 (modern)**: the two uppermost deposits, **1000** and **1001**, are evidently quite modern, having developed over everything else. **1000** clearly represents the topsoil, resulting from the most recent cultivation and bioturbation of the soil, while **1001** probably represents a dump of building waste and soil. Cutting through parts of the western side of the site are narrow service trenches for gas and electricity. These were generally quite shallow and caused minimal damage but they had obscured the southern end of feature **104**.

## 5.2 Conclusion

5.2.1 The watching brief revealed a number of features of archaeological interest, the most significant of which is the presence of medieval iron smelting waste, albeit redeposited in the early post-medieval period. This, combined with evidence from nearby Priory Gardens to the south-east, indicates that there were iron bloomeries somewhere in the immediate vicinity, presumably within the north-west corner of the priory precinct and operated by and for the benefit of Cartmel Priory itself. Iron mining and smelting was an important part of the economy of the local monastic houses, with Furness Abbey in particular being positioned in an area of rich haematite reserves (Farrer and Brownbill 1908, 128). By the time Cartmel Priory was established, in about 1190, the significance of this resource must have been realised because its foundation charter specifically mentions iron mines (Dickinson 1980, 97 see also 54-55; Moseley 2010, 55-57). The location of the mines held by Cartmel Priory is not certain, although it has been postulated that the name Pit Farm on the north-east edge of the village might indicate the presence of a mine (*op cit*, 54) and evidence in nearby Hesketh Wood might also be medieval but these have not been dated (Moseley 2010, 58). In any case, there is plenty of evidence that iron ore was being mined by Cartmel Priory and they were undoubtedly smelting some of it for their own use, although lots of it was transported elsewhere.

5.2.2 No further remains of the probable causeway thought to be of medieval date discovered during the evaluation were revealed, but this had clearly been truncated to both the north and south. It too indicates that the area of higher ground now occupied by Fairfield and Fairfield Lodge was utilised in the medieval period; perhaps it was the location of the bloomeries. The discovery of a ditch, probably forming an early field boundary, and a ha-ha, is also of interest. Although of probable post-medieval date, they demonstrate the manner in which the landscape was shaped prior to the 19<sup>th</sup> century.

5.2.3 Despite the claims of James Stockdale that the remains of a Roman camp were present in this area the watching brief did not reveal any features or finds supporting this suggestion. It is likely that the earthworks he referred to as being levelled out in the early 19<sup>th</sup> century relate to the medieval causeway and perhaps any slag heaps that might have still been present in this area.

5.2.4 The finds include an important addition to the recorded medieval fabric types first defined by the excavations in Priory Gardens (Wild and Howard-Davis 2000) as well as some well-preserved post-medieval forms and two marked clay tobacco pipes of relatively rare 18<sup>th</sup> century types. The iron smelting residue further adds to the similar information already gathered relating to this in Cartmel, although it would be useful to be able to accurately locate the site of the bloomeries. The results of the watching brief, in general, form a useful addition to our understanding of the development and operation of the priory and further analysis of the results, in particular the iron smelting residue, in comparison with what has already been discovered, would be beneficial.

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## Appendix 1: Project Design

### Archaeological Watching Brief Cover Sheet and Project Design

The Site	
Site Name	Fairfield Lodge, Carmel
County	Cumbria
NGR	337899 478955

Client	
Client Name	Mrs Jill and Mr David Culshaw
Client's architect/agent	David Coward

Planning	
Pre-planning?	No
Planning Application No.	SL/2020/0337
Plans (e.g. conversion, extension, demolition)	Creation of private drive leading to new double garage
Condition number	10
Local Planning Authority	South Lakeland District Council
Planning Archaeologist	Jeremy Parsons, Cumbria County Council/Andrew Davison, Historic England
Scheduled Monument Consent reference	S00240441
SMC condition	ii
Groundworks subject to watching brief	Excavation for new drive and foundations of new double garage

Archiving	
Relevant Record Office(s)/Archive Centre(s)	Kendal
Relevant HER	Cumbria
Relevant museum	Kendal



## 1. Introduction

### 1.1 Project Cover Sheet

1.1.1 All the details specific to this project are set out on the cover sheet of this project design. The project design itself covers all elements that are involved in an archaeological watching brief.

### 1.2 Greenlane Archaeology

1.2.1 Greenlane Archaeology is a private limited company based in Ulverston, Cumbria, and was established in 2005 (Company No. 05580819). Its directors, Jo Dawson and Daniel Elsworth, have worked continuously in commercial archaeology since 2000 and 1999 respectively, principally in the north of England and Scotland. Greenlane Archaeology is committed to a high standard of work, and abides by the Chartered Institute for Archaeologists' (CIfA) Code of Conduct. The watching brief will be carried out according to the Standards and Guidance of the CIfA (CIfA 2014a).

### 1.3 Staff

1.3.1 **Dan Elsworth (MA (Hons), ACIfA)** graduated from the University of Edinburgh in 1998 with an honours degree in Archaeology, and began working for the Lancaster University Archaeological Unit, which became Oxford Archaeology North (OA North) in 2001. Daniel ultimately became a project officer, and for over six and a half years worked on excavations and surveys, building investigations, desk-based assessments, and conservation and management plans. These have principally taken place in the North West, and Daniel has a particular interest in the archaeology of the area. He has managed many recent projects in Cumbria and Lancashire including several archaeological building recordings and watching briefs. He is very experienced at building recording, having carried out numerous such projects, mainly in Cumbria and Lancashire.

1.3.2 **Tom Mace (BA (Hons), MA, MIfA)** has extensive experience of working on a variety of archaeological projects, especially watching briefs, but also excavations, evaluations, and building recordings, as well as report writing and illustration production. He joined Greenlane Archaeology in 2008 having worked for several previous companies including Archaeological Solutions and Oxford Archaeology North. He currently works on a broad range of projects and is also responsible for the production of all illustrations for reports and publications as well as some post-excavation assessments. He is a Member of the Chartered Institute for Archaeologists.

1.3.3 **Jo Dawson (MA (Hons), ACIfA)** graduated from University of Glasgow in 2000 with a joint honours degree in Archaeology and Mathematics, and since then has worked continuously in commercial archaeology. Her professional career started at Glasgow University Archaeological Research Division (GUARD), following which she worked for Headland Archaeology, in Edinburgh, and then Oxford Archaeology North, in Lancaster. During this time she has been involved in a range of different archaeological projects. She has extensive experience of both planning and pre-planning projects, and has undertaken assessments of all sizes. Since establishing Greenlane Archaeology in 2005 she has managed numerous projects in south Cumbria, including desk-based assessments and evaluations. She currently mainly carries out quality control of reports and post-excavation assessments. She is an Associate member of the Chartered Institute for Archaeologists.

1.3.4 **Specialists:** Greenlane Archaeology have a range of outside specialists who are regularly engaged for finds and environmental work. Engagement is dependent upon availability, but specialists typically engaged are as follows:

Specialism	Specialist
Animal bone	Naomi Sewpaul
Ceramic building material, medieval and Roman	Phil Mills
Conservation	York Archaeological Trust
Clay tobacco pipe	Peter Davey (or Tom Mace in house for smaller assemblages)
Flots	Headland Archaeology, Edinburgh
Human bone	Malin Holst
Industrial residue	Gerry McDonnell
Medieval pottery	Chris Cumberpatch for assemblages from the North East of England
Miscellaneous find types, for example Roman glass and medieval and earlier metalwork	Chris Howard-Davis
Prehistoric pottery	Blaise Vyner
Radiocarbon dates	Scottish Universities Environmental Research Centre
Roman pottery	Ruth Leary
Samian	Gwladys Monteil
X-ray of metal finds	York Archaeological Trust

## 2. Objectives

### 2.1 Desk-Based Assessment

2.1.1 Where an archaeological desk-based assessment has not already been carried out in a previous phase of work, the objective will be to examine early maps of the site and any other relevant primary and secondary sources in order to better understand its dating and development, and set it in its historic context.

### 2.2 Watching Brief

2.2.1 To carry out an archaeological watching brief on the relevant areas of groundworks, in order to identify any and record surviving any archaeological remains that are revealed.

### 2.3 Report

2.3.1 To produce a report detailing the results of the watching brief.

### 2.4 Archive

2.4.1 Produce a full archive of the results of the project.

## 3. Methodology

### 3.1 Desk-Based Assessment

3.1.1 Where an archaeological desk-based assessment has not already been carried out in a previous phase of work, an examination of various sources, particularly early maps and plans relating to the site, will be carried out, including other relevant primary and secondary sources. The sources that will be used as part of the desk-based assessment will include:

- **Record Office/Archive Centre:** the majority of original and secondary sources relating to the site are deposited in the relevant Record Office(s) or Archive Centre(s), as specified in the cover sheet of this project design. Of principal importance are early maps of the site. These will be examined in order to establish the development of the site, date of any structures present within it, and details of land use, in order to set the site in its historical, archaeological, and regional context. In addition, any details of the site's owners and occupiers will be acquired where available;
- **Online Resources:** where available, mapping such as Ordnance Survey maps and tithe maps will be consulted online;
- **Greenlane Archaeology:** Greenlane Archaeology's office library includes maps, local histories, and unpublished primary and secondary sources. These will be consulted where relevant, in order to provide information about the history and archaeology of the site and the general area.

### 3.2 Watching Brief

3.2.1 The relevant area of groundworks will be monitored, with one archaeologist on site. If there are several areas being excavated concurrently it may be considered necessary to have more than one archaeologist on site.

3.2.2 The watching brief methodology will be as follows:

- All excavation will be carried out under supervision by staff from Greenlane Archaeology;
- All deposits of archaeological significance will be examined by hand if possible in a stratigraphic manner, using shovels, mattocks, or trowels as appropriate for the scale;
- The position of any features, such as ditches, pits, or walls, will be recorded and where necessary these will be investigated in order to establish their full extent, date, and relationship to any other features. If possible, negative features such as ditches or pits will be examined by sample excavation, typically half of a pit or similar feature and approximately 10% of a linear feature;
- All recording of features will include detailed plans and sections at a scale of 1:20 or 1:10 where practicable or sketches where it is not and photographs in both colour print and colour digital format. In addition, photographs will also be taken of the site before work begins and after completion;

- All deposits, drawings and photographs will be recorded on Greenlane Archaeology *pro forma* record sheets;
- All finds will be recovered during the watching brief for further assessment as far as is practically and safely possible. Should significant amounts of finds be encountered an appropriate sampling strategy will be devised;
- All faunal remains will also be recovered by hand during the watching brief as far as is practically and safely possible, but where it is considered likely that there is potential for the bones of fish or small mammals to be present appropriate volumes of samples will be taken for sieving;
- Deposits that are considered likely to have, for example, preserved environmental remains, industrial residues, and/or material suitable for scientific dating will be sampled. Bulk samples of between 20 and 60 litres in volume (or 100% of smaller features) where possible, depending on the size and potential of the deposit, will be collected from stratified undisturbed deposits and will particularly target negative features (e.g. gullies, pits and ditches) and occupation deposits such as hearths and floors. An assessment of the environmental potential of the site will be undertaken through the examination of samples of suitable deposits by specialist sub-contractors, who will examine the potential for further analysis. All samples will be processed using methods appropriate to the preservation conditions and the remains present;
- Any articulated human remains discovered during the watching brief will be left *in situ*, and, if possible, covered. The client will be immediately informed as will the local coroner. Should it be considered necessary to remove the remains this will require a Home Office licence, under Section 25 of the Burial Act of 1857, which will be applied for should the need arise;
- Any objects defined as 'treasure' by the Treasure Act of 1996 (HMSO 1996) will be immediately reported to the local coroner and securely stored off-site, or covered and protected on site if immediate removal is not possible;
- Should any significant archaeological deposits be encountered during the watching brief these will immediately be brought to the attention of the Planning Archaeologist so that the need for further work can be confirmed. Any additional work will be carried out following discussion with the Planning Archaeologist and subject to a new project design, and the ensuing costs will be agreed with the client.

### 3.3 Report

3.3.1 The results of the watching brief will be compiled into a report, which will provide a summary and details of any sources consulted. It will include the following sections:

- A front cover including the appropriate national grid reference (NGR);
- A concise non-technical summary of results, including the date the project was undertaken and by whom;
- Acknowledgements;
- Project Background;
- Methodology, including a description of the work undertaken;
- Results of the watching brief, including finds and samples;;
- Discussion of the results including phasing information;
- Bibliography;
- Illustrations at appropriate scales including:
  - a site location plan related to the national grid;
  - a plan showing the location and extent of the area subject to archaeological watching brief;
  - plans and sections of any features discovered during the watching brief;
  - photographs of any features encountered during the watching brief;
  - copies of selected historic maps and plans of the site relevant to the understanding of its development.

## 3.4 Archive

3.4.1 The archive, comprising the drawn, written, and photographic record of any deposits of archaeological interest and/or working shots identified during the watching brief, formed during the project, will be stored by Greenlane Archaeology until it is completed. Upon completion it will be deposited with the relevant Record Office or Archive Centre, as detailed on the cover sheet of this project design, together with a copy of the report. The archive will be compiled according to the standards and guidelines of the ClfA (ClfA 2014b). In addition, details will be submitted to the Online Access to the Index of archaeological investigationS (OASIS) scheme. This is an internet-based project intended to improve the flow of information between contractors, local authority heritage managers and the general public.

3.4.2 A copy of the report will be provided to the client and a copy will be provided for the relevant Historic Environment Record, as detailed on the cover sheet of this project design.

## 4. Work timetable

4.1 Greenlane Archaeology will be available to commence the project on the date specified on the Order Form, or at another date convenient to the client. It is envisaged that the elements of the project will be carried out in the following order:

- **Task 1:** rapid desk-based assessment (where this has not already been carried out as a previous phase of archaeological work);
- **Task 2:** archaeological watching brief;
- **Task 3:** production of draft report including illustrations;
- **Task 4:** feedback on draft report, editing and production of final report;
- **Task 5:** finalisation and deposition of archive.

## 5. Other matters

### 5.1 Access and clearance

5.1.1 Access to the site will be organised through co-ordination with the client and/or their agent(s). It is assumed that the watching brief will be able to be undertaken without obstruction. Greenlane Archaeology reserves the right to increase the price if problems with access result in delays to the work.

### 5.2 Health and Safety

5.2.1 Greenlane Archaeology carries out risk assessments for all of its projects and abides by its internal health and safety policy and relevant legislation. Health and safety is always the foremost consideration in any decision-making process.

### 5.3 Insurance

5.3.1 Greenlane Archaeology has professional indemnity insurance to the value of **£1,000,000**. Details of this can be supplied if requested.

### 5.4 Environmental and Ethical Policy

5.4.1 Greenlane Archaeology has a strong commitment to environmentally and ethically sound working practices. Its office is supplied with 100% renewable energy by Good Energy, and uses ethical telephone and internet services supplied by the Phone Co-op. In addition, the company uses the services of The Co-operative Bank for ethical banking, Naturesave for environmentally-conscious insurance, and utilises public transport wherever possible. Greenlane Archaeology is also committed to using local businesses for services and materials, thus benefiting the local economy, reducing unnecessary transportation, and improving the sustainability of small and rural businesses.

## 6. Bibliography

ClfA, 2014a *Standard and Guidance for an Archaeological Watching Brief*, Reading

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CIfA, 2014b *Standard and Guidance for the Creation, Compilation, Transfer and Deposition of Archaeological Archives*, Reading

## Appendix 2: Summary Context List

Context	Type	Description	Interpretation
<b>1000</b>	Deposit	Very dry mid-brownish grey loose silty clay with 30% rounded cobbles, some larger stones and modern dumped building waste, no more than 0.1m thick	Topsoil/dumped deposit
<b>1001</b>	Deposit	Mid brownish-grey loose silty clay with c40% rounded cobbles and some sub-angular boulders, no more than 0.1m thick	Topsoil west of ditch <b>1012</b>
<b>1002</b>	Deposit	Mid orange fairly loose sandy clay, only exposed patchily	Natural west of ditch <b>1012</b>
<b>1003</b>	Deposit	Firm mid-brown gravelly silty clay with 20% pebbles and plentiful iron working waste, medieval and early post-medieval pottery	Dumped deposit or subsoil west of ditch <b>1012</b>
<b>1004</b>	Deposit	Dark grey soft silt with 10% rounded cobbles and grit, up to 1.2m wide	Upper fill of <b>1005</b> , same as <b>1009</b>
<b>1005</b>	Cut	Linear ditch following the line of the boundary wall to the north and curving round to the south-west, up to 1.2m wide, boundary wall on top of north edge	Ha-ha ditch continued as <b>1010</b> to east
<b>1006</b>	Deposit	Mid greyish brown soft silt, 10% rounded cobbles and c0.2m thick	Topsoil east of ditch <b>1012</b>
<b>1007</b>	Deposit	Mid-brown loose sandy clay, 20% rounded pebbles, 0.1-0.2m thick	Subsoil east of ditch <b>1012</b>
<b>1008</b>	Deposit	Dark orange-brown loose sandy clay with 50% rounded cobbles and gravel, changing to a pale greenish grey gritty silt in places at depth	Natural east of ditch <b>1012</b>
<b>1009</b>	Deposit	Mid grey soft silt, up to 1.5m wide	Upper fill of <b>1010</b> , same as <b>1004</b>
<b>1010</b>	Cut	Linear ditch following the line of the boundary wall to the north and curving round to the north-east, up to 1.5m wide, boundary wall forming a revetment along the north edge	Ha-ha ditch, continued as <b>1005</b> to west
<b>1011</b>	Deposit	Mid greyish brown soft silty clay with 30% sub-angular cobbles and lots of post-medieval pottery, up to 0.8 wide and at least 0.5m deep	Fill of ditch <b>1012</b>
<b>1012</b>	Cut	Linear, slightly curving ditch cut, 0.8m wide at the top, 0.2-0.3m wide at the bottom, and at least 0.5 deep, with a u-shaped or broad v-shaped section	Cut of presumed boundary ditch

## Appendix 3: Summary Finds List

Context	Type	Quantity	Description	Date range
1000	Pottery	1	Black-glazed red earthenware crock rim fragment	Late 17 <sup>th</sup> – early 20 <sup>th</sup> century
1000	Pottery	1	Brown-glazed grey-bodied stoneware strap handle fragment	Late 18 <sup>th</sup> – early 20 <sup>th</sup> century
1000	Pottery	1	Tin-glazed earthenware jug body fragment with upper handle terminal and blue painted decoration	Late 17 <sup>th</sup> – early 18 <sup>th</sup> century?
1000	Pottery	6	Creamware fragments, including one with blue painted decoration	Mid – late 18 <sup>th</sup> century
1000	Pottery	5	White earthenware fragments, including blue transfer-printed (hollow-ware base fragment, Albion plate rim, Broseley saucer rim, and sugar bowl/jam pot lid rim with edge of cut out for spoon)	19 <sup>th</sup> – early 20 <sup>th</sup> century
1000	Pottery	2	Bone china, including press-moulded egg cup or similar vessel body fragment	19 <sup>th</sup> – 20 <sup>th</sup> century
1000	Glass	1	Dark green bottle mouth	Early 19 <sup>th</sup> – early 20 <sup>th</sup> century
1000	Animal bone	1	Large mammal tooth, probably horse or possibly deer	Not closely dateable
1001	Pottery	5	Black-glazed red earthenware coarseware, including crock base fragment x 2, and hollowware everted rim fragment	Late 17 <sup>th</sup> – early 20 <sup>th</sup> century
1001	Pottery	6	Brown-glazed red earthenware coarseware, including two fragments fired to stoneware hardness with laminated fabric, hollowware base fragment, and hollowware body fragment with white slip stripes	Late 17 <sup>th</sup> – early 20 <sup>th</sup> century
1001	Pottery	1	Brown-glazed grey-bodied stoneware closed bottle body fragment (unglazed internally) with impressed mark '....REN..'	Late 18 <sup>th</sup> – early 20 <sup>th</sup> century
1001	Pottery	1	Transitional ware (?) low fired red earthenware with some attempt at glaze	Early post-medieval
1001	Pottery	3	Tin-glazed earthenware, comprising two refitting blue painted base fragments and plate rim fragment with orange stripe along rim and blue painted pattern on main part of rim	Late 17 <sup>th</sup> – early 18 <sup>th</sup> century?
1001	Pottery	2	White salt-glazed stoneware: press-moulded plate rim with barleycorn pattern, and base fragment	Early – mid 18 <sup>th</sup> century?
1001	Pottery	5	Creamware fragments	Mid – late 18 <sup>th</sup> century
1001	Pottery	4	Pearlware, including blue shell edge press-moulded plate rim x 1, shell edge press-moulded plate body x 1, and blue transfer-printed body fragment	Late 18 <sup>th</sup> – early 19 <sup>th</sup> century
1001	Pottery	3	White earthenware body fragments, comprising press-moulded, brown-transfer-printed, and lilac transfer-printed	19 <sup>th</sup> – early 20 <sup>th</sup> century
1001	Pottery	4	Bone china including saucer rim and Broseley transfer-printed rim fragment	19 <sup>th</sup> – early 20 <sup>th</sup> century
1001	Ceramic building material	1	Red earthenware drainage tile fragment, probably from a horseshoe shaped tile	Early 19 <sup>th</sup> century
1001	Ceramic building material	1	Cream-glazed white earthenware tile rim fragment	19 <sup>th</sup> – 20 <sup>th</sup> century
1001	Glass	2	Dark green bottle base and bottle body fragment	Early 18 <sup>th</sup> – early 19 <sup>th</sup> century



<b>1001</b>	Glass	1	Very light turquoise bottle base	19 <sup>th</sup> century
<b>1001</b>	Glass	2	Very light turquoise flat pane fragments	19 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1001</b>	Glass	1	Colourless medicine bottle with press-moulded dose measurement lines on side and prominent mould seam	Early 20 <sup>th</sup> century
<b>1001</b>	Clay tobacco pipe	4	Stem fragments – 3x plain stem fragments (1x l. 38mm, dia. 6.5-7mm, 5/64" dia. borehole; 1x l. 32mm, dia. 5mm, 5/64" dia. borehole; 1x l. 23mm, dia. 7-8mm [oval-shaped], 4/64" dia. borehole); 1x stamped 'SEPHTON LANCASTER' (l. 48mm, dia. 7mm, 5/64" dia. borehole)	18 <sup>th</sup> – 19 <sup>th</sup> century
<b>1001</b>	Stone	1	Finger-shaped and sized piece of white stone, fairly coarse material but smoothed, possible whetstone?	Medieval – post-medieval?
<b>1001</b>	Animal bone	5	4x cattle-size bone fragments (two sawn, includes bos (cow) femur fragment (proximal end)); 1x bos calcaneus (cow heel bone (left-side))	Probably post-medieval
<b>1001</b>	Fe	1	Corroded fragment, possibly from nail	Not closely dateable
<b>1003</b>	Pottery	24	<p>Mostly small <i>Gritty Ware</i> body sherds, the material probably represents several fabrics; less well-represented are (lightly gritted) <i>sandy wares</i>. All of the material is soft-fired and will mark paper.</p> <p>Of the <i>Gritty Ware</i> (x19), the surfaces tend to be pale orange to buff, although some have a more fully reduced inner margin or core, tending to be mid to light grey in colour. The gritty inclusions are up to 1mm and can be abundant. One of the more lightly gritted and more fully reduced fragments is a fragment of an obtuse-angled base from a thin-walled vessel. Much of the material is from thin-walled vessels, although vessel forms cannot be identified due to the generally small sherd size, however, of particular note are three refitting fragments of a side strap handle attached to the partial rim of a jug. A second fragment is also from the end of a strap handle. Glaze is present on 7 fragments (37%), on external surfaces, including both strap handles, and varies from a slightly dull yellowish- to brownish-green</p> <p>The <i>sandy ware</i> (x4) represents at least two fabrics. The material is a similar pale buff orange colour across the section with a uniform sandy fabric. Two pieces, including a clubbed rim fragment from a thin-walled vessel, have a dark brownish glaze applied to the top of the rim and external surface. One of the other fragments is an unglazed collared rim fragment.</p> <p>1x soft-fired lump of clay – orange colour, with voids in the material; no surface remains and vessel form not identified.</p>	12 <sup>th</sup> – 14 <sup>th</sup> century
<b>1003</b>	Pottery	3	Black-glazed red earthenware coarseware: crock rim, hollowware rim and hollowware body	Late 17 <sup>th</sup> – early 20 <sup>th</sup> century

<b>1003</b>	Pottery	9	Brown-glazed red earthenware, including hollowware body fragment with white slip decoration, everted rim, and rim with white slip stripe	Late 17 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1003</b>	Pottery	5	Mottledware hollowware vessel fragments: 3 refitting body fragments, and 2 refitting body fragments with upper terminal of strap handle	Late 17 <sup>th</sup> – early 18 <sup>th</sup> century
<b>1003</b>	Pottery	1	Staffordshire-type slipware cup/mug (?) body fragment with upper handle terminal in pale pink earthenware with white slip coating with trailed and combed slip decoration on interior	Late 17 <sup>th</sup> – early 18 <sup>th</sup> century
<b>1003</b>	Pottery	1	Glazed white slip coated red earthenware hollowware body fragment	Late 17 <sup>th</sup> – early 18 <sup>th</sup> century
<b>1003</b>	Pottery	2	High-fired brown-glazed creamish-red earthenware	Late 17 <sup>th</sup> – early 18 <sup>th</sup> century
<b>1003</b>	Pottery	2	Tin-glazed earthenware fragments, one with blue painted decoration	Late 17 <sup>th</sup> – early 18 <sup>th</sup> century?
<b>1003</b>	Pottery	1	Glazed buff-bodied stoneware hollowware body fragment	Late 17 <sup>th</sup> – 18 <sup>th</sup> century?
<b>1003</b>	Pottery	3	Creamware jug spout with face moulded on spout, and flatware fragments	Mid – late 18 <sup>th</sup> century
<b>1003</b>	Pottery	4	Pearlware plate base with recessed footrim, rim and body fragments from same bowl (?) with blue transfer-printed landscape pattern, and blue transfer-printed body fragment	Late 18 <sup>th</sup> – early 19 <sup>th</sup> century
<b>1003</b>	Pottery	1	White earthenware plate rim	19 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1003</b>	Clay tobacco pipe	3	3x plain stem fragments; 1x l. 43mm, dia. 10mm, 7/64" dia. borehole; 1x l. 22mm, dia. 6mm, 5/64" dia. borehole; 1x l. 39mm, dia. 6.5-7mm, 4/64" dia. borehole	Late 17 <sup>th</sup> /18 <sup>th</sup> -19 <sup>th</sup> century
<b>1003</b>	Glass	2	Dark green bottle mouth to shoulder, and body fragment	Mid-18 <sup>th</sup> – early 19 <sup>th</sup> century
<b>1003</b>	Glass	5	Very light green flat fragments x 4, of which 2 refitting with folded and sheared edge; very light turquoise flat fragment with thickened edge	Roman or post-medieval?
<b>1003</b>	Glass	7	Very light turquoise thin flat fragments	19 <sup>th</sup> – early 20 <sup>th</sup> century?
<b>1003</b>	Glass	1	Very light turquoise thick body fragment	19 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1003</b>	Glass	2	Colourless thin-wall vessel rim and very light turquoise thin-walled vessel body fragment	18 <sup>th</sup> – 19 <sup>th</sup> century?
<b>1003</b>	Fe	6	Corroded fragments, comprising 5 probable nails, three large and apparently square section, two smaller, one of which has a semi-circular head and is probably a fiddle key type horseshoe nail. 1 section of approximately half of a horseshoe of medieval or early post-medieval type	Medieval – post-medieval
<b>1003</b>	Animal bone	1	Small, unidentified burnt fragment	Not closely dateable

<b>1004</b>	Animal bone	32	<p>2x pig jaw fragments;</p> <p>2x loose teeth, possibly loose from the pig jaw fragments;</p> <p>3x cattle-size vertebrae (two sawn);</p> <p>13x unidentified long bone fragments (two sawn) and rib fragments, including cattle-size (including four sawn);</p> <p>1x ovis femur (sheep leg bone)</p> <p>1x bos calcaneus (cow heel bone (left-side));</p> <p>2x bos astralagus (cow ankle bone L+R side);</p> <p>8x unidentified (three sawn)</p>	Probably post-medieval
<b>1004</b>	Ceramic building material	13	<p>Red earthenware comprising: 2 frogged brick fragments, 1 marked '[C]LAU[GHTON...]', 1 fragment of brown drainage tile, 1 fragment of black glazed floor tile, 4 fragments of drainage tile of horseshoe type.</p> <p>Buff or cream earthenware comprising: 1 fragment of drainage or floor tile or chimney pot, 4 fragments of garden edging tile with moulded interlace or Guilloche and five-pointed star pattern</p>	Post-medieval, mostly late 19 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1004</b>	Pottery	2	Brown-glazed red earthenware coarseware base and crock rim	Late 17 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1004</b>	Pottery	1	Creamware fragment	Mid – late 18 <sup>th</sup> century
<b>1004</b>	Pottery	1	Pearlware jug/bowl base with dabbed decoration in earth colours	Late 18 <sup>th</sup> – early 19 <sup>th</sup> century
<b>1004</b>	Pottery	1	White stoneware hollowware body fragment with matt finish embossed basket weave on exterior and shiny glaze on interior	Late 18 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1004</b>	Pottery	1	Bone china saucer rim with blue transfer-printed Broseley pattern	19 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1004</b>	Pottery	3	Red earthenware flower pot fragments including 2 refitting rims	Late 18 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1004</b>	Pottery	1	Complete brown-glazed grey-bodied stoneware very small pot/jar	Late 18 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1004</b>	Glass	1	Very light turquoise complete jar lid	Late 19 <sup>th</sup> century
<b>1004</b>	Glass	1	Green bottle mouth with ground interior to take ground glass stopper or cork or similar	19 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1004</b>	Glass	1	Dark green bottle base	19 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1004</b>	Glass	1	Complete brown jar external screw top closure punt marked 'Q1052 / CTG'	Early 20 <sup>th</sup> century

<b>1004</b>	Glass	15	Colourless bottle and jar fragments including complete bottle punt marked 'WELLCOME / 108 / CHEMWORKS', faceted Heinz (?) base and body fragments punt marked 'HE[.....]CO / B21', bottle mouth with crown closure and embossed text on shoulder '...OMS...', bottle base punt marked '23', bottle body fragment with embossed text on shoulder '...SON / ...RS', complete pot/jar ridged below rim and punt marked '6', two matching jars with embossed pattern on sides of which one complete and one with mortar (?) in base	Early 20 <sup>th</sup> century
<b>1004</b>	Glass	1	Very light turquoise flat pane fragment	19 <sup>th</sup> – 20 <sup>th</sup> century
<b>1004</b>	Pb or pewter?	1	Child's toy, presumably in the form of a petrol pump, some traces of paint, casting seem very evident on two sides	Early to mid-20 <sup>th</sup> century
<b>1006</b>	Pottery	1	Black-glazed red earthenware crock rim with complete lug handle	Late 17 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1006</b>	Pottery	11	Brown-glazed red earthenware coarseware, including two base fragments, and one body fragment with white slip stripe	Late 17 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1006</b>	Pottery	7	Cream-bodied Staffordshire-type slipware, including two refitting rims and two other rims, one with red slip dot decoration; body fragment with red slip stripes, and fragment with red slip coating and white slip stripe on top	Late 17 <sup>th</sup> – early 18 <sup>th</sup> century
<b>1006</b>	Pottery	2	Mottledware (?) or similar later fabric body fragments	Late 17 <sup>th</sup> – early 19 <sup>th</sup> century
<b>1006</b>	Pottery	6	Red earthenware flower pot fragments	Late 18 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1006</b>	Pottery	3	Tin-glazed earthenware fragments, one with blue painted decoration	Late 17 <sup>th</sup> – early 18 <sup>th</sup> century?
<b>1006</b>	Pottery	5	White salt-glazed stoneware fineware rim, body, and base fragments	Late 17 <sup>th</sup> – early 18 <sup>th</sup> century?
<b>1006</b>	Pottery	1	Brown salt-glazed grey-bodied stoneware bottle/jar body fragment	Late 17 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1006</b>	Pottery	1	Blue salt-glazed grey-bodied stoneware hollowware base fragment	Late 17 <sup>th</sup> – 19 <sup>th</sup> century?
<b>1006</b>	Pottery	1	White salt-glazed stoneware coarseware body fragment	Late 17 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1006</b>	Pottery	1	Green-glazed grey-bodied stoneware jar shoulder	19 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1006</b>	Pottery	3	Porcelain fragments comprising base with enamel painted decoration, and body fragments with blue painted decoration	18 <sup>th</sup> – early 19 <sup>th</sup> century?
<b>1006</b>	Pottery	5	Creamware (?) or similar later fabric fragments	Mid-18 <sup>th</sup> – 19 <sup>th</sup> century
<b>1006</b>	Pottery	8	Pearlware including bowl base with blue transfer-printed pattern, Broseley blue transfer-printed hollowware rim, green shell edge plate rim, and blue transfer-printed hollowware body fragment	Late 18 <sup>th</sup> – early 19 <sup>th</sup> century

<b>1006</b>	Pottery	15	White earthenware including blue shell edge plate rim, blue transfer-printed fragments x 5 including Willow x 2 and Asiatic Pheasants x 1, brown transfer-printed fragment, factory-produced slipware x 1, and green glazed fragment x 1	19 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1006</b>	Pottery	5	Bone china, comprising four with blue transfer-printed Broseley pattern (saucer rim-to-base, saucer base, saucer rim, and cup rim), and relief-moulded hollowware rim fragment	19 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1006</b>	Ceramic building material	1	Unglazed cream-bodied fireclay with slight lip on one side probably chimney pot	19 <sup>th</sup> or early 20 <sup>th</sup> century
<b>1006</b>	Pottery	14	<p>Various different fabrics represented:</p> <p>2x possibly <i>gritty ware</i> fragments, both a similar hard-fired dark grey fabric with reddish-orange to brown surfaces, with frequent inclusions, including quartz (up to 1mm), includes 1x simple, everted rim fragment;</p> <p>2x much-abraded pale buff, soft, 'sandy ware' fabric fragments and 1x similar fragment but deeper orange colour, with infrequent quartz inclusions;</p> <p>1x very small, soft, reddish-orange fabric, with small patch of orange glaze;</p> <p>1x obtuse-angled base fragment of a thin-walled vessel (5mm) in a lightly gritted, '<i>partially reduced</i>' soft sandy fabric with pale buff margins, light orange external surface and light grey core and 1x similar fabric, with pronounced sandwich-effect cross-section with paler margins;</p> <p>6x light olive-green-glazed fragments, all a soft lightly gritted sandy fabric (possibly representing more than one fabric), generally with grey outer margin and pale/light orange to buff inner margin and surface; generally from thin-walled (5-6mm) vessels with glaze only on outer surface (although two have glaze inside and out); includes one with a pronounced (partially reduced) sandwich-effect cross-section, with slightly darker grey core</p>	12 – 14 <sup>th</sup> century
<b>1006</b>	Clay tobacco pipe	4	4x plain stem fragments, all with central 6/64" diameter borehole (1x l. 25mm, dia. 6.5-7mm; 1x l. 25mm, dia. 6.5-7mm; 1x l.36mm dia. 8-10mm [slightly oval-shaped section, narrower to one end]; 1x l.37.5mm, pronounce oval-shaped section, 8-10mm)	18 <sup>th</sup> century
<b>1006</b>	Ceramic building material?	1	Soft, uniform, sandy mid-to-light orange fabric, with definite squared edge; possible tile fragment	Medieval/early post-med?
<b>1006</b>	Animal bone	2	Unidentified re-fitting sheep-size long bone fragments	Not closely dateable
<b>1006</b>	Fe	2	1 thin round-sectioned shaft, probably nail, 1 large round nail head with small amount of shaft remaining	Post-medieval

<b>1006</b>	Stone	1	Fragment lignite or shale? Too fragmentary to determine any form	Not closely dateable
<b>1006</b>	Glass	1	Dark green bottle base fragment	Late 17 <sup>th</sup> – early 18 <sup>th</sup> century
<b>1006</b>	Glass	1	Dark green bottle neck	17 <sup>th</sup> – 18 <sup>th</sup> century
<b>1006</b>	Glass	1	Very light turquoise flat pane fragment with thickened edge	19 <sup>th</sup> century?
<b>1009</b>	Pottery	1	Brown-glazed red earthenware coarseware base fragment with white slip decoration	Late 17 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1009</b>	Pottery	1	Light brown glazed grey-bodied stoneware large closed vessel base fragment	Late 17 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1009</b>	Pottery	2	White earthenware including Fibre transfer-printed saucer base	19 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1009</b>	Glass	1	Dark green bottle base with high kick	Early 19 <sup>th</sup> century?
<b>1009</b>	Glass	2	Very light turquoise complete bottle with embossed text on panels 'OWBRIDGE'S / LUNG TONIC / HULL' and bottle mouth from similar bottle	Late 19 <sup>th</sup> century
<b>1009</b>	Clay tobacco pipe	1	Stamped stem fragment – Peter Davey to look at; l. 38mm, dia. 6.5-7mm, 5/64"	18 <sup>th</sup> – 19 <sup>th</sup> century
<b>1009</b>	Fe	1	Corroded large square-section nail	Post-medieval
<b>1009</b>	Animal bone	3	1x phalange/long bone fragment (unidentified), with flaking surface, possibly hollowed for marrow extraction; 1x sawn cattle-size vertebra; 1x midsection of a cattle-size long bone, both ends having been sawn	Probably post-medieval
<b>1011</b>	Pottery	1	<i>Gritty ware</i> : a pale yellowy-orange to buff-coloured soft, sandy fabric (it will mark paper), with frequent small grit inclusions, including quartz (up to 1mm in size); from a thin-walled vessel, 4-5mm thick, with traces of a light yellowish-green glaze on one side	12 <sup>th</sup> – 14 <sup>th</sup> century
<b>1011</b>	Pottery	36	Brown-glazed red earthenware crock fragments with pronounced throwing rings, from a minimum of two vessels. Two rims and the rest body fragments, some refitting	Late 17 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1011</b>	Pottery	2	Brown-glazed red earthenware coarseware crock body, and dish rim with white slip stripes	Late 17 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1011</b>	Pottery	10	Red earthenware flower pot (?) fragments (some refitting) from two different vessels, with extra drainage holes just above base	Late 17 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1011</b>	Pottery	9	Red earthenware flower pot fragments (some refitting) with splashes of brown glaze, with extra drainage holes just above base	Late 17 <sup>th</sup> – early 20 <sup>th</sup> century
<b>1011</b>	Animal bone	3	Large animal bone fragments, including a sawn cattle-size rib fragment and long bone fragment and a second unidentified rib fragment; the split of the long bone is indicative of the extraction of marrow from a relatively fresh bone	Uncertain / post-medieval?

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<b>1011</b>	Fe	1	Large section of corroded flat-bottomed vessel base, probably part of a large skillet or jam pan	Post-medieval
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## Appendix 4: Clay Tobacco Pipe Assessment

### A small collection of clay tobacco pipe stems from Cartmel (FL 21)

Peter Davey

Twelve pipe stems were found in four contexts. There were no bowl fragments or mouthpieces. Two stems were close to stem-bowl junctions. Two included impressed relief marks. The numbers of stem by context and their bore in /64" and clay type are as follows:

<b>1001</b>	4 (4 x 5/64")	all imported
<b>1003</b>	3 (1 x 7/64"; 2 x 5/64")	2 local, 1 imported
<b>1006</b>	4 (4 x 6/64")	2 local, 2 imported
<b>1009</b>	1 (1 x 5/64")	imported

### *The two marked stems*

#### FL 21 **1001**

This 49mm length of parallel-sided stem, some 8mm in diameter, in imported clay, bears a linear stamp on one side, parallel to the long axis, that reads: SEPHTON LANCASTER. The maker is most likely to have been John Sephton (1759-1833) who arrived in Lancaster, probably from Liverpool in around 1790 (White 1975, 62). The style of the mark with both surname and place running on the same side is typical of Liverpool makers in the late 18th and very early 19th century. This type of mark was uncommon elsewhere and was replaced in Liverpool by the more normal surname and place on opposite sides of the stem by around 1820 (Coney 1980, 34-37). The Sephtons were an important pottery and clay pipe making family in Rainford and Prescott from the later 17th century (Dagnall 2015, 202, 215).

#### FL 21 **1009**

This 37mm length of parallel-sided stem, some 7mm in diameter, bears a very faintly impressed Chester oval stamp and an even more fragmentary Chester border. Although a uniformly pink colour, microscopic examination confirms that it is made of 'imported' clay, rather than from the local Coal Measures.

The oval stem-stamp portrays Queen Anne (1702-1714) facing left. Although very faint the small letters A and R can be seen to the left and right of the bust at the level of the ears. The only study of these 'Royal' ovals has five slightly different designs (Rutter and Davey 1980, 164-5, Fig. 57, Nos. 55-59). The Cartmel find is too faint to be sure of an identification but seems closest to 'Royal' oval 56 which has the same kind of shoulder design and the smallest lettering.

The border has been rolled on below the oval. It is extremely fragmentary but, given its width (c10mm) and the small elements that can be made out clearly enough, it seems most probable that it is one of the 'heart, star and fleur-de-lys' Chester borders (Rutter and Davey 1980, 173-176, Fig. 59, Nos. 35-51). This would fit well with the known associations of the published Queen Anne examples that include Borders 39, 45, 46 and 50. The general production range using this group of borders is from c1690 to 1715.

### **Contexts**

The four groups are far too small for any confident dating to be attempted. Even so, there is clearly a difference between 1001 with all imported clay and smaller bore diameters and **1003** and **1006** with a mixture of larger bores and local and imported clay. Whether or not the local clays were Cumbrian or from further south is an open question. The overall impression is of pipes dating from the late 17th to the early 19th century.



**Significance**

The Chester Queen Anne oval is a rare find even in Chester itself; few have been recorded elsewhere. The Sephton stem is also a very interesting item to have reached Cartmel. At the very least both these stems ought to be retained.

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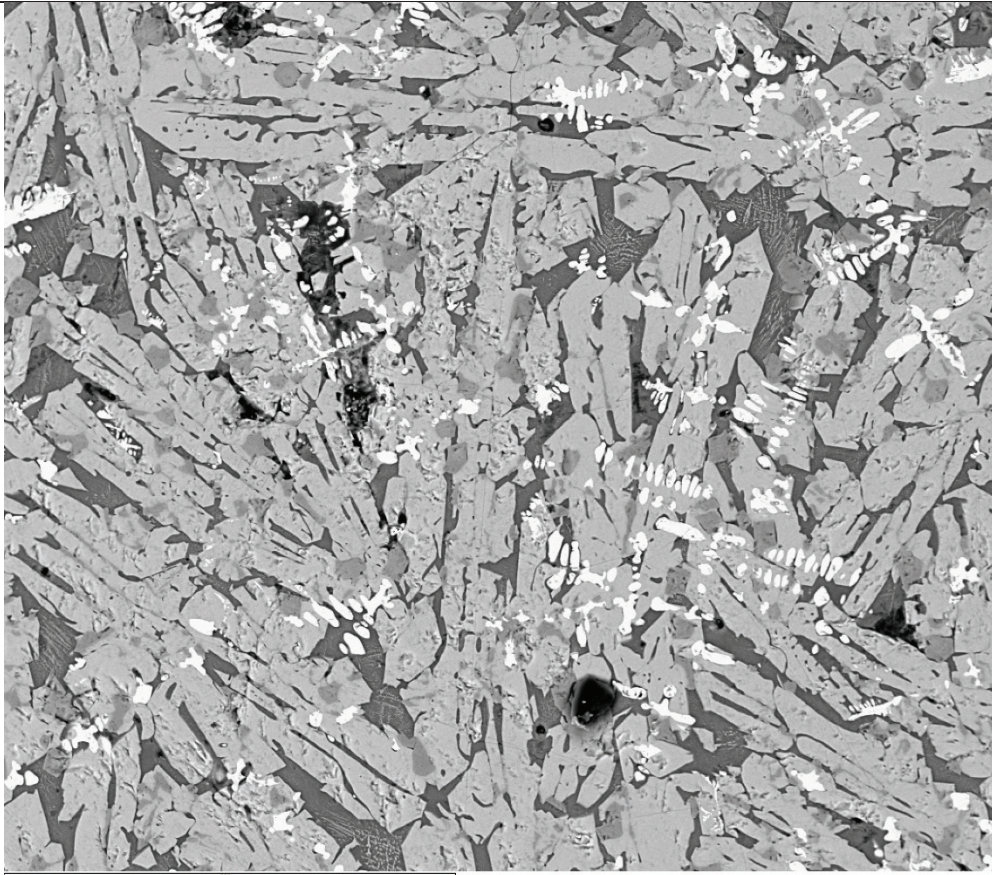
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## **Appendix 5: Iron Smelting Residue Assessment Report**



## **Assessment of the slags recovered from Fairfield, Lodge, Cartmel, Cumbria. Site Code: FL21**

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Monday, 4<sup>th</sup> October 2021



# Assessment of the slags recovered from Fairfield, Lodge, Cartmel, Cumbria. Site Code: FL21

## 1 Introduction

This assessment report describes the material classified as slag recovered from excavations at Fairfield, Lodge, Cartmel, Cumbria. A brief overview of the material from the site is provided, followed by a detailed description and quantification. The significance of the material is discussed, and recommendations made for further work. The assessment report follows the guidelines issued by Historic England (Dungworth 2015, 13-14). The site is located within the Scheduled Area of the Augustinian Priory of Cartmel, Cumbria. The solid geology is the sandstone of the Silurian Bannisdale Formation overlain by an unknown depth of glacial till and alluvium. Although Cartmel lies outside the main Furness Iron ore deposit a small hematite orebody was worked in Hesketh Wood, 0.5km to the southeast of Cartmel (Dunham and Rose 1941, p 22).

## 2 Slag Classification

The slags were visually examined, and the classification is based solely on morphology. Additional data to improve the interpretation was obtained from a brief programme of Hand-Held X-Ray Fluorescence (HH-XRF). Details of the method are provided in Appendix 1. The debris associated with metalworking or submitted in the understanding that they are associated with metalworking, can be divided into two broad groups; residues diagnostic of a particular metallurgical process or non-diagnostic residues that may have derived from any pyrotechnological process (McDonnell 2001). The diagnostic ferrous debris can be attributed to a particular ironworking process; these comprise ores and the ironworking slags, i.e. the macro, hand recovered smelting and smithing slags and the micro-residues such as hammerscale and slag fragments recovered from sieving programmes. The second group, are the diagnostic non-ferrous metalworking debris, e.g. crucibles and moulds. Thirdly, there are the non-diagnostic slags, which could have been generated by a number of different processes but show no diagnostic characteristic that can identify the process. In many cases the non-diagnostic residues, e.g. hearth or furnace lining, may be ascribed to a particular process through archaeological association. The residue classifications used in the report are defined below.

### 2.1 Diagnostic Ferrous Slags and Residues

Smelting Tap Slag - iron silicate slag generated by the smelting process, i.e. the extraction of the metal from the ore. Tap slag is one of the most characteristic forms and is distinguished by either a ropey morphology of the upper cooling surface or a fine crystalline fracture with spheroidal vesicles.

Slag Cake - smelting slag that has cooled in a small pit or depression. They are often plano-convex in shape. The weight (grams), major diameter (mm), minor diameter (mm) and depth (mm) area recorded. A theoretical volume is calculated.

Viscous Smelting Slag – irregularly shaped lumps of dense, fine crystalline slag. Some surfaces may display evidence of liquidity or flow. They vary in size from small pieces a few centimetres across weighing 10's of grams to larger, fist sized lumps weighing 100's grams.

## **2.2 Non-Diagnostic Slags and Residues**

Slagged Hearth or Furnace Lining - the clay lining of an industrial hearth, furnace or kiln that has been heavily attacked by slag resulting in a silica rich side (the original clay lining) which grades through to a slag (i.e. lower in silica, richer in iron oxide). It is not possible to distinguish between furnace and hearth lining, but slagged lining is more common in smelting assemblages.

Cinder - high silica content slag.

## **3 Results**

### **3.1 Overview**

The excavation recovered a small (11kg) but significant deposit of iron smelting slags.

### **3.2 Description**

Table 1 lists the count and weight of the slag types present on the site; no soil samples were processed to recover micro-residues. The assemblage is dominated by three types of smelting slag, tap slag, slag cakes and viscous smelting slag. Most of the viscous smelting slag is very dense, and some respond strongly to a magnet; the viscous smelting slags formed 51% of the assemblage by weight. One such piece (Plate 1) was sectioned in half, which showed a typical black coloured silicate slag with small vesicles, but also evidence of highly reflective particles, indicative of small metallic inclusions (Plate 2). There were some larger pieces, e.g. Plate 3, which appears to have an edge of furnace lining, indicating that the slag was attached to the furnace lining, which broke away when the slag was extracted. The tap slag (Plate 4) displays the classic ropey flowed upper surface, but the pieces are quite small, the largest pieces being 100 mm in length. The tap slags formed 22% of the assemblage by weight. There were three complete and two partial slag cakes (Plates 5 and 6); the dimensions of the cakes, as received, are presented in Table 2. The dimensions of the complete cakes and the calculated complete dimensions of the incomplete cakes, with the calculated cake volume are presented in Table 3. The slag cakes formed 26% by weight of the assemblage. There was a small amount of slagged lining, i.e. slag that had reacted with the furnace lining, and a small amount of cinder.

One specimen of the viscous smelting slag, tap slag and a slag cake were all analysed by HH-XRF. All the spectra (e.g. Figure 1) displayed a significant manganese (Mn) peak supporting the interpretation that they derived from the iron smelting process rather than the smithing

process. Comparison of the spectra from all three samples indicated that the tap slag specimen was richer in calcium and manganese compared to the other two slag types. This would indicate that the smelting slag and slag cake was higher in silica and possibly aluminium, which would indicate a significant contribution in these slags from the furnace lining.

#### **4 Discussion and Significance**

The majority (91%) of the assemblage derives from Context 1003, a levelling deposit of material. The absence of fired clay furnace lining and other material would suggest that it is at least a tertiary deposit, i.e. the slag was taken from the furnace, dumped on a slag heap, and then removed to levelling deposit. This deposit is dominated by viscous smelting slag (Plate 1), a slag that had not been heated sufficiently to ensure that it freely flowed. This is due to the combination of the slag chemistry and the temperature achieved in the slag zone of the furnace. The cut face of the sample of viscous smelting slag (Plate 2) indicated that finely dispersed iron metal inclusions were present, which indicates poor slag-metal separation, again suggesting the slag was viscous.

The assemblage is dominated by viscous smelting slags and slag cakes which is similar to the assemblage from Silloth, Cumbria (McDonnell 2019), which was dated by C<sup>14</sup> to the 12<sup>th</sup> / early 13<sup>th</sup> CE (Elsworth pers. Comm.). The assemblage is radically different to that from the Romano-British (2<sup>nd</sup>/3<sup>rd</sup> CE), site at Poulton-Le-Fylde, Lancashire (McDonnell 2020). The assemblages are compared in Table 3. The calculated volumes of the slag cakes from Cartmel and those from Silloth and Poulton-Le-Fylde are presented in Table 4 and plotted on Figure 4; this shows that the Cartmel cakes are smaller than the Silloth mean and very much smaller (less than a third smaller) than the mean value derived from the Poulton-Le-Fylde assemblage. The Silloth slag cakes differ from the Cartmel examples by having a ‘feeder’ present on some examples.

The HH-XRF analyses of the Cartmel slags showed the presence of a significant manganese peak which (a) is strong evidence that all slag types derived from the smelting process and that (b) a low manganese bearing ore was utilised. The Cartmel spectrum is compared to those for tap slags from Silloth and Poulton-Le-Fylde (Figure 3), which clearly demonstrated that both the Silloth and Poulton-Le-Fylde iron smelters were exploiting a very low manganese bearing ore, i.e. the manganese peak in the slag is very small. The manganese (oxide) will partition to the slag during the smelting process; hence it is an indicator of the presence/absence or quantity of manganese present in the ore. The Furness hematite ores are noted for their high quality and the analyses in Percy (1864, p 206 Table II, 1-4a) show a manganese oxide content below 0.2%. This would result in enhancement in the manganese content of the slag.

Although Silloth lies c.65km to the north and Poulton-Le-Fylde is 40km to the south (as-the-crow-flies) across Morecambe Bay from Cartmel, and hence would be exploiting different ore sources, they do present the closest comparative data.

The slag recovered from Fairfield Lodge and other investigations around Cartmel, e.g. Priory Gardens (Greenlane Archaeology 2015) is indicative of a substantial iron smelting operation in the close vicinity to the priory. The assessment of the Fairfield Lodge slag suggest that the iron smelters are not operating to maximum efficiency, e.g. the slag is viscous and slag/metal separation is poor. This would suggest it derives from an Iron Age technology or perhaps an early medieval technology. It is possible that evolved Iron Age smelting technology originating in Scotland, i.e. beyond Hadrian's Wall was utilised in the Cumbria region during the early medieval period.

## **5 Recommendations**

The assemblage is very important for understanding the evolution of iron smelting technology in the Northwest of England. The assemblage from Context 1003 should be retained and if possible, sources of funding sought to undertake a full archaeometallurgical study of the material.

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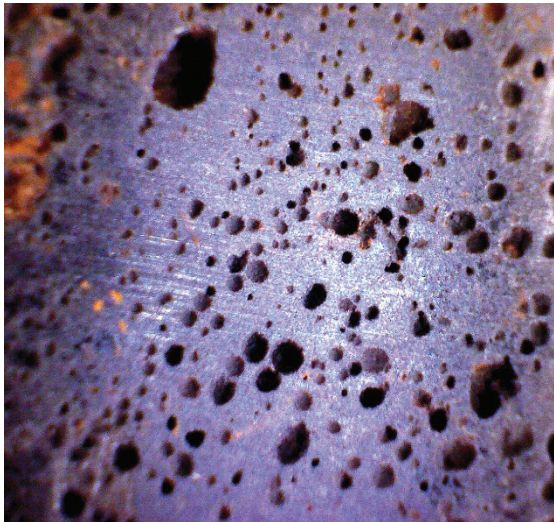
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*Plate 1 Small piece of viscous smelting slag from Context 1003.*



*Plate 2 Section of the Plate 1 viscous smelting slag showing small vesicles and highly reflective metallic particles. (Approximate Width of Field 20mm).*





*Plate 3 Larger piece of viscous smelting slag, showing rim of furnace lining, (top right to bottom right) edge.*



*Plate 4 Examples of tap slag fragments.*



*Plate 5 Complete slag cake (weight 836grams).*



*Plate 6 Incomplete skag cake, (broken edge at the bottom of the picture). (Weight 554 grams as received).*

Context	Tap Slag Count	Tap Slag Weight	Viscous Smelting Slag Count	Viscous Smelting Slag Weight	Slag Cake Count	Slag Cake Weight	Slagged Lining Count	Slagged Lining Weight	Cinder Count	Cinder Weight
1001			3	163						
1003	43	2452	82	4674	5	2838	2	76	3	11
1006		1	69	3	171					
1007			1	80						
Unstratified			4	779						
TOTALS	43	2453	159	5699	176	2838	2	76	3	11

**Table 1 Catalogue of the slags recovered from, Fairfield Lodge, Cartmel. (Weight in grams).**

Context	Cake Weight	D1	D2	DP	Complete?	Amount Present
1003	526	96	79	34	y	
1003	509	120	66	49	n	Approximately half
1003	413	115	84	35	y	
1003	836	125	105	53	y	
1003	554	130	70	44	n	Approximately 60%

**Table 2 Dimensions of the slag cakes, as received. D1- major diameter (mm); D2 - minor diameter (mm); DP - depth (mm).**

Site	% Tap	%	% Slag	%
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	Slag	Smelting Slag	Cakes	Other
Cartmel	22	51	26	1
Silloth	1	48	36	15
Poulton-le-Fylde	74	18	1	7

*Table 3 Comparison of the assemblages from Cartmel, Silloth, (McDonnell 2019) and Poulton-Le-Fylde (McDonnell 2020).*

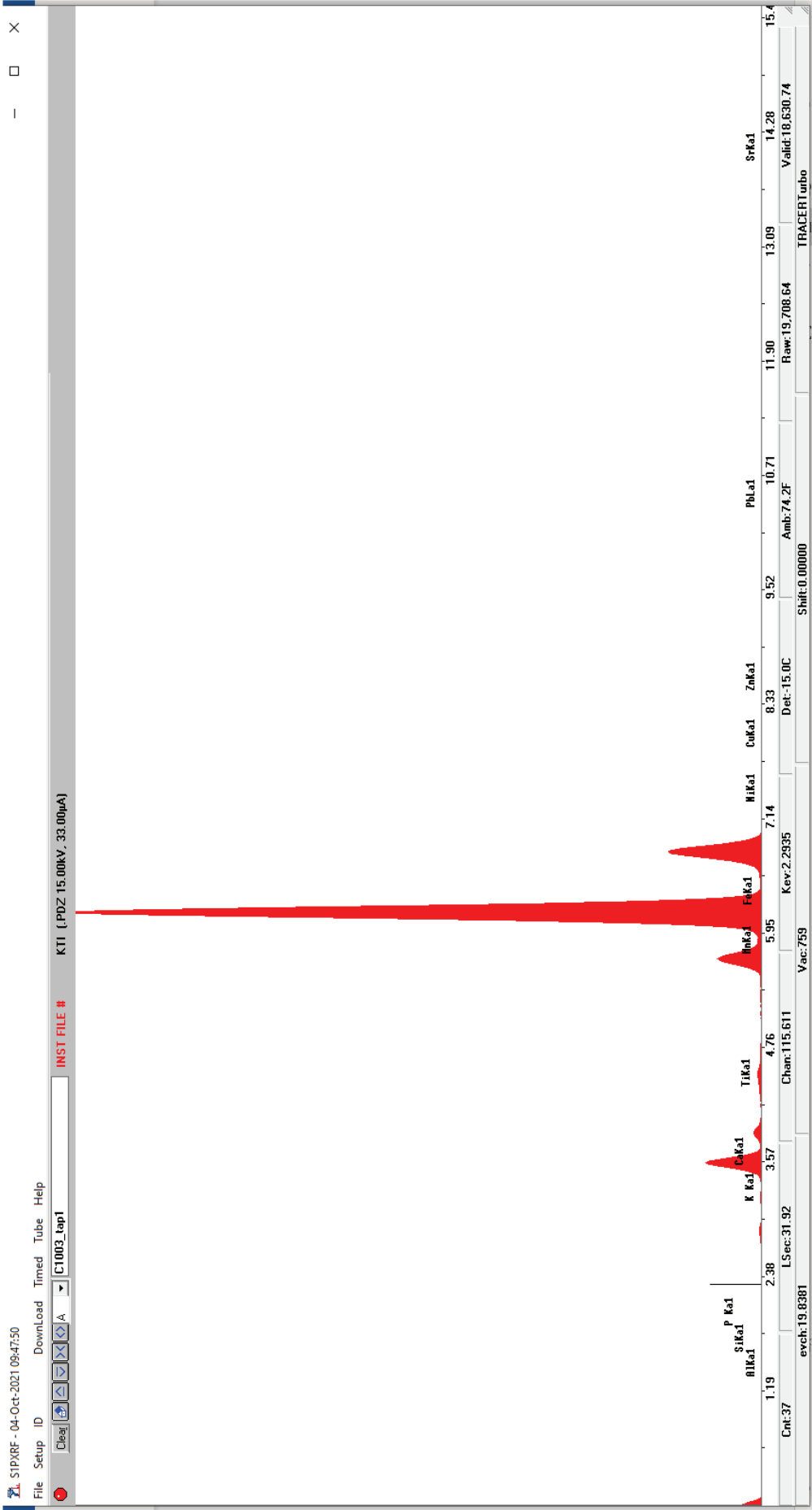


Figure 1 HH-XRF spectrum derived from the specimen of tap slag showing a significant manganese peak.

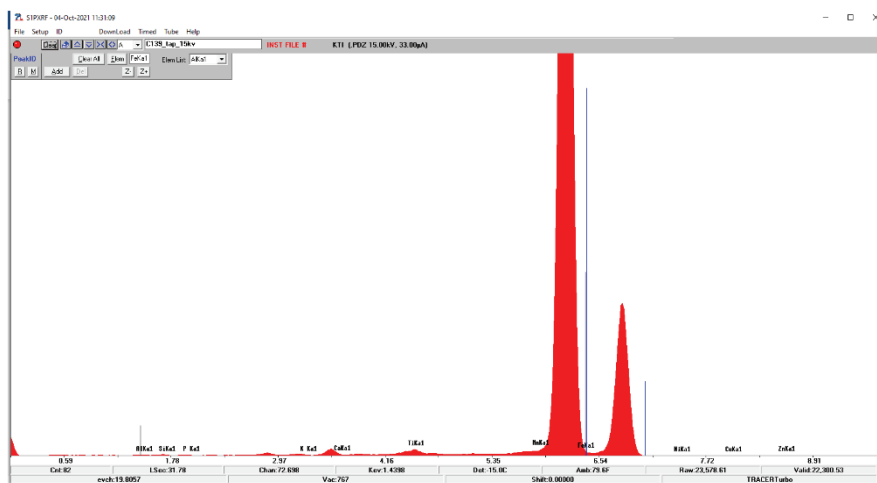
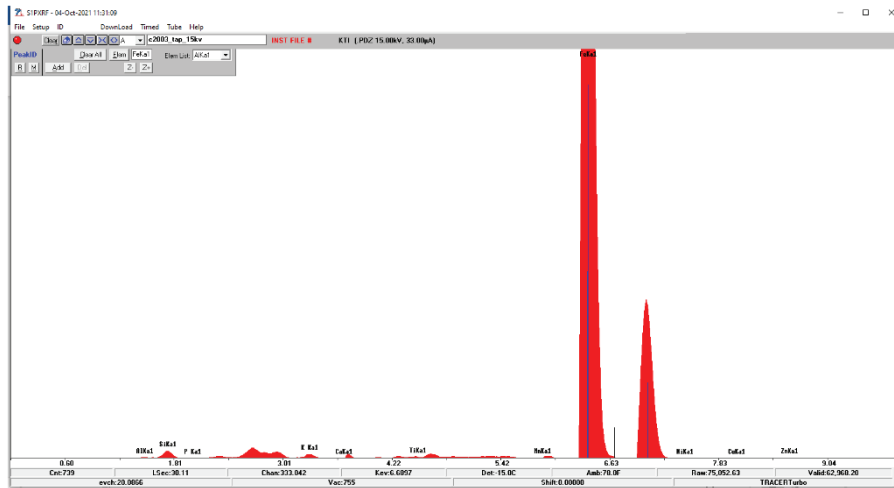
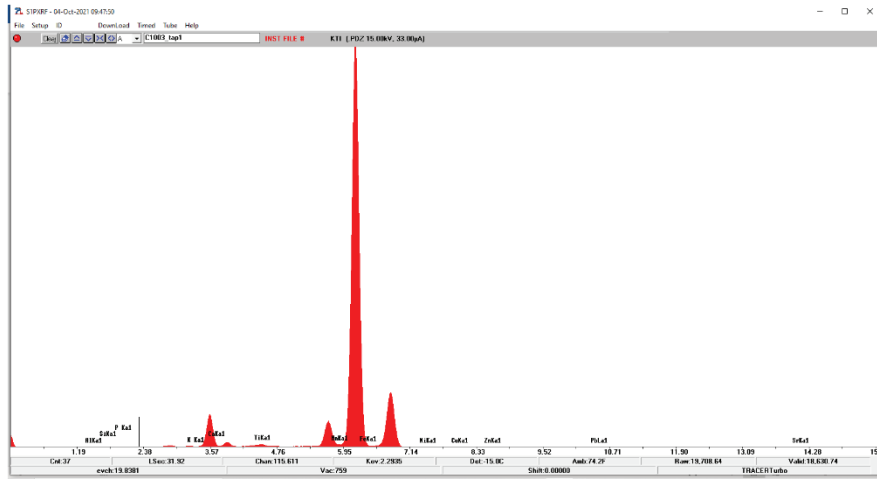
Context	Weight (grams)	D1(mm)	D2 (mm)	DP (mm)	Calculated Volume (CC)
1003	413	115	84	35	708
1003	526	96	79	34	540
1003	836	125	105	53	1457
1003	923	130	117	44	1398
1003	1018	122	120	49	1502
Mean	743	118	101	43	1121
Silloth (Mean)	2057	166	145	64	3275
Poulton-Le-Fylde (Mean)	2648	250	180	60	5487

**Table 4 Dimensions, (Weight, Major Diameter, Minor Diameter and Depth) and the calculated volumes of the complete slag cakes and for the estimated complete values for the partial cakes from Carmel with the mean data from Silloth (McDonnell 2019) and Poulton-Le-Fylde (McDonnell 2020).**



**Figure 2 Plot of the weight of the slag cakes from Cartmel, Silloth and Poulton-Le-Fylde plotted against a calculated volume.**





**Figure 3** The HH-XRF spectra from Cartmel (top), Silloth (middle) and Poulton-Le-Fylde.

## Appendix 1 HH-XRF Methodology

The instrument used was a Bruker S1 Turbosdr hand-held XRF instrument operating at 15kV. The technique is non-destructive. A beam of x-rays is generated in the instrument and focussed on a fresh fractured surface of the sample, the x-rays interact with the elements present in the sample resulting in the emission of secondary x-rays which are characteristic (in terms of their energy and wavelength) of the elements present in the sample. The energies of the secondary x-rays are measured, and a spectrum generated showing a level of background noise with peaks of the elements present superimposed on the background noise. Slag samples were analysed for 30 live seconds; the spectrum is stored, and a normalised composition determined using a bespoke computer programme. All elements heavier than magnesium (Mg, Z=12), can be detected. The data is normalised and hence gives data showing relative (semi-quantitative) percentage of detected oxides.



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Monday, 4<sup>th</sup> October 2021