

**BOREHAM TO SPRINGFIELD LINK MAIN
ESSEX**

**ARCHAEOLOGICAL MONITORING
(PHASES 1 AND 3)**



Essex County Council

FIELD ARCHAEOLOGY UNIT

June 2011

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Prepared By: M. Germany and T Ennis	Signature:
Position: Project Officer	Date:
Approved By: P. Allen	Signature:
Position: Project Manager	Date:

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Please contact the Archaeological Fieldwork Manager at the
Field Archaeology Unit,
Fairfield Court, Fairfield Road, Braintree, Essex CM7 3YQ
fieldarch@essexcc.gov.uk
Tel: 01376 331470
Fax: 01376 331428

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Client: Essex and Suffolk Water Ltd

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SUMMARY

The construction of phases 1 and 3 of a water pipeline running from Church Road, Boreham to White Hart Lane, Springfield was monitored for archaeological remains by the Essex County Council Field Archaeology Unit on behalf of Essex and Suffolk Water Ltd, following planning advice from the Essex County Council Historic Environment Management team. Phase 1, which ran along the valley of the Boreham Brook from Church Road to the A12, was monitored in spring 2009, and phase 3, which ran from the A12 past New Hall School, in autumn 2010. Phase 2 was not monitored as this length involved directional drilling under the A12 and the London-Colchester railway.

An earlier archaeological desk-based assessment (Heppell 2008) established that phase 1 of the pipeline ran along the valley of the Boreham Brook, a tributary of the river Chelmer, in an area with potential for prehistoric and later remains. These include Late Mesolithic/Early Neolithic flint artefacts excavated at Old Hall Reservoir, Boreham (Germany 2008), cropmark sites recorded from aerial photography, the Roman London-Colchester road, and the former Boreham Mill. Phase 3 of the pipeline ran past New Hall School, the site of a palace built by Henry VIII, replacing a medieval manor. Potential cropmark sites were also present in the New Hall area, although the southern part of the phase 3 route had already been disturbed during construction of the school approach road and the Beaulieu Park estate.

Monitoring of phase 1 of the pipeline recorded an earlier channel of the Boreham Brook, filled with clean natural deposits, some of which contained plant remains. The channel is undated,

as it contained no artefacts and the plant remains were not suitable for radiocarbon dating, but is probably post-glacial or prehistoric. Assessment of the plant remains indicates that the former channel was bordered by scrub and woodland with no evidence of human activity. It was sealed beneath the alluvium of the present brook, which appears to have been deposited during the medieval period or later, at the same time as extensive alluviation alongside the adjacent section of the river Chelmer.

The phase 1 monitoring recovered a scatter of worked flint on the south bank of the Boreham Brook near Church Road, dating to the Early Neolithic and Late Neolithic/Bronze Age. This assemblage contained a high proportion of tools, much higher than that produced by the barrows of the nearby Old Hall Reservoir site (Germany 2008). This suggests the presence of a working area beside the Boreham Brook, although related settlement was most likely located on the rising ground overlooking the brook.

The phase 1 monitoring did not locate any remains related to the Roman London-Colchester road, whose line is followed by Main Road, Boreham (B1137). Medieval and post-medieval pottery found alongside the Main Road in the area of the former Boreham Mill suggests that it may have had medieval origins. A wall built of reused 16th-century bricks on the west side of the brook probably represents a boundary between Boreham House and the Boreham Mill. A channel of the Boreham Brook infilled with modern material was also recorded, and this and Ordnance Survey mapping shows that the Boreham Brook was diverted along the line of the mill leat when Boreham Mill was demolished in the second half of the 20th century.

Monitoring of phase 3 of the pipeline recorded three undated features in the area south of New Hall School. No evidence related to adjacent cropmarks was recorded.

1.0 INTRODUCTION

This report presents the results of archaeological monitoring and recording of the Springfield Link Main by the Essex County Council Field Archaeology Unit (ECC FAU) on behalf of Essex and Suffolk Water Ltd. The archaeological work was undertaken on the recommendation of the Essex County Council Historic Environment Management team (ECC HEM), who provide specialist advice within the planning system, and followed an earlier desk-based assessment (Heppell 2008) which had identified several potential archaeological sites adjacent to the pipeline route. The archaeological work was carried out in accordance with a brief prepared by the ECC HEM (2009) and a written scheme of investigation prepared by the ECC FAU (2009a and 2009b). The archaeological work was monitored on behalf of the local planning authority by Teresa O'Connor of the ECC HEM.

Phase 1 of the pipeline was monitored and recorded in spring 2009 and phase 3 in autumn 2010, but the archaeological work did not include phase 2, which involved directional drilling beneath the A12 and the London-Colchester railway (Figs 1 and 2). The entire length of phase 1, from Church Road, Boreham to the A12, was monitored after topsoil stripping of the pipeline easement, with more detailed investigation after restripping of selected areas and during cutting of the pipe trench, including a section across the Boreham Brook. The central length of phase 3, between Generals Lane and the pond west of New Hall School Avenue was targeted for monitoring due to the presence of nearby cropmarks.

Copies of this report will be supplied to the Essex and Suffolk Water Ltd. including a copy to forward to the local planning authority, ECC HEM and the Essex County Council Historic Environment Record. The site finds, archive and copies of this report will be deposited at Chelmsford Museum. A digital copy of the report will form part of the Online Access to Index of Archaeological Investigations (OASIS) at <http://ads.ahds.ac.uk/project/oasis/>.

2.0 BACKGROUND

2.1 Location

Phase 1 of the pipeline runs north-west for 1.7km along the northern slope of the Chelmer valley, from Church Road, Boreham to the south side of the A12 east of the Boreham Interchange (Fig. 1). It closely follows the south bank of the Boreham Brook, a tributary of the Chelmer, running through the brook's floodplain and adjacent agricultural land. It also tunnels

beneath Main Road, Boreham (the B1137), originally the Roman road from London and Chelmsford to Colchester. Phase 3 of the pipeline turns to run south-west for 2km from the north side of the A12 and the London-Colchester railway to White Hart Lane at the southern end of the Beaulieu Park estate (Fig. 2). The route passes through mainly agricultural land and tunnels beneath both Generals Lane and New Hall School Avenue. The south-western 800m of the route skirts the edge of the Beaulieu Park estate where the ground has previously been disturbed.

2.2 Geology

The surface geology of the pipeline route consists of brown-yellow silt-clay of the Springfield Till with orange gravel lenses. On phase 1 of the route this overlay terrace sands and gravels of the river Chelmer, and was itself overlain by more recent deposits of mixed pebbly silt-clay alluvium on both sides of the Boreham Brook.

2.3 History and Archaeology

The following historical and archaeological background is based on information obtained from the Essex Historic Environment Record (EHER) and other sources which have been collated and assessed in the earlier desk-based assessment (Heppell 2008). References to sites recorded in the EHER are included only where these are adjacent to the pipeline route (Figs 1 and 2), and further detail of other sites can be found in the desk-based assessment.

Historic settlement

Phase 1 of the pipeline runs along the valley of the Boreham Brook and avoids the known historic settlements of Boreham village, Boreham Hall and Boreham House. Main Road, Boreham (B1137) at the north-western end of phase 1 follows the line of the Roman road from London and Chelmsford to Colchester.

Tyrell Cottages on the Main Road (B1137) occupy the site of a water mill which was in use until the second half of the 20th century (Figs 1 and 3). The mill dam, which no longer survives, was sited immediately north of the B1137. The mill pond still exists and lies immediately south of the road, immediately opposite the site for the mill dam. Old Ordnance Survey maps record the current section of the Boreham Brook near Tyrell Cottages as following the course of a former mill leat (Fig. 3). The earlier course of the Boreham Brook was sited further to the south-west and was backfilled in the second half of the 20th century.

Phase 3 of the pipeline runs to the south of New Hall School (Fig. 2), a Grade I listed building originally built by Henry VIII as a small 'palace' on the site of an earlier medieval manor,

although it has since been extensively rebuilt. A manorial site at New Hall is documented as early as 1062 and from c. 1350 the manor was held by a series of wealthy secular landowners until 1450, when it became crown property under Henry VI. In 1517, following acquisition of the manor by Henry VIII, the hall was greatly expanded, and the estate was named 'Beaulieu'. The house was altered for the Duke of Buckingham in 1622-5, who employed the Tradescants to import many plants and trees for the gardens, including limes for the avenue or approach drive. Seventeenth-century developments were noted by John Evelyn in 1656, who praised the approach drive, then planted with four rows of limes. These were felled in 1798, since replanted as a single avenue. New Hall has been a Roman Catholic convent and school since 1799.

Archaeological cropmarks

Archaeological features identified as cropmarks plotted from aerial photographs are present close to phase 1 of the pipeline near Church Road, north-east of Boreham Hall Cottages, and south-west of Boreham village (Fig. 1, EHER 5759-60, 5800 and 5822). Along phase 3 of the pipeline, cropmarks have been identified on both sides of the New Hall School Avenue (Fig. 1, EHER 5763 and 5796), and in particular those to the west might continue into the pipeline easement. Some of the cropmarks are likely to be the remains of medieval and post-medieval field boundary ditches, but others are probably much older, probably dating back to the prehistoric period. The cropmarks include circular ditches which are interpreted as the remains of prehistoric barrows.

Archaeological excavations

The pipeline runs between two areas which have seen major archaeological excavations, at Old Hall Reservoir, Boreham, and at Springfield Lyons, south-west of the A12 Boreham Interchange.

The remains of a henge and prehistoric barrows were discovered in 2007 during an archaeological excavation before the construction of Old Hall Reservoir alongside the river Chelmer, 0.5km beyond the eastern end of phase 1 of the pipeline (Fig. 1) (Germany 2008). Some of the remains were overlain by a thick deposit of alluvium, which is likely to have been deposited during or after the medieval period. Further remains included a palaeosol, and a large assemblage of Late Mesolithic/Early Neolithic struck flint. On the rising ground overlooking the henge site were the remains of a medieval farmstead, preceded by Late Iron Age, Roman and Early Saxon settlement.

Major excavations have also been carried out at the western end of phase 3 of the pipeline, south-west of the Boreham Interchange (Fig. 2). Excavations at Springfield Lyons in the 1980s recorded an Early Neolithic causewayed enclosure, a Late Bronze Age defended settlement, an Early Saxon cemetery and a Late Saxon settlement (Buckley and Hedges 1987; Major and Tyler 2005). More recent excavations adjacent to the Boreham Interchange in 1993 recorded a Middle Bronze Age shrine and a medieval farmstead (Lavender 1999). To the north of phase 3 of the pipeline several brick kilns related to the building of Henry VIII's 'palace' were found during a recent trenching evaluation in the area around New Hall (Pocock 2009).

3.0 AIMS AND OBJECTIVES

The general aim of the archaeological monitoring was to record any palaeoenvironmental or archaeological remains disturbed by the pipeline and its easement. The research objectives for the project were in line with those laid out in *Research and Archaeology: a Framework for the Eastern Counties, 2. Research Agenda and Strategy* (Brown and Glazebrook 2000). The project had the potential to add to understanding of settlement and landscape development from the prehistoric to the modern day. The specific objectives of the project were:

- To record any archaeological remains exposed along the pipeline route to help understand settlement and landscape development in the mid Chelmer valley;
- To concentrate detailed monitoring and recording on areas where the desk-based assessment identified potentially significant palaeoenvironmental or archaeological remains.

4.0 METHOD

4.1 Overall Method

The archaeological investigation was carried out in accordance with the Institute of Field Archaeologists' standards and guidance for archaeological watching briefs and the Association of Local Government Officers' standards for field archaeology in the East of England (IFA 1999; Gurney 2003). The ECC FAU is a registered archaeological organisation with the Institute of Field Archaeologists. The ECC FAU uses its own recording system to

record all archaeological deposits and features (ECC FAU 2006). Further details of the recording strategy and method can be found in the written scheme of investigation (ECC FAU 2009a and 2009b).

The entire length of phase 1 and the central section of phase 3 of the pipeline route were monitored (Figs 1 and 2). Following consultation with the ECC HEM monitoring officer and Essex and Suffolk Water, detailed monitoring and recording was carried out in several areas of the phase 1 route (Figs 1 and 4). Monitoring of the central section of the phase 3 route did not identify any significant archaeological features and only limited recording was necessary (Figs 2 and 9). Phase 2 of the pipeline was not monitored as this involved directional drilling beneath the A12 and railway. The easement and the areas of archaeological investigation were mapped by using a directional GPS with on-board map-based software. The error margin of the GPS varies, but is always less than 0.2m.

4.2 Easement strip

The easement for the pipeline was stripped of topsoil by tracked excavators with broad toothless buckets, leaving a thin layer of subsoil where the topsoil had become mixed with the underlying natural (geological) deposits (Plates 1 and 9). The easement was generally 15m wide for phase 1 and 10m wide for phase 3, with the pipe trench 1.4m and 0.7m wide respectively. The surface of the underlying alluvium and natural clay, at which archaeological features might be expected to be present, was not exposed to prevent them from contaminating the topsoil during reinstatement of agricultural land, except in several areas of the phase 1 easement where the topsoil stripping had accidentally gone too deep. The use of the easement for access by wheeled vehicles left it deeply rutted in places. The stripped surface was visually inspected for archaeological features and finds.

4.3 Phase 1: Easement re-strip (ER1-ER8)

Following the recovery of surface finds and the exposure of archaeological features, several parts of the phase 1 easement were identified for further investigation and were cleared of subsoil by machine, either as an area strip or as trenches (Fig. 4, ER1-ER8; Plate 2). At the eastern end of phase 1, six areas were stripped along a 250m length of the easement to investigate a location where prehistoric worked flints had been recovered as surface finds (Fig. 5, ER1-ER2). The western end of this part of the pipeline lay close to the cropmark complex east of Boreham Hall Cottages (Fig. 1, EHER 5800), and in addition to re-stripping of ER2, detailed monitoring was carried out on topsoil stripping and cutting of the pipe trench adjacent to the cropmarks (Fig. 5, ER8).

Towards the western end of phase 1, near the site of the former water mill near Tyrell Cottages, an 80m length of the easement was stripped in an area where medieval and post-medieval pottery had been recovered and features were visible (Fig. 8, ER3). Elsewhere, north of Boreham House, trenches were cut to investigate areas where over-machining of topsoil had exposed features or natural deposits (Figs 7 and 8, ER4-ER7). In all the areas of re-strip the southern part of the phase 1 easement was not investigated because of rutting from vehicles.

4.4 Phase 1: Boreham Brook crossing

Where the pipeline crossed the Boreham Brook west of Church Road, the stream was temporarily dammed and a pipe trench 1.4m wide and up to 3m deep was excavated by a tracked excavator with a toothed bucket. The recording of the trench (Figs 4-6; Plates 3-4) had to be carried out from the surface because its sides extended below the water table and were unstable. Bulk samples for environmental analysis were taken from samples of material brought to the surface by the machine bucket and as far as possible cleaned of contamination.

4.5 Phase 3: Pipe trench recording

As with phase 1, the phase 3 easement was stripped of topsoil leaving a thin layer of subsoil, but the potential archaeological horizon at the surface of the natural deposits was not exposed anywhere. As a result, monitoring was concentrated on the line of the pipe trench, which was cut to a depth of 1.6m (Figs 2 and 9; Plate 9). The length of easement nearest the cropmarks west of the New Hall Avenue (Fig. 2, EHER 5763) had previously been disturbed during the establishment of a pond during the construction of the adjacent Beaulieu Park development.

5.0 FIELDWORK RESULTS

5.1 Phase 1: Boreham Brook, west of Church Road (Figs 4-6; Plates 3-6)

The excavation of the pipe trench across the Boreham Brook west of Church Road revealed an earlier channel, over 7m wide and 1.7m wide, immediately to the east of the existing stream (Figs 4-6; Plates 3-4). The channel was sealed beneath topsoil and a thin layer of alluvium (12). Its western edge was cut by the existing stream and its eastern edge by the trench for a modern irrigation pipe which extended across the line of the main pipe trench at an oblique angle.

The former channel was filled with deposits of soft clay-silt (13, 14, 15, 18 and 19) and soft sand-silt (9/16/17) containing very few inclusions and no artefacts (Fig. 6; Plate 4). Deposits 9/16/17 and 19 (Fig. 6, samples 1, 2 and 5) were distinctively dark with frequent waterlogged root/stem fragments, indeterminate buds and small pieces of twigs and wood, possibly from colonising scrub and woodland habitats. Birch, hazel, oak and sedge were among the species present. By contrast, deposits 13 and 14 (Fig. 6, samples 3 and 4) contained very few plant remains. No artefacts were found in the channel by which to date it and the plant remains recovered from the soil samples were not suitable for radiocarbon dating.

The alluvium of the Boreham Brook was exposed along the northern edge of the phase 1 easement for a distance of 1km to the west of Church Road, where the pipeline followed the south bank of the stream (Fig. 4). The alluvium consisted of grey and orange-brown pebbly silt-clay (3 and 4) overlying natural brown-yellow clay (1 and 2).

A sequence of alluvial deposits was recorded 150-200m to the west of the Church Road crossing (Fig. 5, ER8; Plate 5). The edge of these deposits lay 20m to the south of the existing stream and they were recorded to a depth of up to 1.3m in a section of the pipe trench. The top of the alluvium had been disturbed, but below this clean yellow-brown silt-clay with rare pebbles (29) was recorded to a depth of 1.0m, overlying a 0.1-0.2m thick base layer of grey-yellow silt-gravel (30). These contained no artefacts and represent alluvial deposits which, from their depth, were almost certainly part of the former channel of the Boreham Brook.

A scatter of prehistoric worked flint was recovered after topsoil stripping of phase 1 of the pipeline over a distance of 250m to the west of the Church Road crossing (Fig. 5). Twenty-five flints were recovered during an initial walkover of the stripped surface (surface finds 34), from two areas of easement re-strip (ER1 surface finds 8 and 10, and ER2 surface finds 7), and from stripping and cutting of the pipe trench (ER8, surface finds 28). The flints all came from the surface of the alluvium or the natural clay. The flint assemblage is described and analysed in detail below (see 6.4). The earliest are probably of Early and Late Neolithic date, with about half the assemblage later prehistoric, most likely of Late Neolithic to Bronze Age date. The assemblage contains a high proportion of tools, suggesting activity in the vicinity.

No archaeological features were present in the easement re-strips, in the surface either of the alluvium or the natural clay (Fig. 5, ER1, ER2 and ER8). As well as the prehistoric flints, artefacts of more recent periods were recovered, represented by a sherd of medieval pottery and a post-medieval crota bell (ER1, surface finds 10). These artefacts were found lying on

or pressed into the surface of the alluvium (11). They suggest that the surface of the alluvium, as represented by deposits 11 and 12, is of relatively recent date, even if the earlier deposits 29 and 30 are likely to relate to the former channel of the Boreham Brook.

5.2 Phase 1: North-east of Boreham House (Figs 4 and 7)

Two archaeological features were found in the phase 1 easement north of Boreham House (Fig. 4 and Fig. 7, hollow 27 and ditch 32). The hollow was broad and shallow and contained a single gravelly fill containing burnt flints, and was either a pit or a crude hearth. It contained no dating evidence. The ditch is part of a former field boundary recorded on the first four editions of the Ordnance Survey. There were no alluvial deposits or archaeological features or finds in ER5 to ER7.

5.3 Phase 1: Near Tyrell Cottages and the B1137 (Figs 4 and 8; Plates 7 and 8)

The features recorded near Tyrell Cottage, in easement re-strip 3 (Fig. 8, ER3; Plates 7 and 8) comprised a pit (33), a ditch (23), a brick wall (25) and part of the former channel of the Boreham Brook (20). The pit contained modern glass, slates and bricks and was not investigated. The ditch was traced for a distance of 3.2m and was found to contain two sherds of medieval pottery and fragments of post-medieval brick and tile. The wall was constructed from 16th-century bricks, and was three bricks wide and stood two courses high. It rested on the surface of the natural sand and gravel and ran parallel with the adjacent former section of the Boreham Brook. The bricks had not been bonded together with mortar and had been laid end to end in semi-regular fashion. The former channel of the Boreham Brook had gradually-sloping sides, a broad flat base and was 6.65m wide and 0.66m deep. The single fill of the feature contained numerous modern artefacts, including scrap iron and concrete, and represented deliberate backfilling. Surface finds 5 and 6 comprised sherds of post-medieval pottery.

Although the B1137 follows the line of the Roman London-Colchester road, no Roman features or artefacts were found in easement re-strip 3 alongside it (Fig. 8, ER3).

Around 150m to the south-east, easement re-strip 4 (Fig. 8, ER4) uncovered a ditch (31) which was subsequently traced across the full width of the easement. The ditch ran perpendicular to the Boreham Brook and the existing field alignment and was probably of post-medieval date, although it produced no finds to confirm this.

5.4 Phase 1: North of the B1137 (Figs 3 and 4)

The site of the dam and feeder channel for the former Boreham water mill (Fig. 4) was represented by a large amorphous damp area with patches of standing water immediately north of the B1137.

5.5 Phase 3: Generals Lane to New Hall School Avenue (Fig. 9)

Three features were recorded in the phase 3 easement in the field between Generals Lane and the New Hall School Avenue (Fig. 9). Located in the south-west of the field were two small features (51 and 53) some 4m apart. Gully 51 was well-defined and clearly visible in both sides of the pipe trench, cutting yellow-brown chalk-flecked natural clay. It was 0.68m wide by 0.24m deep with sides sloping at 45° and a flat base and was filled with mid greyish brown to reddish brown silty clay (50). No finds were recovered. Pit 53 was only visible in the northern side of the trench. It was 0.6m wide and 0.15m deep with a concave profile. Its grey silty clay fill (52) contained rare charcoal flecks and a small patch of heat-reddened baked clay, but no datable finds. Although located in the same vicinity but undated it is possible that the two features belong to separate phases as they both had a differing relationship with localised subsoil layer 54. Gully 51 appeared in section to be sealed by this subsoil whilst pit 53 was cut into it. In the north-eastern half of the field was a much larger feature (56), either a ditch or quarry pit, 8.6m wide and over 1.6m deep. The feature cut orange gravelly clay natural and continued below the limit of excavation. It was filled with mid greyish brown clay silt (55) but no finds were recovered from it. The only find from the phase 3 easement was an unstratified copper alloy fitting, probably some form of weight, recovered by a contractor from the topsoil at the western end of the easement.

6.0 FINDS AND ENVIRONMENTAL REMAINS

Small groups of finds were recovered from ten contexts. All of the finds have been recorded by count and weight, in grams, by context; full quantification details can be found in Appendix 2. The finds are described by category below.

6.1 Medieval and later pottery by Helen Walker

A total of seven sherds, weighing 218g, was recovered from five contexts in the phase 1 easement, most of which represent surface finds south-east of Tyrell Cottages (ER3). The earliest pottery comprises an abraded Hedingham fine ware rod handle, probably from a jug and showing the remains of a mottled-green glaze. As in central Essex Hedingham ware was superseded by Mill Green ware in the mid 13th century this fragment most likely dates to the

early to mid 13th century. There is also a very abraded, and almost certainly residual, sherd of medieval coarse ware (from ditch 23 in ER3); it is fragmented but appears to be from a strap handle and shows incised 'cats-claw' decoration. This too is most likely to date to the 13th century.

The remaining pottery comprises post-medieval red earthenware. Finds include the base of a black-glazed ware *tyg*, a tripod base most likely from a pipkin (a small portable cooking vessel) and what looks like the base of a cylindrical mug, which rather unusually has internal slip-coating beneath the glaze. All three could date to the 17th century. A very abraded ?jug rim was also found.

6.2 Brick and tile

Sample brick fragments were collected from wall 25 in ER3. These are fragments of Tudor bricks but have probably been re-used in this structure. Large numbers of bricks were made in the vicinity of New Hall while rebuilding was being carried out for Henry VIII, and several brick kilns were found during a recent evaluation of the land surrounding New Hall (Pocock 2009 near the western end of the pipeline. The fill of ditch 23 in ER3 produced small amounts of abraded brick and tile, amounting to nine pieces, weighing 282g. The pieces are undiagnostic and cannot be closely dated within the post-medieval period.

6.3 Metalwork by Joyce Compton and Helen Walker

A copper alloy crotal bell, in poor condition, was recovered as a surface find from alluvium (11) at the eastern end of the phase 1 easement (ER1). The bell is a large plain example, with its corroded iron clapper still in place, and probably dates to the post-medieval period.

A copper alloy fitting was recovered as an unstratified find in the phase 3 easement. It is a small, sub-rectangular object (measuring 39mm x 13mm, depth 8mm) with an eyelet at one end (14mm in diameter), weighing 17g. The fitting is hollow (apart from the eyelet) and the underside shows a V-shaped opening. The inside of the hollow is partially filled with metal, probably lead, which would account for its relatively heavy weight. The copper alloy part of the object is complete. There are various cut-marks on the upper surface and notches on the sides, but these do not seem to form a decorative pattern.

The presence of the eyelet suggests the fitting was intended to be hung or formed some kind of coupling, such as a purse clasp or horse's bridle. However, such a use would not account for the metal filling. It may be a pendant weight. In imperial measurements it weighs 0.6oz, but as some of the metal filling may have fallen out, originally it may have weighed a little

more. If it is a weight it would have been used to measure small and possibly valuable items. Alternatively it could be a weight in the sense that it was used to weigh things down. The object is difficult to date; pendant weights were manufactured in the medieval period (Egan 1998, fig. 231) although the weight illustrated by Egan shows few similarities with this object.

6.4 Flints by Hazel Martingell

Twenty-five worked flints were recorded, all from areas ER1, ER2 and ER8 at the eastern end of phase 1 of the pipeline, on the southern bank of the Boreham Brook west of Church Road (Figs 4 and 5). Nine were recovered from the surface of the alluvium and natural clay during a walkover following topsoil stripping (surface finds 34) and a further sixteen during monitoring of a restrip of the alluvium and subsoil by machine (ER1, ER2 and ER8, surface finds 7, 8, 10 and 28). A single natural flint was recovered from area ER1 and a further 10 from a shallow hollow (27) near area ER7 to the west. A catalogue is presented in Appendix 2; eight of the flints are illustrated (Fig. 10).

Of the flints recovered from the machine restrip, the earliest is the serrated flake (Fig. 10.1) from surface finds 10 (ER1) which could be Early Neolithic. The translucent flake from surface finds 8 (ER1) and the blade from surface finds 28 (ER8) could also be Early Neolithic. The side-and-end scraper (Fig. 10.2) and the piercer (Fig. 10.3) from surface finds 8 are probably Late Neolithic. The remaining eleven worked flints are most likely to be later prehistoric, in particular the wide platformed flakes from surface finds 8 and 10.

Of the flints recovered from the initial walkover (surface finds 34), five are probably Early Neolithic. These comprise another serrated flake on bullhead flint (Fig. 10.6), a retouched blade, a blade, a blade fragment and a blade core. The remaining four flints are most likely to be Late Neolithic to Early Bronze Age. There is a scraper on a secondary flake (Fig. 10.4) which has invasive retouch around the distal end and a large notch on the right lateral edge; a knife on a flake with cortex backing (Fig. 10.5); a notched flake (Fig. 10.7) and a chisel-ended flaked flake (Fig. 10.8). Except for the serrated flake, the artefacts are made on grey flint with inclusions. All of the flints are likely to have been made from local gravels, as were the majority of the flint artefacts recovered from the adjacent site at Old Hall, Boreham (Germany 2008).

Assessment and Discussion

The Chelmer valley is particularly rich in prehistoric sites, demonstrating the importance of this area throughout prehistory. The river Chelmer is one of four large rivers that cross Essex

from the northwest towards the southeast that formed the first main routes from the North Sea into central Britain.

During prehistoric times the valleys were therefore the earliest areas to be inhabited, and succeedingly inhabited, by new arrivals. The artefacts to survive from the Stone Ages are, in the main, worked flint tools. The evidence for early man in the river valleys largely depends on the recognition and collection of these worked flint tools, with the understanding of how they were made and used during each period. Finds of arrowheads suggest hunting, notched and serrated pieces, cutting and trimming of plants such as reeds and rushes, knives and scrapers, the preparation of skins. Without the collection of small finds, archaeology would be reliant on features in the landscape; these tell us about the environment in which the people lived, the artefacts tell us what the people were actually doing.

The current collection of 25 worked flints has an unusually high percentage (36%) of tools to waste pieces (the average is 5%). This suggests they were made elsewhere and their find-spot location is where they were being used. Continuing work in the vicinity would produce many more special artefacts, helping us to understand the lives of the first people in Essex.

6.5 Environmental material by Val Fryer

Bulk samples for the retrieval of the plant macrofossil assemblages were taken from layers brought to the surface by machine bucket (for health and safety reasons) where phase 1 of the pipeline crossed the Boreham Brook (Fig. 5). Five were submitted for assessment (<1>, <2>, <3>, <4> and <5>). Samples <1>, <2> and <5> came from different points within layer 9/16/17, which was distinctively dark and organic (Fig. 6).

The samples (or sub-samples thereof) were processed by manual water flotation/washover and the flots were collected in a 300 micron mesh sieve. As waterlogged plant remains were predominant throughout, the flots were placed in water prior to sorting. The wet retents were scanned under a binocular microscope at magnifications up to x16 and the plant macrofossils and other remains noted are listed on the table in Appendix 2. Nomenclature within the table follows Stace (1997). With the exception of very rare charcoal/charred wood fragments, all plant remains were waterlogged.

Results

Of the five assemblages studied, three (<1>, <2> and <5>) were largely composed of waterlogged root/stem fragments, indeterminate buds and small pieces of twig and wood. Moss fronds and catkin and leaf fragments were also recorded. Preservation was largely

very good, although some of the smaller, less robust macrofossils were very fragmented. Seeds/fruits occurred infrequently, but included a birch (*Betula* sp.) fruit, a small fragment of hazel (*Corylus avellana*) nutshell, possible pieces of oak (*Quercus* sp.) cupule and sedge (*Carex* sp.) nutlets. Occasional waterlogged arthropod remains were noted within the assemblages from <1> and <5>.

The assemblages from <3> and <4> were noticeably different, containing a far lower density of mostly very poorly preserved plant remains. However, both samples contained very low densities of charcoal/charred wood 'flakes'.

Conclusions The materials within layer 9/16/17 would appear to be principally derived from colonising scrub or woodland habitats, both of which were probably prevalent within the river valley at various points in the past. As seeds and arthropod remains are rare within the assemblages, it is tentatively suggested that the deposits were laid down and sealed relatively quickly, possibly as a result of seasonal flood events. The paucity of anthropogenic materials (*i.e.* charcoal) within these assemblages may indicate that human activity was, at best, peripheral.

It is currently unclear why the assemblages from layers 13 and 14 are smaller and less well preserved. However, it is tentatively suggested that the deposits within the area from which the samples were taken had been partially dehydrated or similarly adversely affected by the insertion of a modern irrigation pipe. This activity may also have introduced the charcoal 'flakes' noted within both assemblages (see also <1> which was taken from immediately below <3> and <4>).

Although it was hoped that these assemblages would contain materials suitable for C14 or AMS determinations, the dating of waterlogged plant macrofossils is not recommended, as the rate of absorption of soluble carbon from the ground water cannot be accurately ascertained. However, the following macrofossils have been removed and stored in separate glass vials, although potential suitability of these materials is considered to be very low:

- <1> (9) Hazel nutshell and catkin fragment
- <5> (17) Possible oak cupule fragment

Although, as noted above, the charcoal fragments from <1>, <3> and <4> may be intrusive within the deposits, they have also been collected. However, it is doubtful if there is a sufficient density of material for either dating technique. As none of the assemblages

contains a sufficient density of material for quantification either, no further analysis is recommended.

6.6 Comments on the finds and plant macrofossil assemblages

A scatter of worked flints of Neolithic and Bronze Age date came from the eastern sections of the phase 1 pipeline easement (ER1, ER2 and ER8), complementing the assemblage recovered during the recent excavation to the east at the Old Hall Reservoir site (Germany 2008). A scatter of medieval and post-medieval finds was present both in ER1 and towards the western end of the phase 1 easement (ER3 and ER4), and reused Tudor bricks were recorded in wall 25 (ER3). Only a single unstratified copper alloy fitting was recovered from phase 3 of the pipeline monitoring. No further work is required on any of the material. The flints, the pottery and the copper alloy crotal bell have been retained, but the remaining finds (mostly post-medieval) have been discarded.

The plant macrofossil samples also have no potential for further analysis, as they did not contain sufficient density of material either for quantification or for absolute dating, the only means of dating these deposits in the absence of datable artefacts.

7.0 CONCLUSIONS

Monitoring of the phase 1 pipeline easement revealed extensive deposits of alluvium and a former channel of the Boreham Brook at its eastern end, together with a scatter of Neolithic and Bronze Age flint artefacts recovered as surface finds. Medieval, post-medieval and modern remains were recorded towards the western end of the phase 1 easement, near Tyrell Cottages and the B1137, including evidence for recent re-routing of the Boreham Brook. Three undated features, including a probable clay pit, were recorded in the central section of the phase 3 pipeline easement, in the field between Generals Lane and the New Hall School Avenue. Phase 2 of the pipeline, consisting of directional drilling beneath the A12 and the London-Colchester railway, was not monitored.

7.1 The Boreham Brook

Phase 1 of the pipeline followed the south bank of the Boreham Brook and an irregular layer of alluvium up to 0.3m thick lies beneath the topsoil along the easternmost 1km of the route (Fig. 4). The alluvium is absent further west, near Tyrell Cottages, no doubt because natural sediments are less likely to have built up in the steeper upper part of the stream valley. The alluvium is the result of natural wash from adjacent fields and the natural clay through which

the Boreham Brook cuts. Prehistoric flint artefacts have been recovered from the surface of the alluvium, but the presence of medieval and post-medieval artefacts as well shows that it continued to form in more recent times.

Sections exposed at the eastern end of the phase 1 pipeline, where it crossed the Boreham Brook near Church Road (Fig. 4, ER1 and ER8), recorded an earlier channel cut by the existing stream and sealed beneath the alluvium discussed above. A full profile of the former channel was recorded in ER1 and a probable channel edge in ER8. The channel was filled with clean natural deposits, although in ER1 samples of waterlogged plant macrofossils were recovered from the lower channel fills. Analysis of these has revealed that when the former channel was open it was surrounded by scrub and woodland and was distant from human habitation. Unfortunately, the channel deposits cannot be dated as they contained no artefacts and the plant macrofossils recovered were not suitable for radiocarbon dating. Nevertheless, the clean natural fills and absence of artefacts suggest that the former channel was of prehistoric or even post-glacial origin.

This evidence of both ancient and more recent alluviation is typical of the middle Chelmer valley, since extensive deposits of medieval and post-medieval alluvium overlying earlier deposits have been found alongside the Chelmer at Old Hall Reservoir, Boreham (Fig. 1), Little Waltham and central Chelmsford (Germany 2008, 63; Drury 1978, 50-1; Wickenden 1992, 1, 10 and 141). The changed course of the Boreham Brook suggests a straightening of the stream channel to by-pass a largely silted-up meander.

A former channel of the Boreham Brook was also recorded to the south-west of Tyrrel Cottages (Fig. 8, ER3, 20). The first four editions of the Ordnance Survey record this section of the brook to have been used as an overflow for the adjacent mill pond (Fig. 3). It was deliberately infilled when the mill was demolished during the second half of the 20th century, and the course of the Boreham Brook was diverted along the line of the former mill leat. This realignment of the brook is clearly a much more recent event than that near Church Road.

7.2 Prehistoric

The scatter of prehistoric worked flints on the south bank of the Boreham Brook near Church Road is the earliest evidence of human activity found by the monitoring (Fig 4, ER1, ER2 and ER8). The flint assemblage is dated to the Early Neolithic and Late Neolithic/Bronze Age, and appears to be related to the upper alluvial deposit of the Boreham Brook rather than its buried former channel. The assemblage contains a high proportion of tools and probably represents working areas for nearby settlement sites on the rising ground overlooking the

floodplain of the river Chelmer, whose existence is suggested by extensive cropmark complexes recorded from aerial photographs (Fig. 1). The Late Neolithic and Bronze Age material at Church Road was contemporary with the henge and most of the barrows at Old Hall Reservoir Site C, only 0.5km beyond the eastern end of phase 1 of the pipeline route (Fig. 1). The Old Hall Reservoir site, however, was used for ritual activity and burials focused on monuments, and the much lower proportion of flint tools recovered there suggests that no or very little settlement took place around its monuments. Other monuments in the surrounding landscape are probably represented by nearby cropmarks of ring-ditches, a clear example of which can be seen near Boreham Hall Cottages, although many of the other cropmarks can be interpreted as field systems and settlement enclosures (Fig. 1).

Although phase 3 of the pipeline route passed close to cropmarks in the vicinity of New Hall, no prehistoric remains were identified in this area (Fig. 2), although an undated gully sealed beneath the subsoil may have been of early date.

7.3 Roman, Medieval and Post-medieval

The monitoring recorded very few remains later than the prehistoric and earlier than the post-medieval period, suggesting that the pipeline route was distant from human settlement, especially along phase 1 of the route which followed the Boreham Brook.

No Roman remains were found at the western end of the phase 1 pipeline route, near the B1137, the Roman London-Colchester road. The original date of the former mill at Tyrell Cottages is not known, although the small amount of medieval and post-medieval pottery recovered from its vicinity may indicate that it was in use from the 13th century onwards (Fig. 8, ER3). A post-medieval brick wall extending along the south-west bank of the Boreham Brook may represent a property boundary between the mill and Boreham House. The wall was constructed from recycled 16th-century bricks which may have been sourced from the nearby New Hall estate. Ordnance Survey mapping and modern finds recovered from the former channel indicate that this section of the Boreham Brook was deliberately infilled when the mill was demolished during the second half of the 20th century, with the infilling of the mill dam and the nearby section of brook probably taking place at the same time. The mill pond and mill leat were retained and the course of the Boreham Brook was diverted to follow the former mill leat.

Undated features recorded in phase 3 of the pipeline route, near New Hall, may have been of post-medieval date. They include a large clay pit, several of which were dug for brick-making during Henry VIII's rebuilding of New Hall in the early 16th century (Pocock 2009).

8.0 ASSESSMENT OF RESULTS

Archaeological monitoring of phase 1 and the central section of phase 3 of the pipeline route found few archaeological remains. This was partly because the easement was only stripped down to mixed subsoil over much of the pipeline route, but also because phase 1 of the pipeline mainly followed the floodplain of the Boreham Brook. Few archaeological features or finds were recorded, even where lengths of the phase 1 easement were re-stripped by machine and investigated in detail. Where features were present, they may have survived partly intact under areas of unstripped subsoil, although in the phase 1 easement especially some damage may have resulted from localised overstripping and vehicle tracks. The main disturbance of archaeological remains, however, resulted from cutting of the pipe trench.

Along the eastern half of the phase 1 easement the alluvium of the existing Boreham Brook seals at least one former stream channel (Fig. 1). This contained waterlogged deposits with plant macrofossils, but assessment of the plant remains did not produce conclusive results and the material was unsuitable for radiocarbon dating. While the former channel is undoubtedly ancient, the lack of good evidence makes it impossible to date it or reconstruct its environment in detail.

The Neolithic and Bronze Age flint scatter recovered from the alluvium of the Boreham Brook at the eastern end of the phase 1 easement represents a significant assemblage due to the high proportion of tools present. The flints probably represent a working area, however, with the related settlement sites most likely located on the rising ground overlooking the Boreham Brook and the river Chelmer. Even so, the flint scatter provides evidence of a prehistoric presence in the area from the Neolithic onwards, contemporary with the important ritual and burial monuments recorded at the Old Hall Reservoir site beyond the eastern end of the pipeline (Fig. 1). Many elements of the cropmark complexes on either side of the pipeline route may also prove to be prehistoric. Near New Hall, where the phase 3 easement passes close to cropmarks, the ground had already been disturbed during the construction of the nearby Beaulieu Park housing development.

The only other significant archaeological remains were those recorded at Tyrell Cottages near the B1137 (Fig. 1), which suggest that the former Boreham water mill had post-medieval, and possibly medieval, origins.

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APPENDIX 1: CONTEXT DATA

Phase 1

No.	Area	Category	Description	Date
1		Natural	Brownish yellow plastic / firm clay with occasional small rounded stones. Below 30	
2		Natural	Brownish orange friable gritty sand with abundant small rounded stones	
3		Alluvium	Brownish orange plastic silt clay with very infrequent small rounded stones	?Medieval / post-med.
4		Alluvium	Brownish grey plastic silt clay with very few infrequent small rounded stones	?Medieval / post-med.
5	ER3 (north)	Finds	Surface finds, subsoil	
6	ER3 (south)	Finds	Surface finds, subsoil	
7	ER2	Finds	Surface finds, alluvium/subsoil	
8	ER1	Finds	Surface finds, alluvium/subsoil	
9	Boreham Brook	Layer	Dark grey/black soft sandy silt with organic remains and infrequent small rounded stones. Above 15. Below 14. Probably same deposit as 16 and 17	
10	ER1	Finds	Surface finds, alluvium layer 11	
11	ER1	Alluvium	Pale brown soft/friable clay silt with very infrequent small rounded stones	?Medieval / post-med.
12	Boreham Brook	Alluvium	Pale brown soft/friable clay silt with very infrequent small rounded stones. c. 0.3m thick. Above 18	?Medieval / post-med.
13	Boreham Brook	Layer	Brownish orange soft clay silt with very few infrequent small rounded stones. Above 14. Below 18	
14	Boreham Brook	Layer	Pale grey soft clay silt with infrequent small rounded stones. Above 9. Below 13	
15	Boreham Brook	Layer	Grey soft clay silt with infrequent small rounded stones. Below 9	
16	Boreham Brook	Layer	Dark brownish grey soft sandy silt with organic remains and infrequent small rounded stones. Below 14. Probably same deposit as 9 and 17. Below 14	
17	Boreham Brook	Layer	Dark brownish grey soft sandy silt with organic remains and infrequent small rounded stones. Below 14. Probably same deposit as 9 and 16	
18	Boreham Brook	Layer	Grey soft clay silt with occasional small rounded stones. Above 13 and 19. Below 12	
19	Boreham Brook	Layer	Dark grey / black clay silt. Contains tree roots and pieces of wood. Below 18	
20	ER3	Brook	Gradually-sloping sides and a broad flat base. 1.5m long, 6.65m wide, 0.66m deep. Filled by 21	Modern
21	ER3	Fill	Dark brownish grey soft / plastic silt clay with infrequent small rounded stones. Single fill of ditch 20	Modern
22	ER3	Fill	Greyish brown firm silt clay with occasional small rounded stones and infrequent flecks of charcoal. Single fill of ditch 23	Post-med.
23	ER3	Ditch	Ditch section. Moderately-sloping sides and a concave base. 1m long, 1.35m wide, 0.5m deep. Filled by 22	Post-med.
24	ER3	Finds	Surface find. Ditch 23	
25	ER3	Wall	Brick wall constructed from orange-red unfrosted bricks laid end to end in an irregular fashion without cement or mortar. Three courses high and three courses wide. Sits within topsoil on surface of natural. No indication of associated construction cut.	Post-med.
26		Fill	Dark brownish grey / red-brown silt clay with occasional small rounded stones, some burnt. Single fill of 27	?Prehistoric
27		Scrape	Oval hollow with poorly defined edges. 1.2m long, 1.1m wide, 0.1m deep. Filled by 26	?Prehistoric
28	ER8	Finds	Surface find, alluvium/subsoil	
29	ER8	Natural	Orange/yellow -brown firm silt-clay with infrequent small rounded stones	
30	ER8	Natural	Greyish-yellow loose silt sand with abundant small rounded stones, and lenses of dark grey silt up to 10mm	

No.	Area	Category	Description	Date
			thick towards top. Above 1. Below 29	
31	ER4	Ditch	Not investigated	?Post-med.
32		Ditch	Not investigated. Recorded on first four editions of Ordnance Survey	Post-med. / modern
33	ER3	Pit	Not investigated. Contains modern artefacts	Modern
34	ER1	Finds	Surface finds from initial walkover, alluvium/subsoil in ER1	Prehistoric

Phase 3

No.	Area	Category	Description	Period
50		Fill of 51	Mid greyish brown to reddish brown silty clay, occasional sub-angular flints	Undated
51		Gully	0.7m+ x 0.68m x 0.24m deep, 45° sides, flat base	Undated
52		Fill of 53	Grey to dark grey silty clay, rare charcoal flecks, one patch of reddish baked clay	Undated
53		Pit	0.60m wide x 0.15m deep, 45-50° sides, flat base	Undated
54		Layer (subsoil)	Mid greyish brown to brown silty clay, 0.27m+ thick	Undated
55		Fill of 56	Mid greyish brown clay silt, 1.6m+ thick	Undated
56		Ditch	0.70m+ x 8.6m x 1.6m deep, 30-40° sides, not bottomed	Undated

APPENDIX 2: FINDS AND ENVIRONMENTAL DATA

2.1. Finds data

Context	Feature	Count	Wt (g)	Description	Date
5	Finds	2	74	Pottery; joining tripod base sherds	Post med.
6	Finds	1	56	Pottery; base sherd, black-glazed	Post med.
7	Finds	1	20	Flint	-
8	Finds	8	100	Flints, 7 worked (retained), 1 natural (discarded)	Neolithic & Late prehist
10	Finds	1	30	Copper alloy crotal bell, poor condition, corroded iron clapper is <i>in situ</i>	Post med.
		7	130	Flints	Neolithic & Late prehist
		1	10	Pottery; rim sherd	Medieval
22	23	3	202	Brick fragments, abraded (discarded)	Post med.
		6	80	Roof tile fragments and spall (discarded)	Post med.
		2	32	Pottery; base and body sherds	Medieval
24	Finds	1	46	Pottery; handle sherd	Medieval
25	Wall	6	6900	Sample bricks; fragments, width 105-110mm, depth 60-70mm (discarded)	Tudor
26	Spread	10	280	Flints and burnt flints, unworked (discarded)	-
28	Finds	1	2	Flint	Neolithic
34	Finds	9	126	Flints	Neolithic & Late prehist
u/s	Finds	1	17	Copper alloy strip with eyelet and lead infill, possibly a pendant weight. Could not be paralleled	?Medieval

2.2. Worked flint catalogue

Context	Feature	Description	Date
7	Finds	Utilised flake, secondary	
8	Finds	Flake, tertiary, translucent flint	Early Neolithic
		Side-and-end scraper, tertiary (Fig. 10.2)	Late Neolithic
		Piercer, tertiary (Fig. 10.3)	Late Neo/Bronze Age
		Flake, tertiary, squat, wide platform	Late Neo/Bronze Age
		Notched flake, notched at distal end	Late Neo/Bronze Age
		Two flakes, secondary, waste	Late Neo/Bronze Age
10	Finds	Serrated flake, tertiary, translucent flint (Fig. 10.1)	Early Neolithic
		Core for flakes, bifacial flake removals from one edge, 'chopper' type	Late Neo/Bronze Age
		Waste block	Late Neo/Bronze Age
		Flake, primary	Late Neo/Bronze Age
28	Finds	Three flakes, secondary	Late Neo/Bronze Age
		Blade fragment, butt part, tertiary	Early Neolithic
34	Finds	Serrated blade, secondary, on bullhead flint (Fig.10.6)	Early Neolithic
		Blade, secondary	Early Neolithic
		Blade fragment, secondary	Early Neolithic
		Blade core, single platform	Early Neolithic
		Retouched blade, secondary	Early Neolithic
		Scraper on secondary flake with semi-abrupt retouch around distal end and large notch removal on right edge (Fig. 10.4)	Late Neo/Bronze Age
		Knife on a flake with cortex backing (Fig. 10.5)	Late Neo/Bronze Age
		Notched flake, secondary (Fig. 10.7)	Late Neo/Bronze Age
		Chisel-ended flaked flake, thick section, tertiary (Fig. 10.8)	Late Neo/Bronze Age

2.3 Plant remains

Sample No.	1	2	3	4	5
Context No.	9	16	14	13	17
Seeds/fruits etc					
<i>Betula</i> sp. (fruit)	xw				
<i>Carex</i> sp.		xw			xw
<i>Corylus avellana</i> L.	xw				
<i>Persicaria maculosa/lapathifolia</i>			xw		
<i>Polygonum aviculare</i> L.			xw		
Polygonaceae indet.	xw				
<i>Rubus</i> sp.	xfgw				
<i>Quercus</i> sp.					xcffgw
<i>Viola</i> sp.	xw	xw			
Other plant macrofossils					
Waterlogged roots/stems	xxxx	xxxx	xx	xx	xxxx
Indet.buds	xw	xxw			xxw
Indet.catkin frags.	xw				
Indet.leaf frags.	xw				
Indet.moss		xw			xxw
Indet.twigs	xxfgw	xw			xxxw
Wood frags.<5mm	xxxxw	xxxw			xw
Wood frags.>5mm	xxw	xxw			
Charcoal <2mm	x		x	x	
Other remains					
Waterlogged arthropod remains	x				x
Sample volume (litres)	20ss	20ss	10	10	10ss
Volume of flot (litres)	1.2	1	<0.1	<0.1	0.6
% flot sorted	<12.5%	<12.5%	100%	100%	25%

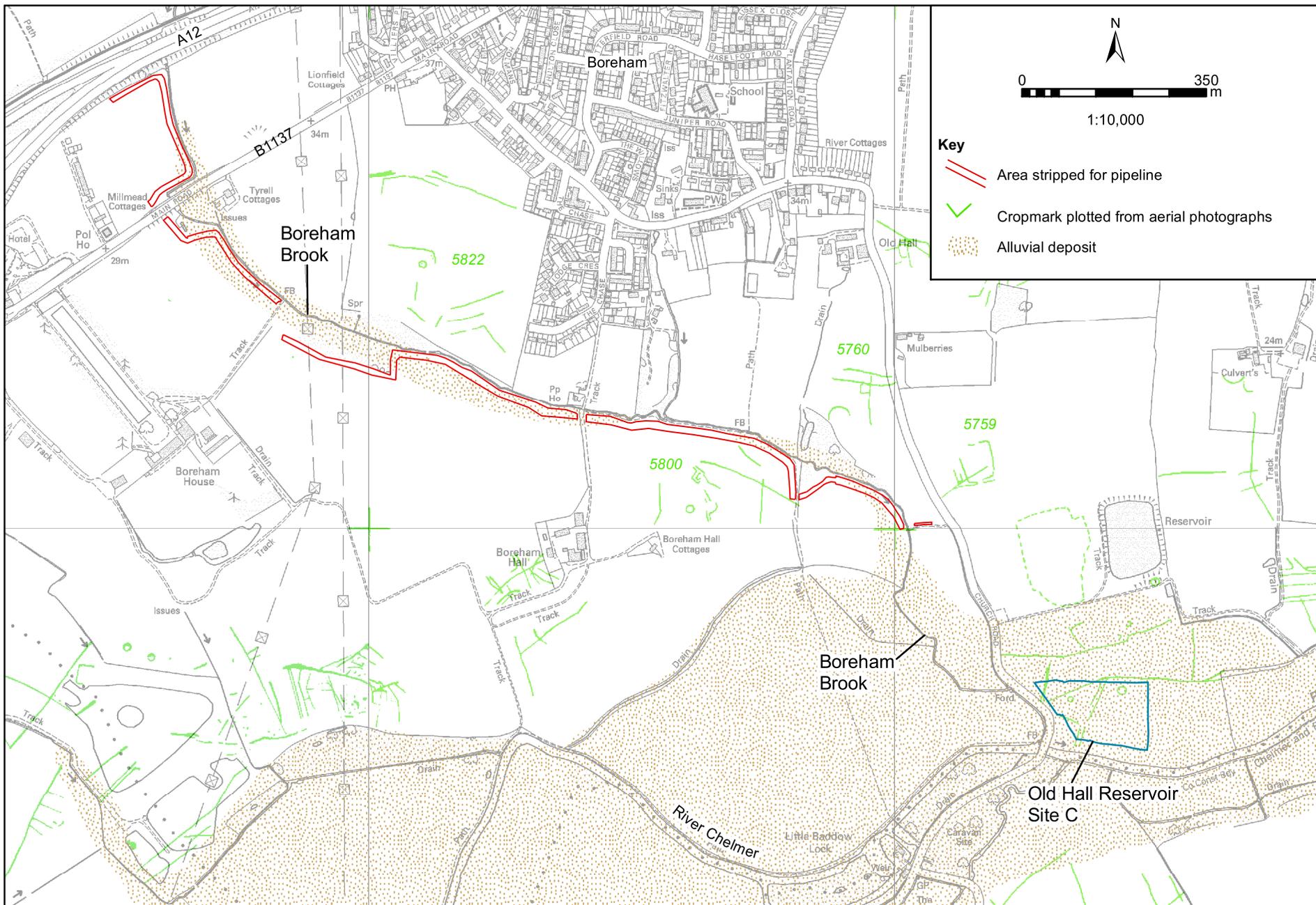
x = 1 – 1- specimens xx = 11 – 50 specimens xxx = 51 – 100 specimens xxxx = 100+ specimens
w = waterlogged fg = fragment cf = compare ss = sub-sample

APPENDIX 3: CONTENTS OF ARCHIVE

1	Client report
1	Archaeological Brief
1	Written Scheme of Investigation
1	Revision to the Written Scheme of Investigation
1	Finds report and tables
1	Copper alloy fitting report
1	Worked flint report and table
1	Medieval and post-medieval pottery report and table
1	Plant macrofossil report and table
4	Watching brief reports
1	Context register
40	Context sheets (contexts 1-34 and 50-56)
2	A4 section sheets
1	Soil sample register
5	Soil sample sheets
1	Photo register
1	Computer disk containing copies of most of the reports listed above and sixty-four digital photographs
1	Small box of finds
2	Large sheets of site drawings

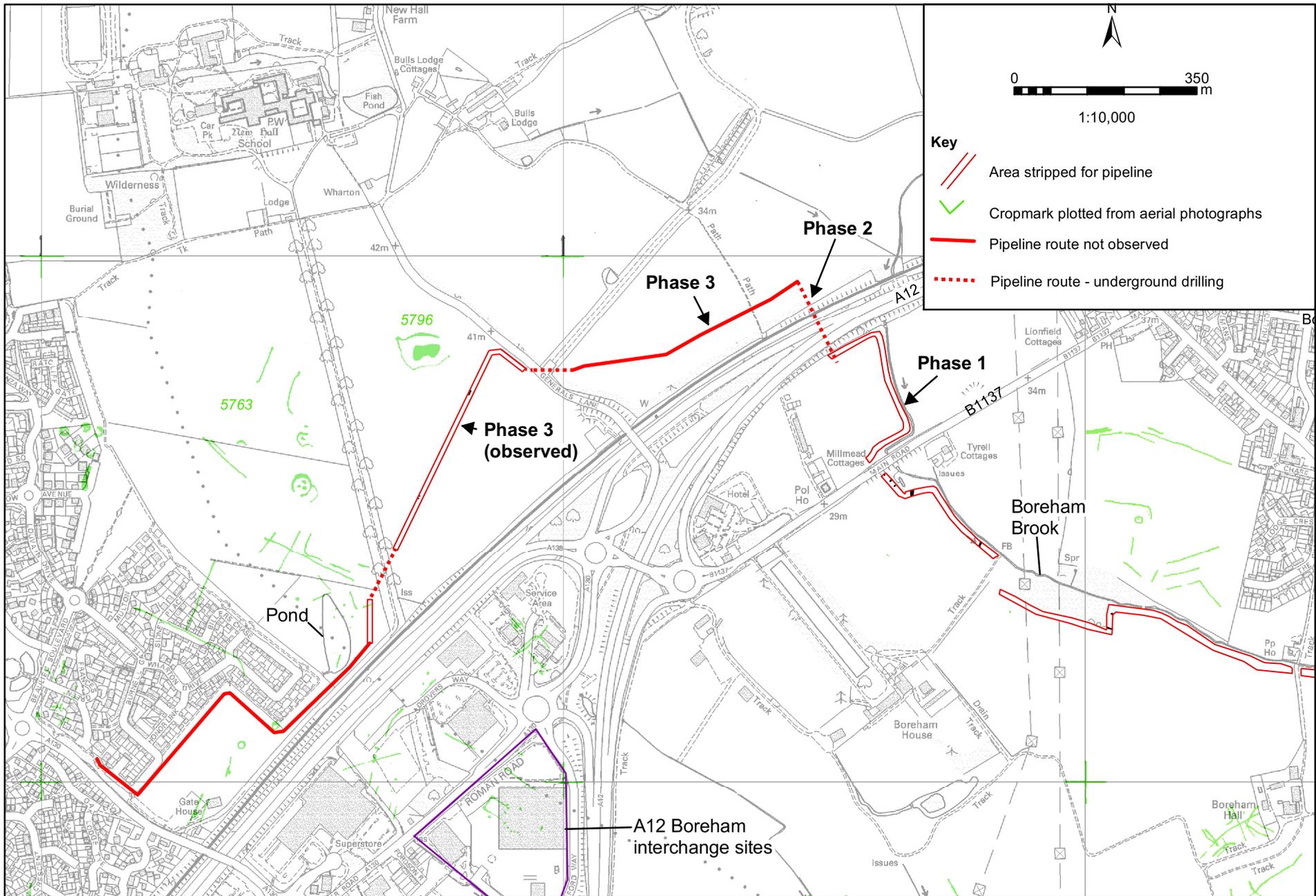
APPENDIX 4: HISTORIC ENVIRONMENT RECORD SUMMARY

Site name/Address: Springfield Link Main Phases 1 and 3, Boreham and Springfield	
Parish: Boreham, Springfield	District: Chelmsford
NGR: TL 76070 09009 to TL 73106, 09043	Site Code: BOSL 09
Type of Work: Archaeological Monitoring	Site Director/Group: Mark Germany, Essex County Council Field Archaeology Unit
Date of Work: 15/5/09 to 22/5/09 and 7/9/10 to 13/10/10	Size of Area Investigated
Location of Finds/Curating Museum: Chelmsford Museum	Client: Essex and Suffolk Water Ltd
Further Seasons Anticipated?: No	Related HER Nos.:
Final Report: Essex Archaeology and History (Summary)	
Periods represented: Prehistoric, Medieval, Post-medieval, Modern	
<p>SUMMARY OF FIELDWORK RESULTS:</p> <p>The construction of phases 1 and 3 of a water pipeline running from Church Road, Boreham to White Hart Lane, Springfield was monitored by the Essex County Council Field Archaeology Unit on behalf of Essex and Suffolk Water Ltd. Phase 1, which ran along the valley of the Boreham Brook from Church Road to the A12, was monitored in spring 2009, and phase 3, which ran from the A12 past New Hall School, in autumn 2010. Phase 2 was not monitored as this length involved directional drilling under the A12 and the London-Colchester railway.</p> <p>An earlier archaeological desk-based assessment (Heppell 2008) established that phase 1 of the pipeline ran along the valley of the Boreham Brook, a tributary of the river Chelmer, in an area with potential for prehistoric and later remains, including Late Mesolithic/Early Neolithic flint artefacts excavated at Old Hall Reservoir, Boreham. Phase 3 of the pipeline ran past New Hall School, the site of a palace built by Henry VIII, replacing a medieval manor.</p> <p>Monitoring of phase 1 of the pipeline recorded an earlier channel of the Boreham Brook, filled with clean natural deposits, some of which contained plant remains. The channel is undated, as it contained no artefacts and the plant remains were not suitable for radiocarbon dating, but is probably post-glacial or prehistoric. Assessment of the plant remains indicates that the former channel was bordered by scrub and woodland with no evidence of human activity. It was sealed beneath the alluvium of the present brook, which appears to have been deposited during the medieval period or later, at the same time as extensive alluviation alongside the adjacent section of the river Chelmer.</p> <p>The phase 1 monitoring recovered a scatter of worked flint on the south bank of the Boreham Brook near Church Road, dating to the Early Neolithic and Late Neolithic/Bronze Age. This assemblage contained a high proportion of tools, much higher than that produced by the barrows of the nearby Old Hall Reservoir site. This suggests the presence of a working area beside the Boreham Brook, although related settlement was most likely located on the rising ground overlooking the brook.</p> <p>The phase 1 monitoring did not locate any remains related to the Roman London-Colchester road, whose line is followed by Main Road, Boreham (B1137). Medieval and post-medieval pottery found alongside the Main Road in the area of the former Boreham Mill suggests that it may have had medieval origins. A wall built of reused 16th-century bricks on the west side of the brook probably represents a boundary between Boreham House and the Boreham Mill. A channel of the Boreham Brook infilled with modern material was also recorded, and this and Ordnance Survey mapping shows that the Boreham Brook was diverted along the line of the mill leat when Boreham Mill was demolished in the second half of the 20th century.</p> <p>Monitoring of phase 3 of the pipeline recorded three undated features in the area south of New Hall School. No evidence related to adjacent cropmarks was recorded.</p>	
<p>Previous Summaries/Reports:-</p> <p>Germany, M., 2009: <i>Springfield Link Main Phase 1, Boreham and Springfield, Essex. Archaeological Monitoring</i>. ECC FAU report 1865</p> <p>Heppell, E., 2008: <i>Springfield Link Main, Springfield/Boreham, Essex. Archaeological Desk-Based Assessment</i>. ECC FAU report 1860</p>	
Author of Summary: Patrick Allen	Date of Summary: June 2011



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Fig.1. Phase1 pipeline route with cropmarks and alluvial deposits



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Fig.2. Phase 2 & 3 pipeline route with cropmarks

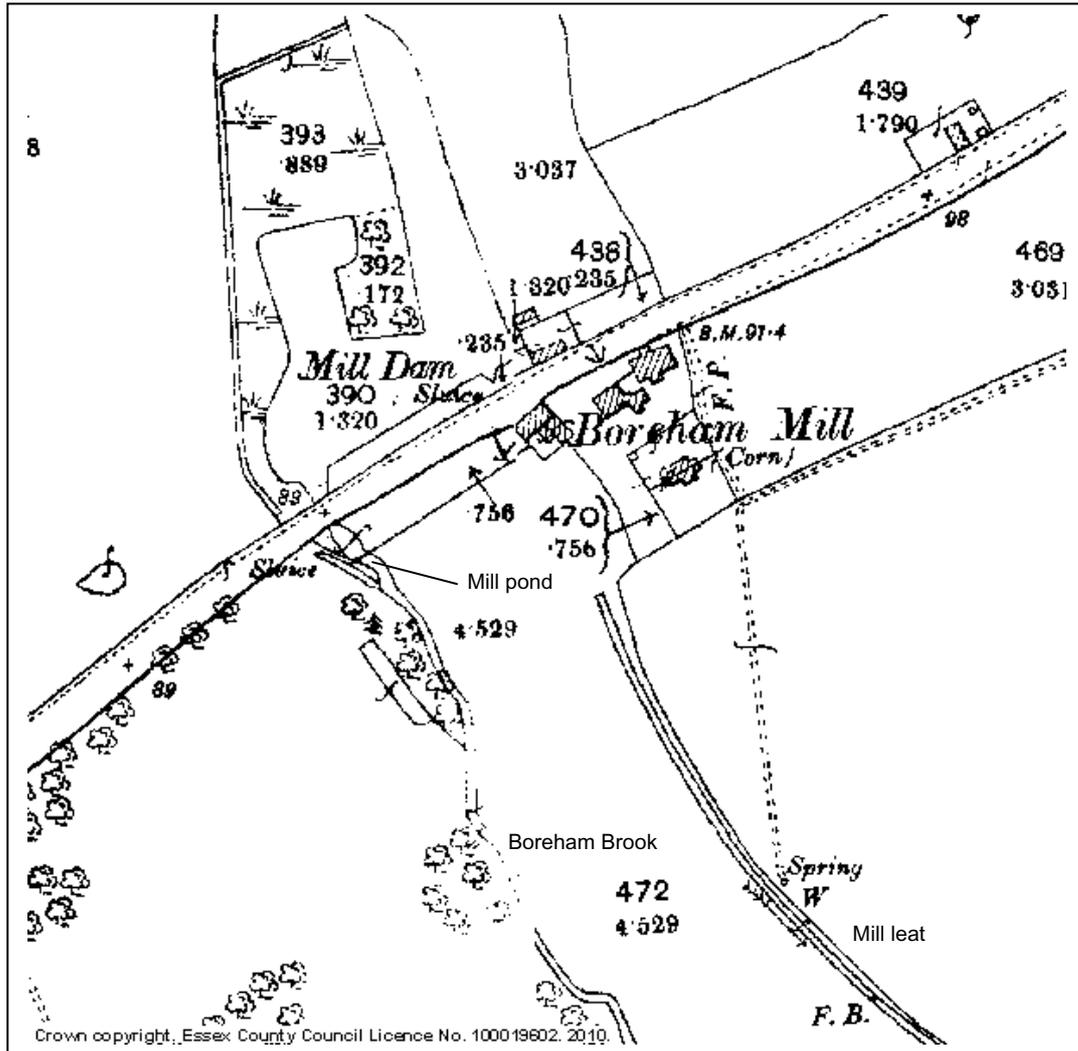


Fig.3. Boreham mill as recorded by the Ordnance Survey second edition (1896 – 1912 25 inch)

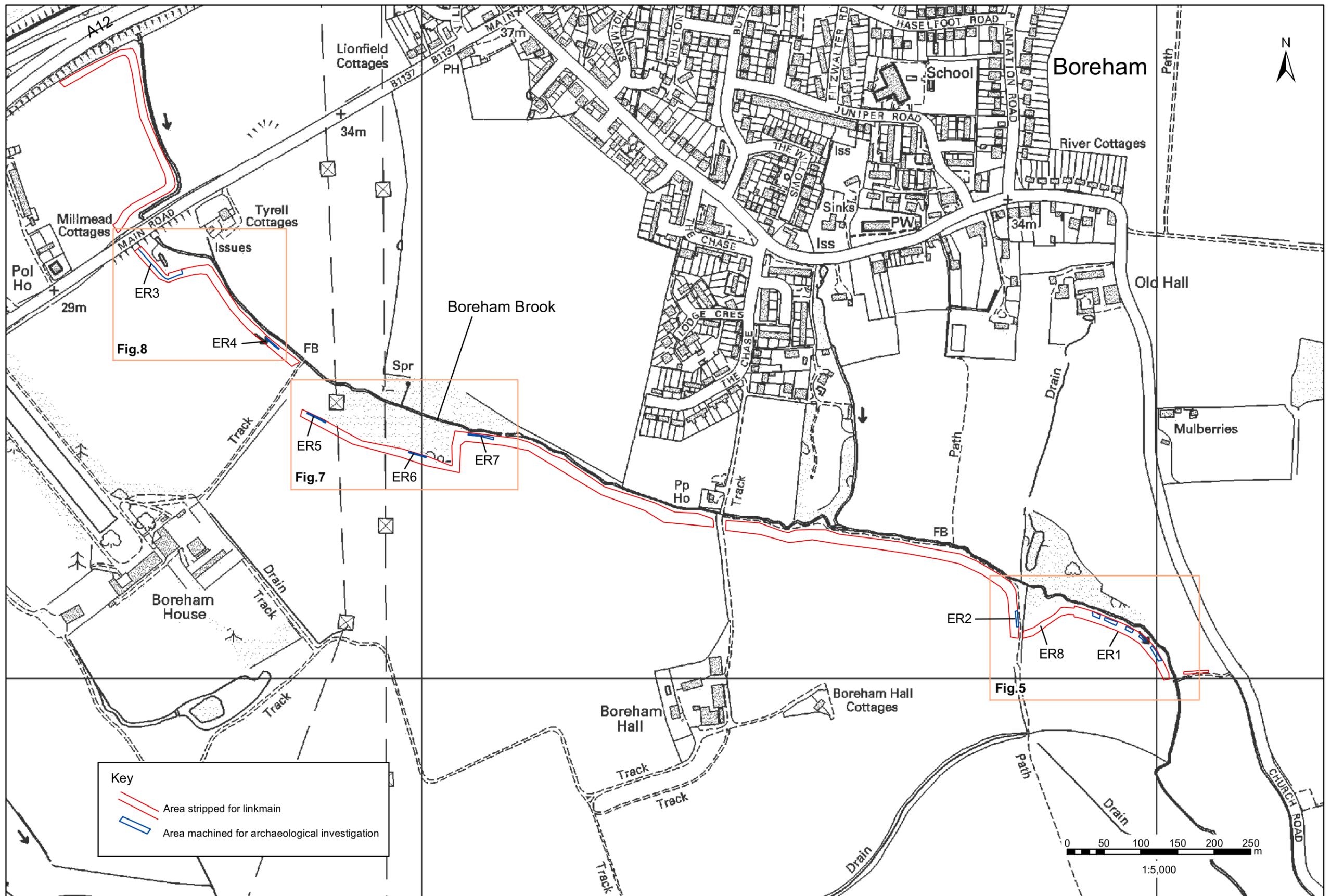


Fig.4. Phase 1 pipeline route and areas of archaeological investigation

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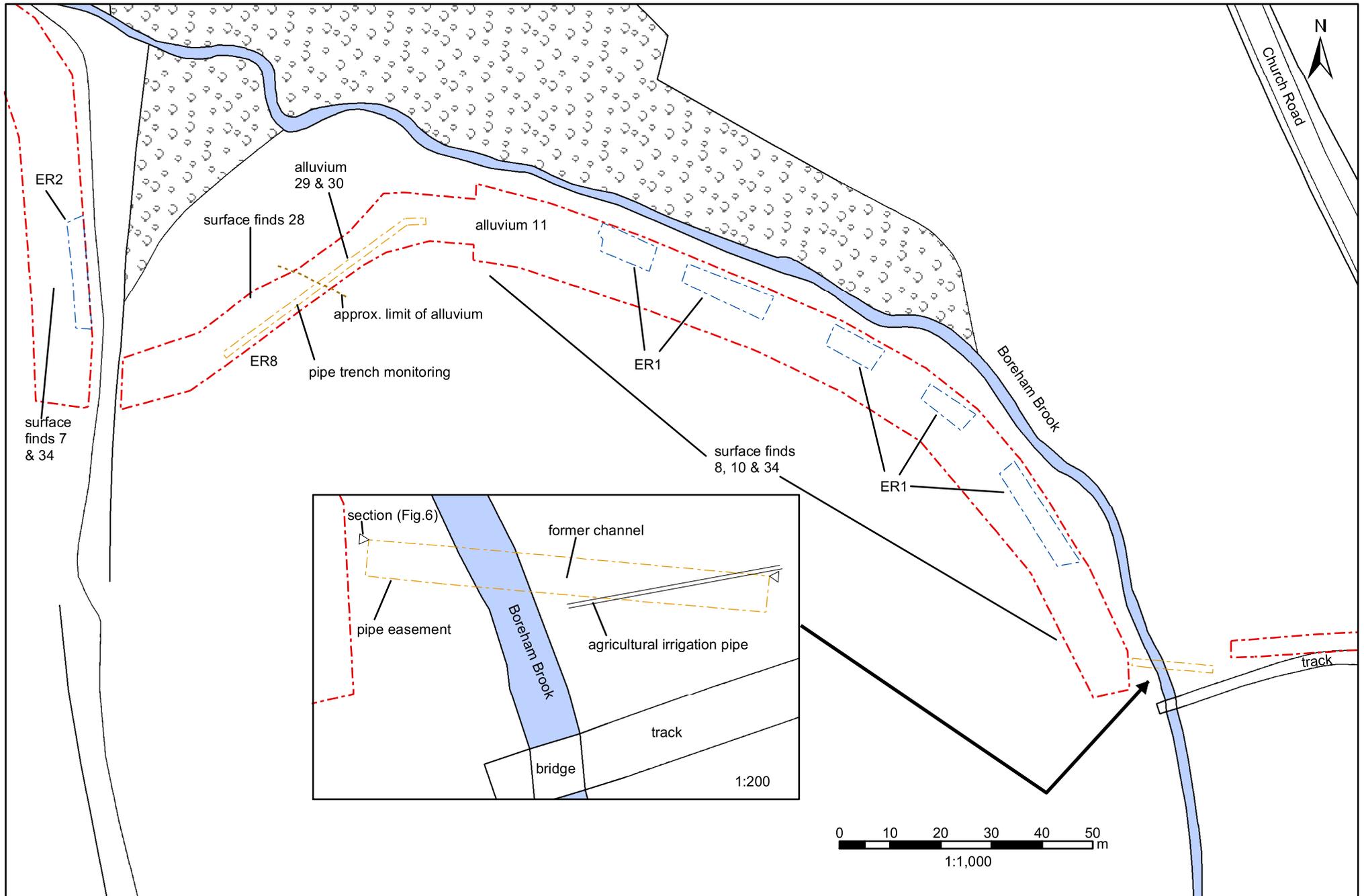


Fig.5. Archaeological remains near Church Road

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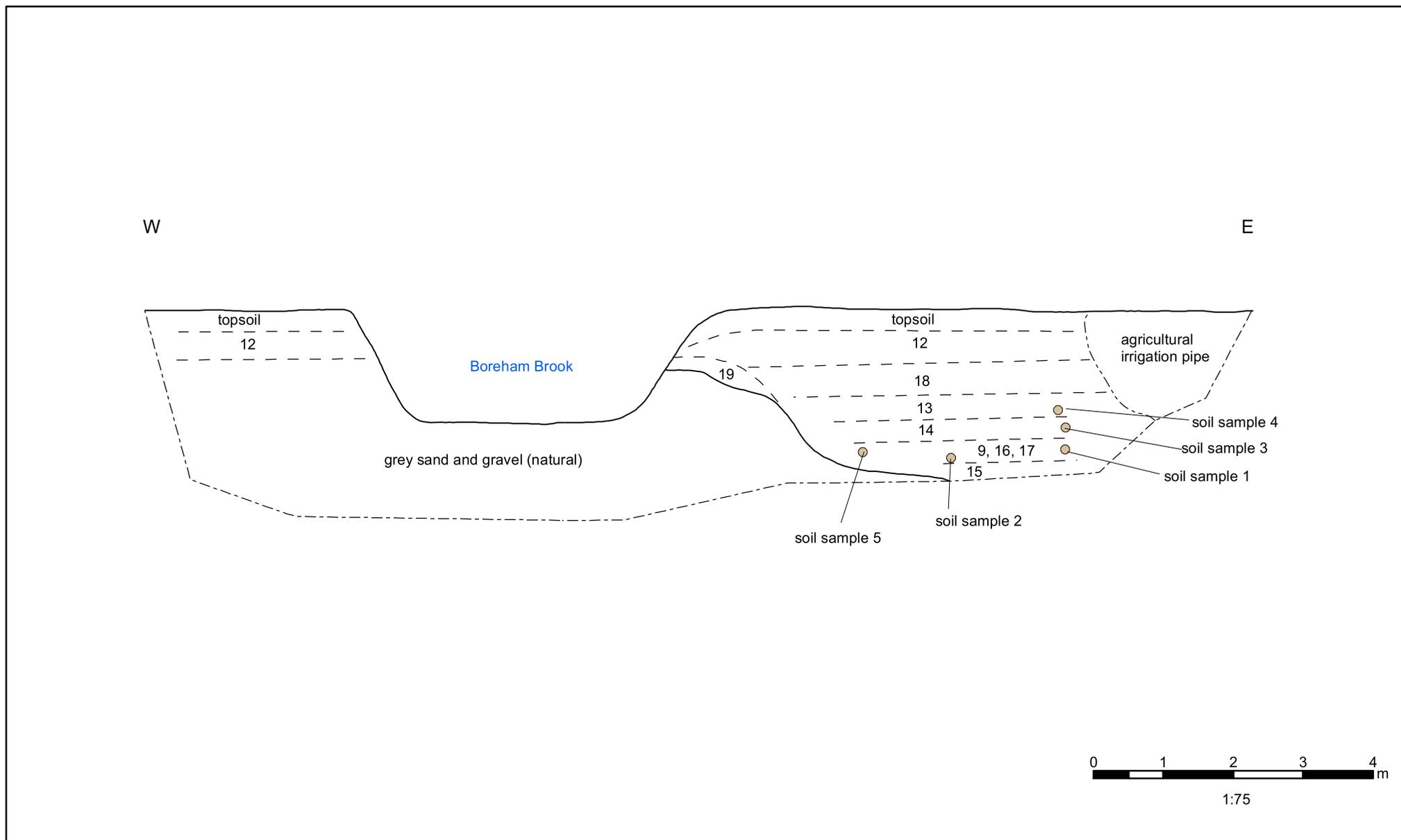
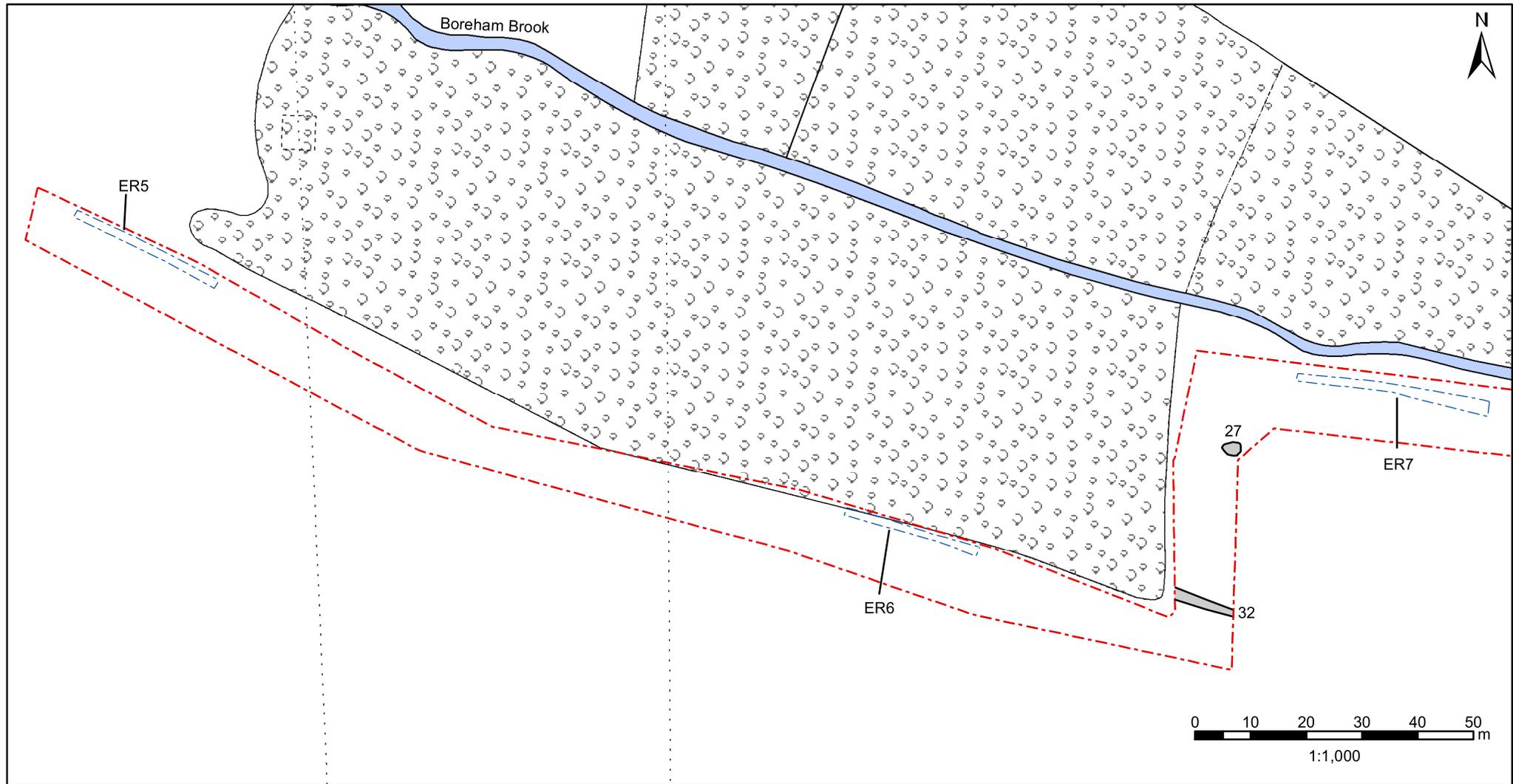


Fig.6. Reconstructed south-facing section of pipe trench across Boreham Brook



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Fig.7. Archaeological remains north-east of Boreham House

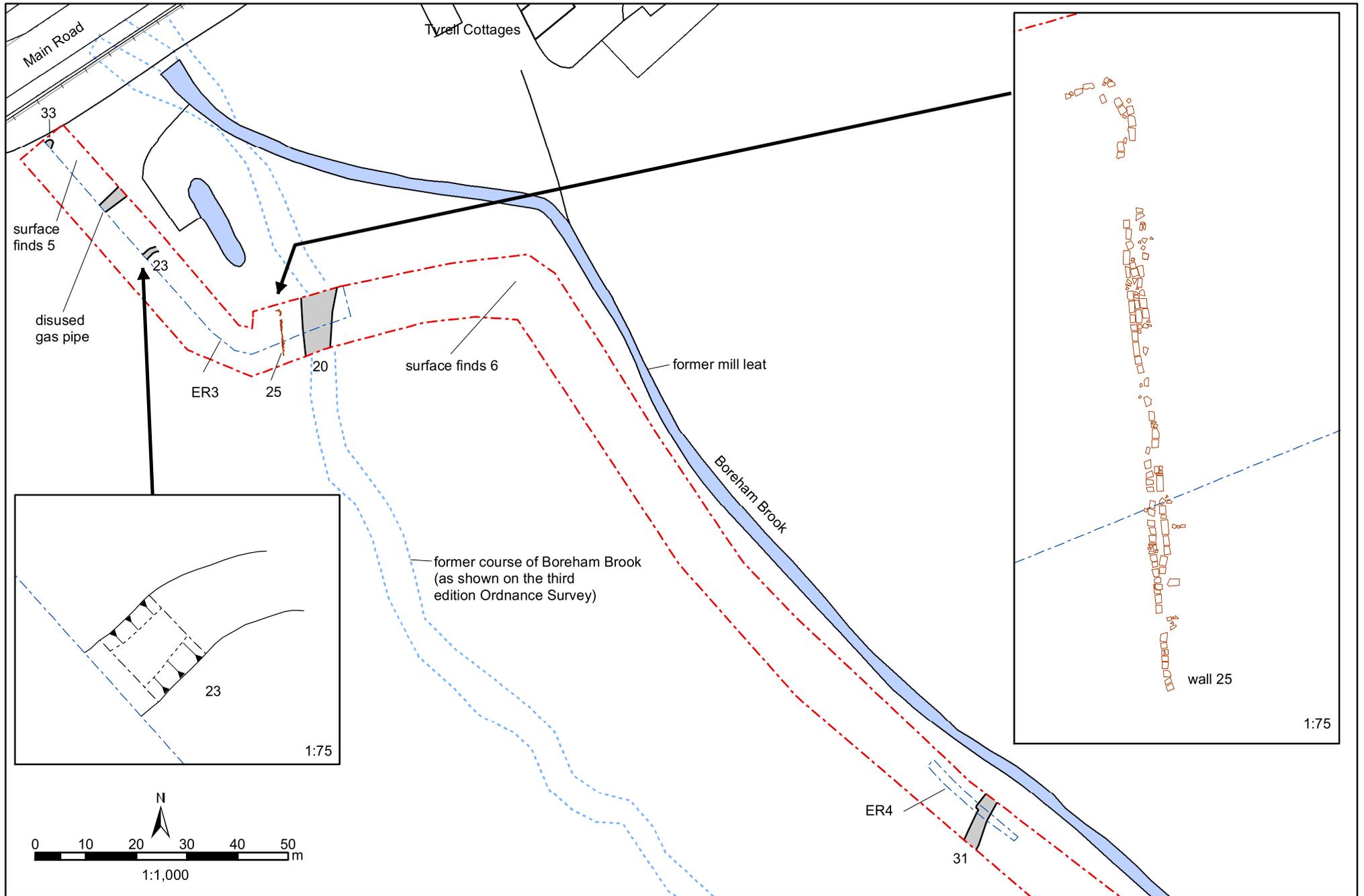
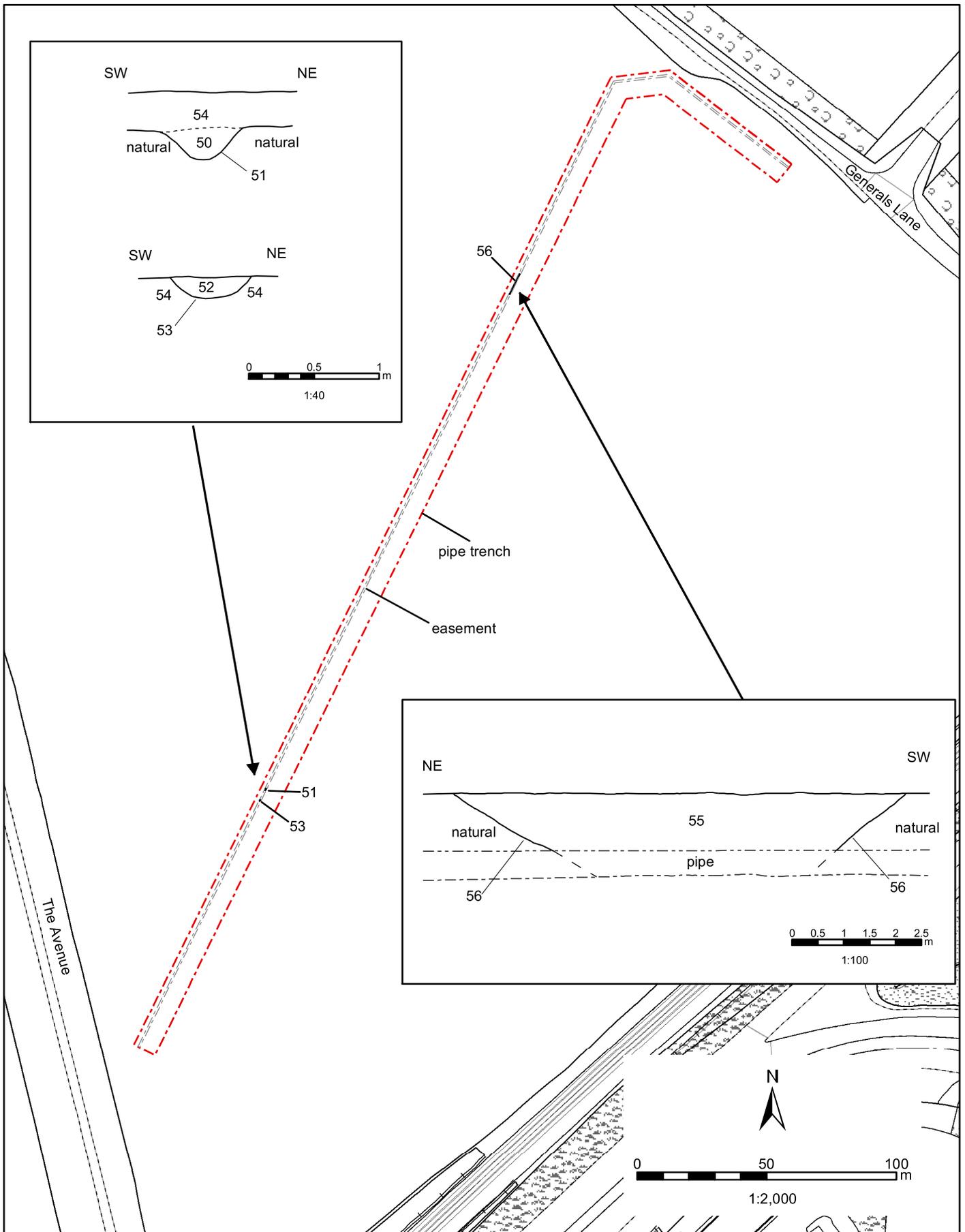


Fig.8. Archaeological remains near Tyrell Cottages

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Fig.9. Phase 3 observed pipeline - all features

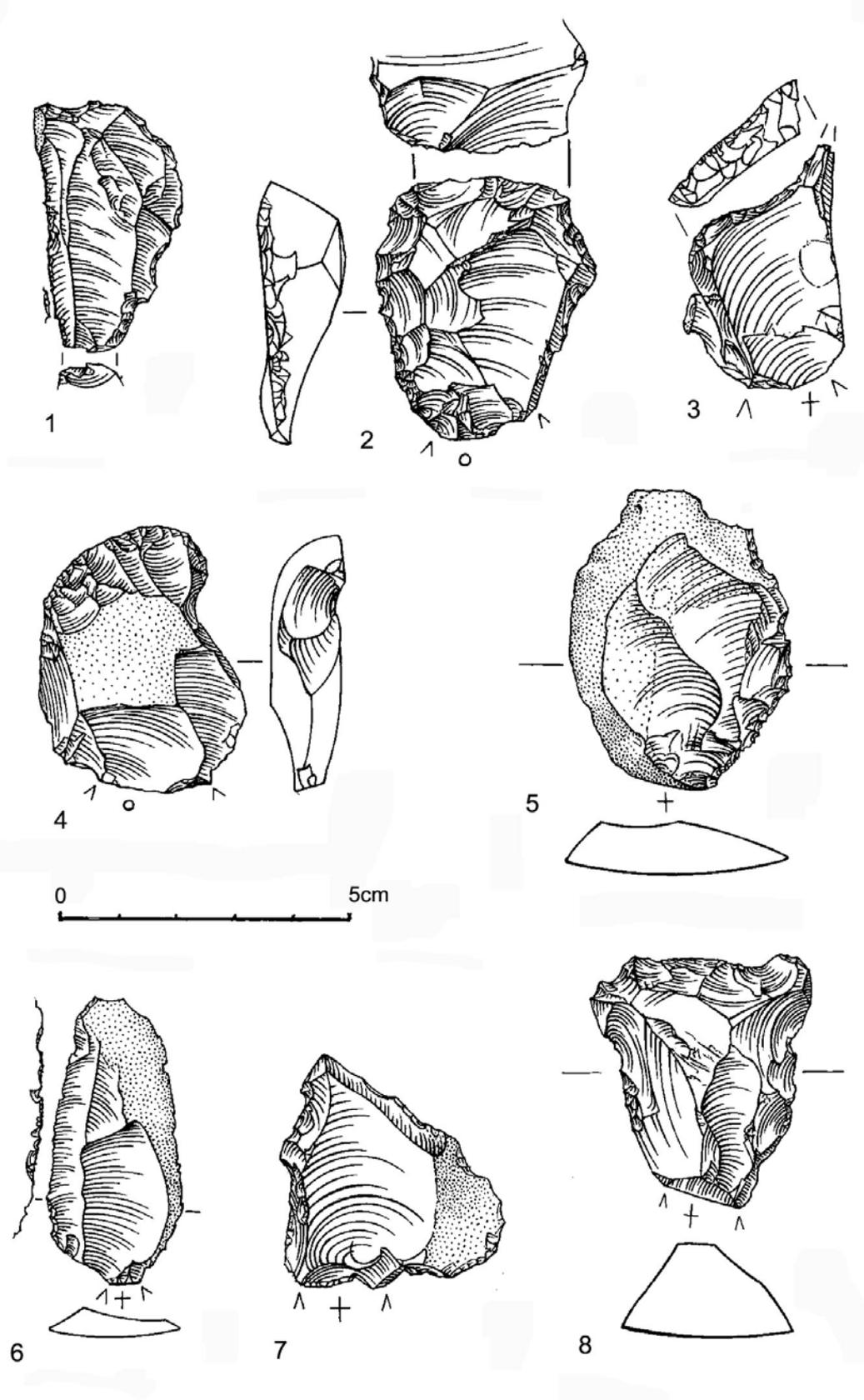


Fig. 10 Worked flint



Plate 1. Easement strip north of Boreham House, looking west



Plate 2. Easement strip north of Boreham Hall Cottages, looking west



Plate 3. Excavation of the pipe trench across the Boreham Brook, looking west



Plate 4. North section of the pipe trench across the Boreham Brook, looking west



Plate 5. Section of pipe trench in ER8 showing alluvium of the Boreham Brook, looking south



Plate6. ER1, looking east



Plate 7. ER3, brick wall 25, looking south



Plate 8. ER3, feature 20, infilled section of Boreham Brook, looking north-east



Plate 9. Phase 3 easement looking north-east towards Generals Lane