

## **APPENDIX 4.1: ARCHAEOLOGICAL DESK BASED ASSESSMENT**

# Ham Close Regeneration

Planning Application:

Archaeological Desk-Based









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

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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

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#### 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



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-20<sup>th</sup> 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 18<sup>th</sup> 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.



- 1.1 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).



- 2.1 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);
  - Standard and Guidance for Historic Environment Desk-Based Assessment (CIfA 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.



## 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 placemaking, 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 17<sup>th</sup> century. Evidence of prehistoric occupation may also be present within this area.
- 4.5 The gardens and pleasure grounds attached to the 17<sup>th</sup> 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 1945 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 17<sup>th</sup> century brick making activities along with probable 18<sup>th</sup> 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 18<sup>th</sup> 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 17<sup>th</sup> and 18<sup>th</sup> 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 20<sup>th</sup> 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 20<sup>th</sup> 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 12<sup>th</sup> 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 20<sup>th</sup> 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 19<sup>th</sup> 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 17<sup>th</sup> and 18<sup>th</sup> 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



343 In Ham Field, Home Piece arable 10a 3r 19p

346 (part) Long Straight, arable 6a 2r 1p347 (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-20<sup>th</sup> 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 18<sup>th</sup> 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



## **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
	Firm and stiff brown clay and gravelly clay.	0 to 0.9
Kempton Park Gravels	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-20<sup>th</sup> 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 18<sup>th</sup> 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-20<sup>th</sup> 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 18<sup>th</sup> 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.



#### General

**British Library** 

The National Archives

Greater London Historic Environment Record

## Cartographic

1746 - 10 miles around London by John Rocque Ref: Layers of London

1806 - 1st edition Ordnance Survey Drawing Ref: BL OSD 127

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

OS mapping 1868-2021

#### Websites

Archaeological Data Service - www.ads.ahds.ac.uk

British History Online - http://www.british-history.ac.uk/

British Geological Society Geology of Britain Viewer -

http://www.bgs.ac.uk/discoveringGeology/geologyOfBritain/viewer.html

Ham Close Regeneration Programme - www.hamclose.co.uk

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

Historic England National Heritage List for England -

https://www.historicengland.org.uk/listing/the-list/

Heritage Gateway - www.heritagegateway.org.uk

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

MAGIC - www.magic.gov.uk

Pastscape - www.pastscape.org.uk

Petersham Village - www.petershamvillage.org

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'Parishes: Petersham', in A History of the County of Surrey: Volume 3, ed. H E Malden (London, 1911), pp. 525-532.



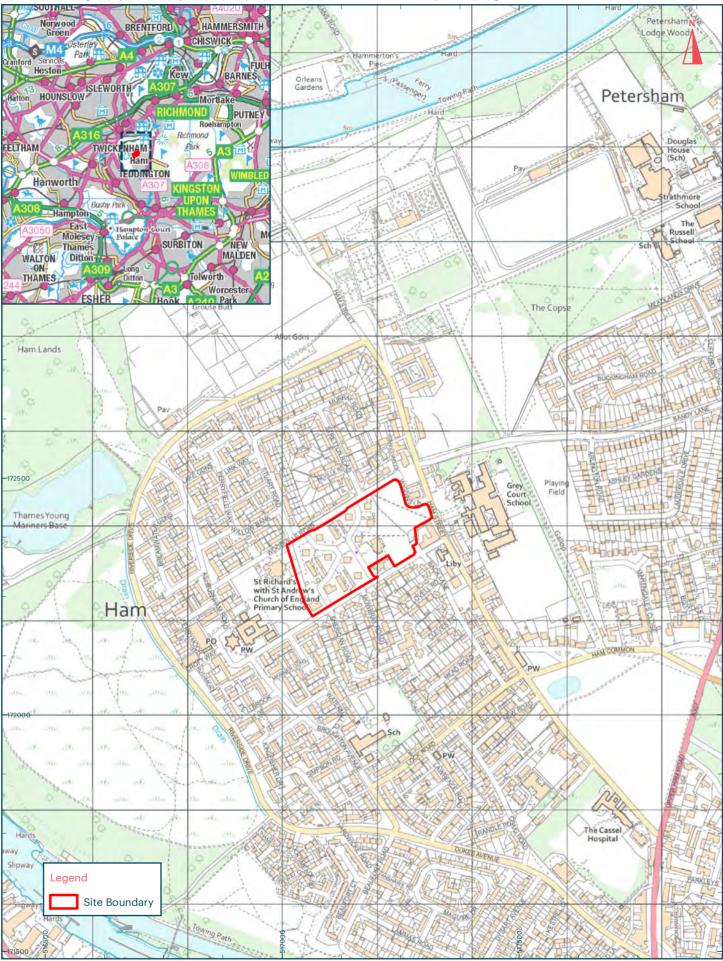


Figure 1: Site Location

Address:

Ham Close Estate, Richmond upon Thames





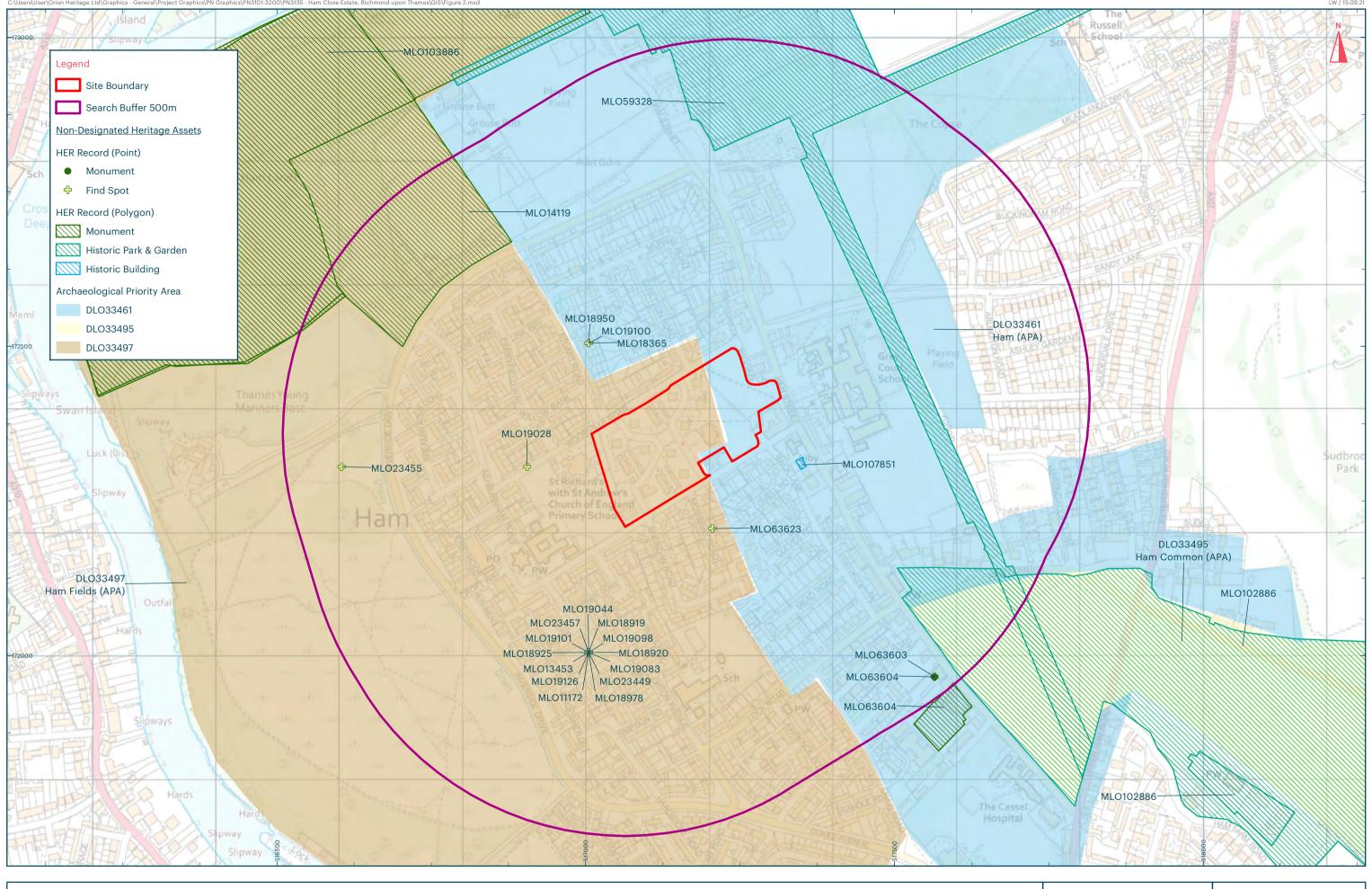
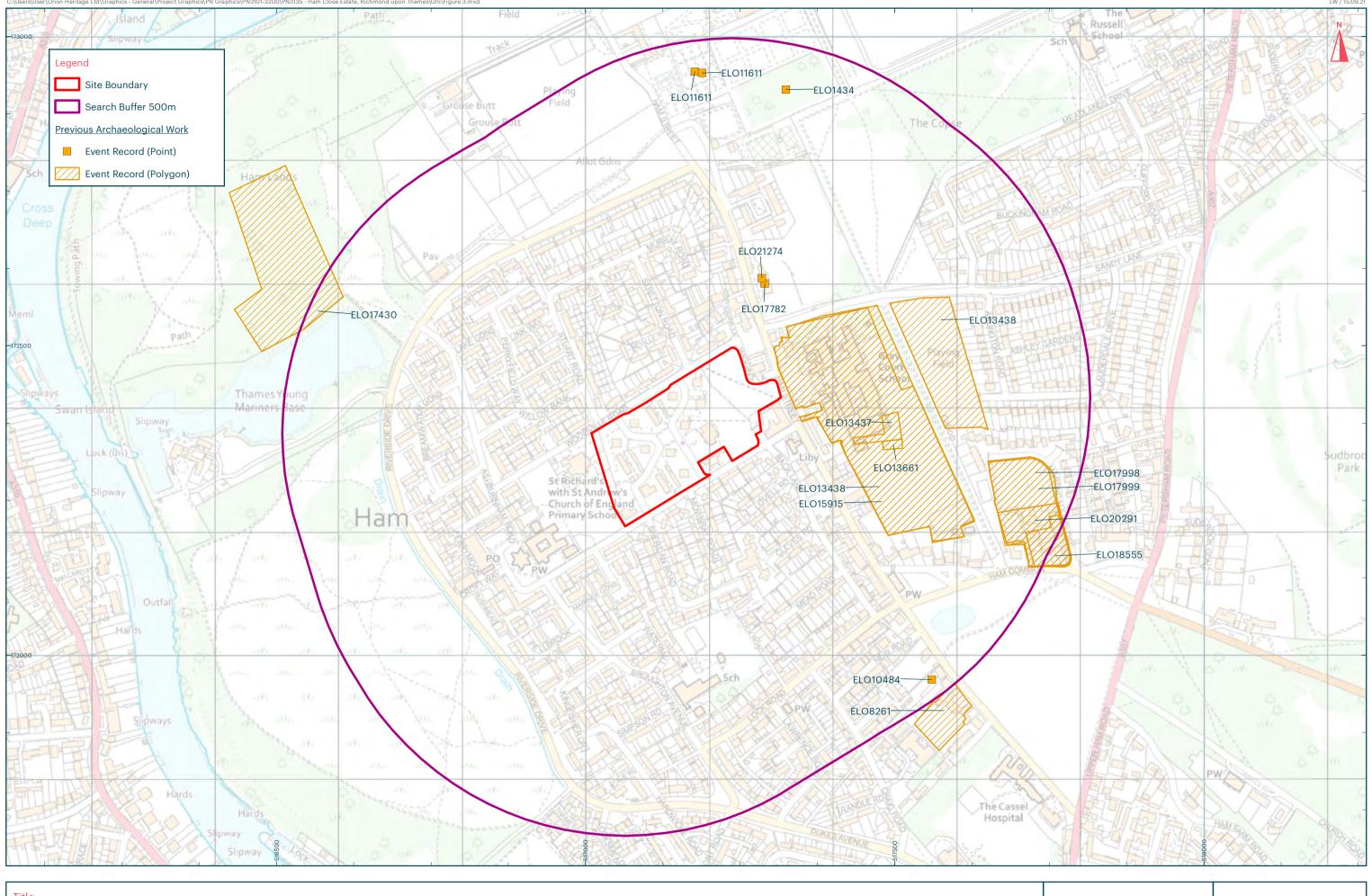


Figure 2: HER Data Plot – Monuments data Address:

Ham Close Estate, Richmond upon Thames

Scale at A3: 1:5,500 0 200m





Ham Close Estate, Richmond upon Thames

Historic England (2021). Contains OS data © Crown copyright and database right (2021).

Ordnance Survey mans encodured with the spection of the controller of HM Stationery Office.

Figure 3: HER Data Plot – Event data

Address:

Scale at A3: 1:5,500 200m

orion.

Figure 4: 1746 John Rocques Map

Ham Close Estate, Richmond upon Thames





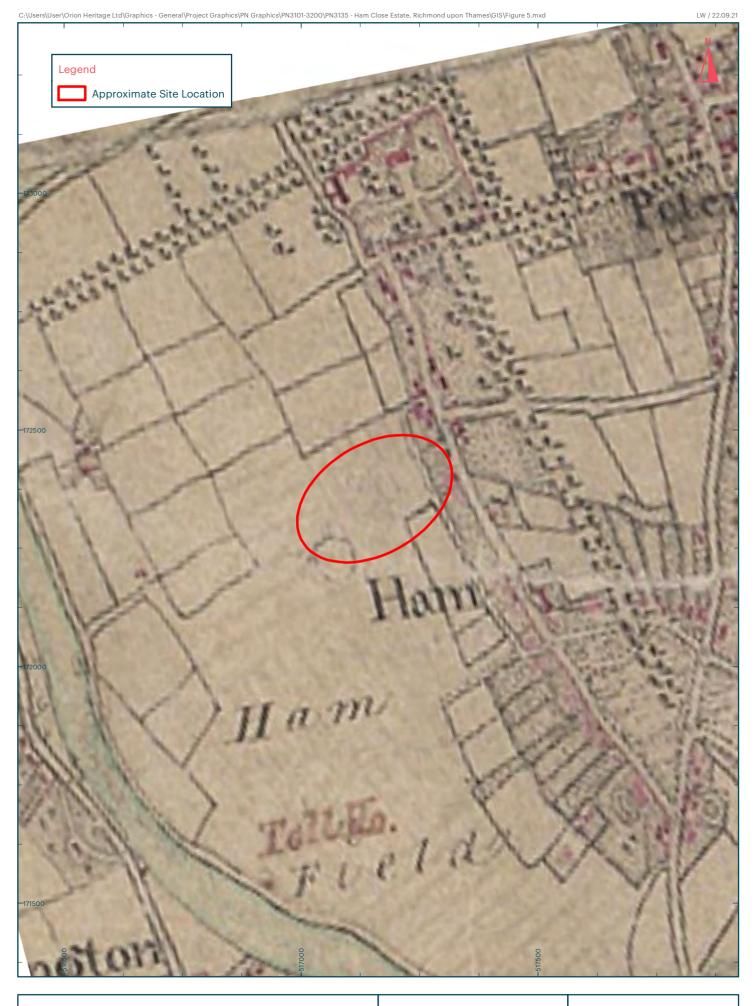


Figure 5: 1806 Ordnance Surveyors Drawing

Ham Close Estate, Richmond upon Thames

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



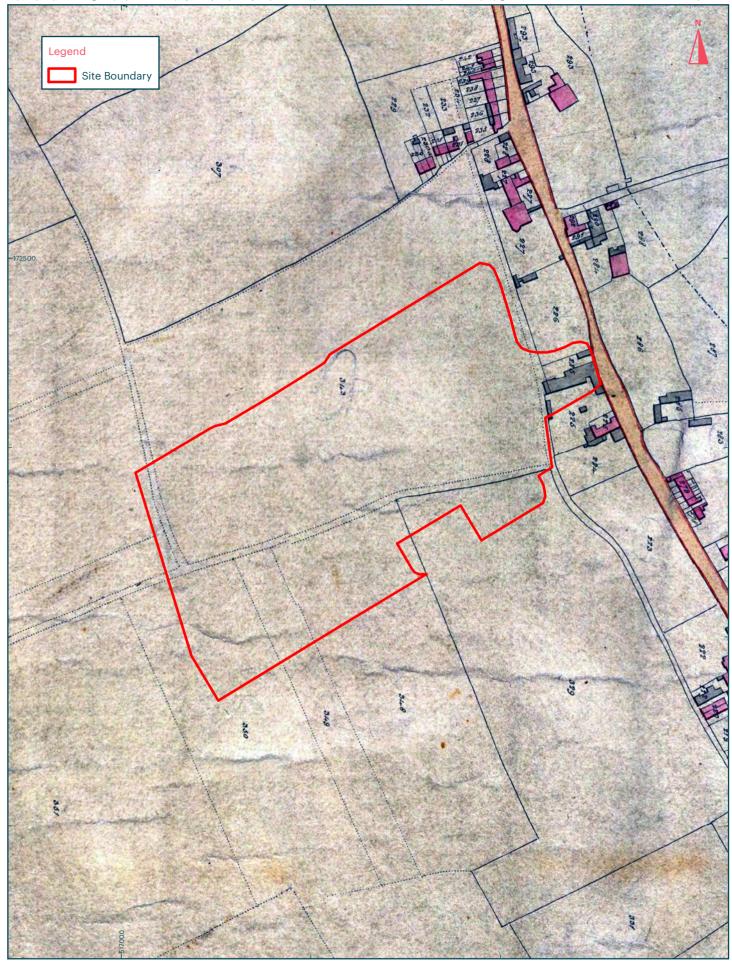


Figure 6: 1842 Ham Tithe Map

Address:

Ham Close Estate, Richmond upon Thames





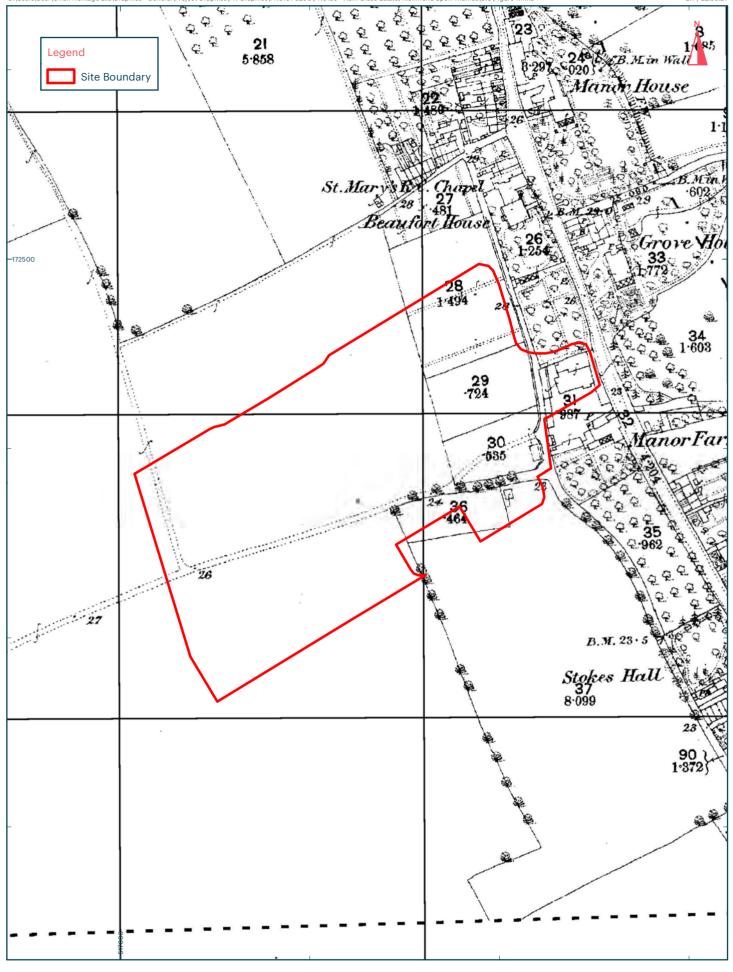


Figure 7: 1868 OS Map 1:2,500

Address:

Ham Close Estate, Richmond upon Thames





Address:
Ham Close Estate, Richmond upon Thames

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



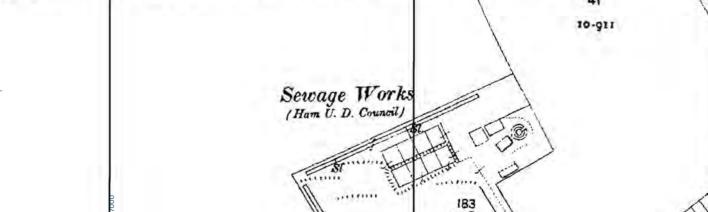


Figure 9: 1913 OS Map 1:2,500

Address:

Ham Close Estate, Richmond upon Thames





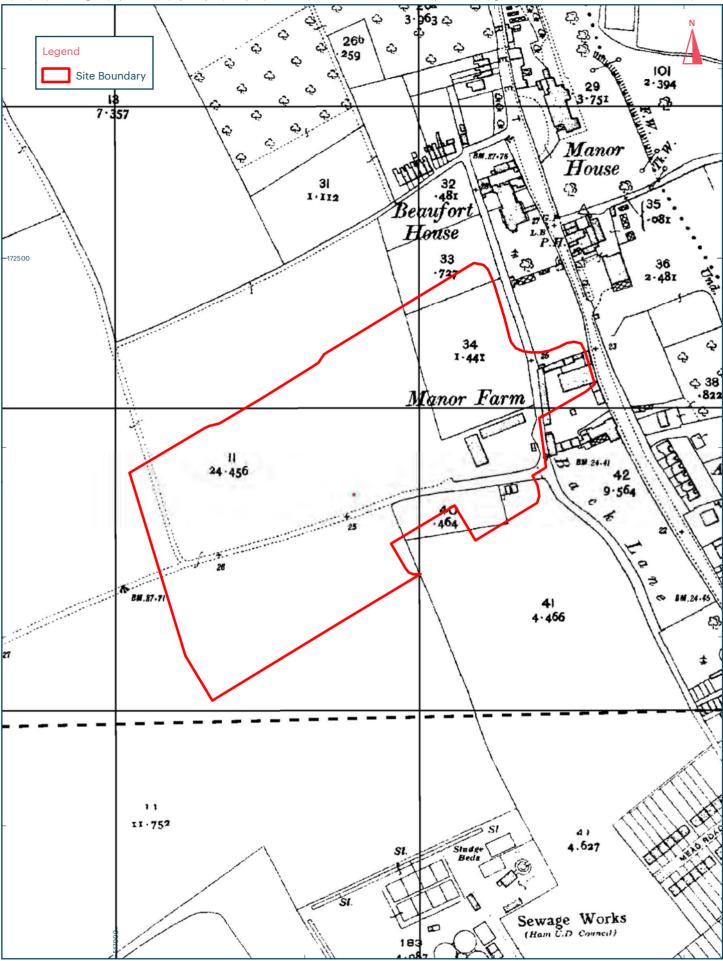




Figure 10: 1934-1935 OS Map 1:2,500

Address:

Ham Close Estate, Richmond upon Thames





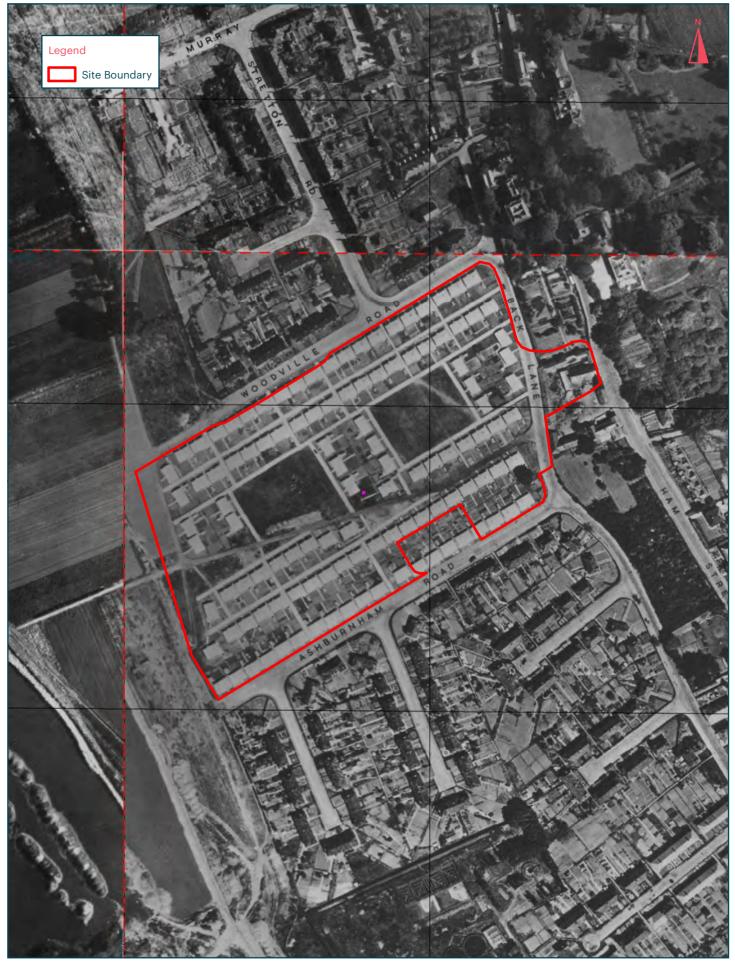


Figure 11: 1946 Historical Aerial Photography 1:1,250

Address:

Ham Close Estate, Richmond upon Thames







Figure 12: 1971 OS Map 1:2,500

Address:

Ham Close Estate, Richmond upon Thames





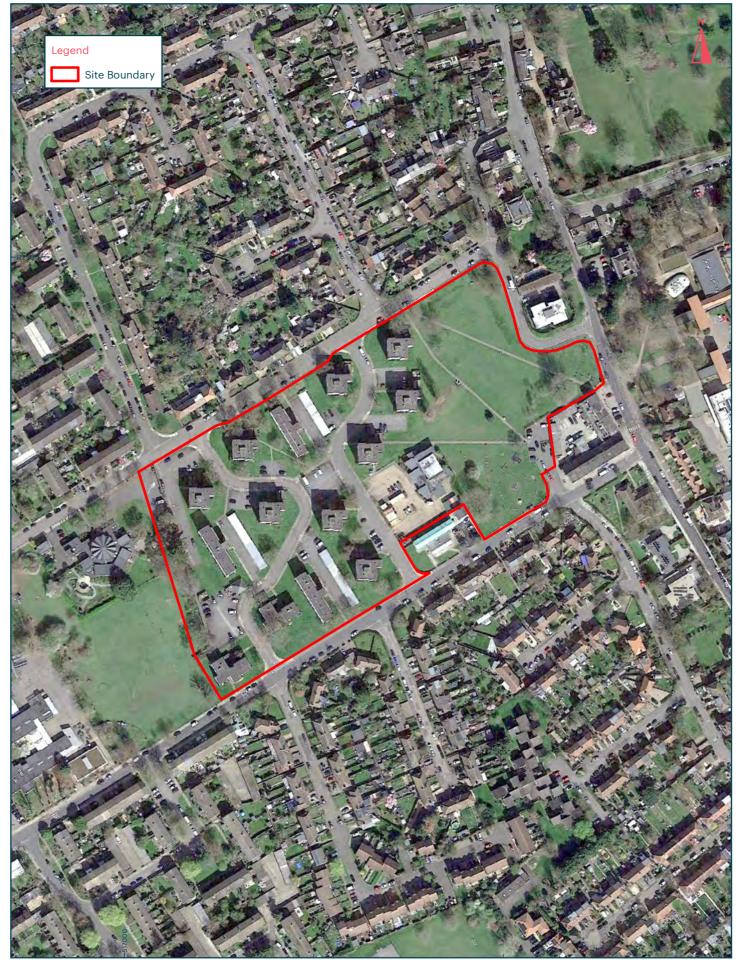


Figure 13: 2021 Google Earth Image

Address:

Ham Close Estate, Richmond upon Thames









Figure 14: Proposed Masterplan

Address:

Ham Close Estate, Richmond upon Thames

Scale at A4: 1:2,500





Appendix A – Geoarchaeological Assessment







# HAM CLOSE, ASHBURNHAM ROAD, RICHMOND

Geoarchaeological
Desk-Based Assessment

NGR: TQ 17160 72360

Date: 25<sup>th</sup> January 2022

Written by: Dr C.P. Green

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3.	CONCLUSIONS & RECOMMENDATIONS	7
4	REFERENCES	7

# 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 (<a href="http://mapapps.bgs.ac.uk">http://mapapps.bgs.ac.uk</a>), 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 al 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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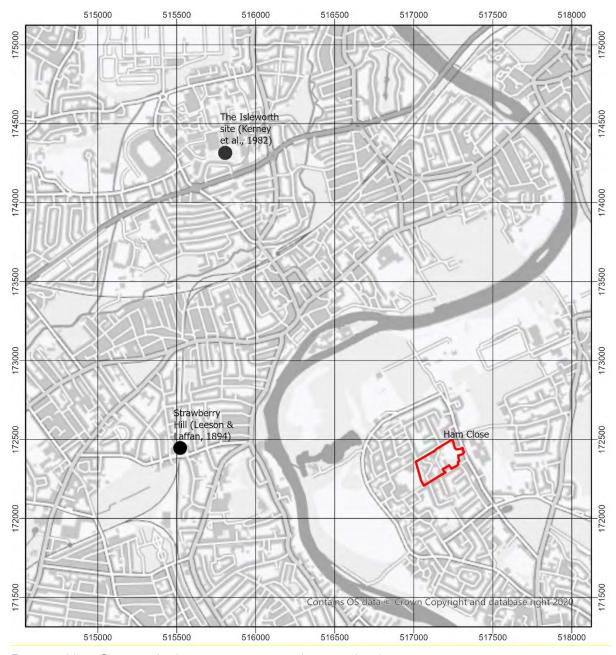


Figure 1: Ham Close and other important sites discussed in the text



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



# APPENDIX B – EXPLORATORY HOLE RECORDS





Web: www.enzygo.com

b No CRM	I.1027.0	087		Start 28 Finish 2	-04-21 8-04-21	Groun	d Level (	m)	Co-Ordinates	WS1
lient H	ill Part	nership	)			1				Sheet 1 of 1
Well	Water Levels	Sam Depth		No/Type	Results	Depth (m)	Level (mAD)	Legend	Stratum Description	
		0.20 -	0.40	ES		0.45			MADE GROUND: Grass over multicoloured (brown to lig black) clayey to very clayey occasionally gravelly fine SA subangular and subrounded, fine to coarse flint, tarmac,	ND. Gravel is
						0.70			Brown sandy CLAY. Sand is fine.	
		0.90 -	1.00	D					Brown clayey fine to medium SAND.	
		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 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 medium flint.	). Gravel is angular
		2.90 - 3.00 -		D SPT	C 56	3.00		- · · · · · · · · · · · · · · · · · · ·	Light brown slightly clayey gravelly fine to medium SANE medium flint.	. Gravel is angular
						3.45			3.00 - 3.45 Very dense, refused.  Borehole completed at 3.45m.	
						{4.00}				
QUIPM IETHO ASINO ROUN	D: Hand 3: Not use DWATE	rchway o dug insp ed. R: Grou	pection pectin pection pection pection pection pection pection pection pection	oit 0.00m		egl. Dyn	amic sam		-3.00m begl.	
rounc	lwater		Dat	e		Strike De	epth	Cas	sing Depth Depth After Observation (m) (m)	



Site				
Richmond				WS2
Job No	Dates Start 27-04-21	Ground Level (m)	Co-Ordinates	VV32
CRM.1027.087	Finish 27-04-21			
Client				Sheet
Hill Partnershir	1 of 1			

1						1	
Well Water				Depth	Level	Legend	Stratum Description
Levels	Depth (m)	No/Type	Results	(m)	(mAD)	Zagoriu XXXXX	MADE GROUND: Grass over multicoloured (brown to light brown and light
	0.20 - 0.40	ES		0.20			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.
							Brown sandy CLAY. Sand is fine.
	0.90 - 1.00	D					
	1.00 - 1.45	SPT	C 14				_
							-
				1.40			
							Brown clayey fine SAND.
				1.80			
	1.90 - 2.00 2.00 - 2.45	D SPT	C 29				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.
						· · · · · · · · ·	-
							-
							_
	2.90 - 3.00 3.00 - 3.45	D SPT	C 53	3.00		. — a . —	
						. — a . —	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.
				3.45		. — a . —	3.00 - 3.45 Very dense, refused.
				3.43			Borehole completed at 3.45m.
				{4.00}			
General Rema EQUIPMENT: A METHOD: Hand CASING: Not us	Archway compact d dug inspection	et window pit 0.00m	sampling -1.00m b	g tracked egl. Dyna	rig. amic sam	npled 1.00m	3.00m begl.
GROUNDWAT	ER: Groundwate completion, the	er not enco borehole v	ountered. was back	filled wit	h arisngs		
Groundwater	Da	ıte		Strike Do	epth	Cas	ng Depth Observation (m) (m)  Depth After Observation (m)
Groundwaler							()
All dimensions							Logged By

General	Remarks
Ochiciai	1 CHILLIAN IX

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



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Site							
Richmond				WS4			
Job No	Dates Start 27-04-21	Ground Level (m)	Co-Ordinates	VV34			
CRM.1027.087	Finish 27-04-21						
Client				Sheet 1 of 1			
Hill Partnership							

		nership		-41				
Well	Water Levels	Samples & I Depth (m)	_	sting Results	Depth (m)	Level (mAD)	Legend	Stratum Description
	Levels	0.20 - 0.40	ES ES	Results	0.70	(IIIAD)		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.  Brown CLAY.
		0.90 - 1.00 1.00 - 1.45	D SPT	C 22	1.50			1.00 - 1.45 Stiff, high strength.
		1.90 - 2.00 2.00 - 2.45	D SPT	C 50	2.00			Multicoloured (light orange brown to light grey) gravelly fine to coarse SAND.  Gravel is angular coarse flint.  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.
General	l Remai	·ks			{4.00}			
EQUIPM METHO CASINO GROUN	MENT: A D: Hand G: Not us IDWATE	rchway compac dug inspection	pit 0.00m r not enco	n-1.00m b ountered.	egl. Dyna	amic sam	•	-2.00m begl.
Ground	lwater	Da	te		Strike Do	epth	Ca	ing Depth Depth After Observation (m) (m)

# General Remarks

Groundwater Date Strike De (m)	epth Casing Dept (m)	Depth After Observation (m)
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Site				
Richmond				WS5
Job No	Dates Start 27-04-21	Ground Level (m)	Co-Ordinates	VV35
CRM.1027.087	Finish 27-04-21			
Client				Sheet

Hill Partnership

1 of 2

Levels Depth (m) No/Type Results (m) (mAD)    Depth (m)   No/Type   Results   (m) (mAD)   Legeliu   Stratum Description	Water	Samples & l	In Situ Tes	sting	Depth	Level	1000-1	Stratum Description
Description of the property o		Depth (m)	No/Type	Results			Legend	Stratum Description
angular fine to coarse flint, ash and clinker.  Description of light brown clayey very occasionally gravelly fine SAND. Gravel subrounded fine flint.  Description of light brown to light prown to light grey and very light orange) clayey to locate subrounded fine flint.  Description of light brown to light grey and very light orange) clayey to locate subrounded fine flint.  Description of light brown to light grey and very light orange) clayey to locate subrounded fine flint.  Description of light brown to light grey and very light orange) clayey to locate subrounded fine flint.  Description of light brown to light grey and very light orange) clayey to locate subrounded fine flint.  Description of light brown to light grey and very light orange) clayey to locate subrounded fine flint.  Description of light brown to light grey and very light orange) clayey to locate subrounded fine flint.  Description of light brown to light grey and very light orange) clayey to locate subrounded fine flint.  Description of light brown to light grey and very light orange) clayey to locate subrounded fine flint.  Description of light brown to light grey and very light orange) clayey to locate subrounded fine flint.  Description of light brown to light grey and very light orange) clayey to locate subrounded fine flint.  Description of light brown to light grey and very light orange) clayey to locate subrounded fine flint.  Description of light brown to light grey and very light orange) clayey to locate subrounded fine flint.  Description of light brown to light grey and very light orange) clayey to locate subrounded fine flint.  Description of light brown to light grey and very light orange) clayey to locate subrounded fine flint.  Description of light brown to light grey and very light orange) clayey to locate subrounded fine flint.  Description of light brown to light grey and very light orange) clayey to locate subrounded fine flint.  Description of light grey and very light orange) clayey to locate subrounded fine flint.  Descr		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.
1.60  1.00 - 1.00 D 1.00 - 1.45 SPT C 8  1.60  1.00 - 1.45 Loose.  □□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□□					0.45			MADE GROUND: Brown to black clayey very gravelly fine SAND. Gravel is angular fine to coarse flint, ash and clinker.
1.00 - 1.45							- ·	Brown to light brown clayey very occasionally gravelly fine SAND. Gravel is subrounded fine flint.
1.00 - 1.45 SPT C 8  1.60  1.90 - 2.00 D 2.00 - 2.45 SPT C 24  2.90 - 3.00 D 3.00 - 3.45 SPT C 24  1.60  1.60  1.60  1.60  1.60  1.60  1.60  1.00 - 1.45 Loose.   1.00 - 1.45 Loose.  1.0							· · · · · · · · · · · · · · · · · · ·	
1.90 - 2.00 D 2.00 - 2.45 SPT C 24  2.90 - 3.00 D 3.00 - 3.45 SPT C 24  1.60  D 2.00 - 3.00 D 3.00 - 3.45 SPT C 24  D 2.00 - 3.00 D 3.00 - 3.45 SPT C 24				C 8				
1.90 - 2.00 D 2.00 - 2.45 SPT C 24  1.90 - 3.00 D 3.00 - 3.45 SPT C 24  1.90 - 3.00 D 3.00 - 3.45 SPT C 24							. · · · · · · ·	1.00 - 1.45 Loose.
1.90 - 2.00 D 2.00 - 2.45 SPT C 24  1.90 - 3.00 D 3.00 - 3.45 SPT C 24  1.60  1.60  1.90 - 2.00 D 2.00 - 2.45 SPT C 24  1.60  1.90 - 2.00 D 2.00 - 2.45 SPT C 24  1.60  1.60  1.90 - 2.00 D 2.00 - 2.45 Medium dense.							- · · · · · · · · · · · · · · · · · · ·	
Multicoloured (light brown to light grey and very light orange) clayey to loo slightly clayey, occasionally gravelly fine to coarse SAND. Gravel is round and subrounded fine flint.  2.00 - 2.45 SPT C 24  2.90 - 3.00 D 3.00 - 3.45 SPT C 24					1.00		. · · · · · ·	
1.90 - 2.00 D SPT C 24					1.00		- ·	Multicoloured (light brown to light grey and very light orange) clayey to locally slightly clayey, occasionally gravelly fine to coarse SAND. Gravel is rounded
2.90 - 3.00 D 3.00 - 3.45 SPT C 24							<u>.</u> <del></del> . ·	
2.90 - 3.00 D 3.00 - 3.45 SPT C 24		2.00 - 2.45	SPT	C 24			. — a	2.00 - 2.45 Medium dense.
3.00 - 3.45   SPT   C 24							. · · · · · · · · · · · · · · · · · · ·	
3.00 - 3.45   SPT   C 24							- · · · · · · · · · · · · · · · · · · ·	
3.00 - 3.45   SPT   C 24							- · · - · · · · · · · · · · · · · · · ·	
		2.90 - 3.00	D				· · · · · · · · · · · · · · · · · · ·	
		3.00 - 3.45	SPT	C 24				3.00 - 3.45 Medium dense.
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							. :a ·	
		3.00 4.00	 				- · · - · · · · · · · · · · · · · · · ·	
3.90 - 4.00 D 4.00 - 4.45 SPT C 51 4.00 (4.00) Continued next sheet				C 51			- · · · · · · · · · · · · · · · · · · ·	Continued next sheet
eneral Remarks	eneral Remai	·ks	•					
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Froundwater  Date  Strike Depth Casing Depth Observation (m) (m)	roundwater	27/04			(m)		Cas	(m) Coscivation (m)

# General Remarks

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



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	ichmor	nd								WS5	
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	1.1027.	087	Finish 2	27-04-21							
Client	GII Dort	nership								Sheet 2 of 2	
	Water		les & In Situ Te	esting	Depth	Level					
Well	Levels	Depth		Results	(m)	(mAD)	Legend	Stratun	n Description		4
								Multicoloured (light brown to light gravelly slightly clayey, occasionally gravelly and subrounded fine flint.	ey and very light oran fine to coarse SAND	ige) clayey to locally . Gravel is rounded	-
								4.00 - 4.45 Very dense, refused.			
					4.45			Borehole completed at 4.45m.			-
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General EQUIPM METHO	ΛΈΝΤ: Α	rchway co	ompact windov ection pit 0.00r	v sampling	tracked	rig. amic sam	nled 1 00m	-4.00m hegl			
CASING	i: Not us	ed.	-		-		_	_			
BACKF	LL: On o	completion	n, a slotted pip	e (50mm)	was insta	illed to 3.	50m begl,	granular response zone (3.50m-0.50n	m), bentonite seal 0.50	0m-0.10m, flush stee	el
cover 0.1	ı um-0.00	m.									
-	1										
Ground	iwater		Date		Strike Do	epth	Cas	Sing Depth Observation  (m) Depth After Observation			
					(111)			(m)			
	ensions i Scale 1:2	n metres								Logged By KC	



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CRM.1027.087  Dates Start 27-04-22 Finish 27-04-23 Finish 27-0	Site										
CRM.1027.087  Interest Trish 27-04-21  Firmish 2		Lichmon	nd								WS6
Hill Partnership  Woll Water Samples & In Situ Testing Depth   Lovel	Job No						Groun	nd Level (	m)	Co-Ordinates	1100
Hill Partnership  Water Samples & In Stut Testing Levels (pepth (m) NoType Results (m) (nAJ) Legend (nAJ)  0.20 - 0.40 ES 0.15 University (name of the control of the contr		1.1027.0	087		Finish 2	27-04-21					GI .
Levels Depth (m) NoType Results (m) (mAD) Logord  0.20 - 0.40 ES  0.15		Iill Part	nership	,							
and subrounded, fine to carse filt and brick.  MADE GROUND: Multicoloured proven to light brown and light black) clayey to very clayer yet gravelly fine 8AMD. Gravel is subangular and subrounded, fine to carse filt and brick.  MADE GROUND: Multicoloured proven to light brown and light black) clayey to very clayer yet gravelly fine 8AMD. With ababosia filters and cast from paces. Gravel is subangular and subrounded, fine to coarse filter and ash.  Brown to light brown occasionally gravelly sand CLAY. Gravel is subrounded fine filtres.  1.00 - 1.45 Firm, low strength.  1.00 - 1.45 Firm, low strength.  2.00 - 2.45 Dense.  2.00 - 2.45 Dense.  2.00 - 2.45 Dense.  2.00 - 2.85 Very dense, refused.  2.00 - 2.98 Very dense, refused.  3.00 - 2.98 Very de	Well				1			Level (mAD)	Legend	Stratum Description	
to very clayey very gravely fine SAND with abbetion filtres and cast on pieces. Gravel is submorphism and subtrounded, fine of coarse filtred and as and precision of the submorphism and subtrounded fine filtres. Sand is fine.  1.00 - 1.45 Firm, low strength.  2.00 - 2.45 Dense.  3.00 - 2.00 Sumple barrel refused.  3.00 Sumple barrel refused.  3.00 - 2.00 Sumple barrel refused.  3.00 Sumple barre			0.20 -	0.40	ES		0.15			black) clayey to very clayey very gravelly fine SAND. Gra and subrounded, fine to coarse flint and brick.	ivel is subangular
fine fint. Sand is fine.    1.00 - 1.45   SPT   C 9							0.60			to very clayey very gravelly fine SAND with asbestos fibr pieces. Gravel is subangular and subrounded, fine to coa	es and cast iron arse flint and ash.
eneral Remarks  QUIPMENT: Archway compact window sampling tracked rig.  ETHOD: Harchway compact window sampling tracked rig.  ETHOD: Not used.  ASING: Not used.  ACKELL: 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 stee ver 0.10m-0.00m.  To a classing Depth (m)  Casing Depth (m)  Casing Depth After Observation  Casing Depth After Observation  Casing Depth After Observation  Casing Depth After Observation  Casing Depth Observation			0.90 -	1.00	D					Brown to light brown occasionally gravelly sand CLAY. G fine flint. Sand is fine.	cravel is subrounded
eneral Remarks  QUIPMENT: Archway compact window sampling tracked rig. EITHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.60m begl.  ROUNDWATER: Groundwater not encountered.			1.00 -	1.45	SPT	C 9			0 0	1.00 - 1.45 Firm, low strength.	
1.90 - 2.00 D 2.00 - 2.45 SPT C 34  2.50 - 2.60 D 2.60 - 2.98 SPT C 53  2.60  3.											
eneral Remarks 2.98  2.60 - 2.98 SPT C 53 2.60  2.60 - 2.98 Very dense, refused. 2.98  2.98  2.98  2.98  2.98  2.98  2.98  2.00 - 2.45 Dense.  2.60 - 2.98 Very dense, refused. 2.60 - 2.98 Very dense, refused. 3.260 - 2.98 Very dense, refused. 3						C 34	1.70				, mostly fine. Gravel
eneral Remarks  QUIPMENT: Archway compact window sampling tracked rig.  ETHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.60m begl.  ASING: Not used.  ROUNDWATER: Groundwater not encountered.  ACKFILL: 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 steewer 0.10m-0.00m.  Toundwater  Date  Strike Depth (m)  Casing Depth Observation (m)  Depth After Observation (m)  Depth After Observation (m)										2.00 - 2.45 Dense.	
eneral Remarks QUIPMENT: Archway compact window sampling tracked rig. EIETHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.60m begl. ASING: Not used. ROUNDWATER: Groundwater not encountered. ACKFILL: 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 steewer 0.10m-0.00m.  Strike Depth (m) Casing Depth Depth After Observation (m)  Casing Depth After Observation (m)						C 53	2.60			2.60 Sampler harrel refused	
eneral Remarks  QUIPMENT: Archway compact window sampling tracked rig.  IETHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.60m begl.  ASING: Not used.  ROUNDWATER: Groundwater not encountered.  ACKFILL: 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 stee over 0.10m-0.00m.  Groundwater  Date  Strike Depth  Casing Depth  Depth After Observation (m)							2.98			2.60 - 2.98 Very dense, refused. Pale orange yellow slightly gravelly fine to coarse SAND is subangular and subrounded fine flint.	, mostly fine. Gravel
eneral Remarks  QUIPMENT: Archway compact window sampling tracked rig.  IETHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.60m begl.  ASING: Not used.  ROUNDWATER: Groundwater not encountered.  ACKFILL: 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 stees over 0.10m-0.00m.  Froundwater  Date  Strike Depth  Casing Depth  Observation  (m)  Depth After Observation  (m)										Borehole completed at 2.98m.	
eneral Remarks  QUIPMENT: Archway compact window sampling tracked rig.  IETHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.60m begl.  ASING: Not used.  ROUNDWATER: Groundwater not encountered.  ACKFILL: 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 steed over 0.10m-0.00m.  Groundwater  Date  Strike Depth (m)  Casing Depth Observation (m)  Depth After Observation (m)											
eneral Remarks  QUIPMENT: Archway compact window sampling tracked rig.  IETHOD: Hand dug inspection pit 0.00m-1.00m begl. Dynamic sampled 1.00m-2.60m begl.  ASING: Not used.  ROUNDWATER: Groundwater not encountered.  ACKFILL: 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 steed over 0.10m-0.00m.  Groundwater  Date  Strike Depth (m)  Casing Depth Observation (m)  Depth After Observation (m)											
QUIPMENT: 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. ROUNDWATER: Groundwater not encountered. CACKFILL: 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 stee over 0.10m-0.00m.  Groundwater  Date  Strike Depth  (m)  Casing Depth  Observation  (m)  Casing Depth  Observation  (m)		. –					{4.00}				
Date Strike Depth Cashing Depth Observation (m) (m) (m)	EQUIPN METHO CASINO GROUN BACKE	MENT: A DD: Hand G: Not use IDWATE ILL: On G	rchway of dug inspect. ER: Groupletic	ndwate	pit 0.00n r not ence	n-1.00m b ountered.	egl. Dyn	amic sam			0m-0.10m, flush stee
All dimensions in metres Logged By		dwater		Da	te				Ca	Observation	
The state of the s											Logged By



		- y \	9				: www.er	izygo.com	
Job No	Richmon	I	Dates Start 27	-04-21	Groun	nd Level (	m)	Co-Ordinates	WS7
Client	M.1027.0 Hill Part		Finish 2	7-04-21					Sheet 1 of 1
Well	Water		es & In Situ Te	sting	Depth	Level	Legend	Stratum Description	
Well	Levels	Depth (		Results	(m)	(mAD)	Legellu	MADE GROUND: Grass over multicoloured (brown to light black) occasionally gravelly clayey to very clayey fine SAI fragments. Gravel is subangular and subrounded, fine to and ash.	ND with glass
		0.90 - 1. 1.00 - 1.		C 16	1.00			Dark brown to brown occasionally gravelly CLAY. Gravel medium flint.	is subangular
								1.00 - 1.45 Medium dense. Brown to light grey brown clayey very gravelly fine SAND and subrounded, fine to medium flint.	Gravel is angular
		1.90 - 2.	00 D		1.70			Very light green to very light brown very slightly clayey fin	e SAND.
		2.00 - 2.		C 53	2.00			Very light green to very light brown very slightly clayey fin 2.00 - 2.45 Very dense, refused.	e SAND.
					2.45		_ · · · · · · ·	Borehole completed at 2.45m.	
									-
									- - -
									- -
					{4.00}				-
EQUIP METH CASIN GROU BACK	OD: Hand [G: Not uso NDWATE	rchway co dug inspe ed. ER: Ground completion	empact window ction pit 0.00m dwater not enco t, a slotted pipe	n-1.00m b ountered.	egl. Dyn	amic sam		n-2.00m begl. granular response zone (2.00m-0.50m), bentonite seal 0.50	0m-0.10m, flush steel
Groun	ndwater		Date		Strike De (m)	epth	Cas	sing Depth Depth After Observation (m) (m)	
All di	mensions i Scale 1:2								Logged By KC



Enzygo Ltd

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	.087 Date	Start 27- Finish 2		Groun	d Level (	m)	Co-Ordinates WS8	
lient Hill Par	tnership						Sheet 1 of 1	
Well Water Levels	Samples & Depth (m)	& In Situ Tes	Results	Depth (m)	Level (mAD)	Legend	Stratum Description	
eneral Rema	Depth (m)  0.20 - 0.40  0.90 - 1.00 1.00 - 1.45	D SPT	C 9	(m) 0.15 0.40 1.70 2.00 2.45	(mAD)	Legend	Stratum Description  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) claye 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.  1.00 - 1.45 Loose.  Very light green to very light brown very slightly clayey occasionally gravelly fine SAND. Gravel is subrounded fine flint.  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.  Borehole completed at 2.45m.	
IETHOD: Han ASING: Not u	d dug inspectio	on pit 0.00m ater not enco	-1.00m b ountered.	egl. Dyna	amic sam		-2.00m begl.	



Richmond  To Make Start 28-04-21  Finish 28-04-22  Third 28-04-21  Water Samples & In Start zeeting Depth (m) Worked Results (m) Co-Ontinutes  Water Samples & In Start zeeting On Ado Stratum Description  MADE STRUMNO Grass over multicoloused (grown to light previous and light zeeting subsurgation and subrounded). The to coarse find, brick and ash.  I so 20 - 40 ES Sept. C 12  D 20 - 245 Sept. C 51 200  D 20 - 245 Sept. C 51 200  D 20 - 246 Sept. C 5			500100								
Trush 28-04-21  Trush 28-04-21  Fruish 2	Site										
CRM.1027.087  First 528-04-21  First 528		chmon	d								WSa
Finish 28-04-21   Sheet   Inf 1   In	Job No			Dates	Start 28	-04-21	Groun	d Level (1	m)	Co-Ordinates	4409
Hill Partnership  Well Vavier Samples & In Stut Teeting Depth (m) NoType Results (m) (nAD) Legend (mAD) Expert (m) NoType Results (m) (nAD) Legend (mAD) Expert (m) NoType Results (m) (nAD) Expert (m) NoType Results (m) (nAD) Expert (m) NoType Results (m) (nAD) Expert (m) NoType Results (m) NoType	CRM.	1027.0	)87		Finish 2	28-04-21					
Well Wards   Samples & In Situ Teeting   Depth (m)   NoType   Results	Client	11.75									Sheet 1 of 1
Levels Depth (m) NotType Results (m) (mAD) Legend  0.20 - 0.40 ES  0.40 Server and server multicontered (from to legit brown and light black) clayey to very clayey consistently gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, brick and sah.  1.50 Server (aleys consistently gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, brick and sah.  1.50 Server (aleys (fine to coarse flint, brick and sah.)  1.50 Server (aleys (fine to coarse flint, brick and sah.)  1.50 Server (aleys) fine SAND.  1.50 Server (aleys) coasionally gravely fine to coarse SAND. Gravel is rounded and subtrounded fine fint.  2.50 Server (aleys) fine SAND.  1.50 Server (aleys) coasionally gravely fine to coarse SAND. Gravel is rounded and subtrounded fine fint.  2.50 Server (aleys) fine SAND.  1.50 Server (aleys) fine SAND.  1.5											
NADE GROUND. Grass over militorioused drown to light brown and light linked dayny to very droys processionally gravely fine SAND. Gravel is subangular and subrounded, fine to coarse flint, brick and ash.  Brown CLAY.  Brown CLAY.  Brown very daysy fine SAND.  1.50					1				Legend	Stratum Description	
GOUIPMENT: 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.  BROUNDWATER: 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 over 0.10m-0.00m.  Groundwater  Date  Strike Depth (m)  Casing Depth Observation (m)  Logged By			0.20 - 0.90 - 1.00 -	1.00 1.45	ES  D SPT	Results  C 12	(m) 0.40 0.90 1.50			MADE GROUND: Grass over multicoloured (brown to light black) clayey to very clayey occasionally gravelly fine SAI subangular and subrounded, fine to coarse flint, brick and Brown CLAY.  Brown Very clayey fine SAND.  1.00 - 1.45 Medium dense.  Multicoloured (light brown to light grey and very light oran slightly clayey occasionally gravelly fine to coarse SAND and subrounded fine flint.  Multicoloured (light brown to light grey and very light oran slightly clayey occasionally gravelly fine to coarse SAND and subrounded fine flint.  2.00 - 2.45 Very dense, refused.	nge) clayey to locally Gravel is rounded
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 Observation (m)  Logged By							{4.00}				
All dimensions in metres  Logged By	EQUIPM METHOI CASING: GROUNI BACKFII cover 0.10	ENT: Ar D: Hand Not use DWATE LL: On c Om-0.00	rchway o dug insp ed. R: Grou completion	ndwater on, a slo	r not enco	ountered.	was insta	alled to 2.	00m begl,	granular response zone (2.00m-0.50m), bentonite seal 0.5  sing Depth Depth After Observation	0m-0.10m, flush steel
Scale 1:25 KC										()	Logged By KC



Richmond    No No   Dates   Start 29-04-21   Ground Lavel (m)   Co-Obdinates   Start   Start   Start   Start   Start   Start   Start   Tof 1			/ (					Web	: www.er	nzygo.com		
Dates   Start 29-04-21   Finish 29-04-21   Fin	Site											
CRM.1027.087 Finish 29-04-21  Client  Hill Partnership  Well Water Levels  Depth (m) No/Type Results (m) Depth (mAD)  Dept	I	Richmor	nd								W040	
Client Hill Partnership  Well Water Levels Supply (m) NoType Results (m) (mAD) Legend (mAD) Stratum Description  0.20 - 0.40 B ES  0.15  0.60  0	Job No			Dates	Start 20	04.21	Groun	d Level (	m)	Co-Ordinates	W510	
Hill Partnership  Well Water Levels Depth (m) NoType Results (m) Level (mAD) Legend (mAD) Legend (mAD) Results (mAD) Legend (mAD) Results (mAD	CRN	М.1027.	087		Finish 2	9-04-21						
Manual Content of the Content of t	Client		I				ļ			5	Sheet	
Well   Water   Levels   Samples & In Situ Testing   Depth (m)   NorType   Results   (m)   Level (mAD)   Legend   Stratum Description	I	Hill Part	nership								1 of 1	
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 sah. Sand is flint of the same shaped of the subangular and subrounded, fine to coarse flint, brick, concrete and ash. Sand is flint of the same shaped of the subangular and subrounded, fine to coarse flint, brick, concrete and ash. Sand is flint of the subangular flint to coarse flint, brick, concrete and ash. Sand is flint of the subangular flint to coarse flint, brick, concrete and ash. Sand is flint of the subangular flint to coarse flint.  1.50 - 1.60 D 1.60 - 2.05 SPT C 52 1.60  1.60 - 2.05 SPT C 52 1.60  1.60 - 2.05 Very dense, refused.  1.60 - 2.05 Very dense prown to light grey) gravelly fine to coarse SAND. Gravel is angular coarse flint.  2.05  Borehole completed at 2.05m.				les & lı	n Situ Te	sting	Depth		Logond	Stratum Description		
Dack) clayer to rev clayer years occasionally gravelly fine SAND. Gravel is submargular and submounded, 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.  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  Multicoloured (light orange brown to light grey) gravelly fine to coarse SAND. Gravel is angular coarse flint.  1.60 - 2.05 SPT C 52  Borehole completed at 2.05m.	Well	Levels	Depth	(m)	No/Type	Results	(m)	(mAD)	Legenu			-0
CLAY. Cravel is angular, fine to coarse flint, brick, concrete and ash. Sand is fine.    0.90 - 1.00			0.20 - 0	.40			0.15			black) clayey to very clayey very occasionally gravelly fine S subangular and subrounded, fine to coarse flint, brick and a	SAND. Gravel is ash.	-  -  -
0.90 - 1.00 D 1.00 - 1.45 SPT C 28  1.10  1.50 - 1.60 D 1.60 - 2.05 SPT C 52  1.60  2.05  Multicoloured (light orange brown to light grey) gravelly fine to coarse SAND.  Gravel is angular coarse flint.  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.							0.60			CLAY. Gravel is angular, fine to coarse flint, brick, concrete fine.	and ash. Sand is	-
1.00 - 1.45 SPT C 28  1.10  1.50 - 1.60 D 1.60 - 2.05 SPT C 52  1.60  2.05  1.50 - 1.60 D 1.60 - 2.05 SPT C 52  1.60  2.05  1.50 - 1.60 SPT C 52  1.60  2.05  1.50 - 1.60 SPT C 52  1.60  2.05  1.50 Sampler barrel refused.  3.00 Signary of the second secon										Brown CLAY.		-
1.00 - 1.45 SPT C 28  1.10  1.50 - 1.60 D 1.60 - 2.05 SPT C 52  1.60  2.05  1.50 - 1.60 D 1.60 - 2.05 SPT C 52  1.60  2.05  1.50 - 1.60 SPT C 52  1.60  2.05  1.50 - 1.60 SPT C 52  1.60  2.05  1.50 Sampler barrel refused.  3.00 Signary of the second secon		<b>S</b>	0.90 - 1	.00	D							
1.50 - 1.60 D 1.60 - 2.05 SPT C 52 1.60  2.05  1.50 - 1.60 D 1.60 - 2.05 SPT C 52 1.60  2.05  1.60 Sampler barrel refused.  1.60 - 2.05 Very dense, refused.  1.60 - 2.05 Very dense flint.  2.05  Borehole completed at 2.05m.						C 28						_1
1.50 - 1.60 D 1.60 - 2.05 SPT C 52 1.60  2.05 Gravel is angular coarse flint.  1.50 - 1.60 Sampler barrel refused.  1.60 - 2.05 Very dense, re							1.10					╽.
1.60 - 2.05 SPT C 52 1.60  2.05 SPT C 52 1.60  1.60 - 2.05 Very dense, refused.  Multicoloured (light orange brown to light grey) gravelly fine to coarse SAND. Gravel is angular coarse flint.  Borehole completed at 2.05m.											to coarse SAND.	-
2.05    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   Borehole completed at 2.05m.			1.50 - 1	.60	D				. · . · a · . ·			-
2.05  1.60 - 2.05 Very dense, refused. Multicoloured (light orange brown to light grey) gravelly fine to coarse SAND. Gravel is angular coarse flint.  Borehole completed at 2.05m.			1.60 - 2	.05	SPT	C 52	1.60		0	1.60 Sampler barrel refused		+
2.05 Borehole completed at 2.05m.										1.60 - 2.05 Very dense, refused.  Multicoloured (light orange brown to light grey) gravelly fine	to coarse SAND.	-
							2.05		. · . · a · . ·	-		<u>-</u> 2
												-
												-
												-
												-
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 Observation (m)  Logged By KC												- 3
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  Depth After Observation (m)  Logged By  Scale 1-25												-
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 Observation (m)  Logged By Scale 1:25	12/6											-
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  Casing Depth  Observation  (m)  Logged By  KC	9											
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  Casing Depth  Observation  (m)  Logged By  KC	<u>5</u>											-
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  Observation (m)  Logged By  KC	NZ X											-
General Remarks E QUIPMENT: 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 Observation (m)  Logged By KC	~   -  -											
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 Observation (m)  Logged By Scale 1:25	355											
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  Casing Depth  Observation  (m)  Logged By  KC	i di						N UUI					- 4
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 Observation (m)  Logged By Scale 1:25	Genera	al Remai	ks		1		ιυυγ	1	1			1
Groundwater Date Strike Depth Casing Depth Observation (m)  All dimensions in metres Scale 1-25  Logged By KC	E EQUIP METHO CASIN GROUN BACKI	OD: Hand G: Not us NDWATE	dug inspe ed. ER: Groun	ection p dwater	oit 0.00m	n-1.00m b ountered.	egl. Dyn	amic sam		n-1.60m begl.		
Groundwater  Date  Strike Depth (m)  Casing Depth Observation (m)  All dimensions in metres  Scale 1:25  Logged By  KC	M.1027.087 F											
All dimensions in metres  Scale 1-25  Logged By  KC	g Groun	dwater		Dat	e				Ca	Observation		
71 SCORE 1773 1 KT	All din										Logged By	



Site				
Richmond				WS11
Job No	Dates Start 28-04-21	Ground Level (m)	Co-Ordinates	WSTT
CRM.1027.087	Finish 28-04-21			
Client				Sheet

1 of 1 Hill Partnership Samples & In Situ Testing Water Depth Level Well Stratum Description Legend Levels (mAD) No/Type Results (m) Depth (m) 0 MADE GROUND: Grass over multicoloured (brown to light brown and light black) clayey to very clayey occasionally gravelly fine SAND. Gravel is 0.20 - 0.40 ES subangular and subrounded, fine to coarse flint, brick and ash. 0.50 Brown sandy CLAY. Sand is fine. 0.90 - 1.00 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 1.90 - 2.00 D and subrounded fine flint. 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. 3

#### 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.

CRM.1027.087 RICHMOND.GPJ

 $GROUNDWATER: Groundwater \ not \ encountered.$ 

BACKFILL: On completion, the borehole was backfilled with arisings.

Groundwater	Date	Strike Depth	Casing Depth	Depth After Observation	
		(m) <sup>-</sup>	(m)	(m)	

Logged By All dimensions in metres Scale 1:25



	, _				vvei	o. www.ei	nzygo.com	,
Site								
Richmo				T a	17 1			WS12
lob No			9-04-21	Groun	nd Level (	m)	Co-Ordinates	
CRM.1027	.087	Finish	29-04-21					Sheet
	tnership							1 of 1
Water		es & In Situ T	esting	Depth	Level	Ī	2	
Well Levels		m) No/Typ	e Results	(m)	(mAD)	Legend	Stratum Description	
	0.20 - 0.4	10 ES		0.20			MADE GROUND: Grass over multicoloured (brown to lig black) very clayey very occasionally gravelly fine SAND. subangular and subrounded, fine to coarse flint, brick an	ht brown and light Gravel is
							MADE GROUND: Multicolored (brown to red to light grey CLAY. Gravel is angular, fine to coarse flint, brick, concr fine.	r) sandy gravelly
				0.60			Brown CLAY.	
								-
	0.90 - 1.0 1.00 - 1.4		C 12					-
	1.00 - 1.4	1011	0 12				1.00 - 1.45 Firm, medium strength.	-
								-
								[
				1.50		0 0	Multicoloured (light orange brown to light grey) gravelly f	ne to coarse SAND
							Gravel is angular coarse flint.	
	1.90 - 2.0	00 D				0		-
	2.00 - 2.4		C 15			0		_
						a	2.00 - 2.45 Medium dense.	-
						0		
								-
						o	2.70 - 3.00 Becoming very gravelly.	_
	2.90 - 3.0	00 D					2.70 - 3.00 Becoming very gravery.	
	3.00 - 3.4	I	C 53	3.00				
						a	Multicoloured (light orange brown to light grey) gravelly f Gravel is angular coarse flint.	ne to coarse SAND.
						0	3.00 - 3.45 Very dense, refused.	[-
				3.45		. · · · · · · ·		
							Borehole completed at 3.45m.	
								-
								-
				{4.00}				_
eneral Rema				-				
QUIPMENT: A	d dug inspec	npact windo	w sampling m-1.00m b	g tracked egl. Dyn	rig. amic san	npled 1.00m	n-3.00m begl.	
ASING: Not u ROUNDWAT	sed. ER: Ground	water not end	countered.					
ACKFILL: On	completion,	the borehole	was back	filled wit	h arisngs			
roundwater				Ctuit- D	auth		sing Depth After	
		Date		Strike D (m)		Cas	sing Depth Depth After (m) Observation (m) (m)	
							• •	
All dimensions	in metres							Logged By
Scale 1:								KC



Site				
Richmond				WS13
Job No	Dates Start 29-04-21	Ground Level (m)	Co-Ordinates	VVS13
CRM.1027.087	Finish 29-04-21			
Client				Sheet 1 of 1

1 of 1 Hill Partnershin

H		nership						1 01 1	_
Well	Water Levels	Samples &			Depth	Level (mAD)	Legend	Stratum Description	
99-393 39-393	Leveis	Depth (m)	No/Type	Results	(m)	(MAD)		MADE GROUND: Grass over multicoloured (brown to light brown and light	+
		0.20 - 0.40	ES		0.20			black) very clayey very occasionally gravelly fine SAND. Gravel is subangular and subrounded, fine to coarse flint, brick and ash.	$\int$
								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.	•
					0.65				_
								Brown CLAY.	ŀ
		0.90 - 1.00 1.00 - 1.45	D SPT	C 50	1.00				4
								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}				
General EQUIPM METHO	IENT: A D: Hand	rchway compa	ct window pit 0.00m	sampling -1.00m b	g tracked egl.	rig.			
CASING GROUN	: Not us DWATF	ed. ER: Groundwate completion, the	er not enco	untered.			š.		
				and Sweet.		<del></del>			
Ground	lwater	D	ate		Strike De (m)	epth	Ca	sing Depth (m) Depth After Observation (m)	
All dime	ensions i	n metres						Logged By	
	Scale 1:2							Logged By KC	

# General Remarks

Groundwater	Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)
Groundwater	Date	/ \ 1	$\mathcal{L}$ 1	Obser



Site				
Richmond				WS14
Job No	Dates Start 28-04-21	Ground Level (m)	Co-Ordinates	VV514
CRM.1027.087	Finish 28-04-21			
Client				Sheet
11'11 D 4 1'				1 of 1

Hill Part	nership						1 01 1	
Well Water Levels	Samples &			Depth	Level	Legend	Stratum Description	
Levels	Depth (m) 0.20 - 0.40	ES	Results	(m) 0.50	(mAD)		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.  Brown sandy CLAY. Sand is fine.	-
	0.90 - 1.00 1.00 - 1.45	D SPT	C 10	1.20			Brown clayey fine to medium SAND.	-  -  -  -  -
	1.90 - 2.00 2.00 - 2.45	D SPT	C 50	1.70			Multicoloured (light brown occasionally Light green to cream) clayey gravelly fine SAND. Gravel is subangular fine flint.  Multicoloured (light brown occasionally Light green to cream) clayey gravelly fine SAND. Gravel is subangular fine flint.	F
				2.45		· · · · · · · · · · · · · · · · · · ·	2.00 - 2.45 Very dense. Refused at 2.45m begl.  Borehole completed at 2.45m.	
								-
				{4.00}				

### General Remarks

1.0 ENZYGO WS LOG CRM.1027.087 RICHMOND.GPJ GINT STD AGS 3\_1 ENZYGO.GPJ 3/5/21

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)

Logged By KC All dimensions in metres Scale 1:25



Site						
Richmond					MOAE	
Job No	Dates Start 27-04-21	Ground Level (1	n)	Co-Ordinates	WS15	
CRM.1027.087	Finish 27-04-21					
Client		•			Sheet	
Hill Partnership	p				1 of 1	

I	Water	Samples &	In Situ Te	stina	Depth	Level		
Well	Levels	Depth (m)		Results	(m)	(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 o 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 1.00 - 1.45	D SPT	C 9				Brown to light grey brown clayey very gravelly fine SAND. Gravel is angular and subrounded, fine to medium flint.
		1.00 - 1.45	J J I	0.9			- · · · · · · · · · · · · · · · · · · ·	1.00 - 1.45 Loose.
							- · · · · · · · · · · · · · · · · · · ·	
		1.90 - 2.00			1.70		- · · · · · · · · · · · · · · · · · · ·	/ery light green to very light brown very slightly clayey occasionally gravelly ine SAND. Gravel is subrounded fine flint.
		2.00 - 2.45	SPT	C 55	2.00			/ery light green to very light brown very slightly clayey occasionally gravelly
								ine SAND. Gravel is subrounded fine flint. 2.00 - 2.45 Very dense, refused.
					2.45		. · · · · · ·	Borehole completed at 2.45m.
					{4.00}			
EQUIPM METHO CASING GROUN	D: Hand 3: Not uso DWATE	rchway compaction dug inspection ed.	pit 0.00m	n-1.00m b ountered	egl. Dyna	amic sam	-	2.00m begl.
BACKFI	ILL: On o	completion, the	borehole v	was back	filled wit	h arisings	S.	
Ground	lwater	Da	ıte		Strike Do	epth	Ca	Depth After Observation (m)

# General Remarks

Groundwater	Date	Strike Depth (m)	Casing Depth (m)	Depth After Observation (m)	
All dimensions in metres Scale 1:25					Logged By KC



CRM.1027.087  Client  Hill Partnership  Water Levels  0.20 - 0.90 - 1.00	oles & In Situ T n (m) No/Typ 0.40 ES	resting Results	Depth (m)	Level (mAD)	Legend	Stratum Description  MADE GROUND: Grass over multicoloured (brown to light brown black) clayey to very clayey occasionally gravelly fine SAND. Grav subangular and subrounded, fine to coarse flint, brick and ash.	
Well Water Levels Sample Depth 0.20 - 0.90 -	0.40 ES		(m)		Legend	MADE GROUND: Grass over multicoloured (brown to light brown black) clayey to very clayey occasionally gravelly fine SAND. Grav	and light
Levels Depth  0.20 -	0.40 ES		(m)		Legend	MADE GROUND: Grass over multicoloured (brown to light brown black) clayey to very clayey occasionally gravelly fine SAND. Grav	
0.90 -			0.50			black) clayey to very clayey occasionally gravelly fine SAND. Grav	
	1.00		0.50				
	1.00	1 1				Brown sandy CLAY. Sand is fine.	
	100   D		0.80				
		C 8				Brown clayey fine to medium SAND.	
<b>≒</b> ∷	1. TO   OF I					1.00 - 1.45 Loose.	
			1.70		00	Light brown to very light green very slightly clayey very occasional fine SAND. Gravel is subangular fine flint.	ly gravelly
1.90 -		C 29			. — a . —	line SAND. Graver is subangular line liint.	
	L. 70   OF I	0 23			- · · · · · · ·	2.00 - 2.45 Medium dense.	
			2.20		· · · · · · · · · · · · · · · · · · ·	Multicoloured (light brown to light grey and very light orange) claye	ey to locally
						slightly clayey occasionally gravelly fine to coarse SAND. Gravel i and subrounded fine flint.	
2.90 -		0.50	2.00				
3.00 -	3.45   SPT	C 50	3.00			Multicoloured (light brown to light grey and very light orange) clays slightly clayey occasionally gravelly fine to coarse SAND. Gravel i and subrounded fine flint.	ey to locally s rounded
					- · · · · · · · · · · · · · · · · · · ·	3.00 - 3.45 Very dense. Refused at 3.45m begl.	
			3.45		<u> </u>	Borehole completed at 3.45m.	
i 1		1	{4.00}	1	i l		



								nzygo.com	
Site									
Richmo	ond								WS17
Job No			Start 2/		Groun	d Level (	m)	Co-Ordinates	11011
CRM.1027	7.087		Finish 2	27-04-21					
Client									Sheet 1 of 1
Hill Pa	rtnership	)							1 01 1
Well Water	· ——	•	In Situ Te		Depth	Level	Legend	Stratum Description	
Levels	Dept	h (m)	No/Type	Results	(m)	(mAD)	××××	MADE COOLIND, Cross such multiple and /house to live	h4 h I i
	0.20 -	0.40	ES		0.40			MADE GROUND: Grass over multicoloured (brown to lig black) clayey to very clayey very gravelly fine SAND. Gra and subrounded, fine to coarse flint, ash and brick.	vel is subangular
	0.90 -	1.00	D					MADE GROUND: Multicoloured (brown to light brown oc grey) occasionally gravelly slightly to very sandy CLAY w fragments. Gravel is subangular and subrounded mediur ash, Sand is fine.	ith sewer pipe
	1.00 -	1.45	SPT	C 7	1.20			1.00 - 1.45 Soft, low strength.	
					1.60			Brown sandy CLAY. Sand is fine.	
	1.90 - 2.00 -		D SPT	C 15	1.00			Multicoloured (light brown to light grey and very light orar slightly clayey, occasionally gravelly fine to coarse SAND and subrounded fine flint.	
	2.00 -	2.40	SF 1	0 13				2.00 - 2.45 Medium dense.	
	2.90 - 3.00 -		D SPT	C 50	3.00			Multicoloured (light brown to light grey and very light orar slightly clayey, occasionally gravelly fine to coarse SAND and subrounded fine flint.  3.00 - 3.45 Very dense. Refused at 3.45m begl.	
					3.45			Borehole completed at 3.45m.	
					(4 00)				
eneral Rem	arks		1		{4.00}	1		l	
EQUIPMENT: METHOD: Hai CASING: Not u GROUNDWA' BACKFILL: Oi	nd dug ins used. FER: Grou	pection indwate	pit 0.00m	n-1.00m b ountered.	egl. Dyna	amic sam		n-3.00m begl.	
Groundwate	r	Da	te		Strike De	epth	Cas	sing Depth Depth After Observation (m) (m)	
All dimensions									Logged By KC



b No	ichmon	lu	Dates C4	tout 27	-04-21	Groun	d Level (	m)	Co-Ordinates	WS18
	.1027.0	)87			7-04-21					
ient H	ill Partı	nershir	)							Sheet 1 of 1
Vell	Water	Sam	nples & In S			Depth	Level	Legend	Stratum Description	
	Levels	Dept	th (m)	No/Type	Results	(m)	(mAD)		MADE GROUND: Grass over multicoloured (brown to light	ht brown and light
		0.20 -	0.40	ES		0.45			black) clayey to very clayey very gravelly fine SAND. Gra and subrounded, fine to coarse flint, ash and brick.	
		0.90 -		D	0.40				Brown sandy CLAY. Sand is fine.	
		1.00 -	1.45	SPT	C 10	1.20			Brown clayey fine to medium SAND.	
						4.70				
		1.90 - 2.00 -		D SPT	C 13	2.00		· · · · · · · · · · · · · · · · · · ·	Multicoloured (brown to light brown and light grey) clayey medium to coarse SAND. Gravel is subrounded fine flint.	
		2.00	2.40		0 10	2.00			2.00 - 2.45 Medium dense.  Multicoloured (light brown to light grey and very light orar slightly clayey, occasionally gravelly fine to coarse SAND and subrounded fine flint.	nge) clayey to locally . Gravel is rounded
		2.90 - 3.00 -		D SPT	C 51	3.00			Multicoloured (light brown to light grey and very light orar slightly clayey, occasionally gravelly fine to coarse SAND and subrounded fine flint.  3.00 - 3.45 Very dense, refused.	nge) clayey to locally . Gravel is rounded
						3.45		. · · · · · · · ·	Borehole completed at 3.45m.	
enerol	Remar	·l/c				{4.00}				
QUIPM ETHOI ASING ROUNI ACKFI	IENT: A D: Hand : Not use DWATE	rchway dug ins ed. R: Grou completi	ındwater n	t 0.00m	-1.00m b ountered.	egl. Dyna	amic sam		n-3.00m begl. granular response zone (3.00m-1.00m), bentonite seal 1.0	0m-0.10m, flush stee
round	water		Date			Strike De	epth	Ca	sing Depth Depth After Observation (m) (m)	



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As ob No									
h No	shburn	ham Road, F		ıd					ВЦ4
טאו טכ		Dates	Start 16	L08-21	Groun	d Level (	m)	Co-Ordinates	BH1
CRM.	1027.0	087	Finish 1	17-08-21					
lient								Sheet	
Hi	ill Part	nership Ltd							1 of 4
	Water	Samples &	In Situ Te	stina	Depth	Level			
/ell	Levels	Depth (m)		Results	(m)	(mAD)	Legend	Stratum Description	
								MADE GROUND: Grass over firm brown slightly sandy slightly gra	velly
								CLAY. Gravel is subnagular and fine of brick and flint.	
					0.60				
								Firm brown to light brown very sandy slightly gravelly CLAY. Grave subnaguar and coarse of flint.	el is
								Subhaguar and coarse or mint.	
							<u></u>		
		1.50 - 1.95	SPT	23	4.00				
					1.60		0 0	Medium dense to dense light brown slightly clayey slightly gravelly	medium
								and coarse SAND. Gravel is angular and subangular coarse of flir	t.
22									
22									
8		3.00 - 3.45	SPT	22			F		
22									
8									
							F		
							F		
	$\nabla$								
	<u> </u>	4.50 - 4.95	SPT	21					
		5.00	D						
		0.00							
					5.40		0 0		
								Stiff greyish brown slightly gravelly CLAY. Gravel is angular and co	oarse of
								claystone.	
		6.00 - 6.45	SPT	11				Note: Groundwater encountered at 4.3 m bgl.	
							[ <del>-</del>		
		7.50 - 7.95	SPT	18					
							<u></u>		
					{8.00}			Continued next sheet	



CRM.1027	7.087 Dates	Start 16	-08-21 7-08-21		d Level (ı	m)	Co-Ordinates	BH1	
lient Hill Pa	artnership Ltd							Sheet 2 of 4	
Well Wate	Samples & I			Depth	Level (mAD)	Legend	Stratum Descripti	on	
Level	Depth (m)	No/Type	Results	(m)	(IIIAD)		<u>`</u>		+
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<b>1999</b>									E
	9.00 - 9.45	SPT	20						Ė
									F
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	10.00	D				<u> </u>			E
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	10.50 - 10.95	SPT	30						-
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	12.00 - 12.45	SPT	25						
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29									F
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<del>33</del>	13.50 - 13.95	SPT	28			<u> </u>			E
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	15.00 15.00 - 15.45	D SPT	46						F
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Site											
А	Ashburnham Road, Richmond										
Job No			Dates Start 16-08-21	Ground Level (m)			Co-Ordinates	BH1			
CRM	.1027.0	87	Finish 17-08-21								
Client		'		'				Sheet			
H	lill Partr	nership	Ltd					3 of 4			
Well Water Samples & In Situ Testing Depth Level Legend Stratum Description						Stratum Description	7				

Samples & Ir Depth (m)  16.50 - 16.95		Results 29 37	Depth (m) (r	Legend  Legend  Compared to the second to th		Suatum I	Description	
16.50 - 16.95	SPT	29						
18.00 - 18.45	SPT	37						
18.00 - 18.45	SPT	37						
18.00 - 18.45	SPT	37						
18.00 - 18.45	SPT	37		0 0				
18.00 - 18.45	SPT	37						
18.00 - 18.45	SPT	37						
18.00 - 18.45	SPT	37						
18.00 - 18.45	SPT	37		<u> </u>				
18.00 - 18.45	SPI	37		I				ļ
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19.50 - 19.95	25.	3/		<u> </u>				+
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21.00 24.45	007	27						ļ
21.00 - 21.45	971	31		<u> </u>				+
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22.50 - 22.95	371	აყ		<u>                                     </u>				
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24.00 04.45	007	11		- <u>-</u> -				
24.00 - 24.45	251	41	{24 በበነ			Continue	1 next sheet	+
			{24.00}			Continued	i liext slieet	
	19.50 - 19.95 20.00 21.00 - 21.45 22.50 - 22.95	20.00 D 21.00 - 21.45 SPT 22.50 - 22.95 SPT	20.00 D  21.00 - 21.45 SPT 37  22.50 - 22.95 SPT 39	20.00 D  21.00 - 21.45 SPT 37  22.50 - 22.95 SPT 39  24.00 - 24.45 SPT 41 {24.00}	20.00 D  21.00 - 21.45 SPT 37  22.50 - 22.95 SPT 39  24.00 - 24.45 SPT 41 {24.00}	20.00 D  21.00 - 21.45 SPT 37  22.50 - 22.95 SPT 39  24.00 - 24.45 SPT 41 {24.00}	20.00 D  21.00 - 21.45 SPT 37  22.50 - 22.95 SPT 39  24.00 - 24.45 SPT 41 {24.00}  Continued  Continued	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

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



I.0 ENZYGO WS LOG CRM.1027.087 ASHBURNHAM ROAD.GPJ GINT STD AGS 3\_1 ENZYGO.GPJ 19/8/21

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	12	-						01454 2 : www.ei	nzygo.com		
Site											_
Job No	shburn	ham Ro	oad, Richr Dates	nond	t	Groun	d Level (	m)	Co-Ordinates	BH1	
	.1027.0	107	Star	rt 16-	08-21 7-08-21	Groun	u Leva (i	· · · · · ·	Co-Ordinates		
Client	. 1027.0	<i>J</i> 01	ГІІІІ	1511 1	7-00-21					Sheet	
Н	ill Part	nership	Ltd							4 of 4	
Well	Water	Samp	oles & In Sit			Depth	Level	Legend	Stratum Description		_
502508	Levels	Depth	(m) No/	/Туре	Results	(m)	(mAD)	0	Cadam Beesilpasii		24
										Ė	
								0 0		-	
		25.00	D			25.00				Ę	٥.
*****		25.00				23.00			Borehole completed at 25.00m.	-	25
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General					,			•		,	
Cable Pe upon cor	rcussive npletion.	Borehole	e advanced f	from	ground le	evel to 25	.0 m bgl.	No servic	es encountered. Groundwater encountered at 4.3 m	bgl. Backfilled with arisings	
Ground	dwater					O: '' =			Denth After		
J. 50110			Date			Strike De (m)	pth	Cas	ing Depth Depth After Observation (m) (m)		
									• •		
All dime	nsions in Scale 1:50	metres )								Logged By KC	



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Site								
A shburr Job No	nham Road, Date		nd	Group	d Level (	m)	Co-Ordinates	BH2
		Start 16		Groun	u Levei (i	111)	Co-Orumates	
CRM.1027.0	087	Finish 7	17-08-21				Sher	<b>2</b> †
	tnership Ltd							1 of 4
Well Water Levels	Samples & Depth (m)		esting Results	Depth (m)	Level (mAD)	Legend	Stratum Description	
				0.50			MADE GROUND: Grass over firm brown slightly sandy slightly (CLAY. Gravel is subangular and fine of brick and flint.	gravelly
				0.50			Firm brown and mottled light brown very sandy slightly gravelly Gravel is subangular and fine to coarse of flint.	E
	1.50 - 1.95	SPT	14	1.50				-  -  -  -  -
	1.30 - 1.93			1.50			Medium dense to dense light brown slightly clayey slightly sand and coarse SAND. Gravel is angular and subangular medium a flint.	nd coarse of
							Note: Groundwater encountered at 3.8 m bgl.	-  -  -  -
	3.00 - 3.45	SPT	41					- - - -
								-
$\overline{\Delta}$								-
	4.50 - 4.80	SPT	50					-  -  -  -
	5.00	D						- - -
				5.20			Stiff greyish brown slightly gravelly CLAY. Gravel is angular and claystone.	I coarse of
	6.00 - 6.45	SPT	14					-  -  -
								- - -
								- - -
	7.50 - 7.95	SPT	19					-
				{8.00}			Continued next sheet	-



		,	$\cup$				web	. www.ei	izygo.com			
Site												
А	shburn	ham R	oad, Ri	chmon	d						DUO	
Job No	Da CRM.1027.087			Start 16-		Ground Level (m)			Co-Ordinates		BH2	
Client										Sheet	0 -4 4	
Н	lill Part	nership	p Ltd								2 of 4	
Well	Water	San	nples & Ir	n Situ Tes	sting	Depth	Level	Logond	Stratum Description			
weii	Levels	Dept	th (m)	No/Type	Results	(m)	(mAD)	Legend	Stratum Description			١,
			Deptif (III) No/Type Results									Ē,

Well	Water Levels	Samples & I Depth (m)			Depth (m)	Level (mAD)	Legend		Stratum Des	scription	
	204013	Depth (m)	INO/Type	Results	(111)	(111/10)	<del> </del>				
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							<u> </u>				ŀ
							<u> </u>				F
		9.00 - 9.45	SPT	16							
		9.00 - 9.45	3F I	10			-°				
		10.00	D				<u> </u>				
											ŀ
							00				-
		10.50 - 10.95	SPT	23							
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		12.00 - 12.45	SPT	22							-
			'								
							F				
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		15.00 - 15.45	SPT								<u> </u>
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					{16.00}				Continued ne	ext sheet	ŀ
onorol	Remark	/C	1	1	1 (10.00)	1			Continued III	311000	l
Cable Pe	ercussive mpletion.	Borehole advan	ced from	ground I	evel to 25	5.0 m bgl.	. No service	s encountered. (	Ground water encountered	d at 5.0 m bgl. Backfi	lled with arising
	T- 20.00.11										
Ground	dwater	Dat	e		Strike De	pth .	Casi	ng Depth (m)	Depth After Observation (m)		
		metres								110	gged By

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



Site				
Ashburnham R	DUO			
Job No	Dates Start 16-08-21	Ground Level (m)	Co-Ordinates	BH2
CRM.1027.087	Finish 17-08-21			
Client				Sheet
Hill Partnershi	n I td			3 of 4

Vater _	Samples & Ir			Depth	Level	Legend	Stratum Desc	ription	
evels	Depth (m)	No/Type	Results	(m)	(mAD)	0 - 0			
	16.50 - 16.95	SPT	25						
	.0.00	5.							ļ
	18.00 - 18.45	SPT	27						
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	19.50 - 19.95	SPT	30						
		5.				<u> </u>			
	20.00	D							
	21.00 - 21.45	SPT	24						
	22.50 - 22.95	SPT	30						
		5.							
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	24.00 - 24.45	SPT	34	(34 00)			0 "		
		18.00 - 18.45  19.50 - 19.95  20.00  21.00 - 21.45	19.50 - 19.95 SPT 20.00 D 21.00 - 21.45 SPT 22.50 - 22.95 SPT	19.50 - 19.95 SPT 30 20.00 D 21.00 - 21.45 SPT 24 22.50 - 22.95 SPT 30	19.50 - 19.95 SPT 30 20.00 D 21.00 - 21.45 SPT 24 22.50 - 22.95 SPT 30	19.50 - 19.95 SPT 30 20.00 D 21.00 - 21.45 SPT 24  22.50 - 22.95 SPT 30	19.50 - 19.95 SPT 30  20.00 D  21.00 - 21.45 SPT 24  22.50 - 22.95 SPT 30	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	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

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



I.0 ENZYGO WS LOG CRM.1027.087 ASHBURNHAM ROAD.GPJ GINT STD AGS 3\_1 ENZYGO.GPJ 19/8/21

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		- y (					Web	: www.ei	nzygo.com	
Site				_						
Job No	shburn	ham Ro	Dates			Groun	d Level (	m)	Co-Ordinates	BH2
	.1027.0	)87	5	Start 16 Finish 1	-08-21 7-08-21		(	,		
Client										Sheet 4 of 4
Н	lill Part							1		7017
Well	Water Levels	Sam Depth	ples & In n (m)		Results	Depth (m)	Level (mAD)	Legend	Stratum Description	
										24
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										E -
		25.00		D		25.00		<del></del>	Borehole completed at 25.00m.	25
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						{32.00}				- - 32
General									L	I
Cable Pe upon cor	ercussive mpletion.	Borehole	e advance	ed from	ground le	evel to 25	.0 m bgl.	No servic	es encountered. Ground water encountered at 5.0 m bg	I. Backfilled with arisings
Ground	dwater		Date			Strike De	pth	Cas	sing Depth After Observation (m) (m)	
			Date			(m)			(m) Cossavatori (m)	
All dime	nsions in Scale 1:50	metres								Logged By KC



o No CRM.1	1027.0	)87	Dates	Start 16 Finish 1	-08-21 6-08-21	Groun	id Level (	m)	Co-Ordinates	BH3
ient Hil	l Parti	nership	Ltd							Sheet 1 of 2
Vall \	Water Levels	Sam	ples & I	n Situ Tes		Depth (m)	Level (mAD)	Legend	Stratum Descrip	otion
		Depti	<u> </u>	NO/Type	Results	0.60	()		MADE GROUND: Grass over firm brown sligt CLAY. Gravel is subangular and fine of brick	and flint.
		1.20 -	1.65	SPT	6	1.50			Gravel is subangular and fine to coarse of flir	nt.
									Medium dense to dense light brown slightly c and coarse SAND. Gravel is angular and sub Note: Groundwater encountered at 3.4 m bgl.	pangular and coarse of flint.
	$\nabla$	3.00 -	3.45	SPT	33					
	$\overline{\Delta}$									
		4.50 - 5.00	4.95	SPT	13					
						5.30			Firm greyish brown CLAY.	
		6.00 -	6.45	SPT	14					
		7.50 -	7.95	SPT	23					
						{8.00}			Continued next sl	heet
neral Rable Percon comp	cussive	(S Borehol					0.0 m bgl.	No service	Continued next sl	
roundv	vater		Dat	e		Strike De (m) 3.40		Cas	ing Depth Depth After Observation (m) (m)	



Site												_
A:	shburn	ham R	oad, Ri	ichmon	ıd						DUO	
Job No			Dates	Start 16	5-08-21	Groun	id Level (	m)	Co-Ordinates		BH3	
CRM.	.1027.0	087		Finish 1	16-08-21							
Client Hi	ill Part	:nership	Ltd								Sheet 2 of 2	
Wall	Water	San	ples & I	n Situ Te		Depth	Level	Legend	Stra	tum Description		
500-500	Levels	Dept	h (m)	No/Type	Results	(m)	(mAD)					8
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		9.00 -	9.45	SPT	21						E	9
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											F	
		10.00		D		10.00			Borehole completed at 10.00m.			10
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General F Cable Per upon com	rcussive	Borehol	e advani	ced from	ground le	{16.00} evel to 10	0.0 m bgl.	No service	s encountered. Groundwater enc	ountered at 3.4 m bgl. Ba	ackfilled with aris	
Ground	water		Dat	e		Strike De	epth	Cas	ng Depth Depth Aft Observation (m) (m)	er on		
All dimen	nsions ir cale 1:50	metres 0									Logged By KC	



b No CRM .	.1027.0		Dates Start 1 Finish	8-08-21 18-08-21		nd Level (	m)	Co-Ordinates	BH4
lient Hi	ill Parti	nership I	Ltd						Sheet 1 of 2
Mall	Water Levels		les & In Situ T	esting e Results	Depth (m)	Level (mAD)	Legend	Stratum Description	ı
	201010	Берип	(III) NO/TY	e Results	0.60	(IIII (D)		MADE GROUND: Firm brown slightly sandy slightly sandy slightly subangular and fine of brick and flint.	ntly gravelly CLAY. Gravel is
					0.00			Firm light brown and orangish brown very sandy coarse.	CLAY. Sand is fine to
		1.50 - 1	.95 SPT	17					- - - - - - - - -
		3.00 - 3	.45 SPT	13	2.50			Medium dense light brown slightly clayey slightly coarse SAND. Gravel is angular and subangular Note: Groundwater encountered at 4.3 m bgl.	gravelly medium and and coarse of flint.
	$\nabla$	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 shee	ıt –
able Per	Remark rcussive npletion.	Borehole	advanced froi	m ground le		).0 m bgl.	No servica	Continued next sheets encountered at 4.3 r	
iround	water		Date		Strike De (m)		Cas	ing Depth Depth After Observation (m) (m)	



nership Ltd Samples & Depth (m)		21 3-21 Depth	Level (mAD)	Legend	Co-Ordinates  Stratum Description	Sheet 2 of 2
Dates D87  nership Ltd Samples & Depth (m)	Start 18-08- Finish 18-08  In Situ Testing  No/Type Res	21 3-21 Depth	Level			Sheet 2 of 2
nership Ltd Samples & Depth (m)	In Situ Testing  No/Type Res	3-21 Depth	Level (mAD)	Legend	Stratum Description	2 of 2
nership Ltd Samples & Depth (m)	In Situ Testing No/Type Res	Depth	Level (mAD)	Legend	Stratum Description	2 of 2
Samples & Depth (m)	No/Type Res		Level (mAD)	Legend	Stratum Description	
Samples & Depth (m)	No/Type Res		Level (mAD)	Legend	Stratum Description	
		sults (m)	(mAD)		Guatam Bescription	-
9.00 - 9.45	SPT 19					- - - -
9.00 - 9.45	SPT 19					
9.00 - 9.45	SPT 19					
9.00 - 9.45	SPT 19					
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10.00	D	10.00				-
					Borehole completed at 10.00m.	E
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	<b>KS</b>	KS		{16.00}		



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nership Ltd Samples & I Depth (m)							
Samples & I							Sheet 1 of 2
	n Situ Te	sting	Depth	Level			
		Results	(m)	(mAD)	Legend	Stratum Description	
			0.50			MADE GROUND: Brown slightly sandy slightly gravelly C subangular and fine of brick and flint.	LAY. Gravel is
			0.00			Firm brown and mottled light brown very sandy slightly gr Gravel is subangular and fine to coarse of flint.	avelly CLAY.
							-
1.50 - 1.95	SPT	10	1.50			Medium dense to dense light brown slightly clayey slightly	y gravelly medium
							coarse of flint.
						Two. Groundwater choodilered at 2.0 in 5gr.	
3.00 - 3.45	SPT	37					
4.50 - 4.95	SPT	37					
5.00	D						
6.00 - 6.45	SPT	13	5.80			Firm to stiff greyish brown CLAY.	
						Note: Claystone between 8.3 and 8.4 m bgl.	
7.50 - 7.95	SPT	14					
			{8.00}		====	Continued next sheet	
	3.00 - 3.45 4.50 - 4.95 5.00 6.00 - 6.45	3.00 - 3.45 SPT  4.50 - 4.95 SPT  5.00 D  6.00 - 6.45 SPT	3.00 - 3.45 SPT 37  4.50 - 4.95 SPT 37  5.00 D  6.00 - 6.45 SPT 13  7.50 - 7.95 SPT 14	1.50 - 1.95 SPT 10 1.50  3.00 - 3.45 SPT 37  4.50 - 4.95 SPT 37  5.00 D 5.80  6.00 - 6.45 SPT 13 5.80	1.50 - 1.95 SPT 10 1.50  3.00 - 3.45 SPT 37  4.50 - 4.95 SPT 37  5.00 D  6.00 - 6.45 SPT 13  7.50 - 7.95 SPT 14	1.50 - 1.95	Firm brown and mottled light brown very sandy slightly gr 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 and coarse SAND. Gravel is angular and subangular and Note: Groundwater encountered at 2.5 m bgl.  3.00 - 3.45 SPT 37 SPT 37 SPT 37 SPT 13 Firm to stiff greyish brown CLAY.  Note: Claystone between 8.3 and 8.4 m bgl.  7.50 - 7.95 SPT 14 SPT 14 Continued next sheet



Site												
	Ashburn	ham R		chmon	d						BH5	
Job No			Dates	Start 18	-08-21	Groun	d Level (	m)	Co-Ordinates		БПЭ	
	1.1027.0	087		Finish 1	8-08-21							
Client H	Hill Part	nershir	Ltd								Sheet 2 of 2	
Well	Water	Sam	ıples & lı			Depth	Level	Legend	Stratum Descri	otion		
500P500	Levels	Dept	h (m)	No/Type	Results	(m)	(mAD)					8
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888	\$	9.00 -	9.45	SPT	19							F
	\$ \$	0.00	0.40									- 9
	\$											Ė
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		10.00		D		10.00						<u> </u>
									Borehole completed at 10.00m.			E
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						{16.00}						<del>-</del> 16
General Cable P upon co	ercussive Impletion.	Borehol			ground le				s encountered. Groundwater encountered at 2 ing Depth After Observation	2.5 m bgl. Ba	ckfilled with arisin	
			Date	е		Strike De (m)	₽m	Cas	ng Depth Depth After Observation (m) (m)			
All dime	ensions ir Scale 1:50	metres									Logged By KC	



Level Legend Stratum Description  MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular and fine of brick, concrete and flint.  Firm light brown and orangish brown very sandy CLAY. Sand is fine.  1  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.  Frim to stifff greylish brown CLAY.	CRM.1027.087  Start 17-08-21 Finish 17-08-21  Client  Hill Partnership Ltd  Well  Water Levels Depth (m) No/Type Results  No/Type Results No/Type Results  MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY.  Sheet  MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY.  Sheet  MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY.  Sheet  MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY.	6	
Level Legend Stratum Description  MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular and fine of brick, concrete and flint.  Firm light brown and orangish brown very sandy CLAY. Sand is fine.  1  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.  Frim to stifff greyish brown CLAY.	CRM.1027.087  Start 17-08-21 Finish 17-08-21  Client  Hill Partnership Ltd  Well  Water Levels Depth (m) No/Type Results  Depth (m) No/Type Results  MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY.  Stratum Description  MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY.  Subangular and fine of brick, concrete and flint.  Firm light brown and orangish brown very sandy CLAY. Sand is fine	BH6	
Level MADD Legend Stratum Description  MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular and fine of brick, concrete and flint.  Firm light brown and orangish brown very sandy CLAY. Sand is fine.  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.  Frim to stifff greyish brown CLAY.	Client  Hill Partnership Ltd  Well Water Levels Depth (m) No/Type Results (m) Legend (mAD) Legend Stratum Description  MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Subangular and fine of brick, concrete and flint.		
Level MADD Legend Stratum Description  MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular and fine of brick, concrete and flint.  Firm light brown and orangish brown very sandy CLAY. Sand is fine.  Prim light brown and orangish 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.  Frim to stifff greyish brown CLAY.	Well   Water   Samples & In Situ Testing   Depth (m)   No/Type   Results   No/Type		
MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular and fine of brick, concrete and flint.  Firm light brown and orangish brown very sandy CLAY. Sand is fine.  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.  Frim to stifff greyish brown CLAY.	Levels Depth (m) No/Type Results (m) (mAD)  MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. subangular and fine of brick, concrete and flint.  O.70  Firm light brown and orangish brown very sandy CLAY. Sand is fine	2	
MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. Gravel is subangular and fine of brick, concrete and flint.  Firm light brown and orangish brown very sandy CLAY. Sand is fine.  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.	MADE GROUND: Firm brown slightly sandy slightly gravelly CLAY. subangular and fine of brick, concrete and flint.  0.70  Firm light brown and orangish brown very sandy CLAY. Sand is fine		
Firm light brown and orangish brown very sandy CLAY. Sand is fine.  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.	0.70 Firm light brown and orangish brown very sandy CLAY. Sand is fine	el is	
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.  Frim to stifff greyish brown CLAY.	Firm light brown and orangish brown very sandy CLAY. Sand is fine	-	
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.  Frim to stifff greyish brown CLAY.			
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.  Frim to stifff greyish brown CLAY.	1.50 - 1.95 SPT 13	E	
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.  Frim to stifff greyish brown CLAY.	1.50 - 1.95 SPT 13	F	
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.  Frim to stifff greyish brown CLAY.		Ė	
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.  Frim to stifff greyish brown CLAY.		Ė	
and coarse SAND. Gravel is angular and subangular and coarse of flint.  Note: Groundwater encountered at 3.8 m bgl.  Frim to stifff greyish brown CLAY.		- ;	
and coarse SAND. Gravel is angular and subangular and coarse of flint.  Note: Groundwater encountered at 3.8 m bgl.  Frim to stifff greyish brown CLAY.		Ė	
and coarse SAND. Gravel is angular and subangular and coarse of flint.  Note: Groundwater encountered at 3.8 m bgl.  Frim to stifff greyish brown CLAY.		E	
and coarse SAND. Gravel is angular and subangular and coarse of flint.  Note: Groundwater encountered at 3.8 m bgl.  Frim to stifff greyish brown CLAY.	2.80 2.80 3.00 - 3.45 SPT 34 Medium dense to dense light brown slightly clayey slightly gravelly n	ım ,	
Frim to stifff greyish brown CLAY.	and coarse SAND. Gravel is angular and subangular and coarse of	E,	
Frim to stifff greyish brown CLAY.	Note: Groundwater encountered at 3.8 m bgl.	Ė	
Frim to stifff greyish brown CLAY.		E	
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Frim to stifff greyish brown CLAY.	4.50 - 4.95   SPT   36   Line 1 - Line 2 - Line	Ė	
Frim to stifff greyish brown CLAY.		F	
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	5.40		
	Frim to stifff greyish brown CLAY.	F	
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	7.50 - 7.95   SPT   15	F	
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Continued next sheet	{8.00} Continued next sheet	- 8	
	6.00 - 6.45 SPT 111	led with ar	
	Groundwater Strike Depth Casing Depth Depth After		
Casing Depth Depth After	Date (m) (m) Observation (m)		
Observation	3.80		
Observation	Il dimensions in metres Scale 1:50  Logged I	;	



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Site														
Ashbu	ırnham R	oad, R	ichmon	nd									DIIA	
Job No		Dates			Groun	nd Level (	m)	Co-Ordinates					BH6	
CRM.102	7.087		Finish 1	17-08-21										
Client												Sheet		
Hill Pa	artnership	bt Lo											2 of 2	
101-4-			n Situ Te	sting	Depth	Level	Ι							
Well Leve		th (m)		Results	(m)	(mAD)	Legend			Stratum Descrip	otion			8
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100 V 70	10.00				10.00			Borehole comple	eted at 10.00	)m.				10
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eneral Rem	 arks		1		{16.00}		1							
Cable Percussi	ve Boreho	le advan	ced from	ground le	evel to 10	0.0 m bgl	. No service	es encountered. G	Froundwater 6	encountered at 3	3.8 m bgl. Ba	ckfilled	with arisi	ngs
upon completion	on.													
0														
Groundwate	er	Dat	te		Strike De (m)	epth	Cas	ing Depth (m)	Depth Observ	After ation				
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All dimensions	s in metres											Logge	d By	
Scale 1	:50												KC	