

1EW03 - Enabling Works Central

AWHh (C2b) - Survey Report: Trial Trench Evaluation at Three Bridge Mill, Twyford, Buckinghamshire (AC250/28)

MDL:

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1 Summary

- 1.1.1 This Survey Report details the survey methodology for setting out and surveying during the archaeological Trial Trench Evaluation at Three Bridge Mill, Twyford (Figure 1). The Trial Trench Evaluation encompassed two parcels of land: C25077 and 25082 (NGR 467013, 226479) measuring 7.74 ha. The Trial Trenching Evaluation consisted of 29 machine excavated trenches.
- 1.1.2 The Site is situated within CFA13 Calvert, Steeple Claydon, Twyford and Chetwode in Archaeological Character Sub-zone (ASZ) 13-17 to the south of Three Bridge Mills, Twyford, Buckinghamshire. A Project Plan was prepared for the works; AWHf Project Plan for a Trial Trench Evaluation at Three Bridge Mill, Twyford, Buckinghamshire AC250 (1EW03-FUS-EV-REP-CS06_CLog-007794). This summarised the results of previous surveys of the site including LiDAR, hyperspectral imagery, aerial photographic analysis and geophysical surveys. The Project Plan also discussed information that had already been prepared for the Cultural Heritage Baseline Report for CFA 13. Archaeological features were observed in a total of 24 trenches, with five of the trenches recorded as blank.

2 Introduction

- 2.1.1 COPA (the Archaeological Contractor) was commissioned by The Contractor to undertake a programme of archaeological works at Three Bridge Mill, Twyford, Buckinghamshire.
- 2.1.2 The archaeological fieldwork consisted of 29 trial trenches split into two areas (C25077 and C25082) covering the entire site. COPA Standard Operating Procedures (SOPs) are listed in *CA Technical Manual 2: Survey Manual*.
- 2.1.3 The project background, methodology, standards and document references are contained in the Fieldwork report (Document No. 1EW03-FUS_COP-EV-REP-CS06_CLog-000004).
- 2.1.4 This survey report specifically sets out the survey methodology and locates the works as outlined in the LSWSI (1EW03-FUS-EV-REP-CS06_CLog-007819)
- 2.1.5 27 trenches were excavated in the pre-determined positions identified in the Project Plan (Figure 2). Trench 24 was moved to avoid the layout of the temporary compound (Change Control 1EW03-FUS-EV-REP-CS06_CLog-007828) and Trench 19 (Change Control 1EW03-FUS-EV-REP-CS06_CLog-007827) was moved to avoid a live service.

3 Survey Methodology

3.1 Set out and Survey

- 3.1.1 For the results of Trial Trench Evaluation to be reliable, it is necessary to maintain an appropriate level of survey accuracy while setting out trenches and mapping archaeological

features. The purpose of setting out is to position trial trenches in locations in accordance with the Project Plan, and LSWSI, avoiding known constraints. The location of trial trenches is set out in the Project Plan). Each trial trench was assigned a unique ID in accordance with the HS2 Ltd Asset Information Management System (AIMS).

- 3.1.2 Prior to commencement, all equipment was checked, and pre-survey information was downloaded onto survey equipment from COPA's File Transfer Protocol (FTP) server. Field recording software for RTK GNSS equipment (Leica SmartWorx/Captivate) was verified as up to date prior to commencement.
- 3.1.3 Three Permanent Ground Markers (PGMs) were installed across the site covering the eastern evaluation area and located with RTK GNSS equipment (Figure 1). Coordinate values for each PGM were calculated in Leica Infinity from the average of two 180 epoch occupations taken an hour apart. PGMs were surveyed at the start and finish of each survey job (= data packet (leica .dbx file) containing site survey for a day - sent back and processed at the end of each day), giving an estimate of the absolute accuracy of each day's survey, in accordance with the LSWSI.
- 3.1.4 Setting out for 29 trenches was undertaken with coordinate data supplied by the Employer using Leica GSo8 Real Time Kinematic (RTK) Global Navigation Satellite System (GNSS) set in network RTK mode, accessing corrections data from Leica Smartnet. Leica manufacturers certificates for RTK GNSS kits are held by the Employer. X,Y coordinates for points at each end of the centre line of each trench were created in ArcGIS and uploaded to Leica GSo8 controllers for setting out. Centrelines of each trench were set out on site using flags and bamboo canes, marked with the appropriate trench number. All trial trenches were located to a horizontal accuracy of +/- 50mm in relation to the GIS data supplied along with the Project Plan and LSWSI figures.
- 3.1.5 Survey work of trench limits and archaeological features was conducted by trained and competent COPA staff using Leica GSo8 RTK GNSS equipment. All features were surveyed in accordance with Fieldwork Manual 2: Survey Manual (CA 2017), compliant with Historic England Metric Survey Specifications (EH 2015). Survey data was related to the Ordnance Survey National Grid (OSGB36/15), with heights given above Ordnance Datum Newlyn (ODN).
- 3.1.6 Trench limits were recorded at the top and base of excavation. The limits of archaeological features were surveyed immediately following the excavation of each trench in order to provide a plan of all archaeological features prior to hand-excitation. All post-excitation survey was conducted with a horizontal accuracy of +/- 50mm and a vertical accuracy of +/- 50mm. Points outside these accuracy benchmarks were automatically rejected by the survey controller software and re-surveyed when conditions allowed an appropriate level of accuracy. Following hand-excitation, the limits of each feature were re-surveyed, along with the limits of each hand-excavated intervention and the feature base. Sections were hand-drawn and

located using RTK GNSS equipment with drawing points surveyed at each end of the section line. Levels were generated from GNSS data.

3.2 Standards and Guidance

- 3.2.1 All spatial data was recorded by Leica RTK GNSS on an appropriate memory card and transferred to the office using FTP. Non-spatial information such as context, sample or registered artefact numbers were recorded either directly into the controller or into a field notebook. Survey data was processed daily in Leica GeoOffice and exported in ESRI Shapefile format before being collated and stored in ESRI File Geodatabase (.gdb) format. The File Geodatabase provided scaled digital data of all required elements of the project and located them within the Ordnance Survey grid with heights given above Ordnance Datum Newlyn (ODN). These files were backed up with originals being stored on COPA's server in Kemble, near Cirencester.
- 3.2.2 COPA followed the relevant HS2 Standards, guidance and procedures in relation to the production of documents and digital materials. The following list of documents outlines the key documents and is not exhaustive.
- HS2 Cultural Heritage GIS Specification (HS2-HS2-GI-SPE-000-000004)
 - The BIM documents set out in HS2-HS2-SA-SPE-000-000008 High Speed Two Phase One Project Requirements Specification (PRS) (section 2.1.4 Information Management)
 - Historic Environment Physical Archiving Strategy (HS2-HS2-EV-STR-000-000018)
 - Historic Environment Digital Data Management and Archiving Strategy (HS2-HS2-EV-STR-000-000019)
 - Information Paper E8: Archaeology. (LWM-HS2-HY-PPR-000-000042)
- 3.2.3 All drawings are composed of closed polygons, polylines or points in accordance with the requirements of GIS construction and COPA Geomatics protocols (CA 2017). In all instances, GIS work has, and will, follow the guidelines set out in the Employer's GIS Standards (HS2-HS2-GI-SPE-000-000004).
- 3.2.4 The GIS drawing (Figure 1) contains an information layout which included all the relevant details appertaining to that drawing. Information (metadata) on all other digital files will be created and stored as appropriate. At the end of the survey all raw measurements are made available as hard copy for archiving purposes.

3.3 Archive Deposition

- 3.3.1 Following the completion of the Trial Trench Evaluation, COPA will provide the Contractor with the required data, metadata and digital materials as specified in the Historic Environment Digital Data Management and Archiving Procedure (C262-ARP-EV-SPE-000-

000003) and the Historic Environment Digital Data Management and Archiving Strategy ((HS2 Ltd, 2015).

3.3.2 The survey data will be edited to ensure that the archive is fit for purpose both as a record of the archaeology removed by excavation, and as a planning resource for future mitigation.

3.3.3 The digital data will be temporarily stored on the server at COPA Kemble (near Cirencester), which is backed up on a daily basis. For long term storage of the digital data, CDs/DVDs will be used. Each disk will be fully indexed and accompanied by the relevant metadata as provenance.

4 References

4.1 Glossary of terms

4.1.1 The following terms have been used in this report:

- **Archaeological Contractor** - the organisation undertaking the specific historic environment works for the Contractor.
- **Contractor** – Fusion; the organisation undertaking the Enabling Works for Area Central on behalf of the Employer.
- **Employer** – HS2 Ltd, the organisation responsible for delivery of HS2 Phase One Scheme and all terms and conditions, policies, procedures, and payments
- **Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy (GWSI: HERDS)** – the framework for delivering all historic environment investigations undertaken as part of the HS2 Phase 1 programme.
- **GNSS** (Global Navigation Satellite System) a generic term for satellite-based positioning systems e.g. GPS, GLONASS, BDS or Galileo
- **Location** – a specific HS2 worksite or group of worksites that are being addressed as a combine historic environment investigation programme of assessment, evaluation and investigation.
- **Location Specific Written Scheme of Investigation (LSWSI)** - specification document assembling one or more Project Plans within an area of land defined primarily for construction programme purposes. The LS-WSIs will be agreed with the Project Manager and would provide a costed and programmed approach to delivering outcomes.
- **Project Plans** – specification document for each specific package of activity (e.g. a survey, desk-based assessment, excavation, recoding project). The plans would respond to the Specific Objectives set out in the GWSI: HERDS and be delivered within an agreed budget.
- **RTK (Real-Time Kinematic)** real-time kinematic survey is a satellite navigation

technique used to enhance the precision of position data derived from satellite-based positioning systems

- **Works** – the specific historic environment assessment, evaluation or investigation works at each location.

4.2 References

Title	Reference
HS2 Cultural Heritage GIS Specification	HS2-HS2-GI-SPE-000-000004
Historic Environment Physical Archiving Strategy	HS2-HS2-EV-STR-000-000018
Historic Environment Digital Data Management and Archiving Strategy	HS2-HS2-EV-STR-000-000019
Information Paper E8: Archaeology	LWM-HS2-HY-PPR-000-000042
Project Plan: AWHf Project Plan for a Trial Trench Evaluation at Three Bridge Mill, Twyford, Buckinghamshire (AC250)	1EW03-FUS-EV-REP-CS06_CL09-007794
LWSI: AWHf Location Specific Written Scheme of Investigation for Trial Trench Evaluation at Three Bridge Mill (AC250/28)	1EW03-FUS-EV-REP-CS06_CL09-007819
AWHh Historic Environment Fieldwork Change Control Acceptance Sheet for Trial Trench Evaluation at Three Bride Mill, Twyford, AC250 FCCF79	1EW03-FUS-EV-REP-CS06_CL09-007827
AWHh Historic Environment Fieldwork Change Control Acceptance Sheet for Trial Trench Evaluation at Three Bride Mill, Twyford, AC250 FCCF80	1EW03-FUS-EV-REP-CS06_CL09-007828
AWHh (C2b) Trial Trench Evaluation at Three Bridge Mill, Twyford, Buckinghamshire (AC250/28)	1EW03-FUS_COP-EV-REP-CS06_CL09-000004
Cotswold Archaeology, Technical Manual 2- Survey Manual	CA 2017
English Heritage: Where on Earth Are We? The Role of Global Navigation Satellite Systems (GNSS) in Archaeological Field Survey	EH 2015



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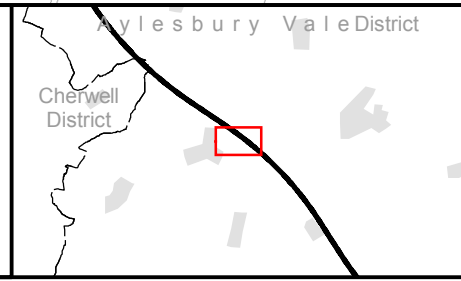
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Legend
 ● Control Point
 □ Site



High Speed Two
 Three Bridge Mill
 Twyford
 Figure 1: Control Point Locations
 Internal

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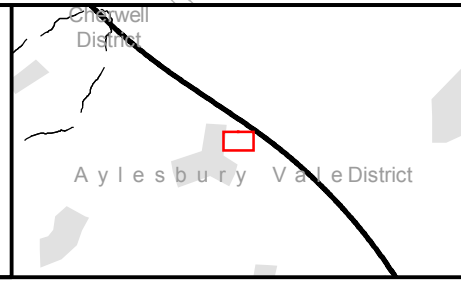
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Legend

- Control Point
- Site
- ▭ Excavated Trench
- ▨ Archaeological Feature



High Speed Two
Three Bridge Mill
Twyford

Figure 2b: Trench Plan: As Dug

Internal

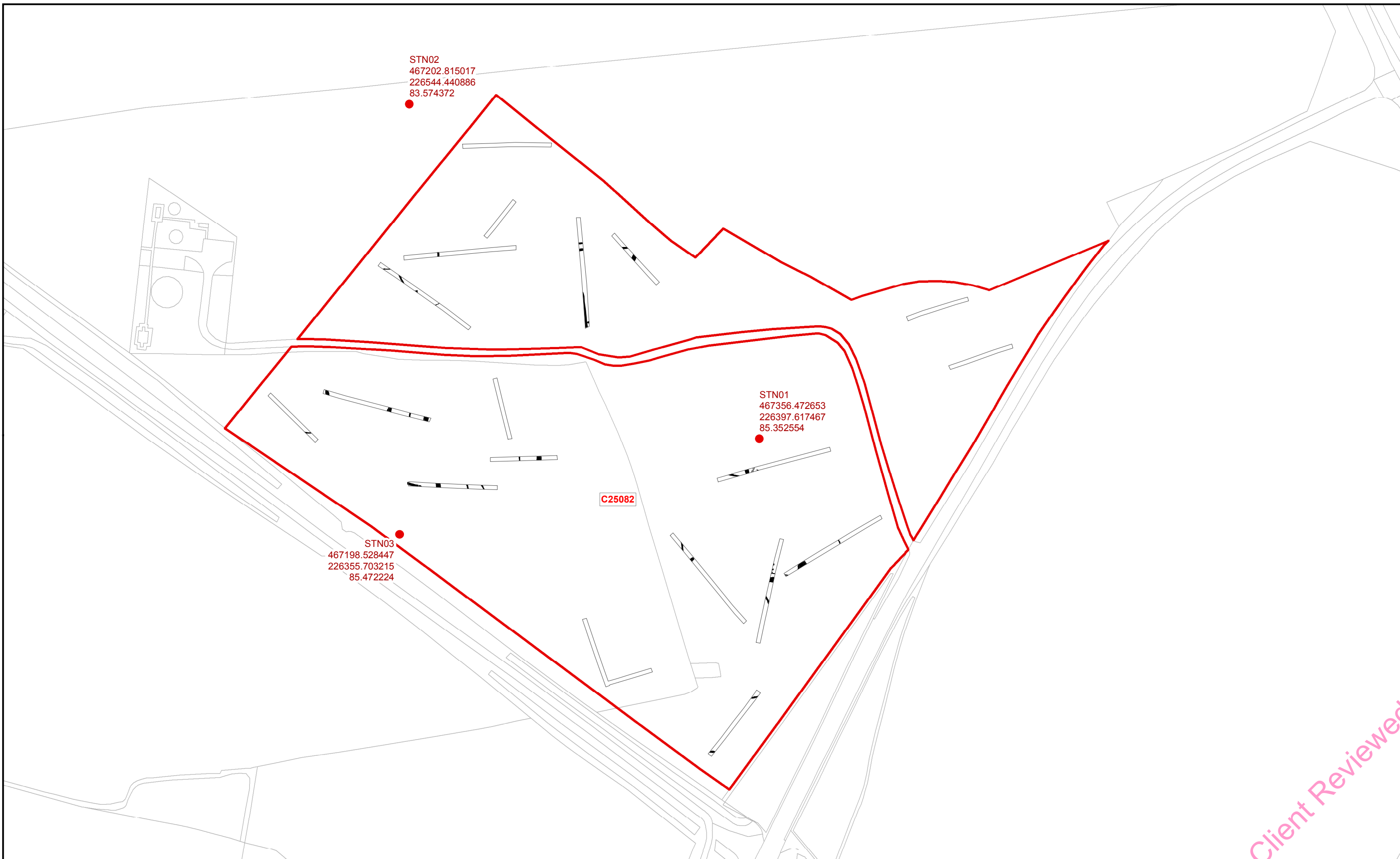
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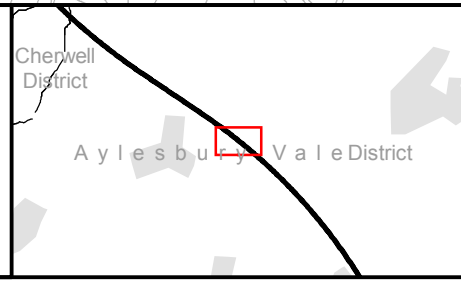
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- Legend**
- Control Point
 - Site
 - ▭ Excavated Trench
 - ▬ Archaeological Feature



High Speed Two
 Three Bridge Mill
 Twyford
 Figure 2a: Trench Plan: As Dug
 Internal

HS2 Scale at A3: 1:1,500

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