APPENDIX 4.1: ARCHAEOLOGICAL DESK BASED ASSESSMENT

Ham Close Regeneration

Planning Application:

Archaeological Desk-Based Assessment

Author: Orion Heritage Ltd

February 2022

Ham Close, Richmond-upon-Thames
Archaeological Desk-Based Assessment
February 2022

Report

Archaeological Desk-Based Assessment

Site

Ham Close, Richmond upon Thames

Client

Hill Residential Ltd

Date

February 2022

Planning Authority

London Borough of Richmond upon Thames

Grid Reference

TQ 17157 72343

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Report Status

FINAL

Orion Ref

PN3135/DBA/1

HER Ref

16536

Contents

List of Illustrations

Timescales Used in This Report

Prehistoric

Palaeolithic	450,000 -12,000 BC
Mesolithic	12,000 - 4,000 BC
Neolithic	4,000 - 2,200 BC
Bronze Age	2,200 - 700 BC
Iron Age	700 - AD 43

Historic

Roman	43 – 410 AD
Saxon/Early Medieval	410 – 1066 AD
Medieval	1066 – 1485 AD
Post Medieval	1486 – 1901 AD
Modern	1901 - Present Day

Executive Summary

This archaeological desk-based assessment considers land at Ham Close, Richmond upon Thames (hereinafter referred to as the "study site"). In accordance with government policy (National Planning Policy Framework), this assessment draws together the available archaeological, historic, topographic and land-use information in order to clarify the heritage significance and archaeological potential of the study site.

There are no known archaeological remains within the site. Based on available evidence there is considered moderate potential for fragmentary, locally significant, early prehistoric occupation evidence to be impacted by the proposed development.

Past impacts within the study site comprise construction and demolition activities associated the current housing, and Manor Farm in the east of the site. Construction and demolition of the mid-20th century prefabricated development is likely to have required superficial rather than substantial ground disturbance, as with historic plough activity across the site. A review of recent geotechnical site investigations does suggest general horizontal truncation across the study site (Enzygo 2021).

The potential for early prehistoric occupation, in the form of residual flint artefacts within or on the Kemptown Gravels cannot be entirely ruled out. Based on past impacts such remains are likely to be fragmentary rather than well-preserved and of local significance. Whilst this is a general theoretic potential across the site, areas outside the footprint of the current development in the west of the study site are identified in particular.

There is high potential for buried remains associated with Manor Farm in the east of the study site, adjacent to Ham Street. A farm is known at this location from at least the 18th century. As the farm was demolished in the 1950's foundations and footing associated with this asset are likely to be fragmentary rather than well-preserved and of local significance. The potential for well-preserved earlier medieval or early medieval roadside occupation is considered low due to later development. It is noted that the proposed development retains this eastern area as open space and no physical impact in this area is proposed. The western part of the study site is historically agricultural and there is low potential for significant occupation evidence from the historic periods.

In summary, the assessment has identified that the proposed development has potential to effect fragmentary early prehistoric evidence of local heritage significance in the west of the study site.

It is recommended that a staged programme of archaeological works is secured as a condition of planning which will allow the identification of archaeological assets, if present, within the study site and a suitable mitigation strategy to be developed and agreed with Richmond and their archaeological advisors.

On this basis the development could be made acceptable in terms of archaeological impacts. It therefore accords with the requirements in paragraphs 194 and 203 of the NPPF, policy HC1 of The London Plan and policy LP7 of Richmond Borough Council Local Plan.

1.0 Introduction

1.1 This archaeological desk-based assessment considers Ham Close, Richmond upon Thames (Figure 1). It has been researched and prepared by Orion Heritage on behalf of Hill Residential Ltd. The site (hereinafter referred to as the "study site") is located at grid reference TQ 17157 72343. It has been prepared in support of a planning application for residential development.

1.2 The assessment includes a geoarchaeological assessment by QUEST (Appendix A).

1.3 In accordance with the Standard and Guidance for Historic Environment Desk-Based Assessment (Chartered Institute for Archaeologists 2017), the assessment draws together available information on designated and non-designated heritage assets, topographic and land-use information so as to establish the potential for non-designated archaeological assets within the study site. The assessment includes the results of a site survey, an examination of published and unpublished records, and charts historic land-use through a map regression exercise.

1.4 The assessment enables relevant parties to assess the significance of heritage/ archaeological assets on and close to the study site and considers the potential for hitherto undiscovered archaeological assets, thus enabling potential impacts on assets to be identified along with the need for design, civil engineering or archaeological solutions. It also provides an understanding of any constraints to development of the study site due to the presence of nearby heritage assets, and provides an assessment of the potential impact development would have on the significance of heritage assets and also provides design responses that would serve to reduce that impact in line with local and national policy.

1.5 The study area used in this assessment is a 500m radius from the boundary of the study site (Figures 2 and 3).

Location, Topography and Geology

1.6 The study site is located on the west side of Ham High Street. It is bounded by Woodville Road on the north, Wiggins Lane and Ham Street in the east and Ashburnam Road in the south. Ham Close Estate is made up of various social housing blocks in the west of the site, set around the two link roads of Ham Close which run between Woodville Road and Ashburnham Road. Ham Village Green lies in the east of the site.

1.7 The study site is relatively level with an average height above ordnance datum of 7m (aOD).

1.8 The solid geology of the study site comprises clay and silt of the London Clay formation. Superficial deposits consist of sand and gravel of the Kempton Park Gravel member (BGS Geology of Britain Viewer 2021).

2.0 Aims, Objectives & Methodology

2.1 The principal aims of the desk-based assessment are to:

- Gain an understanding of the archaeological potential of the study site;
- Identify any archaeological constraints to the development of the study site; and to
- Assess the likely impact of the proposed development.

2.2 The results of the archaeological desk-based assessment will inform an archaeological strategy for further on-site assessment and formulation of a mitigation strategy, as appropriate to the archaeological potential of the study site.

2.3 This desk-based assessment conforms to the requirements of current national and local planning policy (including *National Planning Policy Framework* 2021) and it has been designed in accordance with current best archaeological practice, and the appropriate national and local standards and guidelines, including:

- Management of Recording Projects in the Historic Environment: MORPHE (English Heritage 2006);
- Code of Conduct (Chartered Institute for Archaeologists [ClfA] [revised edition] 2014); and
- Standard and Guidance for Historic Environment Desk-Based Assessment (ClfA January 2017).

2.4 It is noted that the Chartered Institute for Archaeologists defines desk-based assessment as:

"a programme of study of the historic environment within a specified area or site on land, the inter-tidal zone or underwater that addresses agreed research and/or conservation objectives. It consists of an analysis of existing written, graphic, photographic and electronic information in order to identify the likely heritage assets, their interests and significance and the character of the study area, including appropriate consideration of the settings of heritage assets and, in England, the nature, extent and quality of the known or potential archaeological, historic, architectural and artistic interest. Significance is to be judged in a local, regional, national or international context as appropriate."

2.5 The Chartered Institute for Archaeologists Standard for desk-based assessment states that:

"Desk-based assessment will determine, as far as is reasonably possible from existing records, the nature, extent and significance of the historic environment within a specified area. Desk-based assessment will be undertaken using appropriate methods and practices which satisfy the stated aims of the project, and which comply with the Code of conduct and other relevant regulations of ClfA. In a development context desk-based assessment will establish the impact of the proposed development on the significance of the historic environment (or will identify the need for further evaluation to do so) and will enable reasoned proposals and decisions to be made whether to mitigate, offset or accept without further intervention that impact."

Methodology

2.6 The archaeological desk-based assessment will include:

- Map regression based on Ordnance Survey maps and tithe/enclosure maps and apportionments held at Richmond Local Studies Library and The National Archives;

- Examination of material currently held in the Greater London Historic Environment Record, including Historic Landscape Characterisation, for the proposed routes and for a 1km search radius;
- Consultation of the National Heritage List for England;

2.7 The report will also include a consideration of LiDAR and aerial photography for the study site.

2.8 Lidar provides topographic data and is particularly useful in the detection and identification of heritage assets that survive as earthworks. The Environment Agency (EA) regularly collects Lidar data for England and makes these data available for public use through their online portal. Digital Terrain Models (DTM) are routinely used for heritage purposes as this model shows the grounds surface with buildings and trees filtered out to create a 'bare earth' effect. Given the truncation and landscaping caused by post-medieval construction activities on the site a Lidar assessment was not thought to be beneficial to an assessment of its archaeological potential.

3.0 Planning Background and Development Plan Framework

Ancient Monuments & Archaeological Areas Act 1979

3.1 The Ancient Monuments & Archaeological Areas Act 1979 (as amended) protects the fabric of Scheduled Monuments but does not afford statutory protection to their settings.

National Planning Policy Framework (NPPF) & National Planning Practice Guidance (NPPG)

3.2 Government policy in relation to the historic environment is outlined in Section 16 of the National Planning Policy Framework (NPPF), entitled 'Conserving and Enhancing the Historic Environment'. This provides guidance for planning authorities, property owners, developers and others on the conservation and investigation of heritage assets. Overall, the objectives of Section 16 of the NPPF can be summarised as seeking the:

- Delivery of sustainable development;
- Understanding the wider social, cultural, economic and environmental benefits brought by the conservation of the historic environment;
- Conservation of England's heritage assets in a manner appropriate to their significance; and
- Recognition of the contribution that heritage assets make to our knowledge and understanding of the past.

3.3 Section 16 of the NPPF recognises that intelligently managed change may sometimes be necessary if heritage assets are to be maintained for the long term.

3.4 Paragraph 194 states that planning decisions should be based on the significance of the heritage asset, and that the level of detail supplied by an applicant should be proportionate to the importance of the asset and should be no more than sufficient to understand the potential impact of the proposal upon the significance of that asset.

3.5 Paragraph 198 states that decisions regarding the removal or alteration of historic statues, plaques, memorials or monuments should have regard to the importance of their retention in situ and, where appropriate, explaining their historic and social context rather than removal.

3.6 Paragraph 203 requires the decision-maker to take into account the effect on the significance of non-designated heritage assets and to take a balanced judgement having regard to the scale of harm or loss and the significance of the asset(s) potentially affected.

3.7 *Heritage Assets* are defined in Annex 2 as a building, monument, site, place, area or landscape identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. It includes designated heritage assets and assets identified by the local planning authority (including local listing).

3.8 *Archaeological Interest* is defined as a heritage asset which holds, or potentially could hold, evidence of past human activity worthy of expert investigation at some point. Heritage assets with archaeological interest are the primary source of evidence about the substance and evolution of places, and of the people and cultures that made them.

3.9 *Designated Heritage Assets* comprise: A World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Parks and Garden, Registered Battlefield or Conservation Areas designated under the relevant legislation.

3.10 *Significance* is defined as the value of a heritage asset to this and future generations because of its heritage interest. This interest may be archaeological, architectural, artistic

or historic. Significance derives not only from a heritage asset's physical presence, but also from its setting.

3.11 *Setting* is defined as the surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.

3.12 The NPPF is supported by the Planning Policy Guidance (July 2019). In relation to the historic environment, paragraph 002 (002 Reference ID: 18a-002-20190723) states that:

"Where changes are proposed, the National Planning Policy Framework sets out a clear framework for both plan-making and decision-making in respect of applications for planning permission and listed building consent to ensure that heritage assets are conserved, and where appropriate enhanced, in a manner that is consistent with their significance and thereby achieving sustainable development. Heritage assets are either designated heritage assets or non-designated heritage assets."

Local Planning Policy

3.13 The London Plan (adopted March 2021) includes Policy HC1 which relates to heritage assets and archaeology:

Policy HC1 Heritage conservation and growth

A. Boroughs should, in consultation with Historic England, local communities and other statutory and relevant organisations, develop evidence that demonstrates a clear understanding of London's historic environment. This evidence should be used for identifying, understanding, conserving, and enhancing the historic environment and heritage assets, and improving access to, and interpretation of, the heritage assets, landscapes and archaeology within their area.

B. Development Plans and strategies should demonstrate a clear understanding of the historic environment and the heritage values of sites or areas and their relationship with their surroundings. This knowledge should be used to inform the effective integration of London's heritage in regenerative change by:

1) setting out a clear vision that recognises and embeds the role of heritage in place-making

2) utilising the heritage significance of a site or area in the planning and design process

3) integrating the conservation and enhancement of heritage assets and their settings with innovative and creative contextual architectural responses that contribute to their significance and sense of place

4) delivering positive benefits that conserve and enhance the historic environment, as well as contributing to the economic viability, accessibility and environmental quality of a place, and to social wellbeing.

C. Development proposals affecting heritage assets, and their settings, should conserve their significance, by being sympathetic to the assets' significance and appreciation within their surroundings. The cumulative impacts of incremental change from development on heritage assets and their settings should also be actively managed. Development proposals should avoid harm and identify enhancement opportunities by integrating heritage considerations early on in the design process.

D. *Development proposals should identify assets of archaeological significance and use this information to avoid harm or minimise it through design and appropriate mitigation. Where applicable, development should make provision for the protection of significant archaeological assets and landscapes. The protection of undesignated heritage assets of archaeological interest equivalent to a scheduled monument should be given equivalent weight to designated heritage assets.*

E. *Where heritage assets have been identified as being At Risk, boroughs should identify specific opportunities for them to contribute to regeneration and place-making, and they should set out strategies for their repair and reuse.*

3.14 Richmond's Local Plan (Adopted 3 July 2018) has the following policy relating to archaeology:

Policy LP 7 Archaeology

The Council will seek to protect, enhance and promote its archaeological heritage (both above and below ground), and will encourage its interpretation and presentation to the public. It will take the necessary measures required to safeguard the archaeological remains found, and refuse planning permission where proposals would adversely affect archaeological remains or their setting.

Desk based assessments and, where necessary, archaeological field evaluation will be required before development proposals are determined, where development is proposed on sites of archaeological significance or potential significance.

Guidance

Historic Environment Good Practice Advice In Planning Note 2: Managing Significance in Decision-Taking in the Historic Environment (Historic England 2015)

3.15 The purpose of this document is to provide information to assist local authorities, planning and other consultants, owners, applicants and other interested parties in implementing historic environment policy in the NPPF and NPPG. It outlines a six-stage process to the assembly and analysis of relevant information relating to heritage assets potentially affected by a proposed development:

- Understand the significance of the affected assets;
- Understand the impact of the proposal on that significance;
- Avoid, minimise and mitigate impact in a way that meets the objectives of the NPPF;
- Look for opportunities to better reveal or enhance significance;
- Justify any harmful impacts in terms of the sustainable development objective of conserving significance and the need for change; and
- Offset negative impacts on aspects of significance by enhancing others through recording, disseminating and archiving archaeological and historical interest of the important elements of the heritage assets affected.

4.0 Archaeological and Historic Baseline

Archaeological Heritage Assets

4.1 The heritage assets under consideration have been identified by means of a review of the following resources:

- Greater London Historic Environment Record (HER) Data;
- The National Heritage List for England (NHLE) held by Historic England;
- Historic England Archive;
- Pastscape;
- Local studies and record office research; and
- Review of historic mapping.

4.2 This resource has been used to provide an understanding of the heritage assets which may be affected by the proposed development. This chapter will describe the heritage assets which may be affected and assess their significance.

4.3 The west of the study site is covered by the Archaeological Priority Area (APA) of Ham Fields (DLO33497). The APA indicates that finds of prehistoric material in the area suggest that further occupation evidence and artefacts may survive.

4.4 The east of the study site falls within the APA of Ham (DLO33461) which is an early medieval settlement mentioned in Domesday and includes Ham House and associated pleasure gardens dating from the 17th century. Evidence of prehistoric occupation may also be present within this area.

4.5 The gardens and pleasure grounds attached to the 17th century Ham House lie c.350m to the north east of the study site and the avenues which connect the house and gardens to Petersham Road lie c.200m to the east of the study site. This area is now a Registered Historic Park and Garden (DLO32857).

4.6 The study site is covered by the Historic Landscape Characteristic type described as 'Riverside' (HLCUID 374). This was formerly farmland until OS epoch 4. The Broad Group is 'RES 3' of the type 'Modern Residential' i.e. development of housing between I945 and 2006. The attributes of this land parcel are defined as dating from 1968 when the buildings of Ham Close Estate were constructed.

Previous archaeological investigations

4.7 A number of the intrusive investigations in the study area have noted the truncation of deposits caused by post-medieval development, although stratigraphic study at Forbes House has indicated the presence of *in-situ* prehistoric artefacts within brickearth deposits. Closer to the study site a watching brief conducted at Sheridan Road directly to the south in 1992 for Museum of London found alluvial clay overlain by redeposited clay from which a prehistoric flint was recovered (MLO63623). This was sealed by modern construction debris.

4.8 Investigations of relevance to the archaeological potential of the study site include;

- (ELO21274) In 2016 Oxford Archaeology excavated trial trenches at Manor House, c.123m to the north east of the study site which revealed fragmentary remains of the original structure to the south of the present building, along with possible quarry pits and post-medieval garden features.
- (ELO13437/ELO13661) Evaluations were conducted to the west of Ham Street in the area of Grey Court School, c.130m to the south east of the study site in 2013. No archaeological finds or features were observed in any of the trenches and the natural

was encountered at 6.15 to 6.5m OD. On the land adjacent to the south the large amount of brick debris, scattered clinker and the burnt material was suggestive of 17th century brick making activities along with probable 18th century ground working (ELO13661).

- (ELO8261/ELO10484) MOLA excavated four trial trenches at Forbes House in 1992, c.500m to the south of the study site. Although the site had been much damaged by construction activities from the 18th century onwards, islands of stratigraphy were still found to exist between the later foundations. Walls from a Georgian building and its Victorian extension were identified. Brickearth, approximately 1m thick, survived to a height of 7.20m aOD, only 0.20m below the surface in the southern part of the site. A number of Bronze Age flints and a blade fragment were found when the overlaying brick earth was removed to natural gravel. The fresh nature of some of these worked flints was suggestive of *in-situ* deposition but residual worked flint was also found within features of 17th and 18th century date.

Prehistoric

4.9 A watching brief undertaken in 1992 just to the south of the study site at Sheridan Road noted alluvial clay overlain by redeposited clay which contained a prehistoric flint (MLO63623). Excavations at Forbes house further to the south at around the same time also recovered worked flint from the brickearth deposits (MLO63603).

4.10 Nine records of prehistoric finds are recorded in a location c.200m to the south west of the study site. These include Mesolithic to late Neolithic implements (MLO11172/MLO23449); a Neolithic Axe (MLO18919), scraper tool (MLO18925) four blades and twenty two flint cores (MLO18920); Late Neolithic to early Bronze Age arrowheads (MLO19083) scrapers and a blade (MLO19126). Fragments of Iron Age pottery (MLO19101) and a Bronze Age vessel (MLO18978) were also recovered.

4.11 A pointed arrowhead was found in market gardens near Ham Church c.120m to the west of the study site (MLO19028). A number of flint implements have been retrieved from Ham fields further to the west (MLO23455).

4.12 Approximately 140m to the north of the study site, surface finds of Mesolithic microliths, flakes and blades were recovered in 1936 (MLO18365). A very large number of prehistoric flints and pottery sherds were also found just to the north of this at Ham Lands during the 20th century. These included tranchet axes, knives and scrapers and pottery from surface and gravel pits. The area lies to the north of Riverside Drive c.340m to the north of the study site (MLO14119).

4.13 In summary, the GLHER records a number of Mesolithic, Neolithic and Bronze Age flint artefacts which indicates transient occupation across the Thames valley. The high number of early prehistoric finds has led to the area being assigned an Archaeological Priority Area. There is also evidence that *in-situ* remains may be found in lower deposits within the site as noted in excavations at Sheridan Road and Forbes house in the 1990's. There is therefore considered to be a high potential for prehistoric finds or features within the study site based on the current available evidence and proximity to known sites.

Roman

4.14 Ham Lands, an area at least 470m to the north west of the study site, produced a number of Roman finds in the early 20th century, including a decorated vase and two urns, querns and parts of a Roman bottle (MLO103886).

4.15 The site lay away from the routes of known major Roman roads. However evidence for Roman rural settlement has been detected at St John Hospital, Twickenham on the north side of the river by Museum of London Archaeology. Several phases of activity were

identified between 250-400 AD, represented by features which included pits, postholes and ditches all containing numerous fragments of Roman pottery (Rural Settlement of Roman Britain ADS site ID8036).

4.16 There is no evidence of Roman archaeological features within the study area, which indicates a low potential for the presence of significant remains of this period within the study site. However a number of unstratified finds have been retrieved in the study area, particularly at Ham Lands to the north of the study site and therefore the possibility for retrieval of Roman artefacts cannot be completely discounted.

Saxon and early Medieval

4.17 There are no Saxon or early medieval entries in the HER data for the study site.

4.18 Ham is not recorded as a pre-conquest manor in 1086. Historically, Ham was part of the Parish of Petersham. References to the manor of Petersham date back to Saxon times, when it was part of lands granted to Chertsey Abbey.

4.19 The study site lay to the south west of settlement at Ham which is likely to have centred on the manor. Therefore although there is some possibility that Saxon occupation was taking place in the far east of the study site the current evidence suggests a low potential for the presence of finds or features of this date within the study site.

Medieval

4.20 Petersham is a settlement recorded in Domesday and in 1086 it had a recorded population of 17 households, 15 villagers and 2 smallholders and was still held by the Abbot of Chertsey at this time. It consisted of five ploughlands, one lords plough team and four men's plough team as well as meadows a fisher and a church (opendomesday.org).

4.21 The earliest documentary reference to Ham dates to the 12th century when *Hamma* was included in the royal demesne as a member of Kingston.

4.22 The current evidence from excavations in the vicinity indicates a low potential for the presence of significant features of medieval date within the study site due to subsequent development and its situation away from documented settlement. However the possibility for retrieval of medieval artefacts cannot be completely discounted.

Post Medieval

4.23 The manor of Petersham was surrendered by the Abbey to the Crown in 1415 and formed part of the jointure of Elizabeth Woodville, Queen of Edward IV in 1466. The manor was leased several times between 1479 and 1522. In 1541 it formed part of the lands granted by Henry VIII to Anne of Cleves to hold for her life after their divorce. In 1610 James I granted the manor to Henry Prince of Wales, for whom Ham House is thought to have been built.

4.24 Ham House was completed for Sir Thomas Vavasour in 1610 and is surrounded by a formal garden c.350m to the north east of the study site (MLO59328/DLO32857). By 1636, the lease of the manor was held by William Murray, a friend and favourite of Charles I. Murray petitioned for the lease to be granted in perpetuity in consideration of losses suffered by the enclosure of lands elsewhere. This was successful and in 1643 Murray was created Earl Dysart.

4.25 During the Civil War, Murray's lands were sequestered. After the Restoration, Murray's four daughters and co-heirs petitioned for their return. They were granted 75 acres in 1665 and a lease of 289 acres of demesne land granted to Sir Robert Murray, a founder of the Royal Society. In 1672, William Murray's daughter Elizabeth (widow of Sir Lionel Tollemache) remarried to the Earl of Lauderdale and obtained a grant of the manors of

Petersham and Ham. The countess was succeeded by her son Lionel Tollemach, third Earl of Dysart and the manor remained in the hands of the Dysarts, who remained at Ham House for over 300 years, until the 20th century.

4.26 The house itself exhibits various phases of construction. It was enlarged and refurbished in 1670's and the garden extended to the south. The fourth Earl refurbished the house and gardens again in 1727 and parts of the gardens were naturalised in the 1770's but although some elements were altered in the 19th century much of the original grounds still survive. It was passed to the National Trust in 1948. The National Trust leased the house to the Ministry of Works who maintained the building in close consultation with the Victoria and Albert Museum. In 1975 a large private donation allowed a comprehensive restoration of the gardens.

4.27 Ham Common to the south east of the study site was created in 1635 by Charles I from wasteland by the Ham Gate to Richmond Park (MLO102886). Certain rights had been granted to the residents of the surrounding manors when 483 acres of land were taken to create New Park, now Richmond Park. Ham Fair is held on the western part of the common and the eastern part is wooded. From 2001 it was designated as a nature reserve.

4.28 Remains of 17th and 18th century buildings were excavated at Forbes House, c.500m to the south of the study site (MLO63604).

4.29 John Roques' map depicting 10 miles around London in 1746 shows Ham House, field boundaries and buildings (Fig.4). The settlement of Ham comprises a linear settlement along Ham Street; the study site lies immediately west of Ham Street. The presence of a structure is noted at the eastern limit of the study site. This lies in the same location as 'Ham Street Farm' as recorded on the 1842 Tithe Map. Later OS maps indicate that the farm becomes known as Manor Farm or Hatch Farm. A track running parallel to the High Street separates the far east of the site from the rest which appears to be taken up with an orchard.

4.30 The 1806 Ordnance Surveyors Drawing indicates a similar situation, although the scale of the map makes any occupation slightly unclear; the majority of the study site forms open land to the west of Ham (Fig.5).

4.31 At the time of the tithe in 1842, the majority of the study site area is part of Ham Street Farm and falls within what are known as 'Ham Fields' between Ham Street and the River Thames (Fig.6). Part of the lands are owned by the Earl of Dysart; the farm is occupied by William Hatch. It is noted that the wider settlement was reference to as *Ham cum Hatch* or *Ham with Hatch* until the late Victorian period. Later OS maps indicate that the farm becomes known as Manor Farm or Hatch Farm. The remaining smaller section (in Plot no 226) adjoining the road is at this point the garden to Grade II listed Beaufort House, owned at the time of the tithe by the Rev Thomas France.

4.32 The majority of the site area falls into plot number 343. The very western end of the area may lie within plots 346 and 347. The small portion of the site that adjoins the road falls within plot 226, owned and occupied by The Rev Thomas France, and is the garden for the house at plot 227 to the north; this is Beaufort House, now Grade II listed. Plots 343, 346 and 347 are arable fields belonging to Ham Street Farm owned by the Representatives of Earl Lionel Dysart, and occupied by William Hatch. The apportionments list the ownership as follows;

Owned & occupied by Rev Thomas France

226	*Garden*	*n/a*	*0a 2r 11p*

Owned by Representatives of Earl Lionel Dysart, occupied by William Hatch

343	*In Ham Field, Home Piece*	*arable*	*10a 3r 19p*
346 (part)	*Long Straight,*	*arable*	*6a 2r 1p*
347 (part)	*Long Straight*	*arable*	*1a 2r 36p*

4.33 The records of the Tollemache family of Ham House are held at Surrey History Centre (SHC K58). These include several leases relating to Manor Farm during the late C19 and early C20 (K68/6/273-4; 277-80). These indicate it was leased to Mr Robert Ward in 1897 and then in 1918 to FA and AW Secrett, who used it as a dairy farm (RLSA 637.065 L082 Manor Farm #1-5).

4.34 The earliest OS map of the area at 1:2,560 scale is dated to 1868 and shows the study site as part of a large field to the west of settlement at Ham which lines the High Street (Fig.7). A short track or footpath runs from the High Street across the fields that make up the site. It is bounded by garden plots in the north and south. Manor Farm buildings are in place in the far east of the site. Small structures are also indicated within the far east of the study site fronting the track which runs parallel to the High Street (later Back Lane/Wiggins Street).

4.35 By 1896 a further buildings associated with Manor Farm has been constructed in the east, within the study site boundary and directly to the north of the former structure in the area (Fig.8).

4.36 Today the site forms part of the London Borough of Richmond upon Thames. The 'Richmond, Petersham and Ham Open Spaces Act' of 1902 was enacted to protect the view from Richmond Hill. It safeguarded much of the open land by vesting it in the Richmond Corporation and reserving it for 'public enjoyment'.

4.37 There has been little further development by 1913 when a sewage works has been developed to the south of the study site (Fig.9). Manor Farm still occupies the far east of the site.

4.38 Ham began to be developed for housing with roads and sewers laid out during the 1930s (RLSA LM/2921, LM/2726). Further construction is indicated within the site at Manor farm by 1934 (Fig.10).

4.39 Prefabricated houses were erected in Ham Close and Woodville Road in 1946, which were still *in-situ* in 1952 (RLSA LCF4235). The housing estate was laid out within the study site around two areas of green space in the centre/east and centre/west of the site. It is shown on aerial photography of this date (Fig.11). In 1949 the Ham and Petersham Estate – all the remaining land owned by the Dysart family - was put up for sale (RLSA LC/1812). The estate was demolished to make way for high-rise housing in the early 1960s.

4.40 Much of Ham was earmarked for development during the late 1950s and 1960s. The building firm Wates secured a large site at Ham Lands where they developed the Ham Estate in 1964. Three management companies were set up to maintain the Wates estates, which are all still operational (e.g. Ham Riverside Lands Ltd) and include several protective covenants restricting the changes that owners can make to their properties.

4.41 Manor Farm was given up by the Secrett family at the end of the 1950s and the farmhouse demolished in 1958. The development of 192 flats at Ham Close on the site of the farm was built for Richmond Council, by contractor George Wimpey (RLSA PLA/12345) in 1964-66. Ham Village Green comprises the eastern section of the site. Ham Close estate is still owned by Richmond Borough Council as the freeholder but managed by the Richmond

Housing Partnership. The eastern boundary of the site adjoins the Ham House Conservation area (RBC Conservation Area Statement no 23).

4.42 The current Ham Close Estate is first depicted on the map of 1969, although the northern part of the map is not part of the survey at this date. It is better represented on the map of 1971 which covers the whole of the study area (Fig.12). There are no changes to the study site until the present.

4.43 Google Earth provides readily available satellite imagery between 1945 and 2021. The earliest image of 1945 shows the previous pre-fabricated buildings in place on the site arranged around two areas of open ground in the centre of the site. There are no significant changes to the site throughout the period of clear satellite imagery, from 2003 until the present (Fig.13).

4.44 In 2013, the Prince's Foundation for Building Communities was commissioned by the Borough to produce a report outlining the vision for any future development. A masterplan was developed in 2016 and consultation results published in 2017 for the regeneration of the Ham Close Estate. The scheme was modified in 2019 after proving financially unviable and the most recent proposals are for a scheme of 452 houses.

4.45 LiDAR assessment of the study site was not undertaken. It was not considered to be able to provide information relevant to the assessment of archaeological potential; given the previous landscaping and construction that has taken place throughout the site.

4.46 The site was formerly occupied by a post-medieval farmstead in the east of the site and then by a post-war estate. This was superseded by the current development in the 1960's in the west of the site. There is therefore a high potential for post-medieval remains which are likely to survive in made ground and in the east of the site.

Summary of Archaeological Potential and Assessment of Significance

4.47 There are no known archaeological remains within the study site. The potential for previously unrecorded archaeological remains is based on an appraisal of recent geotechnical site investigations, the historical development of the study site and proximity to known occupation sites.

4.48 The west of the study site is covered by an Archaeological Priority Area (APA) for Ham Fields (DLO33497) The east of the study site falls within the APA of Ham (DLO33461).

4.49 Past impacts within the study site comprise construction and demolition activities associated the current housing, and Manor Farm in the east of the site. Construction and demolition of the mid-20th century prefabricated development is likely to have required superficial rather than substantial ground disturbance, as with historic plough activity across the site. A review of recent geotechnical site investigations does suggest general horizontal truncation across the study site (Enzygo 2021).

4.50 The potential for geoarchaeological and paleoenvironmental evidence within the site has been considered by QUEST (Appendix A). The geoarchaeological desk-based assessment concludes that the potential for organic deposits cannot be entirely discounted based on available evidence. As the recorded heights of the Kempton Park Gravels are significantly lower than that seen at Isleworth and Twickenham, the site has potential to inform about the local depositional development of the underlying gravels. Based on available evidence the significance of the underlying quaternary deposits is considered local.

4.51 The potential for early prehistoric occupation, in the form of residual flint artefacts within or on the Kemptown Gravels cannot be entirely ruled out. Based on past impacts such remains are likely to be fragmentary rather than well-preserved and of local significance. Whilst this is a general theoretic potential across the site, areas outside the footprint of the current development in the west of the study site are identified in particular.

4.52 There is high potential for buried remains associated with Manor Farm in the east of the study site, adjacent to Ham Street. A farm is known at this location from at least the 18th century. As the farm was demolished in the 1950's foundations and footing associated with this asset are likely to be fragmentary rather than well-preserved and of local significance. The potential for well-preserved earlier medieval or early medieval roadside occupation is considered low due to later development. It is noted that the proposed development retains this eastern area as open space and no physical impact in this area is proposed. The western part of the study site is historically agricultural and there is low potential for significant occupation evidence from the historic periods.

4.53 In summary, the assessment has identified that the proposed development has the potential to effect fragmentary early prehistoric evidence of local heritage significance in the west of the study site

5.0 Proposed Development and Potential Impact on Heritage Assets

Site Conditions

5.1 The site is currently occupied by Ham Close Estate in the west of the site and Ham Village Green in the east of the site.

5.2 Ham Close Estate was built by Richmond Council in the early 1960s. It consists of 14 blocks, many of which are five storey. In July 2000 the Council transferred ownership of all council homes to Richmond Housing Partnership, a non-profit housing association.

Strata	Summary Description	Thickness (m)
Made Ground	Brown and grey clayey fine sand and flint gravel with fragments of brick concrete and ash.	0.4 to 1.2
Kempton Park Gravels	Firm and stiff brown clay and gravelly clay.	0 to 0.9
	Loose becoming medium dense and dense with depth brown sand and flint gravel.	3.8 to 5.3
London Clay	Stiff grey brown silty clay with occasional claystone gravel.	>20
Groundwater	Seepages	2.2m to 4.3 bgl.

The Proposed Development

5.3 As part of Richmond Councils Uplift programme it has been working with the RHP on proposals for redevelopment in consultation with the residents. The area proposed for the regeneration is bounded by Woodville Road and Ashburnham Road. It includes the Youth Centre and car park, and the 'Little House', the building occupied by MakerLabs. The proposed regeneration area does not include the parade of shops on the corner of Ashburnham Road and Ham Street nor the library or Ham Clinic. Ham Village Green in the east of the site will also be retained.

5.4 Current indicative proposals plan to deliver residential homes in building blocks of 2-6 storeys (Fig.14). These are likely to consist of 452 homes comprising a mixture of replacement and additional affordable housing and homes for market sale, together with replacement community centre and MakerLab facility and basement car park.

Potential Archaeological Impacts and Mitigation Measures

5.5 Past impacts within the study site comprise construction and demolition activities associated the current housing, and Manor Farm in the east of the site. Construction and demolition of the mid-20th century prefabricated development is likely to have required superficial rather than substantial ground disturbance, as with historic plough activity across the site. A review of recent geotechnical site investigations does suggest general horizontal truncation across the study site (Enzygo 2021).

5.6 The potential for early prehistoric occupation, in the form of residual flint artefacts within or on the Kemptown Gravels cannot be entirely ruled out. Based on past impacts such remains are likely to be fragmentary rather than well-preserved and of local significance. Whilst this is a general theoretic potential across the site, areas outside the footprint of the current development in the west of the study site are identified in particular.

5.7 There is high potential for buried remains associated with Manor Farm in the east of the study site, adjacent to Ham Street. A farm is known at this location from at least the 18th century. As the farm was demolished in the 1950's foundations and footing associated with this asset are likely to be fragmentary rather than well-preserved and of local significance. The potential for well-preserved earlier medieval or early medieval roadside occupation is considered low due to later development. It is noted that the proposed development retains this eastern area as open space and no physical impact in this area is

proposed. The western part of the study site is historically agricultural and there is low potential for significant occupation evidence from the historic periods.

5.8 In summary, the assessment has identified that the proposed development has moderate potential for fragmentary early prehistoric evidence of local heritage significance in the west of the study site

5.9 It is recommended that a staged programme of archaeological works (including geoarchaeological evaluation) is secured as a condition of planning which will allow the identification of archaeological assets, if present within the study site, and a suitable mitigation strategy to be developed and agreed with Richmond and their archaeological advisors.

6.0 Summary and Conclusions

6.1 This historic environment desk-based assessment considers land at Ham Close, Ham, Richmond upon Thames, London, which is proposed for residential development (Fig. 1).

6.2 There are no known archaeological remains within the site. Based on available evidence there is considered moderate potential for fragmentary locally significant early prehistoric occupation evidence to be impacted by the proposed development.

6.3 Past impacts within the study site comprise construction and demolition activities associated with the current housing, and Manor Farm in the east of the site. Construction and demolition of the mid-20th century prefabricated development is likely to have required superficial rather than substantial ground disturbance, as with historic plough activity across the site. A review of recent geotechnical site investigations does suggest general horizontal truncation across the study site (Enzygo 2021).

6.4 The potential for geoarchaeological and paleoenvironmental evidence within the site has been considered by QUEST (Appendix A). The geoarchaeological desk-based assessment concludes that the potential for organic deposits cannot be entirely discounted based on available evidence. As the recorded heights of the Kempton Park Gravels are significantly lower than that seen at Isleworth and Twickenham, the site has potential to inform about the local depositional development of the underlying gravels. Based on available evidence the significance of the underlying quaternary deposits is considered local.

6.5 The potential for early prehistoric occupation, in the form of residual flint artefacts within or on the Kemptown Gravels cannot be entirely ruled out. Based on past impacts such remains are likely to be fragmentary rather than well-preserved and of local significance. Whilst this is a general theoretic potential across the site, areas outside the footprint of the current development in the west of the study site are identified in particular.

6.6 There is high potential for buried remains associated with Manor Farm in the east of the study site, adjacent to Ham Street. A farm is known at this location from at least the 18th century. As the farm was demolished in the 1950's foundations and footing associated with this asset are likely to be fragmentary rather than well-preserved and of local significance. The potential for well-preserved earlier medieval or early medieval roadside occupation is considered low due to later development. It is noted that the proposed development retains this eastern area as open space and no physical impact in this area is proposed. The western part of the study site is historically agricultural and there is low potential for significant occupation evidence from the historic periods.

6.7 In summary, the assessment has identified that the proposed development has potential to effect fragmentary early prehistoric evidence of local heritage significance in the west of the study site.

6.8 It is recommended that a staged programme of archaeological works (including geoarchaeological evaluation) is secured as a condition of planning which will allow the identification of archaeological assets, if present within the study site, and a suitable mitigation strategy to be developed and agreed with Richmond and their archaeological advisors.

6.9 On this basis the development could be made acceptable in terms of archaeological impacts. It therefore accords with the requirements in paragraphs 194 and 203 of the NPPF, policy HC1 of The London Plan and policy LP7 of Richmond Borough Council Local Plan.

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Greater London Historic Environment Record

Cartographic

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1842 - Tithe Map & Apportionment, Parish of Ham Ref: TNA IR 30/34/63 & IR 29/34/63

OS mapping 1868-2021

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Ham is where the heart is - http://hamiswheretheheartis.com

Historic England National Heritage List for England - https://www.historicengland.org.uk/listing/the-list/

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Layers of London - https://www.layersoflondon.org/

MAGIC - www.magic.gov.uk

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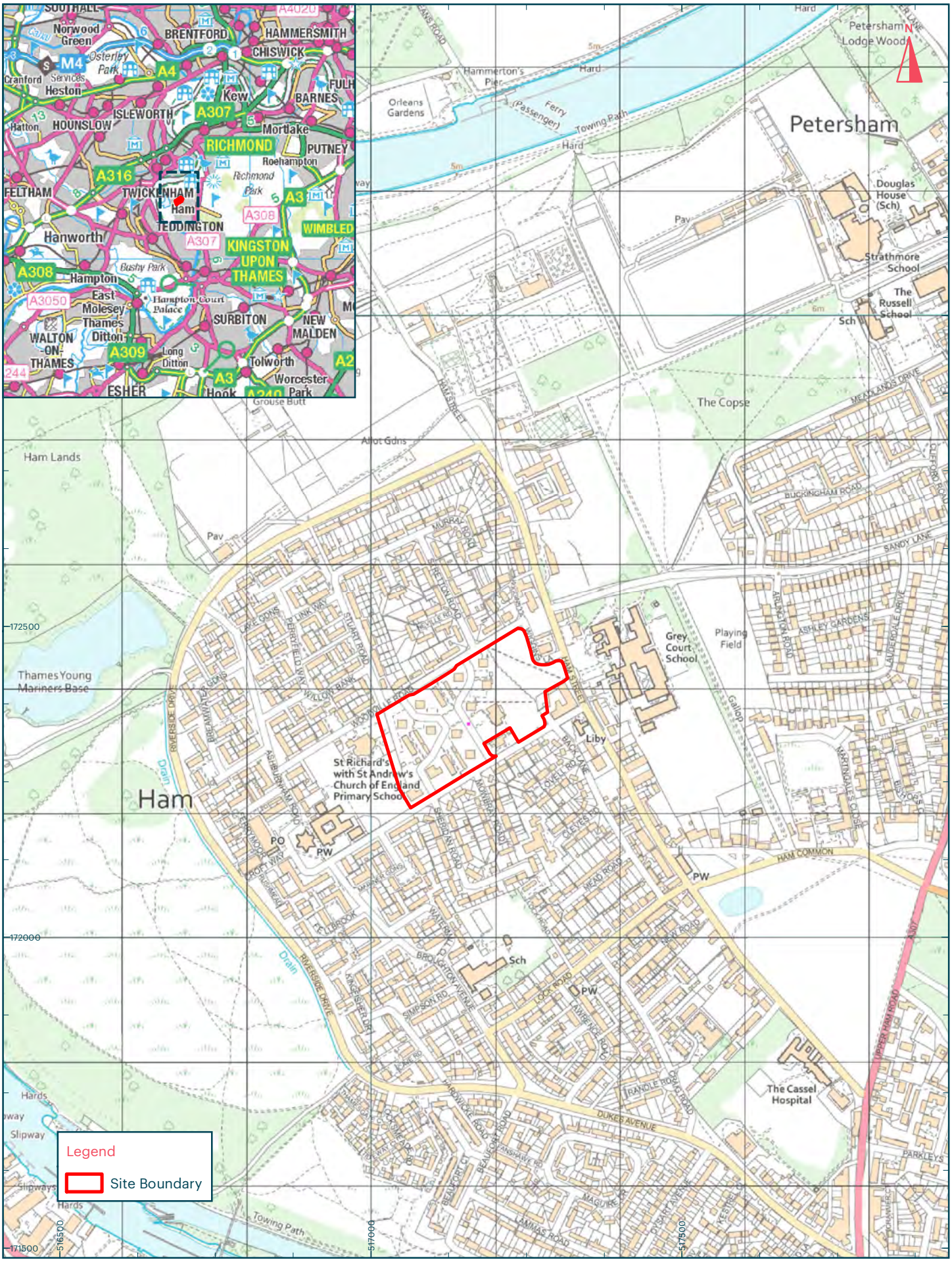

Title:
Figure 1: Site Location
Address:
Ham Close Estate, Richmond upon Thames

Scale at A4: 1:8,000
0 250m

orion.

C:\Users\User\Orion Heritage Ltd\Graphics - General\Project Graphics\PN Graphics\PN3101-3200\PN3135 - Ham Close Estate, Richmond upon Thames\GIS\Figure 2.mxd

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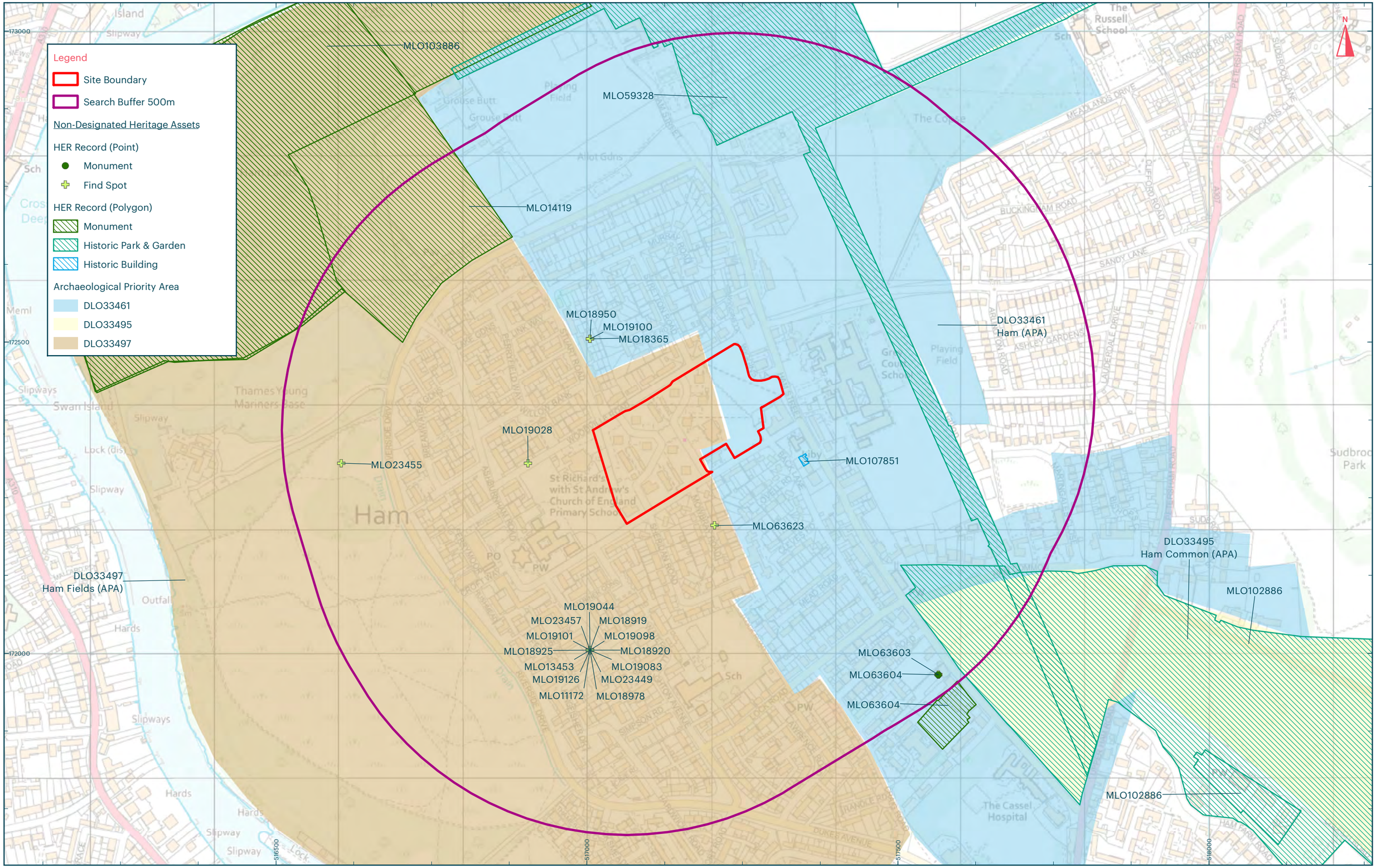

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Figure 2: HER Data Plot – Monuments data
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Ham Close Estate, Richmond upon Thames

Scale at A3: 1:5,500

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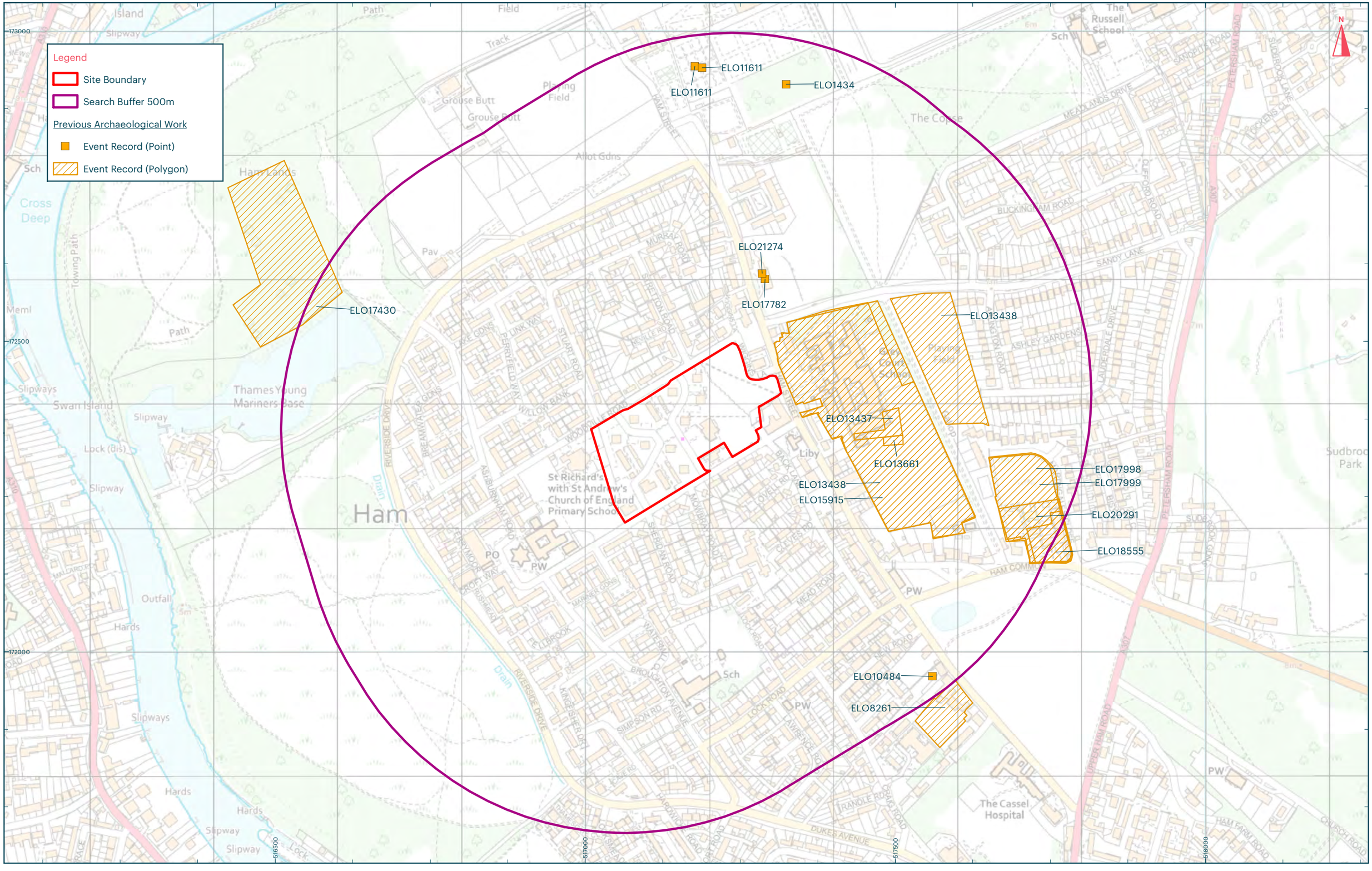

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Figure 3: HER Data Plot – Event data
Address:
Ham Close Estate, Richmond upon Thames

Scale at A3: 1:5,500

0 200m

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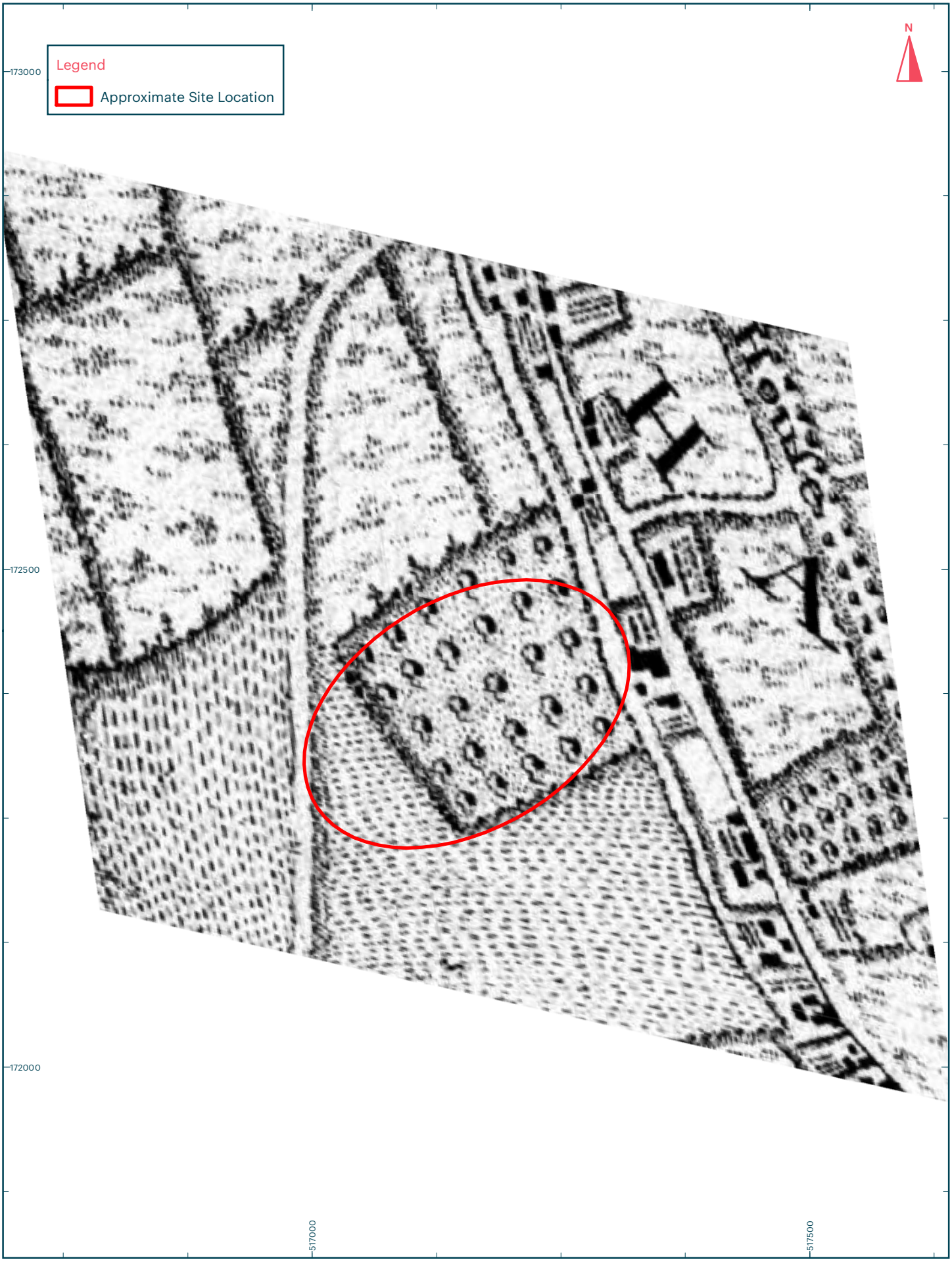

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Figure 4: 1746 John Rocques Map
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Ham Close Estate, Richmond upon Thames

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Figure 5: 1806 Ordnance Surveyors Drawing
Address:
Ham Close Estate, Richmond upon Thames

Scale at A4: 1:8,000
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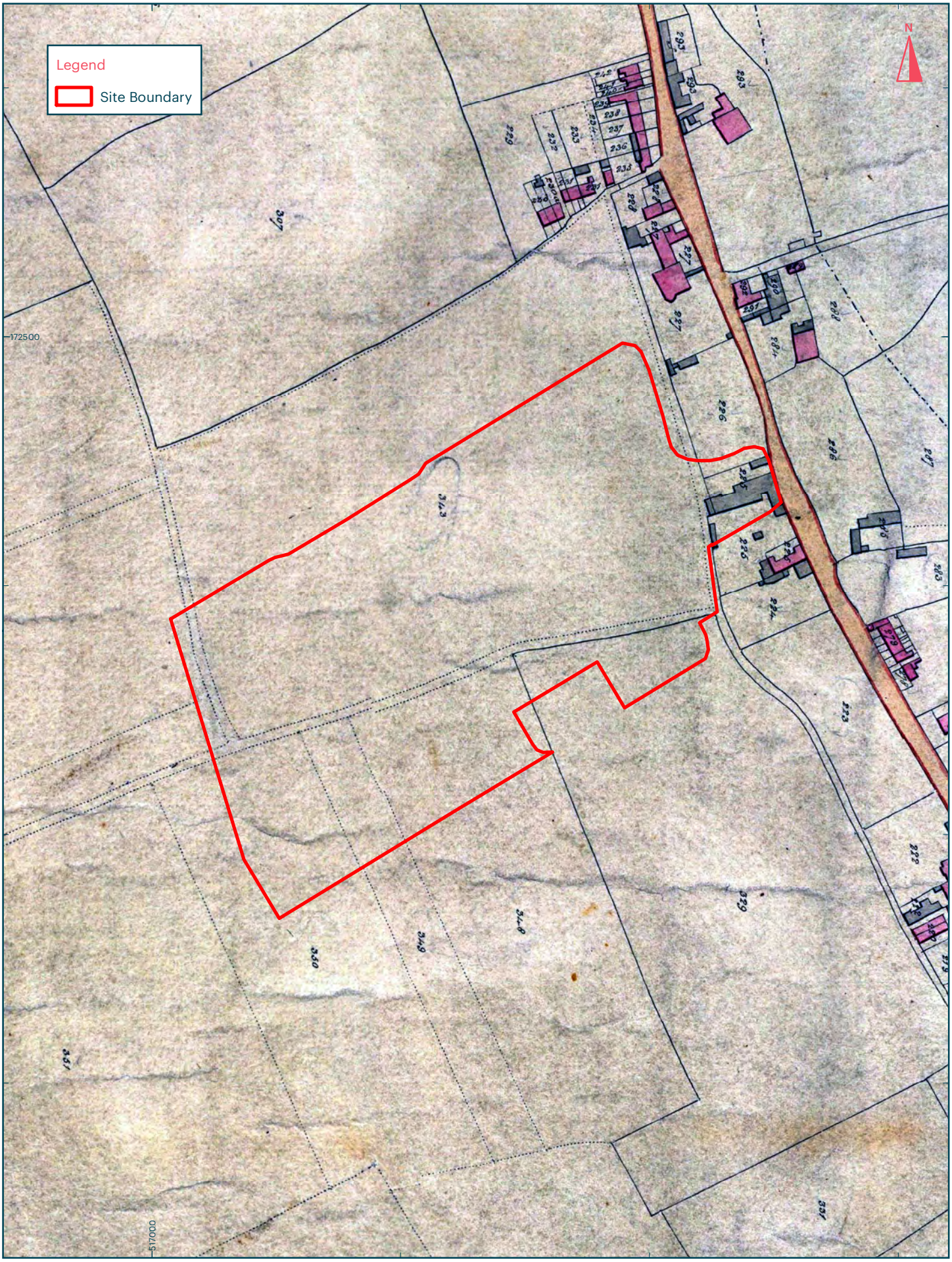

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Figure 6: 1842 Ham Tithe Map
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Ham Close Estate, Richmond upon Thames

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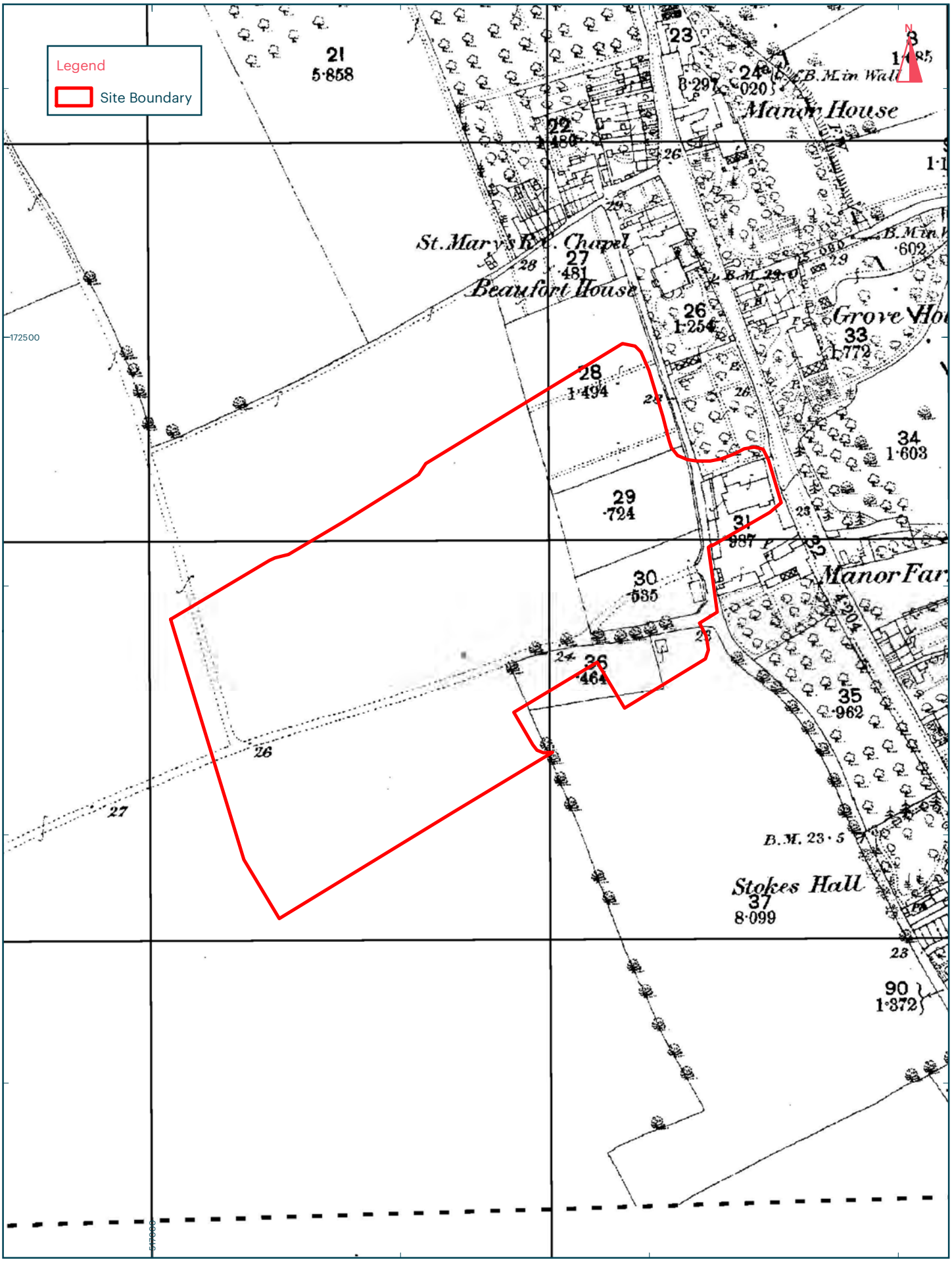

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Figure 7: 1868 OS Map 1:2,500
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Ham Close Estate, Richmond upon Thames

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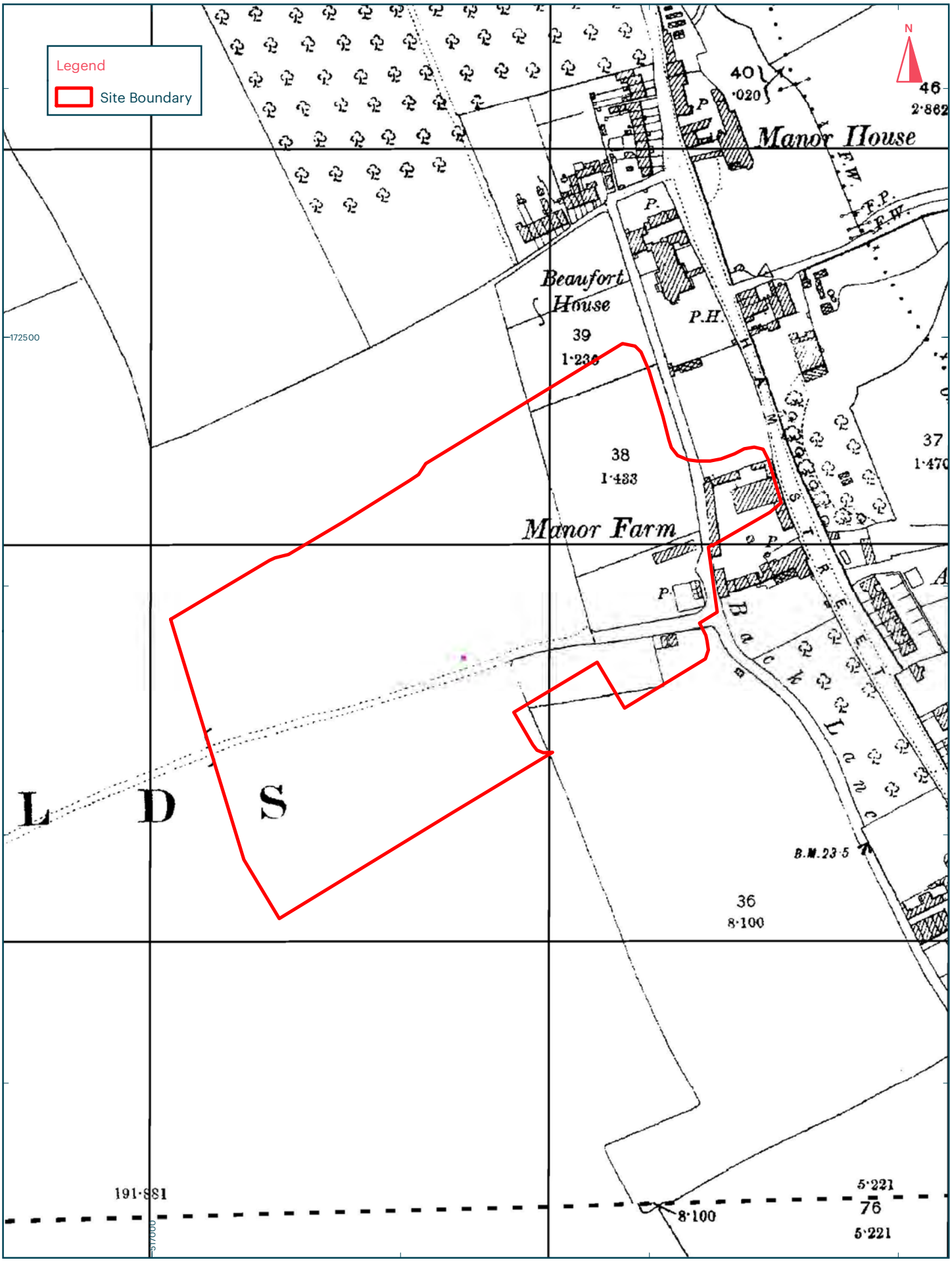

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Figure 8: 1896 OS Map 1:2,500
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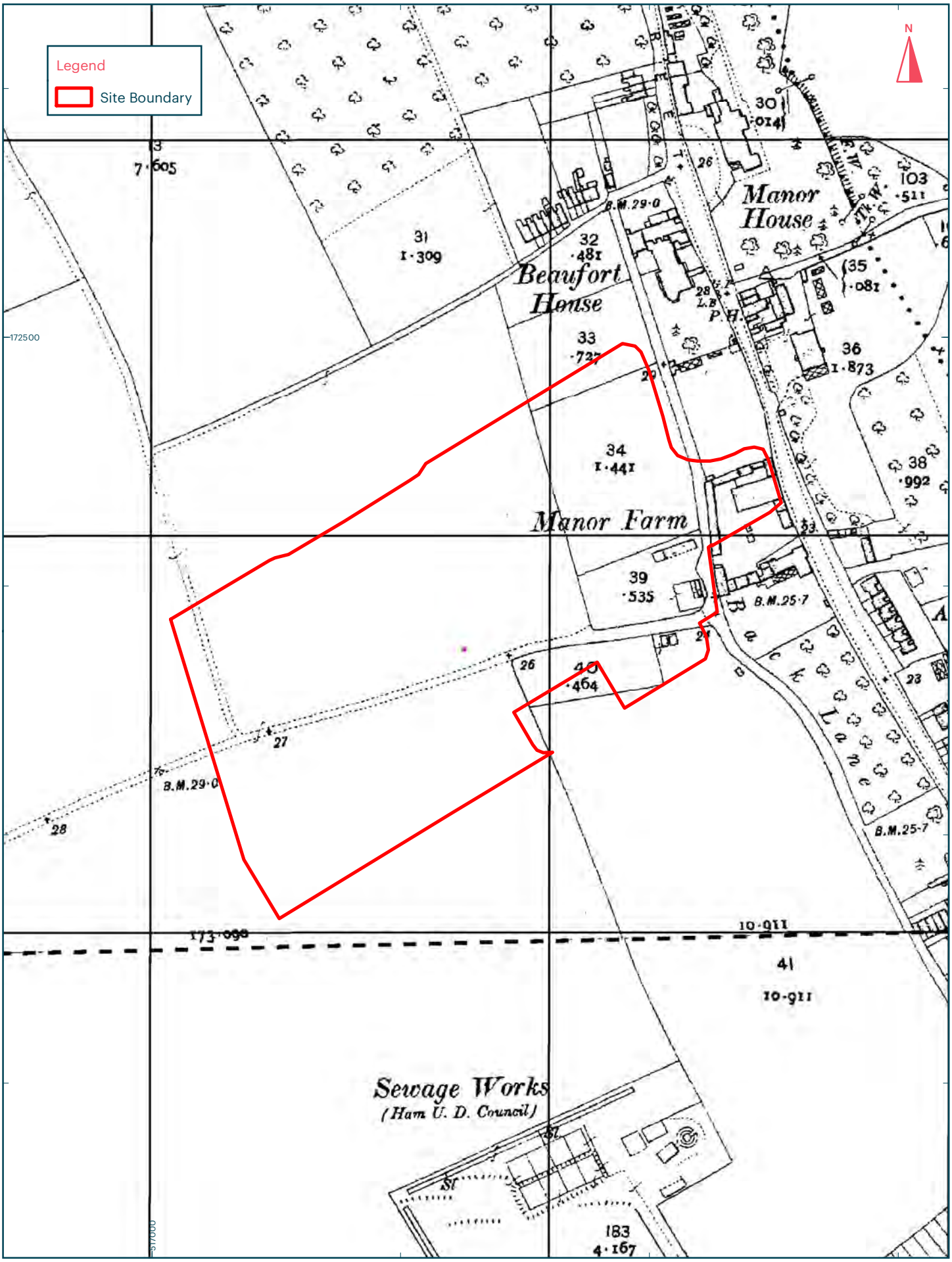

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Figure 9: 1913 OS Map 1:2,500
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Ham Close Estate, Richmond upon Thames

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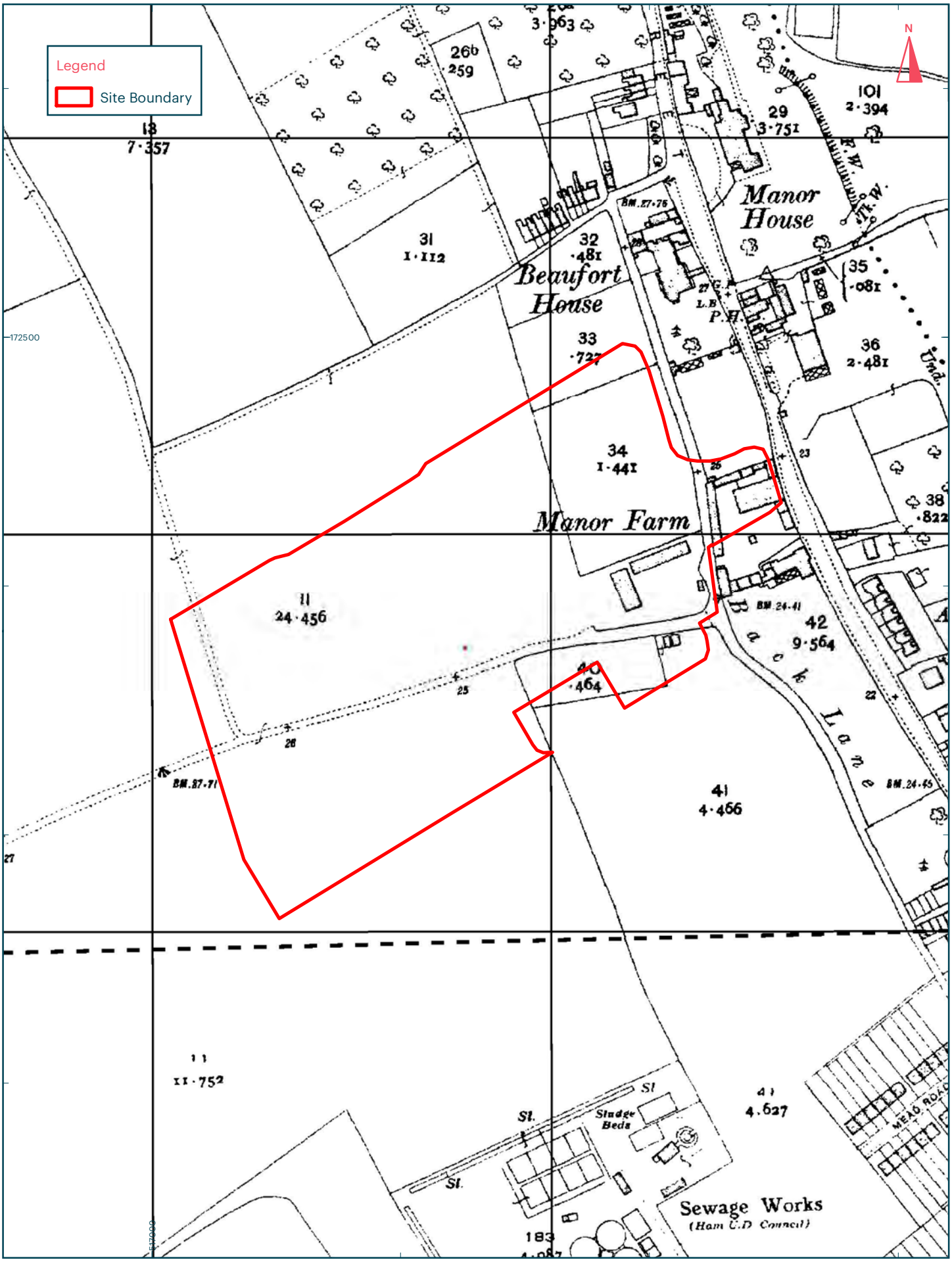

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Figure 10: 1934-1935 OS Map 1:2,500
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Ham Close Estate, Richmond upon Thames

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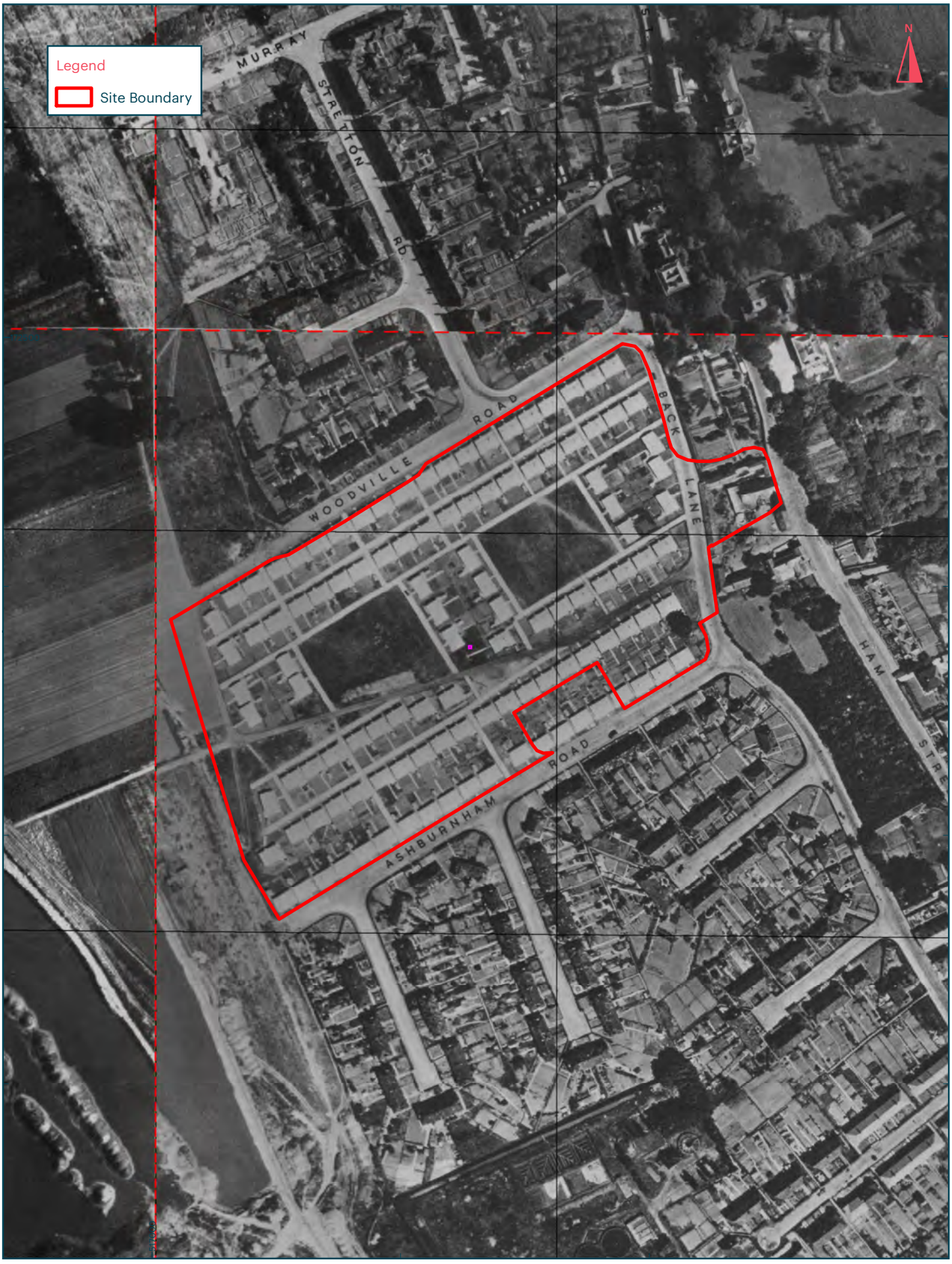

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Figure 11: 1946 Historical Aerial Photography 1:1,250
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Ham Close Estate, Richmond upon Thames

Scale at A4: 1:2,500
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Title:
Figure 12: 1971 OS Map 1:2,500
Address:
Ham Close Estate, Richmond upon Thames

Scale at A4: 1:2,500
0 80m

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Title:
Figure 13: 2021 Google Earth Image
Address:
Ham Close Estate, Richmond upon Thames

Scale at A4: 1:2,500
0 80m

orion.

Legend

Site Boundary

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517000

Title:
Figure 14: Proposed Masterplan
Address:
Ham Close Estate, Richmond upon Thames

Scale at A4: 1:2,500

0 80m

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Appendix A – Geoarchaeological Assessment

QUEST
QUATERNARY SCIENTIFIC

University of Reading

HAM CLOSE, ASHBURNHAM ROAD, RICHMOND

Geoarchaeological Desk-Based Assessment

NGR: TQ 17160 72360

Date: 25th January 2022

Written by: Dr C.P. Green

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DOCUMENT HISTORY:

REVISION	DATE	PREPARED BY	SIGNED	APPROVED BY	SIGNED	REASON FOR ISSUE
v1	25/01/22	C.P. Green		C.R. Batchelor		First edition

CONTENTS

1. INTRODUCTION

1.1 Site context

This report summarises the findings arising out of the desk-based geoarchaeological assessment undertaken by Quaternary Scientific (University of Reading) in connection with the proposed development of land at Ham Close, Ashburnham Road, Richmond (National Grid Reference centred on: TQ 17160 72360; Figures 1 and 2). The site is in the Ham suburb of Richmond to the west of Richmond Park on ground enclosed by a broad meander of the River Thames. Directly to the west of the site the Thames flows northward at a distance of about 800m. The site is roughly rectangular occupying 4.58ha with a longer dimension of c.300m orientated approximately NE-SW. Ashburnham Road bounds the site to the south-east and Woodville Road to the north-west. Wiggins Lane lies to the north-east and open ground to the south-west. Most of the site remained as farmland until the 1930s. Since then, it has been occupied by a succession of residential developments.

1.2 Aims and objectives

The aims of this Geoarchaeological Desk-Based Assessment were as follows:

1. To determine the Geoarchaeological & Palaeoenvironmental significance and potential of the site;
2. To determine whether there are justifications for further work on the site based on current knowledge;
3. To outline a preliminary strategy for on-site investigation.

In order to address these aims, the following objectives are proposed:

1. To review relevant existing documents and sources related to the geoarchaeological and palaeoenvironmental history of the site;
2. To propose a strategy for further investigation (if necessary).

The following documents and sources were reviewed in an attempt to determine the significance and potential of the site including but not limited to: (1) historical borehole data held by the British Geological Survey (http://mapapps.bgs.ac.uk), and (2) relevant geological, Quaternary and archaeological literature relevant to this area of West London

2. RESULTS OF THE DESK BASED ASSESSMENT

2.1 Topographic setting

Within the broad meander loop in which the site is located, the floodplain of the river is narrow and discontinuous at levels around 4-5m OD. Most of the loop is occupied by ground between 6.0m and 8.0m OD forming a low terrace of the Thames. Spot heights on early OS maps (e.g. OS Six Inch, Surrey Sheet VI, 1867/8) show the level of the undisturbed farmland in the area occupied by the present site at 23 feet (7.01m) at the NE end of the site, rising gradually south-westward to 28 feet (8.53m) at the SW end, then falling away gradually beyond the site, south-westward towards the river. To the NE of the site at a distance of ca. 1.0km the ground rises steeply, marking the back of the terrace feature on which the present site lies and extending up to levels above 55.0m OD on the western edge of Richmond Park where a remnant of the Black Park Terrace of the Thames is preserved.

2.2 Geological & Palaeoenvironmental setting

The British Geological Survey (BGS) (mapapps.bgs.ac.uk/geologyofbritain) shows the site underlain by the mid to late Devensian Kempton Park Gravel (sand and gravel locally with lenses of silt, clay or peat) overlying bedrock London Clay. BGS archive boreholes within the Ham meander loop include 45 boreholes (undated) put down by the Ham Estate. They typically record loamy deposits overlying sandy deposits passing down in most cases to gravel (ballast) overlying London Clay. In some boreholes beds of clay are noted in the sand and gravel, including in borehole C28 (BGS archive TQ17SE6CC – NGR TQ 1676 7234) a thin (3") seam of 'black earthy clay' at approximately 5.94m OD; and in borehole C42 (BGS archive TQ17SE6SS – NGR TQ 1695 7179) a bed of 'soft clay, not London Clay' (ca. 0.9m thick) at a level of ca. 4-5m OD.

Twenty-three geo-environmental interventions at the present site (Rhodes 2021) (17 window samples and 6 deeper boreholes) record stratigraphic details of the Kempton Park Gravel and overlying fine-grained deposits. (None of the interventions recorded ground surface level, but it can be inferred fairly confidently to have been between 7.0m and 8.0m OD). The following stratigraphic sequence can be recognised, based on the borehole/window sample sediment logs:

Unit 5 – Made Ground - present everywhere across the site up to a maximum thickness of 1.2m (Window sample WS17) but generally thinner; mean thickness 0.57m (n=23)

Unit 4 – Langley Silt - Clay/sandy clay, slightly gravelly in some boreholes; up to 2.1m thick (borehole BH6); mean 0.87m (n=21)

Unit 3 – Kempton Park Gravel - Sand/clayey sand; not separately recognised in the six boreholes but present in 8 of the 17 window samples; up to 1.5m thick (window sample WS1); mean thickness 0.77m (n= 8)

Unit 2 – Kempton Park Gravel - Clayey, slightly gravelly sand/gravelly sand; the full thickness up to 4.3m (BH5) was recorded in the six boreholes; mean thickness 3.48m (n=6)

Unit 1 - London Clay

London Clay

The six boreholes passed through the Kempton Park Gravel into the underlying London Clay bedrock. The bedrock surface was recorded at levels between 5.2m and 5.8m below the ground surface (bgs) (mean 5.38m, n=6), which represents a level around 1.5m to 2.0m OD.

Kempton Park Gravel

In all six boreholes the London Clay bedrock was overlain by clayey, slightly gravelly sand, and all but one of the window samples bottomed in clayey gravelly sand or gravelly sand. In eight of the window samples the clayey, slightly gravelly sand was overlain by sand or clayey sand. It is unusual for the Kempton Park Gravel to be represented only by predominantly sandy deposits, but it is quite common for the gravel facies of the Kempton Park Gravel to be overlain by a sandy facies – a situation confirmed in the Ham Estate boreholes.

The Kempton Park Gravel is widely present in the Middle Thames valley, traced upstream by Gibbard (1985) as far as Marlow. It represents evidence of intermittent aggradation during the long period between the end of the last interglacial (Ipswichian) and the phase of erosion/downcutting that preceded the deposition of the Late Devensian Shepperton Gravel. Organic deposits representative of interstadial conditions during this period are present in a small number of places within or beneath the Kempton Park Gravel, at Kempton Park (Gibbard *et al* 1982), Isleworth (Coope & Angus 1975; Kerney *et a*l 1982) and South Kensington (Coope *et al* 1997). The organic deposits in Isleworth were described from Willments gravel pit (TQ 158 746), about 2.5km NNW of the present site on the opposite side of the river (Figure 1). These deposits were present as 'dark grey laminated silt with plant and animal remains' forming a bed about 1.0m thick towards the bottom of the gravel at a level close to 1.0m OD. A radiocarbon date of 43,140 BP was obtained here from coarse plant fragments. Similar deposits were described by Leeson & Laffan (1894) from a site near Strawberry Hill Train Station (TQ 155 724) about 1.5km to the west of the present site on the opposite side of the river where the ground surface is at ca. 10.5m OD (Figure 1). The deposits here, described as 'dark loam' were also preserved within the gravel and were recorded at levels between 13 feet (3.96m) and 17 feet (5.18m) bgs, approximately 5.6m OD, so possibly not exactly contemporary with the Isleworth deposits at ca. 1.0m OD, but closer to the level (ca. 5.94m OD) of the 'black earthy clay' in the Ham Estate borehole C28.

Langley Silt

Although the Langley Silt is not mapped by BGS at the present site, it is mapped overlying the Kempton Park Gravel to the south of the site, underlying large parts of Kingston-upon-Thames and to the north of the site on both sides of the River Thames, beneath Petersham on the right bank and Twickenham on the left bank. There can be little doubt that the clayey deposits recognised at the present site immediately underlying the Made Ground in all the boreholes and 15 of the window samples are in fact the Langley Silt. In the north-western half of the site, these deposits are

stoneless clays and sandy clays, with a cluster of window samples near the south-western end of the site described simply as 'clay' (WS4, WS9, WS10, WS12, WS13).

2.3 Geoarchaeological, palaeoenvironmental and archaeological potential

Pleistocene remains are the geological and biological deposits laid down by various agents – water, wind and ice between 2.6 million and 11,500 years ago. The Pleistocene sediments recorded on this site (the Kempton Park Gravel and Langley Silt) provide insights into the former landforms, climatic conditions and environments during the period in which they were deposited. The organic-rich deposits recorded in the nearby vicinity at Isleworth and Twickenham have more potential to provide such insights due to the biological remains they can contain (e.g. pollen, seeds, wood and insects). Recent advances in direct dating techniques, including OSL (optically stimulated luminescence), ESR (electron spin resonance), and AAR (amino acid racemization), have added further significance to Pleistocene remains, enabling us to achieve more reliable dating, relevant both to artefacts and to an understanding of landscape evolution.

Palaeolithic artefacts in primary context or significant numbers have never been recorded from the Kempton Park Gravel, but the likely Middle and Upper Palaeolithic occupation of Britain for short intervals during the period in which the Kempton Park Gravel was deposited means that the possible preservation of Palaeolithic remains cannot be ignored. OS maps, e.g. Six Inch London Sheet M (1920), show a gravel pit working Kempton Park Gravel on the western edge of the Ham meander with a note: 'Flint Implements found AD 1905-1910'. This was the gravel working now occupied by the Thames Young Mariners lagoon and the flint implements appear to have been surface finds of Mesolithic and later age comprising axes, adzes, scrapers, awls, chisels and knives as well as arrowheads, hammerstones and flint shards, many of which now form part of the Edwards Collection in the Museum of Richmond. The Archaeological DBA for the present site (Orion. 2021) draws attention to other finds of Mesolithic and post-Mesolithic flint artefacts from near-surface contexts elsewhere in the Ham meander loop, but none from the present site or its immediate vicinity.

3. CONCLUSIONS & RECOMMENDATIONS

As outlined above, organic deposits are present in association with the Kempton Park Gravel in Isleworth and Twickenham, respectively 2.5km and 1.5km from the present site. No evidence of organic deposits was recorded in the boreholes put down through the Kempton Park Gravel at the present site, nor in the window samples, though most, if not all of these did not penetrate to the levels OD at which organic beds were recorded in Isleworth and Twickenham.

It may also be relevant that the deposits mapped as Kempton Park Gravel at the present site consist entirely of sand or gravelly sand with a surface elevation of 6-8m OD. They are therefore significantly different from the deposits at Isleworth and Twickenham which consisted largely of gravel with a surface elevation around 10.5m OD. Bearing in mind the long period of time represented by the Kempton Park Gravel, it seems possible that two different depositional episodes within that time period are represented. However BGS archive boreholes TQ17SE6CC and TQ17SE6SS, within the Ham meander loop do record fine-grained beds in which the presence of organic remains seems possible.

It will therefore be appropriate to undertake further field investigation of the Ham Close site. A transect of three boreholes is recommended to record and if necessary to sample the underlying deposits. The transect should be located parallel with the long dimension of the site and should include at least one borehole in the north-eastern part of the site where none of the geo-environmental interventions were located.

4. REFERENCES

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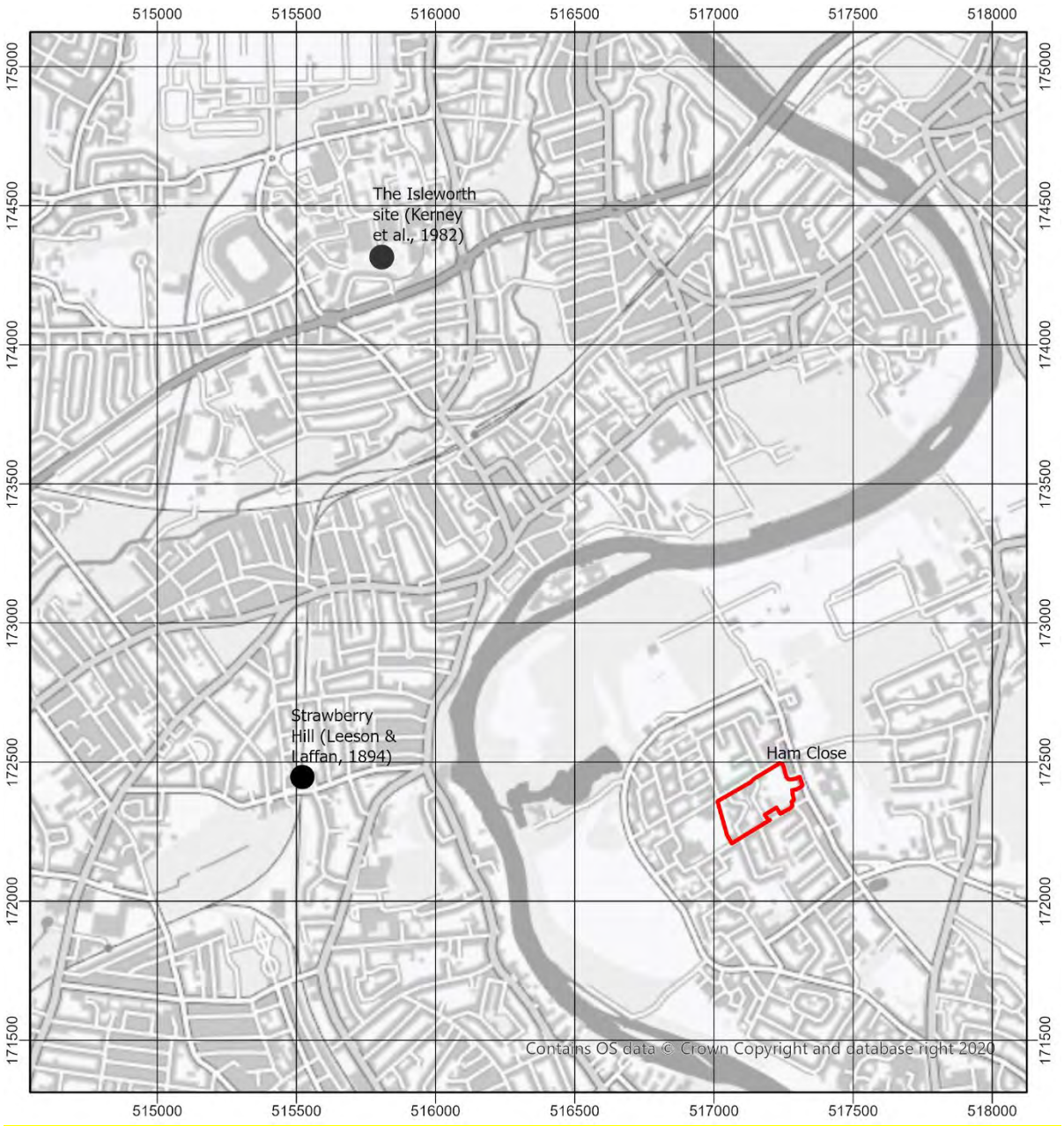

Figure 1: Ham Close and other important sites discussed in the text

Figure 2: Geotechnical borehole plan across the Ham Close site (reproduced from Rhodes, 2021)

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Site				
Richmond				**WS1**
Job No: CRM.1027.087	Dates: Start 28-04-21, Finish 28-04-21	Ground Level (m)	Co-Ordinates	
Client: Hill Partnership				Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES					MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey occasionally gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, tarmac, brick and ash.
					0.45			Brown sandy CLAY. Sand is fine.
					0.70			Brown clayey fine to medium SAND.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 7				1.00 - 1.45 Loose.
					1.30			Light brown slightly clayey fine to medium SAND.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 11				
					2.20			Brown to light brown very sandy CLAY. Sand is fine.
					2.60			Light brown slightly clayey gravelly fine to medium SAND. Gravel is angular medium flint.
		2.90 - 3.00	D					
		3.00 - 3.45	SPT	C 56	3.00			Light brown slightly clayey gravelly fine to medium SAND. Gravel is angular medium flint.
								3.00 - 3.45 Very dense, refused.
					3.45			Borehole completed at 3.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-3.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

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Site				
Richmond				**WS2**
Job No: CRM.1027.087	Dates: Start 27-04-21, Finish 27-04-21	Ground Level (m)	Co-Ordinates	
Client: Hill Partnership				Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES		0.20			MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey very gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, ash and brick. 0.00 - 1.80 With roots.
					0.45			MADE GROUND: Brown to black clayey very gravelly fine SAND. Gravel is angular fine to coarse flint, ash and clinker.
		0.90 - 1.00	D					Brown sandy CLAY. Sand is fine.
		1.00 - 1.45	SPT	C 14				
					1.40			Brown clayey fine SAND.
					1.80			
		1.90 - 2.00	D					Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey, occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint. 2.00 - 2.45 Medium dense.
		2.00 - 2.45	SPT	C 29				
		2.90 - 3.00	D					
		3.00 - 3.45	SPT	C 53	3.00			Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey, occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint. 3.00 - 3.45 Very dense, refused.
					3.45			Borehole completed at 3.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-3.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisngs.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

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Site: Richmond

WS4

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 27-04-21 Finish 27-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES					MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey occasionally gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, brick and ash.
					0.70			
		0.90 - 1.00	D					Brown CLAY.
		1.00 - 1.45	SPT	C 22				1.00 - 1.45 Stiff, high strength.
					1.50			
								Multicoloured (light orange brown to light grey) gravelly fine to coarse SAND. Gravel is angular coarse flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 50	2.00			Multicoloured (light orange brown to light grey) gravelly fine to coarse SAND. Gravel is angular coarse flint.
								2.00 - 2.45 Very dense. Refused at 2.45m begl.
					2.45			Borehole completed at 2.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

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Site				
Richmond				**WS5**
Job No: CRM.1027.087	Dates: Start 27-04-21, Finish 27-04-21	Ground Level (m)	Co-Ordinates	
Client: Hill Partnership				Sheet: 1 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES		0.20			MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey very gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, ash and brick.
					0.45			MADE GROUND: Brown to black clayey very gravelly fine SAND. Gravel is angular fine to coarse flint, ash and clinker.
		0.90 - 1.00	D					Brown to light brown clayey very occasionally gravelly fine SAND. Gravel is subrounded fine flint.
		1.00 - 1.45	SPT	C 8				1.00 - 1.45 Loose.
					1.60			Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey, occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 24				2.00 - 2.45 Medium dense.
	▽							
		2.90 - 3.00	D					
		3.00 - 3.45	SPT	C 24				3.00 - 3.45 Medium dense.
		3.90 - 4.00	D					
		4.00 - 4.45	SPT	C 51	4.00 {4.00}			Continued next sheet

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-4.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater encountered at 2.20m begl.
BACKFILL: On completion, a slotted pipe (50mm) was installed to 3.50m begl, granular response zone (3.50m-0.50m), bentonite seal 0.50m-0.10m, flush steel cover 0.10m-0.00m.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
27/04/21	2.20		

All dimensions in metres
Scale 1:25

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Site				
Richmond				**WS5**
Job No: CRM.1027.087	Dates: Start 27-04-21, Finish 27-04-21	Ground Level (m)	Co-Ordinates	
Client: Hill Partnership				Sheet: 2 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
								Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey, occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint.
								4.00 - 4.45 Very dense, refused.
					4.45			Borehole completed at 4.45m.
					{8.00}			

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-4.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater encountered at 2.20m begl.
BACKFILL: On completion, a slotted pipe (50mm) was installed to 3.50m begl, granular response zone (3.50m-0.50m), bentonite seal 0.50m-0.10m, flush steel cover 0.10m-0.00m.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

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WS6

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 27-04-21 Finish 27-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES		0.15			MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey very gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint and brick.
								MADE GROUND: Multicoloured (brown to light brown and light black) clayey to very clayey very gravelly fine SAND with asbestos fibres and cast iron pieces. Gravel is subangular and subrounded, fine to coarse flint and ash.
					0.60			Brown to light brown occasionally gravelly sand CLAY. Gravel is subrounded fine flint. Sand is fine.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 9				1.00 - 1.45 Firm, low strength.
					1.70			Pale orange yellow slightly gravelly fine to coarse SAND, mostly fine. Gravel is subangular and subrounded fine flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 34				2.00 - 2.45 Dense.
		2.50 - 2.60	D					
		2.60 - 2.98	SPT	C 53	2.60			2.60 Sampler barrel refused.
								2.60 - 2.98 Very dense, refused. Pale orange yellow slightly gravelly fine to coarse SAND, mostly fine. Gravel is subangular and subrounded fine flint.
					2.98			Borehole completed at 2.98m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.60m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, a slotted pipe (50mm) was installed to 2.50m begl, granular response zone (2.50m-0.50m), bentonite seal 0.50m-0.10m, flush steel cover 0.10m-0.00m.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

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Site: Richmond

WS7

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 27-04-21 Finish 27-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES					MADE GROUND: Grass over multicoloured (brown to light brown and light black) occasionally gravelly clayey to very clayey fine SAND with glass fragments. Gravel is subangular and subrounded, fine to coarse flint, brick and ash.
					0.55			Dark brown to brown occasionally gravelly CLAY. Gravel is subangular medium flint.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 16	1.00			1.00 - 1.45 Medium dense. Brown to light grey brown clayey very gravelly fine SAND. Gravel is angular and subrounded, fine to medium flint.
					1.70			Very light green to very light brown very slightly clayey fine SAND.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 53	2.00			Very light green to very light brown very slightly clayey fine SAND. 2.00 - 2.45 Very dense, refused.
					2.45			Borehole completed at 2.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, a slotted pipe (50mm) was installed to 2.00m begl, granular response zone (2.00m-0.50m), bentonite seal 0.50m-0.10m, flush steel cover 0.10m-0.00m.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

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Site: Richmond

WS8

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 27-04-21 Finish 27-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	D ES		0.15			MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey very gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint and brick.
					0.40			MADE GROUND: Multicoloured (brown to light brown and light black) clayey to very clayey very gravelly fine SAND with asbestos fibres. Gravel is subangular and subrounded, fine to coarse flint, ash, and brick.
								Brown to light grey brown clayey fine SAND.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 9				1.00 - 1.45 Loose.
					1.70			Very light green to very light brown very slightly clayey occasionally gravelly fine SAND. Gravel is subrounded fine flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 51	2.00			Very light green to very light brown very slightly clayey occasionally gravelly fine SAND. Gravel is subrounded fine flint.
								2.00 - 2.45 Very dense, refused.
					2.45			Borehole completed at 2.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

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Site				
Richmond				**WS9**
Job No: CRM.1027.087	Dates: Start 28-04-21, Finish 28-04-21	Ground Level (m)	Co-Ordinates	
Client: Hill Partnership				Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES					MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey occasionally gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, brick and ash.
					0.40			Brown CLAY.
		0.90 - 1.00	D		0.90			Brown very clayey fine SAND.
		1.00 - 1.45	SPT	C 12				1.00 - 1.45 Medium dense.
					1.50			Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 51	2.00			Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint.
								2.00 - 2.45 Very dense, refused.
					2.45			Borehole completed at 2.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, a slotted pipe (50mm) was installed to 2.00m begl, granular response zone (2.00m-0.50m), bentonite seal 0.50m-0.10m, flush steel cover 0.10m-0.00m.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

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Site: Richmond

WS10

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 29-04-21 Finish 29-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	B ES		0.15			MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey very occasionally gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, brick and ash.
								MADE GROUND: Multicolored (brown to red to light grey) sandy gravelly CLAY. Gravel is angular, fine to coarse flint, brick, concrete and ash. Sand is fine.
					0.60			Brown CLAY.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 28				
					1.10			Multicoloured (light orange brown to light grey) gravelly fine to coarse SAND. Gravel is angular coarse flint.
		1.50 - 1.60	D					
		1.60 - 2.05	SPT	C 52	1.60			1.60 Sampler barrel refused.
								1.60 - 2.05 Very dense, refused. Multicoloured (light orange brown to light grey) gravelly fine to coarse SAND. Gravel is angular coarse flint.
					2.05			Borehole completed at 2.05m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-1.60m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

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WS11

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 28-04-21 Finish 28-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES					MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey occasionally gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, brick and ash.
					0.50			Brown sandy CLAY. Sand is fine.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 12				
					1.20			Brown clayey fine to medium SAND.
					1.70			Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 50	2.00			Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint. 2.00 - 2.45 Very dense. Refused at 2.45m begl.
					2.45			Borehole completed at 2.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

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Site				
Richmond				**WS12**
Job No: CRM.1027.087	Dates: Start 29-04-21, Finish 29-04-21	Ground Level (m)	Co-Ordinates	
Client: Hill Partnership				Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES		0.20			MADE GROUND: Grass over multicoloured (brown to light brown and light black) very clayey very occasionally gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, brick and ash.
								MADE GROUND: Multicolored (brown to red to light grey) sandy gravelly CLAY. Gravel is angular, fine to coarse flint, brick, concrete and ash. Sand is fine.
					0.60			Brown CLAY.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 12				1.00 - 1.45 Firm, medium strength.
					1.50			Multicoloured (light orange brown to light grey) gravelly fine to coarse SAND. Gravel is angular coarse flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 15				2.00 - 2.45 Medium dense.
								2.70 - 3.00 Becoming very gravelly.
		2.90 - 3.00	D					
		3.00 - 3.45	SPT	C 53	3.00			Multicoloured (light orange brown to light grey) gravelly fine to coarse SAND. Gravel is angular coarse flint.
								3.00 - 3.45 Very dense, refused.
					3.45			Borehole completed at 3.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-3.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisngs.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

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Site: Richmond

WS13

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 29-04-21 Finish 29-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES		0.20			MADE GROUND: Grass over multicoloured (brown to light brown and light black) very clayey very occasionally gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, brick and ash.
					0.65			MADE GROUND: Multicolored (brown to red to light grey) sandy gravelly CLAY. Gravel is angular, fine to coarse flint, brick, concrete and ash. Sand is fine.
		0.90 - 1.00	D					Brown CLAY.
		1.00 - 1.45	SPT	C 50	1.00			Brown CLAY. 1.00 - 1.45 Very stiff, very high strength. Refused at 1.45m begl.
					1.45			Borehole completed at 1.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

Logged By: KC

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Site: Richmond

WS14

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 28-04-21 Finish 28-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES					MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey occasionally gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, brick and ash.
					0.50			Brown sandy CLAY. Sand is fine.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 10				
					1.20			Brown clayey fine to medium SAND.
					1.70			Multicoloured (light brown occasionally Light green to cream) clayey gravelly fine SAND. Gravel is subangular fine flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 50	2.00			Multicoloured (light brown occasionally Light green to cream) clayey gravelly fine SAND. Gravel is subangular fine flint. 2.00 - 2.45 Very dense. Refused at 2.45m begl.
					2.45			Borehole completed at 2.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, a slotted pipe (50mm) was installed to 2.00m begl, granular response zone (2.00m-0.50m), bentonite seal 0.50m-0.10m, flush steel cover 0.10m-0.00m.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

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Site: Richmond

WS15

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 27-04-21 Finish 27-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES		0.15			MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey very gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint and brick.
					0.40			MADE GROUND: Multicoloured (brown to light brown and light black) clayey to very clayey occasionally cobbly very gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, ash, brick, and occasional cobble of brick.
					0.70			MADE GROUND: Brown very clayey fine SAND with occasional coarse sand-sized brick and ash.
		0.90 - 1.00	D					Brown to light grey brown clayey very gravelly fine SAND. Gravel is angular and subrounded, fine to medium flint.
		1.00 - 1.45	SPT	C 9				1.00 - 1.45 Loose.
					1.70			Very light green to very light brown very slightly clayey occasionally gravelly fine SAND. Gravel is subrounded fine flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 55	2.00			Very light green to very light brown very slightly clayey occasionally gravelly fine SAND. Gravel is subrounded fine flint.
								2.00 - 2.45 Very dense, refused.
					2.45			Borehole completed at 2.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

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Site				
Richmond				**WS16**
Job No: CRM.1027.087	Dates: Start 28-04-21, Finish 28-04-21	Ground Level (m)	Co-Ordinates	
Client: Hill Partnership				Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES					MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey occasionally gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, brick and ash.
					0.50			
								Brown sandy CLAY. Sand is fine.
					0.80			
		0.90 - 1.00	D					Brown clayey fine to medium SAND.
		1.00 - 1.45	SPT	C 8				1.00 - 1.45 Loose.
					1.70			
		1.90 - 2.00	D					Light brown to very light green very slightly clayey very occasionally gravelly fine SAND. Gravel is subangular fine flint.
		2.00 - 2.45	SPT	C 29				2.00 - 2.45 Medium dense.
					2.20			
								Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint.
		2.90 - 3.00	D					
		3.00 - 3.45	SPT	C 50	3.00			
								Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint.
								3.00 - 3.45 Very dense. Refused at 3.45m begl.
					3.45			
								Borehole completed at 3.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-3.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, a slotted pipe (50mm) was installed to 3.00m begl, granular response zone (3.00m-1.00m), bentonite seal 1.00m-0.10m, flush steel cover 0.10m-0.00m.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

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Site: Richmond

WS17

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 27-04-21 Finish 27-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES					MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey very gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, ash and brick.
					0.40			MADE GROUND: Multicoloured (brown to light brown occasionally light grey) occasionally gravelly slightly to very sandy CLAY with sewer pipe fragments. Gravel is subangular and subrounded medium flint, brick, and ash, Sand is fine.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 7				1.00 - 1.45 Soft, low strength.
					1.20			Brown sandy CLAY. Sand is fine.
					1.60			Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey, occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 15				2.00 - 2.45 Medium dense.
		2.90 - 3.00	D					
		3.00 - 3.45	SPT	C 50	3.00			Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey, occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint.
								3.00 - 3.45 Very dense. Refused at 3.45m begl.
					3.45			Borehole completed at 3.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-3.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

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Site: Richmond

WS18

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 27-04-21 Finish 27-04-21		

Client: Hill Partnership

Sheet: 1 of 1

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		0.20 - 0.40	ES					MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey very gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, ash and brick.
					0.45			Brown sandy CLAY. Sand is fine.
		0.90 - 1.00	D					
		1.00 - 1.45	SPT	C 10				
					1.20			Brown clayey fine to medium SAND.
					1.70			Multicoloured (brown to light brown and light grey) clayey very gravelly medium to coarse SAND. Gravel is subrounded fine flint.
		1.90 - 2.00	D					
		2.00 - 2.45	SPT	C 13	2.00			2.00 - 2.45 Medium dense. Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey, occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint.
		2.90 - 3.00	D					
		3.00 - 3.45	SPT	C 51	3.00			Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey, occasionally gravelly fine to coarse SAND. Gravel is rounded and subrounded fine flint. 3.00 - 3.45 Very dense, refused.
					3.45			Borehole completed at 3.45m.
					{4.00}			

0 1 2 3 4

General Remarks

EQUIPMENT: Archway compact window sampling tracked rig.
METHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-3.00m begl.
CASING: Not used.
GROUNDWATER: Groundwater not encountered.
BACKFILL: On completion, a slotted pipe (50mm) was installed to 3.00m begl, granular response zone (3.00m-1.00m), bentonite seal 1.00m-0.10m, flush steel cover 0.10m-0.00m.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:25

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Site: Ashburnham Road, Richmond

BH1

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 16-08-21 Finish 17-08-21		

Client: Hill Partnership Ltd

Sheet: 1 of 4

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.00			MADE GROUND: Grass over firm brown slightly sandy slightly gravelly CLAY. Gravel is subnagular and fine of brick and flint.
					0.60			Firm brown to light brown very sandy slightly gravelly CLAY. Gravel is subnaguar and coarse of flint.
		1.50 - 1.95	SPT	23	1.60			Medium dense to dense light brown slightly clayey slightly gravelly medium and coarse SAND. Gravel is angular and subangular coarse of flint.
		3.00 - 3.45	SPT	22				
	▽	4.50 - 4.95	SPT	21				
		5.00	D					
					5.40			Stiff greyish brown slightly gravelly CLAY. Gravel is angular and coarse of claystone. Note: Groundwater encountered at 4.3 m bgl.
		6.00 - 6.45	SPT	11				
		7.50 - 7.95	SPT	18				
					{8.00}			Continued next sheet

0 1 2 3 4 5 6 7 8

General Remarks

Cable Percussive Borehole advanced from ground level to 25.0 m bgl. No services encountered. Groundwater encountered at 4.3 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
	4.30		

All dimensions in metres
Scale 1:50

Logged By: KC

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Site: Ashburnham Road, Richmond

BH1

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 16-08-21 Finish 17-08-21		

Client: Hill Partnership Ltd

Sheet: 2 of 4

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description
		Depth (m)	No/Type	Results				
		9.00 - 9.45	SPT	20				
		10.00	D					
		10.50 - 10.95	SPT	30				
		12.00 - 12.45	SPT	25				
		13.50 - 13.95	SPT	28				
		15.00	D	46				
		15.00 - 15.45	SPT					
					{16.00}			Continued next sheet

8 9 10 11 12 13 14 15 16

General Remarks

Cable Percussive Borehole advanced from ground level to 25.0 m bgl. No services encountered. Groundwater encountered at 4.3 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: KC

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Site: Ashburnham Road, Richmond

BH1

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 16-08-21 Finish 17-08-21		

Client: Hill Partnership Ltd

Sheet: 3 of 4

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description
		Depth (m)	No/Type	Results				
		16.50 - 16.95	SPT	29				
		18.00 - 18.45	SPT	37				
		19.50 - 19.95	SPT	37				
		20.00	D					
		21.00 - 21.45	SPT	37				
		22.50 - 22.95	SPT	39				
		24.00 - 24.45	SPT	41	{24.00}			Continued next sheet

16 17 18 19 20 21 22 23 24

General Remarks

Cable Percussive Borehole advanced from ground level to 25.0 m bgl. No services encountered. Groundwater encountered at 4.3 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

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Site: Ashburnham Road, Richmond

BH1

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 16-08-21 Finish 17-08-21		

Client: Hill Partnership Ltd

Sheet: 4 of 4

Well	Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		25.00	D		25.00			Borehole completed at 25.00m.
					{32.00}			

24 25 26 27 28 29 30 31 32

General Remarks

Cable Percussive Borehole advanced from ground level to 25.0 m bgl. No services encountered. Groundwater encountered at 4.3 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: KC

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Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH2

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 16-08-21 Finish 17-08-21		

Client: Hill Partnership Ltd

Sheet: 1 of 4

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.50			MADE GROUND: Grass over firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular and fine of brick and flint.
								Firm brown and mottled light brown very sandy slightly gravelly CLAY. Gravel is subangular and fine to coarse of flint.
		1.50 - 1.95	SPT	14	1.50			Medium dense to dense light brown slightly clayey slightly sandy medium and coarse SAND. Gravel is angular and subangular medium and coarse of flint. Note: Groundwater encountered at 3.8 m bgl.
	▽	3.00 - 3.45	SPT	41				
		4.50 - 4.80	SPT	50				
		5.00	D		5.20			Stiff greyish brown slightly gravelly CLAY. Gravel is angular and coarse of claystone.
		6.00 - 6.45	SPT	14				
		7.50 - 7.95	SPT	19				
					{8.00}			Continued next sheet

0 1 2 3 4 5 6 7 8

General Remarks

Cable Percussive Borehole advanced from ground level to 25.0 m bgl. No services encountered. Ground water encountered at 5.0 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
	3.80		

All dimensions in metres
Scale 1:50

Logged By: KC

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Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH2

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 16-08-21 Finish 17-08-21		

Client: Hill Partnership Ltd

Sheet: 2 of 4

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		9.00 - 9.45	SPT	16				
		10.00	D					
		10.50 - 10.95	SPT	23				
		12.00 - 12.45	SPT	22				
		13.50 - 13.95	SPT	26				
		15.00 15.00 - 15.45	D SPT	25				
					{16.00}			Continued next sheet

8 9 10 11 12 13 14 15 16

General Remarks

Cable Percussive Borehole advanced from ground level to 25.0 m bgl. No services encountered. Ground water encountered at 5.0 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: KC

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Site: Ashburnham Road, Richmond

BH2

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 16-08-21 Finish 17-08-21		

Client: Hill Partnership Ltd

Sheet: 3 of 4

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		16.50 - 16.95	SPT	25				
		18.00 - 18.45	SPT	27				
		19.50 - 19.95	SPT	30				
		20.00	D					
		21.00 - 21.45	SPT	24				
		22.50 - 22.95	SPT	30				
		24.00 - 24.45	SPT	34	{24.00}			Continued next sheet

16 17 18 19 20 21 22 23 24

General Remarks

Cable Percussive Borehole advanced from ground level to 25.0 m bgl. No services encountered. Ground water encountered at 5.0 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

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Site: Ashburnham Road, Richmond

BH2

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 16-08-21 Finish 17-08-21		

Client: Hill Partnership Ltd

Sheet: 4 of 4

Well	Water Levels	Samples & In Situ Testing: Depth (m)	Samples & In Situ Testing: No/Type	Samples & In Situ Testing: Results	Depth (m)	Level (mAD)	Legend	Stratum Description
		25.00	D		25.00			Borehole completed at 25.00m.
					{32.00}			

24 25 26 27 28 29 30 31 32

General Remarks

Cable Percussive Borehole advanced from ground level to 25.0 m bgl. No services encountered. Ground water encountered at 5.0 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: KC

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Site: Ashburnham Road, Richmond

BH3

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 16-08-21 Finish 16-08-21		

Client: Hill Partnership Ltd

Sheet: 1 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.60			MADE GROUND: Grass over firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular and fine of brick and flint.
		1.20 - 1.65	SPT	6	1.50			Firm brown and mottled light brown very sandy slightly gravelly CLAY. Gravel is subangular and fine to coarse of flint.
	▽	3.00 - 3.45	SPT	33				Medium dense to dense light brown slightly clayey slightly gravelly medium and coarse SAND. Gravel is angular and subangular and coarse of flint. Note: Groundwater encountered at 3.4 m bgl.
		4.50 - 4.95	SPT	13				
		5.00	D		5.30			Firm greyish brown CLAY.
		6.00 - 6.45	SPT	14				
		7.50 - 7.95	SPT	23	{8.00}			Continued next sheet

0 1 2 3 4 5 6 7 8

General Remarks

Cable Percussive Borehole advanced from ground level to 10.0 m bgl. No services encountered. Groundwater encountered at 3.4 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
	3.40		

All dimensions in metres
Scale 1:50

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH3

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 16-08-21 Finish 16-08-21		

Client: Hill Partnership Ltd

Sheet: 2 of 2

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description
		Depth (m)	No/Type	Results				
		9.00 - 9.45	SPT	21				
		10.00	D		10.00			Borehole completed at 10.00m.
					{16.00}			

8 9 10 11 12 13 14 15 16

General Remarks

Cable Percussive Borehole advanced from ground level to 10.0 m bgl. No services encountered. Groundwater encountered at 3.4 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH4

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 18-08-21 Finish 18-08-21		

Client: Hill Partnership Ltd

Sheet: 1 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
					0.00			MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular and fine of brick and flint.
		1.50 - 1.95	SPT	17	0.60			Firm light brown and orangish brown very sandy CLAY. Sand is fine to coarse.
		3.00 - 3.45	SPT	13	2.50			Medium dense light brown slightly clayey slightly gravelly medium and coarse SAND. Gravel is angular and subangular and coarse of flint. Note: Groundwater encountered at 4.3 m bgl.
	▽	4.50 - 4.95	SPT	11				
		5.00	D		5.20			Firm greyish brown CLAY.
		6.00 - 6.45	SPT	14				
		7.50 - 7.95	SPT	19	{8.00}			Continued next sheet

General Remarks

Cable Percussive Borehole advanced from ground level to 10.0 m bgl. No services encountered. Groundwater encountered at 4.3 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
	4.30		

All dimensions in metres
Scale 1:50

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH4

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 18-08-21 Finish 18-08-21		

Client: Hill Partnership Ltd

Sheet: 2 of 2

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description
		Depth (m)	No/Type	Results				
		9.00 - 9.45	SPT	19				
		10.00	D		10.00			Borehole completed at 10.00m.
					{16.00}			

8 9 10 11 12 13 14 15 16

General Remarks

Cable Percussive Borehole advanced from ground level to 10.0 m bgl. No services encountered. Groundwater encountered at 4.3 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH5

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 18-08-21 Finish 18-08-21		

Client: Hill Partnership Ltd

Sheet: 1 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
								MADE GROUND: Brown slightly sandy slightly gravelly CLAY. Gravel is subangular and fine of brick and flint.
					0.50			Firm brown and mottled light brown very sandy slightly gravelly CLAY. Gravel is subangular and fine to coarse of flint.
		1.50 - 1.95	SPT	10	1.50			Medium dense to dense light brown slightly clayey slightly gravelly medium and coarse SAND. Gravel is angular and subangular and coarse of flint. Note: Groundwater encountered at 2.5 m bgl.
	▽	3.00 - 3.45	SPT	37				
		4.50 - 4.95	SPT	37				
		5.00	D					
					5.80			Firm to stiff greyish brown CLAY. Note: Claystone between 8.3 and 8.4 m bgl.
		6.00 - 6.45	SPT	13				
		7.50 - 7.95	SPT	14				
					{8.00}			Continued next sheet

0 1 2 3 4 5 6 7 8

General Remarks

Cable Percussive Borehole advanced from ground level to 10.0 m bgl. No services encountered. Groundwater encountered at 2.5 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
	2.50		

All dimensions in metres
Scale 1:50

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH5

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 18-08-21 Finish 18-08-21		

Client: Hill Partnership Ltd

Sheet: 2 of 2

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description
		Depth (m)	No/Type	Results				
		9.00 - 9.45	SPT	19				
		10.00	D		10.00			Borehole completed at 10.00m.
					{16.00}			

8 9 10 11 12 13 14 15 16

General Remarks

Cable Percussive Borehole advanced from ground level to 10.0 m bgl. No services encountered. Groundwater encountered at 2.5 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH6

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 17-08-21 Finish 17-08-21		

Client: Hill Partnership Ltd

Sheet: 1 of 2

Well	Water Levels	Samples & In Situ Testing: Depth (m)	No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description
								MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular and fine of brick, concrete and flint.
					0.70			Firm light brown and orangish brown very sandy CLAY. Sand is fine.
		1.50 - 1.95	SPT	13				
					2.80			Medium dense to dense light brown slightly clayey slightly gravelly medium and coarse SAND. Gravel is angular and subangular and coarse of flint. Note: Groundwater encountered at 3.8 m bgl.
	▽	3.00 - 3.45	SPT	34				
		4.50 - 4.95	SPT	36				
		5.00	D					
					5.40			Frim to stifff greyish brown CLAY.
		6.00 - 6.45	SPT	11				
		7.50 - 7.95	SPT	15				
					{8.00}			Continued next sheet

0 1 2 3 4 5 6 7 8

General Remarks

Cable Percussive Borehole advanced from ground level to 10.0 m bgl. No services encountered. Groundwater encountered at 3.8 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
	3.80		

All dimensions in metres
Scale 1:50

Logged By: KC

Enzygo Ltd
Tel: 01454 269237
Fax: 01454 269760
Web: www.enzygo.com

Site: Ashburnham Road, Richmond

BH6

Job No	Dates	Ground Level (m)	Co-Ordinates
CRM.1027.087	Start 17-08-21 Finish 17-08-21		

Client: Hill Partnership Ltd

Sheet: 2 of 2

Well	Water Levels	Samples & In Situ Testing			Depth (m)	Level (mAD)	Legend	Stratum Description
		Depth (m)	No/Type	Results				
		9.00 - 9.45	SPT	18				
		10.00	D		10.00			Borehole completed at 10.00m.
					{16.00}			

General Remarks

Cable Percussive Borehole advanced from ground level to 10.0 m bgl. No services encountered. Groundwater encountered at 3.8 m bgl. Backfilled with arisings upon completion.

Groundwater

Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)

All dimensions in metres
Scale 1:50

Logged By: KC