

# The King's School, Ely

## Redevelopment of the Drama and Art Centre

An Archaeological Evaluation



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CAMBRIDGE ARCHAEOLOGICAL UNIT  
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# **King's School, Ely, Cambridgeshire Redevelopment of the Drama and Art Centre**

An Archaeological Evaluation and Watching Brief

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## SUMMARY

*An archaeological test pit and borehole survey, pipeline watching brief and ground-penetrating radar survey was undertaken on behalf of the King's School, Ely (NGR: TL 5397 8015). A total of 24 test pits, borehole and archaeological sections were excavated and recorded with several within the quadrangle of the current building configuration and adjacent to the garden wall of the Old Bishop's Palace revealing varying thicknesses of made ground overlying clays deposited in hollow, possibly a former quarry or ancient excavation on the site, possibly relating to building work associated with the Cathedral or associated nearby buildings.*

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## **Introduction**

Between December 2008 and February 2009 (site codes EKS08 and EKS09) an archaeological test pit, borehole survey and watching brief was undertaken by a team from the Cambridge Archaeological Unit (CAU) at the King's School, Ely, ahead of the construction of a new Arts and Drama Building on behalf of King's School (NGR: TL 5397 8015; figures 1 and 2).

In addition, a ground penetrating radar survey of the site (Appendix 1) was undertaken by Dr Steve Boreham, Department of Geography, University of Cambridge, to compliment the results of the archaeological and geotechnical fieldwork findings (Appendix 1.A).

The work was carried out in response to a condition on planning permission and was approved and monitored by CAPCA.

## **Topography and Geology**

The site is situated on localised patches of glacial till (boulder clay) overlying Lower Greensand, in turn overlying Jurassic Kimmeridge Clay. Located adjacent to the geographically advantageous high ground west of the River Great Ouse, upon which the Cathedral was constructed, the topography and the original contours have been affected by quarrying (including backfilling/dumping), building construction and demolition, drainage work and made ground. The present ground surface, and that immediately surrounding the site, lies between and 18-18.60 m OD.

## **Historical & Archaeological Background**

The first part of the following text is taken from the recent desktop assessment (Standring & Dickens 2008):

The archaeology and development of Ely has been the subject of study for many years, with an increasing archaeological element over the last fourteen. There have been a number of studies of the city as a whole and of particular areas, including those of the medieval market area (Jones 1994), the area north of the market (Robinson 1994) and an assessment of the City as a whole (Robinson 1993). In the lower town area a study was carried out by Mills Whipp in 1997 which specifically considered the Broad Street Area and the subsequent publication of excavations at the Old Jewson's Yard (Jubilee Park site) pulls many of these recent discoveries together (Cessford *et al.* 2006).

Occupation of the wider Isle of Ely dates back to at least the Bronze Age. Finds and excavations to date suggest that prehistoric, Bronze Age and Iron Age activity as focused on the north and west of Ely, exploiting the fen margins. Evidence of Mesolithic activity is known in the form of flint scatters adjacent to West Fen Road (Mortimer *et al.* 2005). Late Neolithic or Early Bronze Age pits and ditches were found during excavations at Bray's Lane, along with a house eaves-drip gully, ploughmarks and a buried soil horizon (Hunter 1991). Iron Age pottery was found at Walsingham House, and a paddock based field system at Bray's Lane.

A Roman presence in Ely is indicated by several chance finds, and may have been concentrated on the line of the Roman Road from Cambridge (Akeman Street), which ran south-west of the city towards Littleport. At this time the river ran at some distance from Ely, and was most accessible at Stuntney where a Roman dock has been located.

An early Anglo-Saxon cemetery on the west side of New Barns Road suggests the possibility of a pre-monastic settlement to the north west of the city (Robinson 1994). The founding of the slightly later religious establishment (AD 673) by St. Etheldreda would have provided another focus for settlement. The monastery was destroyed by Viking raids but was re-founded in 970. There is a presumption that both this and the earlier priory were located where the post-Conquest establishment was later founded and that the early market place grew up to the west of the precinct at Palace Green (Robinson 1994), but there is no direct archaeological evidence for this. More recent investigations are increasing the amount of Saxon archaeology known from the city and showing that it was not limited to the hill area. Middle Saxon features were found at the Jewson's site on Broad Street, the Lady Chapel, Bray's Lane and Walsingham House. A recently discovered settlement spanning the 8th to the 15th centuries on the west side of the island at West Fen Road (Mortimer *et al.* 2005) was considered to be a 'low status' site that served the early ecclesiastical centre. However, the subsequent find of a richly furnished 8th Century burial (possibly that of a Princess) at the adjoining Westfield Farm (Newman 2007) also suggests that much yet remains to be discovered that would challenge the traditional settlement model focused on the 'core' of the city.

The site lies directly to the west of the majority of the surviving Medieval buildings situated on the east side of The Gallery, many of which relate to the early Monastic period at Ely. The School House, across the road, has a North Range dating to the 11<sup>th</sup> and 12<sup>th</sup> centuries, with the addition of a South Range in the 14<sup>th</sup> century (Atkinson 1933). The backward 'L' shaped building which backs onto the site has an uncertain date but from the architectural detail Atkinson (*ibid.*:166) suggests it is possibly stables related to Goodrich's work in the 16<sup>th</sup> century. There appears to be re-use of earlier masonry in the buildings construction, including windows of narrow round-headed lancets of Barnack stone which are Norman in character (*ibid.*:166).

Within the Cathedral environs a number of archaeological excavations have taken place. Medieval structural remains and a possible early monastic precinct boundary were uncovered within the range around the Sacrist's Gate (Holton-Krayenbuhl *et al* 1989). Within the Choir the installation of new services revealed Late Saxon deposits (Holton-Krayenbuhl 2000). Excavations along the south side of the Cathedral indicated the presence of disturbed graves, these remains probably deriving from the monk's cemetery, this situated to the south of the main Cathedral building (Gibson 1995; Regan & Alexander 1995; Whittaker 1996). The replacement of drainage along the south side of the Nave and the Front of the Cathedral revealed late Saxon occupation deposits and a possible pre-11<sup>th</sup> century structure. Also revealed within the trenches were foundations and floors relating to the later Cloister complex (Alexander 1994). To the west around the Old Bishops Palace, foundations of 13<sup>th</sup> 14<sup>th</sup> buildings were noted, while a previously unknown graveyard possibly of similar date was also unearthed (Regan & Alexander 1997).

## **Methodology**

A scheme of works was devised with the objective of assessing the presence or absence of any archaeological remains on the site and the potential impact any redevelopment would have upon them. The initial plan was to excavate 10 test pits and to record specific locations and identified archaeological features within the pipe trench cut for the new storm drain. Eight test pits were hand-excavated and recorded by experienced archaeologists after hard-standing, hardcore and building debris (concrete, tarmac and bricks) had been machine removed. Boreholes and pipe-trench details were recorded *in situ*. Sections were recorded at a scale of 1:10 and plans at 1:50 on CAU recording sheets. Where appropriate, unique feature and context numbers and labels were provided.

Test pit sections were recorded on CAU test pit forms with strict attention being paid to the safety of all personnel. Deposit sequences for each test pit and trench section were recorded along with digital photographs. The test pits were fixed to the OS grid by means of measured distances from known building points (figure 2).

## **Results**

No archaeological features of a non-building nature were recorded in any of the test excavated pits, with only a single feature recorded within the pipe-trench at section 10. Former top-soil horizons and varying depths of made ground and rubble were recorded in several test pits and boreholes. A sequence of alluvial deposits were recorded in all but two of the boreholes (BH1 & BH7), confirming the existence of a hollow and possible sand and or stone extraction (see Appendix 1 conclusions). Demolition and building material was recorded in all of the test pits and dated from the Medieval period to the 20<sup>th</sup> century. Individual test pit and section deposits are detailed below; test pit and section numbering follows those that issued in the field. Borehole date obtained by Dr Steve Boreham, Dept. of Geography, University of Cambridge, on behalf of the CAU is also included in this assessment, in addition to the geotechnical borehole data provided by GEA Geotechnical and Environmental Associates (Appendix 2).

### **Test pit and borehole data**

#### *EKS08 Results*

##### **Test Pit 1**

Test Pit 1 was abutted the Old Bishop's Palace garden wall. L-shaped in plan, it measured 0.4m wide along the wall's edge, 0.70m wide and its maximum length measured 1.10m. Due to poor access and light conditions the test pit was abandoned at *c.* 0.55m. The south facing section comprised of brick and mortar, with a stringing layer (base of the wall) of tile.



Figure 1. Site location

Based on the Ordnance Survey 1:2500 map  
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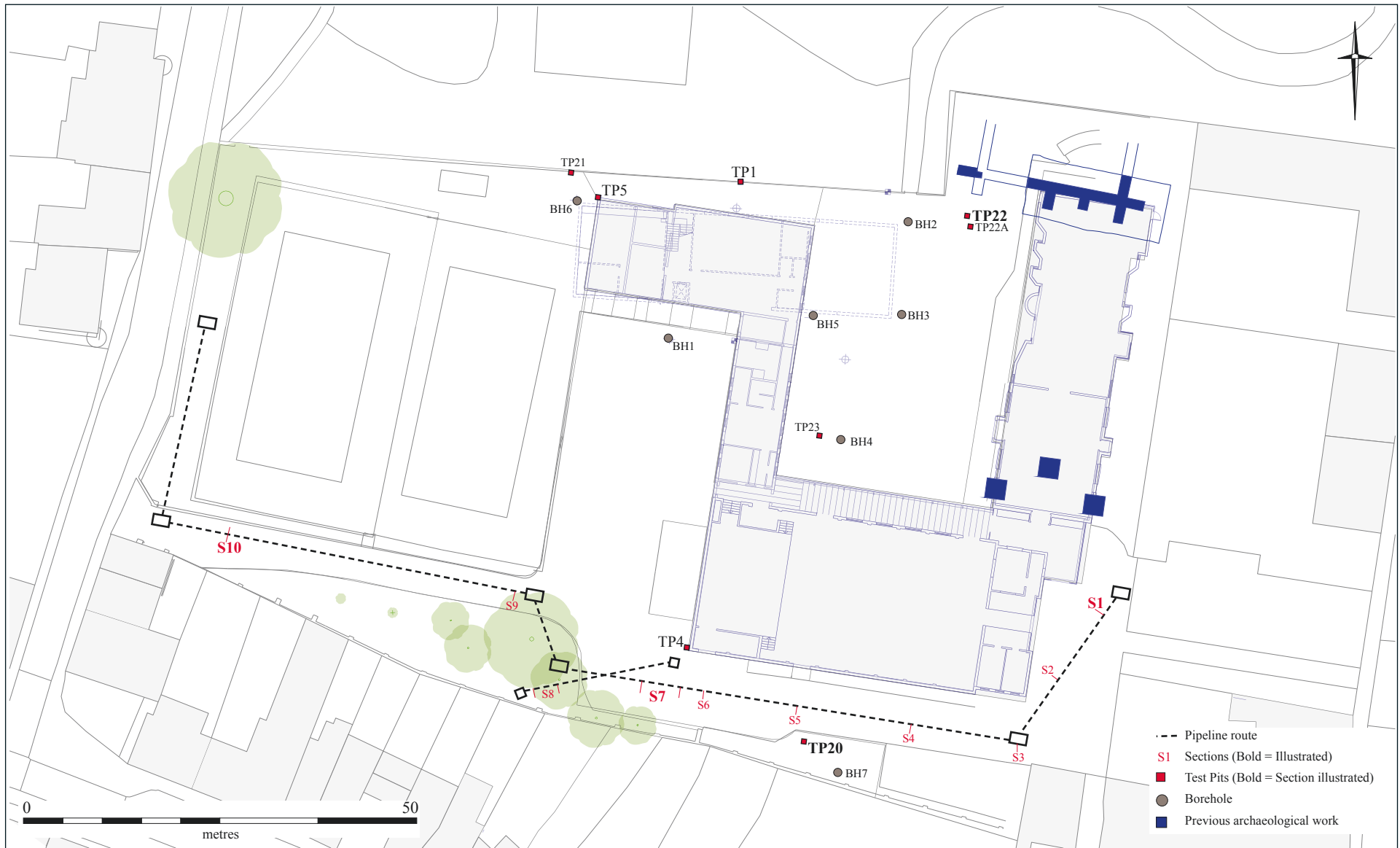


Figure 2. Test pit, bore hole and pipeline section location

#### Test Pit 4

Test Pit 4 was excavated to a depth of 1.10m through 0.05m tarmac and 0.24m of made ground; sandy gravel (hardcore). Beneath these layers was found a mid to dark grey clay; at 0.69m depth, the wall (consisting of nine brick courses) sits on a 0.30m thick concrete footing, extending 0.35m outwards from the perpendicular. This clay sealed a layer of peaty organics 0.10m thick representing a good level of preservation, a further 0.40m of blue grey alluvial clay overlaid the gravel terrace.

Depth from surface (m)	Description
0.00-0.05	Tarmac
0.05-0.29	Pale brown sandy gravels
0.29-1.10	Mid to dark grey clay

#### Test Pit 5

Test Pit 5 was excavated to a depth of 0.90m and revealed two fills or layers. The upper 0.25m layer consisted of a dark brown clay silt, possibly a topsoil, with the second fill/layer composed of dark grey brown, silty clay. In the southern corner of the test pit a concrete footing extended 0.25 to 0.35m outwards from the building's corner and measured 0.25m thick.

Depth from surface (m)	Description
0.00-0.25	Dark brown clay silt - topsoil
0.25-0.90	Mid to dark grey brown clay

#### Borehole WS1: BH1

Borehole WS1 was excavated to a depth of 7m through 0.15m of compacted ground sealing up to 18 layers of soil and clays and a 0.30m thick topsoil. At depths of 1.0 and 2.0m, compacted layers were also encountered. These do not appear to represent earlier ground surfaces, although decayed possible wood was encountered at 2.25m and may indicate a buried soil layer/horizon. Disturbed natural may have been encountered at 2.91m depth.

Depth from surface (m)	Description
0-00-0.15	Compacted ground
0.15-0.45	Mid to dark grey brown clay silt - topsoil
0.45-0.55	Mid brown sandy silt
0.55-0.65	Pale to mid brown sandy silt with frequent small angular stones
0.65-0.79	Moderately firm, mid brown silty clay
0.79-1.00	Firm, mid greyish brown clay with occasional angular stones
1.00-1.23	Compacted ground
1.23-1.55	Firm, mid greyish brown clay with occasional angular stones
1.55-1.95	Pale to mid grey, slightly sandy silt
1.95-2.00	Firm mid to dark grey silt clay
2.00-2.05	Compacted ground
2.05-2.25	Firm mid to dark grey silt clay
2.25-2.35	Mid brownish grey silt with possibly decayed wood
2.35-2.76	Relatively soft dark grey silty clay
2.76-2.91	Mid brownish grey sandy clay
2.91-3.00	Mid brown sandy gravels
3.00-3.24	Firm dark grey clay
3.24-3.82	Moderately soft, dark grey/black clay silt
3.82-3.96	Mottled dark grey green, clay silt
3.96-4.00	Firm mid to dark grey clay, rare dark grey silty mottles
4.00-5.00	Dark grey clay with rare small angular stone inclusions
5.00-8.00	Dark grey clay
5.36	Chalk lens 2cm thick
5.74	Chalk lens 2cm thick
5.74-6.10	Compacted
6.35	Chalk lens 2cm thick
6.96	Chalk lens 1cm thick
6.50-6.83	Occasional chalk flecks
7.91	Chalk lens 1cm thick

## Borehole WS2: BH2

Borehole WS2 was excavated to a depth of 7m through 0.19m of compacted ground sealing up to 32 layers and lenses of soil and clays and a 0.20m thick topsoil. Between 0.39m and 0.59m mortar and large fragments of building material were found, representing either made ground or episodes of dumping. A soft organic rich black silt were encountered at 2.94m, above which were found possible traces of wood at 2.82m and possibly disturbed natural at 1.32m; a second organic black silt was found at 3.95m.

Depth from surface (m)	Description
0.00-0.19	Compacted ground
0.19-0.39	Dark grey brown clay silt - topsoil
0.39-0.59	Mixed deposit – mid and light brown, mottled sandy silt with frequent pea sized mortar fragments
0.59-0.83	Mid brown sandy silt with occasional light brown sandy mortar patches and CBM fragments, including one large piece.
0.83-1.00	Mid brown sandy silt
1.00-1.32	Compacted ground
1.32-1.43	Mid to dark brown silty sand
1.43-1.53	very soft (moist) pale grey brown sandy clay with frequent small stones
1.53-1.94	Moderately firm mid grey silty clay with occasional small stones and some blue grey mottles towards the base
1.94-2.14	Mid grey silty clay with some blue grey clay flecks
2.14-2.43	Mid to dark grey clay with occasional small angular stones
2.43-2.59	Mid to dark grey clay with medium to large stone inclusions
2.59-2.81	Firm mid grey clay
2.81-2.83	Possible wood
2.83-2.94	Moderately firm to firm mottled mid grey and dark grey clay
2.94-3.00	Soft black silk - organics
3.00-3.11	Compacted ground
3.11-3.68	Moderately soft dark grey and black silt, possibly organic rich
3.68-3.80	Dark grey sandy (sandy) silt
3.80-3.95	Dark grey clay silt with green mottles
3.95-4.00	Dark grey/black silt – organics
4.00-4.15	Compacted ground
4.15-4.64	Slightly mottled dark grey and black silt
4.64-4.71	Relatively firm mottled mid to dark grey and brown silty clay
4.71-5.00	Firm dark grey clay
5.00-5.19	Compacted ground
5.19-6.00	Firm mid to dark grey clay with occasional chalk/shell flecks
6.00-6.03	Compacted ground
6.03-7.00	Firm mid to dark grey clay with rare chalk/shell flecks
7.00-7.45	Water-filled
7.45-7.76	Mid to dark grey clay
7.76-8.00	Dark grey clay

## Borehole BH3:EC

Borehole BH:EC was excavated to a depth of 7m through 1.65m of made-up and disturbed ground sealing up to 15 layers and lenses; the first 0.30m was of the borehole were hand-excavated. Disturbed natural was possibly present at 1.30m, mixed with building debris and clay. A black silt was encountered at 4.80m, although the majority of the fills/layers were dominated by clay with the exception of a 0.54m thick band of mottled silt at 3.46m and a further layer of black silt at 4.80m.

Depth from surface (m)	Description
0.00-0.30	Hand-dug layer
0.30-0.50	Dark grey silty clay loam with occasional small gravel inclusions and brick fragments
0.50-1.00	Dark grey silty clay, slightly lighter than above, with gravel inclusions, brick and sandy stone fragments
1.00-1.10	Compacted ground
1.10-1.30	Dark yellowish brown sandy clay with gravel inclusions and brick fragments
1.30-1.65	Mid yellowish grey sandy clay with gravel inclusions and brick fragments
1.65-2.00	Dark greenish grey silty clay with some sand present and occasional small gravel inclusions
2.00-2.40	Compacted ground
2.40-2.50	Greyish brown silty clay
2.50-3.10	Grey/black mottled clayey silt – very sticky
3.10-3.46	Greenish grey silty clay with occasional small gravel inclusions and some sand present
3.46-4.00	Very dark greenish grey/black mottled silt

4.00-4.40	Compacted ground
4.40-4.50	Light greenish grey chalky clay
4.50-4.80	Dark greenish grey silty clay
4.80-5.00	Black silt
5.00-5.20	Greenish grey silty clay
5.20-5.60	Grey clay
5.60-5.70	Green sandy clay
5.70-6.00	Dark grey clay with occasional chalky inclusions
6.00-6.41	Collapsed fill
6.41-6.46	Green sandy clay
6.46-7.00	Dark grey clay with rare chalk inclusions

#### **Borehole BH4:ED**

Borehole BH:ED was excavated to a depth of 5m through 1.00m of made-up and disturbed ground, (possibly mixed former top and sub-soil) sealing up to 9 layers; the first 0.40m of the borehole was hand-excavated. Disturbed natural was possibly present at 1.26m. A black silty clay was encountered at 1.80m, with organic material also encountered between 2.60m and 3.67m. Undisturbed was encountered at 3.67m, where clay, chalk and flint were found.

<b>Depth from surface (m)</b>	<b>Description</b>
0.00-0.40	Hand-dug layer
0.40-0.60	Dark greyish brown silty clay loam with gravel inclusions and brick fragments
0.60-1.00	Greyish brown silty clay with gravel inclusions and brick fragments
1.00-1.26	Very dark silty clay with small gravel inclusions
1.26-1.71	Grey sandy clay with gravel inclusions
1.71-1.80	Greenish grey sandy clay
1.80-2.00	Black silty clay
2.00-2.30	Compacted ground
2.30-2.60	Black/grey mottled silty clay
2.60-3.10	Patches of black silt with organic preservation grading into a grey silty clay
3.10-3.67	Black silt – with some organic material
3.67-4.00	Clay chalk mix with flint
4.00-5.00+	Greyish green silty clay

#### **Borehole BH5:EB**

Borehole BH:EB was excavated to a depth of 7m through 0.36m of made-up and disturbed ground sealing up to 25 layers and lenses. A possible buried soil was found at 1.51m with possible disturbed natural found at 1.85m, layers of black silt encountered at 2.79m and a thin layer of chalk, flint and gravel at 3.65m. Preserved wood was also found between 3.10 and 3.45m, possibly indicating a wet edge environment.

<b>Depth from surface (m)</b>	<b>Description</b>
0.00-.036	Mid dark grey silty clay loam with occasional small gravel inclusions and brick fragments
0.36-1.00	Mid grey silty clay
1.00-1.20	Compacted ground
1.20-1.35	Greenish grey silty clay with a slight sand presence
1.35-1.51	Grey silty clay with some sand and occasional gravel
1.51-1.80	Black/very dark silt, slightly organic
1.80-1.85	Grey silty clay
1.85-2.00	Grey sandy clay with frequent gravel
2.00-2.31	Grey silty clay
2.31-2.79	Dark grey silty clay
2.79-3.00	Black silt with slight greenish tinge
3.00-3.10	Compacted ground
3.10-3.45	Black silt with slight greenish tinge with wood/organics present
3.45-3.65	Black silt with greenish grey mottling
3.65-3.75	Chalk with small gravel and flint inclusions
3.75-3.92	Greenish grey mottled silty clay
3.92-4.00	Black silt – slightly organic
4.00-4.10	Compacted ground
4.10-5.00	Greenish grey clay with some sand present
5.00-5.10	Compacted ground
5.10-5.40	Greenish grey clay with some sand present
5.40-5.50	Black silty clay

5.50-6.00	Dark grey clay
6.00-6.22	Compacted ground
6.22-7.00+	Dark grey clay

### Borehole BH7:EA

Borehole BH:EA was excavated to a depth of 5m through 1.4m of made-up and disturbed ground sealing up to 13 layers. A possible buried soil was found at 1.75m. Sand was encountered at 2.30m, indicating possible disturbed natural, above a grey clay at 3.40m, with a lens of black silt/clay encountered at 3.85m.

Depth from surface(m)	Description
0-00-0.35	Dark grey silty clay loam with occasional small gravel and small fragments of brick and stone, including flecks of charcoal
0.35-0.50	Greyish brown silty clay with small to large gravel
0.50-1.40	Greenish grey silty clay with occasional small gravel inclusions, charcoal flecks and very degraded brick fragments
1.40-1.55	Mid grey silty clay with large charcoal flecks and occasional small inclusions
1.55-1.75	Brownish grey silty clay with frequent small rounded gravel
1.75-2.00	Very dark grey silty clay loam
2.00-2.10	Compacted ground
2.10-2.30	Very dark grey silty clay loam
2.30-2.85	Yellowish grey clayey sand with patches of sandy clay and occasional gravel inclusion
2.85-3.40	Yellow sand grading into yellowish brown sand
3.40-3.85	Grey clay
3.85-3.90	Lens of black silt/peat
3.90-5.00+	Grey clay

### EKS09 Results

#### Test Pit 20

TP20, measuring 1.00m by 1.00m, was located 14.4m west of the shed of the Hayward Theatre building and hand-dug to a depth of 1.30m and contained 10 fills or layers. The north-facing section revealed the possible presence of a possible cut, or similar (20.8), the fill containing CBM (figure 3). The west-facing section revealed a gravel layer (20.6) at a depth of *c.* 0.75m, with a maximum thickness of 0.14m, possibly representing undisturbed natural. Building material was found in six of the fills, illustrating the extent and depth, up to 1.29m, of disturbance at this location, with at least two different forms of brick used in nearby and former buildings.

Context	Description
-	Top-soil, up to 0.12m thick
20.1	0.07-0.20m thick; sub-soil containing a spread of mortar fleck and occasional red brick/tile fragments, rare charcoal and post-Medieval ceramic
20.2	0.10-0.29m thick; slightly sandy (coarse) clay sub-soil with occasional lumps of mortar and occasional large fragments of yellow brick, frequent flecks of red brick, coke and occasional rounded pebbles equal or less than 5cm in diameter
20.3	0.04-0.15m thick; reddish brown clayey silt with diffuse fine sand mottling, rare charcoal and flecks of red brick/tile. Frequent rounded pebbles, diameter equal to or less than 3cm, with occasional angular stones and frequent large pea gravel. Matrix variable from firm to friable
20.4	<i>c.</i> 0.10-0.19m thick; mid grey brown silt with distinct yellow brown sandy silt mottling. Firm to friable matrix with occasional CBM debris and rare rounded pebble inclusions
20.5	<i>c.</i> 0.10m thick; consists of up to 30% sub-angular small stones with diameters equal to or less than 5cm in dark grey sandy friable matrix
20.6	<i>c.</i> 0.14m thick; heavily packed rounded and sub-angular pebbles, comprising up to 90% of the layer, containing loose silty sand and dark grey brown material between the stones, with rare charcoal lumps – loose compaction and prone to collapse. Gravel deposit
20.7	0.10-0.28m thick; firm mid brown, slightly clayey silt with rare pea gravel with occasional charcoal lumps and rare flecks of CBM
20.8	<i>c.</i> 0.20m thick; firm and stable mottled yellow brown grey clayey silt with occasional CBM debris in the form of small flecks and lumps
20.9	0.15-0.34m thick; Firm to friable mid greenish brown fine sandy, slightly clayey, silt with rare sub-angular stones approximately 6cm in diameter
20.10	0.10-0.26m thick; firm mid grey brown medium sandy, slightly clayey, silt with rare sub-angular stones up to 5cm in diameter

## Test Pit 21

TP21, measuring 1.00m by 0.50m, was located 38.75m from the eastern end of the Old Bishop's Palace garden wall (figure 4). The test pit was hand-dug to a depth of 0.98m; the water table was encountered at 0.71m. In addition to exposing the wall foundation three distinct layers were revealed containing traces of building debris, and a distinct foundation trench (21.3). Upon full exposure, the wall measured 3.63m from the base of the foundation to the top, the foundation extended into the ground cut by 0.34m and was approximately 0.37m high. Wall construction primarily consisted of sandstone with use of tile or brick and conglomerate stone to a height of *c.* 1.93m. Above this was a layer of white sandstone blocks followed by smaller sandstone pieces, 1.43m of red brick and 2.26m of modern capping.

Context	Description
-	Top-soil, up to 0.10m thick
21.1	0.20m thick; firm dark blocky grey, slightly clayey silt with occasional brick and mortar flecks and occasional stones
21.2	0.25-0.0.56m thick; firm mid dark grey sandy clayey silt, with diffuse interface with 21.1 and 21.3/4, with frequent charcoal flecks and occasional lumps of mortar and brick flecks
21.3	<i>c.</i> 0.05-0.30m thick; foundation cut – firm mid grey clayey silt with fine sandy patches
21.4	<i>c.</i> 0.13-0.27m thick; slightly friable mid grey clayey silt with coarse sand inclusions and occasional mortar and brick flecks

## Test Pit 22

TP22, measuring 1.00m by 1.00m, was located 7.24m west of the northern corner of the Music Centre, close to the southeastern corner of the garden wall. Hand-dug, the water table was encountered at a depth of 0.72m. In addition to the top-soil five distinct layers were revealed containing traces of building debris, possibly relating to a section of demolished wall (figures 3 and 4).

Context	Description
22.1	Top-soil, up to 0.7m thick – black/grey dark crumbly sandy silt
22.2	0.14m thick; firm dark blackish grey gritty clayey silt with moderate quantities of mortar, occasional brick fragments and rare charcoal
22.3	0.44m thick; firm mid dark brown grey clayey silt with frequent flecks of mortar, brick lumps and occasional coke – interfaces with 22.4 and 22.5
22.4	<i>c.</i> 0.04-0.12m thick; friable mid dark brown grey, slightly sandy clayey silt with occasional brick and mortar and rare coke inclusions – interfaces with 22.5 and 22.6
22.5	0.19m thick; possible demolition dump with same matrix as 22.4 but with very frequent large pieces of brick, tile, sandstone blocks and paving slabs
22.6	0.03-0.05m thick; layer of tile

## TP22B Pipe locator

This test pit was located *c.* 0.5m to the southeast of TP22 and excavated to a depth of 0.66m and measured 0.5m wide. Five distinct layers were identified in section, excluding the top-soil, and represent primarily late post-Medieval made ground, probably 19<sup>th</sup> to 20<sup>th</sup> century in date.

Context	Description
1/1A	Top-soil, up to 0.14m thick
2	0.7-0.12m thick; firm mid dark grey brown, slightly sandy clayey silt with occasional coke fragments, moderate quantity of small brick fragments, rare to occasional quantity of mortar flecks and rare small sub-angular stones
3	0.08m thick; firm rubble layer – mid, slightly orange brown, slightly sandy clayey silt with very frequent large red and cream brick fragments, very frequent lumps of mortar, patches of moderate quantities of coke and charcoal flecks
4	<i>c.</i> 0.07m thick; same soil matrix as 3 with rare stone inclusions and occasional to moderate amounts of brick and mortar lumps
5	0.13-0.20m thick; loose crumbly pale cream brown, slightly silty sandy fine mortar with occasional small to medium sized brick lumps, rare coke, moderate quantity of small sub-angular and sub-rounded stones resulting from ground mortar and sand mix
6	0.11-0.15m thick; mid dark, slightly sandy, gritty silt with moderate to large brick and mortar lumps

## Test Pit 23

TP23, measuring 1.00m by 1.00m, was located in the southwest corner of the Hayward Theatre quadrangle and hand-dug to a depth of 1.05m. In addition to the top-soil six distinct layers were revealed containing traces of brick, mortar and coke fragments, indicative of disturbed ground, notably the lower fill 23.6, which may be disturbed natural and falling on or close to a wet-edge environment.

Context	Description
-	Top-soil, up to 0.12m thick
23.1	0.2-0.12m thick; firm mid brown grey, slightly clayey silt with brick and mortar fragments, moderate specks and occasional coke inclusions – interfaces with 23.2 and 23.3
23.2	0.12-0.17m thick; soft mid brown grey silt with rare, mortar charcoal and coke flecks and rare very small stones, diameter up to 2cm – interfaces with 23.3 and 23.4
23.3	up to 0.36m thick; friable mid yellow grey silt with frequent flecks and small lumps of mortar, occasional small to large brick fragments and rare coke
23.4	0.08-0.20m thick; soft mid dark grey (slightly blackish) clayey silt with moderate coke and rare mortar flecks
23.5	0.12-0.24m thick; firm and stable mid, slightly brown grey coarse sandy clay with rare mortar flecks, occasional small stones with diameters up to 2cm
23.6	0.31-0.037m thick; soft to friable dark blackish grey peaty clay (very smelly) with very frequent gravel inclusions, moderate to frequent coke fragments and rare small lumps of mortar

## Pipe Trench Sections

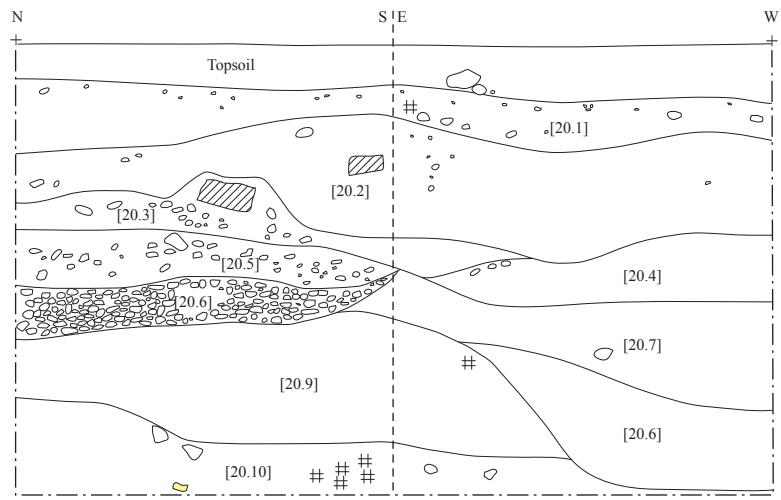
The following descriptions provide details of ten sections recorded at intervals along the pipe trench excavated for the installation and construction of a new storm drain. Numbered sections proceed east to west. Between sections 5 and 9 an arc of natural sand was identified, with a single linear feature found at section 10.

### Section 1

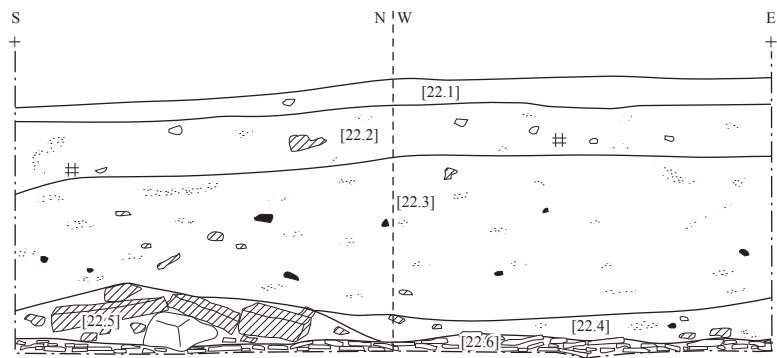
Section 1, an east facing section, was recorded over a length of 1m and depth of 1.5m (figure 5). The upper 0.30m consisted of 0.10m of surface concrete, *c.* 0.13m of hardcore or made ground with yellow browns sand mortar and slabs of concrete/hardcore at the northern side. Five fills/layers were recorded in section with natural encountered at 0.80m: [1] 0.28m thick; firm dark blackish brown peaty clayey silt with occasional to moderate mortar and brick fragments, moderate coke fragments and charcoal flecks. [2] up to 0.25m thick; rubble dump with shallow profile consisting of a friable mid to dark brown clayey silt with frequent crumbly, creamy mortar and mortar lumps, moderate to frequent stones and brick fragments. [3] up to 0.25m thick; moderately firm mid to dark grey brown, slightly peaty sandy silt with occasional chalk flecks, brick and mortar. [4] *c.* 0.56m thick; soft to moderately firm mid grey brown clayey silt. [5] *c.* 0.15m thick; firm dark blackish brown grey peaty silt.





### Section 2

Section 2, an east facing section, was recorded over a length of 1m and depth of 1.5m. The upper 0.30m consisted of 0.10m of surface concrete, *c.* 0.13m of hardcore or made ground with yellow browns sand mortar and slabs of concrete/hardcore at the northern side. Five fills/layers were recorded in section with natural encountered at *c.* 0.63m: [1] 0.28m thick; firm dark blackish brown peaty clayey silt with occasional to moderate mortar and brick fragments, moderate coke fragments and charcoal flecks. [2] *c.* 0.83m thick; soft to moderately firm mid grey brown clayey silt. [3] *c.* 0.06m thick; firm dark blackish brown grey peaty silt.



TP20



-  Brick
-  Charcoal
-  Bone
-  Mortar

TP22

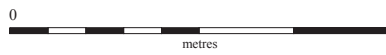


Figure 3. Selected Test Pit sections





Test pit 20



Test pit 21

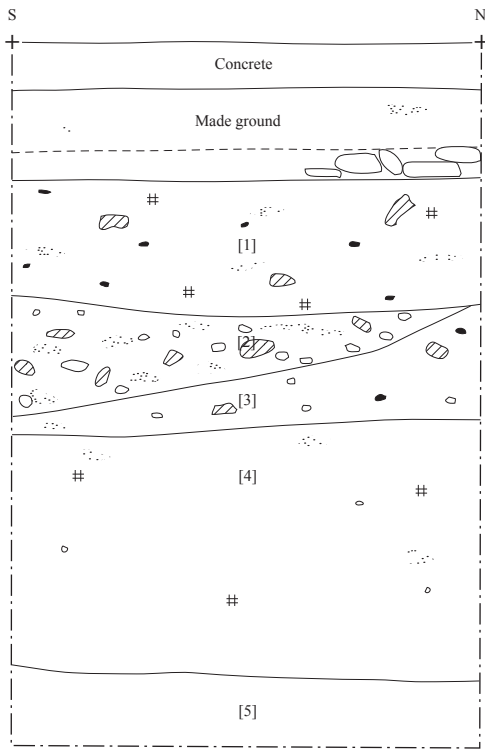


Test pit 22

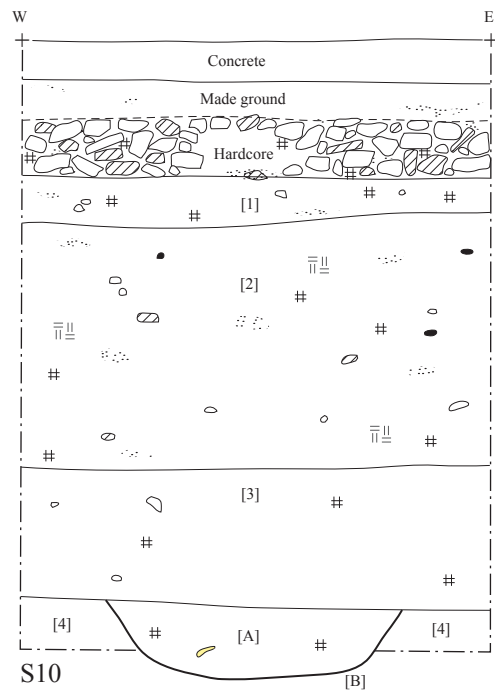


Test pit 22 building debris

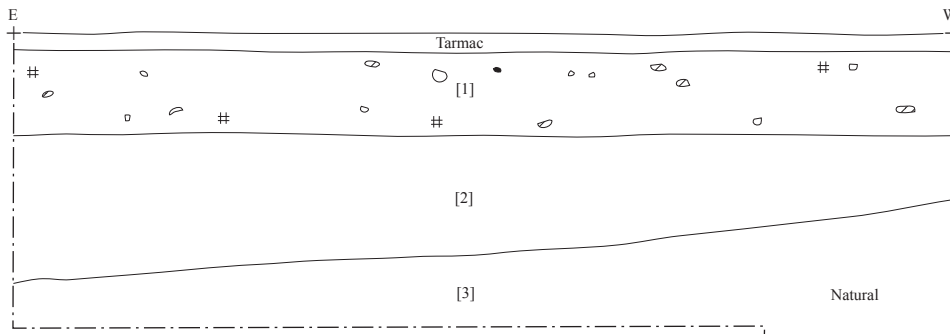
Figure 4. Selected Test Pits









S1



S10



S7

-  Brick
-  Charcoal
-  Coke
-  Oyster shell
-  Clay
-  Mortar

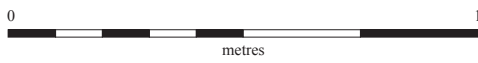


Figure 5. Selected pipe trench sections

### Section 3

Section 3, a north facing section, was recorded over a length of 1m and depth of 1.5m. The upper 0.32m consisted of 0.10m of concrete and 0.22m of hardcore. Five fills/layers were recorded in section with natural encountered at *c.* 1.3m; the basal natural, [5], was not seen the south facing section, indicating it sloped/dipped down towards the north, with fill [2] possibly a moderately disturbed sub-soil: [1] 0.18m thick; quite firm dark blackish brown clayey silt with occasional mortar, bricks and small sub-angular stones. [2] *c.* 0.60m thick; soft dark brown sandy, slightly clayey/sticky silt with evidence of bioturbation, occasional to moderate chalk flecks, coke and rare brick fragments and occasional to moderate amounts of mortar. Diffuse boundary with [3], 0.12-0.22m thick, the same as [2], but slightly more blackish brown with occasional to moderate coke and charcoal. [4] *c.* 0.10m thick; firm and stiff mid brown grey silty clay with rare sub-angular stones. [5] 0.10-0.12m thick; moderately firm mid orange brown clayey silt.

### Section 4

Section 4, a north facing section, was recorded over a length of 1m and depth of 1.5m. The upper 0.35m consisted of 0.10m of concreted and 0.25m of hardcore. Three fills were recorded with no obvious signs of natural deposits observed in this section, although inclusions of mid bluish grey clay, possibly redeposited natural were common 2m west of this location; the upper fill contained post-Medieval artefacts and indicate either rubbish disposal or made ground: [1] 0.32m thick; moderately firm dark, almost black, clayey. slightly peaty silt, with frequent chalk and mortar flecks, frequent brick fragments, china, clay-pipe and moderate to frequent coke and charcoal. [2] 0.55m thick; soft dark blackish brown sandy, slightly clayey/sticky silt with occasional to moderate chalk and mortar flecks, occasional brick fragments, moderate coke inclusions and lumps and flecks of charcoal. [3] 0.28m thick; moderately firm dark, almost black, heavy peaty silt with occasional to moderate charcoal flecks.

### Section 5

Section 5, a north facing section, was recorded over a length of 1m and depth of 1.35m. The upper 0.30m consisted of 0.10m of concrete lain on top of a 0.20m thick layer of yellow brick and sandstone rubble. Three fills, similar to those recorded in section 4, were observed, indicative of disturbed ground: [1] 0.33m thick; moderately firm dark, almost black, clayey. slightly peaty silt, with frequent chalk and mortar flecks, frequent brick fragments, china, clay-pipe and moderate to frequent coke and charcoal. [2] 0.55m thick; soft dark blackish brown sandy, slightly clayey/sticky silt with occasional to moderate chalk and mortar flecks, occasional brick fragments, moderate coke inclusions and lumps and flecks of charcoal. [3] 0.18m thick; moderately firm dark, almost black, heavy peaty silt with patches of mid green/brownish green sand and with occasional to moderate charcoal flecks.

### Section 6

Section 6, a north facing section, was recorded over a length of 1m and depth of 1.25m. The upper 0.34m consisted of 0.03m of concrete, 0.09m of tarmac and 0.22m of hardcore and made ground containing brick and sandstone rubble. Three fills and layers were recorded with undisturbed natural encountered at a depth between 0.94m and 1.05m: [1] 0.30m thick; relatively soft black, slightly sandy, peaty silt with moderate charcoal, mortar and coke. [2] 0.29-0.040m thick; soft mid dark grey brown sandy, slightly sticky silt with moderate oyster shell, mortar, chalk flecks and occasional patches of loose green sand. [3] 0.19-0.31m thick; natural – mid orange brown fine sand with occasional to moderate patches of degraded chalk.

### Section 7

Section 7, a north facing section, was recorded over a length of 2m and depth of 0.63m, with the western 0.6m length further excavated to a maximum depth of 1.7m (figure 5). The upper 0.04m consisted of a thin layer of tarmac lain on a 0.18m thick layer of probable disturbed top-soil. 'Dirty' natural was encountered at 0.22m: [1] 0.18m thick; soft mid dark grey sticky, sandy silt with occasional to moderate brick, charcoal and small sub-angular stone inclusions. [2] 0.14-0.31m thick, sloping layer of soft mid grey brown orange, very slightly silty sand with mixed material from above; dirty natural. [3] 1.7m+; loose mixed orange brown sand – same as [3] recorded in Section 6.

## Section 8

Section 8, a northwest facing section, was recorded over a length of 1.5m and depth of 1.0m. Three distinct layers were recorded below a *c.* 0.21m thick dark black/brown sandy silt top-soil. One layer, [2], may represent a dumping event: [1] 0.06-0.12m thick; soft mid dark grey brown, very sandy silt. [2] maximum 0.29m thickness; quite firm dark blackish brown sandy, sticky silt. [3] 0.72m+ loose mixed orange brown sand – same as [3] recorded in Sections 6 and 7.

## Section 9

Section 9, a north facing section, was recorded over a length of 1m and depth of 1.10m. The upper 0.24m consisted of 0.09m of concrete, 0.05m of made ground and 0.10m of rubble and hardcore. Three layers were recorded with undisturbed natural encountered at 1.05m: [1] moderately firm to plastic very dark brown peaty, slightly clayey silt with occasional to moderate rubble inclusions – coke, brick, mortar, charcoal. [2] diffuse interface with [3], up to 0.45m thick; moderately firm dark brown grey clayey silt with charcoal, coke, mortar and brick fragments and occasional sub-angular and angular stones. [3] *c.* 0.27m thick; moderately firm mid to dark grey brown sandy, slightly clayey silt with occasional charcoal and small sub-angular stones. [4] 0.05m+; moderately firm mid orange brown sticky, clayey silt at interface with natural, with rare charcoal flecks.

## Section 10

Section 10, a south facing section, was recorded over a length of 1.0m and to a maximum depth of 1.36m. The upper 0.29m consisted of 0.09m of concrete, 0.07m of made ground and .013m of hardcore and rubble. A single linear feature was identified at the base of the section [B]: [1] 0.10m thick; firm to plastic dark grey black peaty clay with moderate charcoal, mortar and small sub-angular stones. [2] 0.50-0.54m thick; moderately firm dark brown grey clayey silt with charcoal, coke, mortar and brick fragments and occasional sub-angular and angular stones. [3] 0.29m thick; moderately firm mid to dark grey brown sandy, slightly clayey silt with occasional charcoal and small sub-angular stones.

Feature [B] (figure 5): north-south oriented linear, parallel to Church Lane, 0.60m wide, 0.15m deep with a wide U-shaped profile, 45° sides leading to a flattish base, with a sharp break of slope at the top and moderate to gradual at the base. Fill [A] was a soft dark black brown sandy, peaty silt with rare oyster shell inclusions; no finds.

## Discussion

Located in an area of known Medieval building use the test pit and borehole survey data confirm a widespread area of disturbed and made up ground, especially in the area of BH1 where the made ground extends to a depth of 5.3m. The results from the pipe trench section recordings also confirm areas of disturbance, including a possible partially trampled or compacted trackway and a linear feature running parallel to Church Lane. Significantly, a cut or feature edge that may relate to the partially back-filled and silted 'hollow' identified beneath the Hayward Theatre was found in Test pit 20, with an arc of natural undisturbed sand identified between sections 5 and 8 of the pipe trench.

The ground penetrating radar (GPR) and borehole survey data and the subsequent section and profile data these provide (Appendices 1 & 2) confirm that the hollow referred to above consists, in the upper layers, of varying thickness of made ground or back-fill, sealing layers of alluvial clay, silts and peaty elements, before more solid stiff clay was encountered. As related by Dr Boreham below, the geotechnical profiles (figures. 9 - 13) obtained from the borehole data and GPR survey suggest that south of the wall of the Old Bishop's Palace garden the hollow has a relatively steep slope and extends to a depth of 5.7m in places, before a more gentle gradient towards borehole

BH7 (figures 6 & 7); however, further data would be required to positively confirm this assumption and the precise dimensions of this feature. Nonetheless, these results confirm the findings of the earlier evaluation and excavations carried out in the late 1990s where the hollow was first identified, although then thought to be either a small river channel or valley ‘thought to have run east to west from the old Sextry Barn across The Gallery and towards the Cherry Hill Motte and Bailey’ (Whittaker 1999: 29). From the data Dr Boreham concludes:

[the hollow] ‘...represents a pit or quarry.... Some 4-5m of sand may have been removed from this area, although it is not clear whether that would have been in the form of ‘soft’ sand for mortar, or as carstone iron-cemented blocks. Following excavation, the flooded quarry, fed by a perched water-table on the Kimmeridge Clay bedrock, formed a pool or pond. This depression was then backfilled by material dumped from the edges of the excavation, which eventually brought the ground level up to the present height.’

The arc of undisturbed sand identified between sections 5 and 8 of the pipe trench lends support to the interpretation that a previously unknown quarry pit is located on the site and the recovery of fossiliferous items from the test pits further attests to the depth of excavation. Dating this feature in the absence of further analysis is problematic, but it most likely predates the construction of the building foundations exposed in 1999; cores obtained from boreholes will potentially provide dating evidence for when the quarry was first opened. After abandonment the former quarry was allowed to fill with water, creating a waterlogged environment suitable for the formation and growth of peat, albeit in relatively thin lenses. It is interesting to speculate that the ‘complex drainage’ system identified by Whittaker may have been an attempt to relieve the flooding that affected the former 14<sup>th</sup> century masonry building, possibly a kitchen situated to take advantage of a convenient rubbish pit, by draining flood water into the former quarry. Later ‘reinstatement’ of the original ground surface, probably by the later 16<sup>th</sup> century, occurred as use and occupation of the area changed following the demolition of the masonry building, with much of the building refuse used as hardcore and packing.

Finds recovered from the test pits (only those from 2009 were kept for assessment), consisted primarily of pottery, including numerous pieces of flower-pot, dating from the mid 17<sup>th</sup> century onwards. A residual late Mesolithic blade (Lawrence pers. comm) was recovered from the lowest fill of test pit 20; a Mesolithic scatter/site is known in southeast Ely (Gdaniec 1993), and this blade attests to activity of this period in the general area. Six sherds of Medieval pottery were also recovered from the lowest fill of this test pit, the recovery of which suggests the hollow’s depth may extend somewhat further than currently known and that these sherds may represent *in situ* artefacts. Alternatively, the test pit may also be located on the edge of the hollow (mixed post-Medieval finds, including plastic and rubber, were recovered from then remaining upper fills) where it becomes more shallow in profile and as attested to be the results of the geotechnical borehole data. The faunal remains from the test pits provide evidence of butchery and meat processing and reflect the findings from the larger faunal assemblage recovered during 1998-99 (Whittaker 1998, 1999). Finally, the north-south oriented linear identified in the pipe-trench at section 10 contained no

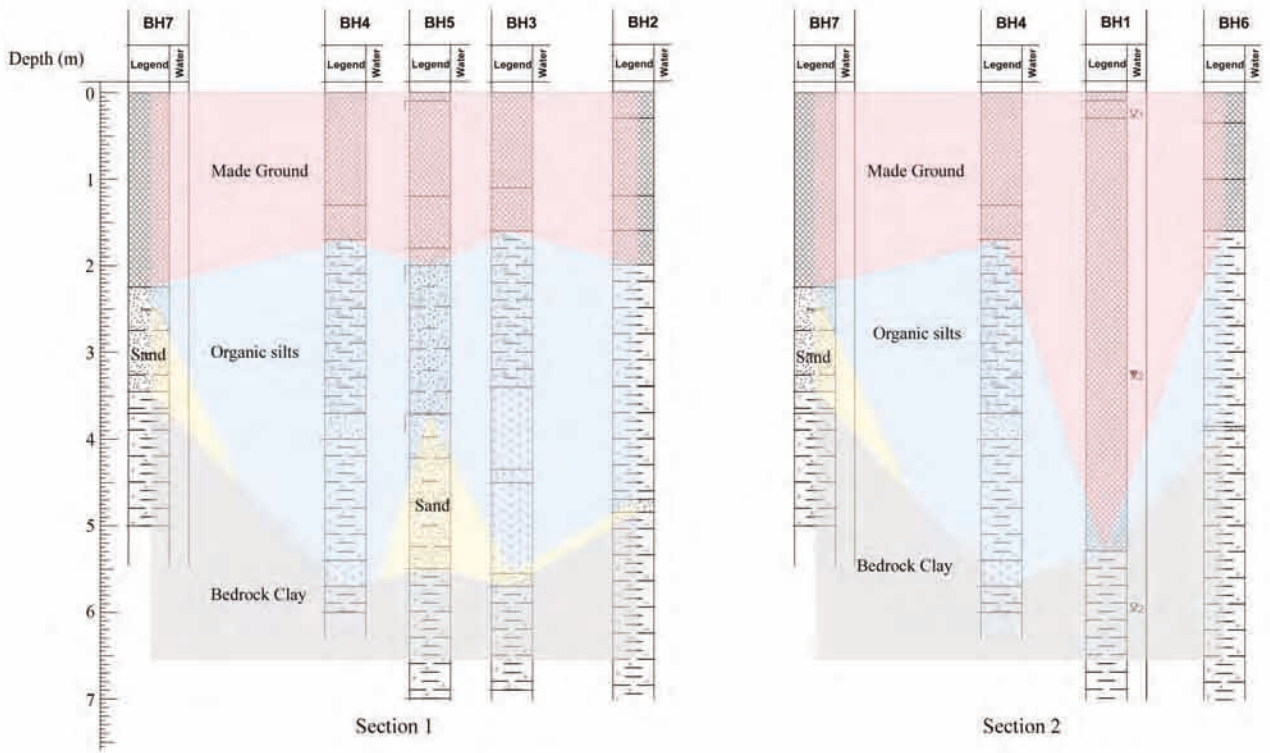


Figure 6. Borehole profile and transect schematic

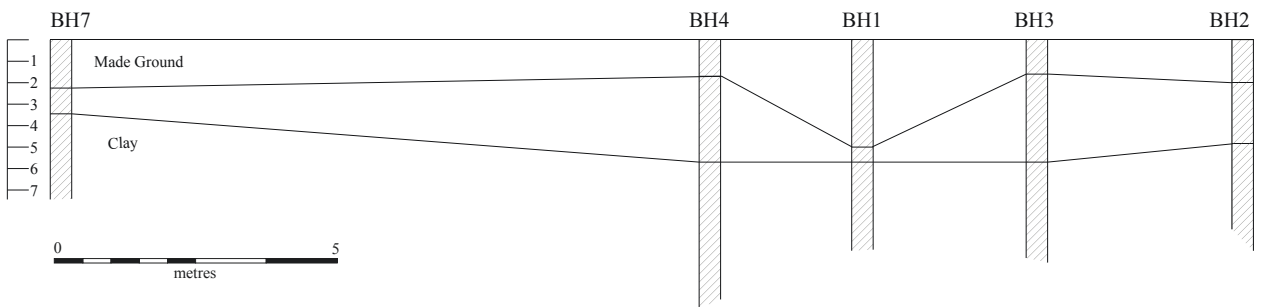
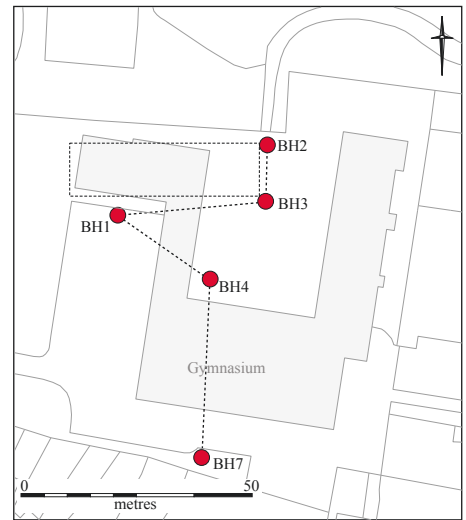


Figure 7. Simplified schematic of hollow profile from geotechnical borehole data

datable material. On the same alignment as Church Lane, this may represent an earlier road or trackside ditch, possibly also employed as a drain.

## **Conclusion**

The archaeological and geotechnical fieldwork have confirmed the presence of a deep feature first identified during excavations carried out in 1998 and 1999. Importantly, this 'hollow' feature, initially thought to be natural in origin, has been demonstrated to be man-made and to have been excavated prior to the 14<sup>th</sup> century. Possibly relating to the quarrying of suitable building material for the construction of the nearby ecclesiastical buildings, a possible kitchen was constructed immediately adjacent to the quarry. The quarry was subsequently used as a convenient dump, but may have also affected the local drainage, resulting in severe flooding. The site of the quarry was eventually completely backfilled, with waste and building debris used to make up the ground level.

Further analysis of the data produced, including the possibility for C14 dating on the deeper sediments, may work towards closer positioning this event in time.

## **Acknowledgements**

Test pit excavation and section investigations were carried out by Emma Reese, Shannon Hogan and Dan Britton. Illustrations are by Vicky Herring and the project was managed on behalf of the CAU by Alison Dickens and for the King's School by Nigel Clarke.

## Specialists' Reports

Table 1 provides a quantification of finds by test pit excavated in 2009. With the exception of the few Medieval sherds recovered from test pit 20 and the residual sherd from , all of the pottery/ceramic dated from the later 17<sup>th</sup> onwards

TP		Bone	Brick	Burnt stone	Flint	Glass	Mortar	Metal	Other*	Pottery	Shell	Stone	Tile	Tobacco pipe	Worked stone	Total
20	No.	30	4	1	2	5	2	11	5	33	3		4	5	1	106
	Wg.	692	730	4	8	54	222	204	31	596	4		294	16	550	3405
21	No.	2	8					1		8			1			20
	Wg.	70	220					19		42			26			377
22	No.	5	1		1	1	1	1	2	25	4		10	1		52
	Wg.	12	108		1	2	412	11	12	356	15		232	3		1164
23	No.	8	1	1		7		4	2	20	10	1	3	2		59
	Wg.	136	26	78		80		26	3	294	90	12	182	8		935

**Table 1:** Test pit artefact summary. \* plastic, rubber, coal, cinder

to the mid 17<sup>th</sup> century onwards; two residual worked flints were also recovered from the test pit with a further piece recovered from test pit 22. Building material was similarly mixed, and in the absence of diagnostic pieces (such as those found during the recent cable work; Dickens 2009), these are also presumed to be post-Medieval.

### *Pottery* (C. Cessford)

#### Test pit 20

Six sherds of Medieval pottery, weighing 68g, were recovered from lowest fill (20.10). With the exception of a single residual sherd from the uppermost fill of test pit 20, these sherds represent the earliest pottery recovered from the test pit exercise.

### *Faunal remains* (V. Rajkovača)

A small assemblage of animal bone recovered from the Ely Kings School site in 2009 totalled 36 bone fragments, 18 of which were identified to species. The preservation ranged from quite poor to quite good with a number of bones showing extensive erosive damage and surface exfoliation. Medium-sized mammals and three main food species dominate the assemblage (Table 2). Identification of the assemblage was undertaken with the aid of Schmid (1972), Hillson (1999) and reference material from the Cambridge Archaeological Unit.

Butchery marks were noted on 10 specimens (c. 28%) and chop marks are more common than cut marks. Main points of interest include skinning, bone splitting for marrow fat removal, as well gross dismemberment. A complete cow metatarsal recovered from test pit 20 has been measured and it has produced the shoulder height estimate of 111 to 118 cm (Fock in Von den Driesch and Boessneck 1974). The same specimen showed signs of trauma evidenced by abnormally splayed medial condyles which could be related to the excessive stress as a result of ploughing or cart pulling (Dobney *et al.* 1996: 39).



SPECIES	NISP	MNI
Ovicaprid	10	2
Cow	3	1
Pig	2	1
Horse	1	1
Roe deer	1	1
Rabbit	1	1
ULM	6	-
UMM	9	-
UUB	2	-
UUF	1	-

**Table 2:** NISP and MNI counts

Key: UMM & ULM = Unid. Medium and Large Mammal / UUM = Unid. Fragment. These differ from the unidentified counts as these are calculated on the basis of element identification (for UMM & ULM) and total fragments (for UUM) (corresponding to  $\Sigma$  in brackets).

This assemblage is quantitatively inadequate to support suggestions about animal use on site. Apart from stating the representation of species, it would be inappropriate to discuss the assemblage any further.

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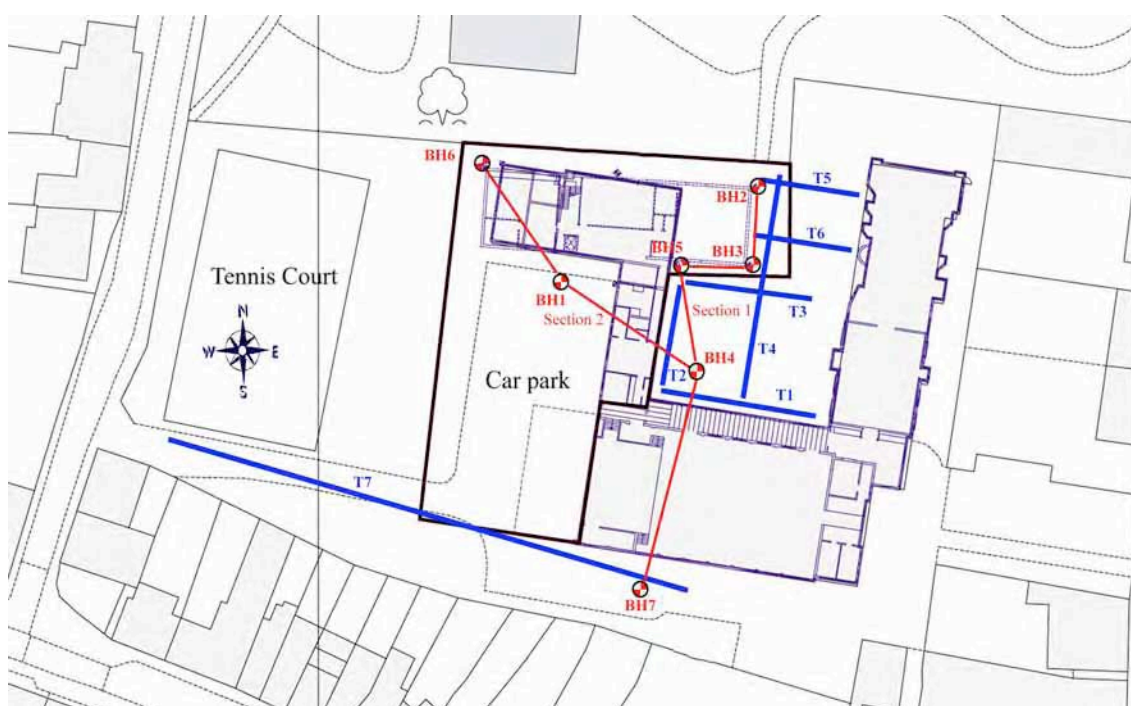
## Appendices

### Appendix 1 Ground Penetrating Radar and Borehole investigation

#### Ground Penetrating Radar and Borehole investigation of Sediments from King's School, Ely, Cambridgeshire. Steve Boreham BSc. PhD.

##### Introduction

This study focuses on a sequence of sandy and organic silty sediments identified from engineering boreholes and archaeological trenches filling a 'hollow' thought to be *c.* 50m wide and 5-6m deep at the new Arts and Drama Building, King's School, Ely (Figure 8). Geological cross-sections of the area (Sections 1 & 2) have been constructed across the 'hollow' from the engineering boreholes (BH1-7) (Figure 7). The geology of the King's School area is mapped by the British Geological Survey as localised patches of glacial till (boulder clay) overlying Lower Greensand bedrock, which in turn overlies Jurassic Kimmeridge Clay bedrock. The geological sections in Figure 9 show bedrock clay at between 3.5m and 6m below the ground surface, apparently forming a 'hollow'. There is a little Lower Greensand present above the bedrock clay (BH7 & 5), but for the most part the 'hollow' is filled with a sequence of sandy and organic silts up to 4m thick overlain by 'made ground' up to 2m thick that contains 15/16th Century archaeological material.



**Figure 8** – Map of King's School, Ely showing the location of boreholes (BH1-7), geological sections (Sections 1 & 2) and GPR transects (T1-7).

## **Ground Penetrating Radar**

This investigation was conducted in two parts, with an initial Ground Penetrating Radar (GPR) survey, which attempted to establish the extent and depth of the in-filled 'hollow', and some hand-auger boreholes located using the GPR data to assess the depth and nature of the basal sediments, and potentially provide material for dating. The GPR survey comprised six intersecting transects (T1-6) that ran N-S and W-E across the area of the in-filled 'hollow'. Both 200MHz and 100MHz GPR antennae were employed to provide a combination of good depth penetration and resolution. One further GPR transect (T7) was made W-E along the southern edge of the site with the 100MHz GPR antennae to attempt detection of the edge of the 'hollow'. The GPR results for transects T1-6 are shown in Figures 10-12. The result for T7 is shown in Figure 9. Where possible the GPR results have been 'truthed' using adjacent engineering boreholes.

Transect 1 (W-E) shows some very strong reflectors below 4m depth, which seem to be associated with saturated organic silts. In general reflectors are sub-horizontal, although there is some evidence for slightly inclined bedding in the Made Ground with dips toward the east (Figure 10a). Transect 2 (S-N) again shows sub-horizontal reflectors, with slight evidence for inclined bedding in the silty sandy clay unit towards both the south and north (Figure 10b). Transect 3 (W-E) also shows sub-horizontal reflectors, but with some slight indication of inclined bedding towards the west (Figure 10c). In contrast, Transect 4 (S-N) clearly shows the form of the beds in the 'hollow' with northward dipping reflectors at the southern end of the transect, southward dipping reflectors at the northern end of the transect, and sub-horizontal reflectors in the centre (Figure 11). Transects 5 and 6 (Figure 12) both show well-defined inclined reflectors dipping towards the west.

Taken together, the GPR data from Transects 1-6 suggest that the centre of the 'hollow' with sub-horizontal reflectors is in the vicinity of BH5 and BH3, with well-defined 'edges' with inclined reflectors interpreted as inclined beds of dumped material towards the east and north. There is also some evidence for an 'edge' towards the south, but little sign of a limit to the west. This agrees with the sediment architecture implied by the engineering boreholes (Figure 9). Transect T7 (W-E) may indicate the western boundary of the 'hollow', with inclined reflectors by the tennis court and sub-horizontal reflectors by the car park (see Figures 8 & 13). The presence of upstanding 'pinnacles' of sand with poor reflectors (probably Lower Greensand) close to BH7, raises the possibility that the deepest parts of the 'hollow' may be split into two sub-basins (west and east) or arranged in a 'horseshoe' (west-north-east) around a higher area of sand. This could mean that the total size of the 'hollow' was c.100m W-E and c.60m N-S.

## **Boreholes**

Hand auger boreholes at the sites of BH4 and BH3 recovered sandy and organic silty sediments with broadly the same stratigraphy as the engineering boreholes. The detailed descriptions of these boreholes appear in Appendix 1. In both cases, the hand auger holes were stopped on dense gravel and sand at c.4m depth and were not able to penetrate to the very base of the sequences. However, core samples suitable for

radiocarbon dating and palaeoenvironmental analyses were obtained from these two boreholes. It was clear that a powered drill would be needed to break through the gravel layer, which at BH3 seemed to comprise large cobbles. In general, the sediments above 2m depth were sandy silts and silty sands with brick, tile, charcoal, plaster and masonry that must have been dumped across the area. The sediments below 2m depth were sandy and organic silts with reed stems, shells and wood that had the characteristics generally associated with marsh, pool and pond deposits.

## **Conclusions**

The author's interpretation of the King's School, Ely, 'hollow' is that it represents a pit or quarry originally intended to access the Lower Greensand. Some 4-5m of sand may have been removed from this area, although it is not clear whether that would have been in the form of 'soft' sand for mortar, or as carstone iron-cemented blocks. Following excavation, the flooded quarry fed by a perched water-table on the Kimmeridge Clay bedrock, formed a pool or pond. This depression was then backfilled by material dumped from the edges of the excavation, which eventually brought the ground level up to the present height. The samples of basal organic sediments obtained are suitable for radiocarbon dating and palaeoenvironmental analyses, including pollen assessment. A powered auger (for example Cobra TT) would be needed to penetrate the dense gravel layer to access organic sediments deeper than 4m.

## Appendix 1.A – Sediment description from hand auger boreholes at BH3 & BH4

### King's School, Ely - BH3

Depth relative to the ground surface

0 to 20cm	Topsoil
20 to 55cm	Brown silty sand with brick & tile
55 to 105cm	Brown clayey silty sand with brick fragments
105 to 116cm	Black-brown sandy silt with shells and brick fragments
116 to 125cm	Brown-black silty sand with brick fragments
125 to 165cm	Brown silty sand with brick fragments (water table at 125cm)
165 to 200cm	Beige sand rich in oolitic limestone fragments
200 to 210cm	Grey-brown silty sand with charcoal and brick fragments
210 to 233cm	Black organic silt with wood, shells and a little sand
233 to 250cm	Grey-brown silty sand with occasional small pebbles
250 to 255cm	Brown organic sandy silt with shells, wood and charcoal
255 to 260cm	Green-grey organic silty clay with shells and reed stems
260 to 270cm	Brown organic sandy silt with shells
270 to 280cm	Green-grey organic silty clay
280 to 300cm	Brown-black sandy silt with shells
300 to 400cm	Green-grey organic silt with reed stems
400 to 410cm	Dense gravel (cobbles?)

Borehole stopped at 410cm on gravel.

### King's School, Ely – BH4

Depth relative to the ground surface

0 to 20cm	Topsoil
20 to 40cm	Black-brown silty sand with brick & tile
40 to 65cm	Brown sandy silt with charcoal
65 to 80cm	Black-brown sandy silt with charcoal, brick and mortar
80 to 120cm	Black-brown organic sandy silt with charcoal and oyster shells
120 to 165cm	Grey-brown sandy clayey silt with brick, tile and charcoal (water table 120cm)
165 to 190cm	Grey-brown sandy clayey silt with brick, tile, charcoal and shells
190 to 220cm	Soft brown sandy silt
220 to 230cm	Grey sandy silt with pebbles
230 to 240cm	Grey-brown organic silt with reed stems, shells and wood
240 to 255cm	Black-brown organic silt with reed stems and wood
255 to 295cm	Green-grey organic silty clay with a little fine sand
295 to 350cm	Black organic clayey silt
350 to 370cm	Dense sand and gravel

Borehole stopped at 370cm on gravel.

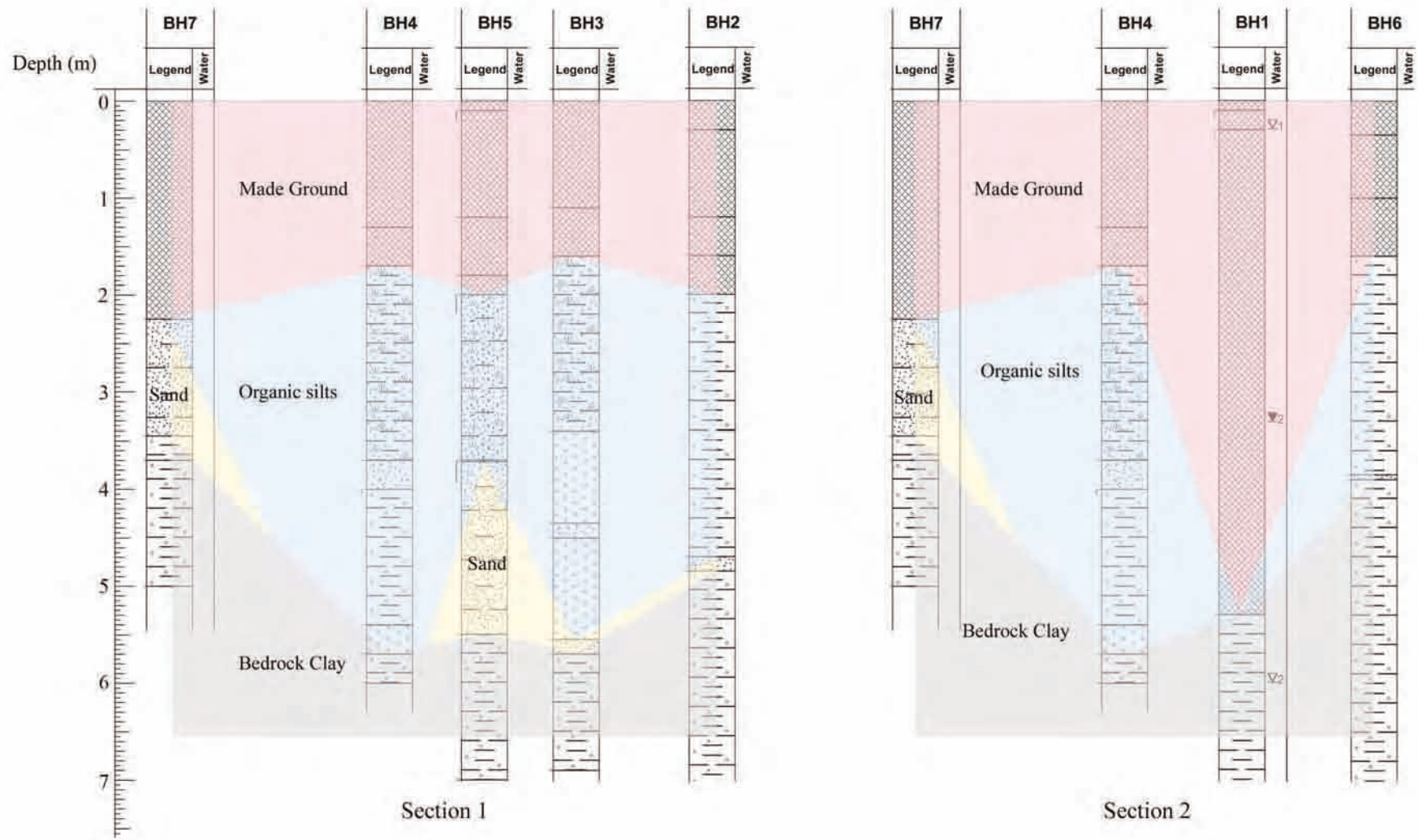


Figure 9. Borehole transect profile



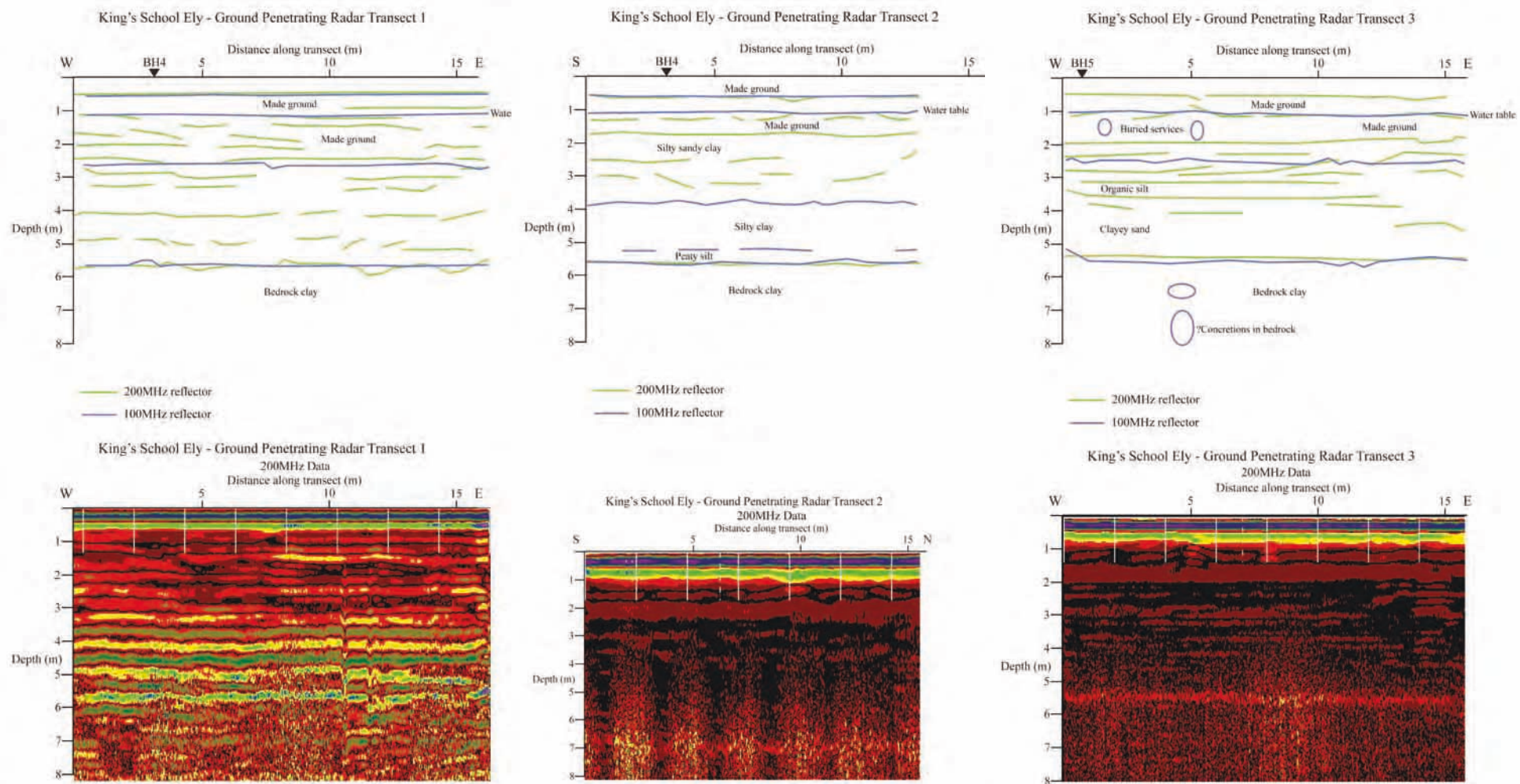


Figure 10. GPR transects 1 to 3

### King's School Ely - Ground Penetrating Radar Transect 4

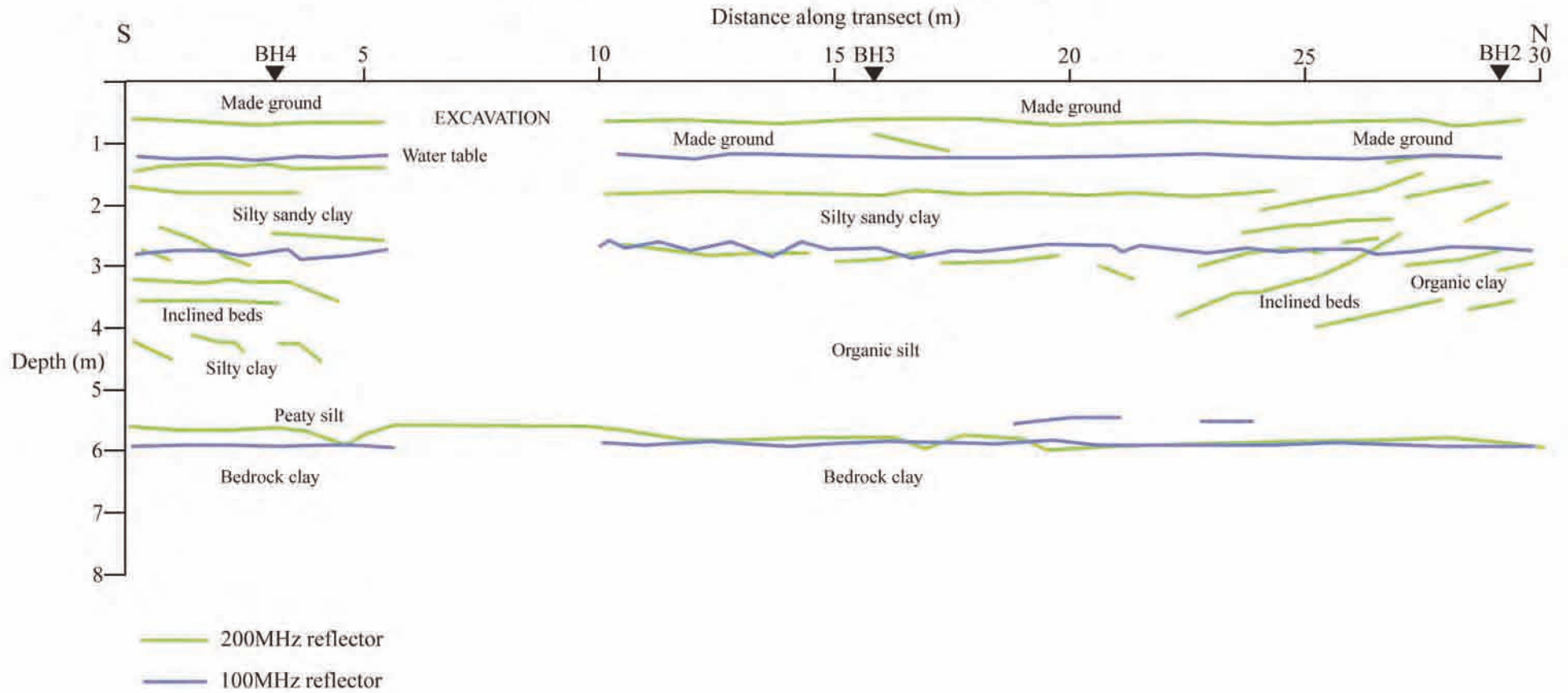


Figure 11. GPR transect 4

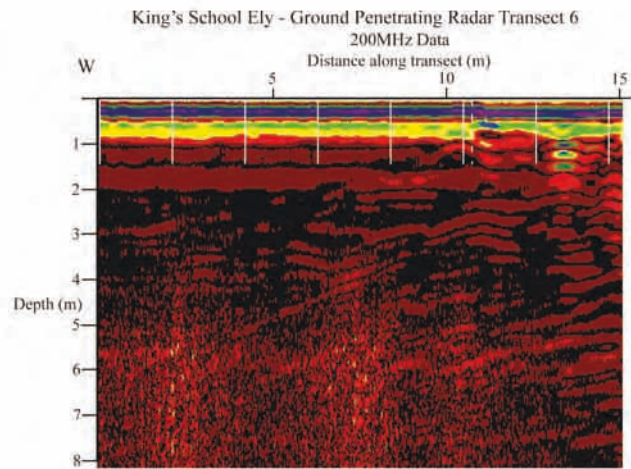
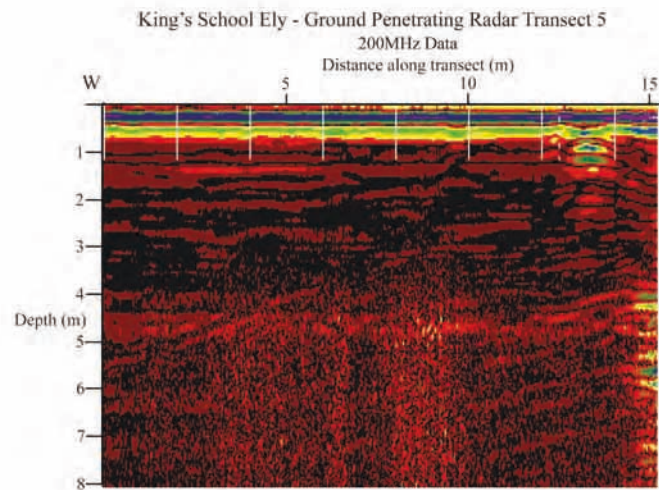
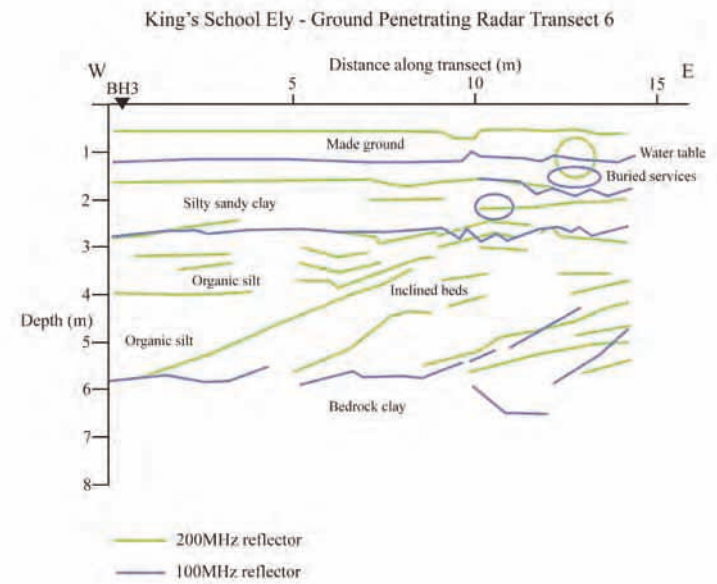
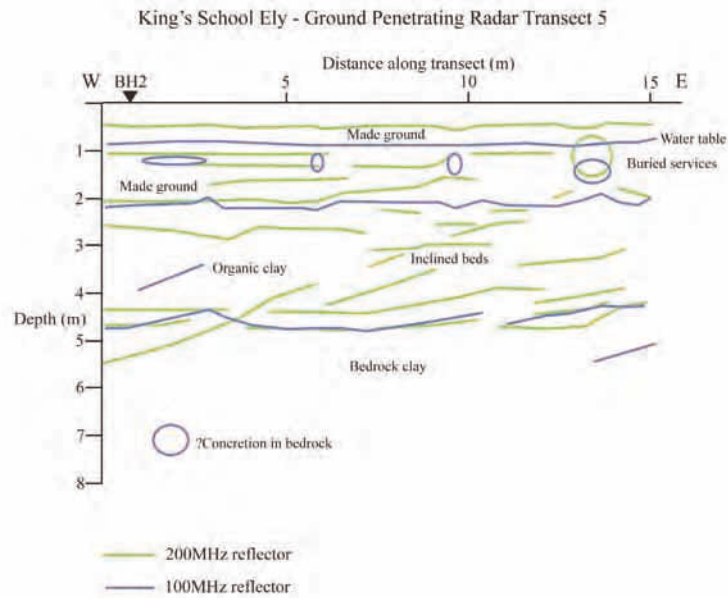


Figure 12. GPR transects 5 and 6

King's School Ely - Ground Penetrating Radar Transect 7

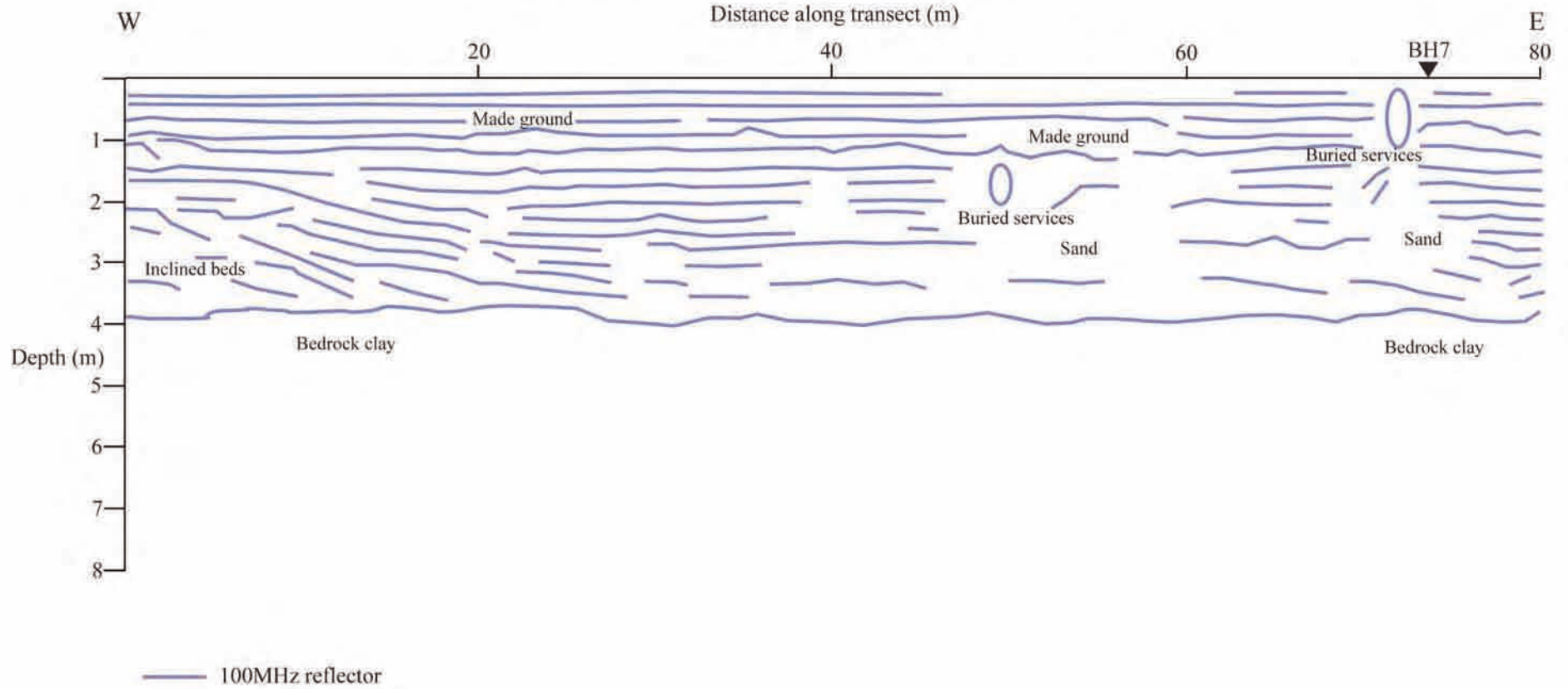


Figure 13. GPR transect 7

## **Appendix 2 Geotechnical borehole data**

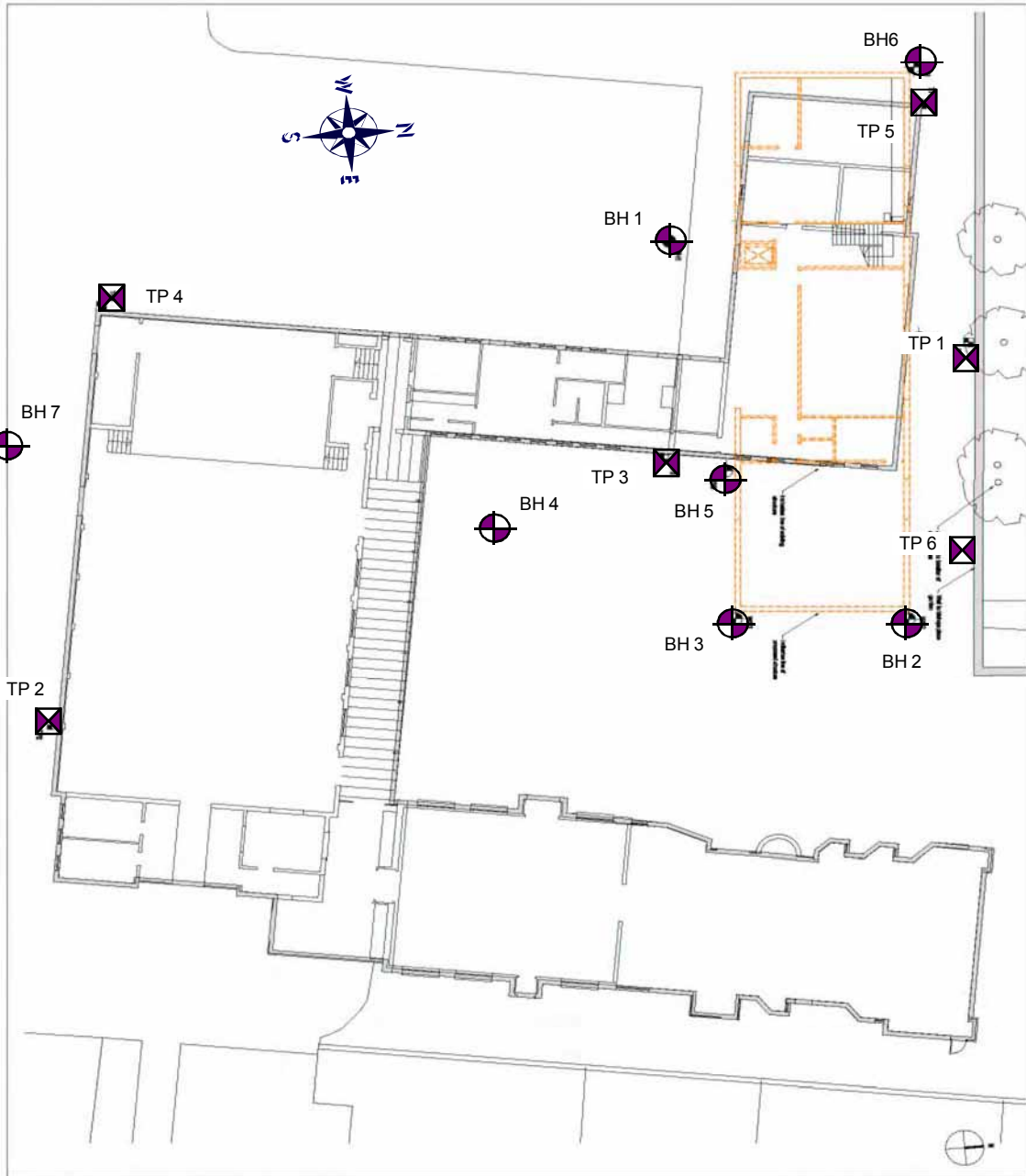
Site : The Kings School, Ely

Client : The Kings School, Ely

Engineer : Heyne Tillett Steel

Job Number  
J08268

Sheet  
1 / 1



HEYNELTILLETSTEEL  
THE KINGS SCHOOL, ELY  
CAMBRIDGESHIRE  
CB7 4DS

PLAN SHOWING PROPOSED  
GROUND INVESTIGATION WORKS  
IN RELATION TO NEWESTIG BUILDING

Author: PMS/ANWY  
Date: 02/09/15  
Scale: 1:500

**LEGEND**

1. Trial Pit (TP) - Indicated by a purple square symbol.

2. Borehole (BH) - Indicated by a purple circle symbol.

3. Proposed Building Footprint - Indicated by a dashed orange line.

4. Existing Building Footprint - Indicated by a solid black line.

5. Proposed Access Road - Indicated by a dashed black line.

6. Proposed Parking Area - Indicated by a dashed black line.

7. Proposed Landscaping - Indicated by a dashed black line.

8. Proposed Fencing - Indicated by a dashed black line.

9. Proposed Boundary - Indicated by a dashed black line.

10. Proposed Drainage - Indicated by a dashed black line.

11. Proposed Services - Indicated by a dashed black line.

12. Proposed Foundations - Indicated by a dashed black line.

13. Proposed Foundations - Indicated by a dashed black line.

14. Proposed Foundations - Indicated by a dashed black line.

15. Proposed Foundations - Indicated by a dashed black line.

16. Proposed Foundations - Indicated by a dashed black line.

17. Proposed Foundations - Indicated by a dashed black line.

18. Proposed Foundations - Indicated by a dashed black line.

19. Proposed Foundations - Indicated by a dashed black line.

20. Proposed Foundations - Indicated by a dashed black line.



Tyttenhanger House  
Coursers Road  
St Albans  
AL4 0PG

Site  
The Kings School, Ely

Borehole  
Number  
**BH1**

Boring Method Cable Percussion	Casing Diameter 150mm cased to 7.50m	Ground Level (mOD)	Client The Kings School, Ely	Job Number J08268
	Location	Dates 04/12/2008- 05/12/2008	Engineer Heyne Tillet Steel	Sheet 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.40	D1			Medium(1) at 0.30m, sealed at 1.00m.		(0.10) 0.10 (0.20) 0.30	Made Ground (Tarmac) Made Ground (Hardcore) Made Ground (Soft brown organic matter with occasional brick fragments, topsoil and gravel - fill)	▽1	
0.80	D2								
1.00-1.45 1.00	SPT N=16 S1			1,0/0,1,7,8					
2.00-2.45	CPT N=2			1,2/1,0,1,0					
3.00-3.45 3.00	CPT N=1 B1			1,0/0,0,1,0		(5.00)			▽2
3.80	D3								
4.00-4.45 4.00	SPT N=3 S2			1,0/1,1,0,1					
5.00-5.45 5.00	SPT N=7 S3			1,0/1,2,2,2		5.30	Stiff to hard grey CLAY with shells and shaley patches		
5.80	D4								▽2
6.00	U1			Medium(2) at 6.00m, rose to 3.32m in 20 mins, sealed at 7.50m.					
6.50	D5								
7.50-7.95 7.50	SPT N=21 S4			3,4/5,5,5,6					
9.00	U2								
9.50	D6					(8.30)			

<b>Remarks</b> Groundwater monitoring standpipe installed to a depth of 5.0 m with a response zone from 1.0 m to 5.0 m Further small seepages were observed within the grey clay	Scale (approx)	Logged By
	1:50	Driller
	Figure No. J08268.BH1	



Tythenhanger House  
Coursers Road  
St Albans  
AL4 0PG

Site  
The Kings School, Ely

Borehole  
Number  
**BH1**

Boring Method Cable Percussion	Casing Diameter 150mm cased to 7.50m	Ground Level (mOD)	Client The Kings School, Ely	Job Number J08268
	Location	Dates 04/12/2008- 05/12/2008	Engineer Heyne Tillet Steel	Sheet 2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.50-10.95 10.50	SPT N=27 S5			5,6/6,6,7,8					
11.30	D7					(8.30)			
12.00	U3								
12.50	D8								
13.50-13.95 13.50	SPT N=52 S6			10,7/9,12,15,16		13.60 (0.10) 13.70	CLAYSTONE Hard grey shaley CLAY		
14.50	U4					(1.30)  15.00			
							Complete at 15.00m		

Remarks	Scale (approx)	Logged By
	1:50	Driller
	Figure No. J08268.BH1	





Tytenhanger House  
Coursers Road  
St Albans  
AL4 0PG

**Site**  
The Kings School, Ely

**Number**  
**BH2**

<b>Excavation Method</b> Percussive lined open-drive sampler (Terrier Rig)	<b>Dimensions</b> 125mm to 5.00m	<b>Ground Level (mOD)</b>	<b>Client</b> The Kings School, Ely	<b>Job Number</b> J08268
	<b>Location</b>	<b>Dates</b> 04/12/2008	<b>Engineer</b> Heyne Tillet Steel	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	D1				(0.30) 0.30	Made Ground (Brown humic sandy clay with abundant rootlets)		
1.00-1.45	SPT N=5		1,1/1,2,1,1		(0.90)	Made Ground (Pale brown clayey sand with gravel and abundant brick fragments)		
1.50	D2				1.20 (0.40)	Made Ground (Pale brown sandy clay with pockets of pale brown sand)		
2.00-2.45	SPT N=0		0,0/0,0,0,0		1.60 (0.40)	Made Ground (Greyish brown sandy clay with occasional brick fragments and gravel)		
2.50	D3				2.00	Soft grey and very dark grey very silty organic CLAY with pockets of black silt and occasional pockets of decaying organic matter		
3.00-3.45	SPT N=3		0,0/0,0,2,1		(2.70)			
3.50	D4							
4.00-4.45	SPT N=0		0,0/0,0,0,0					
4.50	D5				4.70 (0.15)	Dark greyish brown and greenish brown silty fine SAND		
5.00-5.45	SPT N=8		0,1/1,2,2,3		4.85	Stiff becoming very stiff dark grey slightly fissured silty CLAY with scattered shells and occasional layers of shale		
5.50	D6							
6.00-6.45	SPT N=13		1,2/2,4,3,4					
6.50	D7				(3.60)			
7.00-7.45	SPT N=28		8,11/7,7,7,7					
7.50	D8							
8.00-8.45	SPT N=30		4,4/6,7,8,9		8.45			
						Complete at 8.45m		

<b>Remarks</b> Groundwater at 0.8 m on completion of the borehole and withdrawal of the casing	<b>Scale (approx)</b>	<b>Logged By</b>
	1:50	Prelim
	<b>Figure No.</b> J08268.BH2	



Tythenhanger House  
Coursers Road  
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Site  
The Kings School, Ely

Number  
**BH3**

Excavation Method Percussive lined open-drive sampler (Terrier Rig)	Dimensions 125mm to 5.00m	Ground Level (mOD)	Client The Kings School, Ely	Job Number J08268
	Location	Dates 09/12/2008	Engineer Heyne Tillet Steel	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.70	D1				(1.10)	Made Ground (Brown humic sandy clay with scattered gravel and brick fragments and occasional shell fragments)		
1.50	D2				1.10 (0.50)	Made Ground (Pale brown sandy clay with abundant gravel and occasional fragments of brick)		
2.40	D3				1.60 (1.80)	Soft grey, pale brownish grey and pale silty sandy CLAY with pockets of black peat		
3.60	D4				3.40 (0.95)	Soft black organic SILT		
4.40	D5				4.35 (0.15) 4.50	Pale brownish grey sandy GRAVEL with scattered fragments of flint and chalk		
4.90	D6				(1.05)	Soft black organic SILT		
5.60	D7				5.55 (0.15) 5.70	Pale brownish green clayey fine SAND		
6.80	D8				(1.20)	Stiff dark grey slightly fissured silty CLAY with scattered shells and occasional layers of shale		
					6.90	Complete at 6.90m		

Remarks Groundwater at 0.68 m on completion of the borehole and withdrawal of the casing Refusal of the sampler at 6.9 m	Scale (approx)	Logged By
	1:50	Prelim
	Figure No. J08268.BH3	



Tyttenhanger House  
Coursers Road  
St Albans  
AL4 0PG

Site  
The Kings School, Ely


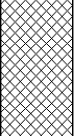


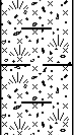

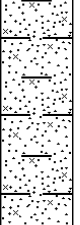
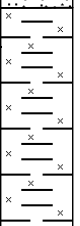
Number  
**BH4**

Excavation Method Percussive lined open-drive sampler (Terrier Rig)	Dimensions 125mm to 5.00m	Ground Level (mOD)	Client The Kings School, Ely	Job Number J08268
	Location	Dates 09/12/2008	Engineer Heyne Tillet Steel	Sheet 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	D1				(1.30)	Made Ground (Brown humic sandy clay with scattered gravel and brick fragments and occasional shell fragments)		
1.20	D2				1.30 (0.40)	Made Ground (Pale brown sandy clay with abundant gravel and occasional fragments of brick)		
1.60	D3				1.70	Soft grey, pale brownish grey and pale silty sandy CLAY with pockets of black peat		
2.70	D4				(2.00)			
3.30	D5							
3.80	D6				3.70 (0.30) 4.00	Pale brownish grey sandy GRAVEL with scattered fragments of flint and chalk		
4.60	D7				(1.40)	Soft greyish brown silty CLAY		
5.40 (0.30)					5.40 (0.30)	Soft black organic peaty SILT		
5.70 (0.30)	D8				5.70 (0.30)	Stiff dark grey slightly fissured silty CLAY with scattered shells and occasional layers of shale		
6.00					6.00	Complete at 6.00m		

Remarks Groundwater at 0.55 m on completion of the borehole and withdrawal of the casing	Scale (approx)	Logged By
	1:50	Prelim
	Figure No. J08268.BH4	

<b>Excavation Method</b> Percussive lined open-drive sampler (Terrier Rig)	<b>Dimensions</b> 125mm to 4.00m	<b>Ground Level (mOD)</b>	<b>Client</b> The Kings School, Ely	<b>Job Number</b> J08268
	<b>Location</b>	<b>Dates</b> 09/12/2008	<b>Engineer</b> Heyne Tillet Steel	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50	D9				(0.10) 0.10	Made Ground (Brown humic sandy clay)		
0.70	D1				(1.10)	Made Ground (Brown humic sandy clay with scattered gravel and brick fragments)		
1.00-1.45	SPT N=3		0,0/0,1,1,1		1.20 (0.60)	Made Ground (Grey and brownish grey mottled sandy clay with pockets of peat and decaying roots)		
1.70	D2				1.80 (0.20)	Made Ground (Brown silty very sandy clay with scattered gravel and shell fragments)		
2.00-2.45	SPT N=0		0,0/0,0,0,0		2.00	Very soft pale grey, black and dark greyish brown organic SILT with clayey layers and pockets of black peat		
2.70	D3				(1.70)			
3.30	D4							
					3.70 (0.02)	Fragments of CHALK		
4.40	D5				3.72 (1.78)	Medium dense brownish green very clayey SAND with thin layers of black clayey silt		
5.20	D6				5.50			
5.80	D7				(1.50)	Firm becoming stiff by 5.7 m dark grey slightly fissured silty CLAY with scattered shells and occasional layers of shale		
6.60	D8				7.00	Complete at 7.00m		

<b>Remarks</b> Groundwater at 0.54 m on completion of the borehole and withdrawal of the casing	<b>Scale (approx)</b>	<b>Logged By</b>
	1:50	Prelim
	<b>Figure No.</b> J08268.BH5	



Tythenhanger House  
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Site  
The Kings School, Ely

Number  
**BH6**

<b>Excavation Method</b> Percussive lined open-drive sampler (Terrier Rig)	<b>Dimensions</b> 125mm to 4.00m	<b>Ground Level (mOD)</b>	<b>Client</b> The Kings School, Ely	<b>Job Number</b> J08268
	<b>Location</b>	<b>Dates</b> 04/12/2008	<b>Engineer</b> Heyne Tillet Steel	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.20	D1				(0.35) 0.35	Made Ground (Brown humic sandy clay with occasional fine gravel and abundant rootlets)		
0.80	D2				(0.65)	Made Ground (Brown sandy clay with scattered gravel and fragments of brick)		
1.00-1.45	SPT N=4		0,0/0,1,2,1		1.00	Made Ground (Greyish brown very clayey sand)		
1.20	D3				(0.60)			
1.90	D4				1.60	Soft grey and very dark grey very silty organic CLAY with pockets of black silt and occasional pockets of decaying organic matter		
2.00-2.45	SPT N=0		0,0/0,0,0,0		(2.25)			
2.50	D5							
3.00-3.45	SPT N=0		0,0/0,0,0,0					
3.30	D6							
3.85	D7				3.85	Brownish green silty SAND		
4.00-4.45	SPT N=6		1,1/1,1,2,2		(0.05) 3.90	Stiff becoming very stiff dark grey slightly fissured silty CLAY with scattered shells and occasional layers of shale		
4.20	D8							
5.00-5.45	SPT N=14		1,2/3,3,4,4					
5.50	D9							
6.00-6.45	SPT N=26		2,5/6,6,7,7		(4.55)			
6.50	D10							
7.00-7.45	SPT N=27		2,4/4,5,7,11					
7.80	D11							
8.00-8.45	SPT N=21		2,3/3,5,6,7		8.45			
						Complete at 8.45m		

<b>Remarks</b> Groundwater at 0.59 m on completion of the borehole and withdrawal of the casing	<b>Scale (approx)</b>	<b>Logged By</b>
	1:50	Prelim
	<b>Figure No.</b> J08268.BH6	



Tyttenhanger House  
Coursers Road  
St Albans  
AL4 0PG

**Site**  
The Kings School, Ely

**Number**  
**BH7**

<b>Excavation Method</b> Percussive lined open-drive sampler (Terrier Rig)	<b>Dimensions</b> 125mm to 4.00m	<b>Ground Level (mOD)</b>	<b>Client</b> The Kings School, Ely	<b>Job Number</b> J08268
	<b>Location</b>	<b>Dates</b> 09/12/2008	<b>Engineer</b> Heyne Tillet Steel	<b>Sheet</b> 1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.30	D1					Made Ground (Brown humic sandy clay with scattered gravel and brick fragments and occasional shell fragments)		
0.80	D2							
1.00-1.45	SPT N=3		0,0/0,1,1,1		(2.25)			
1.50	D3							
2.00-2.45	SPT N=0		0,0/0,0,0,0					
2.30	D4				2.25	Pale brown silty clayey SAND		
					(1.20)			
3.30	D5				3.45	Soft becoming firm grey silty organic CLAY		
3.60	D6				(0.25) 3.70	Stiff dark grey slightly fissured silty CLAY with scattered shells and occasional layers of shale		
					(1.30)			
4.60	D7				5.00	Complete at 5.00m		

<b>Remarks</b> Groundwater at 0.89 m on completion of the borehole and withdrawal of the casing	<b>Scale (approx)</b>	<b>Logged By</b>
	1:50	Prelim
	<b>Figure No.</b> J08268.BH5	

# OASIS DATA COLLECTION FORM: England

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**OASIS ID: cambridg3-72257**

### Project details

Project name	Evaluation and Watching Brief at the King's School Ely
Short description of the project	An archaeological test pit and borehole survey, pipeline watching brief and ground-penetrating radar survey was undertaken on behalf of the King's School, Ely (NGR: TL 5397 8015). A total of 24 test pits, borehole and archaeological sections were excavated and recorded with several within the quadrangle of the current building configuration and adjacent to the garden wall of the Old Bishop's Palace revealing varying thicknesses of made ground overlying clays deposited in hollow, possibly a former quarry or ancient excavation on the site, possibly relating to building work associated with the Cathedral or associated nearby buildings.
Project dates	Start: 01-12-2008 End: 28-02-2009
Previous/future work	Yes / No
Any associated project reference codes	EKS08 - Sitecode
Any associated project reference codes	EKS09 - Sitecode
Any associated project reference codes	ECB3337 - HER event no.
Type of project	Recording project
Current Land use	Other 3 - Built over
Monument type	QUARRY Medieval
Significant Finds	POTTERY Medieval
Significant Finds	POTTERY Post Medieval
Investigation type	'Geophysical Survey','Test-Pit Survey','Watching Brief'
Prompt	Direction from Local Planning Authority - PPG16

Solid geology	LOWER GREENSAND
Drift geology	GLACIAL SAND AND GRAVEL
Techniques	Ground penetrating radar

### Project location

Country	England
Site location	CAMBRIDGESHIRE EAST CAMBRIDGESHIRE ELY King's School, Ely, Arts and Drama Building
Postcode	CB7 4DB
Study area	2730.00 Square metres
Site coordinates	TL 5397 8015 52.3972677803 0.263264204463 52 23 50 N 000 15 47 E Point
Height OD / Depth	Min: 14.00m Max: 17.00m

### Project creators

Name of Organisation	Cambridge Archaeological Unit
Project brief originator	Local Authority Archaeologist and/or Planning Authority/advisory body
Project design originator	Alison Dickens
Project director/manager	Alison Dickens
Project supervisor	Shannon Hogan
Type of sponsor/funding body	Developer
Name of sponsor/funding body	The King's School, Ely

### Project archives

Physical Archive recipient	Cambridge Archaeological Unit
Physical Archive ID	EKS08/09
Physical Contents	'Animal Bones','Ceramics','other'
Digital Archive recipient	Cambridge Archaeological Unit
Digital Archive ID	EKS08/09
Digital Contents	'Animal Bones','Ceramics','other'
Digital Media available	'Geophysics','Images raster / digital photography','Spreadsheets','Survey','Text'



Paper Archive recipient	Cambridge Archaeological Unit
Paper Archive ID	EKS08/09
Paper Contents	'Animal Bones','Ceramics','other'
Paper Media available	'Context sheet','Drawing','Map','Photograph','Plan','Report','Section','Survey','Unpublished Text'

### Project bibliography 1

Publication type	Grey literature (unpublished document/manuscript)
Title	King's School, Ely, Cambridgeshire, Redevelopment of the Drama and Art Centre: An Archaeological Evaluation and Watching Brief
Author(s)/Editor(s)	Appleby, G.
Author(s)/Editor(s)	Dickens, A.
Other bibliographic details	CAU Report 919
Date	2010
Issuer or publisher	Cambridge Archaeological Unit
Place of issue or publication	Cambridge
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## OASIS:

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