

Archaeological Desk-based Assessment & Geophysical Survey
of
HAYESFIELD LOWER SCHOOL,
BROUGHAM HAYES, BATH, B&NES.
for
Bath & North East Somerset Council



Report No. 2363/2010



Bristol and Region Archaeological Services

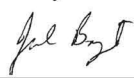

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Archaeological Desk-based Assessment & Geophysical Survey
of
HAYESFIELD LOWER SCHOOL,
BROUGHAM HAYES,
BATH, B&NES.

Centred on
N.G.R. ST 7402 6460

Client: Bath & North East Somerset Council

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Abbreviations

AD	<i>Anno Domini</i>	LBS	Listed Building System
aOD	Above Ordnance Datum	m	Metre
B&NES	Bath and North East Somerset	NGR	National Grid Reference
BaRAS	Bristol & Region Archaeological Services	NMR	National Monuments Record
BC	Before Christ	OS	Ordnance Survey
BCL	Bath Central Library	SMR	Sites & Monuments Record
BGS	British Geological Survey Gallery	SRO	Somerset Records Office
B&NES HER	Bath & NE Som Historic Environment Record	TRE	<i>Tempore Regis Edwardi</i> (a formulaised in the Domesday Book meaning ‘in the time of King Edward’; i.e. before the Conquest in 1066)
BRO	Bath Record Office		
<i>c</i>	<i>Circa</i>		
GPR	Ground Probing Radar		
GWR	Great Western Railway		
Km	Kilometre	UNESCO	United Nations Educational, Scientific & Cultural Organization
		WW2	World War 2

NOTE

Notwithstanding that Bristol and Region Archaeological Services have taken reasonable care to produce a comprehensive summary of the known and recorded archaeological evidence, no responsibility can be accepted for any omissions of fact or opinion, however caused.
October 2011.

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SUMMARY

Bristol and Region Archaeological Services were commissioned by Mace Ltd. to undertake an archaeological desk-based assessment (DBA) for land at Hayesfield Lower School, Brougham Hayes, Bath (NGR ST 7402 6460). The DBA was supplemented by a geophysical survey commissioned by B&NES.

The northern end of the study area lies above a Middle Pleistocene gravel terrace with proven potential for the survival of prehistoric mammalian remains.

Cartographic and documentary evidence suggests that Brougham Hayes probably defines the line of a former Roman road. The gravel terrace at the northern end of the study area has also been identified as an area with potential for prehistoric and Roman settlement. However, no conclusive evidence of any activity pre-dating the post-medieval period has been identified in or around the study area.

An analysis of historic maps confirmed that the study area probably remained undeveloped land until the mid 19th century. The earliest development within the study area was probably the establishment of a large Militia Barracks in 1864. The 2nd Militia Regiment of Somerset occupied the barracks until 1881. The main barrack building now forms the main block of Hayesfield Lower School.

Between 1881 and 1930 the former barracks were used as an Industrial School known as the 'Somerset Certified Industrial Home for Boys'. Children between the ages of seven and fourteen were sentenced to these institutions for 'crimes' such as vagrancy, begging, petty crime, or associating with known criminals or prostitutes. The school re-opened as a Domestic Science College in 1934 after undergoing a major renovation programme. The renovation programme involved several alterations and extensions to the original barracks building and landscaping to create playing fields. Later 20th century activity on the site included a number of extensions to the School, the construction of wartime hutments on the playing fields and landscaping works associated with alterations to the playing fields. No significant features associated with either the Militia Barracks or the subsequent Industrial School were identified within the proposed development area.

An analysis of historic maps, geotechnical trial pit logs and a site walkover survey confirm that the proposed development area, presently used as a tennis court, is likely to have suffered heavy horizontal truncation by landscaping works in the late 19th and 20th centuries. Additional damage may have been caused by the construction of WW2 hutments on the playing fields. Given the level of known disturbance it is probable that any archaeological features that did exist in this area will have been heavily truncated or destroyed. However, the playing fields immediately to the north of the tennis courts are likely to have suffered a lesser degree of disturbance and consequently have a higher archaeological potential.

A GPR survey of the tennis courts revealed features indicative of surfaces related to the present tennis court and a post-war predecessor. A number of small discrete features were also identified. These are difficult to interpret with any confidence, and although there is a reasonable probability they indicate the presence of structures related to the WW2 hutments, the possibility that they represent earlier archaeological features cannot be entirely discounted.

Although the study area is considered to have moderate, but currently unproven archaeological potential, the evidence suggests that much of the proposed development area is likely to have been heavily affected by 19th and 20th century developments, and is therefore considered to have low archaeological potential.

1. INTRODUCTION & CURRENT USE

- 1.1 Bristol and Region Archaeological Services were commissioned by Mace Group to undertake an archaeological desk-based assessment (DBA) for land at Hayesfield Lower School, Brougham Hayes, Bath (NGR ST 7402 6460) (see **Fig. 1**). The DBA was supplemented by a geophysical survey commissioned by B&NES.
- 1.2 The study area is situated in the inner suburbs of Bath, slightly to the south of the A4 Lower Bristol Road, some 500m to the west of the City Centre. The study area is rectangular and measures approximately 80m from east to west and 190m north to south. The site is defined by Brougham Hayes to the west; the main Bath to Bristol railway line to the south; Widcombe, Lyncombe and St James Cemetery to the east and the 'Holiday Inn' hotel and car park to the north. Brougham Hayes is a terraced residential street.
- 1.3 The study area presently comprises a complex of school buildings at the southern end of the site with a tennis court and playing field to the north. Features noted during the walkover of the study area (see **Section 2.3**) include a late 19th century barracks, later converted into a school building (**Plates 1 & 2**); several 20th century extensions to the school (**Plates 3 & 4**); a playing field and tennis court with evidence of landscaping (**Plate 5**).
- 1.4 The proposed development entails the construction of a new science and technology building in an area presently used as a tennis court to the north of the existing school. Several different development options have been proposed and the exact scale and location of the proposed development have yet to be decided.
- 1.5 The geology in the immediate environs of the study area comprises Lower Jurassic mudstones of the Charmouth Mudstone Formation (BGS 2010). The solid geology is overlain at the northern end of the study area by Middle Pleistocene river terrace deposits of sand and gravel (Bates & Wenban-Smith 2005). The study area is situated above the floodplain of the river Avon on the south side of the valley, which slopes gently north to south and ranges in height from c28m to c20m aOD.

2. METHODOLOGY

- 2.1 The study was undertaken in accordance with criteria set out the Institute of Field Archaeologists' *Standards and Guidance for Archaeological Desk-Based Assessment* (revised 2001).
- 2.2 Selected material from the holdings of the Bath Record Office and Bath Central Library were consulted. All information considered appropriate to the study was collated, summarised and is presented in the following report. Due to the temporary closure of Somerset Records office it was not possible to view a number of documents that relate to the study area. All digital photographs and notes are preserved in the Project Archive to be retained at BaRAS's premises at St Nicholas Church, Bristol. A copy of the report is to be lodged at the National Monuments Record (NMR), Swindon.
- 2.3 The aim of this report is to assess the archaeological potential of the study area using selected locally available documentary sources combined with a rapid walkover survey and reference to the B&NES HER. Archaeological potential is taken to include the built and burial environment, any historic parkland/garden landscapes, important hedgerows and other bio-archaeological features. The documentary research is supplemented with the results of geophysical survey.
- 2.4 A rapid walkover survey of the study area was undertaken by Cai Mason (BaRAS) on the 20th of July 2010. Photographs (see **Plates 1-6 & Cover**) and rough notes were taken during the visit. The insides of the buildings were not inspected.
- 2.5 A geotechnical survey was undertaken by Greenfield Associates on the 24th of August 2011. This work was not archaeologically monitored but the trial pit logs and site photographs were examined as part of this report (**Appendix 2; Plates 7 & 8**).
- 2.6 A Ground Probing Radar (GPR) survey of the tennis courts was carried out by Richard Fleming and Tim Lewis of Stratascan on the 24th of August 2011. The subsequent report (**Appendix 3**) was produced by Richard Smalley (2011).
- 2.7 The project has been entered in the OASIS Online Access to the Index of Archaeological Investigations as: bristola1-79955. It is the policy of B&NES not to assign Historic Environment Numbers to desk-based assessments at the time of their preparation.

3. HISTORICAL CONTEXT

General

- 3.1 The study area lies in the historic parish of Widcombe with Lyncombe in the Bath Forum Hundred (Hinson 2003). The western edge of the site lies along the boundary between Widcombe with Lyncombe and Twerton parishes.
- 3.2 The Bath Forum Hundred is not yet covered by the *Victoria History of the Counties of England*, however a recent account of Widcombe with Lyncombe parish, including twentieth-century developments, is provided by Scott (1993). Early descriptions of Widcombe with Lyncombe parish are given by Samuel Lewis in *A Topographical Dictionary of England* (1848), and in the *The National Gazetteer of Great Britain and Ireland* (1868).

Historical Background

- 3.3 The study area is bounded to the west by the Twerton and Widcombe with Lyncombe parish boundary. This boundary is very straight and is recorded in Saxon charters as ‘*Fosse Straet*’ (Bird 1991). It is therefore highly likely that the boundary defines the route of a Roman road. Indeed, it has also been suggested by Bird (1991), that the route may have originated as a prehistoric river crossing, formalised in the Roman period into the main road to the south of Bath (*Aquae Sulis*). The hypothesis is that the Fosse Way actually ran across the Avon Valley to the west of Bath, probably due to the marshy nature of the area immediately to the south of the town (*ibid*).
- 3.4 It has been suggested that the Bath Forum hundred originated as a Roman administrative unit, which later formed part of the post-Roman polity of the Dubonni (Davenport 2002). By AD 626 the Bath area formed part of the kingdom of the Hwicce and in 675 the *Hat Bathu* were gifted to ‘a convent of Holy Virgins’ (*ibid*). The land granted to the convent corresponds well to the Domesday Bath Foreign Hundred (later known as Bath Forum).
- 3.5 When the Domesday Survey was undertaken in 1086, Widcombe was part of a Crown demesne rented to the Prior of Bath, who directly held Lyncombe (*Lincume*) and administered the two as a single parish (Scot 1993). The Domesday entry for Lyncombe reads:
- ‘The Church itself holds Lyncombe. TRE it paid geld for 10 hides. There is land for 8 ploughs. Of this 7 hides are in demesne, and there are 3 ploughs and 8 slaves; and 4 villans and 10 boarders with 3 ploughs. There are 2 mills rendering 10s, and 30 acres of meadow and 200 acres of pasture. It was worth £6; now £8’ (Williams *et al* 1992).
- 3.6 The parish of Widcombe with Lyncombe probably had three settlements at the time the Domesday Survey recorded. These comprised a settlement focussed around Widcombe Old Church, *c* 1.7km to the east of the study area; a settlement at Lyncombe, *c* 1.5km to the south-east; and a settlement along Holloway, near Magdalene Church, *c* 0.75km to the east (Scott 1993). A settlement in the adjacent parish of Twerton was situated *c* 1km to the west of the study area.
- 3.7 Widcombe with Lyncombe parish remained essentially rural in character until well into the 18th century, as is shown by a panorama of Bath produced in 1730 (**Fig. 2**), and it is probable that the study area remained well beyond any areas of settlement throughout the medieval and earlier post-medieval periods.
- 3.8 The expansion of Bath in the early 19th century led to a dramatic rise in the population of Widcombe with Lyncombe. By 1801 there were 2,781 residents in the parish, but by 1821 this had risen to 5,880, and by 1841 a population of 9,920 are recorded in the parish (Scot 1993).

Despite the rapid growth of the suburban population, the study area itself remained undeveloped open fields until the late 19th century.

- 3.9 The adjacent parish of Twerton also grew rapidly in the early 19th century and by the 1820s a row of terraced houses (LBS no. 444658) had been built along the western side of Brougham Hayes.
- 3.10 In 1833 The Great Western Railway Company was founded, and on the 1st of August 1840 the Bristol to Bath section of the line was opened; the railway line forms the southern boundary of the study area.
- 3.11 In 1861 Widcombe, Lyncombe and St James Cemetery was opened. The Cemetery includes an ornate French Gothic style mortuary chapel designed by C.E. Davis and forms the eastern boundary of the study area.
- 3.12 Documents held by the SRO record that in 1863, the County acquired the whole of the study area on behalf of the 2nd Militia Regiment of Somerset. This land, forming part of 'Sydenham Furlong', was purchased for the construction of a new Militia Stores (Q/AM/1). A newspaper cutting held by the BRO in the Hunt collection (vol 4 p47) records that the foundations of the new building were laid on the 11th of May 1864. The site is described as being located in 'the upper part of a field adjoining the cemetery in Lower Bristol Road'. The new Militia Stores referred to in these documents is undoubtedly the barrack building that survives as the northern range of Hayesfield Lower School. There are a number of other documents held by the SRO that relate to this building. However, due to the temporary closure of the records office none were available for inspection. The SRO online catalogue identifies the records held as: 'agreement, plans, correspondence and insurance policy relating to the building of the Stores' dated 1863-65 (Q/AM/2); and 'leases, correspondence and plans of the late Militia Barracks let to the 1st Somerset Rifle Volunteers and Miss Sheppard' dated 1881-86 (Q/AM/3). The earliest listing for the 2nd Somerset Regiment of Militia in the Bath Directory is in 1868-9, where the address is recorded as: Barracks, Lower Bristol Road. This suggests that building work on the Barracks was completed by *c.* 1867. The final listing for the Militia is in the Bath Directory is in 1880-1 edition.
- 3.13 The 1871 census records that there were three officers and their families living at Nos. 1 – 3 Barrack Gate and thirteen officers, their families and five drummers or band members living in the Barracks Main Building. The Barrack Gate buildings were situated on land to the north of the study area along the Lower Bristol Road frontage.
- 3.14 The 1881 census records a total of thirteen officers living at the barracks; this probably included the Barrack Gate buildings, as they are not listed separately.
- 3.15 Documents held by the SRO (DD/SCS) record that in the late 19th century the study area was used as an Industrial School for boys. Industrial Schools were founded under the 1857 Industrial Schools Act (Duckworth 2002). This gave magistrates the power to sentence children between the ages of seven and fourteen years old to a spell in one of these institutions. The act dealt with those children who were brought before the courts for vagrancy. In 1861 a further act was passed that included additional categories of children that could be detained. These included any who were apparently under the age of fourteen and found begging or receiving alms; any found wandering and not having any home or visible means of support, or those in company of reputed thieves; any whose parents declare him to be beyond their control, and any apparently under the age of twelve who have committed an offence punishable by imprisonment or less (*ibid*). The act stated the child had to be 'apparently' under the age of fourteen. This was because children often lied about their age if it was advantageous for them to do so, whilst some children genuinely did not know how old they were (*ibid*). Another Act in 1866 also transferred overall responsibility for the Schools to the Prison Authority, and from 1871 children under fourteen of a woman twice convicted of a crime could be sent to an Industrial School (Higginbotham 2010). Under the 1876 Elementary

Education Act, School Boards were authorised to establish Industrial Schools and Day Industrial Feeding Schools ‘for those children whose education is neglected by their parents, or who are found wandering or in bad company’. Day Industrial Schools were defined as institutions ‘in which industrial training, elementary education, and one or more meals a day, but not lodging, are provided for the children’ for their ‘proper training and control’ (*ibid*). An amendment to the Industrial Schools Act in 1880 also stated that ‘any child under fourteen found to be living in a brothel, or living with or associating with common or reputed prostitutes’ could be sent to an Industrial School (*Ibid*).

- 3.16 The ‘Somerset Certified Industrial School’ was founded in 1866, and certified on 19th July that year to accommodate 180 boys. The stated object of the home was ‘to reclaim abandoned boys, and to rescue those whose unhappy circumstances would inevitably lead them to crime and profligacy’ (DD/SCS). This institution housed boys not only from Somerset but also from places at a considerable distance. The School was originally based at Devonshire House, Wells Road, Bath (Higginbotham 2010), and admission registers record that boys began to be admitted from September 1866 onwards (DD/SCS). In 1868 the School at Devonshire house was ‘found to be in so dangerous a condition that it was necessary to remove the boys for a time, while they were repaired and strengthened’. Temporary accommodation was found for them in two cottages belonging to Mr Sheppard, at Bathampton’ (Wall 2010).
- 3.17 In 1881 the Industrial School was re-located to the Brougham Hayes site, and re-certified to accommodate 180 boys. This was later reduced to 150 (*ibid*). Despite only being certified for 180 inmates the 1891 census records 191 inmates and nine members of staff. In 1901 the number of inmates had been reduced to 179 with seven staff members. Alterations to the School are recorded in documents held by the SRO. These include ‘specification, plans and elevations of proposed alterations and additions to the Industrial School, Bath’ dated 1897 - 1900 (Q/AGZ/20/4). A photograph of the Somerset Certified Industrial School was published in the 1896 edition of the Bath Pictorial (**Fig. 3**).
- 3.18 The prompt for departure of the Militia from the Brougham Hayes site was provided by a major reorganisation of the military undertaken in 1881, known as the Childers Reforms. These reforms led to the amalgamation of many regiments, including the 2nd Militia Regiment of Somerset, which became part of The Prince Albert’s Somerset Light Infantry, based at the newly built Jellallabad Barracks in Taunton. Documents held by the SRO record the transfer part of the study area to First Somerset Rifle Volunteer Corps between 1881 and 1886 (Q/AM/3). This document undoubtedly refers to the ‘Rifle Volunteer Drill Ground’ and buildings along the Lower Bristol Road that are shown on the First Edition 1888 OS map (See **Section 4.2** below). Although the 1882-3 edition of the Bath Directory only lists the address of the Rifle Volunteers as ‘Bath’, it seems probable that by this date they were based in the buildings ranged along Lower Bristol Road. Indeed, the 1891 census confirms that three officers and their families were living at 1 – 3 Volunteer Stores, Lower Bristol Road. An army officer was also living at ‘Industrial School Cottage’ on the Lower Bristol Road. The 1901 census records only two officers and their families at Nos. 1- 4 Volunteer Stores.
- 3.19 Admissions records for the Industrial School, then known as the ‘Somerset Boys Home’, end in 1929 (DD\SCS). The Boys Home is not listed in Kelly’s 1931 Directory, which suggests it closed in about 1930. In 1934 the building was re-opened as the new home of a Domestic Science and Technical College. Prior to the opening of the College the site had undergone a major renovation programme at a cost of £20,999. This money paid for the conversion and renovation of the former Boys Home and the creation of playing fields on the old Rifle Volunteer’s drill ground. The playing fields included a hockey pitch and a tennis court (Jefferies 1997). A comparison of photographs taken before and after the renovation programme demonstrates that the works also included a substantial re-modelling of the Barracks external façade (see **Figs. 3 & 4**).
- 3.20 The outbreak of war in 1939, led to the Domestic Science and Technical College being requisitioned by the Admiralty. During the war a number of new hutments were constructed

on the former tennis court to the north of the College. The Admiralty relinquished control of the College in 1944 (*ibid*).

- 3.21 The Domestic Science and Technical College returned to the site after the war and the hutments created by Admiralty were adapted for uses by the School. The hutments were evidently well suited to the purpose and in 1947 the Bath Education Committee decided to erect further hutments, which were used as the headquarters of the School (*ibid*). No photographs exist of these buildings. In 1960 the Domestic Science College was re-located to new premises in Sion Hill and by 1964 the hutments had been demolished and replaced by the present tennis court. A large new gymnasium block was also built in 1960 (*ibid*).
- 3.22 Following the departure of the Domestic Science College, the School was re-named ‘City of Bath Technical School for Boys’. The School closed in 1970. In 1973 the School re-opened under the name ‘Hayesfield School’. The School was re-named ‘Hayesfield School Technology College’ in 1979, ‘Hayesfield School’ by 1985 and ‘Hayesfield Girls School’ in 2009.
- 3.23 Recent developments at the school include the construction of a new drama block in 1993, the demolition of an electricity sub station and caretakers store in 2004 and the construction of a steel framed covered area in 2007.

Nomenclature

- 3.24 The name Hayes is derived from the Old English *haes* meaning brushwood or underwood, or possibly *horg* or *hege*, meaning enclosure or hedge respectively (Cotle 1967).
- 3.25 Lyncome is believed to mean ‘Watery Valley’, while Widcombe means either ‘Wide Valley’ or ‘Withy Valley’ (Scott 1993).

4. CARTOGRAPHIC EVIDENCE

General

4.1 Historic and Ordnance Survey maps held by the Bath Record Office were examined.

Cartographic Observations

4.2 The observations made on the maps examined are summarised in **Table 1** below.

Map	General Observations	Fig. No.
Thorpe, 1742	<ol style="list-style-type: none"> 1) General location of study area indicated only; 2) Study area situated in open fields adjacent to the Lower Bristol Road; 3) Lower Bristol Road annotated 'to Twerton'. 	5
Bath Turnpike Map, 1786-7	<ol style="list-style-type: none"> 1) Only the northern half of the study area depicted; 2) Study area situated in open fields adjacent to the Lower Bristol Road; 3) Field annotated 'Mr House's land'; 4) Western boundary of the study area defined by a hedgerow. 	
Plan of the Manor of Lyncombe and Widcombe in the county of Somerset belonging to the Feoffees of Bruton Hospital, J. Charlton 1799 (Copy produced in 1944)	<ol style="list-style-type: none"> 1) Study area divided into two fields; 2) Northern field labelled 'Crabtree Hayes'; 3) Southern field labelled 'Miss Allen Lower Hayes' 	6
Plan of Bath, 1801	<ol style="list-style-type: none"> 1) Western edge of study area not depicted; 2) Study area divided into two fields. 	
Twerton Tithe Map, 1838	<ol style="list-style-type: none"> 1) Western boundary of study area depicted; 2) Houses depicted along west side of Brougham Hayes. 	
Lyncombe and Widcombe Tithe Map, 1839	<ol style="list-style-type: none"> 1) Study area divided into two fields; 2) Northern field labelled 24, southern field labelled 25; 3) Southern field bisected by the Great Western Railway. This defined the sites southern boundary. 	7
Plan of the City and Environs of Bath and its Suburbs, 1852	<ol style="list-style-type: none"> 1) Study area divided into two fields; 2) Turnpike depicted along Lower Bristol Road to the north-east of the study area 	8
<i>First Edition</i> 1888 (1: 2500) OS map	<ol style="list-style-type: none"> 1) Study area divided into three plots; 2) The southernmost plot (Nos. 519 and 568), form part of a large nursery, that contains deciduous and coniferous trees, and is labelled 'Crandale Nursery'. The Nursery contains a range of small buildings near the southern edge of the study area; 3) The middle plot (No. 520) includes a large complex of buildings annotated 'Somerset Certified Industrial Home (boys)', a small ancillary building to the south-east is also labelled 'Magazine'; 4) The northern plot (No. 521) is an open field annotated 'Rife Volunteer Drill Ground'. There appears to be a terraced slope between plots 520 and 521; 5) A building annotated 'Drill shed' is situated along the study area's eastern boundary; 6) The northern plot is accessed off Lower Bristol Road through an arched entrance with a range of buildings on either side. A path leads from this gateway to a set of steps to the Industrial Home; 7) The buildings along the Lower Bristol Road frontage, to the north of the study area, are annotated 'Lodge'; 8) A large burial ground defines the eastern boundary of the study area (Plot No 518), which is annotated 'Lyncombe and Widcombe and St James 	9

	<p>Cemetery'. The cemetery contains two buildings joined by an archway that are labelled 'Mortuary Chapel (Church of England)' and 'Mortuary Chapel (Nonconformist)' respectively. The cemetery is depicted with deciduous and coniferous trees;</p> <p>9) The Great Western Railway line defines the southern boundary of the study area;</p> <p>10) A road defines the western boundary of the study area, the buildings on the western side of this road are labelled 'Twerton Hayes Buildings' and 'Brougham Hayes Buildings'.</p>	
<p><i>Second Edition 1904 (1: 2500) OS map</i></p>	<p>1) Study area now divided into two plots;</p> <p>2) The southernmost plot (formed from plots 519, 520 and 568) annotated 'Somerset Certified Industrial Home', a glasshouse and a small extension have been added to the south of the Industrial Home. Later plans identify this extension as a toilet block;</p> <p>3) A western extension has also been added to the southern wing of the Industrial Home;</p> <p>4) Most of the northern plot is still an open field. The pathway shown in the centre on the 1888 map is not depicted and the southern end of the plot appears to have been landscaped;</p> <p>5) The buildings labelled 'Drill Shed' on the 1888 map have been extended to the north;</p> <p>6) To the north of the study area, a large new building, labelled 'Drill Hall', fronting the Lower Bristol Road, is depicted to the east of the 'Lodge' buildings shown on the 1888 map;</p> <p>7) The eastern boundary of the study area is still defined by 'Lyncombe and Widcombe and St James Cemetery';</p> <p>8) The Great Western Railway line still defines the southern boundary of the study area;</p> <p>9) The road defining the eastern boundary of the site is labelled 'Brougham Hayes';</p> <p>10) A new road labelled 'Victoria Road' is depicted to the west of the study area.</p>	10
<p><i>Edition of 1932 (1: 2500) OS map</i></p>	<p>1) Study area still divided into two plots;</p> <p>2) The southernmost plot is labelled 'Somerset Boys Home'. The glasshouse depicted on the 1904 map has been extended to the east and west. A small range of buildings that were originally built within Crandale Nursery, and first shown on the 1888 map, have been removed;</p> <p>3) A new drive to the Boys Home off Brougham Hayes has been added;</p> <p>4) Most of the northern plot is still an open field. There is some evidence of landscaping at the northern end of the study area;</p> <p>5) The buildings labelled 'Drill Shed' on the 1888 map have been removed;</p> <p>6) Two small new buildings and a large new building, labelled 'Drill Hall' has been added opposite the Drill Hall shown on the 1904 map;</p> <p>7) The eastern, southern and western boundaries are still defined by Lyncombe and Widcombe and St James Cemetery, The Great Western Railway line and Brougham Hayes;</p> <p>8) Tramway shown running along Lower Bristol Road.</p>	11

<p><i>Revision of 1936 (1: 2500) OS map</i></p>	<ol style="list-style-type: none"> 1) Study area now a single plot; 2) Former Boys Home now labelled 'Training College'. The glasshouse depicted on the 1904 and 1932 maps has removed; 3) Buildings built before 1904 at the western end of the southern wing of the College have been removed, as have some small ancillary buildings in the south-eastern corner; 4) A new extension has been added linking the southern wing to the main College building; 5) New rectangular enclosure depicted to the south of the College. This is labelled as a tennis court on a 1951 map. 6) The access off Brougham Hayes has been modified and two new flights of steps added to the north of the College; 7) The open area to the north of the College labelled 'Playing Field'; 8) A new boundary has been added that defines the northern edge of the study area with a new gateway providing access from the Drill Hall to two small buildings first shown on the 1932 map; 9) Buildings to the north of the study area still labelled 'Drill Hall'; 10) The eastern, southern and western boundaries are still defined by Lyncombe and Widcombe and St James Cemetery, The Great Western Railway line and Brougham Hayes. 	<p>12</p>
<p>High explosive bomb sites map. Annotated version of <i>Revision of 1936 (1: 2500) OS map</i></p>	<ol style="list-style-type: none"> 1) A single high explosive bomb site is shown within the study area. The bomb site is situated immediately to the north of the main College building and is marked in blue; this is believed to indicate an unexploded bomb. 2) A single bomb site is shown to have hit Victoria Road, to the west of the study area. The houses on that street are all coloured in red, indicating they were destroyed or seriously damaged; 3) Four bomb sites are depicted in the Cemetery to the east of the Study area, all of which exploded. 	<p>13</p>
<p>City of Bath Air Raid Damage 25th, 26th and 27th April 1942. Annotated version of <i>Revision of 1936 (1: 2500) OS map</i></p>	<ol style="list-style-type: none"> 1) No bomb damage is shown within the study area; 2) Six houses in Victoria Road are shown to have been completely destroyed. Most of the others are show to be so badly damaged that demolition is necessary; 3) Many of the houses in Brougham Hayes are show to be badly damaged, but still repairable; 4) The Mortury Chapels in the Cemetery were also badly damaged; 5) The Drill Hall suffered slight general damage. 	<p>14</p>
<p>1951 <i>Survey (1: 1250) OS National Grid map</i></p>	<ol style="list-style-type: none"> 1) Study area now a single plot; 2) Main building still labelled 'Training College'. A small extension is shown to the west of the toilet block; 3) A large complex of buildings have been added in the former playing field to the north of the College. The area directly to the north of these buildings still labelled 'Playing Field'; 4) Enclosure to the south-west of the College , first shown on the 1938 map, labelled 'Tennis Court'; 5) Former Drill Hall to the north of the study area, now labelled 'T A Centre'. The small new buildings added to the south of the Drill hall between 1904 and 1932 have been removed and replaced with new buildings; 6) The eastern, southern and western boundaries are still defined by Lyncombe and Widcombe and St James Cemetery, the former Great Western Railway line and Brougham Hayes. 	
<p>Proposed engineering workshop Brougham Hayes technical school. Plan accompanying approved planning application dated 10th December 1954</p>	<ol style="list-style-type: none"> 1) Shows site as depicted in the 1951 map; 2) Shows proposed new building on the sites northern boundary. 	<p>15</p>
<p>Brougham Hayes School erection of a technical school. Plan accompanying approved planning application dated 1st July 1958</p>	<ol style="list-style-type: none"> 1) Shows ground floor of existing School buildings and proposed extensions; 2) The main School building contains offices and classrooms; 3) The east wing contains a staff room and a drawing office and classroom; 4) The southern wing contains a cloakroom, showers, changing room and boys lavatory; 	<p>16</p>

	5) Proposed extensions to the south include a two metalwork shops, an engineering shop, an assembly room, a dining room, a gymnasium and a kitchen.	
Brougham Hayes School erection of a technical school. Plan accompanying approved planning application dated 3rd March 1959	1) Shows the existing School, an outline of the proposed 1958 extension, labelled 'New extension under separate contract' 2) Shows dotted outline of buildings to the north of the School that were built between 1938 and 1951. This area is labelled 'Playground' and 'Football Pitch'	
<i>Revision of 1968</i> (1: 1250) OS National Grid map	1) Only shows western part of the site; 2) Former Training College now labelled 'City of Bath Technical College (Boys)'; 3) Large new extension shown to the south-west of the College. This extension has been built over the tennis courts shown on the 1938 and 1951 maps; 4) The complex of buildings added to the north of the College between 1938 and 1951 have been removed and replaced with an enclosure labelled 'Tennis Court'.	
<i>Revision of 1985</i> (1: 1250) OS National Grid map	1) Only shows eastern part of the site; 2) Former City of Bath Technical College now labelled 'Hayesfield School (Girls)'; 3) The area to the north of the School still labelled 'Tennis Court' and 'Playing Field'; 4) In the former T A Centre to the north of the study area, the Lodge, first depicted in 1888, and the Drill Hall, first depicted in 1904, have both been removed. A large new building is shown on the former Drill Hall site; this is labelled 'Depot'. The second Drill hall, built between 1904 and 1932 is still shown, now labelled as 'Depot'.	

Table 1: Summary of Cartographic Observations

Discussion

- 4.3 The earliest map examined depicting the study area in detail is the Thorpe map of 1742 (see **Fig. 5**). This map lacks the detail available on later maps but does show that the site was situated in open fields adjacent to the Lower Bristol Road.
- 4.4 The first detailed map to depict the study area is the Bath Turnpike map of 1786-7. This shows that the area was still characterised by open fields defined by hedgerows. Only the northern part of the study area is shown on this map, which identifies the owner of the northern half as 'Mr House'.
- 4.5 The next available map to include the study area is a 1944 copy of the Plan of the Manor of Lyncombe and Widcombe, produced by J. Charlton 1799 (**Fig. 6**). This map shows that the study area comprised two fields; the northernmost is labelled 'Crabtree Hayes' owned by 'Porker and House'. The smaller southern field is labelled 'Miss Allen Lower Hayes'. This field formed part of the Ralph Allen Estate (Chapman *et al* 1998). The 1801 Plan of Bath shows the same layout.
- 4.6 The 1839 Lyncombe and Widcombe Tithe Map (**Fig. 7**) show the same boundaries as the earlier maps. However, by then the southern field had been bisected by newly built Great Western Railway (GWR), which forms the southern boundary of the study area. The accompanying apportionment identifies the northern field as 'The Crabtree Hayes', owned by a Henry Edward House; presumably a relative of the Mr House identified on the 1786-7 and 1799 maps. The field was tenanted by Joseph Oram and used as pasture (see **Table 2**). The southern field was owned and occupied by John Shackle and used as a garden, though apparently with no associated building. The area to the west of the study area, depicted on the

5. ARCHAEOLOGICAL EVIDENCE

Introduction

- 5.1 The study area lies in an area of moderate, but unproven archaeological potential.
- 5.2 No previous archaeological work has been undertaken within the study area.
- 5.3 The northern end of the study area is situated on a Middle Pleistocene gravel terrace. Gravel extraction to the west of the study area at a former quarry situated in Bellott Road, Twerton (ST 4330 6500) led to the discovery of a number of Pleistocene mammal bones (Bates & Wenban-Smith 2005). Although a number of sites situated on the gravel terraces in the Bath area have produced faunal remains, no evidence of early human activity has been recovered to date (*ibid*).
- 5.4 The gravel terrace at the northern end of the study area is also believed to have good potential for prehistoric and Roman settlement (B&NES 2010), indeed excavations to *c.* 0.5km to the north of the study area, on a gravel terrace to the north of the river Avon, have identified an Iron Age settlement at Lower Common (Bird 1991).
- 5.5 Mr Richard Sermon, Archaeological Officer for Bath & North East Somerset, provided a trawl of the Bath & North East Somerset Sites and Monuments Record. The location of the SMR monuments is presented in **Figure 16**. Three entries are recorded within the study area; these are included below:

MBN10123

Eastern Parish Boundary of Twerton

Centred on ST 741 648

The eastern parish boundary of Twerton, adjoining Lyncombe and Widcombe is thought to indicate the course of the Fosse Way south of Bath.

MBN11497

Somerset Certified Industrial Boys Home

ST 73991 64541

A boy's home was built at the southern end of the 'Rifle Volunteers Ground' (BN11498) by the late 1880s. (1) Following WWII it was taken over as an annexe to the city technical college (domestic science). Since the introduction of comprehensive education it has become part of Hayesfield School. The Postal Directories give date of certification as 1866.

MBN11498

Drill Hall (site of)

ST 74039 64630

At some time before 1885 a large 'Rifle Volunteer Drill Ground' was laid out alongside Brougham Hayes. The entrance onto the Bristol Road consisted of a turreted gothic gate-house and arch which housed various offices, but the only other building on site was a drill shed against the eastern boundary wall (1) By 1904 a large drill hall had been added on the NE side, and by the end of WWII other large vehicle sheds added to the west side. It remained a TA centre occupied by the Somerset light Infantry until the 1970s, when the gatehouse block was demolished. The police have retained the remaining sheds as a vehicle depot.

- 5.6 There are a several other SMR entries within 200m of the study area; these are presented below:

1838 Twerton Tithe Map, had by then been developed with a row of houses fronting Brougham Hayes.

No.	Proprietors	Occupiers	Premises	State	Measure		
					<i>a</i>	<i>r</i>	<i>p</i>
24	Henry Edward House	Joseph Oram	The Crap Tree Hayes	Pasture	15	1	23
25	John Shackle	Himself	Garden	Garden		2	32

Table 2: Extract from the Apportionment for Lyncombe and Widcombe Tithe Survey of 1839 (see **Fig. 6** for map)

- 4.7 The 1852 Plan of Bath (**Fig. 8**) shows no additional developments within the study area, but by the time the First Edition Ordnance Survey Map was published in 1888 (**Fig. 9**), a number of major developments had occurred both in and around the study area. Most significantly the study area by then contained a large complex of buildings labelled ‘Somerset Certified Industrial Home (boys)’ with a ‘Rifle Volunteer Drill Ground’ and a ‘Drill Shed’ to the north. Records indicate that the Somerset Certified Industrial Home was an Industrial School that moved to the site in 1881 (see **Section 3.14** above). The building used by the Industrial School originated as Militia Barracks built in 1864 (see **Section 3.10** above). A small building labelled on the map as a ‘Magazine’ was later converted storeroom; this building was demolished in 2004. The eastern boundary of the study area, defined by the Lyncombe and Widcombe and St James Cemetery, is also shown for the first time on the 1888 map. The cemetery was established in 1861 (see **Section 3.9** above). The southern end of the study area formed part of the large ‘Crandale Nursery’ which extended into Twerton parish, to the west of the study area. Given that the 1839 Tithe Map identifies this plot as a garden with no associated buildings, it is probable that the Nursery was in operation from at least the 1830s.
- 4.8 A few minor extensions and alterations to the Industrial School and buildings in the Drill Ground are shown on the 1904 and 1932 OS Maps, and by 1932 the, by then closed, Industrial School had been re-named ‘Somerset Home For Boys’ (**Figs. 10 & 11**).
- 4.9 The 1938 OS Map (**Fig. 12**) shows the former boys home labelled as a ‘Training College’ with playing fields on the former Drill Ground.
- 4.10 Maps produced to record the affects of bombing during WW2 show that a high explosive bomb landed immediately to the north of the Training College (**Fig. 13**). The bomb sites are marked either in red or blue; the ones marked in blue are believed to denote bombs that failed to detonate. The 1942 Map produced to record air raid damage (**Fig. 14**) indicates that while every other building in the surrounding area was damaged, the buildings within the study area appear to have been completely unaffected.
- 4.11 Post-war maps show that between 1938 and 1951 a complex of buildings was built in the former playing fields to the north of the College. The majority of these buildings can be identified as hutments built by the Admiralty between 1939 and 1944 (see **Section 3.17** above). The Bath Education Committee is also known to have added some additional hutments soon after the War (see **Section 3.18**). By the time the 1968 OS Map was produced these hutments had been removed and replaced by the present tennis court.
- 4.12 Plans attached to planning applications lodged in 1954 (**Fig. 15**), 1958 (**Fig. 16**) and 1959 show a number of proposed major extensions to the south of what was then a Technical School. These extensions are also shown 1968 OS Map where the School is identified as the ‘City of Bath Technical College’. The tennis court is also identified for the first time on this map.

MBN6151

Tanyard

Centred on ST 739 648

A tannery was established here in a meadow on the south side of the Lower Bristol Road, just inside the parish boundary, in 1800. There was a large pond at the rear, fed by the Marbrook. It appears to have been the first industrial site built for its proximity to Bath. In 1870 the tannery was replaced by a laundry, which still exists in modernised form. The remnants of earlier buildings and the pond appear to have survived at the rear of the laundry. The building of St Peters Terrace at about the same time reduced the Tanyard area.

MBN9820

Maltings site

Centred on ST 740 647

Malthouses have occupied this and the neighbouring site since at least the 18th century. The malthouse stood behind a dwelling house that fronted onto Twerton High Street (now the Lower Bristol Road). The house was realigned with a new frontage called Avon Buildings when the road was diverted along the GWR embankment in c 1839, the eastern part of which was converted into a hotel called the Railway Hotel. This served as a horse bus terminus between 1894-1903. It was badly damaged by a bomb that fell in the road during WWII and was demolished soon after, together with the rest of the maltings. The site has since become a plot of waste ground and temporary sheds. On the east side of ferry lane there have been a rank of cottages since the 18th century which appear to have been much modified in the early 20th century and were mostly demolished after WWII.

MBN10023

Lyncombe Widcombe & St James Cemetery

Centred on ST 74 65

Laid out 1862. Landscaped by Mr. Butler.

MBN10025

Chapel Lyncombe Cemetery

ST 741 645

Built in 1862 by C.E. Davis. Spires removed in 1978.

MBN10206

St Peters Mission Chapel

Centroid ST 738 648

By C.E. Davis, possibly dating to 1870.

MBN11329

Moorfields Brick Works (site of)

ST 73926 64350

One of several brickworks built in this area, but probably the first where clay was dug on site. In existence by 1888, a large quantity of bricks was required for the extensive housing development in that area at that time, but by 1907 the site had already closed and built over. For a while after the business (owned by Charles Harding) was transferred to Oldfield Lane, where it was renamed the Moorland Brick and Tile Works.

MBN11495

ST 74219 64730

Railway yard

Extensive railway yards were laid out in Sydenham Meadow following the completion of the Midland railway from Mangotsfield to Bath. As a railway terminus, it included engine sheds, goods sheds, cattle pens, timber and coal yards. It was connected to Green Park Station on the opposite side of the river by two iron lattice bridges (BN11494) (1) The whole area was cleared away after closure of the line in the 1960s and now contains Pines Way circuit road

and offices (commemorating the 'Pines Express') together with Sainsbury's Homebase and other new Warehouses.

MBN11878

Midland Railway embankment

ST 73959 64836

Surviving stretch of embankment for the Midland railway incorporating bridge abutments at Midland Road and Victoria Bridge Road. The track was removed in the 1960's.

- 5.7 A search of the SMR within 400m of the study area revealed only one entry pre-dating the post-medieval period. This entry is included below:

MBN10169

Possible Fosse Way Late Bypass

Centred on ST 742 643

This line marks the line of a possible late diversion for the Fosse Way.

Discussion

- 5.8 The study area comprises land considered to have moderate archaeological potential. The northern end of the study area is situated on a Middle Pleistocene river terrace. Gravel extraction at a former quarry situated in Bellott Road, Twerton lead to the discovery of a number of Pleistocene mammal bones and it is possible that other faunal remains may exist within the study area. The geotechnical survey shows that the drift geology comprises interbedded layers of clay sand and gravel which is deepest show that the natural geology is overlain by deposits
- 5.9 The study area probably lies alongside a former Roman road (MBN10123) along the line of modern Brougham Hayes. This putative road would have joined the Fosse Way to the south of Bath (*Aquae Sulis*) and crossed the Avon to the west of the town. If such a road existed then the possibility of roadside settlement or burials existing in the area cannot be discounted. Indeed the gravel terrace situated at the northern end of the site has been identified as an area with potential for prehistoric and Roman settlement (BANES 2010). However, no direct evidence has been recovered to date to confirm the existence of the Roman road and no prehistoric or Romano-British artefacts have been found in the vicinity of the study area. A second possible Roman road (MBN10169) is thought to lie *c.* 230m south-west of the study area, but again there is no hard evidence to confirm its existence.
- 5.10 Two post-medieval SMR events also lie within the study area. These comprise the Somerset Certified Industrial Home for Boys (MBN11497) and the site of a Drill Hall (MBN11498). These are discussed in detail in **Section 3** above.
- 5.11 The study area is situated within the area of Bath designated by UNESCO as a World Heritage Site, but does not lie within the BANES Bath Conservation Area, Green Belt Land or an Area of Outstanding Natural Beauty.
- 5.12 There is no evidence for any of the following in the study area:
- a. Scheduled monuments;
 - b. Important hedgerows;
 - c. Historic battlefields;
 - d. Registered parks and gardens;
 - e. Formal burial grounds;
 - f. Ecclesiastical establishments.

6. GEOPHYSICAL SURVEY AND INTERPRETATION OF GEOTECHNICAL SURVEY TRIAL PIT LOGS

Geophysical survey

- 6.1 A Ground Probing Radar (GPR) survey of the tennis courts was carried out on the 4th of October 2011; the results of which are presented in **Appendix 3**. This survey identified a small number of discrete features that are potentially of an archaeological origin. Features indicative of shallow buried surfaces or horizontal layers were also identified; these are likely to be modern and related to the present tennis court and its post-war predecessor. These layers/surfaces may be concrete, compacted ash or similar conductive material.
- 6.2 The discrete features are difficult to interpret with any confidence, and although there is a reasonable probability they indicate the presence of structures related to WW2 hutments, the possibility that they represent earlier features cannot be entirely discounted.

Interpretation of geotechnical survey trial pit logs

- 6.3 A geotechnical survey of the site was carried out on the 24th of August 2011; the results of which are presented in **Appendix 2**. Trial pit logs show that the underlying geology of the site is lower lias clay. Test pits near the north-east corner of the tennis courts (test pits 2 (**Plate 7**), 2A & 3), revealed that the geological clay is overlain by a 0.55m – 0.75m thick deposit of interbedded sand, clay and gravel. A similar sequence of deposits was revealed in test pits 4 and 5, but here the sand, clay and gravel deposits are 1.30m – 1.75m deep. There are two possible interpretations of the disparity in thickness between the two areas; firstly it is possible that some of the apparently natural deposits revealed in test pits 4 and 5 (**Plate 8**) are in fact re-deposited made ground layers associated with 19th or 20th century landscaping. Alternately it may indicate that a greater degree of horizontal truncation has occurred in the tennis court area than is apparent on the surface. These two interpretations are not mutually exclusive, and it is possible that some material was excavated from the tennis court area and re-deposited in the surrounding area.
- 6.4 All of the clean sand, clay and gravel deposits were sealed by modern made ground and topsoil that ranged from 0.30m – 0.40m deep around the tennis courts, to 1.30m deep at the northern end of the playing fields. The test pit at the northern end of the site (test pit 1) was excavated to a maximum depth of 2.10m, but did not fully penetrate the sand, clay and gravel drift deposits overlying the geological clay.

7. DISCUSSION

- 7.1 The northern end of the study area lies above a Middle Pleistocene river terrace with proven potential for the survival of prehistoric mammalian remains.
- 7.2 Cartographic and documentary evidence suggests that Brougham Hayes probably defines the line of a former Roman road. The gravel terrace at the northern end of the study area has also been identified as an area with potential for prehistoric and Roman settlement. However, there is as yet no hard evidence to confirm these suggestions and no conclusive evidence of any activity pre-dating the post-medieval period has been identified in or around the study area.
- 7.3 An analysis of historic maps confirms that the study area remained undeveloped farmland from at least the mid 18th century and probably long before. The earliest development within the study area was almost certainly the establishment of a large Militia Barracks on the site in 1864. These Barracks survive as the main block of the present School.
- 7.4 Officers from 2nd Militia Regiment of Somerset occupied these Barracks until they were integrated into The Prince Albert's Somerset Light Infantry as part of the Childers Reforms in 1881. Although the Militia ceased using the Barracks in 1881, the newly formed 1st Somerset Rifle Volunteer Corps did retain the use of the drill ground until at least 1888.
- 7.5 In 1881 an Industrial School known as the 'Somerset Certified Industrial Home for Boys' acquired the site. These schools were established under the Industrial School Acts of 1857, 1866, 1871, 1880 and the 1876 Elementary Education Act. Children between the ages of seven and fourteen were sentenced to these institutions for 'crimes' such as vagrancy, begging, petty crime, or associating with known criminals or prostitutes. In the early 20th century the Industrial School was re-named as the 'Somerset Boys Home'. The Boys Home was closed in about 1930. The School re-opened as a Domestic Science College in 1934 after undergoing a major renovation programme. The renovation programme involved several alterations and extensions to the original Barracks building and landscaping to create playing fields. Later 20th century activity in the study area included a number of extensions to the School, the construction of wartime hutments on the playing fields and landscaping works associated with alterations to the playing fields. No significant features associated with either the Militia Barracks or the subsequent Industrial School have been identified within the proposed development area.
- 7.6 An analysis of historic maps, geotechnical trial pit logs and a site walkover survey confirm that the proposed development area, presently used as a tennis court, is likely to have suffered heavy horizontal truncation by landscaping works in the late 19th and 20th centuries. Additional damage may have been caused by the construction of WW2 hutments on the playing fields. Given the level of known disturbance it is probable that any archaeological features that did exist in this area will have been heavily truncated or destroyed. However, the playing fields immediately to the north of the tennis courts are likely to have suffered a lesser degree of disturbance and consequently have a higher archaeological potential.
- 7.7 A GPR survey of the tennis courts revealed features indicative of surfaces related to the present tennis court and a post-war predecessor. A number of small discrete features were also identified. These are difficult to interpret with any confidence, and although there is a reasonable probability they indicate the presence of structures related to the WW2 hutments, the possibility that they represent earlier features cannot be entirely discounted.
- 7.8 Although the study area is considered to have moderate, but currently unproven archaeological potential, the evidence suggests that much of the proposed development area is likely to have been heavily affected by 19th and 20th century developments, and is therefore considered to have low archaeological potential.

8. CONSULTANT'S ADVICE

- 8.1 The proposed development is likely to have an impact on the soil strata and possible archaeological remains that might be preserved below the surface as subterranean features or deposits (Davis *et al.* 2004).
- 8.2 *Planning Policy Statement 5: Planning for the Historic Environment* (PPS5, 2010) The Planning Policy Statement 5: Planning for the Historic Environment (PPS5) (Department for Communities and Local Government 2010) consolidates advice to planning authorities. The Guidance stresses the non-renewable nature of the archaeological resource, details the role of the County Sites and Monuments Record (SMR), encourages early consultation with county and district archaeological officers and sets out the requirement for developers to provide sufficient information on the archaeological impact of development to enable a reasonable planning decision to be made. PPS5 also indicates the circumstances where further work would be necessary and outlines the use of agreements and conditions to protect the archaeological resource.
- 8.3 In respect of paragraphs 8.1-8.2, it is important that any intact archaeological features and deposits which may lie below the surface, and which will be disturbed by the proposed construction project, are identified and, if necessary, recorded in an appropriate manner. Where appropriate, however, the physical preservation of features and deposits should be considered.
- 8.4 Although the study area lies within an area with moderate archaeological potential, the proposed development site itself is likely to have been heavily affected by 19th or 20th century landscaping and the construction of WW2 hutments, and is therefore considered to have low archaeological potential.
- 8.5 However, as the presence/absence of archaeological features within the development area is currently unproven, it is advised that an archaeological recording programme be undertaken in accordance with a brief provided by the Archaeological Officer for Bath and North East Somerset.

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1840-1	Bath Directory
1868-9	Bath Directory
1880-1	Bath Directory
1882-3	Bath Directory
1919	Bath Directory
1930	Bath Directory
1931	Kelly's Directory
1935	Bath Directory
1940	Bath Directory

Maps

- 1742 *An Actual Survey of the City of Bath, in the County of Somerset, and Five Miles Around* by Thomas Thorpe's (BRO)
- 1786-7 Maps of Bath Turnpike Roads (SRO)
- 1799 *Plan of the Manor of Lyncombe and Widcombe in the county of Somerset belonging to the Feoffees of Bruton Hospital*, J. Charlton 1799 (Copy produced in 1944)
- 1801 Plan of Bath
- 1838 Twerton Tithe Map
- 1839 Lyncombe and Widcombe Tithe Map
- 1852 *Plan of the City and Environs of Bath and its Suburbs*
- 1862 The City of Bath
- 1888 *First Edition 1888* (1: 2500) OS map
- 1904 *Second Edition 1904* (1: 2500) OS map
- 1932 *Edition of 1932* (1: 2500) OS map
- 1936 *Revision of 1936* (1: 2500) OS map
- 1942 High explosive bomb sites map. Annotated version of *Revision of 1936* (1: 2500) OS map
- 1942 *City of Bath Air Raid Damage 25th, 26th and 27th April 1942*. Annotated version of *Revision of 1936* (1: 2500) OS map
- 1951 *Survey* (1: 1250) OS National Grid map
- 1968 *Revision of 1968* (1: 1250) OS National Grid map
- 1985 *Revision of 1985* (1: 1250) OS National Grid map

Planning applications

- 1954 *Proposed engineering workshop Brougham Hayes technical school*. Plan accompanying approved planning application dated 10th December 1954
- 1958 *Brougham Hayes School erection of a technical school*. Plan accompanying approved planning application dated 1st July 1958
- 1959 *Brougham Hayes School erection of a technical school*. Plan accompanying approved planning application dated 3rd March 1959

Photographs

Photograph of Hayesfield Lower School, probably taken in the 1930s

APPENDIX 1: Policy Statement

This report is the result of work carried out in the light of national and local authority policies.

NATIONAL POLICIES

Statutory protection for archaeology is enshrined in the Ancient Monuments and Archaeological Areas Act (1979), amended by the National Heritage Act, 1983. Nationally important sites are listed in the Schedule of Ancient Monuments (SAM). Scheduled Monument consent is required for any work that would affect a SAM.

GOVERNMENT POLICY GUIDANCE

Planning Policy Guidance Note 15: Planning and the Historic Environment (1994) and Planning Policy Guidance Note 16: Archaeology and Planning (1990) have been replaced (23 March 2010) by Planning Policy Statement 5: Planning for the Historic Environment (2010) which sets out the Government's national policies on conservation of the historic environment. Those parts of the historic environment that have significance because of their historic, archaeological, architectural or artistic interest are called heritage assets.

Of particular relevance within the Planning Policy Statement are:

Policy HE6: Information Requirements for Applications for Consent Affecting Heritage Assets

HE6.1 Local planning authorities should require an applicant to provide a description of the significance of the heritage assets affected and the contribution of their setting to that significance. The level of detail should be proportionate to the importance of the heritage asset and no more than is sufficient to understand the potential impact of the proposal on the significance of the heritage asset. As a minimum the relevant historic environment record should have been consulted and the heritage assets themselves should have been assessed using appropriate expertise where necessary given the application's impact. Where an application site includes, or is considered to have the potential to include, heritage assets with archaeological interest, local planning authorities should require developers to submit an appropriate desk-based assessment and, where desk-based research is insufficient to properly assess the interest, a field evaluation.

Policy HE9: Additional Policy Principles Guiding the Consideration of Applications for Consent Relating to Designated Heritage Assets

HE9.1 There should be a presumption in favour of the conservation of designated heritage assets and the more significant the designated heritage asset, the greater the presumption in favour of its conservation should be. Once lost, heritage assets cannot be replaced and their loss has a cultural, environmental, economic and social impact. Significance can be harmed or lost through alteration or destruction of the heritage asset or development within its setting. Loss affecting any designated heritage asset should require clear and convincing justification. Substantial harm to or loss of a grade II listed building, park or garden should be exceptional. Substantial harm to or loss of designated heritage assets of the highest significance, including scheduled monuments, protected wreck sites, battlefields, grade I or II* listed buildings and grade I and II* registered parks and gardens, World Heritage Sites, should be wholly exceptional.

Policy HE12: Policy Principles Guiding the Recording of Information Related to Heritage Assets

HE12.3 Where the loss of the whole or a material part of a heritage asset's significance is justified, local planning authorities should require the developer to record and advance understanding of the significance of the heritage asset before it is lost, using planning conditions or obligations as appropriate. The extent of the requirement should be proportionate to the nature and level of the asset's significance. Developers should publish this evidence and deposit copies of the reports with the relevant historic environment record. Local planning authorities should require any archive generated to be deposited with a local museum or other public depository willing to receive it. Local planning authorities should impose planning conditions or obligations to ensure such work is carried out in a timely manner and that the completion of the exercise is properly secured.

DISTRICT POLICY

Bath & North East Somerset Local Plan including waste and minerals policies Revised Deposit Draft 2003 as approved for used for Development Control purposes contains the following policies:

Policy BH.11 – Development which would adversely affect Scheduled Ancient Monuments or any other sites of national importance, and their settings and does not preserve such sites in situ will not be permitted.

Policy BH.12 – Development which would harm important archaeological remains or their settings outside the scope of Policy BH.11 will not be permitted unless the adverse impact of the development proposal on the remains can be mitigated.

Policy BH.13 – Development which adversely affects significant archaeological remains within Bath will not be permitted unless the preservation in situ of these remains can be achieved through a detailed design and construction scheme.

A draft <http://www.bristol-city.gov.uk/ccm/content/Environment-Planning/Planning/planning-policy-documents/planning-policy-documents.en?page=2> - [internalSection2](#) Supplementary Planning Guidance, (SPG) 'Archaeology in Bath & North-East Somerset' has recently (2004) been prepared. Its principal purpose when adopted is to supplement Policies BH.11, BH.12 & BH.13 of the existing and emerging Bath & North East Somerset Local Plan and should be read in conjunction with these.

Internet sites

B&NES Planning Maps: <http://www.bathnes.gov.uk>

British Geological Survey, Geology of Britain viewer: <http://www.bgs.ac.uk>

Heritage Gateway: <http://www.heritagegateway.org.uk/>

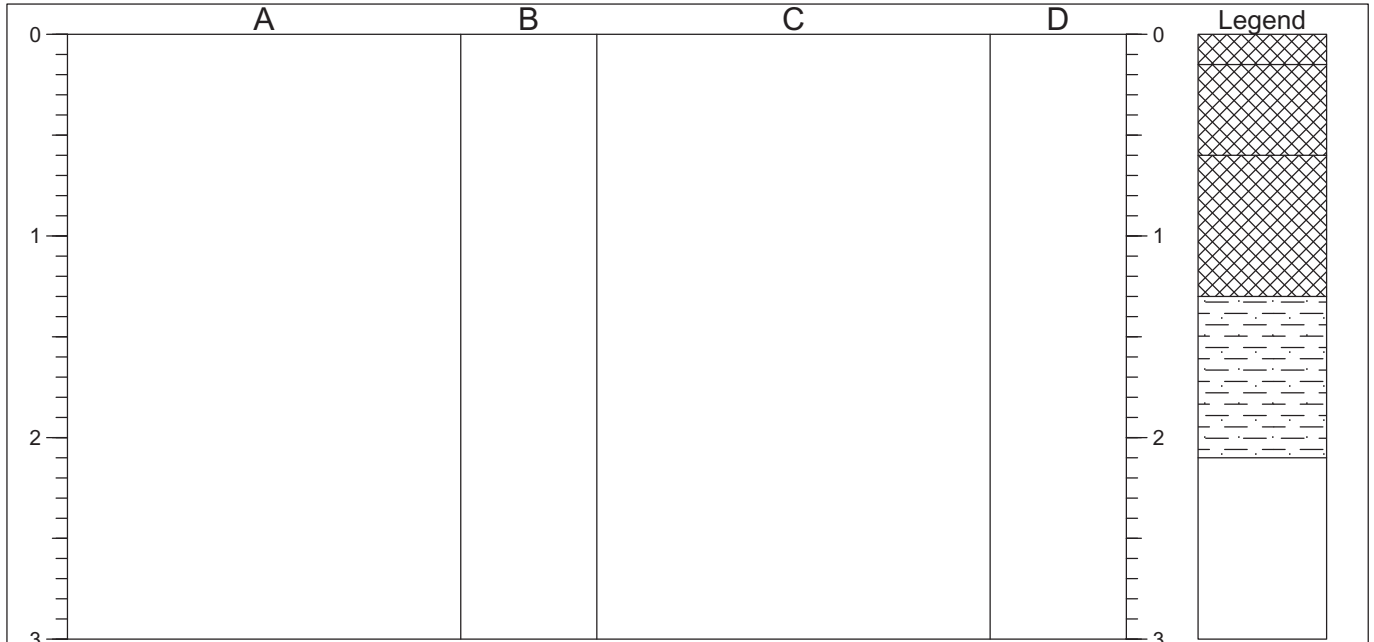
Information of Industrial Schools: <http://www.workhouses.org.uk>

Information of Industrial Schools: <http://www.missing-ancestors.com>

9. ACKNOWLEDGEMENTS

- 9.1 Bristol and Region Archaeological Services wish to thank the following for their help and advice: Staff of the Bath Record Office, Bath Central Library and Hayesfield Girls School; Craig Morrison (Project Manager, Mace Group); Derek Quilter (Divisional Director, Major Projects, B&NES); Richard Smalley (Senior Project Officer, Stratascan); David Elks (Bids Manager, Stratascan) and Richard Sermon (Archaeological Officer, B&NES);
- 9.2 The above report was written and compiled by Cai Mason (Project Officer, BaRAS) and produced by Ann Linge (Design and Production Officer BaRAS). The project was managed by John Bryant (Acting Manager, BaRAS)

Project Hayesfield Lower School STEM Building, Bath			TRIAL PIT No TP 1	
Job No HAY/HLS/101	Dates start 24-08-11 finish 24-08-11	Ground Level (m OD (estimated from provided survey)) 20.85		
Client Bath & North East Somerset		Co-Ordinates ()	Sheet 1 of 1	



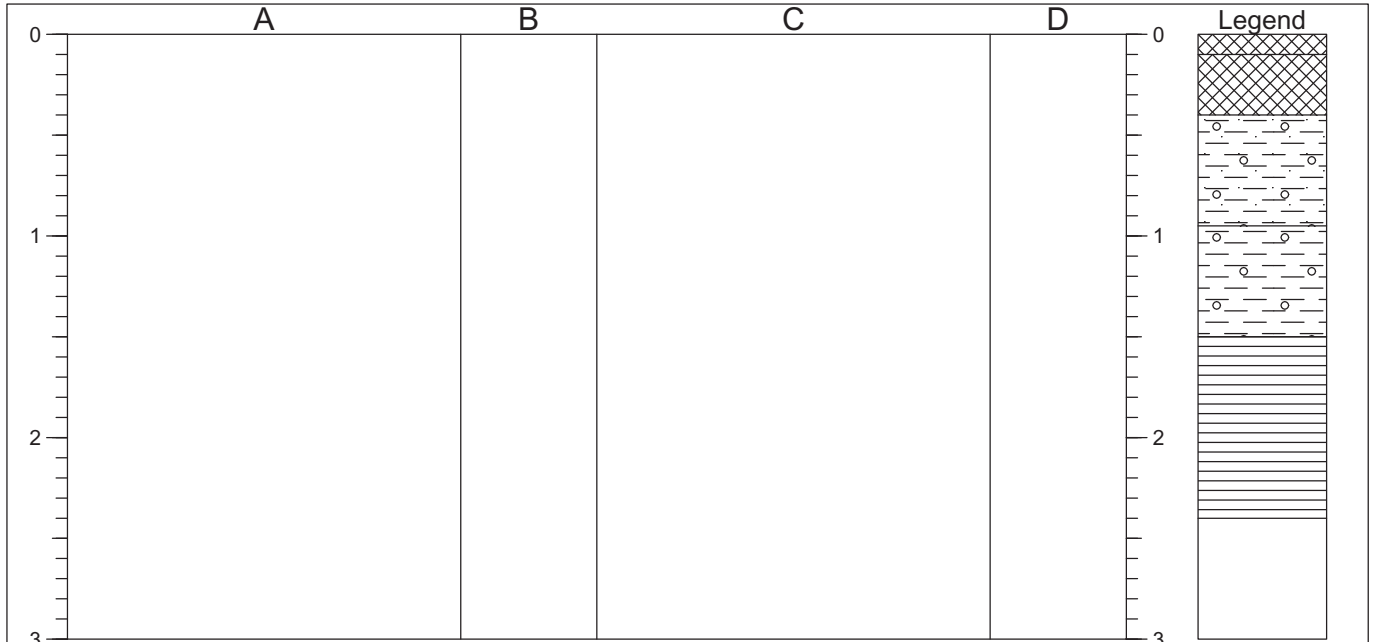
STRATA			SAMPLES & TESTS		
Depth (elev)	No	DESCRIPTION	Depth	No	Remarks/Tests
0.15 (20.70)		Made ground: turf over brown silty organic topsoil			
		Made Ground: dark orange-brown and brown mottled silty very clayey Sand with occasional to some fine to medium gravel of brick, ash, and Bath stone	0.20-0.35	D1	
0.60 (20.25)		Made Ground: Orange brown very clayey Sand with occasional fine to coarse angular to subangular gravel of sandstone and Bath stone	0.60-0.75	D2	
1.30 (19.55)		On south side of pit: includes pockets of dark grey sand and fine to medium gravel of ash, stone and fragments of glass, occasional cobbles of Bath stone, lumps of tarmac, and pieces of corrugated roofing sheet - possible asbestos-containing material - sample B1 taken of roof sheet fragment	1.00	B1	
		'Firm' orange-brown very sandy CLAY/very clayey SAND with occasional rootlets	1.50	D3	
2.10 (18.75)					

Shoring/Support: None Stability: Minor spalling of sides in made ground 	GENERAL REMARKS No groundwater encountered Soakaway test carried out - pit filled to 1.29m bgl
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All dimensions in metres Scale 1:37.5	Engineer Integral Engineering Design	Method/ Plant Used JCB 3CX	Logged By T Skailles
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AGS3 UK TP_HAYESFIELD TPS.GPJ AGS_3_1.GDT 16/9/11

Project Hayesfield Lower School STEM Building, Bath			TRIAL PIT No TP 2	
Job No HAY/HLS/101	Dates start 24-08-11 finish 24-08-11	Ground Level (m OD (estimated from provided survey)) 22.30		
Client Bath & North East Somerset		Co-Ordinates ()	Sheet 1 of 1	



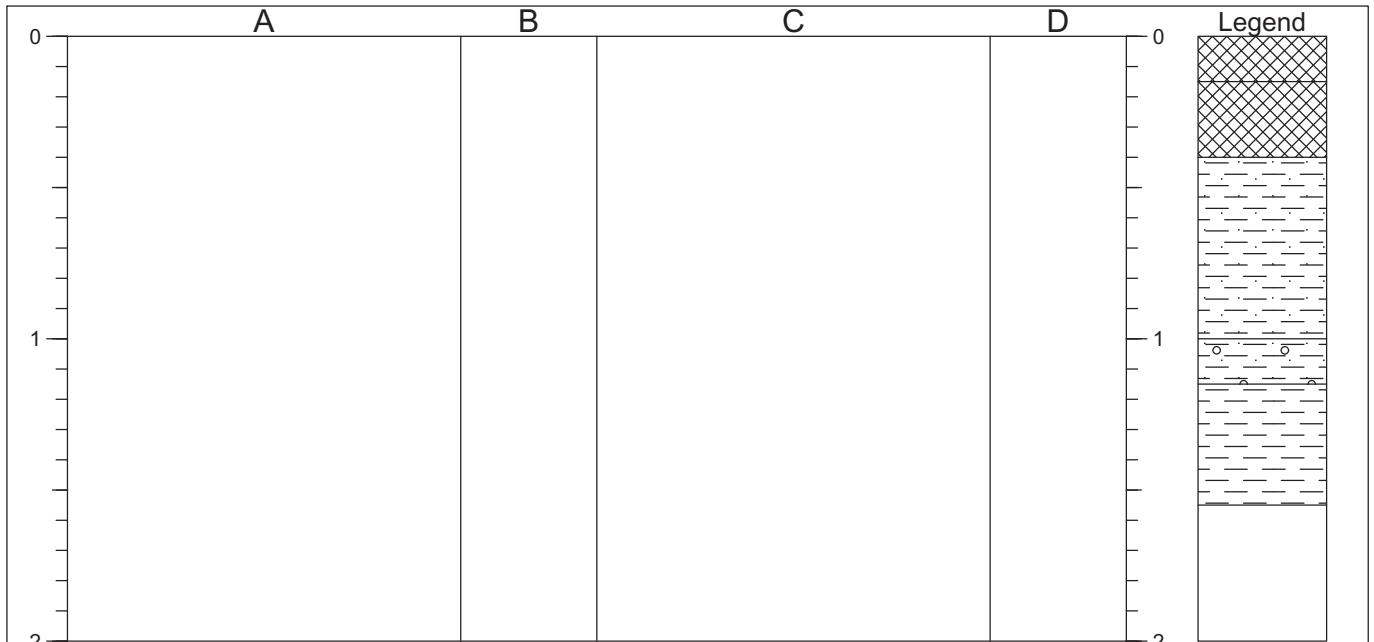
STRATA				SAMPLES & TESTS		
Depth (elev)	No	DESCRIPTION	Depth	No	Remarks/Tests	
0.10 (22.20)		Made ground: Turf over topsoil				
0.40 (21.90)		Made ground: grey-brown silty sandy Clay/clayey Sand with some fine to medium subangular gravel of brick, bath stone, coal, fragments of glass, concrete and occasional cobbles	0.25	D1		
		Base level varies from 0.25m at North end to 0.55m at south end				
0.95 (21.35)		'Soft to firm' orange brown very sandy CLAY with some fine to medium occasionally coarse subangular gravel with roots	0.75	D2		
		Base level varies from 0.80m at North end to 1.10m at south end				
1.50 (20.80)		Firm becoming stiff to very stiff pale grey with pale grey-brown and dark red brown (iron-staining) mottling extremely closely fissured CLAY with occasional medium to coarse 'gravel' of pale grey limestone (LOWER LIAS CLAY)	1.20	D3		
		Very stiff to hard pale grey extremely closely fissured CLAY/MUDSTONE with mudstone lithorelicts, remnant mudstone structure, with coarse gravel and cobbles of limestone (LOWER LIAS CLAY)	2.10	D4		
2.40 (19.90)		...bed of strong limestone 12-15cm thick at 2.25m - difficult to break out				

Shoring/Support: None Stability: Pit sides stable 	GENERAL REMARKS No groundwater encountered Pit dug in sloping bank, stratum boundaries and estimated ground level measured relative to centre of pit.
--	---

All dimensions in metres Scale 1:37.5	Engineer Integral Engineering Design	Method/ Plant Used JCB 3CX	Logged By T Skailles
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AGS3 UK TP HAYESFIELD TPS.GPJ_AGS_3_1.GDT 16/9/11

Project Hayesfield Lower School STEM Building, Bath			TRIAL PIT No TP 2A	
Job No HAY/HLS/101	Dates start 24-08-11 finish 24-08-11	Ground Level (m OD (estimated from provided survey)) 22.30		
Client Bath & North East Somerset		Co-Ordinates ()	Sheet 1 of 1	

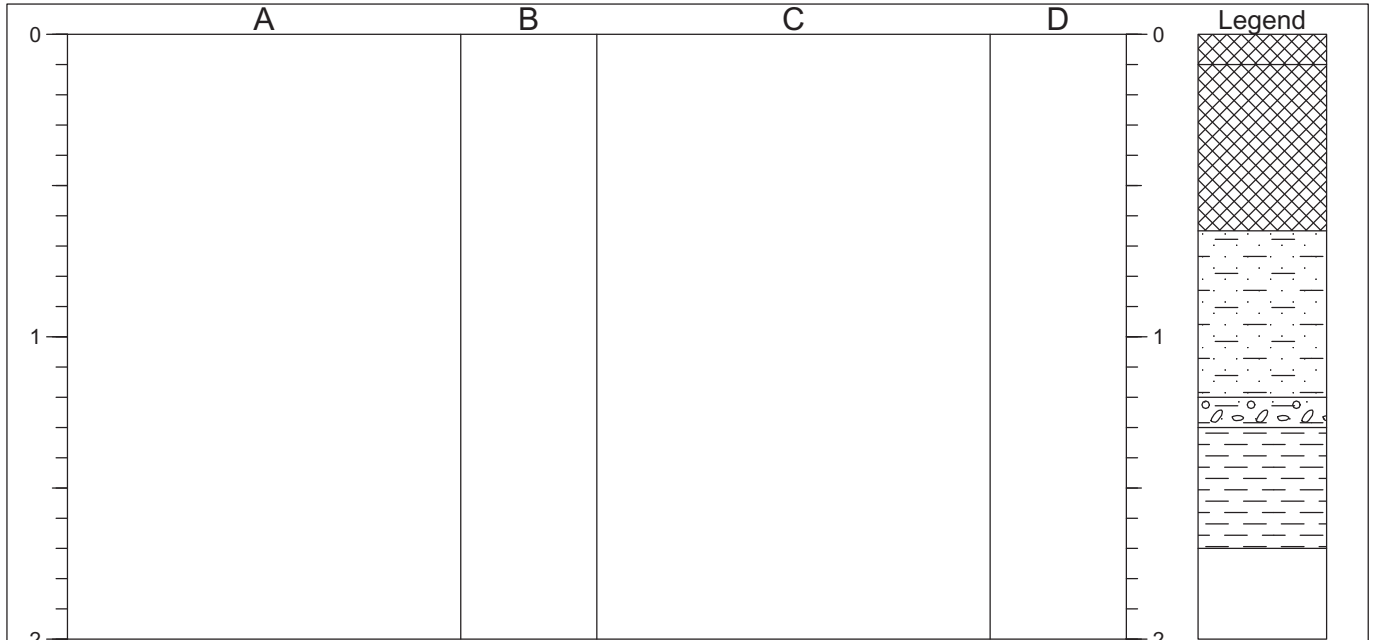


STRATA				SAMPLES & TESTS		
Depth (elev)	No	DESCRIPTION	Depth	No	Remarks/Tests	
0.15 (22.15)		Made ground: turf over topsoil base level varies between 0.10-0.15m Made ground				
0.40 (21.90)		Orange brown very sandy CLAY				
1.00 (21.30)		Orange brown sandy gravelly CLAY/claybound GRAVEL				
1.15 (21.15)		Pale grey with pale grey-brown and dark red brown (iron-staining) mottling extremely closely fissured CLAY (LOWER LIAS CLAY)				
1.55 (20.75)						

<p>Shoring/Support: None Stability: Stable mostly, minor spalling in gravelly layer</p>	<p>GENERAL REMARKS</p> <p>No groundwater encountered</p> <p>Pit dug in sloping bank, stratum boundaries and estimated ground level measured relative to centre of pit</p> <p>Soakaway test carried out, pit filled to 0.93m bgl</p>
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All dimensions in metres Scale 1:25	Engineer Integral Engineering Design	Method/ Plant Used JCB 3CX	Logged By T Skailles
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Project Hayesfield Lower School STEM Building, Bath			TRIAL PIT No TP 3	
Job No HAY/HLS/101	Dates start 24-08-11 finish 24-08-11	Ground Level (m OD (estimated from provided survey)) 22.60		
Client Bath & North East Somerset		Co-Ordinates ()	Sheet 1 of 1	



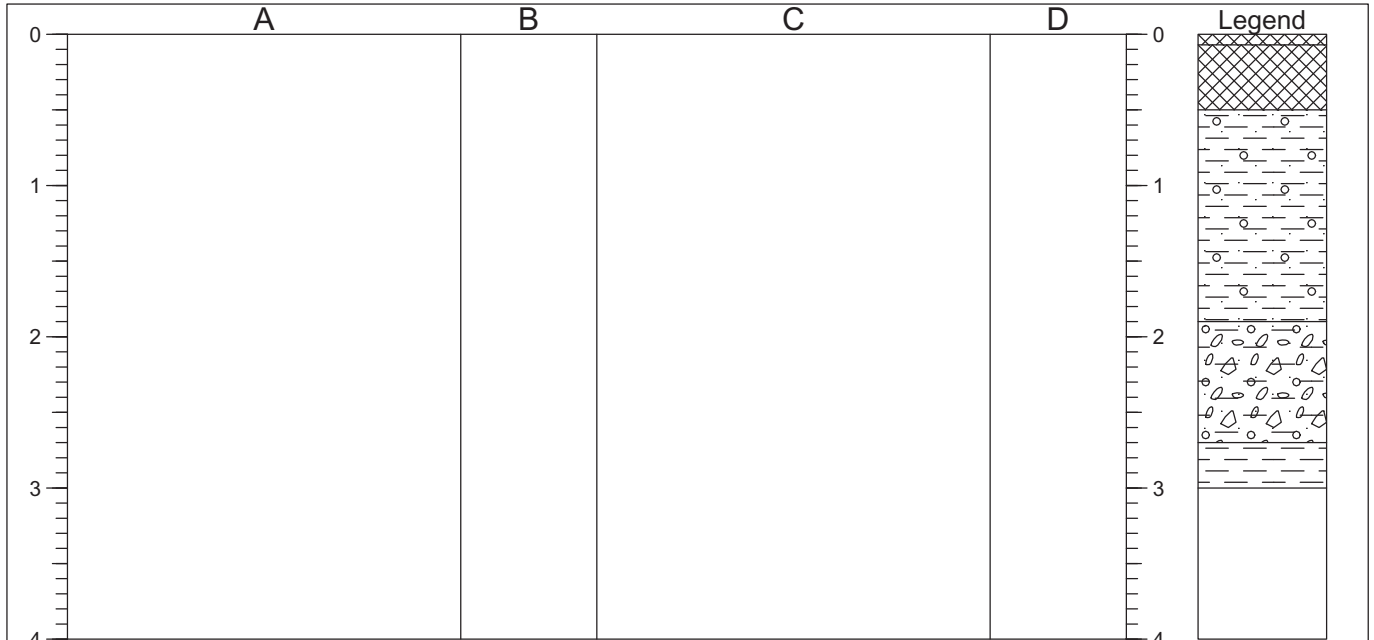
STRATA			SAMPLES & TESTS		
Depth (elev)	No	DESCRIPTION	Depth	No	Remarks/Tests
0.10 (22.50)		Made ground: compacted topsoil base level varies from 0.05-0.10m	0.25	D1	
0.65 (21.95)		Made ground: brown and orange brown clayey Silt with some fine to coarse subangular gravel and occasional cobbles of stone, brick and concrete, plus 0.65x0.65x0.2m concrete base remnant Orange brown 'stiff' silty very clayey SAND - dry, friable, numerous roots Base level varies from 0.90m at North end to 1.20m at south end	0.90	D2	
1.20 (21.40)		Brown fine to coarse tabular subrounded GRAVEL with some matrix of sandy clay/clayey sand Very stiff pale grey with pale grey-brown and dark red brown (iron-staining) mottling extremely closely fissured CLAY, desiccated (LOWER LIAS CLAY)	1.15	B1	
1.30 (21.30)			1.15	D3	
1.70 (20.90)			1.35	D4	

Shoring/Support: None Stability: Stable mostly, minor spalling in gravelly layer and made ground 	GENERAL REMARKS No groundwater encountered
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All dimensions in metres Scale 1:25	Engineer Integral Engineering Design	Method/ Plant Used JCB 3CX	Logged By T Skailles
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AGS3 UK TP HAYESFIELD TPS.GPJ AGS_3_1.GDT 16/9/11

Project Hayesfield Lower School STEM Building, Bath			TRIAL PIT No TP 4	
Job No HAY/HLS/101	Dates start 24-08-11 finish 24-08-11	Ground Level (m OD (estimated from provided survey)) 23.80		
Client Bath & North East Somerset		Co-Ordinates ()	Sheet 1 of 1	



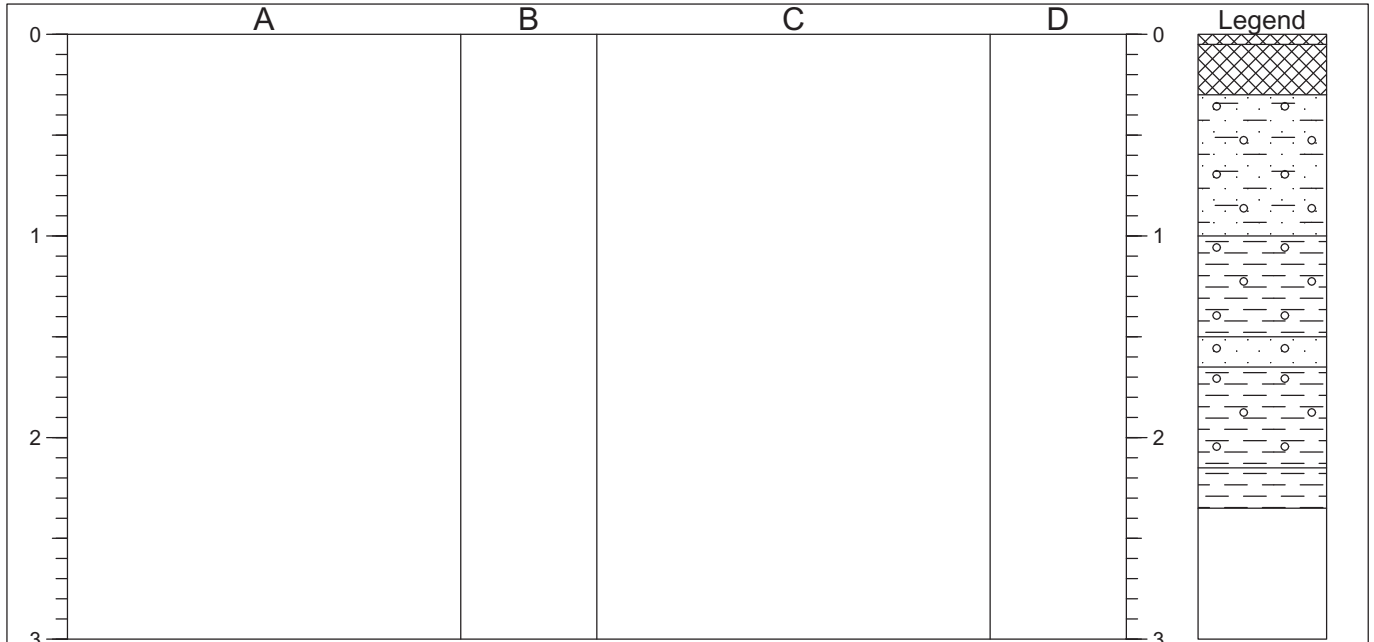
STRATA				SAMPLES & TESTS		
Depth (elev)	No	DESCRIPTION	Depth	No	Remarks/Tests	
0.07 (23.73)		Made ground: compacted topsoil				
0.50 (23.30)		base level varies from 0.02-0.07m	0.30-0.40	D1	<140kPa	
		Made Ground: brown silty Sand with pockets of orange brown sandy Clay with some to much brick fragments and half bricks, coarse gravel and some cobbles of concrete rubble, pieces of tile, fragments of bitumen, occasional pockets of ash and clay pipe (smoking) fragments	0.70	D2		
		Orange brown 'stiff', friable, dry, very clayey SAND/very sandy CLAY with occasional fine to medium subrounded gravel, with roots	1.35-1.40	D3 HSV		
1.90 (21.90)		base level varies from 1.8-1.9m	2.20	B1		
		Orange-brown with cream mottling fine to coarse GRAVEL with some matrix of silty clay/very clayey sand, locally claybound	2.20	D4		
2.70 (21.10)		Stiff to very stiff, with occasional pockets of moist, firm material, pale grey with pale grey-brown and dark red brown (iron-staining) mottling extremely closely fissured CLAY (LOWER LIAS CLAY)	2.80	D5		
3.00 (20.80)						

Shoring/Support: None Stability: Stable mostly, minor spalling in gravelly layer 	GENERAL REMARKS
	No groundwater encountered

All dimensions in metres Scale 1:50	Engineer Integral Engineering Design	Method/ Plant Used JCB 3CX	Logged By T Skailles
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AGS3 UK TP HAYESFIELD TPS.GPJ AGS.3_1.GDT 16/9/11

Project Hayesfield Lower School STEM Building, Bath			TRIAL PIT No TP 5	
Job No HAY/HLS/101	Dates start 24-08-11 finish 24-08-11	Ground Level (m OD (estimated from provided survey)) 23.75		
Client Bath & North East Somerset		Co-Ordinates ()	Sheet 1 of 1	



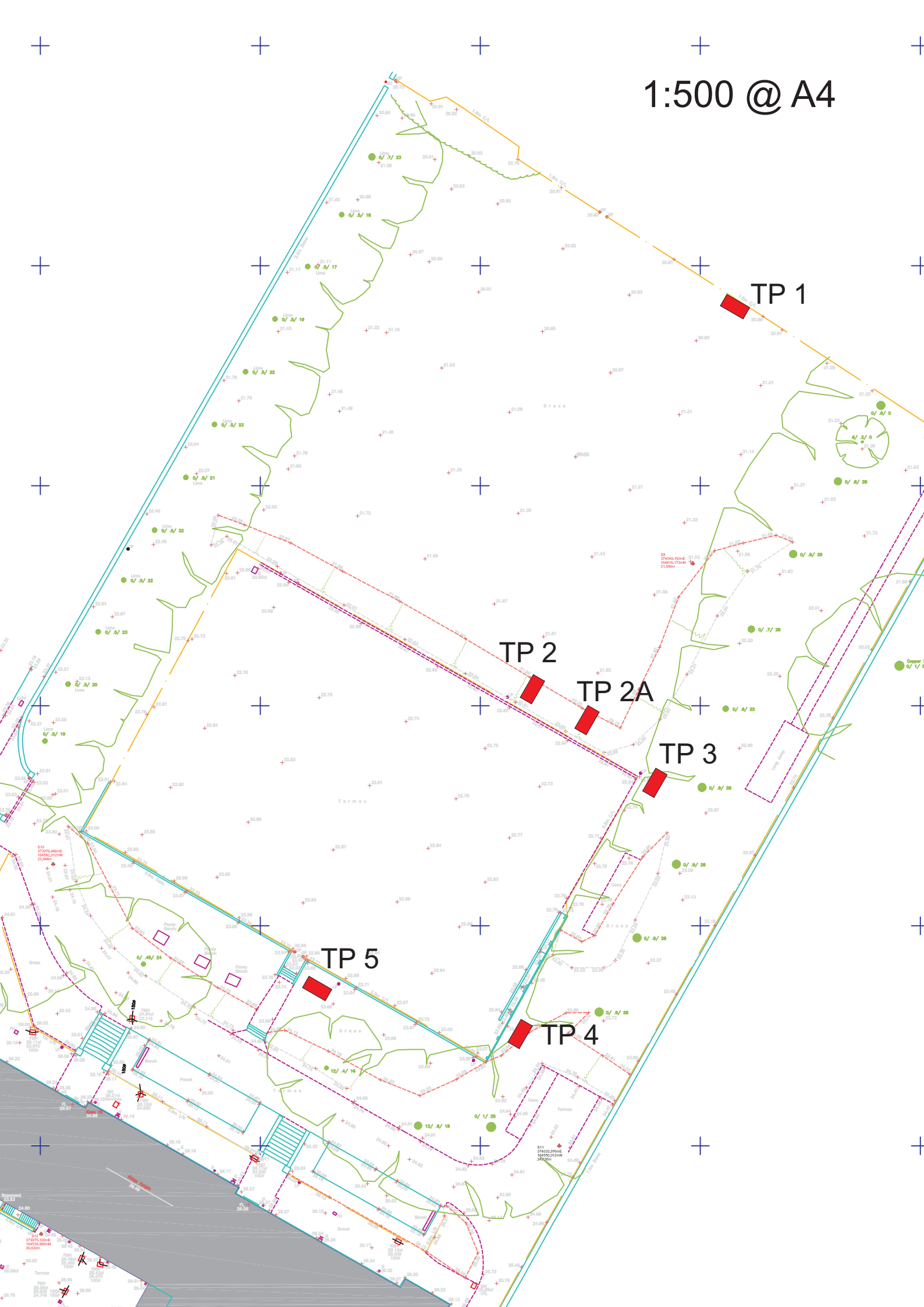
STRATA				SAMPLES & TESTS		
Depth (elev)	No	DESCRIPTION	Depth	No	Remarks/Tests	
0.05 (23.70)		Made Ground: Turf over topsoil				
0.30 (23.45)		Made Ground: brown silty Sand with some to much brick fragments and half bricks, coarse gravel and occasional cobbles of concrete rubble	0.20	D1		
		Firm orange-brown silty clayey SAND with occasional fine to medium subrounded gravel with roots				
		disused steel water/gas pipe (~30mm dia) encountered at 0.7m crossing pit				
1.00 (22.75)		Firm brown CLAY with some fine to coarse tabular subrounded gravel	1.20	D2		
1.50 (22.25)		Pale yellow brown clayey SAND with some fine to medium subrounded gravel				
1.65 (22.10)		Firm brown CLAY with some fine to coarse tabular subrounded gravel	1.60	D3		
2.15 (21.60)		Firm to stiff pale grey with pale grey-brown and dark red-brown (iron-staining) mottling	2.05	D4		
2.35 (21.40)		extremely closely fissured CLAY (LOWER LIAS CLAY)	2.20	D5		

Shoring/Support: None Stability: Pit sides stable 	GENERAL REMARKS No groundwater encountered
--	--

All dimensions in metres Scale 1:37.5	Engineer Integral Engineering Design	Method/ Plant Used JCB 3CX	Logged By T Skailles
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AGS3 UK TP HAYESFIELD TPS.GPJ_AGS_3_1.GDT 16/9/11

1:500 @ A4



Document Title: **Geophysical Survey Report
Hayesfield Lower School, Bath**

Client: **Bristol and Region Archaeological Services (BARAS)**

Stratascan Job No: **J2971**

Techniques: **Ground Probing Radar**

National Grid Ref: **ST 740 645**



Field Team: **Richard Fleming and Tim Lewis BA (Hons)**

Project Manager: **Simon Haddrell B.Eng (Hons) AMBCS PIFA**

Report written by: **Richard Smalley BA (Hons) AIFA**

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Geophysical Survey Report

Hayesfield Lower School, Bath

For

Bristol and Region Archaeological Services

October 2011

Job ref. J2971

Richard Smalley BA (Hons) AIFA



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Figure 4	1:500	Timeslice plot at depths between 2.0m – 2.50m
Figure 5	1:200	Abstraction and Interpretation of radar anomalies

1 SUMMARY OF RESULTS

The geophysical survey undertaken at Hayesfield Lower School has identified a small number of features that may be of a possible archaeological origin. Discrete anomalies in the northern region of the survey area are possibly related to structural remains and areas of strong planar responses may indicate the presence of former building platforms.

2 INTRODUCTION

2.1 Background synopsis

Stratascan were commissioned to undertake a geophysical survey of an area outlined for development. This survey forms part of an archaeological investigation being undertaken by Bristol and Region Archaeological Services (BARAS).

2.2 Site location

The site is located within the grounds of Hayesfield Lower School, Bath at OS NGR ref. ST 740 645.

2.3 Description of site

The survey area comprises approximately 1750m² of flat tarmac surfaced tennis courts at Hayesfield Lower School.

The underlying geology is Lias group mudstone and limestone (British Geological Survey South Sheet, Fifth Edition Solid, 2007). No drift geology is recorded for the site (British Geological Survey South Sheet, First Edition, Quaternary, 1977).

The overlying soils are known as Evesham 1 which are typical calcareous pelosols. These consist of slowly permeable calcareous clayey soils associated with shallow well drained brashy calcareous soils over limestone (Soil Survey of England and Wales, Sheet 5 South West England).

2.4 Site history and archaeological potential (Mason 2010)

The line of the Brougham Hayes road to the west of the survey area is believed to represent the route of a former Roman road; however no evidence of any activity predating the post-medieval period has been identified within or around the survey area.

The main block of Hayesfield Lower School used to be the primary barrack building of the Militia Barracks occupied by the 2nd Militia Regiment of Somerset between 1864 and 1881. Between 1881 and 1930 the site was used for the Somerset Certified Industrial Home for Boys.

In 1934 the site re-opened as a Domestic Science College and a renovation programme was carried out which included extensions to the barrack building and landscaping in order to create the playing fields. During the Second World War a number of hutments were constructed within the survey area.

There is potential for the identification of features relating to the later developments of the site within the geophysical survey data; however the potential for Roman finds is likely to be low due to these extensive developments, this is particularly the case with respect to the landscaping of the site which may well have truncated any archaeological deposits.

2.5 Survey objectives

The objective of the survey was to locate any anomalies that may be of archaeological significance prior to further investigation.

2.6 Survey methods

Ground Probing Radar was deemed the most suitable method for locating potentially archaeological anomalies beneath a tarmac surface. More information regarding these techniques is included in the Methodology section below.

3 **METHODOLOGY**

3.1 Date of fieldwork

The fieldwork was carried out on the 4th October 2011. Weather conditions during the survey were wet.

3.2 Grid locations

The location of the survey grids has been plotted in Figure 2 together with the referencing information. Grids were set out using a Leica 705auto Total Station and referenced to suitable topographic features around the perimeter of the site.

3.3 Description of techniques and GPR configuration

Two of the main advantages of radar are its ability to give information of depth as well as work through a variety of surfaces, even in cluttered environments which normally prevent other geophysical techniques being used.

A short pulse of energy is emitted into the ground and echoes are returned from the interfaces between different materials in the ground. The amplitude of these returns depends on the change in velocity of the radar wave as it crosses these interfaces. A measure of these velocities is given by the dielectric constant of that material. The travel times are recorded for each return on the radargram and an approximate conversion made to depth by calculating or assuming an average dielectric constant (see below).

Drier materials such as sand, gravel and rocks, i.e. materials which are less conductive (or more resistant), will permit the survey of deeper sections than wetter materials such as clays which are more conductive (or less resistant). Penetration can be increased by using longer wavelengths (lower frequencies) but at the expense of resolution (see 3.4.2 below).

As the antennae emit a "cone" shaped pulse of energy an offset target showing a perpendicular face to the radar wave will be "seen" before the antenna passes over it. A resultant characteristic *diffraction* pattern is thus built up in the shape of a hyperbola. A classic target generating such a diffraction is a pipeline when the antenna is travelling across the line of the pipe. However it should be pointed out that if the interface between the target and its surrounds does not result in a marked change in velocity then only a weak hyperbola will be seen, if at all.

The Ground Penetrating Impulse Radar used was a SIR3000 system manufactured by Geophysical Survey Systems Inc. (GSSI).

The radar surveys were carried out with a 400MHz antenna. This mid-range frequency offers a good combination of depth of penetration and resolution.

3.4 Sampling interval, depth of scan, resolution and data capture

3.4.1 Sampling interval

Radar scans were carried out along traverses 0.5m apart on a parallel grid as shown in Figure 2. Data was collected at 80scans/metre. A measuring wheel was used to put markers into the recorded radargram at 2m centres.

3.4.2 Depth of scan and resolution

The average velocity of the radar pulse is calculated to be 0.1m/nsec which is typical for the type of sub-soils on the site. With a range setting of 50nsec this equates to a maximum depth of scan of 2.5m but it must be remembered that this figure could vary by $\pm 10\%$ or more. A further point worth making is that very shallow features are lost in the strong surface response experienced with this technique.

Under ideal circumstances the minimum size of a vertical feature seen by a 400MHz (mid frequency) antenna in a damp soil would be 0.05m (i.e. this antenna has a wavelength in damp soil of about 0.2m and the vertical resolution is one quarter of this wavelength).

3.4.3 Data capture

Data is displayed on a monitor as well as being recorded onto an internal hard disk. The data is later downloaded into a computer for processing.

3.5 Processing, presentation of results and interpretation

3.5.1 Processing

The radar plots included in this report have been produced from the recorded data using Radan software. Filters were applied to the data to remove background noise.

3.5.2 Presentation of results and interpretation

Manual abstraction

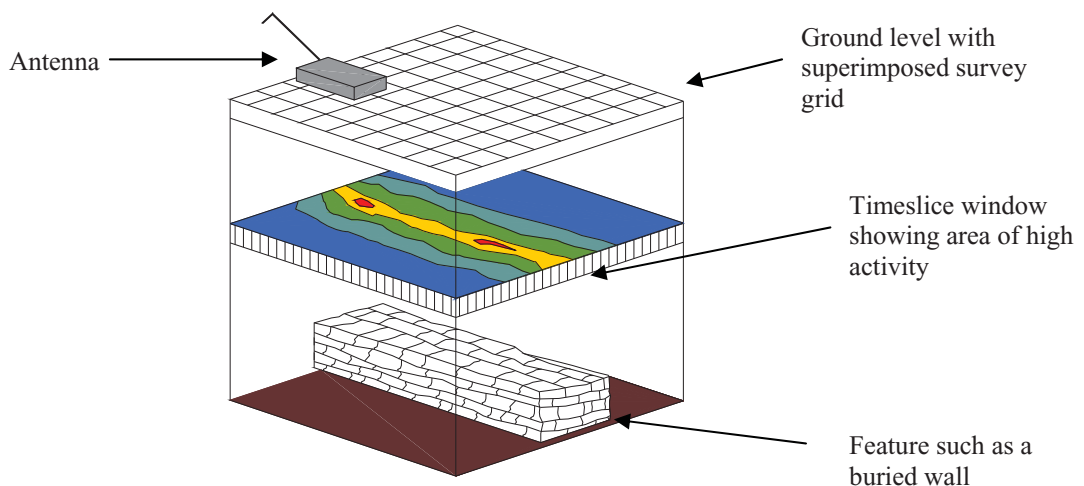
Each radargram has been studied and those anomalies thought to be significant were noted and classified as detailed below. Inevitably some simplification has been made to classify the diversity of responses found in radargrams.

- i. Strong and weak discrete reflector.
These may be a mix of different types of reflectors but their limits can be clearly defined. Their inclusion as a separate category has been considered justified in order to emphasise anomalous returns which may be from archaeological targets and would not otherwise be highlighted in the analysis.
- ii. Complex reflectors.
These would generally indicate a confused or complex structure to the subsurface. An occurrence of such returns, particularly where the natural soils or rocks are homogeneous, would suggest artificial disturbances. These are subdivided into both strong and weak giving an indication of the extent of change of velocity across the interface, which in turn may be associated with a marked change in material or moisture content.
- iii. Point diffractions.
These may be formed by a discrete object such as a stone or a linear feature such as a small diameter pipeline being crossed by the radar traverse (see also the second sentence in iv. below).
- iv. Convex reflectors and broad crested diffractions.
A convex reflector can be formed by a convex shaped buried interface such as a vault or very large diameter pipeline or culvert. A broad crested diffraction as opposed to a point diffraction can be formed by (for example) a large diameter pipe or a narrow wall generating a hybrid of a point diffraction and convex reflector where the central section is a reflection off the top of the target and the edges/sides forming diffractions.
- v. Planar returns.
These may be formed by a floor or some other interface parallel with the surface. These are subdivided into both strong and weak giving an indication of the extent of change of velocity across the interface which in turn may be associated with a marked change in material or moisture content.

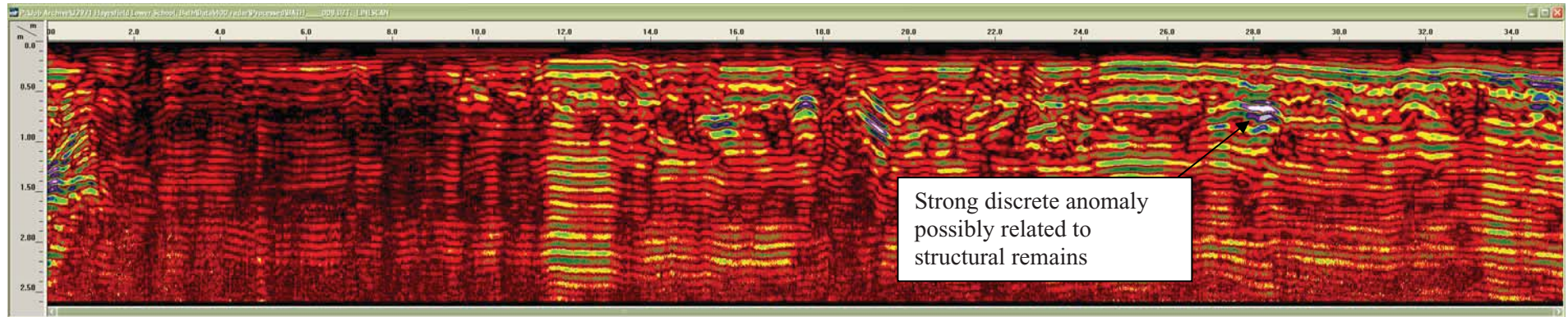
- vi. Inclined events.
These may be a planar feature but not parallel with the survey surface. However, similar responses can be caused by extraneous reflections. For example, an “air-wave” caused by a strong reflection from an above ground object would produce a linear dipping anomaly and does not relate to any sub-surface feature. Normally this is not a problem as the antennae used are shielded, but under some circumstances these effects can become noticeable.
- vii. Conductive surface.
The radiowave transmitted from the antenna has its waveform modulated by the ground surface. If this ground surface or layers close to the surface are particularly conductive a ‘ground coupled wavetrain’ is generated which can produce a complex wave pattern affecting part or all of the scan and so can obscure the weaker returns from targets lower down in the ground.
- viii. A category for “*focused ringing*” has been included as this type of anomaly can indicate the presence of an air void. This is created by the signal resonating within the void, but with a characteristic domed shape due to the “velocity pull-up effect”.

Timeslice plots

In addition to a manual abstraction from the radargrams, a computer analysis was also carried out. The radar data is interrogated for areas of high activity and the results presented in a plan format known as timeslice plots (Figures 3 and 4). In this way it is easy to see if the high activity areas form recognisable patterns.

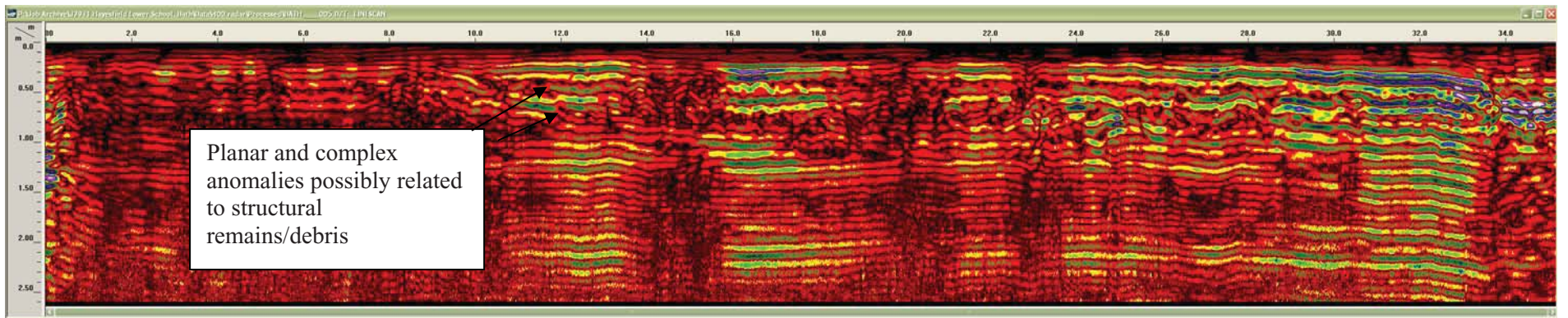


The GPR data is compiled to create a 3D file. This 3D file can be manipulated to view the data from any angle and at any depth within a range. The 3D file can be sampled to produce activity plots at various depths. As the radar is actually measuring the time for each of the reflections found, these are called "time slice windows". Plots for various time slices have been included in the report. Based on an average velocity calculations have been made to show the equivalent depth into the ground.



Example Radargram 1: 3E -2.2N – 33N

Strong Discrete Anomaly- Possible Structural Remains



Example Radargram 2: 1.5E -2.2N – 33N

Planar and Complex Anomalies

The weaker reflections in the time slice windows are shown as dark colours namely blues and greens. The stronger reflections are represented by brighter colours such as light green, yellow, orange, red and white.

Reflections within the radar image are generated by a change in velocity of the radar from one medium to another. It is not unreasonable to assume that the higher activity anomalies are related to marked changes in materials within the ground such as foundations or surfaces within the soil matrix.

4 RESULTS

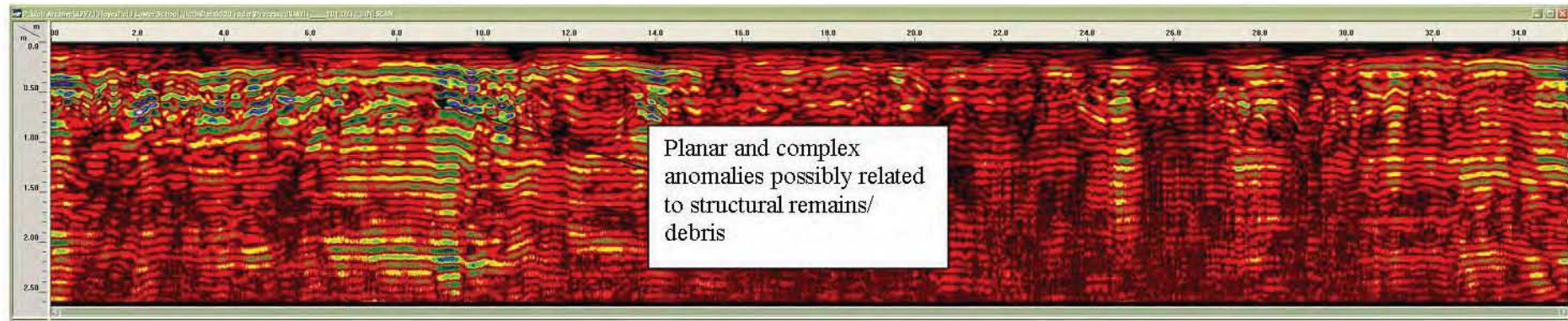
The Ground Probing Radar survey undertaken over the tennis courts at Hayesfield Lower School, Bath has identified little in the way of anomalies that can be confidently attributed to being of an archaeological origin.

A small number of strong discrete anomalies can be noted clustered in the north western region of the survey area. These anomalies are all located around 0.5m from the surface and have been interpreted as possible structural remains. An example of this type of feature can be seen in Example Radargram 1 below.

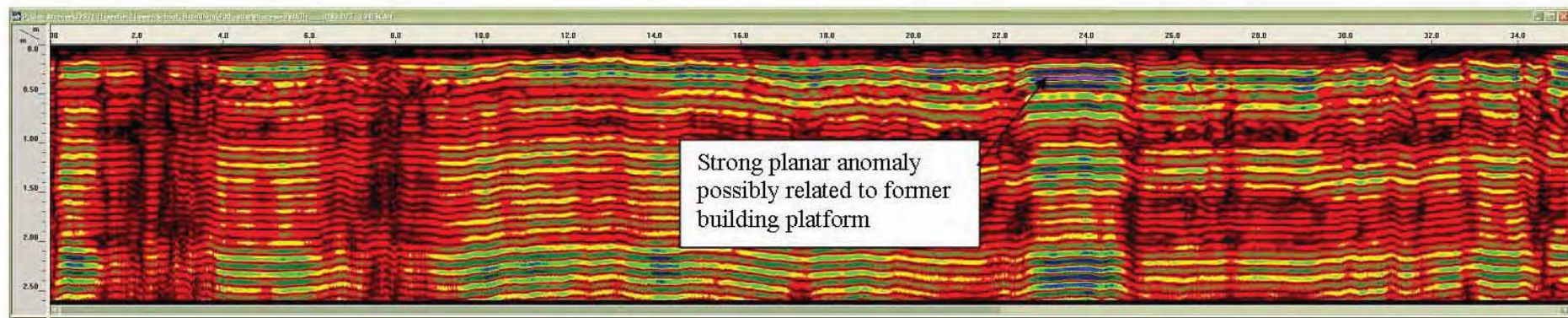
Three areas of complexity have been identified within the survey area. This complexity includes interspersed discrete and planar anomalies and may be related to buried structural debris. This type of feature can be seen in Example Radargrams 2 and 3.

Shallow planar anomalies can be noted across the survey area with a particular concentration of high energy responses in the central region. These anomalies are likely to be related to the bedding layers of the tennis courts and those in the central region are likely to be related to the earlier tennis courts located in this area. Discrete, stronger planar anomalies can be noted in this central region which may be related to former building platforms such as those of the Nissen huts erected on the site during the Second World War. Examples of this type of feature can be seen in Example Radargram 3.

A number of rectilinear features can be seen at depth in the timeslice data (see Figure 4). These anomalies correlate well in places with shallow features identified in the manual abstraction. It is possible therefore that these deep features are reflections of the stronger features identified closer to the surface.



Example Radargram 3: 48.5E -2.2N - 33N Planar and Complex Anomalies



Example Radargram 4: 15E -2.2N - 33N Planar Anomalies

5 CONCLUSION

The Ground Probing Radar survey undertaken over the tennis courts at Lower Hayesfield School has identified a small number of features that may be of an archaeological origin in the form of discrete, complex and planar anomalies possibly related to structural remains.

The central region of the survey area is dominated by the presence of strong planar anomalies likely to be related to the earlier tennis courts located in this area. The very high energy response in this central region may suggest that the previous tennis court was constructed out of concrete or that there may be a layer of ash or similar conductive material beneath the surface.

6 REFERENCES

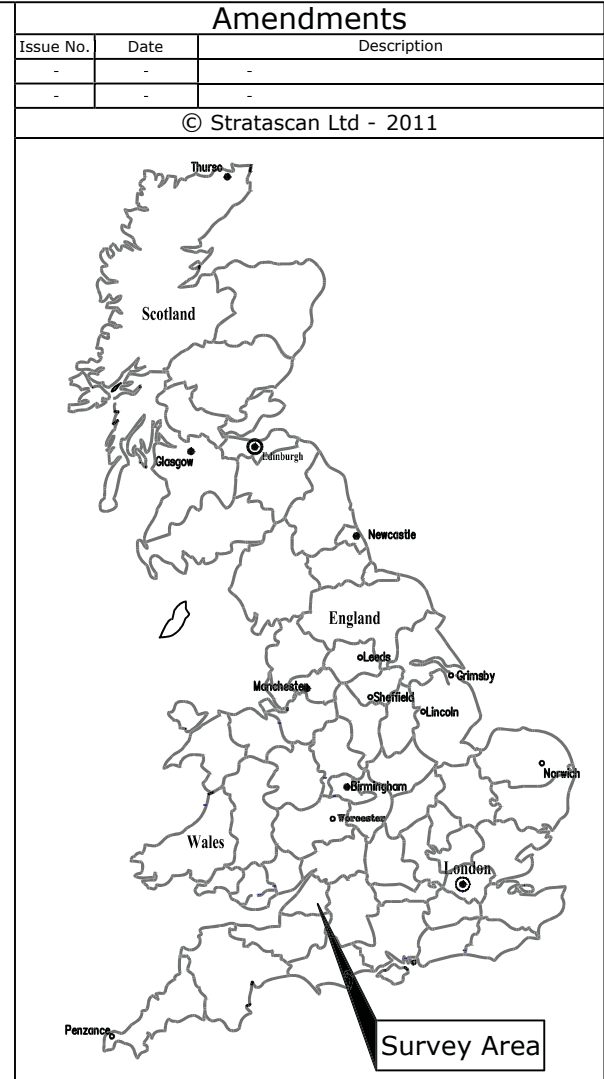
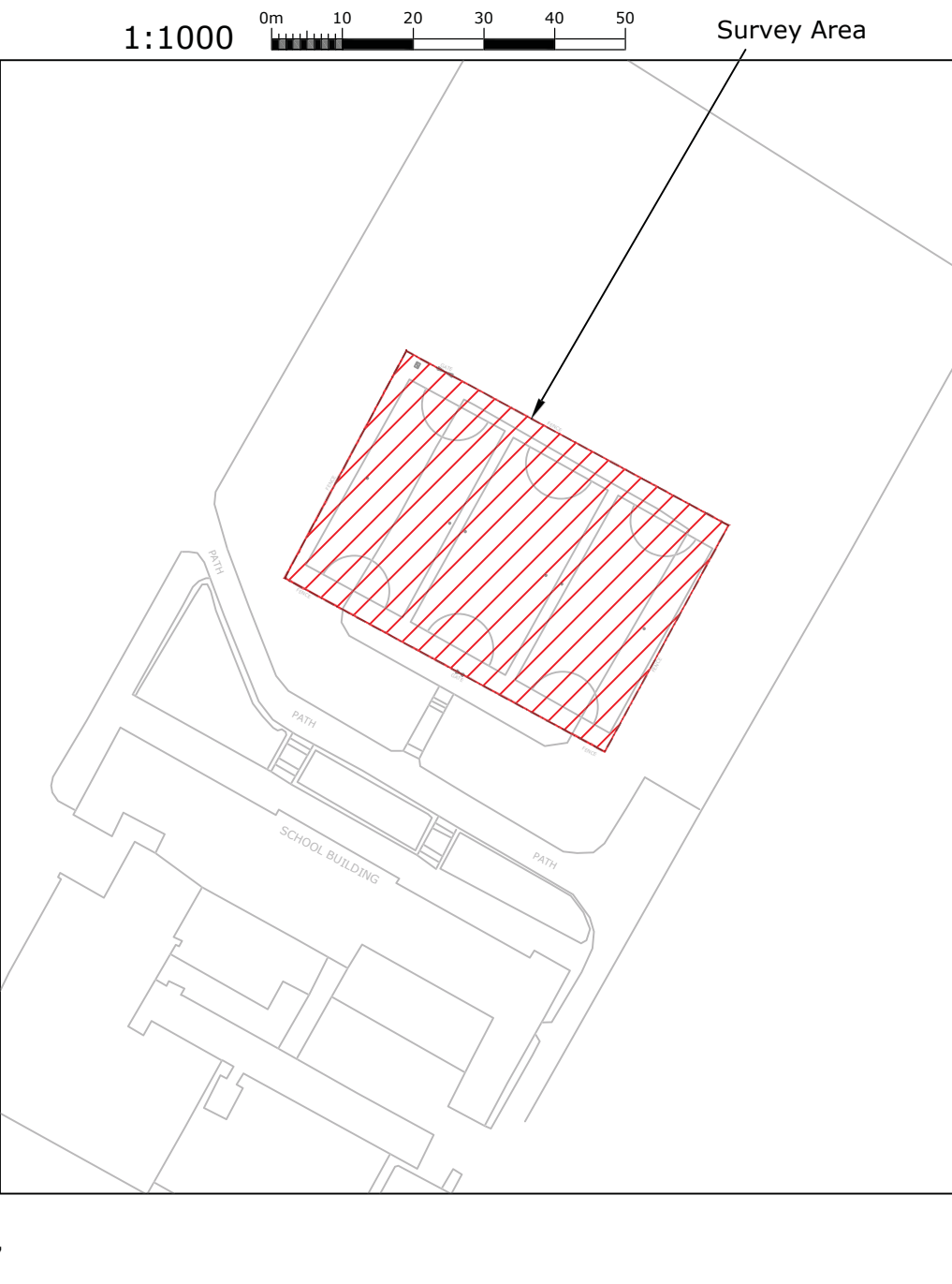
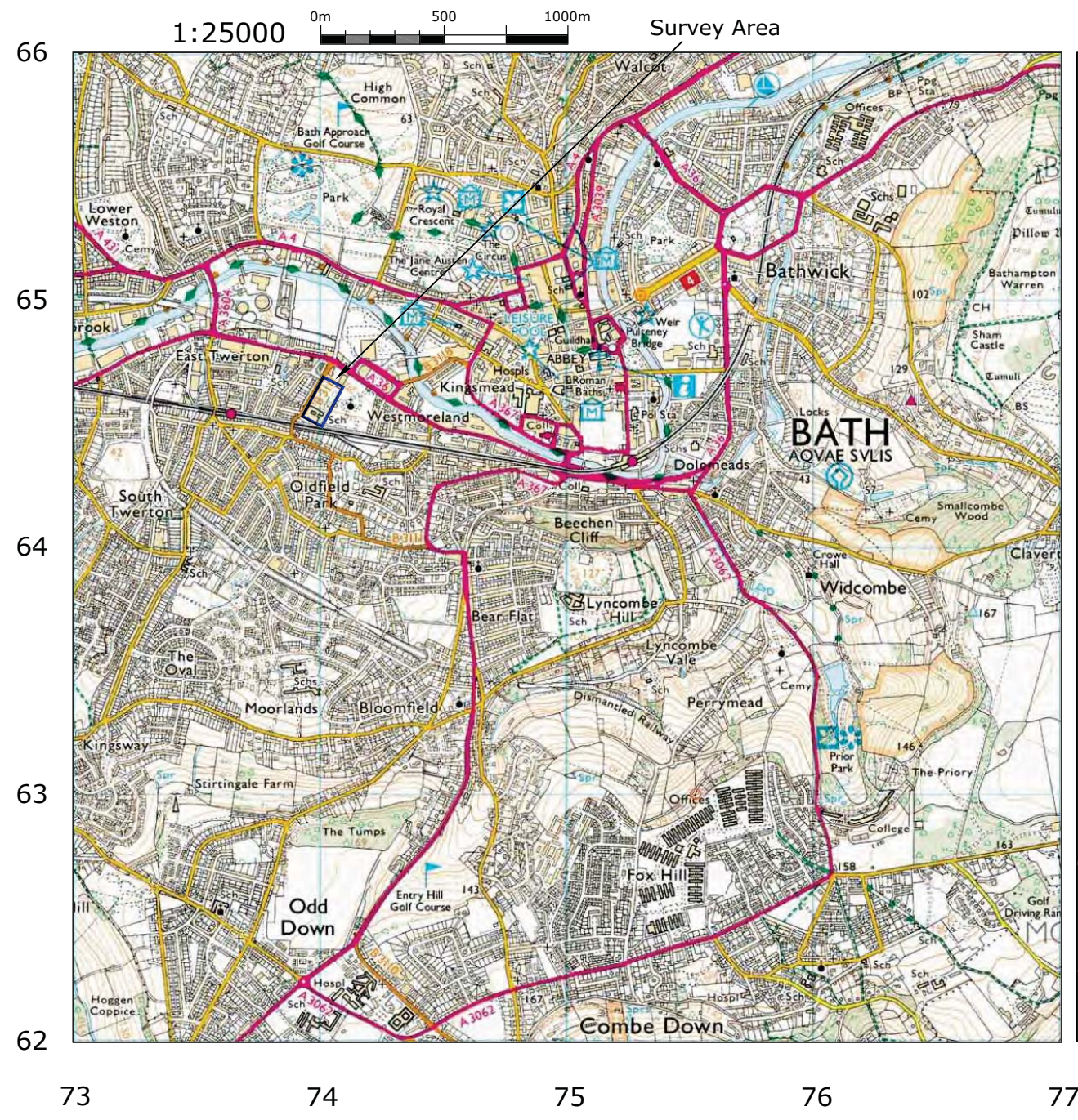
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Mason, C (2010) *Archaeological Desk Based Assessment of Hayesfield Lower School, Brougham Hayes, Bath, B&NES*, BARAS Report No. 2363/2010

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 WR8 0SA
 OS 100km square = ST



Site centred on NGR **ST 740 645**

Client **BRISTOL AND REGION
 ARCHAEOLOGICAL SERVICES**

Project Title **GEOPHYSICAL SURVEY -
 HAYESFIELD LOWER SCHOOL, BATH** Job No. 2971

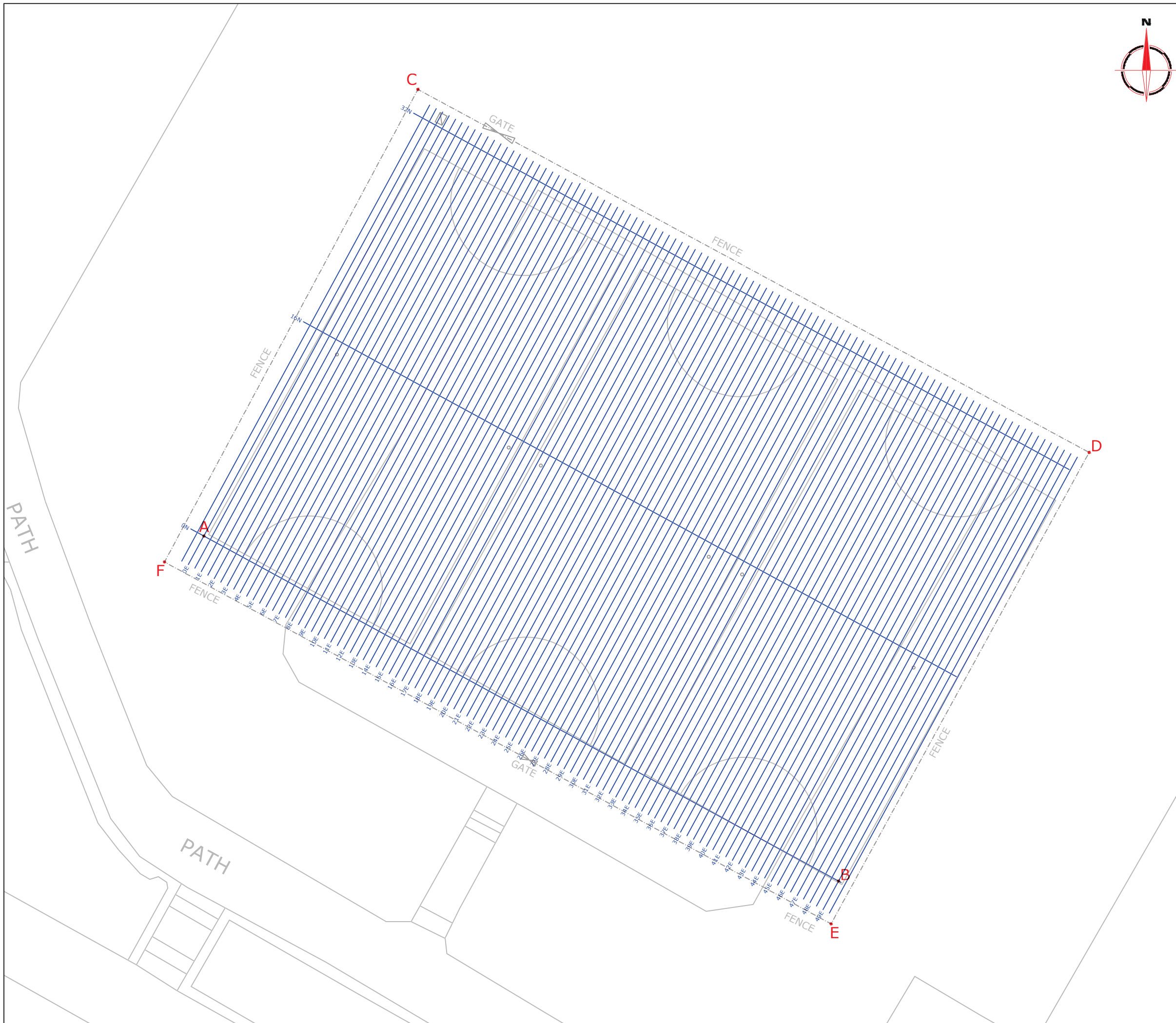
Subject **LOCATION PLAN OF SURVEY AREA**

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Scale **AS SHOWN**

Plot A3	Checked by PPB	Issue No. 01
Survey date OCT 2011	Drawn by RAJS	Figure No. 01



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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REFERENCING INFORMATION

A-B	49m	A-C	33.60m	A-D	60.32m
A-E	50.02m	B-C	60.81m	B-D	33.68m
B-F	50.58m				

A-B	Base line
C, D, E, F	Referencing points
	GPR survey transect

Client
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**GEOPHYSICAL SURVEY -
 HAYESFIELD LOWER SCHOOL, BATH**

Job No. 2971

Subject
**LOCATION OF SURVEY GRIDS AND
 REFERENCING**

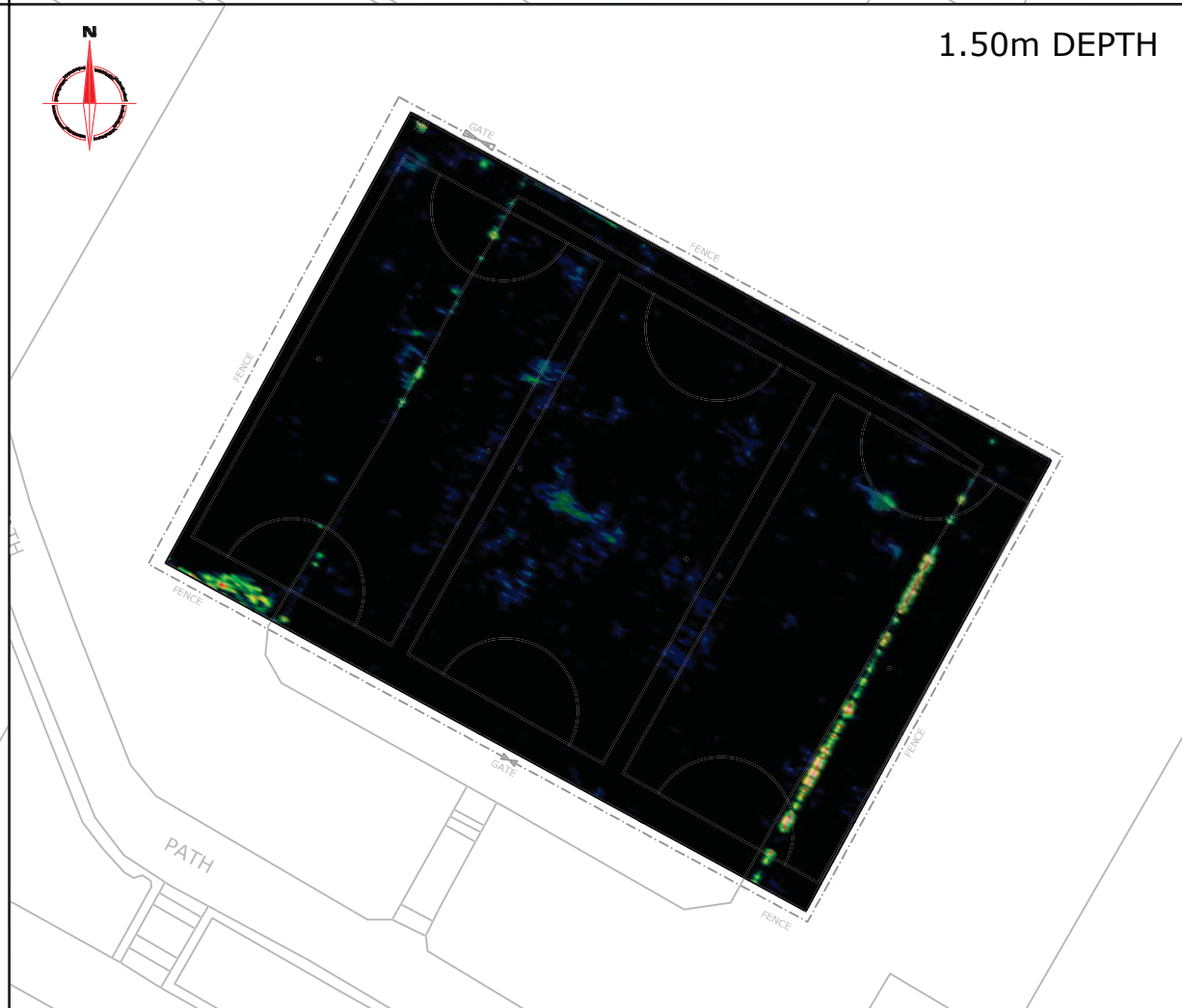
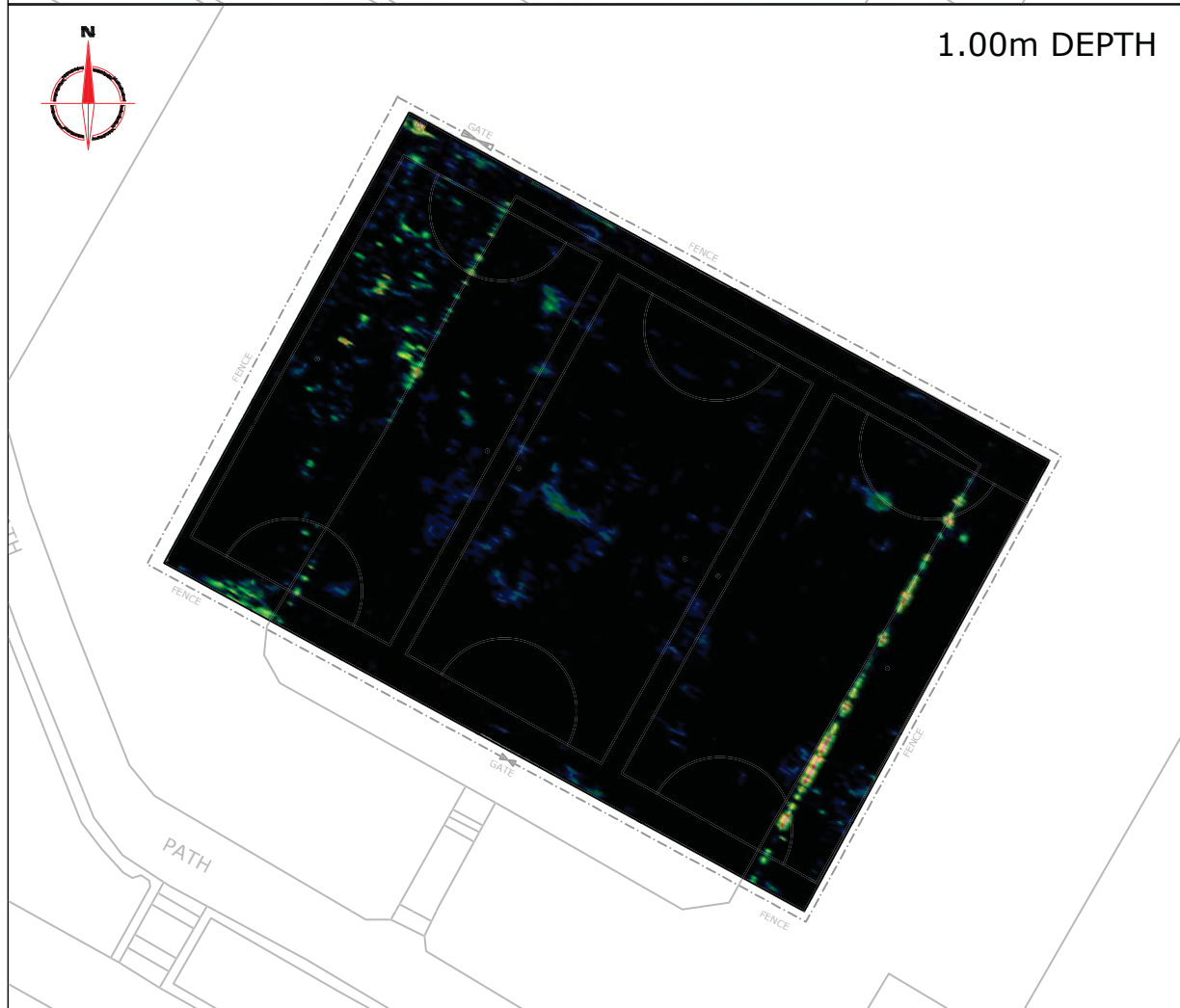
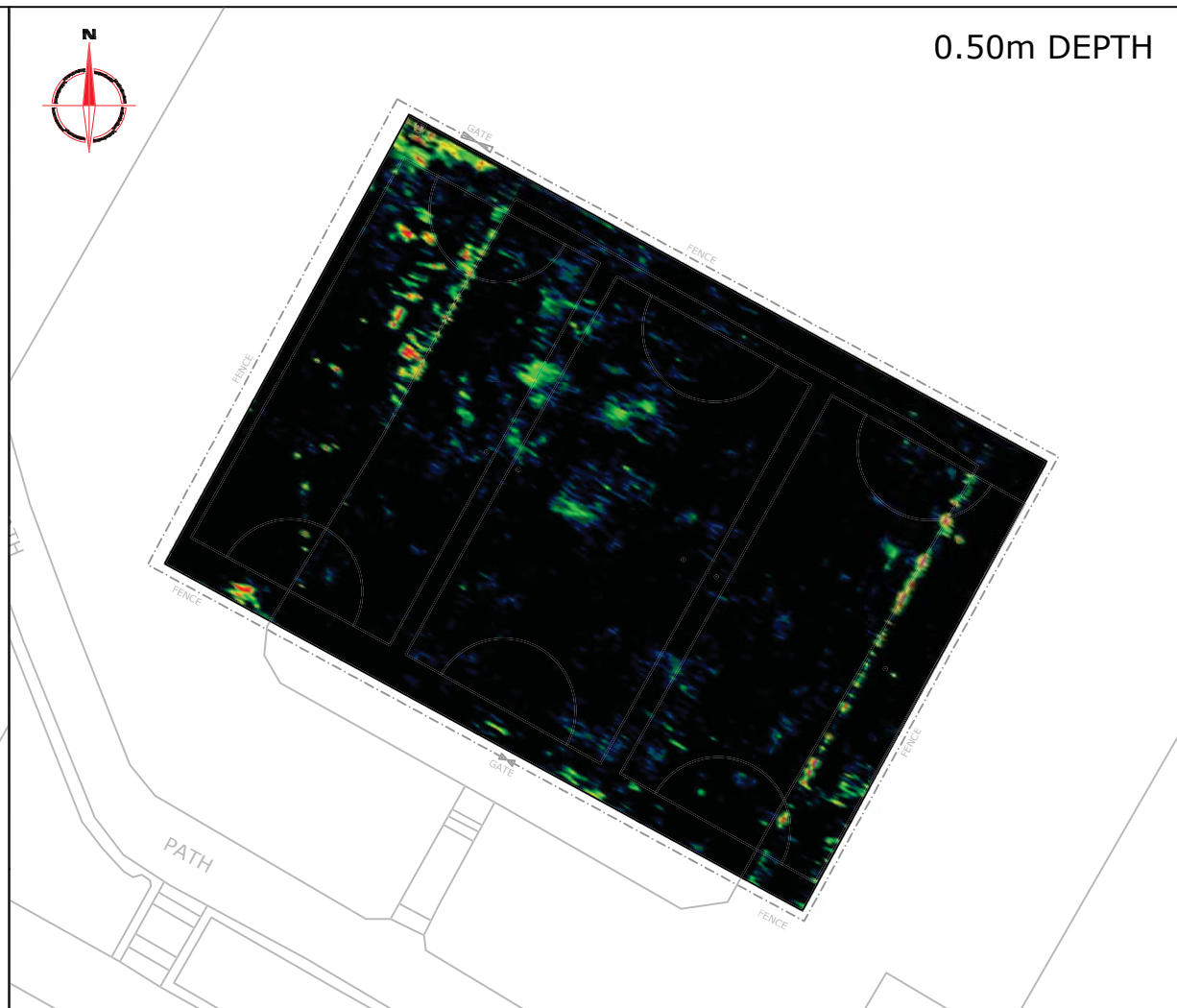
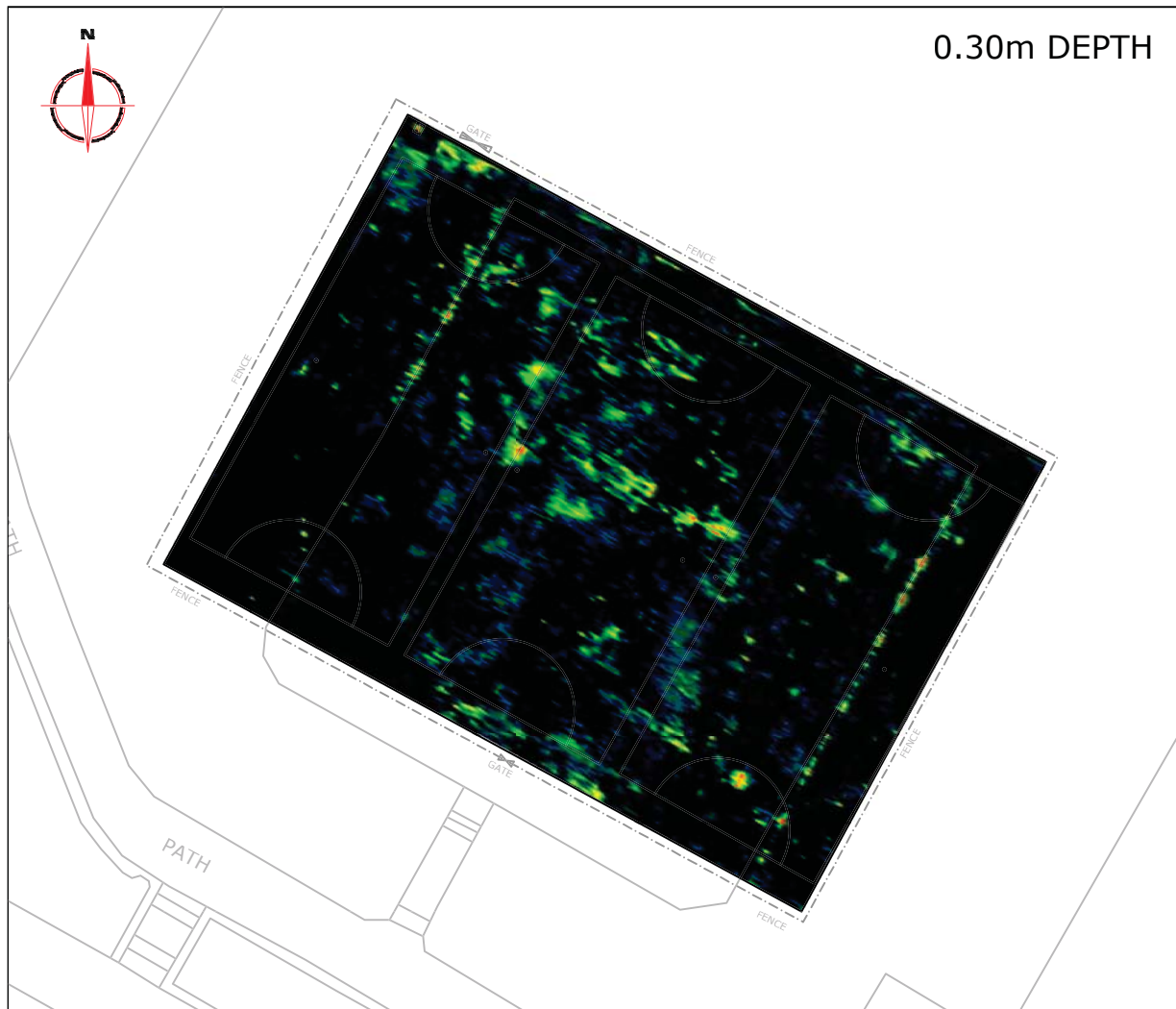
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Scale
1:250

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Survey date OCT 2011	Drawn by RAJS	Figure No. 02



Amendments		
Issue No.	Date	Description
-	-	-
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Antenna
Ground level with superimposed survey grid
Timeslice window showing area of high activity
Feature such as buried foundations or a collapsed wall

Colour Scale for Timeslice 'Activity' Plots and Simplified Key

INCREASING ENERGY LEVEL
↑
High Energy Return
-Possible Archaeological Target

Medium Energy Return
-Mixed Ground

↓
DECREASING ENERGY LEVEL
Low Energy Return
-Homogenous Ground

Client	BRISTOL AND REGION ARCHAEOLOGICAL SERVICES		
Project Title	GEOPHYSICAL SURVEY - HAYESFIELD LOWER SCHOOL, BATH		Job No. 2971
Subject	GPR TIMESLICE PLOTS AT VARIOUS DEPTHS		

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GPR ASSOCIATION

THE SURVEY ASSOCIATION

REGISTERED ORGANISATION

UVDB
UTILITIES PREQUALIFICATION SCHEME

SUMO SERVICES

SUMO GROUP MEMBER

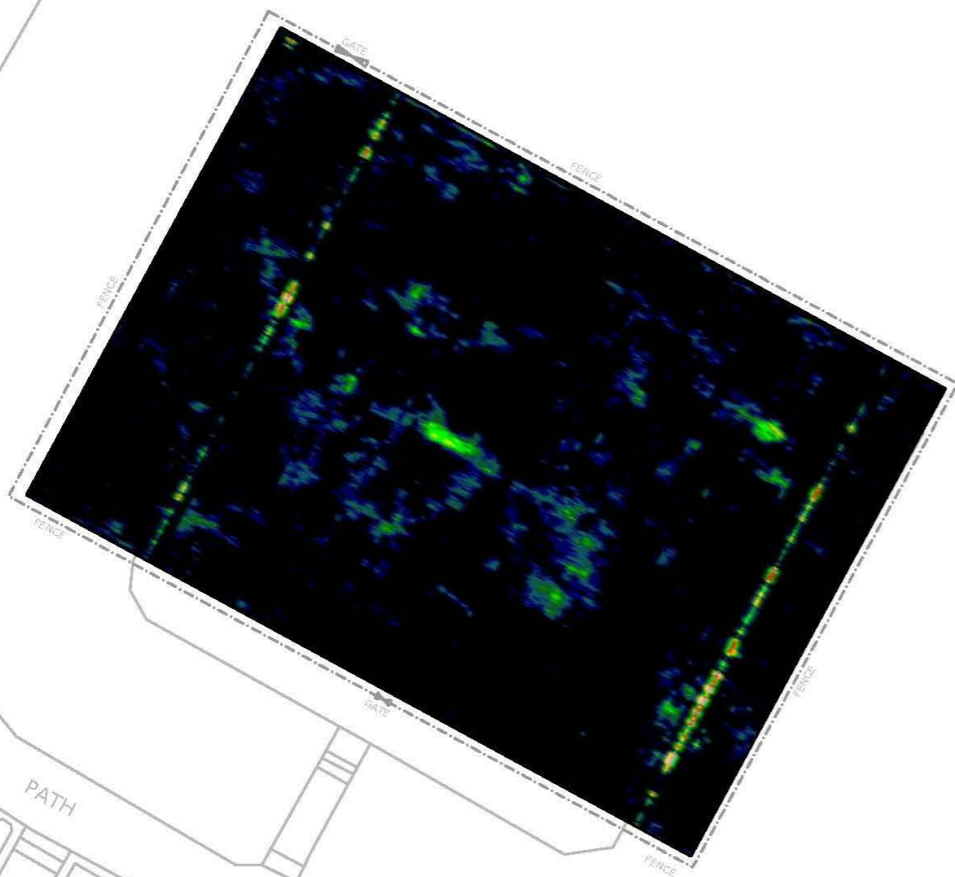
IMS ISO 9001 certified

UKAS ISO 14001 certified

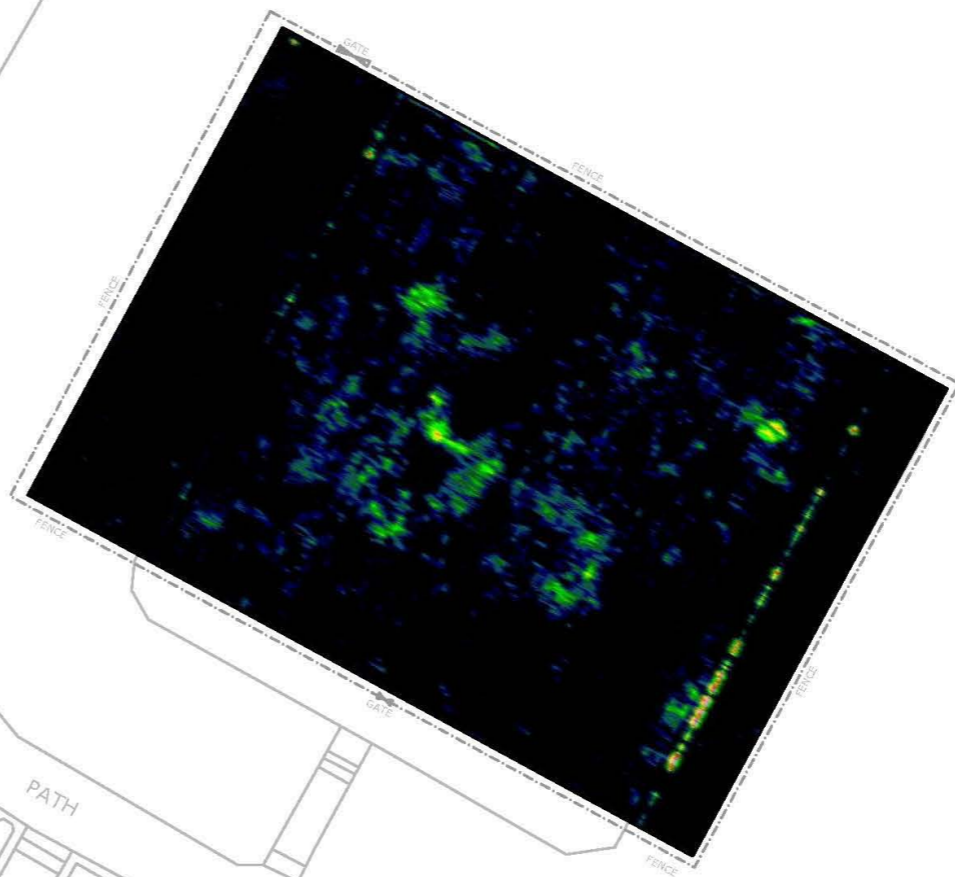
Scale **1:500** 0m 5 10 15 20 25

Plot	Checked by	Issue No.	
A3	PPB	01	
Survey date	Drawn by	Figure No.	
OCT 2011	RAJS	03	

2.00m DEPTH



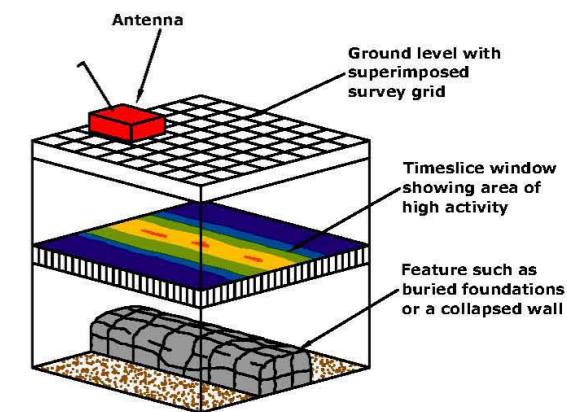
2.50m DEPTH



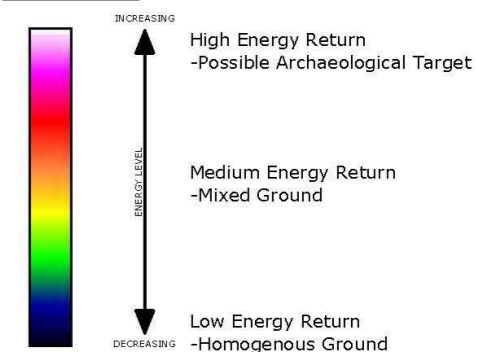
Amendments

Issue No.	Date	Description
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-	-	-

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Colour Scale for Timeslice 'Activity' Plots and Simplified Key



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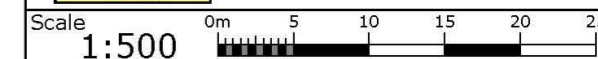
Project Title
**GEOPHYSICAL SURVEY -
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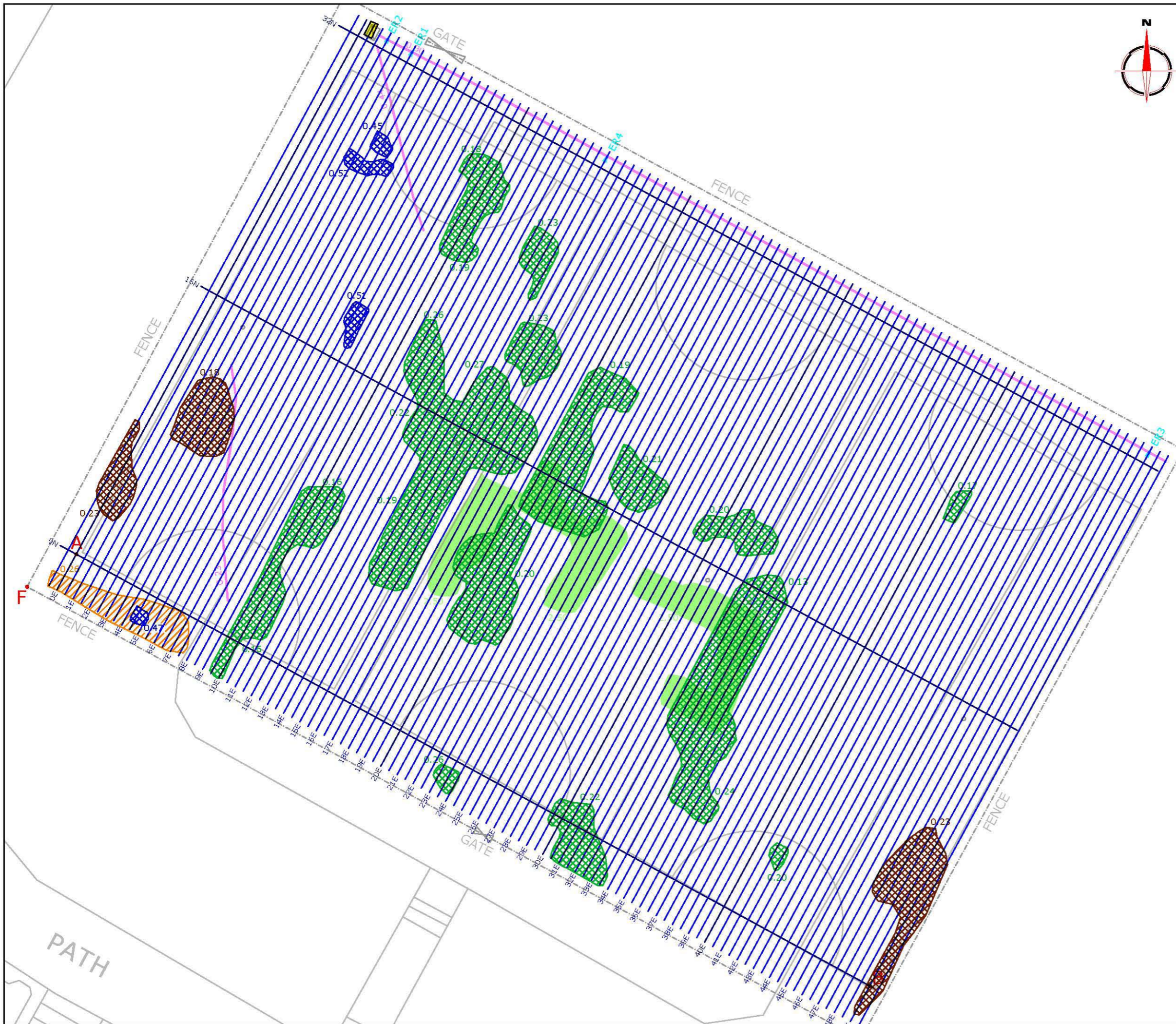
Subject
**GPR TIMESLICE PLOTS AT VARIOUS
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Survey date OCT 2011	Drawn by RAJS	Figure No. 04



Amendments

Issue No.	Date	Description
-	-	-
-	-	-

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KEY

	Likely service
	Discrete responses- possible structural remains
	Complexity with interspersed discrete anomalies- possible structural debris
	Planar anomalies- possibly related to former building platforms
	Complexity- possibly related to disturbed/made ground
	Rectilinear anomalies evident in timeslice data
0.33	Depth to top of surface
	Position of Example Radargram

Client
**BRISTOL AND REGION
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Project Title
**GEOPHYSICAL SURVEY -
 HAYESFIELD LOWER SCHOOL, BATH**

Job No. 2971

Subject
GPR INTERPRETATION

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Scale
1:200 0m 2 4 6 8 10m

Plot A3	Checked by PPB	Issue No. 01
Survey date OCT 2011	Drawn by RAJS	Figure No. 05

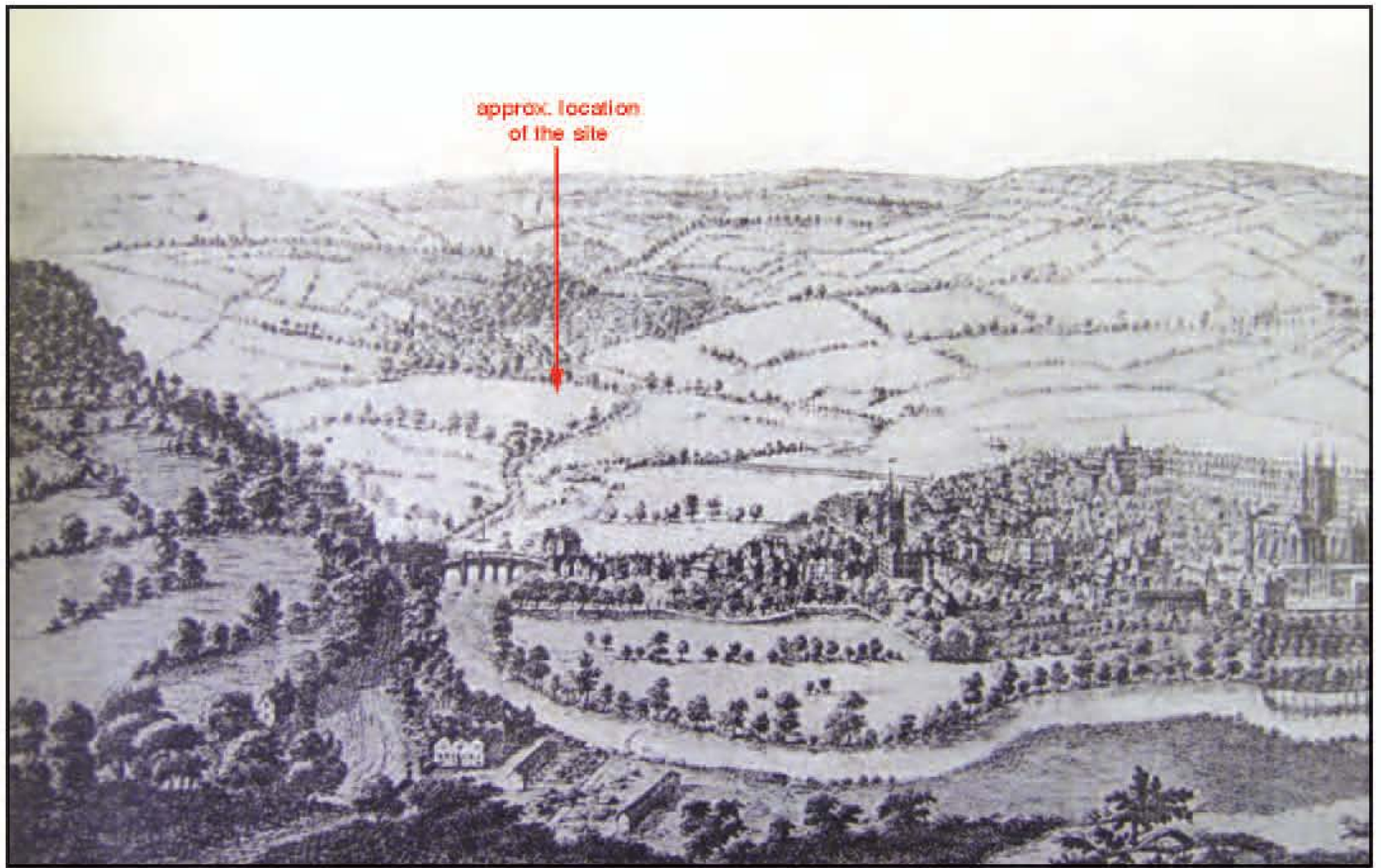


Fig.2 Extract from a Panorama of Bath in 1730 in the 1896 edition of the *Bath Pictorial* (BRO)



Fig.3 Photograph of Somerset Certified Industrial School in the 1896 edition of the *Bath Pictorial* (BRO)

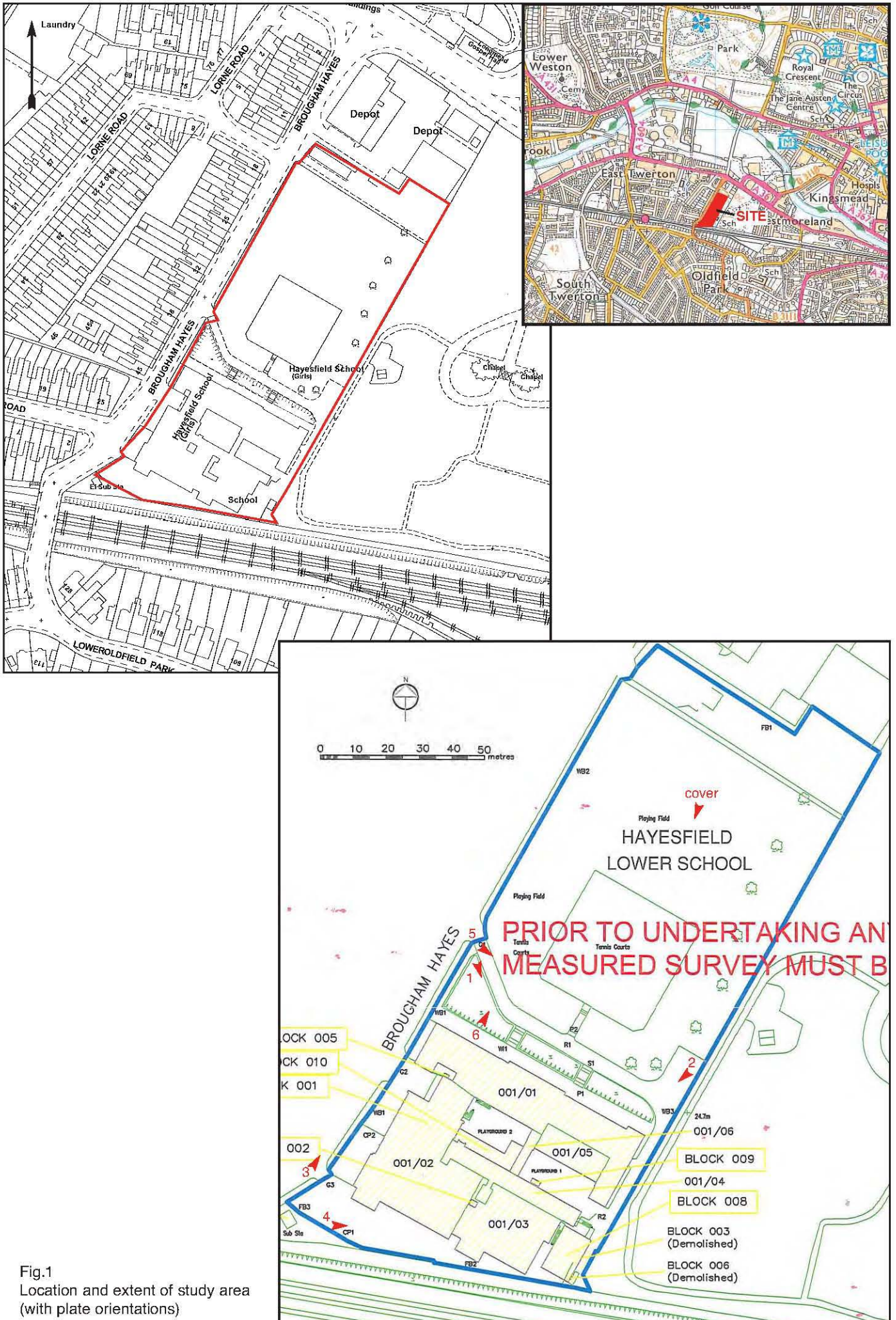


Fig.1
Location and extent of study area
(with plate orientations)



Fig.4 Photograph of Hayesfield Lower School c.1935 (BRO)



Fig.5 Extract from Thomas Thorpe's 1742 *An Actual Survey of the City of Bath, in the County of Somerset, and Five Miles Around* (SRO)

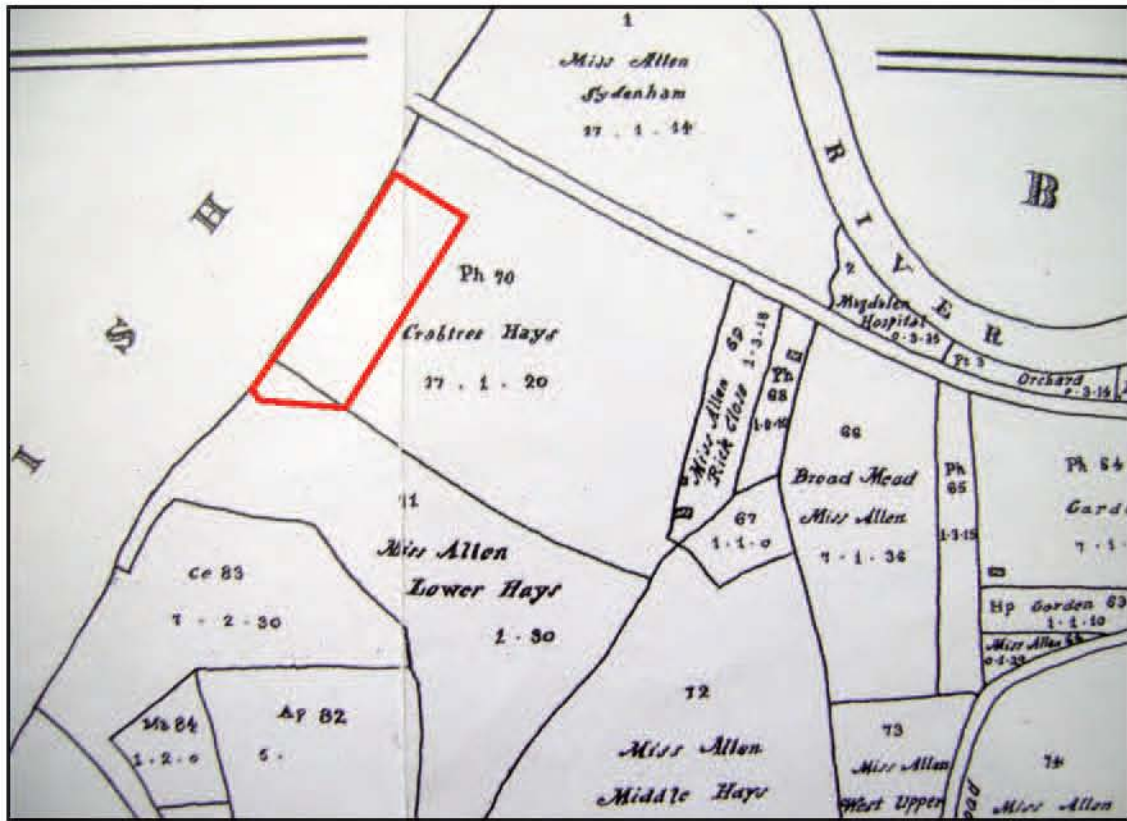


Fig.6 Extract from a 1944 copy of J. Charlton's 1799 *Plan of the Manor of Lyncombe and Widcombe in the county of Somerset belonging to the Feoffees of Bruton Hospital (BRO)*



Fig.7 Extract from the 1839 *Widcombe with Lyncombe Tithe Map (BRO)*



Fig.8 Extract from the 1852 *Plan of the City and Environs of Bath and its Suburbs* (BRO)

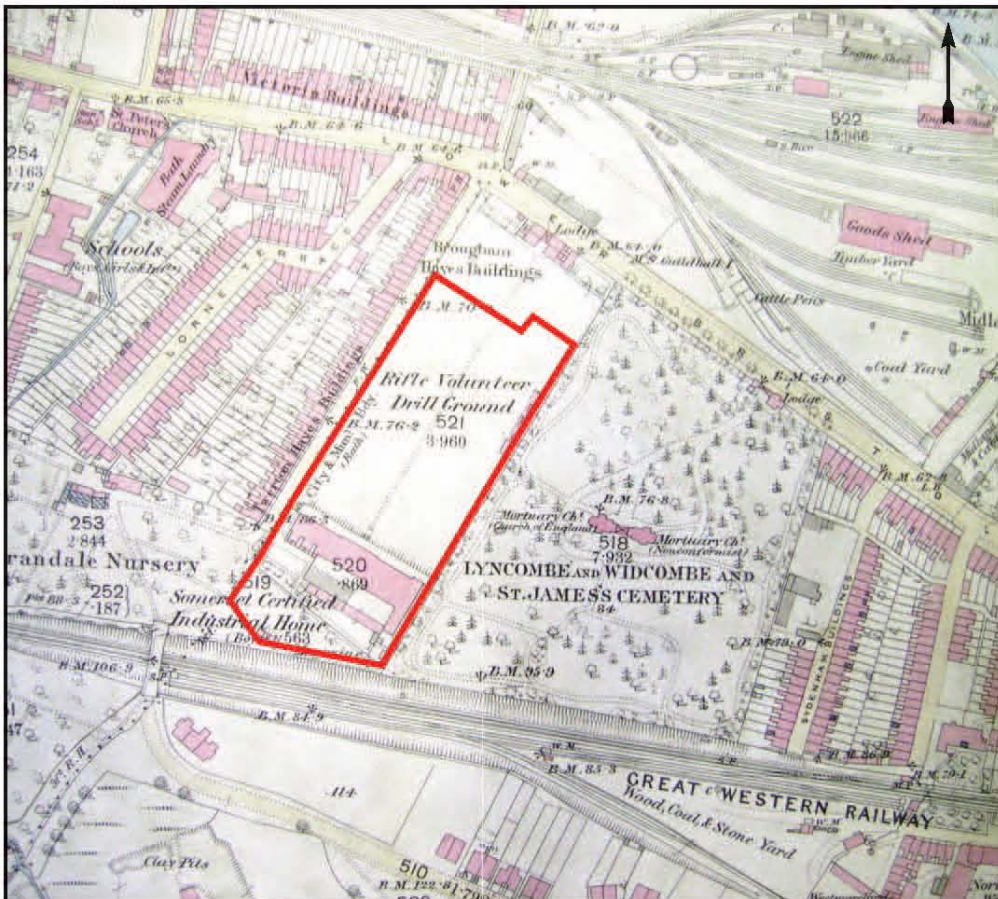


Fig.9 Extract from First Edition 1888 (1:2500) OS

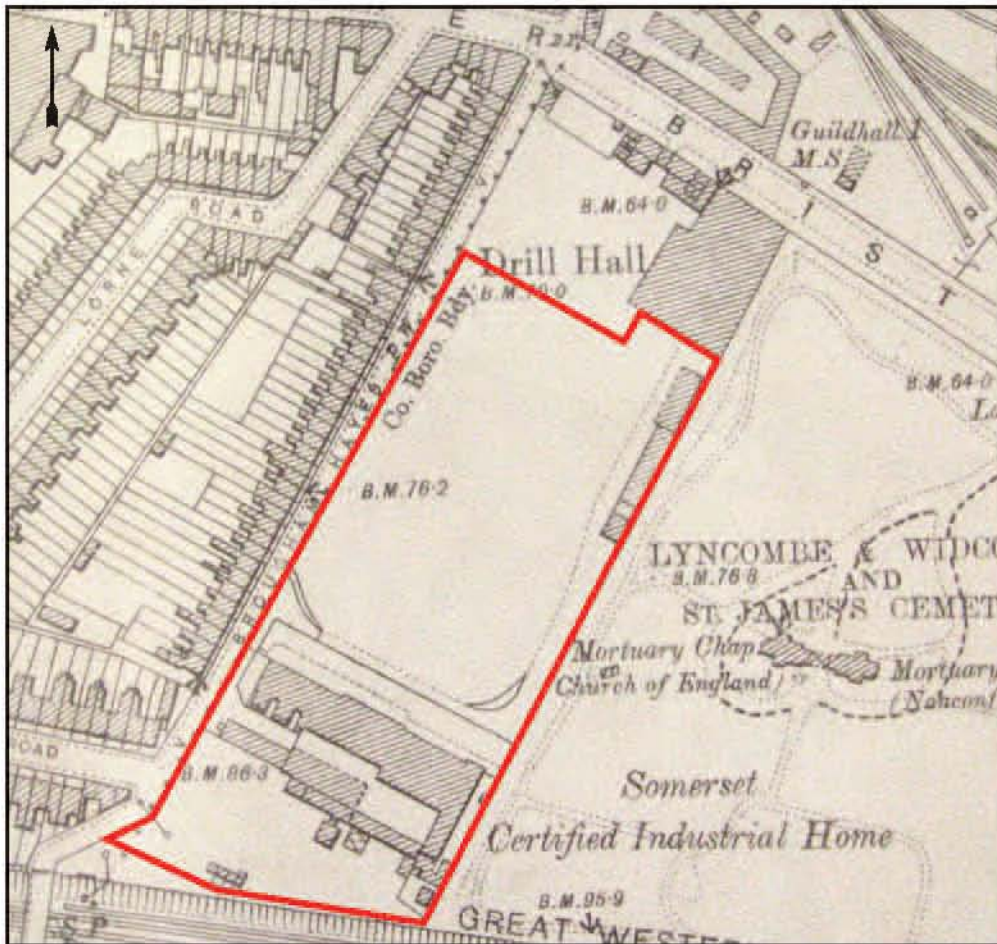


Fig.10 Extract from Second Edition 1904 (1:2500) OS



Fig.11 Extract from Edition of 1932 (1:2500) OS

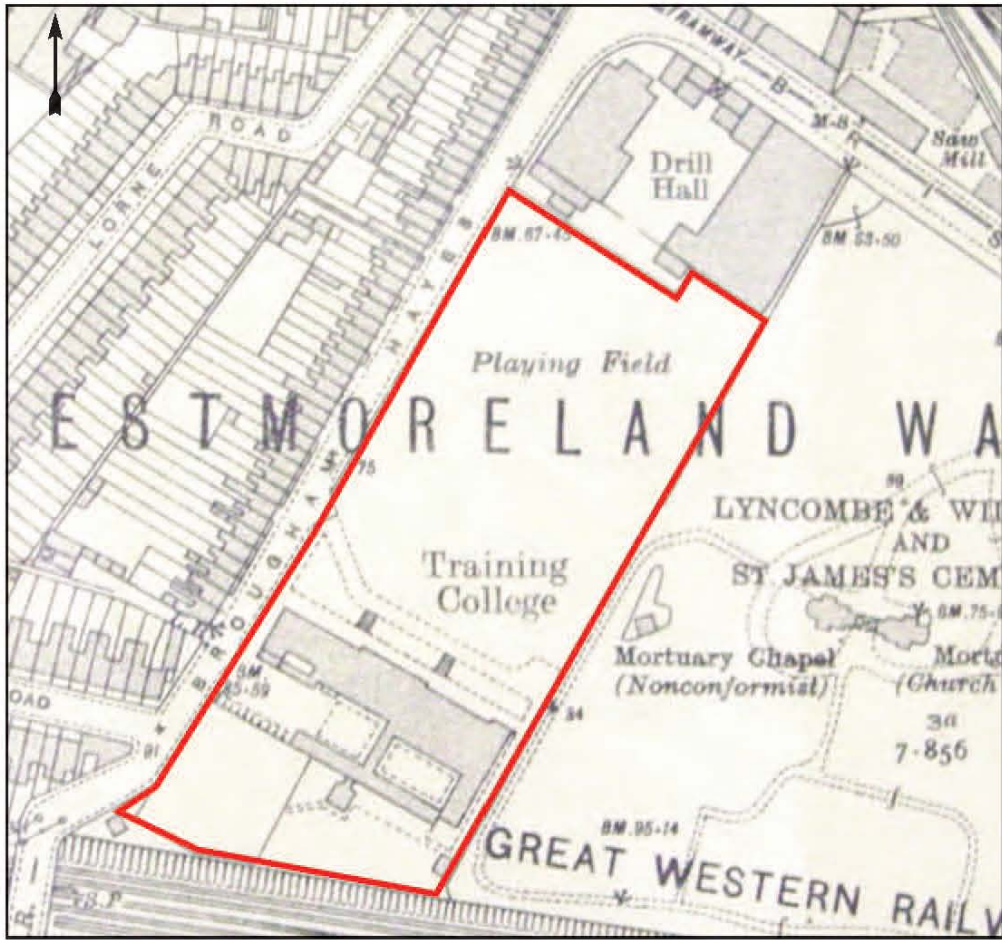


Fig.12 Extract from Revision of 1936 (1:2500) OS

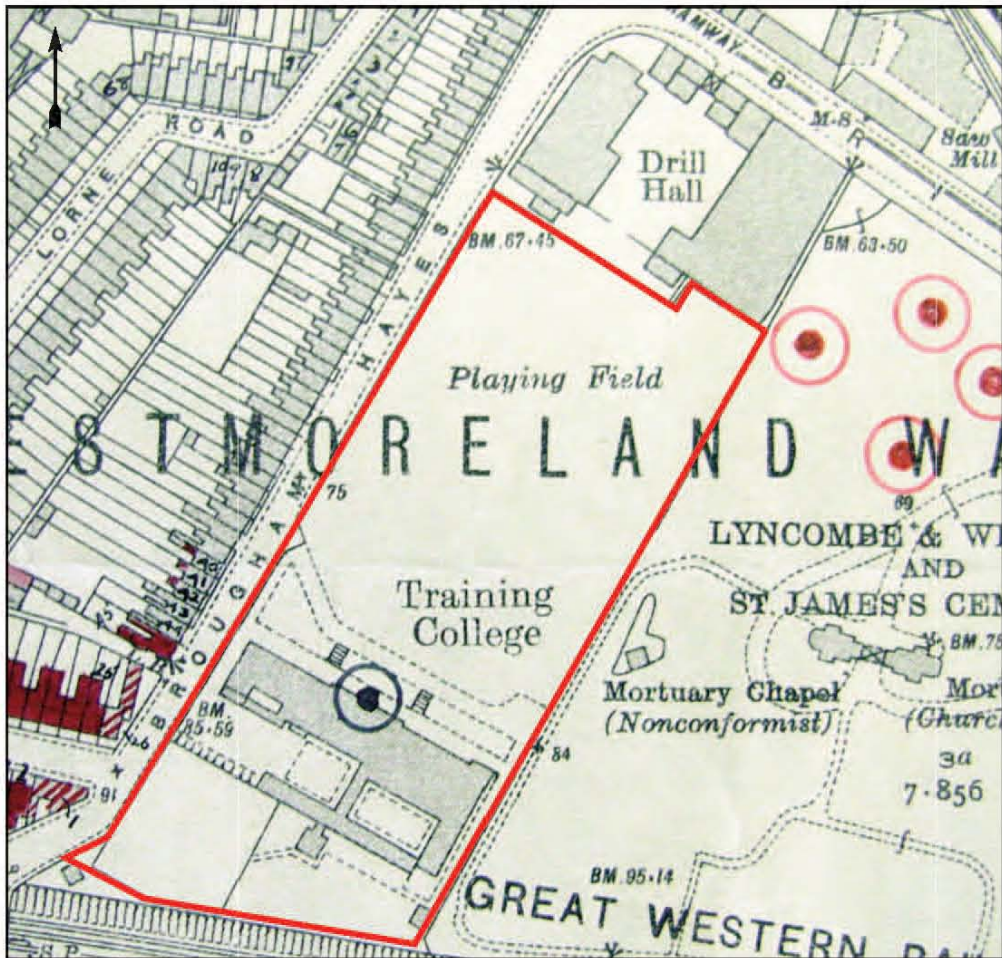


Fig.13 High explosive bomb sites map. Annotated version of Revision of 1936 (1: 2500) OS map

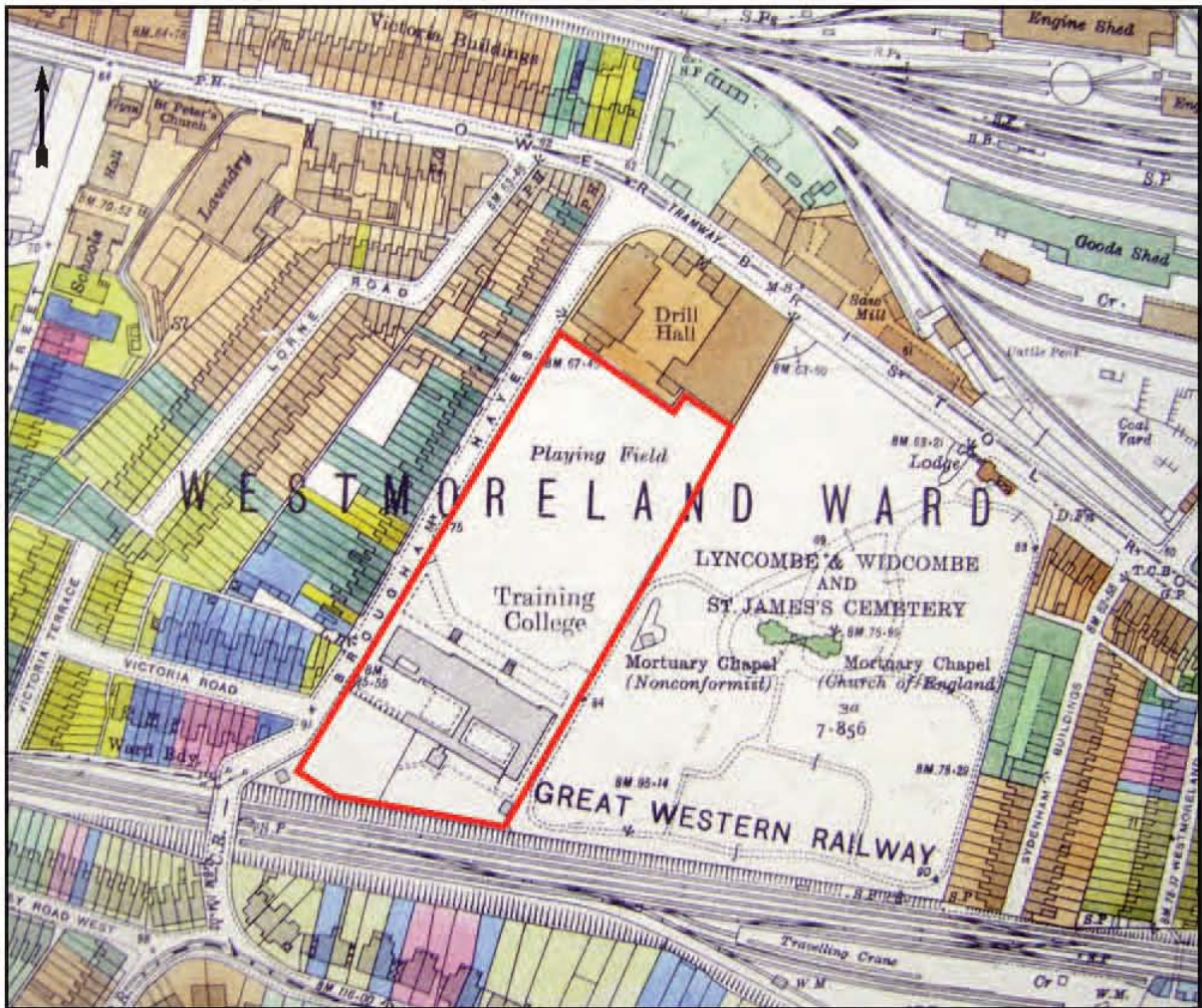


Fig.14 Extract from *City of Bath Air Raid Damage 25th, 26th and 27th April 1942*. Annotated version of Revision of 1936 (1:2500) OS map

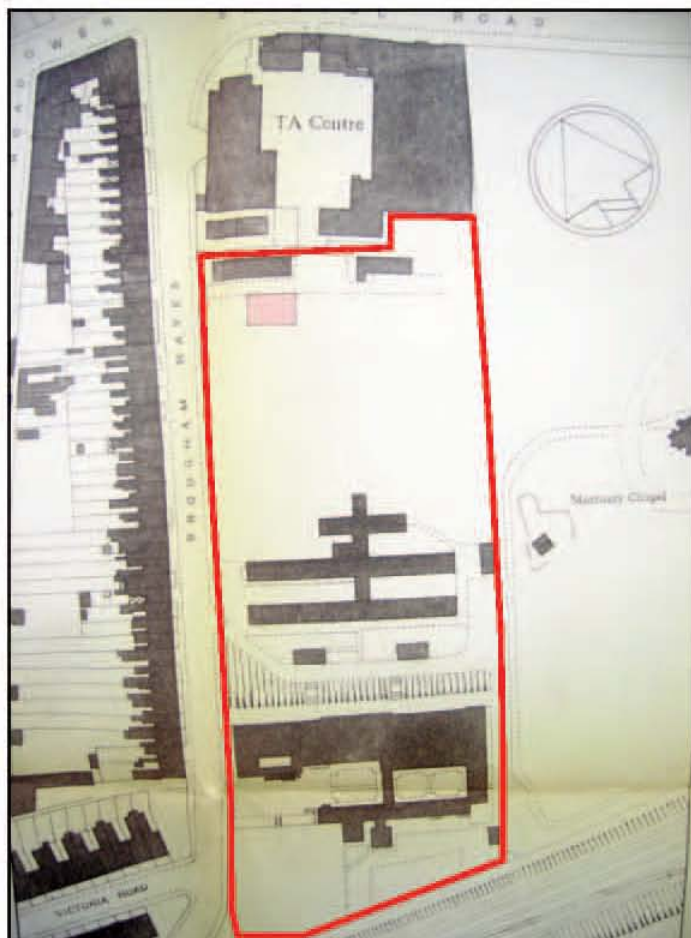
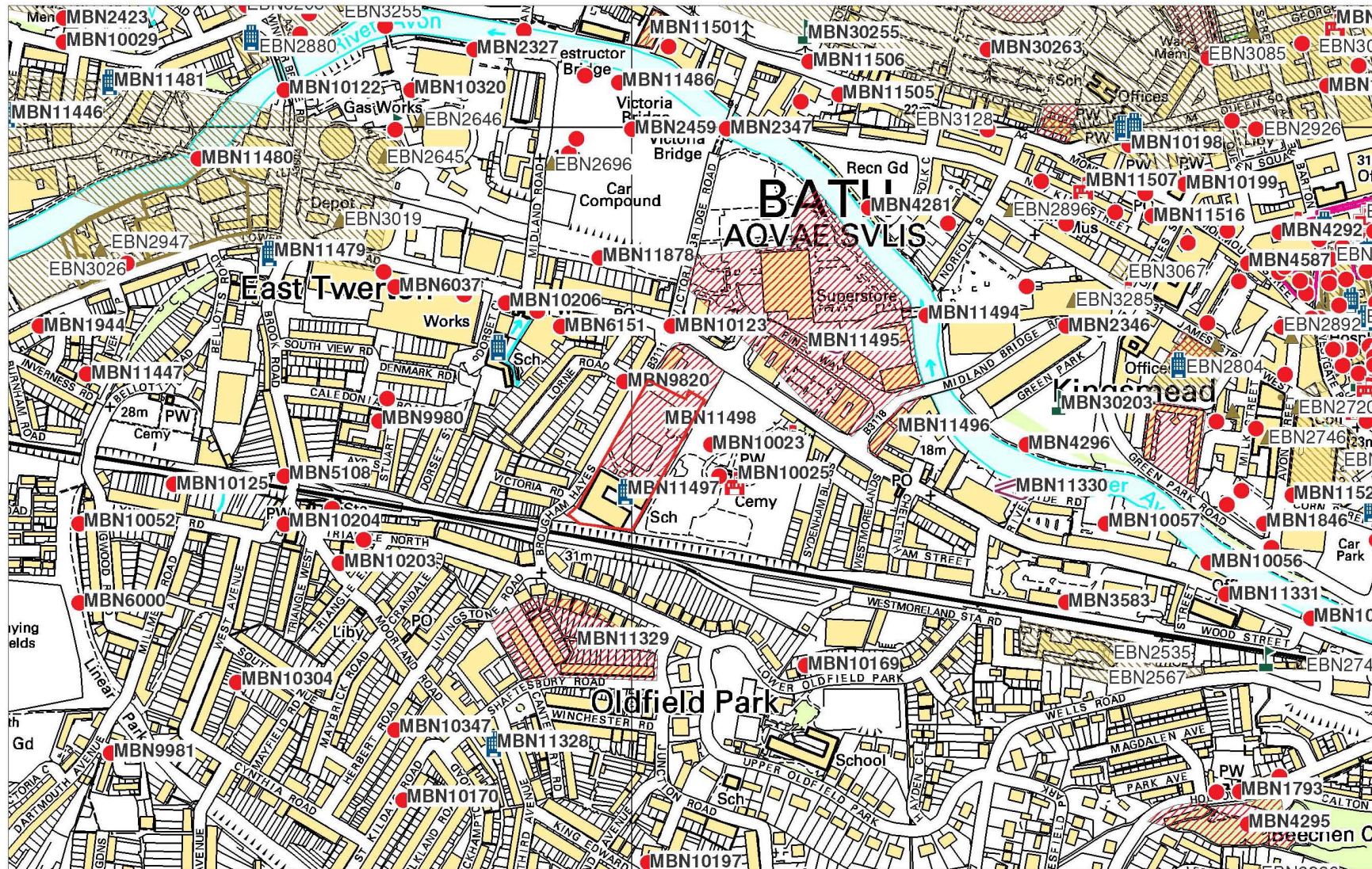


Fig.15 Extract from *Proposed engineering workshop Brougham Hayes technical school*. Plan accompanying approved planning application dated 10th December 1954



Legend

- FEP Area
- Sites & Monuments Record
 - Monument
 - Findspot
 - Place
 - Building
 - Listed Building
 - Park
 - Ancient Woodland
 - Landscape
 - Maritime
- Scheduled Monument

Fig.17 Plan incorporating study area with locations of B&NES HER monuments indicated

Trimbridge House
Trim Street
Bath BA1 2DP
Tel 01225 396126

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Plate 1
Hayesfield Lower School, former Barracks and Industrial School, viewed from the north-west



Plate 2
Hayesfield Lower School, former Barracks and Industrial School, viewed from the north-east



Plate 3
Extension to Hayesfield Lower School, built in 1960, viewed from the south-west



Plate 4
Extension to Hayesfield
Lower School, built in
1960, with later additions
in the background,
viewed from the south-
west



Plate 5
Tennis court, showing
evidence of terracing,
viewed from the west



Plate 6
Tennis court and playing
fields, viewed from the
south



Plate 7
Geotechnical trial pit 2



Plate 8
Geotechnical trial pit 5