Quality Control

Sibthorpe

SIWP 04

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ARCHAEOLOGICAL WATCHING BRIEF OF SERVICE TRENCHES AND A TREATMENT PLANT AT SIBTHORPE, NOTTINGHAMSHIRE

(SIWP 04)

Work Undertaken For
Severn Trent Water

May 2007

Report Compiled by
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National Grid Reference: SK 7620 4554 – SK 7639 4529
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ARCHAEOLOGICAL PROJECT SERVICES

APS Report No. **44/07**

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1. SUMMARY

An archaeological watching brief was undertaken during groundworks at Sibthorpe, Nottinghamshire. The watching brief monitored the excavation of a pipeline trench and groundworks for a new treatment plant.

The works traverse the area of the medieval (AD 1066-1540) village which is best represented by the 13th century church of St. Peter and a 13th – 14th century dovecote. Earthwork remains of a possible manorial complex, fishponds, enclosures, ridge and furrow and mill sites also lie close to the pipeline route. Remains of Romano-British date (AD 42-410) are also known from the vicinity.

The watching brief revealed a sequence of natural, undated, post-medieval and recent deposits. Undated remains include walls with an associated foundation trench and dumped deposits which probably indicate a former bridge across the Car Dyke watercourse. A single post-medieval deposit, that of subsoil, was encountered, although most subsoils were recorded as natural layers.

Finds retrieved during the investigation include pottery sherds of 17th – 18th century date, along with post-medieval to modern brick and tile.

In addition to the watching brief, a number of samples taken during an earlier evaluation were processed as part of this work. These comprised three bulk samples from a fishpond and a monolith to detail the vegetation history of the surrounding area from glacial episodes to present.

2. INTRODUCTION

2.1 Definition of a Watching Brief

An archaeological watching brief is defined 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."* (IFA 1999).

2.2 Planning Background

Archaeological Project Services was commissioned by Severn Trent Water to undertake an archaeological watching brief during groundworks associated with a new water pipeline and associated treatment plant at Sibthorpe, Nottinghamshire. The watching brief was carried out between the 19th January and 28th June 2005 in accordance with a specification prepared by Nottingham University Consultants Limited (Appendix 1).

2.3 Topography and Geology

Sibthorpe is located 20km northeast of Nottingham in the administrative district of Rushcliffe Borough, Nottinghamshire (Fig. 1).

The monitored length of the pipeline starts along Main Street, at National Grid Reference SK 7620 4554, and follows Church Lane to south of the village to a new treatment plant (NGR SK 7639 4529). The pipeline route crosses the shallow valley of a minor watercourse, the Car Dyke, and local heights vary between *c*. 19m OD to *c*. 16m OD.

The pipeline principally traverses soils of the Whimple 3 Association, typically stagnogleyic argillic brown earths (SSEW 1983), with clayey alluvial soils of the Fladbury 1 Association present in the valley bottom (Hodge *et al.* 1984, 194). These soils are developed upon a solid geology of Upper Triassic mudstones, siltstone and sandstones of the Edwalton Formation (BGS 1996).

2.4 Archaeological Setting

Sibthorpe is located in an area of known archaeological remains dating from the Romano-British period to the present day. A Roman well was identified and excavated to the east of the village.

Sibthorpe is first mentioned in the Domesday Survey of *c*. 1086. Referred to as *Sibetorp* the name is derived from the Old Danish personal name *Sibba* or the Old English *Sibbi* with the Old Danish *Þorp*, meaning a subsidiary settlement (Ekwall 1989, 421). At the time of Domesday the land was held by Count Alan, William Peverel and Ilbert of Lacy and contained a church with two priests, a mill and 41 acres of meadow (Morris 1977).

The only extant remains of the medieval period are a 13th - 14th century dovecote and the church of St. Peter which has elements dating from the 13th century (Pevsner 2003, 315). A chantry established at St. Peter's church in 1324 developed into a collegiate foundation until it was surrendered in 1545 (Page 1910, 150).

Sibthorpe is rich in earthwork remains that include moats, fishponds, field boundaries, ridge and furrow of the medieval field system and two platforms that may indicate the site of a mill. Fishponds of the collegiate foundation were levelled during 1967 (May 1967, 30).

An evaluation was undertaken adjacent to the Car Dyke and Church Lane in 2003. Large vertically cut features identified during this work were interpreted as fishponds (Sheppard 2004, 2). A number of samples were taken during that evaluation which were subsequently processed as part of this current work. These were not processed at that time and were to form part of the subsequent phase of work.

3. AIMS

The aim of the archaeological investigation was to ensure that any archaeological features exposed during the groundworks should be recorded and, if present, to determine their date, function and origin.

4. METHODS

The site for the new treatment plant was initially stripped of topsoil. Trenches for new tanks and other elements of the treatment plant were then excavated by machine to depths required by the development. Trenches along the pipeline route were also excavated by machine. The sides of the trenches were cleaned and rendered vertical, only when trenches did not exceed the safe working depth of 1.2m. Selected deposits were excavated further to retrieve artefactual material and to determine their function. Each deposit was allocated a unique reference number (context number) with an individual written description. A list of all contexts and their descriptions appears as Appendix 2. A photographic record was compiled and sections were drawn at a scale of 1:10 and 1:20. Recording was undertaken according to standard Archaeological Project Services' practice.

The methodology for the processing of the environmental samples is outlined in Appendix 4.

Following excavation finds were examined and a period date assigned where possible (Appendix 3). The records were also checked and a stratigraphic matrix produced. Phasing was assigned based on the nature of the deposits and recognisable relationships between them and supplemented by artefact dating.

5. RESULTS

Following post-excavation analysis four phases were identified;

Phase 1	Natural deposits
Phase 2	Undated deposits
Phase 3	Post-medieval deposits
Phase 4	Recent deposits

Archaeological contexts are listed below and described. The numbers in brackets are the context numbers assigned in the field.

Phase 1 Natural deposits

Natural deposits recorded within the area for the treatment plant comprised brownish yellow sandy clay (011), greyish brown clayey silt (012), pinkish red sandy silt (013), greyish yellow clayey sand (014), pinkish red clayey sand (015), bluish grey silty clay (016), pinkish red sand (038), yellowish brown sand and silt (051), grey silty clay (052) and red sand (053).

Developed upon these natural layers were subsoil deposits comprising greyish brown sandy silt and clay (003) and yellow silty clay (037). These deposits measured between 0.26m and 0.44m thick.

Outside of the treatment plant area (Sections 9, 12 and 14), natural was identified as a reddish brown sand and limestone (026). This had subsequently been sealed by grey and yellowish brown sand and silty sand (035), with yellowish brown and pinkish red silty clay and sandy silt (041) or brownish red sandy silt (047) to the north of this.

Developed upon natural (041) was a subsoil layer of reddish brown clayey silt (040). This was 0.56m thick (Fig. 8, Section 12). Subsoil was also apparent above (047) and was recorded as a 0.7m thick (Fig. 9, Section 14) layer of reddish brown silt (046).

North of the bridge, the earliest layer was a deposit of brown/black organic silt and clay (009) which lay beneath a deposit of grey and brown sandy clay (008). Both these deposits sloped down to the east (Fig. 6, Section 1) and deposit (009) continued to the north (Fig. 8, Sections 7 and 8).

Situated on the south side of the bridge (Fig. 5), the earliest deposit encountered comprised a layer of grey sandy silt (021). Above this were further deposits of reddish brown sand and sandstone (020) and brown silty clay with sand and gravel (023). These deposits had a combined thickness of 0.78m (Fig. 7, Section 4).

To the east of the bridge, adjacent to the Car Dyke, natural was recorded as brownish red silty clay (043). This was over 1.1m thick (Fig. 9, Section 13).

In a trench opposite the church, natural was identified as a layer of pinkish red sand (029), that measured in excess of 0.7m thick (Fig. 7, Section 6), sealed beneath a layer of pink and yellowish grey clay (028).

The most northerly recorded section (Fig. 7, Section 5) identified a natural deposit of greyish brown sandy silt (032) which was sealed beneath reddish brown silty sand (027).

Phase 2 Undated deposits

Overlying natural (035) outside the treatment area was a deposit of grey sandy silt and sandstone (034) that measured 0.12m thick (Fig. 8, Section 9). This may represent a former surface. This was sealed by a 0.32m thick subsoil of brown and greyish brown sandy silt (033) which was also recorded in Sections 7 and 8.

Constructed upon the natural alluvium (008) north of the bridge (Fig. 5) was a north-south aligned sandstone wall (006). This was over 2.8m long by 0.62m wide

and 0.5m high (Fig. 6, Section 1). Once the wall had been constructed, deposits of greyish brown clay and sand (007) and brown sandy silt (010) had been dumped against it.

A similar wall was apparent on the south side of the bridge (019). This was longer than 3.5m and was 0.6m wide and 0.68m high (Fig. 7, Section 4). This had been cut through the subsoil layers (020) and (023), although a foundation trench (018) that was only apparent on the east side was filled with grey sandy silt (017).

Butting against this wall to the west and sealing (023) was a former surface comprising yellowish brown limestone (022).

Phase 3 Post-medieval deposits

Overlying the natural deposit (027) in Section 5 (Fig. 7) was a further subsoil comprising a 0.28m thick layer of brown sandy silt (031). Pottery of 18th century date was retrieved from this deposit.

Phase 4 Recent deposits

Sealing natural subsoil in the compound area was a 0.25m thick topsoil comprising brown silty clay (002) or brown/black sandy silt (039). This had been removed during the groundworks and replaced with hardstanding of crushed stone with brown silt and sand (036).

Overlying natural (043) adjacent to the Car Dyke was the current topsoil comprising a 1.4m thick layer of grey clayey silt (042).

Overlying the post-medieval subsoil was a topsoil of brown sandy silt (030). This had been cut into by the construction of the road to a depth of 0.75m and backfilled with yellowish brown silt and limestone (024) and brown and grey sandy silt with limestone (025).

The modern road surface comprised a make-up layer of yellow crushed limestone (005) overlain by black tarmac (004).

Environmental Sampling

Three bulk samples and four monolith samples were taken from former fishponds during the evaluation phase of the work undertaken in 2003. All three bulk samples, and one monolith, were processed, the monolith principally for pollen analysis and radiocarbon dating. The full report appears as Appendix 4.

6. DISCUSSION

Natural deposits (Phase 1) comprise sandy clays, sandy silts, clayey sand, silty clay, sand and limestone, sand, clay and clayey silt. Within the valley floor, such deposits are likely to be alluvial in origin with the remainder representing the upper weathered surface of the underlying solid geology.

A number of deposits remain undated (Phase 2) due to a lack of artefactual material. these include a possible former surface and a clustering of walls, foundation trenches and deposits on either side of the bridge. The walls and their associated features are likely to represent remnants of a former bridge over the Car Dyke. The layout of the walls suggest that the road was formerly narrower than at present. As such, it is likely to be post-medieval in origin, although a medieval date is also possible.

A single deposit of subsoil (Phase 3) was assigned a post-medieval date. Other subsoils identified, which were grouped with natural deposits, may also have a similar date.

Finds retrieved from the investigation include 17th – 18th century pottery and post-medieval to modern brick and tile.

Bulk samples confirm the aquatic

environment of the fishponds examined in the earlier investigation, with fish identified in the samples. Molluscan evidence indicates running water which may derive from sluices to the adjacent stream. Fish remains include eel, gudgeon and stickleback, none of which were typically raised in fishponds.

Pollen analysis was undertaken on a sequence of deposits dating from glacial episodes to the present day. Analysis from the fill of the fish pond indicates that the village was set in a largely grassland area, with evidence for cultivation in the form of cereal and hemp or hop pollen. These fishponds had been dug into the floor of the river valley, exposing deposits of glacial and subsequent periods. Pollen evidence shows a transition of vegetation of the area, with initial birch and pine woodland changing to more herbaceous open ground, followed by development of hazel and pine wood at *c*. 6800 BC.

7. CONCLUSION

An archaeological watching brief was undertaken at Sibthorpe as the site lay within and the route of a pipeline traversed the medieval core of the village.

However, no medieval deposits were encountered during the watching brief and only natural, undated, post-medieval and recent deposits were recorded. Undated deposits are related to a former bridge over the Car Dyke which, though undated is likely to be post-medieval in date. A subsoil was assigned a post-medieval date.

Finds retrieved from the investigation include three sherds of 17th – 18th century pottery as well as brick and tile.

8. ACKNOWLEDGEMENTS

Archaeological Project Services wishes to acknowledge the assistance of Mr G. Kinsley of Nottingham University Consultants Limited for commissioning the fieldwork and post-excavation analysis on behalf of Severn Trent Water. Thanks are also due to Pick Everard for assistance at the site. The work was coordinated by Gary Taylor who edited this report along with Tom Lane. Dave Start kindly allowed access to the library maintained by Heritage Lincolnshire.

9. PERSONNEL

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Site Supervisors: Tom Bradley-Lovekin, Aaron Clements, Robert Evans, Vicky Mellor, Fiona Walker, Steve Williams, Michael Wood
Finds processing: Denise Buckley
Photographic reproduction: Sue Unsworth
Illustration: Paul Cope-Faulkner
Post-excavation analysis: Paul Cope-Faulkner

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11. ABBREVIATIONS

APS Archaeological Project Services

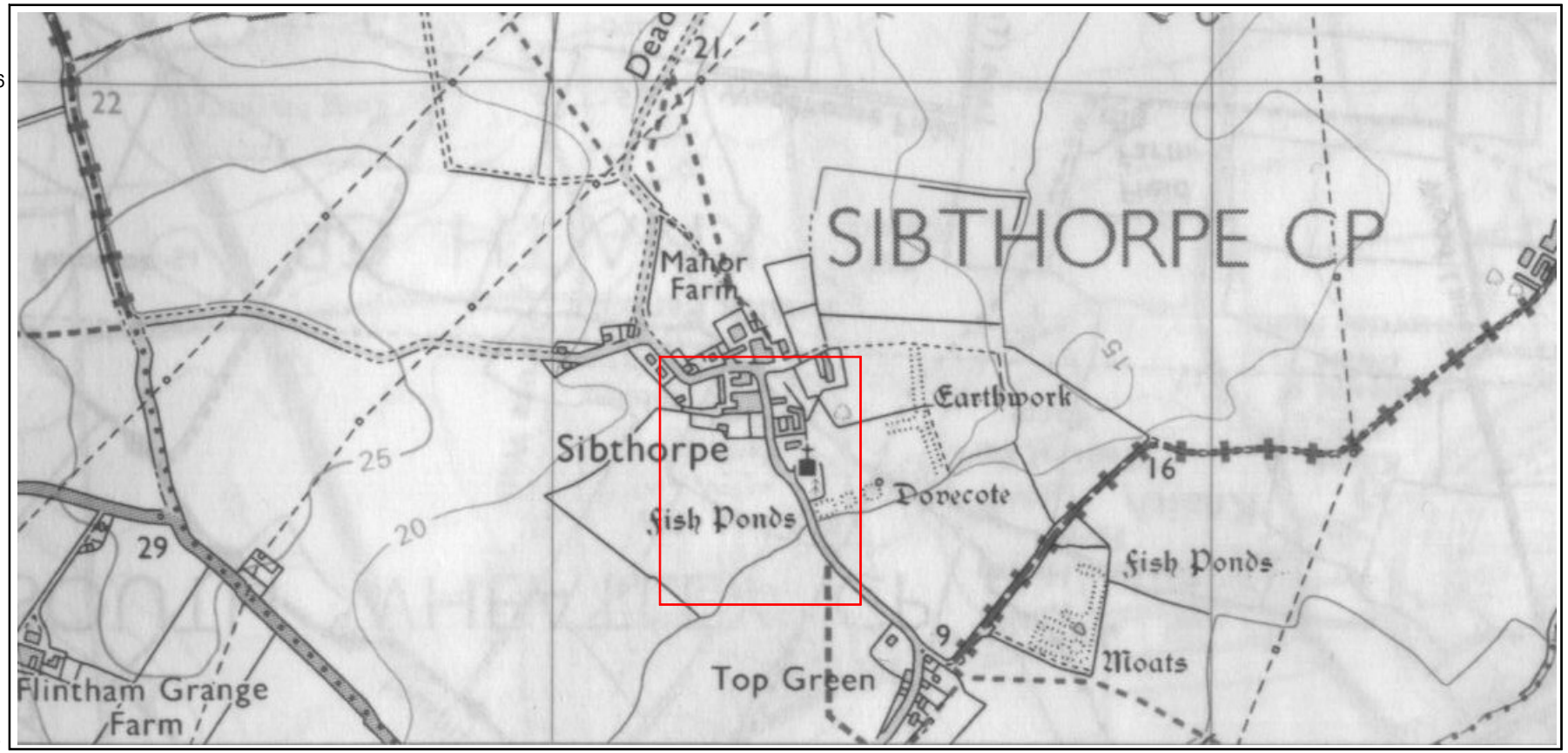
BGS British Geological Survey

IFA Institute of Field Archaeologists

SSEW Soil Survey of England and Wales

TPAU Trent and Peak Archaeological Unit

Figure 1 - General location plan



Area detailed in Figure 3

Archaeological Project Services		
Project Name: Sibthorpe SIWP04		
Scale 1:10000	Drawn by: PCF	Report No: 44/07

Figure 2 - Site location plan

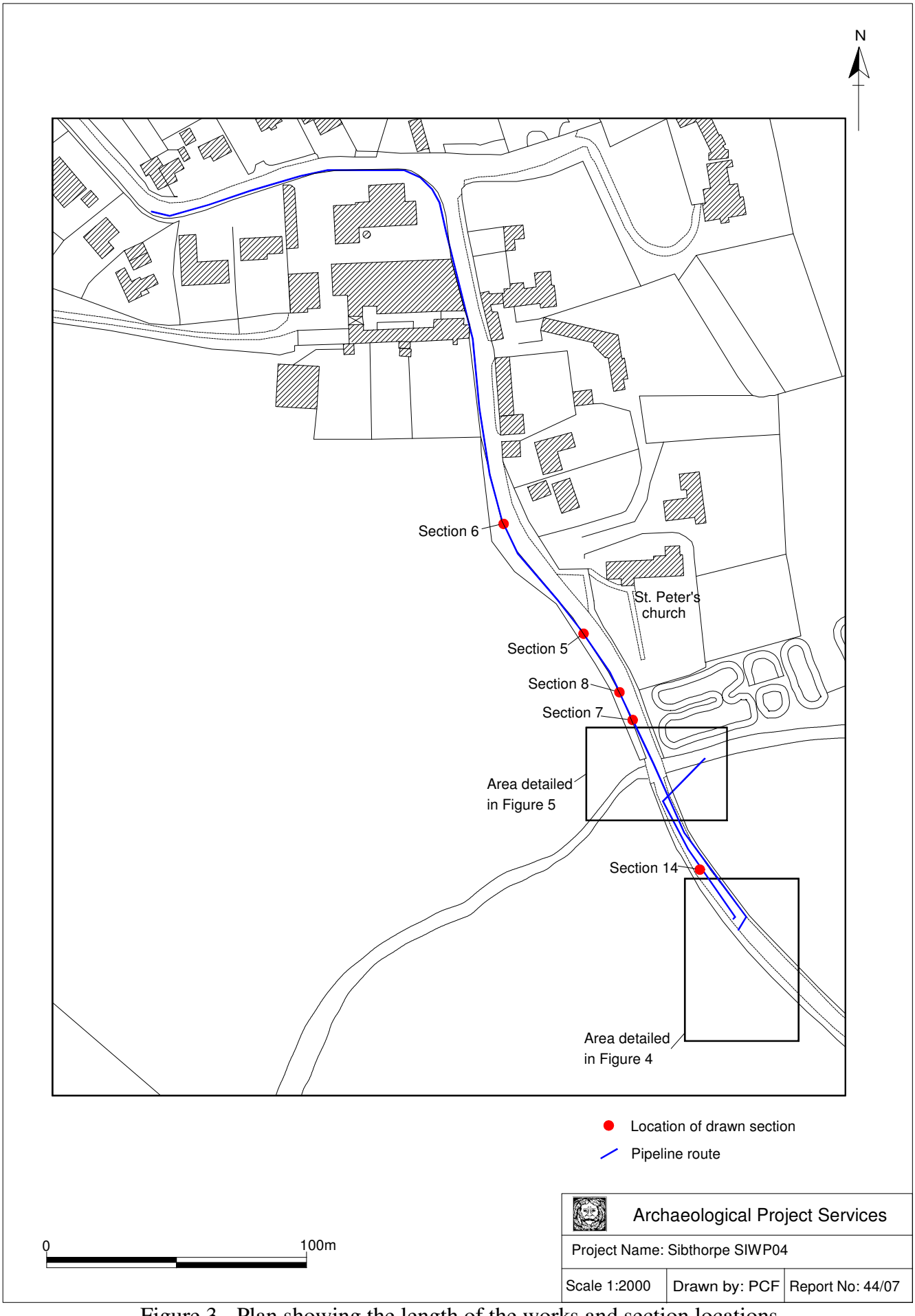


Figure 3 - Plan showing the length of the works and section locations

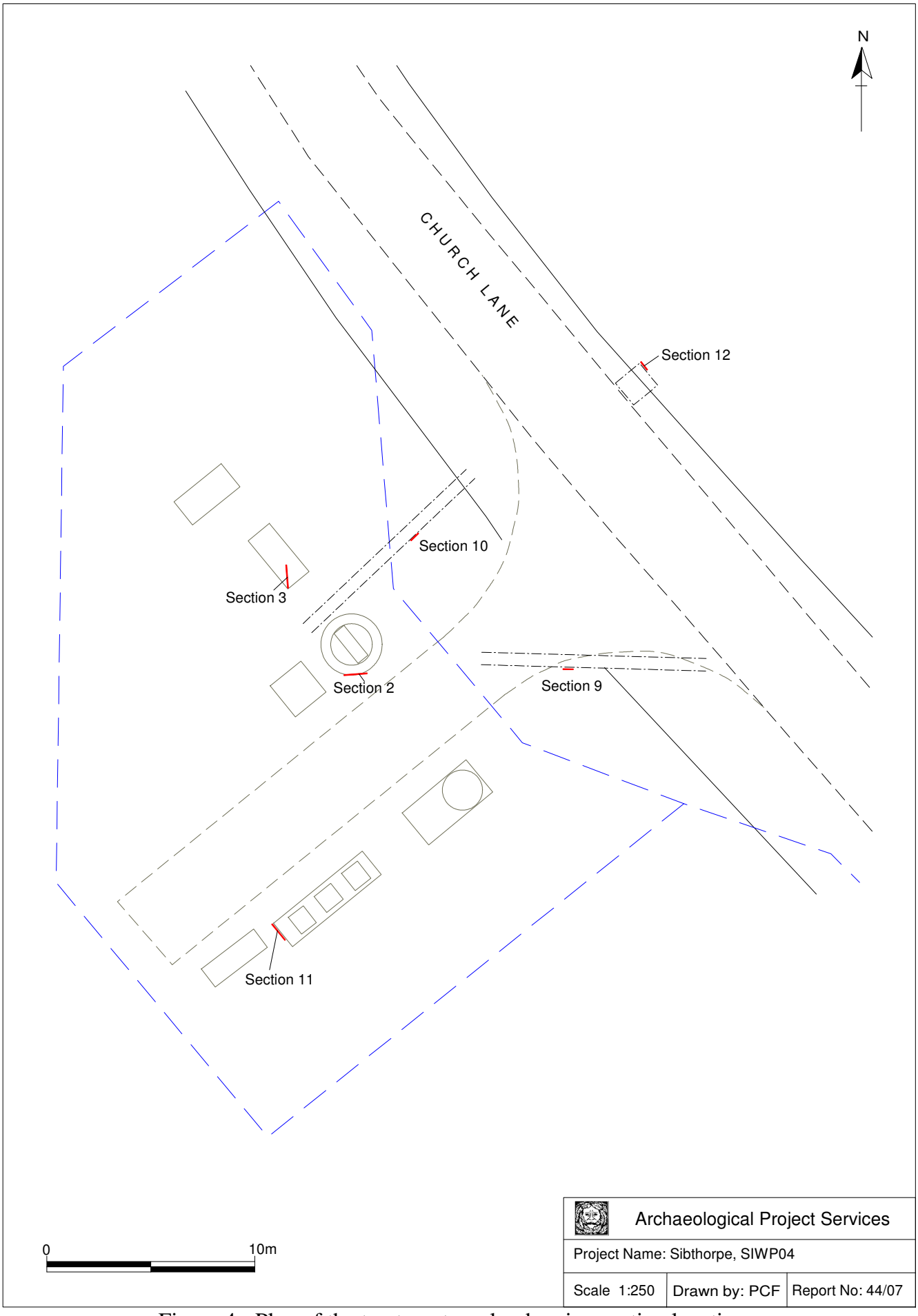


Figure 4 - Plan of the treatment works showing section locations

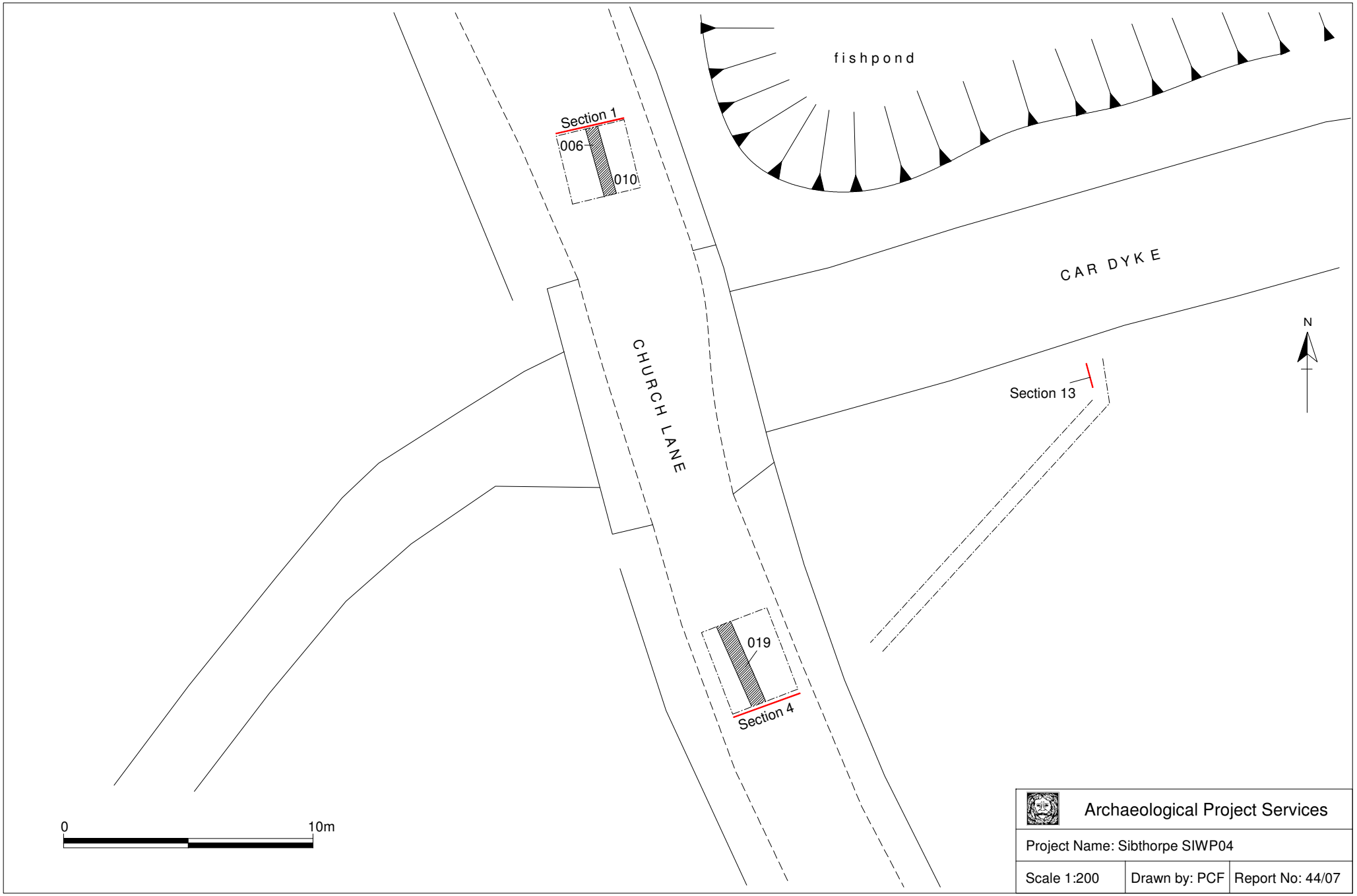


Figure 5 - Detailed plan of the bridge area showing principal features and section locations

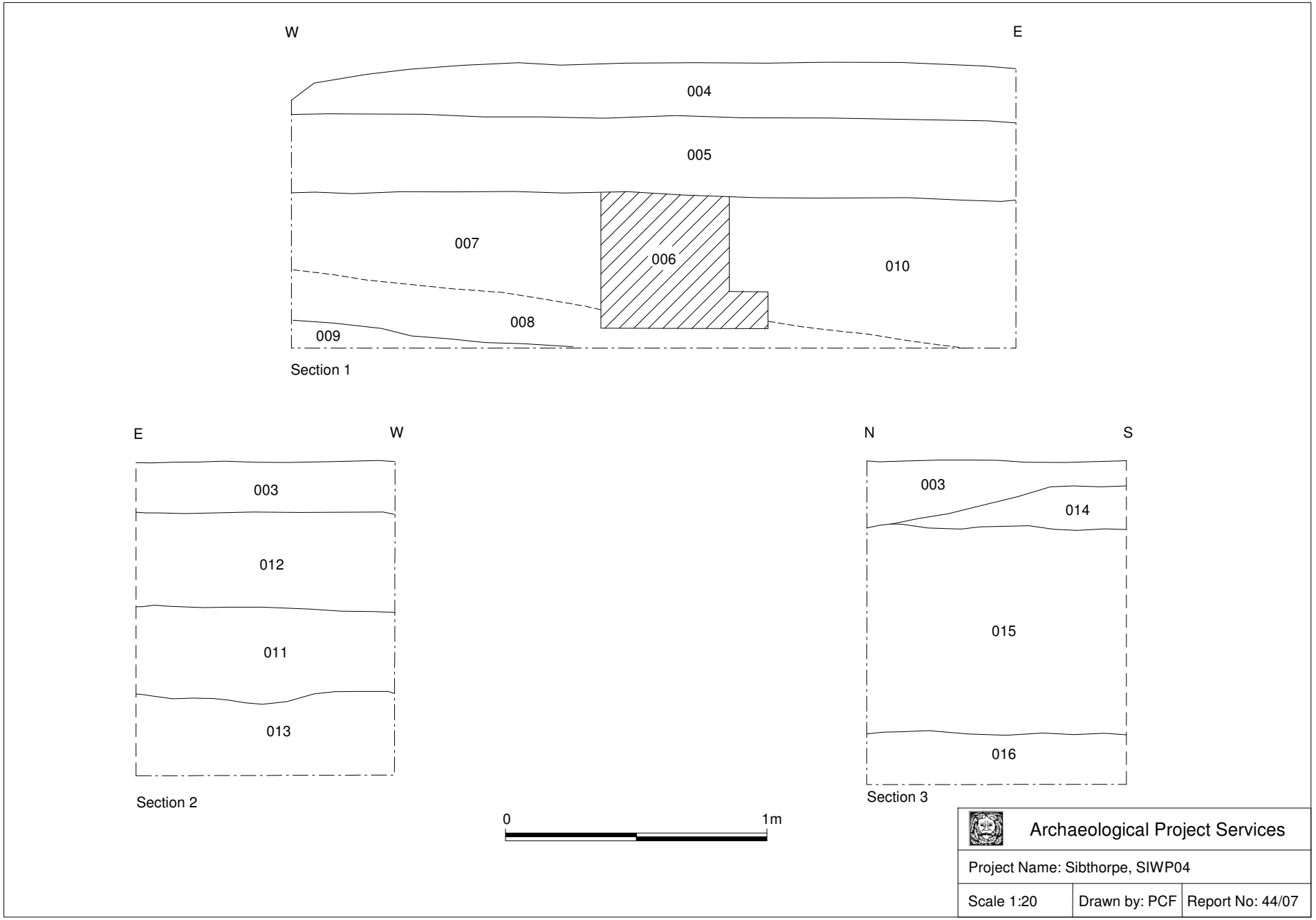


Figure 6 - Sections 1 to 3

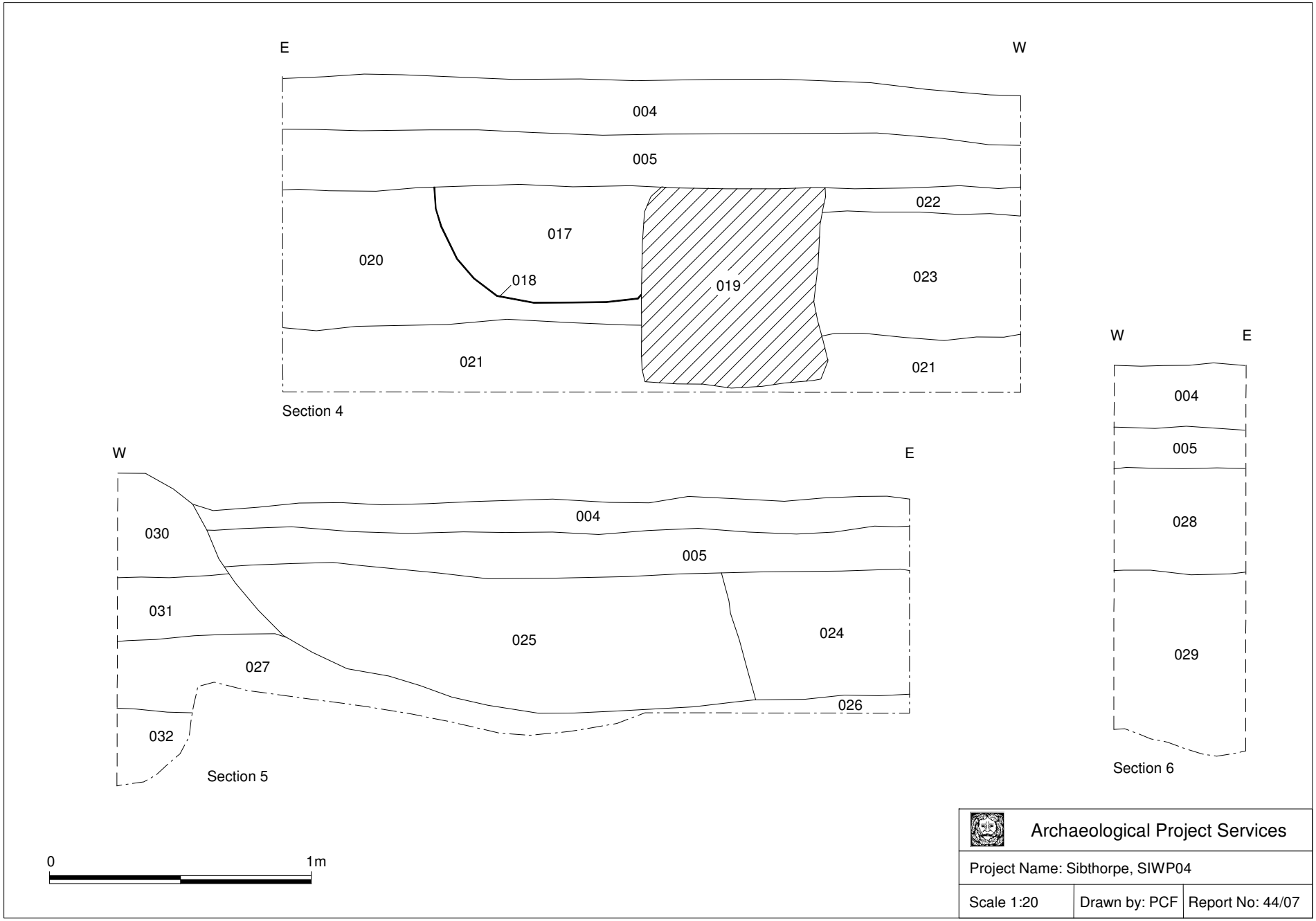


Figure 7 - Sections 4 to 6

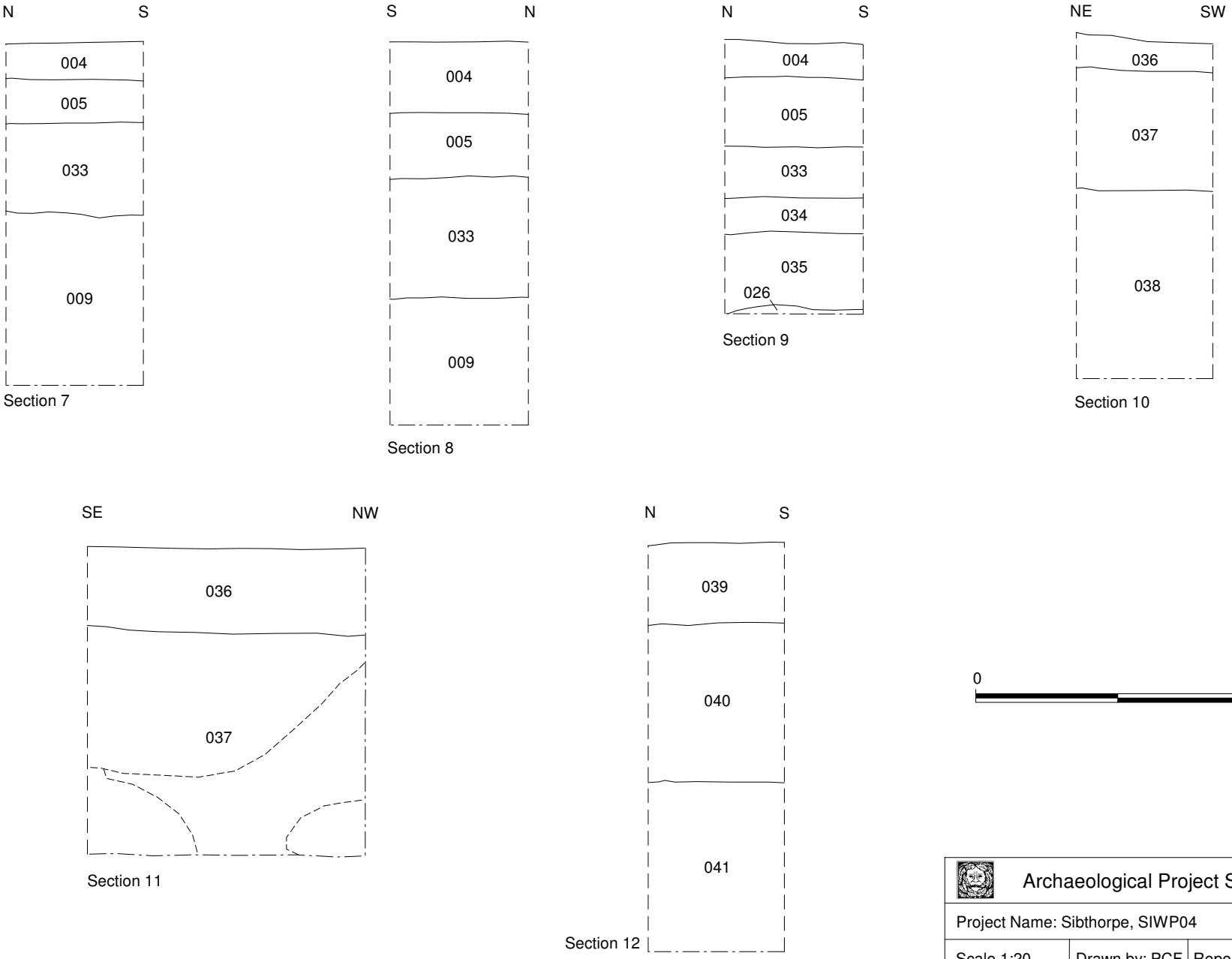
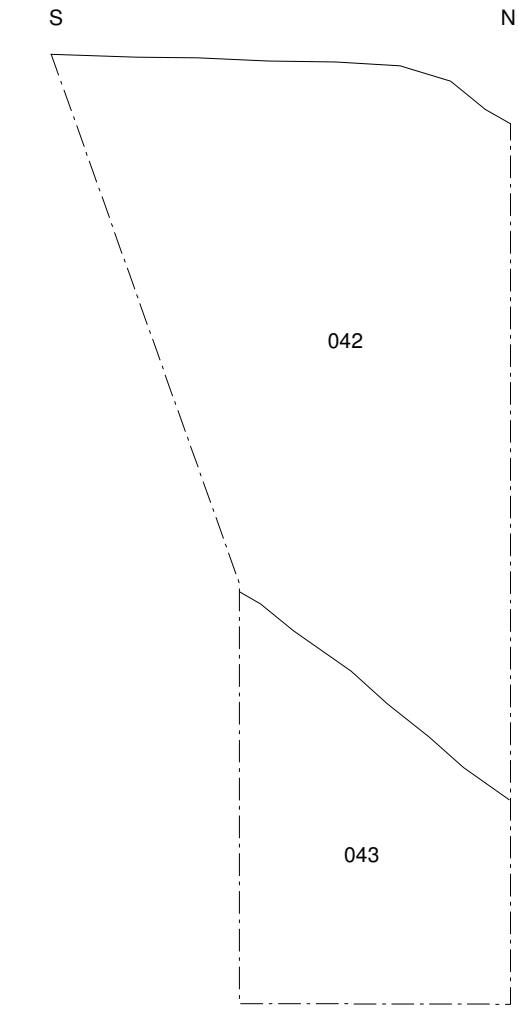
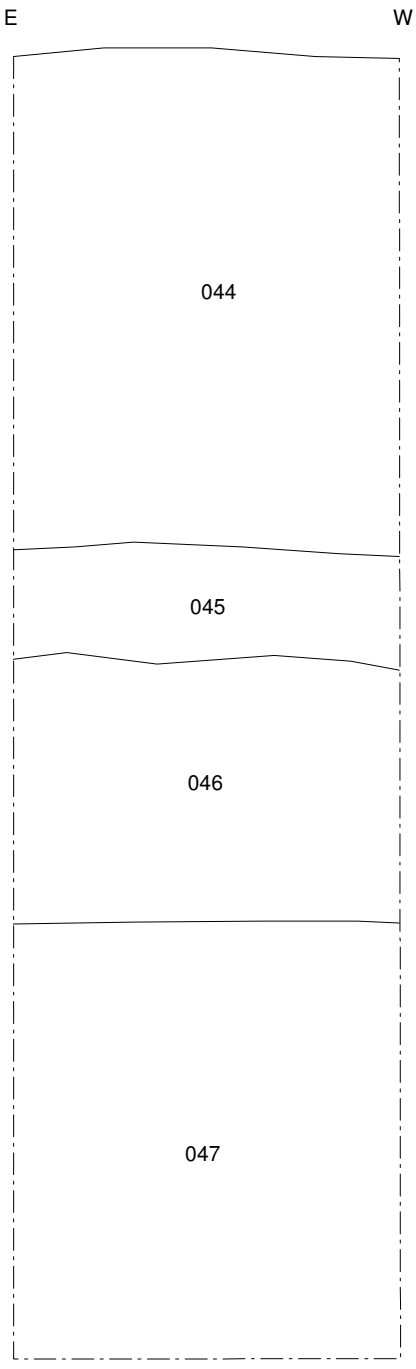


Figure 8 - Sections 7 to 12



Section 13



Section 14

Archaeological Project Services		
Project Name: Sibthorpe, SIWP04		
Scale 1:20	Drawn by: PCF	Report No: 44/07

Figure 9 - Sections 13 and 14

Plate 1 - View looking across the area for the new treatment plant with Sibthorpe in the background, looking north

Plate 2 - Section 1 showing the undated stone wall (006), looking north

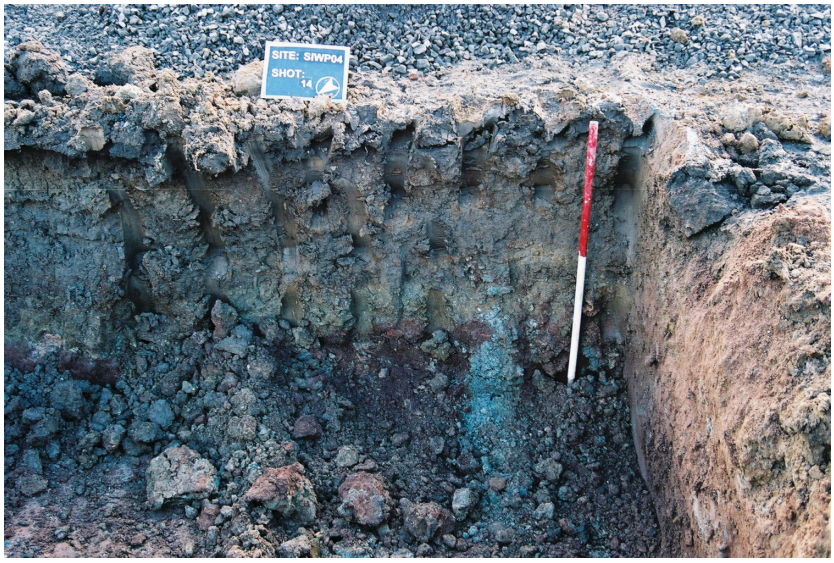


Plate 3 - Section 2 showing the general sequence of deposits within the area of the new treatment plant, looking southeast

Plate 4 - Section 4 showing the undated wall (019), looking south-east

Appendix 1

SPECIFICATION FOR ARCHAEOLOGICAL WATCHING-BRIEF AT SIBTHORPE PROPOSED STW

Prepared by Gavin Kinsley, 4th November 2004

1 Scope of construction works

1.1 Severn Trent Water's construction works within the area indicated in bold red line (trenching in the carriageway) and red hatch (new STW) on the accompanying plan.

2 Archaeological context

2.1 A field evaluation of the outfall site has been carried out (R. Sheppard 4/2/04). Its conclusions were

2.1.1 Only the west half of the site, where the access road and installations are proposed, has been evaluated.

2.1.2 A rectangular feature was cut into a series of natural deposits including alluvium and peat.

2.1.3 The main, lower-level cut for the feature (depth below surface of 0.8m in section A, 1.25m in section B) measured about 5x14m but a shallow step at a higher level (depth below surface of 0.35m in section A, 1.0m in section B) was about 2m larger on all sides. [Could this be an edge eroded during flooding?].

2.1.4 One sherd of 12th-13th century Splashed Ware provides slight evidence for a medieval date for the feature, which is presumably a fish pond.

2.1.5 No structure to the pond (lining, revetting, timber settings etc) was detectable.

2.1.6 Samples of the peat sequence have been taken but not analysed.

3 Requirements from contractor

3.1 In topsoil stripping and for the formation of the access road, excavation must be carried out to a flat and clean surface using a back actor with a toothless ditching bucket in order to ensure the best conditions for observing archaeological features.

3.2 Inform NUCL of any significant changes to the works as summarily described in this document

4 Scope of archaeological works

4.1 Work must be undertaken to a high professional standard. The archaeological contractor will be expected to adhere to the Standard *and Guidance for Archaeological Watching-Briefs* published by the Institute of Field Archaeologists.

4.2 The archaeological contractor will observe all areas of topsoil stripping and excavation within the STW, and on the trenching in the carriageway and produce written, drawn and photographic records of deposits exposed.

4.3 If artefacts and / or features are identified in topsoil stripping, the area will be protected from traffic until the remains are dealt with.

4.4 **Within the new STW only**. In the event that significant archaeological deposits are encountered during topsoil stripping or excavation of access road formation levels, the recording of which is beyond the scope of the normal watching-brief, the archaeological contractor must inform the STW site agent, NUCL (Gavin Kinsley, tel 0115 951 4825; mobile 07951 285 355) and the County Archaeological Officer (Ursilla Spence / Elaine Willett, tel: 0115 9772129) immediately.

4.5 It is usual for the County Archaeological Officer to monitor progress of archaeological projects in accordance with the *Standard and Guidance for Archaeological Watching-Briefs* published by the Institute of Field Archaeologists. In addition, the CAO will be appraised of the progress of the

watching brief by the archaeological contractor and will be invited to visit to inspect any significant deposits exposed.

4.6 At the completion of fieldwork the archaeological contractor will produce a summary written report on the works undertaken, which includes brief comment on the significance of any archaeological deposits discovered. The report will be submitted to Severn Trent Water no later than one month after the completion of fieldwork. It will include locations of all environmental samples, comment on their potential and a costed proposal for the assessment and analysis of selected samples not exceeding £2,000 plus VAT. The proposed analyses will be only carried out by agreement with the CAO and the Archaeological Consultant.

4.7 In addition the archaeological contractor will compile a well-ordered and indexed archive of all site records, including drawings and photographs, produced during the watching-brief.

4.8 All artefacts recovered will be kept by the archaeological contractor, or their agents, for study. Upon agreement with the legal owner all artefacts will be deposited, along with the written archive with an appropriate Museum. The archaeological contractor must obtain an accession number from the Museum before the start of work on site. All artefacts and site records must be appropriately labeled with the accession number.

4.9 On completion of all analyses, a draft report should be sent to NUCL. On approval, two copies of the archaeological contractor's report should be forwarded to the County Council Archaeological Officer to be lodged in the County Sites and Monuments Record, and two copies to NUCL.

4.10 The copyright of all reports will be vested in the archaeological contractor, who will be free to publish the results of this work with due acknowledgement to Severn Trent Water. There will be no limitation on reproduction of the archaeological contractor's report by Severn Trent Water.

Appendix 2

CONTEXT DESCRIPTIONS

No.	Description	Interpretation
001	Unstratified finds retrieval	
002	Firm dark brown silty clay, 0.25m thick	Topsoil
003	Firm mid greyish brown sandy silt and clay, 0.26m thick	Subsoil
004	Indurated black tarmac, 0.2m thick	Road surface
005	Firm light to mid yellow crushed limestone, 0.3m thick	Make-up for (004)
006	Sandstone structure, aligned north-south, >2.8m long by 0.62m wide by 0.5m high	Wall
007	Firm mid brown to greyish brown clay and sand, 0.46m thick	Dumped deposit
008	Firm mid grey and light to mid brown sandy clay, 0.4m thick	Subsoil
009	Firm dark brown/black organic silt and clay, >100mm thick	Natural deposit
010	Firm mid brown sandy silt, 0.6m thick	Dumped deposit
011	Firm light to mid brownish yellow sandy clay, >0.34m thick	Natural deposit
012	Firm light to mid greyish brown clayey silt, 0.36m thick	?subsoil
013	Firm mid pinkish red sandy silt, >0.3m thick	Natural deposit
014	Firm light greyish yellow clayey sand, 0.25m thick	Natural deposit
015	Firm mid pinkish red clayey sand, 0.8m thick	Natural deposit
016	Firm light bluish grey silty clay, >0.2m thick	Natural deposit
017	Firm mid grey sandy silt	Fill of (018)
018	Linear feature, aligned northwest-southeast, >3.5m long by 1.4m wide by 0.68m deep, vertical sides and flat base	Foundation trench
019	Sandstone structure, >3.5m long by 0.6m wide by 0.68m high	Wall
020	Firm mid reddish brown sand and sandstone fragments, 0.54m thick	Natural deposit
021	Firm mid grey sandy silt, >0.24m thick	Natural deposit
022	Indurated light to mid yellowish brown limestone, 90mm thick	Former surface
023	Firm mid brown silty clay with frequent sand and gravel, 0.38m thick	Natural deposit
024	Firm mid yellowish brown silt and limestone, 0.46m thick	Dumped deposit
025	Firm mixed dark brown and grey sandy silt and limestone fragments, 0.6m thick	Dumped deposit
026	Firm mid reddish brown sand and limestone, >100mm thick	Natural deposit
027	Firm mid reddish brown silty sand, 0.22m thick	Natural deposit
028	Firm light pink and yellowish grey clay, 0.4m thick	Natural deposit
029	Firm mid pinkish red sand, >0.7m thick	Natural deposit
030	Soft to firm dark brown sandy silt, 0.4m thick	Topsoil
031	Firm mid to dark brown sandy silt, 0.28m thick	Subsoil
032	Firm mid greyish brown sandy silt	Natural deposit
033	Firm mid brown and greyish brown sandy silt, 0.32m thick	?subsoil
034	Firm dark grey sandy silt and sandstone, 0.12m thick	Possible former surface
035	Firm mixed dark grey and dark yellowish brown sand and silty sand, 0.28m thick	Natural deposit

No.	Description	Interpretation
036	Firm mid to dark grey crushed stone and mid brown silt and sand, 100mm thick	Hardstanding
037	Firm light yellow silty clay, 0.44m thick	Subsoil
038	Firm mid pinkish red sand, >0.66m thick	Natural deposit
039	Soft to firm dark brown/black sandy silt, 0.3m thick	Topsoil
040	Firm mid reddish brown clayey silt, 0.56m thick	Subsoil
041	Firm mixed light to mid yellowish brown and pinkish red silty clay and sandy silt, >0.6m thick	Natural deposit
042	Firm dark grey clayey silt, 1.4m thick	Topsoil
043	Firm dark brownish red silty clay, >1.1m thick	Natural deposit
044	Firm dark grey sandy silt, 1.3m thick	Road make-up
045	Friable mid brownish yellow gravel, 0.3m thick	Road make-up
046	Soft dark reddish brown sandy silt, 0.7m thick	Subsoil
047	Soft dark brownish red sandy silt, 1.1m thick	Natural deposit

Appendix 3

THE FINDS
by Gary Taylor

Recording of the pottery was undertaken with reference to guidelines prepared by the Medieval Pottery Research Group (Slowikowski *et al.* 2001) and the pottery was quantified by count and weight. Three fragments of pottery weighing 80g were recovered from 2 separate contexts. In addition to the pottery, a small quantity of other artefacts, all of it brick/tile, comprising 2 items weighing a total of 89g, was retrieved. No faunal remains were recovered.

Provenance
The material was recovered from a subsoil (031) and as unstratified material (001).

Most of the artefacts are likely to have been made in moderate proximity to Sibthorpe in Nottinghamshire, though the earliest piece of pottery is a Staffordshire product.

Range
The range of material is detailed in the tables.

Table 1: Pottery

Context	Description	No.	Wt (g)	Context Date
001	Red painted black glazed earthenware	1	18	18th century
031	Nottingham brown stoneware, bottle/flagon, 18th century	1	39	18th century
	Midlands Yellow ware, late 17th century	1	23	

Table 2: Other Artefacts

Context	Material	Description	No.	Wt (g)	Context Date
001	CBM	Drain, 19th-20th century	1	64	19th-20th century
	CBM	Handmade brick, post-medieval	1	25	

Note: CBM = Ceramic Building Materials

Condition
All the material is in good condition and presents no long-term storage problems. Archive storage of the collection is by material class.

Documentation
There have been previous archaeological investigations at Sibthorpe that are the subjects of reports. Details of archaeological sites and discoveries in the area are maintained in the Nottinghamshire County Council Sites and Monuments Record.

Potential
As a small assemblage that is entirely post-medieval to early modern in date the artefacts are of limited local potential and significance, though reflect use of the area in this period.

The lack of any material earlier than the 17th century is informative and suggests that archaeological deposits dating from prior to this period are absent from the area, or were not disturbed by the development, or were of a nature that did not involve artefact deposition.

References

Slowikowski, A., Nenk, B. and Pearce, J., 2001 *Minimum Standards for the Processing, Recording, Analysis and Publication of Post-Roman Ceramics*, Medieval Pottery Research Group Occasional Paper **2**

Appendix 4

SIBTHORPE, NOTTINGHAMSHIRE - SST03 - ENVIRONMENTAL ARCHAEOLOGY REPORT

Introduction
Excavations were undertaken by Trent and Peak Archaeological Trust at Sibthorpe on the south bank of the Car Dyke in advance of the construction of a Water Treatment works for Severn Trent Water. The site lies on the opposite bank to a series of earthworks indicating a complex of medieval fish ponds associated with a medieval college for chantry priests. The excavations uncovered another fishpond on the south bank where no surface features were apparent.

A series of four monolith samples (Samples 1, 2A, 2B and 5) were taken through the deposits revealed in the sections of trenches 1 and 2 and three bulk soil samples (samples 3, 4 and 6). From these one monolith (Monolith 2A - Fig 1) was selected for study and all three bulk samples. The monolith sample was studied for pollen and the lower deposits radiocarbon dated. The bulk samples were washed and processed and the waterlogged plant and the mollusc shells were identified. All three samples were rich in insect fragments but owing to a lack of funds analysis of this component was not undertaken.

Bulk samples
Three bulk samples were submitted for processing and study. Sample 3 was taken from the upper part of the pond fill, context 31a, 4 from the lower part of 31a, while 6 was taken from the peats, context 30. The small sample taken from the base of monolith 2a can probably be equated with context 37.

Preservation was generally good in samples 3 and 4, with well preserved organic remains and mollusc shells. In sample 6 organic preservation was much more degraded, although identifiable material still survived, but the majority of any snail shells that were originally present in the deposits will have been lost. The animal remains identified in the samples are noted in Table 1 and the botanical remains in Table 2. The samples were processed using the standard methods applied by the Environmental Archaeology Consultancy for waterlogged samples (EAC Method Sheet 2).

The finds from the samples are clearly indicative of an aquatic habitat. The mollusc taxa in samples 3 and 4 are completely dominated by aquatic taxa. Several species such as *Valvata piscinalis*, *V, cristata* and *Physa fontinalis* tend to be found in running water habitats which might suggest that the fish pond was linked by sluices to the adjacent stream, but most of the remaining taxa are more typical of ponds and lakes, with two taxa, *Lymnaea truncatula* and *Planorbis leucostoma* perhaps characteristic of marshier or waters edge environments (Macan 1977). The large number of bivalves of the genus *Pisidium* have not been taken to species due to time constraints so the ecological requirements of this component of the fauna have not been established. Terrestrial taxa are very limited in the assemblages, with only four shells of catholic taxa, *Trichia hispida* and *Cochlicopa lubrica*, and two of marsh species, a Succinidae and *Carychium*. These give little information on the adjacent terrestrial environment around the pond.

The small terrestrial vertebrate bones give no significant palaeoenvironmental information but the few fish bones recovered from samples 3 and 4 include eel, stickleback and small cyprinid (carp family) species. Two pharyngeal teeth plates in sample 4 may be from small gudgeon (*Gobio gobio*), a bottom living fish found in shallow waters but of little food value since it rarely grows above 15cm in length.

Table 1. Animal remains identified from the bulk samples**.**

Sample no.	**3**	**4**	**6**	**Mono2A 0-5cm**
Trench	**2**	**2**	**1**	**2**
Context				
Volume in l.	**9**	**36**	**9**	**0.3**
Weight in kg	**8**	**33**	**7**	**-**
Insects *	5*	5*	5*	
Anguilla anguilla - eel		5		
Gasterosteous aculeatus - stickleback	2	3		
Cyprinid - carp family	1	2		
Small fish	2	5		

Sample no.	3	4	6	Mono2A 0-5cm
Vole sp.		2		
Frog/toad		2		
	3	4	6	
Valvata piscinalis	22	11		++
Valvata cristata	10	2		+
Bithynia tentaculata	38	26		++
B tentaculata opercula	41	48		++
Bithynia leachii	3			
Lymnaea palustris?		1		
Lymnaea peregra	110	192	1	+++
Lymnaea truncatula		7		+
Physa fontinalis?		1		
Planorbis leucostoma	5	3		
Planorbis laevis	1	10		++
Planorbis planorbis	75	8		
Pisidium spp. (valves)	12	253		+++++
Succinea sp.	1			
Cochlicopa lubrica	1	1		
Trichia hispida	2			
Carychium sp.	1			
Ostracoda	+			+++++

Abundance score: + = present; ++ = occasional; +++ = common; ++++ = abundant; +++++= very abundant

The botanical remains identified from the bulk samples are given in Table 2.

Sample 3

The majority of the flot consists of very degraded plant vegetative material with traces of moss noted. The botanical assemblage is dominated by aquatic species, notably water crowfoots and horned pondweed whilst sedges and club-rush, which are commonly associated with areas of damp or wet ground, are also present. Areas of disturbed/waste ground are further indicated by the presence of species including nettle, dock, campion, carrot family, ox-tongue, and thistles. The only tenuous evidence for domestic activity is a single fragment of unidentifiable charred cereal grain.

Sample 4

Sample 4 produced the largest flot and an accompanying high abundance score of uncharred botanical remains, although this is likely to be attributed to the volume of soil processed which is greater than for samples 3 and 6. Most of the flot appears to be composed of comminuted wood/woody herbaceous stem fragments with occasional leaf buds also present. Despite the high abundance score of weed seeds, the density of botanical remains does not seem to be as high as that of Sample 3. However the weed assemblage is comparable to that of the previous sample, and contains aquatic species such as water crowfoot and pondweed, as well as indicators of damp/wet ground such as sedges. In addition, species associated with drier/disturbed ground including meadow/creeping/bulbous buttercup, knotgrass, dock, brambles, ox-tongue and thistles are present. No charred botanical remains have been recorded.

Table 2. Frequency of plant species encountered in the bulk samples.

	Sample	3	4	6	Mono 2A
	Context	?	?	?	
	Trench	2	2	1	2
	Sample vol (L)	9	36	9	0.3
	Flot vol. (ml)	50	1150	15	
Species	**Common name**				
Cultivars					
Triticum cf. *spelta* L.	?spelt wheat (charred)			1	
Cerealia indet.	(charred indet. grain frag.)	1			
Wild species					
Ranunculus Section *Ranunculus*	meadow/creeping/bulbous buttercup		*		

	Sample	3	4	6	Mono 2A
Ranunculus sceleratus L.	celery leaved croowfoot				*
R. Subgenus *Batrachium* (DC.) A. Gray.	water crowfoots	***	*	*	
Silene sp(p).	campions	***		***	
Caryophyllaceae	pink family	**			
Stellaria media (L.) Vill.	common chickweed	*			
Chenopodiaceae	goosefoot family		*		
Rubus sp.	bramble		*		
Umbeliferae	carrot family	*	*		
Polygonum aviculare agg.	knotgrass		*		
Rumex sp.	dock	**	**		
Urtica dioica L.	common nettle	**		**	
Hyoscyamus niger L.	henbane			*	
Lamium sp.	dead-nettle		*		
Plantago major L.	greater plantain			*	
Anthemis cotula L.	stinking chamomile (charred)			1	
Carduus/Cirsium spp.	thistles	***	**	**	
Picris sp.	ox-tongue	*	*		
Potamogeton sp(p).	pondweed		**	*	***
Zannichellia palustris L.	horned pondweed	*****	*	*	
Scirpus sp(p).	club-rush	*			
Carex spp.	sedge	**	*	**	
Cyperaceae	sedge family		**		*
Other taxa	(species not formally identified)	**			
Other plant remains					
Chara sp.	stonewort	+	+		++++
Moss stem fragments		++			
Leaf buds			++	++	
Comminuted wood/woody herbaceous stem frags.			+++++		
Degraded plant vegetative material		++++		++++	
Proportion of flot assessed (approximated)		20%	4%	100%	
Overall estimated abundance score of charred grain/seed		*		*	
Overall estimated abundance score of uncharred grain/seed		*****	*****	****	

Frequency score: * = 1-10, ** = 11=50, *** = 51-150, **** = 151-250, ***** = >250; Abundance score: + = present, ++ = common, +++ = frequent, ++++ = abundant.

This botanical evidence may also suggest the margins of the pond. The concentration of bulky woody herbaceous plant remains implies an accumulation of plant material and it may be that the pond could have been receiving plant detritus potentially from vegetation over-hanging or nearby the feature.

Sample 6

This sample from the peats produced a small flot containing very degraded plant vegetative material and some leaf buds. Again the weed assemblage does contain aquatic species water crowfoot, horned pondweed and pondweed, and species previously identified as indicators of disturbed ground with great plantain and henbane also identified, the latter of which is always situated in open habitats (Clapham *et. al*. 1962, 765). The orecise location of this sample is not known although it was taken from the peats, context 30. The lower part of the peat sequence is dated to the early meoslithic, but the upper as well as being more recent may have been contaminated during the excavation of the pond and its subsequent use.

In addition a single charred grain, identified as possible spelt, has also been recovered, but the state of preservation prevents the identification to be taken to species positively, as well as a one charred stinking chamomile seed. If the grain is indeed that of spelt wheat it would suggest that earlier Iron Age or Roman activity took place within the locality, since spelt does not seem to have been actively cultivated beyond the Roman period. However, since the identification cannot be confirmed it is not possible to draw any further interpretations, particularly on the basis of a single cereal grain. The occurrence of this cereal grain does imply some later disturbance of this peat horizon, perhaps pre-dating the excavation of the pond.

Discussion

The environmental evidence clearly confirms the interpretation of the feature as a pond, with a dominance of aquatic plant and animal taxa. The mollusc evidence implies some running water, perhaps through sluices from the stream running nearby and the plants suggests some disturbed ground nearby, with perhaps overhanging shrubs. This latter may reflect a period when the ponds had ceased to function or be maintained.The earlier peat deposits also reflect an aquatic environment but the occurrence of charred cereal grain in a deposit that formed during the mesolithic indicates some contamination of the deposit.

The monolith sequence

Only one of the monoliths was chosen for study, partly due to funding constraints. The selected monolith was Mono 2A from the east facing section of Trench 2, apparently just north of the cut for the fish pond. The sequence is illustrated in Fig. 1 and was chosen because it included several of the deposits recorded on site.

At the base of the sequence is a shelly organic silt. This is overlain by a silty peat with a fairly sharp boundary between, becoming more silty and less organic upwards. Above is 0.12m of humified fibrous peat becoming more mineral in its upper two centimetres. A thin continuous sand lens or parting forms a sharp boundary across the top of the organic sediments and is overlain by iron rich clayey silts. A single radiocarbon sample was taken from the peat deposit at 15-16cm from the base of the monolith and a series of eight pollen samples were taken at 4cm intervals from the base of the monolith to 34-35cm.. A single pollen sample was also collected from the pond fills in Monolith 2B.

The stratigraphic data recorded on site (Fig. 5) shows that the construction cut for the fish pond cut through a sequence of earlier valley floor sediments, including the peats. The fine sand lens recorded in the monolith immediately above the peats is taken to be the base of this later feature. A hiatus is therefore present at this horizon.

Fig. 1. Sibthorpe - SST03 - Monolith 2A, Trench 2 - Pollen samples taken at 4cm intervals from 0-35cm

Pond fills

25-49 cm iron stained silts

_____ __ sharp boundary with sand parting

Peats

13-25cm humified fibrous peat

15-16cm - C14 sample 8800±50 BP

8-13cm silty peat

_____ _ fairly sharp boundary

Shelly organic sandy silts
0-8cm greyish brown (10YR 5/2) silt with shell fragments.

Radiocarbon Dating
The single sample was collected at 15-16cm up from the base of the monolith (Fig. 1). This has produced an early holocene date (Table 4) confirming the pollen interpretation (see below).

Table 3. Radiocarbon result from sample taken at level 15-16 on Monolith 2A.

Sample Data	Measured Radiocarbon Age	13C/12C Ratio	Conventional Radiocarbon Age(*)
Beta - 227281	8870 +/- 50 BP	-29.0 o/oo	8800 +/- 50 BP
SAMPLE : SST-MONO2A-15 to 16cm			
ANALYSIS : AMS-Standard delivery			
MATERIAL/PRETREATMENT : (peat): acid washes			
2 SIGMA CALIBRATION : Cal BC 8200 to 8040 (Cal BP 10150 to 9990) AND Cal BC 8010 to 7680 (Cal BP 9960 to 9630)			

Pollen Analysis
Rob Scaife

Introduction
Pollen analysis has been carried out on the series of samples from sediments recorded in the monolith, the upper part of which may be filling what is believed to be a medieval fish pond. It was suggested that these ponds were cut into earlier organic deposit of the river floodplain. Pollen analysis demonstrates that this is the case and an interesting and, somewhat unusual sequence is described here which provides data on the upper Pleistocene, late Devensian (the end of last glacial) period, the early Holocene, early Mesolithic, Boreal period as well as from the period of the monastic pond.

Pollen method
Pollen sub-samples of 2ml volume were processed using standard techniques for the extraction of the sub-fossil pollen and spores (Moore and Webb 1978; Moore *et al.* 1992). Micromesh sieving (10u) was also used to aid with removal of the small clay fraction in these sediments. The concentrated sub-fossil pollen and spores were identified and counted using an Olympus biological research microscope fitted with Leitz optics. Taxonomy used, in general, follows that of Moore and Webb (1978) modified according to Bennett *et al.* (1994) for pollen types and Stace (1992) for plant descriptions. These procedures were carried out in the Palaeoecology Laboratory of the Department of Geography, University of Southampton. A pollen diagram has been constructed for profile 2a and data for a spot sample from profile 2b is given in Table 3. Data for the former are calculated as follows.

Sum = % total dry land pollen.
Marsh/aquatic = % tdlp + sum of marsh/aquatics
Spores = % tdlp + sum of spores.
Misc. = % tdlp + sum of misc. taxa (incl. *Pediastrum*).

The Pollen Data.
Pollen data come from the analysis of a series of sub-samples taken from monolith profile (2a) and a spot sample from an adjacent profile (monolith 2b). Note that the samples are number in the reverse of their measurement in Fig. 1 because the Tilia programme that plots the diagrams requires depth measurements down the profile not sequential measurements up profile. Hence the sample at 34-35cm in the monolith (on Fig. 1) is recorded as '0' (ie at the top) on the pollen diagram and in the discussion below.

a.) Profile 2a
Four local pollen assemblage zones have been described for this sequence (Fig. 2). The lowest zones 1-3 appear to be of late Devensian and early Holocene age whilst the upper zone 4 represents the sediment fills of the 'monastic pond'. The characteristics of these pollen assemblage zones is as follows.

Zone 1: 32cm. Betula-Poaceae-Cyperaceae-Pediastrum. This single basal sample taken from organic silts containing freshwater mollusc is dominated by the cysts of freshwater, algal *Pediastrum* (73% sum + misc.). Pollen numbers are less than in subsequent levels. However, a count was obtained which shows higher tree pollen percentages than the subsequent 2 levels (Zone 2). *Betula* (birch; 34%) is most important with some *Pinus* (pine; 12%). A number of small *Betula* grains are possibly of *B. nana* (dwarf birch). There is a single

record of *Juniperus* (juniper) and occasional *Salix* (willow). Herbs are, however, dominant with Poaceae (grasses; 37%) and Cyperaceae (sedges; 40%) being the most important.

Zone 2: 28cm to 20cm. Poaceae-Typha latifolia-Typha angustifolia type-Cyperaceae. There is a reduction of tree pollen noted in the preceding zone although there is a small expansion of *Salix*. Herbs are dominant with high values of Poaceae (peak to 95% at 14cm) and Cyperaceae (40%). In addition there is a diverse range of herbs which includes *Polemonium caeruleum* (jacobs ladder), *Sanguisorba officinalis* (greater burnet), *Polygonum bistorta* type (Alpine or common bistort). Marsh and aquatic taxa are important although the high values of algal *Pediastrum* are absent. *Typha latifolia* (19%; reedmace) and *Typha angustifolia* type (lesser reedmace and bur reed; 15%) along with Cyperaceae (23%) are important. *Myriophyllum spicatum* (water-milfoil) and *Alisma plantago-aquatica* (water plantain) are other marsh/aquatic constituents. These taxa occur especially at level 26cm.

Zone 3: 20cm to 12cm. Pinus-Corylus avellana type. This zone is characterised by a sharp reduction in herbs and corresponding increase in trees and shrubs. This is associated with a change to peat stratigraphy the base of which (at 17cm on the diagram - Fig. 2) has been radiocarbon dated at 8800±50 BP. *Corylus avellana* type (likely hazel but may include bog myrtle; 78%). *Pinus* (20%) attains its highest values with first occurrences of *Ulmus* (elm) and *Quercus* (oak). Numbers of marsh and aquatic taxa are also greatly reduced. Pteropsida become more important with monolete *Dryopteris* forms (typical ferns; 10%) and occasional *Polypodium* (polypody fern).

Zone 4; 12m to 0cm; Plantago lanceolata-Lactucoideae-Poaceae. This upper zone corresponds with the fills of the pond and contains a markedly different pollen flora above what is clearly a massive hiatus. Herbs are dominant with small numbers of trees and shrubs. The latter comprise *Alnus glutinosa* (alder; 18% at 10cm). Other taxa include small numbers of *Quercus, Ulmus*, *Tilia* (lime/linden) and *Corylus avellana* type. Poaceae are important with other taxa which are largely diagnostic of grassland/pasture. These include *Plantago lanceolata* (ribwort plantain; to 17%) and Lactucoideae (dandelion types to 16%). A small number of Cereal type pollen is present at 10cm. Some marsh and aquatic taxa are present with Cyperaceae (to 10%), *Alisma* type, *Typha* spp. and *Potamogeton* type. There are also small numbers of *Pediastrum.* Within the spores there is an expansion of *Pteridium aquilinum* (bracken; increasing to 10%).

b.) Profile 2b.

A single sample has been analysed from this adjacent profile. This was taken from a humic horizon occurring within the definite fills of the pond. Data from the pollen count are given in Table 3 below. The taxonomic diversity is high with Poaceae ands Cyperaceae dominant. As with the contemporaneous pollen spectra of profile 2a this is suggesting a predominantly pastoral, grassland habitat. However, the significant difference is that this sample contains higher numbers of cereal pollen and associated weeds including *Centaurea cyanus* (blue cornflower) and *Cannabis/Humulus* type pollen (hop or hemp; see discussion below). There are only small numbers of trees and shrubs.

The Palaeoecology

This sequence has proven interesting because of the contrasting age of the sediments present and the pollen flora identified. It appears that three principal periods are represented which include the Late-Devensian interstadial (Windermere/Allerod) and stadial (Loch Lomond/Younger *Dryas*), an early Holocene phase and the historic/monastic age. The latter is matched by a spot sample from monolith 2b.

a) The Late Devensian:

Although the pollen resolution is not good with only a small number of samples available, it appears that the lowest levels of sediment are of Windermere interstadial age (Allerod) at *ca.* 12,000 to 11,000 BP. This is based on the occurrence of birch and pine growth prior to a subsequent open habitat, cold stadial conditions described for zone 2 above. The growth of these pioneer tree taxa in the Allerod is well documented. Juniper is similarly of note. Thus, for this period a very open wooded landscape is envisaged. Subsequently (Zone 2) these trees die caused by a change to extreme cold (tundra) conditions attributed to the Younger Dryas stadial between 11,000 and 10,000 BP. The sharp expansion of herbs from a range of communities represents the unstable soil conditions and inter-species competition. Of note are a number of typical late-glacial indicator taxa which include greater burnet, jacobs ladder and common and/or Alpine bistort which are characteristic plants of tall herb communities today akin to the Alps and as outliers in northern England. This taxonomic diversity appears greater in the lower level of this zone which is followed by an expansion of Poaceae. It is not possible to specify whether this is a real expansion over time or a single anomolous peak (additional finer interval pollen analysis would be required). The overall conclusion is that this zone demonstrates an open environment dominated by a range of herbaceous communities existing in extreme cold Arctic conditions.

There is evidence that the on-site habitat during this period started as a standing freshwater environment in pollen zone 1. This is evidenced by the presence of large numbers of algal *Pediastrum* and the freshwater muds and their included aquatic molluscs. It appears that this gave way to a grass-sedge-reed swamp fen community with the onset of colder (Younger *Dryas*) conditions.

b.) The early Holocene

After the cold conditions and open habitats discussed for the late-Devensian, there is evidence of the marked change to the warmer early Holocene (present interglacial) which is manifested by the almost total absence of herbs but dominance of trees and shrubs. The latter comprise dominant hazel along with pine to form what has often been called the Boreal Pine-Hazel forest (Godwin 1975). This represents the arrival and spread of both taxa during the early Holocene (Flandrian chronozone I) and was asynchronous due to differing migration rates of trees from their glacial refugia. This similarly applies to the small numbers of oak and elm here, which marks their arrival and the start of their rise to competitive dominance during this period.

Here, a radiocarbon date of 8800±50 BP is in accord with their arrival in the early Holocene Boreal period in this region. It is important to note, however, that the sediment sequence here is short and it is very likely that there is a substantial hiatus between zone 2 and 3, perhaps indicated by the fairly sharp change from an organic silt to a peat at 13cm on the monolith (see Fig. 1). This is to a large extent confirmed palynologically by the absence of any juniper or birch peaks which frequently represent the Devensian/Holocene transition consequent on the temperature amelioration. The period represented here is a small window on the early Holocene habitat of early Mesolithic human communities.

c.) The Historic, 'monastic' period

It is clear that the medieval ponds were cut into the existing and wet floodplain an obvious choice to maintain water levels and probably easily fed by a leat from the stream if needed. As might be expected for this historic period, the habitat was one of a largely open agricultural environment with only limited woodland, that is, subsequent to late-prehistoric clearance. Alder is the most abundant tree in the pollen record but, however, as a producer of copious quantities of wind disseminated pollen, its area of growth was probably localised and along the fringes of the local stream. Other woodland of well drained soils comprised oak and hazel which may have been managed (not discernible from the pollen). The occasional pollen of lime (*Tilia*) trees is enigmatic. As a taxon which is very poorly represented in pollen spectra, the occasional grains may be from sporadic local growth or alternatively as a robust grain it may be re-worked from earlier soils or sediments when lime was the dominant woodland element.

The pollen data (zone 4) are dominated by herbs, which in profile 2a are of predominantly pastoral affinity with only minor indications of arable cultivation (small number of cereal pollen grains at the base of zone 4). The profile also contains small numbers of marginal aquatic taxa and no real aquatic megaphytes excepting a single record of pond weed. However, such paucity of pollen from aquatic megaphytes is not unusual in even small lakes and ponds. This would be especially so if the ponds were regularly cleared. However, freshwater algal *Pediastrum* is present indicating freshwater and the abundance of aquatic molluscs and aquatic plant seeds is testimony to the pond environment.

A single spot sample from the pond fills of an adjacent monolith proved palynologically more interesting than profile 2a described above. This single sample (Table 3) contained a diverse herb pollen flora which contains larger numbers of cereal pollen grains and associated weeds (incl. *Centaurea cyanus* L.) and also *Cannabis* type. The latter taxon includes both hop and hemp but unfortunately these taxa are not easily separable (Whitington and Gordon 1987). The former is a native plant and is typically a constituent of fen carr woodland apart from hop cultivation. Thus, it is possibly from this source. However, growth of *Cannabis* for fibre is diagnostic of the Saxon to medieval period (Godwin 1967; Edwards and Whittington 1990; Schofield and Waller 2005) especially the latter, where pollen peaks have been observed especially from north-west England. Given the ecclesiastical status of this site, it is very likely that we are dealing with hop cultivation or pollen liberated from retting activity in this or one of the nearby ponds.

Other herbs include large numbers of grasses and other pasture types which, as with profile 2a, indicate grassland/pasture. High levels of sedges are probably from growth on the adjacent floodplain or fringing the pond.

A sample of the basal 5centimetres of the monolith, equating with Pollen Zone 1, was washed and processed for macroscopic remains. The plant and mollusc taxa identified in the sample are listed in Tables 1 and 2 above. Organic preservation was poor but the calcareous nature of the deposit has resulted in abundant molluscs,

ostracods and stoneworts. These macroscopic remains confirm the aquatic character of the deposits, and there is a particularly high frequency of the stonewort, *Chara* sp., an algae and the ostracods both of which require a permanent water body to survive. The latter have not been identified to taxa and among the molluscs the bivalves, *Pisidium* sp. predominate. This interstadial assemblage is similar to the medieval pond assemblage although lacking *Planorbis planorbis* and any terrestrial taxa.

Summary
Pollen analysis of the valley floor sediments and the medieval pond fills demonstrates that the pond was cut into floodplain sediments of much greater antiquity. Periods represented in profile 2a include the Upper Palaeolithic, late Devensian interstadial (Windermere/Allerod) and the late Devensian stadial (Younger Dryas), the early Holocene Boreal/ Mesolithic and the historic, medieval period. The following essential points have been made.

* The pond feature is cut into sediments of late Devensian glacial interstadial and final stadial periods and the early post glacial, Holocene, age.

* The flora discussed for these basal sediments is diagnostic of these periods.

* The late Devensian is characterised by a lowest level with open birch woodland and some pine growing in an open habitat. This is thought to be of Allerod interstadial age at *ca*. 12,000 to 11,000 BP. The site was a permanent stream or water body at this time.

* The late Devensian, Younger Dryas was a much more open herbaceous vegetation growing in cold Arctic tundra conditions. This is thought to date to the period 11,000 BP to 10,000 BP.

* Peat is attributed to the early Holocene, Boreal period showing dominance of hazel and pine with some oak and elm and has been radiocarbon dated to 8800±50 BP. This was the environment of the early Mesolithic.

* There are hiatuses' in this pollen record which includes the Devensian-Holocene transition.

* The medieval pond, probably associated with a period of ecclesiastical ownership of Sibthorpe were cut into these early floodplain deposits. The fills of the medieval pond show in the case of monolith 2a, an open grassland/pasture habitat with a background of oak and hazel woodland.

* A spot sample from monolith 2B, also from the pond fill, has greater evidence of cultivation with larger numbers of cereals and more interestingly hop or hemp pollen. The latter is suggested as likely for cultivation of hemp for fibre as this is an ecclesiastical site.

* The macroscopic analysis of molluscs and plant macrofossils from the pond fills has confirmed the aquatic character of the feature and indicated a good water quality with the possibility that the pond could have been fed through a sluice from the adjacent stream.

* A few small fish bones were recovered from the bulk samples from the pond fills, and included eel, a small cyprinid, possibly gudgeon, and stickleback. Although the eel is a very common food item in medieval England fish ponds are usually stocked with other fish and neither gudgeon or stickleback can be seen as a serious food fish. These bones therefore probably do not give us any indication as to the types of fish being raised in the pond.

Acknowledgments
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Fig. 2. Sibthorpe, Nottinghamshire. Pollen diagram for Monolith 2A - part 1.

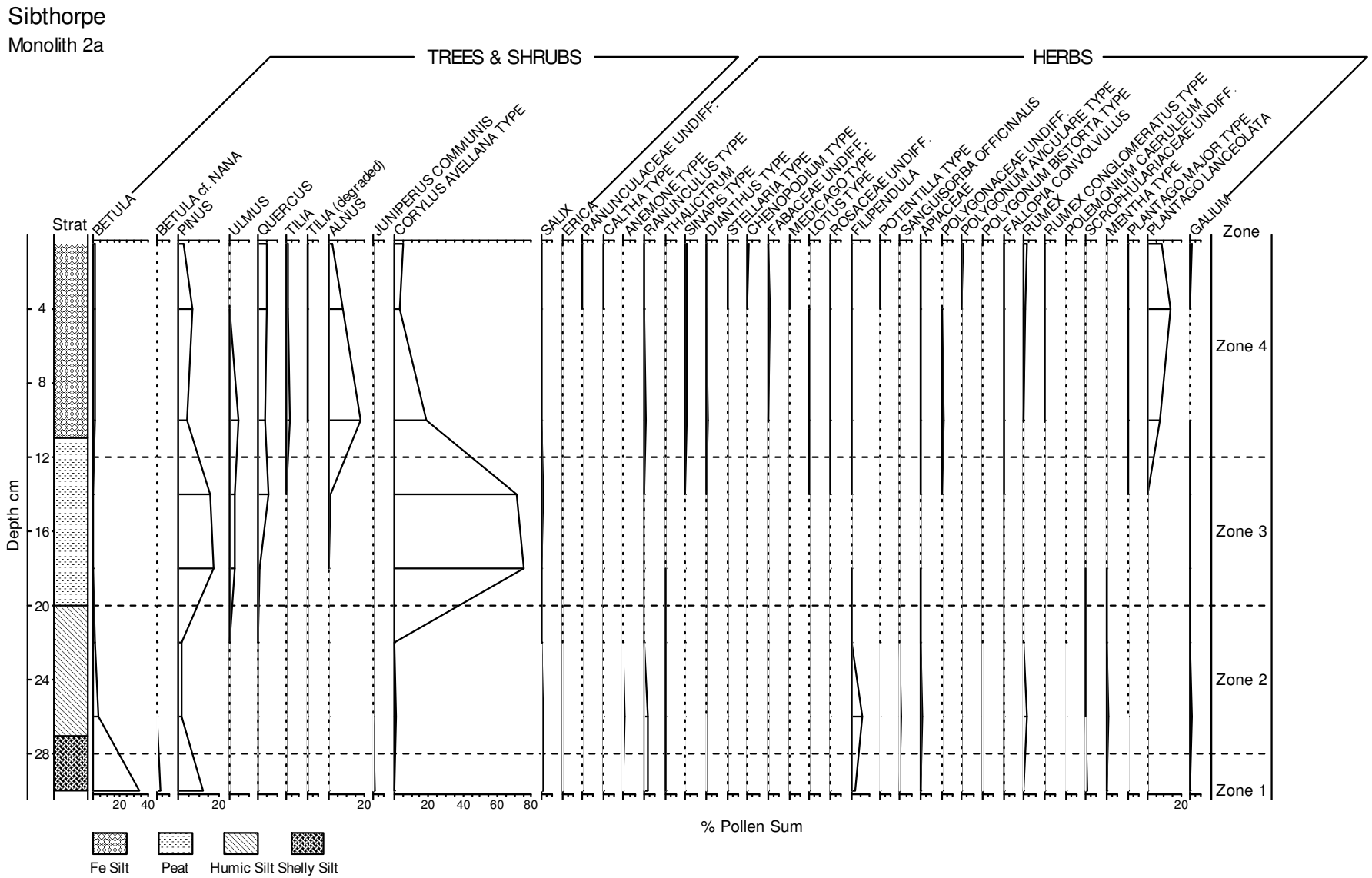


Fig. 2. Sibthorpe, Nottinghamshire. Pollen diagram for Monolith 2A - part 2

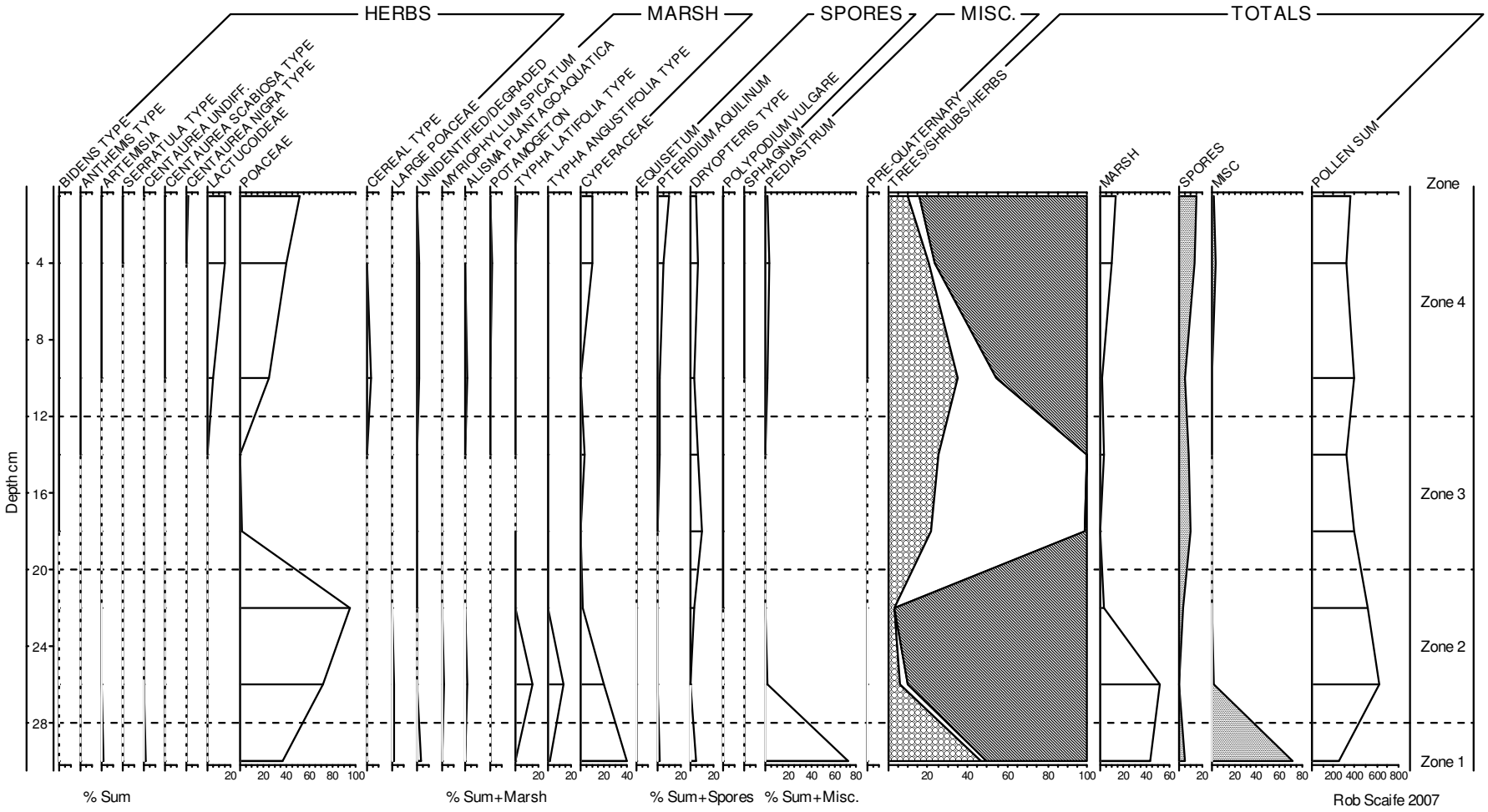


Table 3. Pollen taxa identified from the spot sample from the pond deposits in monolith 2B.

TREES	
PINUS	2
QUERCUS	9
TILIA	1
FRAXINUS EXCELSIOR	1
CORYLUS AVELLANA TYPE	17
SALIX	11
HERBS	
RANUNCULUS TYPE	3
SINAPIS TYPE	12
HORNUNGIA TYPE	1
CHENOPODIUM TYPE	1
DIANTHUS TYPE	1
TRIFOLIUM TYPE	1
VICIA UNDIFF.	1
MALVACEAE	1
FILIPENDULA ULMARIA	2
APIACEAE	1
POLYGONUM AVICULARE	1
RUMEX	5
URTICA TYPE	1
CANNABIS SATIVA TYPE	11
SCROPHULARIACEAE	2
MENTHA TYPE	2
PLANTAGO LANCEOLATA	8
GALIUM	3
BIDENS TYPE	2
ASTER TYPE	0
ANTHEMIS TYPE	1
ARTEMISIA	1
CENTAUREA NIGRA TYPE	3
CENTAUREA CYANUS	1
LACTUCOIDEAE	14
POACEAE	155
CEREAL TYPE	12
LARGE POACEAE	0
UNIDENTIFIED/DEGRADED	3
MARSH & AQUATIC	
LEMNA	1
TYPHA ANGUSTIFOLIA TYPE	2
CYPERACEAE	90
SPORES	
PTERIDIUM AQUILINUM	21
DRYOPTERIS TYPE	2
POLYPODIUM VULGARE	1
SPHAGNUM	1
LIVERWORTS	1
MISCELLANEOUS	
PEDIASTRUM	2

Appendix 1. Radiocarbon calibration curve.

CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-29:lab. mult=1)

Laboratory number: **Beta-227281**

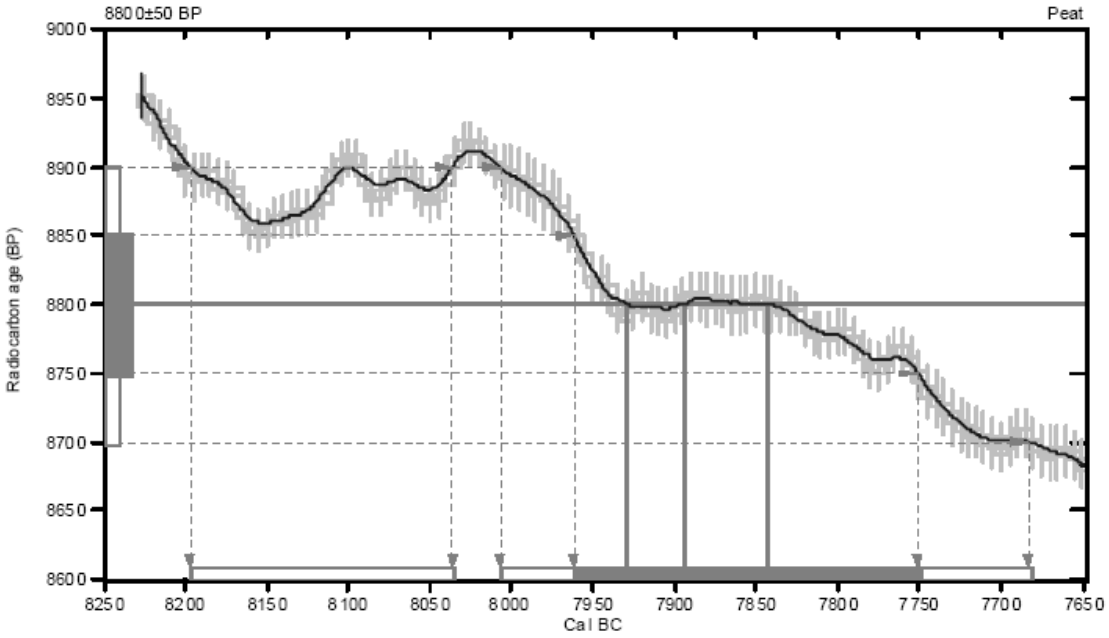
Conventional radiocarbon age: **8800±50 BP**

2 Sigma calibrated results: **Cal BC 8200 to 8040 (Cal BP 10150 to 9990) and**
(95% probability) **Cal BC 8010 to 7680 (Cal BP 9960 to 9630)**

Intercept data

Intercepts of radiocarbon age with calibration curve: Cal BC 7930 (Cal BP 9880) and
Cal BC 7890 (Cal BP 9840) and
Cal BC 7840 (Cal BP 9790)

1 Sigma calibrated result: Cal BC 7960 to 7750 (Cal BP 9910 to 9700)
(68% probability)



References:

Database used
INTCAL04

Calibration Database
INTCAL04 Radiocarbon Age Calibration
IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).

Mathematics
A Simplified Approach to Calibrating C14 Dates
Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322

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Appendix 5

GLOSSARY

Alluvium	A deposit (usually clay, silts or sands) laid down in water. Marine alluvium is deposited by the sea and freshwater alluvium by streams, rivers or within lakes.
Context	An archaeological context represents a distinct archaeological event or process. For example, the action of digging a pit creates a context (the cut) as does the process of its subsequent backfill (the fill). Each context encountered during an archaeological investigation is allocated a unique number by the archaeologist and a record sheet detailing the description and interpretations of the context (the context sheet) is created and placed in the site archive. Context numbers are identified within the report text by brackets, *e.g.*(004).
Cut	A cut refers to the physical action of digging a posthole, pit, ditch, foundation trench, *etc*. Once the fills of these features are removed during an archaeological investigation the original 'cut' is therefore exposed and subsequently recorded.
Dumped deposits	These are deposits, often laid down intentionally, that raise a land surface. They may be the result of casual waste disposal or may be deliberate attempts to raise the ground surface.
Fill	Once a feature has been dug it begins to silt up (either slowly or rapidly) or it can be back-filled manually. The soil(s) which become contained by the 'cut' are referred to as its fill(s).
Layer	A layer is a term to describe an accumulation of soil or other material that is not contained within a cut.
Medieval	The Middle Ages, dating from approximately AD 1066-1500.
Natural	Undisturbed deposit(s) of soil or rock which have accumulated without the influence of human activity.
Post-medieval	The period following the Middle Ages, dating from approximately AD 1500-1800.
Romano-British	Pertaining to the period dating from AD 43-410 when the Romans occupied Britain.

Appendix 6

THE ARCHIVE

The archive consists of:

47	Context records
2	Photographic record sheets
35	Daily record sheets
8	Sheets of scale drawings
1	Stratigraphic matrix
1	Bag of finds

All primary records and finds are currently kept at:

Archaeological Project Services
The Old School
Cameron Street
Heckington
Sleaford
Lincolnshire
NG34 9RW

The ultimate destination of the project archive is:

Nottingham Museums and Art Gallery
Brewhouse Yard
Castle Boulevard
Nottingham
NG7 1FB

Archaeological Project Services Site Code: SIWP 06

The discussion and comments provided in this report are based on the archaeology revealed during the site investigations. Other archaeological finds and features may exist on the development site but away from the areas exposed during the course of this fieldwork. *Archaeological Project Services* cannot confirm that those areas unexposed are free from archaeology nor that any archaeology present there is of a similar character to that revealed during the current investigation.