

142 - 152 Plymouth Road, Tavistock, Devon

An Archaeological Watching Brief



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An Archaeological Watching Brief

For

Lidl Ltd

By



Brickfield Offices, Maperton, Wincanton, Somerset. BA9 8EG.

T: 01963 824696

F: 07092 259858

E: mail@contextone.co.uk

W: www.contextone.co.uk

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COAS Team:

Project Director: Richard McConnell

Fieldwork Manager: Stuart Milby

Fieldwork: Cai Mason & Peter Fairclough

Post-Excavation Co-ordinator: Fay Pegg

Report: Cai Mason

Specialist Finds Reports: Cai Mason

Research: Cai Mason, Dr Cheryl Allum & Richard McConnell

Graphics: Tara Fairclough

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Non-Technical Summary

Context One Archaeological Services Ltd (COAS) carried out an Archaeological Watching Brief at 142 - 152 Plymouth Road, Tavistock, Devon, (centred on NGR SX 48067 73027) over 6 days between the 9th and the 18th of June 2009. The investigation was commissioned and funded by Lidl Ltd.

The Watching Brief represents the second phase stage of an archaeological programme of works, which commenced with an archaeological desk based assessment (DBA), carried out by COAS in May 2009. The DBA was requested by the Local Planning Authority (West Devon Borough Council) on the advice of Ms Stephanie Knight (Archaeological Officer, Devon County Council (DCC)) as a condition of granting planning permission for the erection of a Lidl food store with associated access and parking (Outline Planning Application No: 12008/2008/TAV; Planning Application No: 12364/2008/TAV). The results of which concluded that upstanding remains of a 19th century Bone Mill existed in the south west corner of the site and that further remains were likely to exist below the ground. Based on these results, a Watching Brief was subsequently requested by West Devon Borough Council, on the advice of Ms Stephanie Knight, as a condition of planning consent for the above works.

The Watching Brief recorded substantial remains of the 19th century Bone Mill, the principal components of which were two contemporary stone built east to west aligned buildings with a cobbled alley running between them. These were clearly the structures shown on the first edition OS map of 1885.

The northern Bone Mill building was floored with paving bricks produced by Candy & Co.; a local brick and tile manufacturer that was founded in the 1860s and is still in operation today. There was no evidence for any earlier structures on the site which strongly suggests that the Bone Mill was constructed between 1860 and 1885. If this is the correct then it is a surprisingly late date, given that most Bone Mills were established in the first half of the 19th century and by this date the industry was facing competition from early chemical fertilisers.

The location of the Bone Mill adjacent to the fast flowing Tiddy Brook, suggests that the Bone Mill was probably water powered. If this were the case then it is likely that the bone crushing machinery was located in the building nearest the brook with the larger northern building used to process and dry the bone prior to milling.

Excavation beneath the site of the Bone Mill and a geotechnical survey undertaken in advance of the project established that the Bone Mill was built directly onto natural shale and that a possible east to west aligned palaeochannel existed to the north of it. This suggests that the natural topography of the site had been substantially altered at some point before 1885 and that the current course of the Tiddy Brook is probably an artificial channel. There are two possibilities for when this may have occurred; the first is that this section of the Tiddy Brook forms part of a leat known to have been constructed in 1677 for Brook Mill to the west of the site, or alternately, it could have been dug in the 19th century to provide power for the Bone Mill itself.

1. Introduction

- 1.1 Context One Archaeological Services Ltd (COAS) carried out an Archaeological Watching Brief at 142 - 152 Plymouth Road, Tavistock, Devon, (centred on NGR SX 48067 73027) (hereafter referred to as the Site) over 6 days between the 9th and the 18th of June 2009. The investigation was commissioned and funded by Lidl Ltd.
- 1.2 The Watching Brief represents the second phase stage of an archaeological programme of works, which commenced with an archaeological desk based assessment (DBA), carried out by COAS in May 2009. The DBA was requested by the Local Planning Authority (West Devon Borough Council) on the advice of Ms Stephanie Knight (Archaeological Officer, Devon County Council (DCC)) as a condition of granting planning permission for the erection of a Lidl food store with associated access and parking (Outline Planning Application No: 12008/2008/TAV; Planning Application No: 12364/2008/TAV). The results of which concluded that upstanding remains of a 19th century Bone Mill existed in the south west corner of the site and that further remains were likely to exist below the ground. Based on these results, a Watching Brief was subsequently requested by West Devon Borough Council, on the advice of Ms Stephanie Knight, as a condition of planning consent for the above works.
- 1.3 The Watching Brief was monitored by Ms Stephanie Knight (Archaeological Officer, Devon County Council) and Bill Horner (Archaeologist, Devon County Council), with a site visit on 16th of June 2009.
- 1.4 At the request of Ms Stephanie Knight, COAS issued a *Written Scheme of Investigation for an Archaeological Watching Brief: 142 - 152 Plymouth Road, Tavistock, Devon* (COAS June 2009), which provided a strategy for the archaeological works. This was submitted to and approved by DCC Historic Environment Service (HES) prior to the commencement of the Watching Brief.
- 1.5 The request for the archaeological work follows advice given by Central Government as set out in *Planning Policy Guidance Note 1* (PPG1), *General Policy and Principles, 1997*, and *Planning Policy Guidance: Note 16* (PPG16), issued by the DoE in 1990. The recommendation also conforms to County Structure and Local Plans.
- 1.6 This report summarises the topographical, geological, archaeological setting of the site, and presents the results of the Watching Brief.

2. Definition and Objectives of a Watching Brief

- 2.1 An Archaeological Watching Brief is defined by the Institute for Archaeologists (IfA) (formerly the Institute for Field Archaeologists) as:

“...a formal programme of observation and investigation conducted during any operation carried out for non-archaeological reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive.” (IfA rev.1999)

- 2.2 The purpose of a Watching Brief is also defined by the IfA as:

“To allow, within the resources available, the preservation by record of archaeological deposits, the presence and nature of which could not be established (or established with sufficient accuracy) in advance of development or other potentially disruptive works.

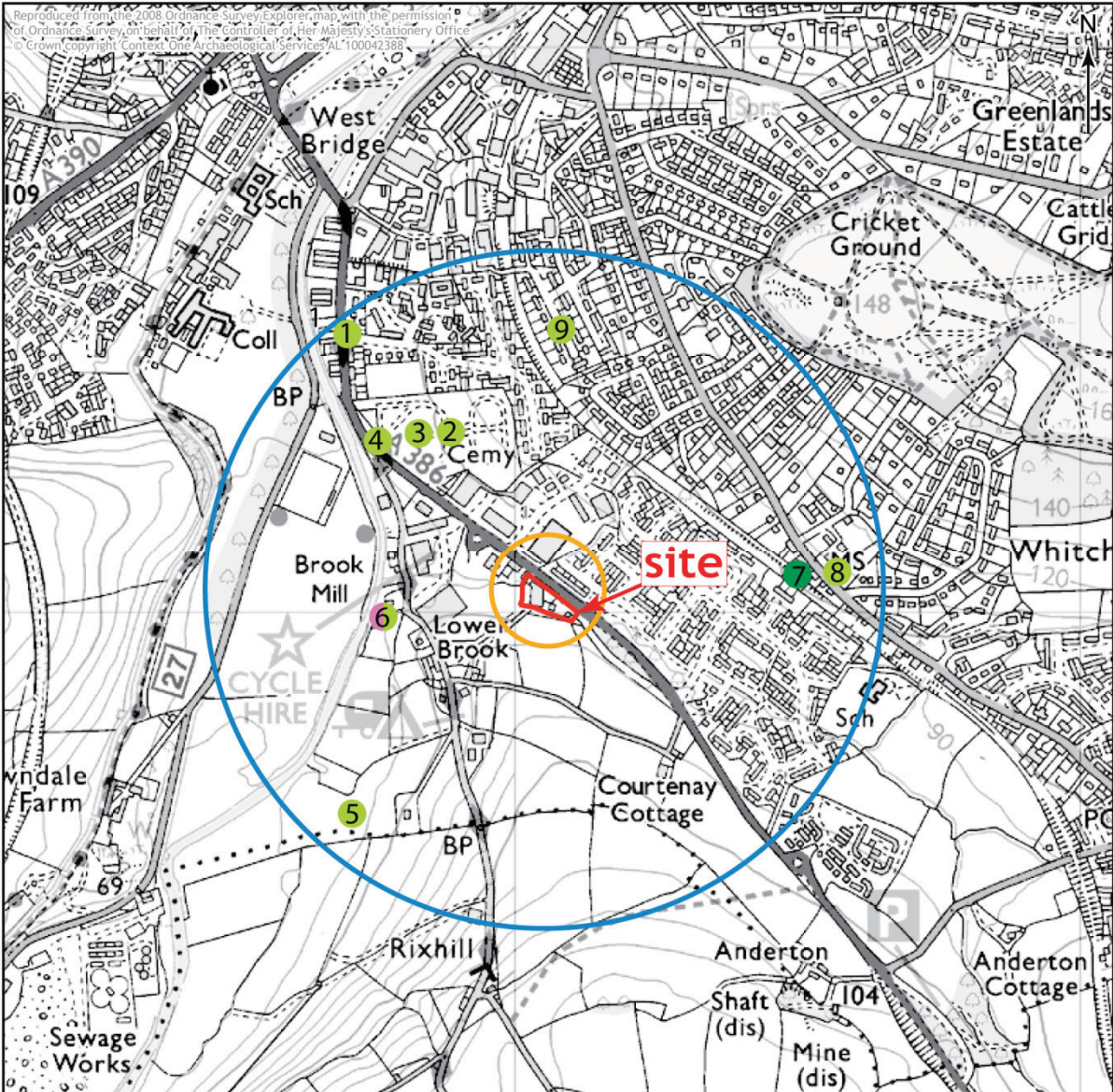
To provide an opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological find has been made for which the resources allocated to the Watching Brief itself are not sufficient to support treatment to a satisfactory and proper standard.” (IfA rev. 1999)

2.3 The results of a watching brief are used to:

- produce a record of the location, nature and date of any archaeological remains encountered on the site;
- add to the knowledge about the previous history of activity on the current site and its surroundings; and
- provide information to influence planning decisions in the area.

3. Site Location, Topography and Geology

- 3.1 The Site (centred on NGR SX 48067 73027) is situated on the southern side of Plymouth Road (A386) on the south-western edge Tavistock in Devon (**Figure 1**). The Site occupies an area of land which is generally level but falls slightly from east to west, with minimal variation between 73m AOD and 74.5m AOD. The site was formerly occupied by a warehouse/ retail unit, a café, a shop (once a petrol station and garage) and car parking areas.
- 3.2 Ground conditions and underlying geology were established by a geotechnical survey previously undertaken on the site; the investigations showed that made ground up to 1.9m deep overlay Middle Devonian weathered shale of the Tavy Formation.



1.	HER No. 1593	industrial housing	6.	HER No. 21287	mill
2.	HER No. 19958	chapel	7.	HER No. 4066	milestone
3.	HER No. 51349	cemetery	8.	HER No. 51358	milestone
4.	HER No. 23132	New Cemetery Lodge	9.	HER No. 58395	Crelake Mine, shaft
5.	HER No. 51353	mine			

	<ul style="list-style-type: none"> — 200m radius (see figure 2) — 1000m radius ● medieval ● post-medieval ● modern 	PROJECT TITLE 142-152 Plymouth Road, Tavistock, Devon.		
		FIGURE TITLE Site setting and known archaeological landscape between a 200m and 1km radius		
		SCALE as shown	PROJECT CODE COAS/WBF/09/PRD	FIGURE NO. 1

4. Archaeological Background

4.1 The archaeological background for the Site has been previously summarised in the desk-based assessment (COAS 2009) and is repeated in summary here to provide a context for the findings of the current work. Where relevant, the Devon Historic Environment Record (HER) reference number has been included.

4.2 The site is located in the north western corner of Whitchurch parish, approximately 1km south of the medieval settlement of Tavistock and is situated in what was, until recently, open countryside.

4.3 Relevant archaeological events within the immediate environs of the Site are listed below:

- Medieval gallows possibly located to the south west of the site at Werydon (HER 16971);
- Medieval deer park recorded to the south west of the site in the 16th century (HER 56176);
- In 1677 Mill leats were constructed to channel water from the Tiddy Brook to Brook Mill (HER 21287), located c. 225m to the west. The extent of these leats is not clear, but may have included the stretches of the Tiddy Brook that form the western and southern boundaries of the site;
- Between 1817 and 1820 Plymouth Road was constructed, which forms the eastern boundary of the site;
- A small-scale survey of the town in 1835 (**Plate 1**) shows the site as undeveloped open land;
- The 1st edition OS map of 1885 (**Plate 2**) shows the south western corner of the site occupied by a Bone Mill (HER 51351) comprising two parallel east to west aligned rectangular structures with a footbridge crossing the Tiddy Brook adjacent to them. The site boundaries were defined by Plymouth Road to the north and Tiddy Brook to the south. As the main Bone Mill structure was located adjacent to the Tiddy Brook, which forms the southern boundary of the Site, the Mill machinery might have been water-powered although the water may only have been utilised for cleaning the bone (see below).
- The 2nd edition OS map of 1904 (**Plate 3**) continued to identify the main building on the site (an amalgamation of the two structures shown on the 1885 map) as a Bone Mill. An additional small rectangular structure is also shown to the east of the Bone Mill. The footbridge across the Tiddy Brook continues to be shown and whilst the site remains predominantly surrounded by open fields, a small row of houses known as Glanville Terrace had been built along Plymouth Road immediately to the west of the site.
- The 1938 edition OS map (**Plate 4**) continued to identify the main building as a Bone Mill. This appears to have been surrounded by an enclosure probably defining a yard. A small structure is also shown along the northern boundary of the site with a possible small structure near the western boundary. The site remained predominantly surrounded by open fields.
- Aerial photographs taken in 1947 showed the Bone Mill unchanged from the previous map, but with the addition of two structures that may be holding tanks to the north of the building. An additional building is shown at the eastern end of the site.
- The 1962 edition OS map (**Plate 5**) showed the Site apparently divided into three plots; the western plot contained the Bone Mill building labelled 'works'. The central plot contained two structures, including one first shown on the 1904 map and a further rectangular structure immediately to the north of this. The eastern plot contained a garage. Despite some

additional development along the Plymouth Road to the west of the site, the site remained predominantly surrounded by open land.

- 4.4 Cartographic evidence suggests that the Bone Mill in the south western corner of the site was constructed between 1835 and 1885. These mills produced bone meal for use as an agricultural fertiliser using animal bones obtained from slaughterhouses. This involved first boiling the bones to remove fat, which was often used to make soap (Tyler & Brown 2005); they were then dried for several months before being milled into bone meal, which can be used as a slow release fertiliser. The effectiveness of bone meal as a fertiliser can be improved by dissolving the bone meal in sulphuric acid to produce an early form of superphosphate.
- 4.5 Bone meal was first used as an agricultural fertiliser in the late 18th century, but its use was not widespread until after 1815 when Bone Mills were established in Yorkshire (Greenwood 1867). The majority of known Bone Mills were established in the first half of the 19th century and by the early 1840s some, such as the *Steam Mill Bone Manure Company* (Anchor Warehouse) in Penryn (Archaeological Consultancy Ltd. 2009), and several factories in Lambeth (Greenwood 1867) had begun using sulphuric acid to produce superphosphates. In the 1850s commercial quantities of coprolites that could be refined into superphosphates more economically were discovered in East Anglia and by the 1870s these were being imported from America in vast quantities (Grove 1976). The result was that by the 1880s coprolite based chemical fertilisers were supplanting bone meal as a fertiliser (Russel & Williams 1977). Many Bone Mills continued producing bone meal into the early 20th century, but few continued in operation beyond the 1930s when true synthetic fertilisers produced by major industrial manufacturers such as Fisons and Imperial Chemical Industries supplanted both bone meal and coprolite based superphosphates as the most commonly used fertilisers (Competition Commission 1959).

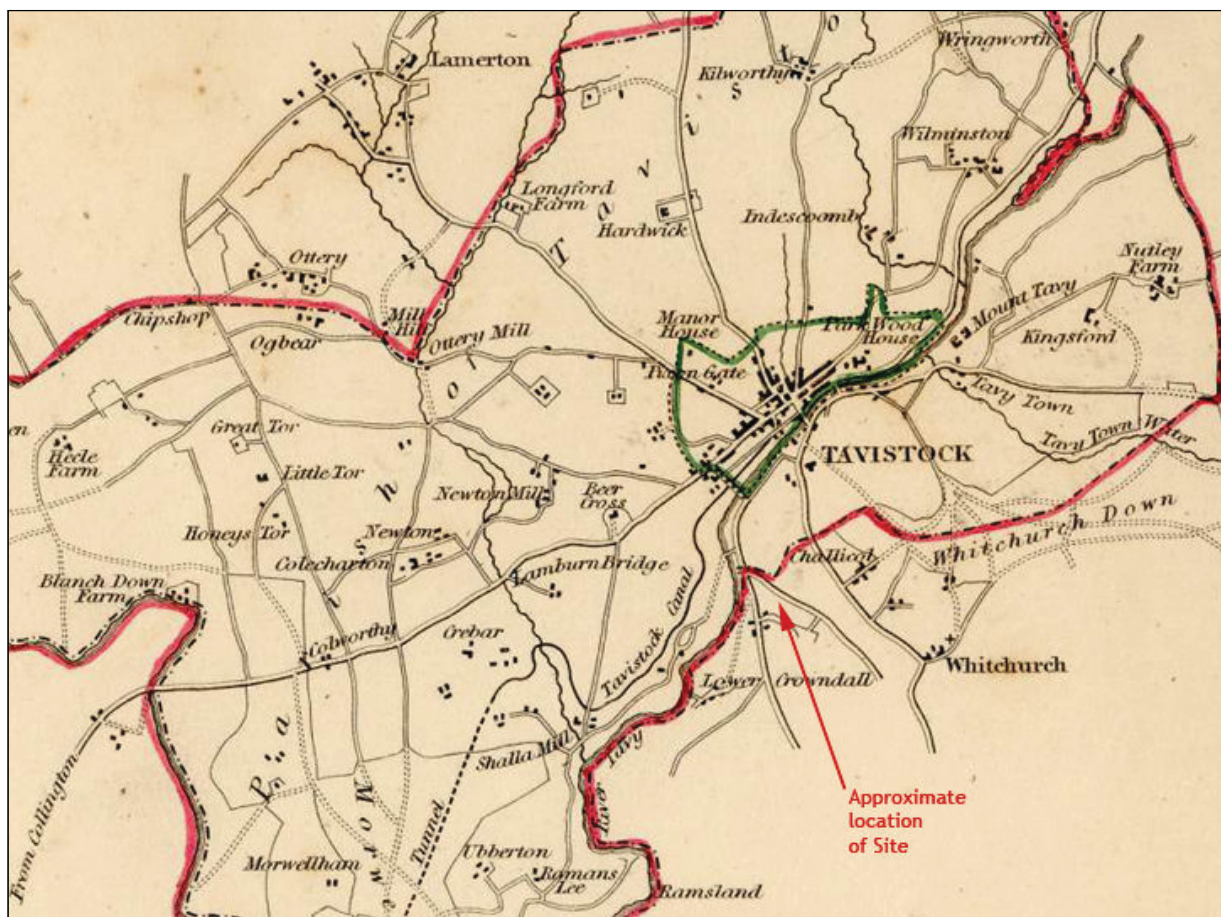


Plate 1. Extract: Tavistock Parish, Robert Creighton, engr. J. & C. Walker for Lewis' Topographical Dictionary, 1835

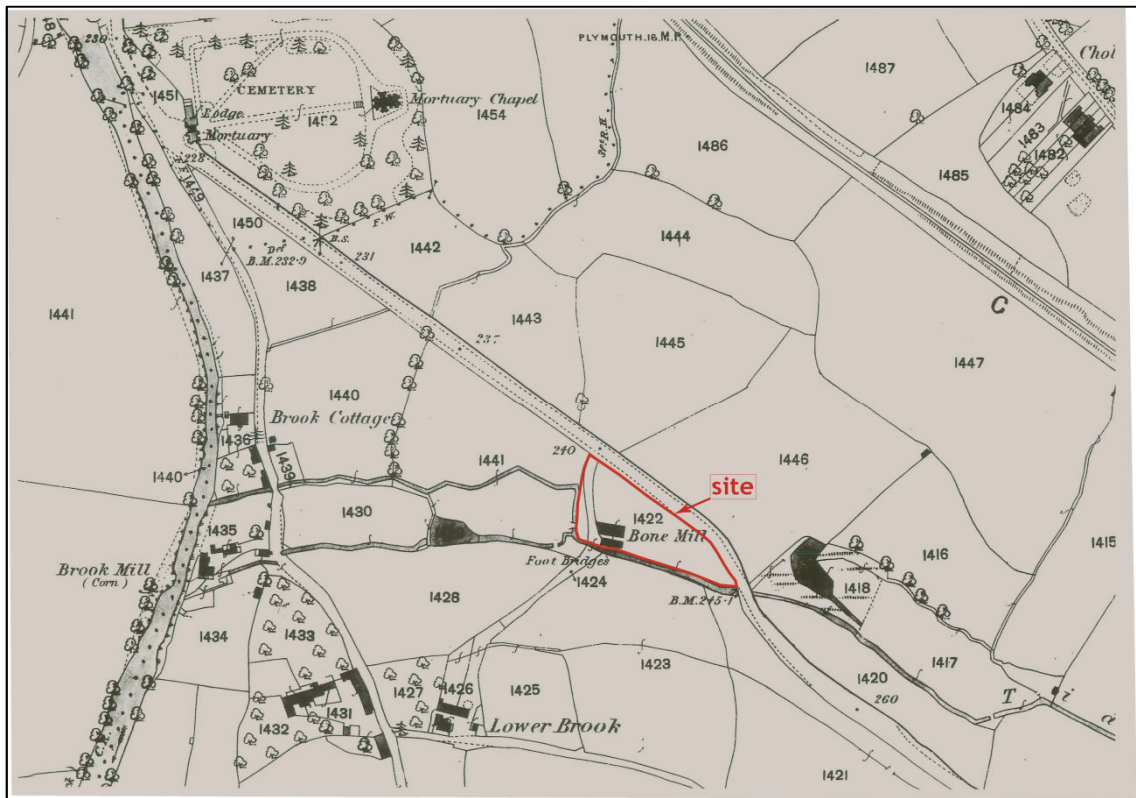


Plate 2. Extract: 25" Ordnance Survey Map, 1885 (site outlined in red)

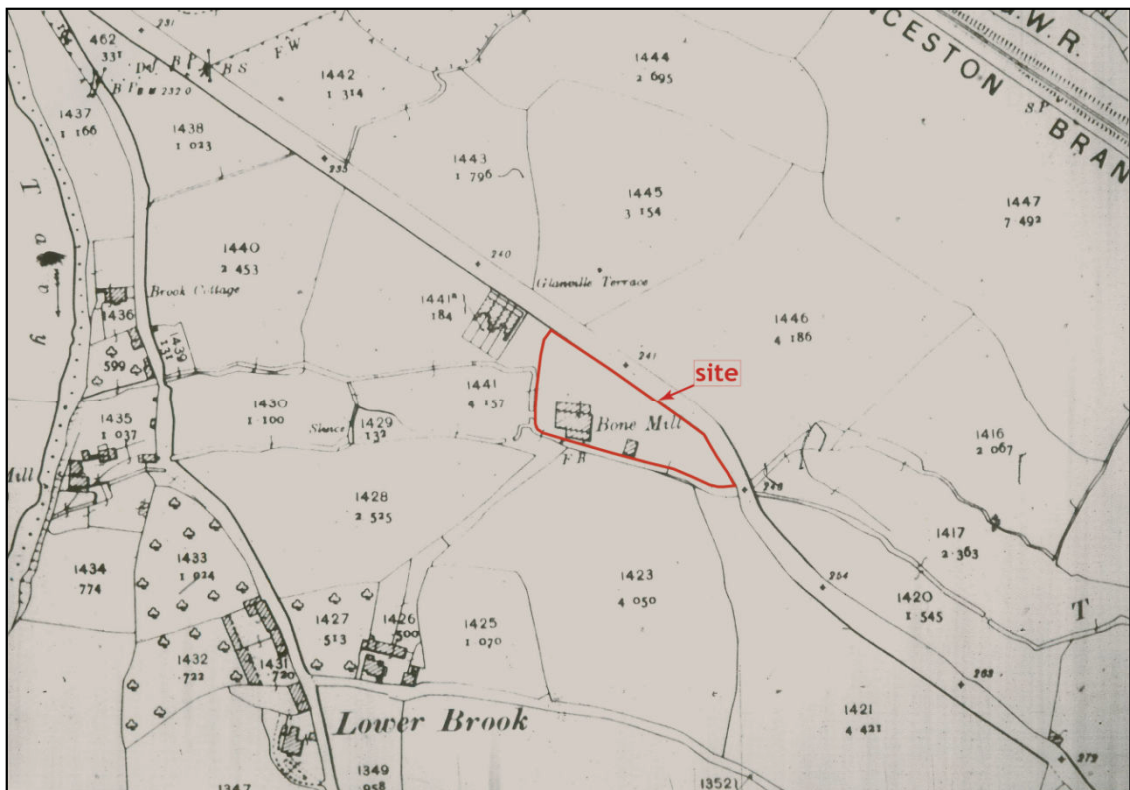


Plate 3. Extract: 25" Ordnance Survey Map, 1904 (site outlined in red)

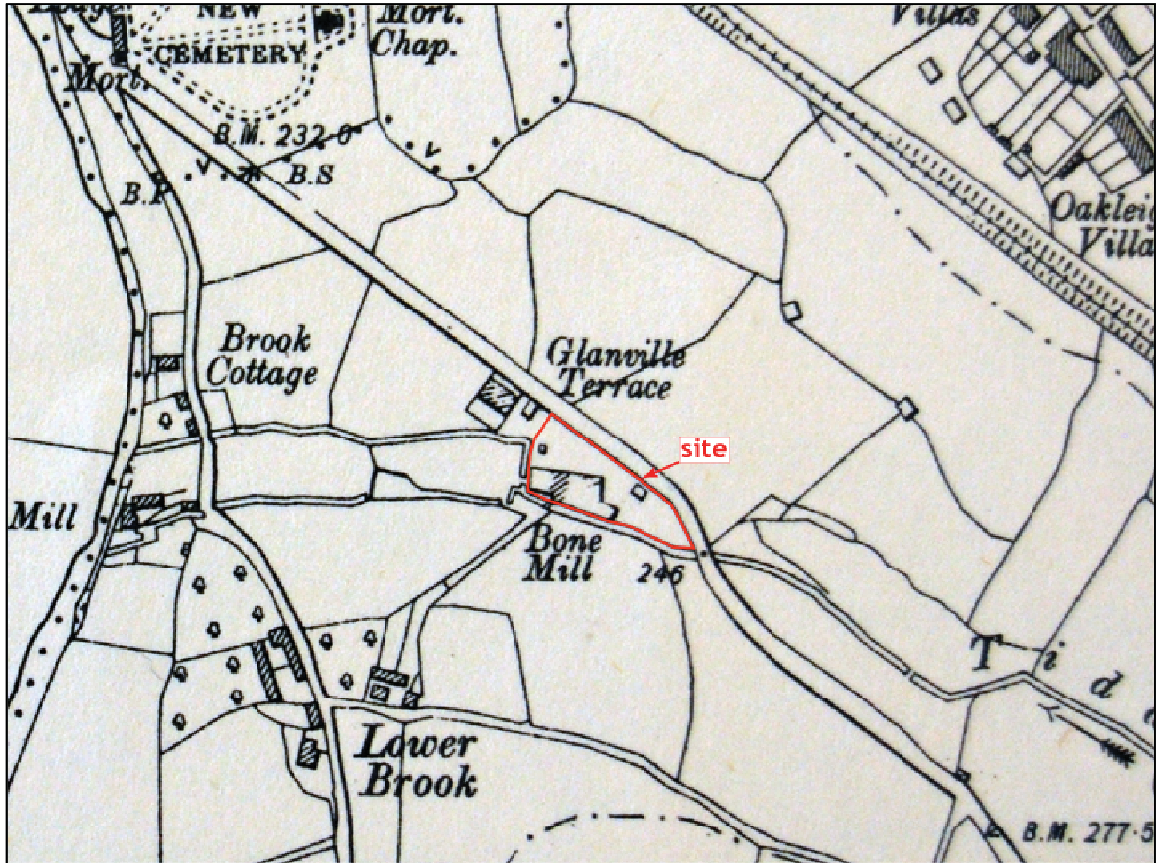


Plate 4. Extract: 25" Ordnance Survey Map, 1938 (site outlined in red)



Plate 5. Extract: 25" Ordnance Survey Map, 1962 (site outlined in red)

5. Methodology

Demolition Methodology

- 5.1 Following the demolition of all upstanding buildings, a machine equipped with a toothless bucket was used, under archaeological supervision, to remove the concrete slab covering the area of the site where remains of the former Bone Mill were expected to survive. A machine equipped with a toothed bucket was then used to remove all remaining concrete and tarmac surfaces, foundations and petrol tanks.

Archaeological Methodology

- 5.2 The programme of archaeological work was carried out in accordance with the *Standards and Guidance for an Archaeological Watching Brief* published by the Institute of Field Archaeologists (IfA) in 1995 (revised 1999). COAS adhered to the *Code of Conduct* issued by the IfA in 1985 (revised 2000), and *Code of Approved Practice for the Regulation of Contractual Arrangements in Field Archaeology* (1990, revised September 2000), at all times during the course of the investigation. Current Health and Safety legislation and guidelines were followed on site.
- 5.3 The upstanding remains of the Bone Mill, identified during the desk based assessment (COAS 2009), were largely cleared of vegetation and recorded by digital photography. The upstanding remains were also recorded on dimensionally stable media at a scale of 1:100 (plans) and 1:50 (Profile).
- 5.4 The vegetation on the upstanding remains could not be completely cleared due to the strong adhesive nature of the ivy present on Site. The complete removal of the plant may have caused the masonry to collapse prior to any recording and become a hazard for those on Site.
- 5.5 A qualified archaeologist was present on site to monitor the grubbing out of foundations during the demolition phase to the development for the purpose of identifying and recording any archaeological features/deposits present in areas where there was potential for archaeological remains to be impacted.
- 5.6 The Archaeological Officer at DCC was kept fully informed of the fieldwork schedule.
- 5.7 A GPS survey of all features identified during the watching brief, including the upstanding remains, was undertaken using a Topcon GRS-1 instrument capable of up to 20mm accuracy. At the request of Stephanie Knight and Bill Horner a machine dug section was excavated across the site of the Bone Mill; this was recorded at a scale of 1:50.
- 5.8 All features/deposits were recorded using standard COAS pro-forma recording sheets. Stratigraphic relationships were recorded using a "Harris-Winchester matrix" diagram. Soil colours were recorded using a Munsell soil colour chart. A photographic record of the work was prepared and involved the use of digital images. The photographic record included shots of the excavated area, individual features and working shots to illustrate the nature of the archaeological operation mounted.
- 5.9 Artefacts collected from archaeological features/deposits were bagged using a combination of site code and context numbers. All finds from the Site were retained for processing in preparation for further analysis and archiving. The specialist report of the artefact assemblage was compiled using a descriptive format (see **Section 7**). Discussions as to the disposal of any artefactual material will be held with the Curator of Archaeology at Plymouth City Museum & Art Gallery.

6. Results

- 6.1 The weather varied between overcast with occasional sunny intervals or heavy rain.

6.2 The deposits and features encountered during fieldwork are listed and described in Appendix 1. In the text, context numbers for cuts appear in square brackets, e.g. [1004]; layer, structure and fill numbers appear in standard brackets, e.g. (1002). Where a feature is discussed, it is referenced with its cut and associated fill numbers.

Soil Sequence and Geology

6.3 A geotechnical survey undertaken in advance of the construction project established that a reasonably uniform and simple vertical sequence made ground over alluvium, underlain by weathered shale of the Tavy Formation, existed across the site. The made ground varied between 0.65m and 1.9m in depth and consisted predominantly of reworked river gravel (medium dense gravels - consisting of slate and quartz in a silty sandy matrix) overlain by imported sub-base and tarmac surfacing. Alluvium was described as medium dense gravel (slate and quartz) in a silty sandy matrix with lenses of firm sandy gravelly silt. Bedrock was recorded between 69.72m AOD and 72.17m AOD; i.e. between 1.85m and 3.95m below ground level. A marked variation in the surface of the bedrock was interpreted as a possible buried palaeochannel (see **Figure 2**) running east to west across the site.

6.4 A section excavated across the site of the Bone Mill revealed that in this location modern surfaces and structures directly overlay a compact degraded natural greyish brown (10YR 5/2) shale with clay; this deposit is equivalent to the weathered shale described in the geotechnical report.

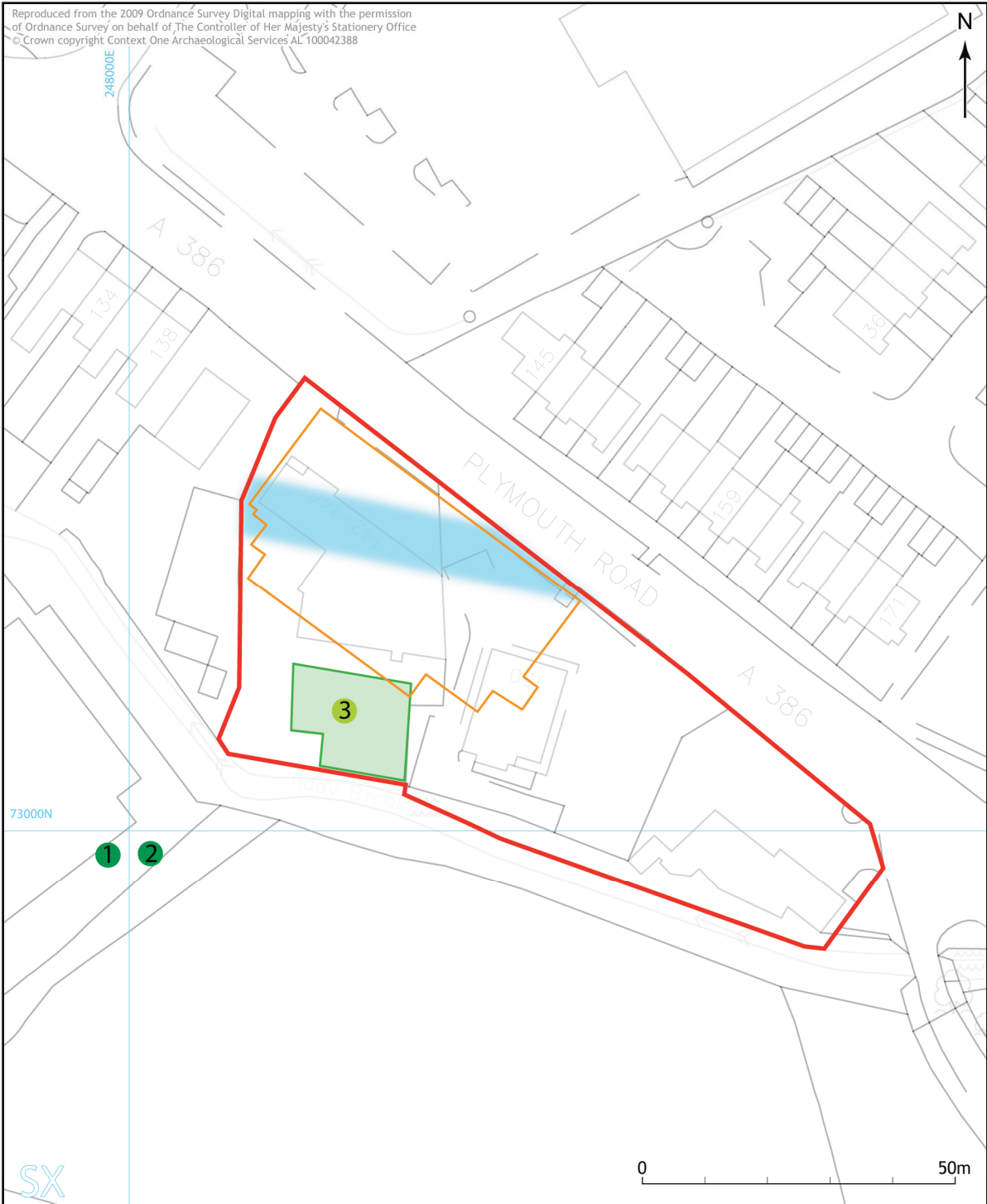
Archaeological Features

6.5 Following the removal of a modern concrete floor surface (103) well preserved remains of the former Bone Mill were revealed that included upstanding walls and floor surfaces. The principal structures were two parallel east to west aligned buildings with a cobbled alleyway running between them.

6.6 The most southerly of the buildings, (**Plate 6, Figure 3**) measuring 11.5m x 4m, was defined by wall (101) (**Figure 5**) at its eastern end, wall (114) to the west and wall (121) to the north. Walls (101) and (114) were constructed with randomly coursed granite and slate blocks bonded with a soft white lime mortar. Wall (121) was constructed with concrete slab foundations. An upstanding wall (101) up to 2m high defined the east end of the building which originally had a 3m wide entrance; this was later narrowed to a 1m wide doorway which was in turn blocked entirely (**Plate 7**). These blocking walls were constructed using the same materials and methodology as the original wall. There was no visible evidence of wall (121) having been keyed into wall (101) above ground, suggesting that either wall (121) originally abutted and is later than wall (101), or alternately, an entrance from the alleyway into the building may have existed at the eastern end of wall (121).

6.7 Within this building two floors could be identified; a cobbled surface (104) at the eastern end and a concrete surface (113) at the western end. The concrete floor had iron stains and an impression that is likely to have marked the position of some sort of machinery. Between these two floors a shallow sump (122) (3m x 2.5m x 0.2m) constructed with concrete slabs was recorded; this was backfilled with modern demolition rubble (112). Imbedded within the concrete used to construct this sump was a large cog that could have formed part of the bone crushing machinery used on the site (see **section 7**). A stone step was also recorded in the centre of the western end of the building suggesting there was an entrance there too.

- 6.8 The larger northern building, measuring 20m x 7.5m externally, was also defined by wall (101) (**Figure 5**) at its eastern end, wall (100)/(105) to the west and wall (106) to the north. These walls were constructed using the same materials and methodology as the stone built walls of the southern building. A doorway was located in the centre of the eastern wall (101); the surviving corner of this entrance had the corners chamfered at a 45 degree angle (**Plate 8**), presumably to prevent the materials being carried in and out of the building from damaging the corner of the wall. The southern side of the building was defined by a row of four round iron column bases ((116), (117), (118) and (119)) with the remains of an 'H' section rigid steel girder attached (**Plate 9**). These would originally have supported the roof and left that side of the building open to the cobbled alley (102)/(107) outside (**Plate 9**). The floor (115) in this building (**Plate 9**) was constructed with pale yellow paving bricks with the word CANDY impressed on the underside, which overlay a concrete bedding layer. Several contemporary concrete pads were also recorded in this floor ((109), (110), (111), (120) and (123)), all of which had iron bolts set in them and were presumably used to mount machinery or other structures associated with the bone milling process.
- 6.9 Both the cobbled surfaces (102)/(107) (**Plate 9**) and (104) were constructed with light grey (10YR 7/1) sub-rounded granite setts that directly overlay natural (127). To the north of the Bone Mill complex a concrete slab floor (108) was recorded; this is probably a 20th century addition.
- 6.10 A cut [126] recorded in section outside the north wall of the Bone Mill may be the edge of a large pit, or alternately represents the natural fall of the land away to the north. This was filled with a reddish brown (5 YR 3/2) silty clay (125) with gravel, that was overlain by a very dark greyish brown (10YR 3/2) silty clay with coal (124). Both of these fills contained an assortment of 19th or early 20th century refuse, which included pottery, glass, metal and a few small unidentifiable bone fragments.



<ul style="list-style-type: none"> ● medieval ● modern 	<ul style="list-style-type: none"> 1. HER No. 56178 deerpark 2. HER No. 16971 gallows 3. HER No. 51351 Bone Mill 	<p>PROJECT TITLE 142-152 Plymouth Road, Tavistock, Devon.</p>	
<ul style="list-style-type: none"> proposed new store site boundary site of Bone Mill possible palaeochannel identified during geotechnical survey 	<p>FIGURE TITLE Detailed site setting showing known archaeological landscape within a 200m radius</p>		
<p>SCALE as shown</p>		<p>PROJECT CODE COAS/DBA/09/PRD</p>	<p>FIGURE NO. 2</p>

