1EW03 - Enabling Works Central

AWHf Location Specific Written Scheme of Investigation for Evaluation Trenching at Lower Radbourne, Warwickshire AC320

Document no.: 1EW03-FUS_ARC-EV-REP-CS07_CL23-000001

Revision	Author	Checked by	Approved by	Date approved	Reason for revision
C01	Tim Sperring Lawrence Pontin	Christos Karalis	Nick Finch	06/02/2020	First Issue

Contents

Tables

Figures

1 Summary

1.1.1 This location specific Written scheme of Investigation (LSWSI) sets out the methodology, deliverables, programme, health, safety and environmental requirements, resource and interfaces necessary to deliver archaeological defined in the Project Plan for a Trial Trench Evaluation at Lower Radbourne DMV Warwickshire AC320 (1EW03-FUS-EV-REP-CS07_CL23-007797)

1.1.2 The project plan established the scope, aims and contributions to the Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy (GWSI: HERDS) objectives, techniques, Post investigation reporting and archive.

1.1.3 The work is related to the construction of the rail alignment formation, a viaduct over the River Itchen and associated embankments, access roads, electricity substation, attenuation ponds and wetland habitat creation, planting, temporary storage stockpile areas, satellite construction compound and redirection of the existing roads and relocating Public Rights of Way (PRoW). The site encompasses one parcel of land, C32021 measuring 16.2ha and is centre at NGR 443804 257171. The site forms part of several arable and pastorial field and a small area of mature woodland located between Upper Radbourne Farm (to the north east) and Lower Radbourne Farm (to the west).

1.1.4 The results of this archaeological investigation will determine, as far as reasonably possible, the nature, extent and character of any surviving archaeological remains within the Site and to inform an archaeological resource assessment of its knowledge value and ability to contribute to Specific Objective and in doing so, this would be used to inform the requirement and strategy of further archaeological investigation.

1.1.5 This LSWSI has been prepared in accordance with the standards and guidance provided by the GWSI: HERDS, the Technical Standards for Specification for historic environment project plans and location specific written schemes of investigation (Document No. HS2-HS2-EV-STD-000-000015) and Specification for Historic Environment Investigations (Document No. HS2-HS2-EV-STD-000-000035) and relevant CifA Standards.

2 Introduction

2.1.1 This Written Scheme of Investigation (WSI) has been prepared by Archaeological Research Services Ltd (ARS Ltd) on behalf of Fusion JV. It details a scheme of works for archaeological trial trenching in satisfaction of planning for the HS2 Phase 1 Environmental Statement; Lower Radbourne, Warwickshire (NGR 443804 257171). The evaluation encompasses one parcel of land, C32021, measuring 16.2ha.

2.1.2 The Site is required to enable the construction of the rail alignment formation, a viaduct over the River Itchen and associated embankments, access roads, electricity substation, attenuation ponds and wetland habitat creation, planting, temporary storage stockpile areas,

satellite construction compound and redirection of the existing roads and relocating Public Rights of Way (PRoW). The location for the evaluation has been selected to address construction programme risk to land required for the proposed development.

2.1.3 The Site is located in Warwickshire, within the Ladbroke and Southam Community Forum Area (CFA16). The evidence suggests there is a potential for the site to contain as yet unknown archaeological remains of prehistoric/Roman, medieval and post-medieval date. These are likely to be associated with a previously unknown prehistoric settlement identified by previous geophysical surveys and/or the Lower Radbourne deserted medieval village. There is also good evidence for medieval cultivation. Although part of the site lies within Archaeological Sub-Zone 16-05 Upper Itchen floodplain/channel, which in general has potential for archaeological and palaeoenvironmental remains to be buried in or under alluvium. There may be potential for preservation of palaeochannels within the river floodplain, representing typical locations for preservation of archaeology and deposits of palaeoenvironmental potential.

2.1.4 The trial trench evaluation is required to identify the location, extent, survival and significance of any heritage assets of archaeological interest within the site (Figure 1) and will contribute to the following specific GWSI: Historic Environment Research and Delivery Strategy (HERDS) objectives:

- KC5: Identifying settlement location and developing models for settlement patterns for the Mesolithic, Neolithic and Early Bronze Age.
- KC9: Does a lack of visibility of Neolithic and Bronze Age monuments reflect genuine area distinctiveness, or is this due to variation in geology or investigative techniques?
- KC15: Can we identify regional patterns in the form and location of Late Bronze Age and Iron Age settlements across the route, and are there associated differences in landscape organisation and enclosure?
- KC21: Assess the evidence for regional and cultural distinctiveness along the length of the route in the Romano-British period, with particular regard to the different settlement types encountered along the route.
- KC23: Identify evidence for late Roman occupation and attempt to identify any continuity in settlement patterns between the end of the Romano-British period and the Early Medieval period.
- KC31: Identify the location of Middle to Late Saxon settlement, explore processes of settlement nucleation and understand the development of associated field types and agricultural regimes.
- KC35: Investigate the impacts on rural communities of social and economic shocks in the mid-14th century and thereafter and their contribution to settlement desertion.
- KC40: Identify patterns of change within medieval rural settlement from the 11th to mid-14th century.
- KC47: Test and develop geophysical survey methodologies.
- KC49: Ground truth and develop multispectral and LiDAR prospection technique

2.1.5 Guidance has been provided by Fusion and the Warwickshire local planning authority, on the programme of archaeological work required. The trial trench evaluation (Figure 2) will consist of 91 No. trial trenches, comprising: 12 No. 50m x c. 1.8m trenches, 77 No. 25m x c. 1.8m trenches and 2 No. 25m x 4m trenches (actual trench width to be determined by machine bucket width). This represents an overall approximate 4% sample of the site by area, however, the density of placed trenches varies based on the already detected and anticipated archaeological character of the constituent areas of the Site.

2.1.6 This Written Scheme of Investigation (WSI) describes the archaeological investigation to be undertaken by Archaeological Research Services Ltd (ARS Ltd).

3 Project Background

3.1 Site Location

3.1.1 The Site is located within CFA16 Ladbroke and Southam, in the county of Warwickshire and within the historic parish of Lower Radbourne. It surrounds Chapel Bank Cottage and lies c. 2.5km south-east of the village of Ladbroke along the River Itchen. The Site encompasses a single parcel of land, C32021 (NGR centre 443804 257171) measuring 16.2ha.

3.2 Site Description

3.2.1 The Site forms part of six arable and pasture fields and a small area of mature woodland located along a road between Upper Radbourne Farm to the north-east and Lower Radbourne farm to the south-west, focussed at Chapel Bank Cottage situated on the bank of the River Itchen.

3.3 Landform

3.3.1 The topography of the Site is characterised by a gently rolling landscape sloping down from c. 115m aOD at the northern boundary to c. 100m aOD within the valley of the River Itchen, to gradually rise again further south.

3.4 Geology

3.4.1 The British Geological Survey (BGS 2019) indicates that the underlying solid geology within the site is the Charmouth Mudstone formed as interbedded sequences in the shallow seas of the early part of the Jurassic period (Sinemurian–Pliensbachian, c. 200-182Ma). No superficial (drift) geology is recorded within the site, however alluvial sequences of the River Itchen are mapped c. 300m to the west and 200m to the east of the site (Figure 8).

3.4.2 However, ground investigations across the site carried out for HS2 (Greatworth to Ufton Area Z) confirmed the presence of alluvial deposits both to the north and to the south of the river (i.e. ML120-CP023 and ML120-CR006 to the north and ML120-TP049 to the south), within the majority of the southern parcel of the site. The recorded sequence includes topsoil

(approximately 0.2m thick), which overlies clay deposits interpreted as alluvium, which in turn seals the mudstone geology, encountered at approximately 0.9m below ground level.

3.4.3 The parent material gives rise across the site to moderately fertile, slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils (Soilscapes 2019).

4 Archaeological and Historical Background

4.1 Archaeological Review

4.1.1 The information presented below has been derived from the Environmental Statement, prepared in 2013, the Warwickshire Historic Environment Record (HER) data updated in August 2018, and the results of the recent surveys undertaken within the site and in its environs, i.e. geophysical and LiDAR surveys (ES 3.5.2.16.7, 1EW03-FUS-EV-CS207_CL23-001959, 1EW03-FUS-EV-REP- CS07_CL23-007769, 1EW03-FUS-EV-REP-CS07_CL23-002502). This section also draws upon the Detailed Desk-Based Assessment of the Deserted Medieval Village (DMV) of Lower Radbourne (1D037-EDP-EV-REP-040-000035). These sources recorded multiple heritage assets within the environs of the site (Figure 3), but only those of direct relevance to the development and potential of the site are discussed in this report.

4.1.2 The site extends across three Archaeological Sub-zones (ASZ, Figure 1). Most of the site to the north of Chapel Bank Cottage lies within 'ASZ 16-06 Radbourne: South facing slopes down to Upper Itchen'. This ASZ occupies the gently rolling land between 100m and 115m above Ordnance Datum (aOD) characterised by planned enclosure. The ASZ is the site of Radbourne DMV (LBS035), with a possibility of earlier Romano-British activity and potential for other periods of archaeology to be present, including a well-understood medieval landscape.

4.1.3 Further south and to the west of Chapel Bank Cottage the site falls within 'ASZ 16-05 Upper Itchen floodplain/channel'. It is defined by a narrow flood plain of the Upper Itchen, historically within a fieldscape with some floodplain meadows. This ASZ has potential for stream-side activities of all periods, and also potential for remains buried in or under alluvium with good environmental preservation (see 6.7 below).

4.1.4 At its southern boundary, the site encroaches upon 'ASZ16-04 Wormleighton/Radbourne: North facing valley from Oxford Canal to Upper Itchen'. The ASZ is characterised again by gently rolling land characterised by larger, post-medieval fields. No known archaeology earlier than well-known remnants of ploughed out medieval field systems and post-medieval agriculture/farmsteads (Church Farm, LBS012) have been recorded within this ASZ at the time of the preparation of the Environmental Statement.

4.2 Prehistoric

4.2.1 There is no known evidence of earlier prehistoric (Palaeolithic to Neolithic) activity within the Site or its environs and the topographic and geologic character of the area indicates a limited potential for earlier prehistoric use. There has been some suggestion, however, that claylands such as those found within the site may have some potential for Mesolithic activity (Garwood 2011). Specifically, such evidence could possibly be found within alluvium bordering the Upper Itchen, and which has been recorded within the southern part of the site by the HS2 ground investigations (see 6.7 below).

4.2.2 Although later prehistoric periods (Bronze Age and Iron Age) are better represented in Warwickshire, no known heritage assets datable to these periods are known within the site or its vicinity. Nevertheless, the results of the geophysical survey undertaken within the northern and central parts of the site (site CRO1477, 1EW03-FUS-EV-CS207_CL23-001959) revealed a complex of multi-phase buried archaeological remains comprising possible prehistoric settlement and perhaps also a northern continuation of a known deserted medieval village. Both sets of features extend south and east beyond the boundaries of the survey area. The results imply that this previously unknown unenclosed settlement appears to be similar to examples seen elsewhere in Warwickshire and dated to the late Bronze Age or early Iron Age (e.g. at Brailes). Moreover, two of the recorded ring ditches within this complex are large enough to be barrows rather than settlement-related and could thus relate to Neolithic or Bronze Age funerary activity.

4.3 Roman

4.3.1 The site is located 10km south of the Fosse Way Roman road, in between known Roman roads and settlements. However, the 'Salt Way' (LBS024) is located c. 1km south of the site. Although identified as an early medieval trackway, mentioned in an Anglo-Saxon charter, the alignment of the road can be traced to Droitwich, known as a source of salt first exploited during the Iron Age, and the track is likely to have continued in use during the Roman period.

4.3.2 Indeed, Roman pottery has been found at Lower Radbourne during utility works in 1969, but little is known about the type or dates of the material, as only its presence is identified on the Warwickshire HER (MWA5184). The finds do suggest Roman activity in the area, perhaps related to the use of the Salt Way.

4.4 Medieval and Later

4.4.1 The earliest known record of Radbourne is from AD 998, when King Æthelred II granted lands at Southam, Ladbroke and Radbourne to Leofwine, Ealdorman of the Hwicce. At the time of Domesday, the population of Radbourne, itemised with the records of Ladbroke, was given as 9 villagers, 2 smallholders and 6 slaves.

4.4.2 The charter of AD 998 describes the boundaries of Ladbroke and Radbourne, starting from 'Wylman ford' on the border of Radbourne and Wormleighton, taking in 'Cocgebyll' on the

road from Priors Marston and Watergall to the south-west of Lower Radbourne. Wylman ford has been identified as being on the Salt Way (LBS024), and the settlement at Radbourne may be associated with activities on that routeway.

4.4.3 The medieval history of Radbourne is, in general, the story of a small village that became even smaller throughout the period, until it was considered completely depopulated and deserted. Due to the small size of the settlement at any given time, the causes or exact times of this depopulation are unknown. Still, the main period of depopulation was probably in the 15th century when the area was subject to early enclosure. Radbourne is included in John Rous' list of villages that were deserted before 1485. The church was first mentioned in 1195, but appears to have been a private chapel later in the medieval period. It is thought to have fallen into decay by 1535, and ruined by 1616. It was then used as a barn, and taken down in 1880.

4.4.4 The site lies in the western part of Lower Radbourne DMV (LBS035) which was scheduled as an Ancient Monument in 1952, with surviving earthworks including a rectilinear enclosure thought to represent the church, three crofts, hollow-ways, a possible building platform, a possible building, and fish or mill ponds. Ploughing during the 1960s destroyed the earthworks, and the site was de-scheduled in 1989. Remains of the DMV are now only visible as crop/soil marks. Aerial photographs identified a rectilinear enclosure, which has been interpreted as the location of the original church. Other enclosure earthworks were identified during LiDAR surveys, but no interpretation has been made of these.

4.4.5 The core of the village may have been in the area of Chapel Bank Cottage (LBS034), at the eastern boundary of the site. Although the cottage itself is post-medieval, reused dressed stone appears to have derived from the nearby demolished medieval church. The fish ponds to the south of the site and DMV are modern and shown for the first time on a 1972 OS map (Figure 7), although they appear to be in the location of medieval ponds (MWA1303). Pottery dating to 1150-1400 has been recovered from within the DMV.

4.4.6 The aforementioned geophysical survey undertaken in the northern and central parts of the site (CRO1477) is likely to have identified a phase of archaeological features associated with the deserted medieval settlement. Moreover, a geophysical survey, which covered the land within the north-western and south-western parts of the site (site AC320/5 areas 5A and 5C respectively, 1EW03-FUS-EV-REP-CS07_CL23-007769), has recorded a number of anomalies of uncertain, but possible archaeological origin, presumably also associated with the Lower Radbourne DMV and therefore of possible medieval date. These comprised linear and medieval cultivation features, perhaps overlain by later medieval or post-medieval structures (including tile debris or perhaps areas of burning). There is, therefore, a strong likelihood that finds and features associated with the medieval settlement might be discovered within the site. However, given the results of the aforementioned geophysical survey CRO1477, which identified a predominantly prehistoric settlement, it is also deemed possible that some of the recorded field systems could reflect features associated with a prehistoric settlement.

4.4.7 The southernmost part of the site was also subject to a magnetometer survey (site CRO1078, 1EW03-FUS-EV-REP-CS07_CL23-002502). Nothing of obvious archaeological interest was detected by the survey although a small area of former ridge and furrow cultivation was seen in the north-west corner (albeit outside the Site boundary) where it seems to have respected the former line of a field boundary known from historic Ordnance Survey maps.

4.4.8 A further DMV is present around Hodnell Manor, 800m to the west of the central part of the site. This is a Scheduled Ancient Monument (HE List Entry 1020421) and comprises a series of earthworks and buried remains.

4.4.9 Elements of the medieval and post-medieval agricultural landscape associated with Lower Radbourne, Hodnell and Ladbroke, comprising areas of ridge and furrow and former field boundaries, are present within and around the site, although the majority have been identified by geoarchaeological surveys rather than remote sensing techniques. A small field with ridge and furrow visible on the LiDAR survey probably formally belonging to Lower Radbourne is present to the north of the site (LBS107; WA16.25, Figures 3-4). Remains of a sub-oval enclosure to the north-west of Chapel Bank Cottage and a series of linear earthworks aligned NE-SW, possibly former lynchets and ponds have also been recorded within the site (WA16.24). A small pond recorded on historic Ordnance Survey maps has also been identified in the northern corner of the site (WA16.26). Similar post-medieval and modern ponds have been identified further north and south of the site (WA16.26 and WA16.22). To the south of the site preliminary drawings for the 1st series OS maps (1812) show buildings within an enclosure, which is still visible on the 1887 map (Figure 6) albeit reduced in size (LBS032). Nothing now survives on the ground or is visible on aerial photographs, but on current evidence it seems likely that this is the site of an abandoned post-medieval settlement.

4.4.10 The comparison between the 1887 and 1972 OS maps (Figures 6-7) shows that the site and its environs changed little in the modern period.

4.5 Previous Disturbance

4.5.1 The site appears to have been in agricultural use since at least the medieval period. This agricultural activity will have damaged upper horizons and truncated buried archaeological features, but it is unlikely that any other impacts have affected the site other than potential burial of earlier prehistoric archaeology that could potentially survive in any palaeosols buried by alluvial deposits which may occur close to the river Itchen. The extant drainage and buried services would have had only localised and negligible direct destructive impact on any archaeological remains that may be present within the site.

4.6 Previous Archaeology

4.6.1 The site lies within an area whose archaeological potential is not well understood due to the limited amount of previous intrusive investigations. However, a number of remote-sensing surveys have been undertaken in close proximity to the site. The site was included in a remote

sensing survey (interpretation of aerial photographs, hyperspectral imagery and LiDAR imagery) as part of the ES (ES 3.5.2.16.7, Figure 3).

4.6.2 The site has been subject to several geophysical surveys; the northern and central parts have been investigated as site CRO1477 (1EW03-FUS-EV-CS207_CL23-001959); the north-western and south-western parts as site AC320/5 areas 5A and 5C respectively (1EW03-FUS-EV-REP-CS07_CL23-007769); and the southern most part as site CRO1078 (1EW03-FUS-EV-REP-CS07_CL23-002502).

5 Aims and Objectives

5.1 Needs and Aims

5.1.1 The trial trench evaluation is required to determine, as far as reasonably possible, the nature of the archaeological resource within the site. The evidence suggests there is a potential for the site to contain as yet unknown archaeological remains of prehistoric/Roman, medieval and post-medieval date. These are likely to be associated with a previously unknown prehistoric settlement identified by previous geophysical surveys and/or the Lower Radbourne DMV. There is also good evidence for medieval cultivation.

5.1.2 Although part of the site lies within 'Archaeological Sub-Zone 16-05 Upper Itchen floodplain/channel', which in general has potential for archaeological and palaeoenvironmental remains to be buried in and under alluvium, no alluvial deposits have been recorded by the BGS within or near the site, but surveys for HS2 have noted its presence in the southern part of the site (see 6.7 below). The presence of alluvial deposits with the potential for preservation of palaeochannels within the river floodplain, representing typical locations for preservation of archaeology and deposits of palaeoenvironmental potential, cannot be completely discounted.

5.1.3 The aims of the trial trenching evaluation are:

- to test the presence/absence, extent and depth of any surviving archaeological remains within the site;
- to determine the nature, date, condition, state of preservation, complexity and significance of any archaeological remains;
- to determine the likely range, quality and quantity of artefactual and environmental evidence present;
- suggest measures, if appropriate and feasible, for further archaeological investigation to mitigate identified significant impacts; and
- contribute to the delivery of GWSI: HERDS Specific Objectives as specified in Section 2.4:
    - Identify the presence/absence of archaeological features and deposits within the site.

- Record all archaeological features and deposits encountered.
- Sample sufficient of the archaeological features and deposits to establish relative sequence, likely dating and quality of preservation.
- Gather sufficient information to establish the character, extent, form, function and likely status of any surviving archaeological deposits with a view to evaluating their significance and potential to inform the aims and objectives outlined in section 4 of this document.

5.2 Evaluation Objectives

5.2.1 The objectives of the investigation are:

- to test the presence/absence, extent and depth of any surviving archaeological remains within the site;
- to determine the nature, date, condition, state of preservation, complexity and significance of any archaeological remains;
- to determine the likely range, quality and quantity of artefactual and environmental evidence present;
- suggest measures, if appropriate and feasible, for further archaeological investigation to mitigate identified significant impacts; and
- contribute to the delivery of GWSI: HERDS Specific Objectives as specified in Section 5.3.

5.3 Contribution to Specific Objectives

5.3.1 Through delivery of the works set out in Section 5 and through addressing the aims set out in 5.1, the trial trench evaluation will create knowledge and outputs that will contribute to achieving the objectives in the following ways:

Table 1 Contributions to HERS Objectives

SPECIFIC OBJECTIVE	CONTRIBUTION
KC5: Identifying settlement location and developing models for settlement patterns for the Mesolithic, Neolithic and Early Bronze Age.	Although no finds of these periods are known from within the site, the evaluation has the potential to investigate deposits along the margins of the River Itchen and therefore inform this objective.

KC9: Does a lack of visibility of Neolithic and Bronze Age monuments reflect genuine area distinctiveness, or is this due to variation in geology or investigative techniques?	The presence of probable Bronze Age round barrows within the site provides the opportunity to test the results of magnetometer surveys on the identification of this monument type and compare it with evidence from other sites on different geologies.
KC15: Can we identify regional patterns in the form and location of Late Bronze Age and Iron Age settlements across the route, and are there associated differences in landscape organisation and enclosure?	The evaluation has the potential to verify the presence/absence, character and date of the enclosures and ring ditches identified by geophysical surveys within the site. The evaluation has, therefore, the potential to inform this research objective.
KC21: Assess the evidence for regional and cultural distinctiveness along the length of the route in the Romano-British period, with particular regard to the different settlement types encountered along the route.	The DDBA has identified the potential for Romano-British archaeology relating to the use of the Salt Way (LBW024) and possible settlement evidenced by Roman pottery encountered within the site during mid-20th century utility works. The evaluation also has the potential to test the presence/absence, character and date of the rectilinear enclosures identified by geophysical surveys within the site. Characterising the date and function of the enclosures will contribute to this objective by adding to the understanding of Romano-British cultural distinctiveness of Warwickshire by analysis of feature forms and any finds.
KC23: Identify evidence for late Roman occupation and attempt to identify any continuity in settlement patterns between the end of the Romano-British period and the Early Medieval period.	The DDBA has identified the potential for early medieval settlement along the River Itchen tributary, with hay meadows recorded in Domesday at Radbourne, and nearby droveways and a ford mentioned in an Anglo-Saxon charter. The evaluation has the potential to test the presence/absence, character and date of the enclosures identified by geophysical surveys within the site, which at least partially may date back to the early medieval period.
KC31: Identify the location of Middle to Late Saxon settlement, explore processes of settlement nucleation and understand the development of associated field types and agricultural regimes.	The DDBA has identified the potential for a late Saxon (or earlier) settlement in Radbourne, based on its location near known droveways, the Salt Way (LBS024), and hay meadows mentioned in Domesday Book.

KC35: Investigate the impacts on rural communities of social and economic shocks in the mid-14th century and thereafter and their contribution to settlement desertion. KC40: Identify patterns of change within medieval rural settlement from the 11th to mid-14th century.	The available evidence suggests that Radbourne was wealthier than Ladbroke during the late 14th century, though its dominance may be in terms of value in livestock, rather than in population. However, whilst an understanding of potential models for occupation and exploitation has been established, the nature of the medieval landscape is unclear. The status and prosperity of the abandoned village of Radbourne is poorly understood and may be examined by the evaluation trenching through uncovering potential evidence for changing land-use, crafts and industry at the site. This work has the potential to further our understanding of both rural settlement and the development and evolution of the landscape in the area.
KC47: Test and develop geophysical survey methodologies.	The site and its environs have been subject to a series of remote sensing and geophysical surveys, which produced varying results including clear concentrations of archaeological features and magnetically enhanced ridge and furrow. The evaluation has the potential to ground- truth these results and help develop non-intrusive archaeological prospection techniques.

6 Trench Evaluation Scope

6.1.1 The trial trench evaluation will be undertaken in accordance with specific guidance produced by HS2, namely the Technical Standard Specification for historic environment investigations (HS2-HS2-EV-STD-000-000035) and the GWSI: HERDS (HS2-HS2-EV-STR-000-000015).

6.1.2 In the first instance, exploratory test pits will be excavated in each trench location to recover artefacts from the topsoil and upper subsoil horizons (see Section 6.2: Artefact Collection for methodology). Test pits (measuring 0.25 x 0.25m square) will be excavated prior to the main trenches to sample sieve the topsoil for artefacts. This method will test for the possible presence of early prehistoric and early medieval finds and plot their distributions. There will be two test pits excavated within each 25m trench, and three within 50m trenches, giving a total of 190 test pits.

6.1.3 The trial trench evaluation (Figure 10) will consist of 91 No. trial trenches, comprising: 12 No. 50m x c. 1.8m trenches, 77 No. 25m x c. 1.8m trenches and 2 No. 25m x 4m trenches (actual trench width to be determined by machine bucket width). This represents an overall

approximate 4% sample of the site by area, however, the density of placed trenches varies according to the detected and anticipated archaeological character of the constituent areas of the site:

- Areas of identified potential prehistoric settlement remains and medieval DMV: 4% sample recommended to characterise and determine extent of settlement;
- Seemingly "Blank" area north-west of settlement: 4% sample recommended to investigate continuation of settlement or related peripheral features;
- Cultivated area to west of potential settlement activity: 4% sample to determine boundary between settlement and cultivated area, and investigate for continuation of settlement features possibly masked by overlying ridge & furrow;
- Seemingly "Blank" area to west of settlement and cultivation area: 4% sample recommended to investigate continuation of settlement or related peripheral features; and
- Areas close to watercourse: 3% sample to investigate any potential for alluvial deposits being present that could contain palaeoenvironmental residues, palaeosols etc. (alluvial deposits recorded in ground investigation), but with lower potential for settlement activity within the floodplain.

6.1.4 The trial trenches have been sited individually using the reconnaissance information gathered during the course of the ES and the subsequent geophysical survey data. This evidence-lead approach has also considered the topography and areas of known settlement, as identified by adjacent geophysical survey and archaeological investigation. Of particular note is the identification of the Radbourne Deserted Medieval Village (DMV), containing a large part of the site itself within its defined extent. Archaeological features likely associated with this settlement have been detected by remote sensing and geophysical survey, further contributing to the positioning of a selection of trial trenches.

6.1.5 If necessary, an additional contingency of up to 500m², equating to 5 No. trenches measuring 50m (l) by c. 1.8m (w), will be excavated to further investigate and characterise significant or unexpected remains should they be encountered during the trial trench evaluation (actual width to be determined by the width of the machine bucket). Any contingency trenching will only be carried out following approval by Fusion JV and agreement of additional costs.

6.1.6 All trial trenches listed in Table 2 have been assigned a unique ID in accordance with HS2 Ltd's Asset Information Management System (AIMS). The trenches have been positioned to avoid the identified constraints, but targeted on known areas of highest impact from the development proposals, including the insertion of new services/utilities, and where applicable, they are targeted on anomalies identified by the geophysical survey. The remaining trenches were placed to provide appropriate coverage of the evaluation.

6.1.7 Based on the information from HS2 ground investigations, it is considered likely that alluvial deposits as well as former palaeochannels may be present within the southern area of the site, specifically in Trenches 26, 28-30, 32-89 and 91). In the event of alluvium and/or peat deposits being identified their presence will be noted and the trench cleaned and recorded. FUSION JV will be informed and should investigation into the alluvial deposits be requested a method will be agreed and additional costs agreed accordingly. For example, a sondage could be excavated into the base of the trial trench to:

- Test the depth of any alluvium;
- Identify if there are surfaces contained within the alluvium; and
- Recover any artefacts and/or take environmental samples.

6.1.8 If the depth of any alluvium or palaeochannel sequence cannot be safely ascertained the trench base could, where safe and practicable, be hand-augered to sample the depth and record the stratigraphic unit.

AIM ID.	Tr. No.	Length	Tr. Width	Max Trench Depth	Objectives/Comments
	1	25	1.8	To natural geology	Investigate possible continuation of settlement features (situated to the south-east)
	2	25	1.8	To natural geology	Targeted on geophysical anomaly (linear)
	3	25	1.8	To natural geology	Investigate possible continuation of settlement features (situated to the south-east)
	4	25	1.8	To natural geology	Investigate possible continuation of settlement features (situated to the south-east)
	5	25	1.8	To natural geology	Investigate possible continuation of settlement

					features (situated to the south-east)
	6	25	1.8	To natural geology	Investigate possible continuation of settlement features (situated to the south-east)
	7	50	1.8	To natural geology	Targeted on parallel geophysical anomalies (linear boundaries/trackway?) in an area of potential prehistoric settlement/DMV
	8	25	1.8	To natural geology	Investigate possible continuation of settlement features (situated to the south-east)
	9	25	1.8	To natural geology	Investigate possible continuation of settlement features (situated to the south-east)
	10	25	1.8	To natural geology	Targeted on geophysical anomaly (rectilinear enclosure) in an area of potential prehistoric settlement/DMV
	11	25	1.8	To natural geology	Targeted on edge of geophysical anomaly (circular enclosure/barrow?) in an area of potential prehistoric settlement/DMV
	12	50	1.8	To natural geology	Targeted on geophysical anomalies at the edge of the settlement (linear) in an area of potential prehistoric settlement/DMV

	13	25	1.8	To natural geology	Investigate possible continuation of settlement features (situated to the east)
	14	25	1.8	To natural geology	Investigate possible linear anomaly associated within settlement in an area of potential prehistoric settlement/DMV
	15	25	1.8	To natural geology	Investigate seemingly "blank" area within settlement to test for presence of discrete features in an area of potential prehistoric settlement/DMV
	16	25	4	To natural geology	Targeted on geophysical anomaly (circular – roundhouse/barrow?) within settlement in an area of potential prehistoric settlement/DMV
	17	25	4	To natural geology	Targeted on geophysical anomaly (circular – roundhouse/barrow?) and intersecting linear feature in an area of potential prehistoric settlement/DMV
	18	25	1.8	To natural geology	Investigate possible continuation of settlement features (situated to the east)
	19	25	1.8	To natural geology	Targeted on geophysical anomaly (linear) and to test apparently blank area within the potential prehistoric settlement/DMV
	20	25	1.8	To natural geology	Targeted on geophysical anomalies (rectilinear enclosure?) in an area of

					potential prehistoric settlement/DMV
	21	50	1.8	To natural geology	Targeted on geophysical anomalies (linear boundaries?) associated with the potential prehistoric settlement/DMV
	22	25	1.8	To natural geology	Targeted on spread of geophysical disturbance to test for continuation of settlement related features
	23	25	1.8	To natural geology	Targeting ridge & furrow adjacent to potential prehistoric settlement/DMV – to test extent of settlement and for features which may be masked by agricultural activity
	24	25	1.8	To natural geology	Investigate "blank" area within ridge & furrow and to test extent of potential prehistoric settlement/DMV related features
	25	50	1.8	To natural geology	Investigate area beyond geophysical survey within area of medieval DMV
	26	25	1.8	To natural geology	Investigate "blank" area between concentrations of features associated with potential prehistoric settlement/DMV
	27	25	1.8	To natural geology	Investigate area beyond geophysical survey to test for settlement extent / outlying features

	28	25	1.8	To natural geology	Targeted on remote sensing feature (enclosure/linear boundaries) and to test for features associated with potential prehistoric settlement/DMV
	29	25	1.8	To natural geology	Random trench location within seemingly blank area to test true extent of the potential prehistoric settlement/DMV
	30	50	1.8	To natural geology	Targeted on geophysical anomalies & remote sensing feature (enclosure/linear boundaries)
	31	25	1.8	To natural geology	Investigate area beyond geophysical survey
	32	25	1.8	To natural geology	Targeted on remote sensing feature within ridge & furrow – to test for potential for features associated with potential prehistoric settlement/DMV to be masked by later agricultural activity
	33	25	1.8	To natural geology	Targeted on geophysical anomaly & remote sensing feature (linear) which may be associated with potential prehistoric settlement/DMV
	34	50	1.8	To natural geology	Investigate area beyond geophysical survey within area of medieval DMV; within area of "Chapel Bank" (1st Edition OS)

	35	25	1.8	To natural geology	Targeted on geophysical anomaly & remote sensing feature (linear) to test for extent of activity associated with potential prehistoric settlement/DMV
	36	25	1.8	To natural geology	Targeted on geophysical anomalies (discrete) and to establish extent of outlying settlement features
	37	25	1.8	To natural geology	Targeted on ridge & furrow near to settlement (potential prehistoric settlement/DMV)
	38	25	1.8	To natural geology	Targeted on geophysical anomaly (linear) in an area associated with potential prehistoric settlement/DMV
	39	25	1.8	To natural geology	Targeted on geophysical anomalies (enclosure) in an area associated with potential prehistoric settlement/DMV
	40	25	1.8	To natural geology	Targeted on ridge & furrow near to potential prehistoric settlement/DMV
	41	25	1.8	To natural geology	Targeted on geophysical anomalies (enclosures) associated with potential prehistoric settlement/DMV
	42	25	1.8	To natural geology	Investigate seemingly "blank" area between potential prehistoric settlement/DMV features and ridge & furrow
	43	25	1.8	To natural geology	Targeted on geophysical anomaly (linear) and to test

					area of poorly defined anomalies
	44	25	1.8	To natural geology	Investigate seemingly "blank" area to test for the presence of features associated with potential prehistoric settlement/DMV
	45	50	1.8	To natural geology	Targeted on geophysical anomalies (enclosures) potentially associated with potential prehistoric settlement/DMV
	46	25	1.8	To natural geology	Targeted on ridge & furrow near to settlement to test for the presence of features associated with settlement which may be masked by furrows
	47	25	1.8	To natural geology	Targeted on ridge & furrow near to settlement to test for the presence of features associated with settlement which may be masked by furrows
	48	25	1.8	To natural geology	Investigate seemingly "blank" area in an area of poorly defined anomalies
	49	25	1.8	To natural geology	Targeted on features at margin of potential prehistoric settlement/DMV
	50	25	1.8	To natural geology	Investigate seemingly "blank" area within the margins of potential prehistoric settlement/DMV

	51	50	1.8	To natural geology	Investigate area beyond geophysical survey within area of medieval DMV
	52	25	1.8	To natural geology	Targeted on remote sensing feature within the margins of potential prehistoric settlement/DMV
	53	25	1.8	To natural geology	Investigate seemingly "blank" area in an area of poorly defined anomalies
	54	25	1.8	To natural geology	Targeted on ridge & furrow near to settlement to test for the presence of features associated with settlement which may be masked by furrows
	55	50	1.8	To natural geology	Targeted on parallel geophysical anomalies (linear boundaries/trackway?) potentially associated with potential prehistoric settlement/DMV
	56	25	1.8	To natural geology	Investigate seemingly "blank" area in an area of poorly defined anomalies
	57	25	1.8	To natural geology	Targeted on geophysical anomalies within "blank" area (discrete)
	58	25	1.8	To natural geology	Targeted on remote sensing feature potentially associated with potential prehistoric settlement/DMV

	59	25	1.8	To natural geology	Investigate blank area and area beyond geophysical survey to test for presence of features associated with potential prehistoric settlement/DMV
	60	25	1.8	To natural geology	Investigate "blank" area between features associated with potential prehistoric settlement/DMV
	61	25	1.8	To natural geology	Targeted on ridge & furrow adjacent to settlement to test for the presence of features associated with settlement which may be masked by furrows
	62	25	1.8	To natural geology	Targeted on ridge & furrow adjacent to settlement to test for the presence of features associated with settlement which may be masked by furrows
	63	25	1.8	To natural geology	Targeted on feature at margin of settlement (linear boundary)
	64	25	1.8	To natural geology	Targeted on geophysical anomaly (pit?)
	65	25	1.8	To natural geology	Targeted on ridge & furrow adjacent to settlement to test for the presence of features associated with settlement which may be masked by furrows
	66	25	1.8		Investigate seemingly "blank" area in

				To natural geology	an area of poorly defined anomalies
	67	25	1.8	To natural geology	Targeted on geophysical anomaly (pit?)
	68	25	1.8	To natural geology	Targeted on geophysical anomalies (pits?)
	69	25	1.8	To natural geology	Investigate seemingly "blank" area on the outskirts of known activity associated with potential prehistoric settlement/DMV
	70	25	1.8	To natural geology	Targeted on ridge & furrow near to settlement to test for the presence of features associated with settlement which may be masked by furrows
	71	25	1.8	To natural geology	Targeted on remote sensing feature which may be associated with potential prehistoric settlement/DMV
	72	25	1.8	To natural geology	Targeted on ridge & furrow near to settlement to test for the presence of features associated with settlement which may be masked by furrows
	73	25	1.8	To natural geology	Investigate seemingly "blank" area of poor geophysics results

	74	25	1.8	To natural geology	Targeted on ridge & furrow near to settlement to test for the presence of features associated with settlement which may be masked by furrows
	75	25	1.8	To natural geology	Investigate seemingly "blank" area of poor geophysics results
	76	25	1.8	To natural geology	Investigate seemingly "blank" area at the edge of know settlement activity
	77	25	1.8	To natural geology	Investigate seemingly "blank" area at the edge of know settlement activity
	78	50	1.8	To natural geology	Targeted on geophysical anomalies (potential pits in an area of poorly defined anomalies)
	79	25	1.8	To natural geology	Targeted on geophysical anomalies (potential pits in an area of poorly defined anomalies)
	80	25	1.8	To natural geology	Investigate seemingly "blank" area to test for potential features associated with peripheries of potential prehistoric settlement/DMV
	81	25	1.8	To natural geology	Targeted on geophysical anomalies (potential pits in an area of poorly defined anomalies)

	82	25	1.8	To natural geology	Investigate seemingly "blank" area within the floodplain and potential to investigate alluvium
	83	25	1.8	To natural geology	Investigate seemingly "blank" area within the floodplain and potential to investigate alluvium
	84	25	1.8	To natural geology	Investigate seemingly "blank" area within the floodplain and potential to investigate alluvium & features near to suggested centre of DMV
	85	25	1.8	To natural geology	Investigate seemingly "blank" area within the floodplain and potentially test alluvium & features near to suggested centre of DMV (situated to the north- east)
	86	25	1.8	To natural geology	Investigate seemingly "blank" area within the floodplain and potential to test for alluvium & features near to suggested centre of DMV (situated to the north)
	87	25	1.8	To natural geology	Investigate seemingly "blank" area within the floodplain and potential to test for alluvium & features near to suggested centre of DMV (situated to the north)
	88	25	1.8	To natural geology	Investigate seemingly "blank" area within the floodplain and potential to test for alluvium & features near to suggested centre of DMV (situated to the north)

	89	25	1.8	To natural geology	Investigate "blank" area within extent of medieval DMV
	90	25	1.8	To natural geology	Targeted on geophysical anomalies at the edge of the settlement (linear) in an area of potential prehistoric settlement/DMV
	91	25	1.8	To natural geology	Investigate seemingly "blank" area within the floodplain and potential to investigate alluvium

7 Evaluation Trenching and Fieldwork Methodology

7.1 Setting Out and Recording

7.1.1 All spatial setting out and recording shall be in accordance with The Ordnance Grid and Ordnance Survey Newlyn Datum (ODN) as defined by the OS Active GNSS network. HS2 Primary Control PGMs, where they exist within the accessible contract package area, will be re-occupied during each survey to check the accuracy of the equipment.

7.1.2 Trial trenches shall be located (i.e. 'staked out') to a horizontal accuracy of +/-500mm. The corner points of each trench location shall be set out with Global Navigation Satellite System (GNSS) equipment with Real Time Kinematic (RTK) corrections from the Leica Smartnet service, or other suitable automated equipment referenced from Temporary Bench Marks (TBMs) should they be required.

7.1.3 Trial trench or excavation limits, height data and significant archaeology shall be recorded 'as dug' using RTK GNSS equipment to a 3-dimensional accuracy of +/- 100mm. Ground level height data shall be recorded for each trench. Survey methodology and a detailed survey record will be provided to FUSION JV within the survey report. Prior to the excavation of each trial trench the topsoil/ploughsoil will be sampled for the recovery of artefacts.

7.2 Artefact Collections

7.2.1 Prior to the excavation of each trial trench the topsoil/ploughsoil will be sampled for the recovery of artefacts.

7.2.2 Two sample locations will be tested at each trench location and should be recovered from each end of the trench, for a total of 90 test pits. Each sample will be recovered using a shovel or mechanical excavator fitted with a toothless ditching bucket and placed on an adjacent board or tarpaulin/ geotextile.

7.2.3 Samples will be equivalent in volume to a 0.25m by 0.25m test pit of a depth corresponding to the particular plough soil depth at each test pit location and the plough soil will be dry hand-sieved through a 10mm wire mesh. Samples will be sieved on site.

7.2.4 In the event of encountering substantial quantities of archaeological artefactual evidence during the test pit phase, an amended trenching strategy may be employed to better understand the factors behind the evidence. Any trial trench amendments will be discussed with Fusion JV and a change control process (see Section 9) will be implemented if required.

7.3 Mechanical Excavation

7.3.1 Trial trenches shall be excavated to the first archaeological horizon or natural geology, whichever is encountered first. Excavation will be undertaken using a mechanical excavator with toothless ditching bucket.

7.3.2 In the unlikely event that modern foundations are encountered, and where it is clear that modern foundations have truncated certain archaeological levels, they should be removed to assess lower archaeological levels. ARS Ltd shall take all reasonable care to ensure that any damage to archaeological deposits is limited as far as practicable. If significant damage is likely to occur the work shall be suspended and Fusion JV's Historic Environment Manager informed so that a technical solution can be agreed.

7.3.3 Machining shall be carried out under the constant supervision of ARS Ltd to excavate the ground in spits. ARS Ltd shall use their professional judgement to determine the appropriate depth of each spit. Any variations to the excavation methodology shall be at the discretion of the ARS Ltd and recorded in writing for inclusion in the final report. Each spit shall be examined carefully to assist the recovery of any archaeologically significant artefacts and thus to determine when to cease machining. It is the responsibility of the ARS Ltd to ensure that the finished surface is machined to a suitably 'clean' state in order to identify, define and investigate any exposed archaeological deposits. If the surface is not sufficiently clean, hand cleaning of the surface will be required. Machine excavation will comply with HS2 Ltd's Technical Standard - Route wide soil resources plan (HS2-HS2-EV-STD-000-000008).

7.3.4 Metal detectors will be used by experienced staff to scan for metallic finds during the excavation of key archaeological features or deposits. The spoil from each trench will also be subject to a metal detector survey, with any finds recorded on the relevant trench sheet.

7.3.5 ARS Ltd shall ensure that water is discharged and excavated material from archaeological excavations are stored in accordance with Fusion JV's environmental protection requirements (as set out in the package Works Information and their Environmental Management Plan) and

any relevant consents for the worksite. Fusion JV shall monitor discharge rates and, if necessary, conductivity of discharge waters to ensure compliance.

7.3.6 In the unlikely event that deep stratigraphy is encountered, such as alluvial or colluvial sequences, each intervention shall be excavated to the base of the stratigraphic sequence, and shall be appropriately stepped or shored and kept free of water sufficient to allow 'person entry' to the excavations to allow ARS Ltd to undertake investigation and recording and any sampling to fulfil the aims of the work prior to backfilling. ARS Ltd will ensure that all works undertaken in deep stratigraphy will comply with HS2 Ltd's Technical Standard – Temporary Works (HS2-HS2-CV-STD-000-000005). When recording deep stratigraphic sequences ARS Ltd shall pay particular attention to establishing the vertical extent of layers of archaeological potential and shall be aware that horizons of cultural activity may be interdigitated with horizons of sterile sediments. ARS Ltd will supervise the excavation in such a manner so as to allow a cumulative or continuous section to be recorded.

7.3.7 Should any material be excavated that is deemed to be contaminated or potentially contaminated it shall be investigated, controlled (e.g. placed separately from clean material) and removed from the site in accordance with Fusion JV's environmental protection requirements (as set out in their Environmental Management Plan).

7.4 Sondages into Alluvium

7.4.1 The BGS has mapped alluvial deposits along the route of a watercourse that divides the site. In the event that alluvial deposits are identified within the site in the trenches nearest to the watercourse (Trenches 82-88), following the excavation and recording of all overlying features, ARS Ltd will inform FUSION JV and discuss and agree whether to, how to and the associated additional costs of sampling any such alluvial deposits to test their depth, sedimentary sequence and for the recovery of artefacts. Alluvium could be investigated through the excavation of a single sondage to the full depth of the alluvium in each trench location where it is identified.

7.4.2 Each sondage in the alluvium would measure no less than 1.5m x 1.5m and would typically be excavated to the top of the underlying solid geology. This will be undertaken through the excavation of a single machine-excavated sondage where the alluvium is expected to be at its deepest. It is expected that in practice this will mean excavating sondages within the ends of trenches closest to the watercourse in the centre of the valley.

7.4.3 Sondages will provide the opportunity to observe the full stratigraphic sequence in section and access larger volumes of sample than is achievable through coring.

7.4.4 Where identified, the alluvial layers will be first assessed by ARS Ltd's geo-archaeologist and investigated for the presence of artefacts, primarily lithic implements, flakes etc. Unless the initial inspection of the exposed alluvial deposits should produce surface finds, each slot will be excavated with the use of the machine under constant archaeological supervision. Arisings from each machine-excavated spit will be inspected for the presence of artefacts. Should lithic

artefacts be identified, the machine excavation will be halted and the excavation of a sondage will be undertaken manually at minimum to the base of the discrete stratum that produced the artefacts.

7.4.5 ARS Ltd shall supervise the excavation of each sondage in such a manner as to allow a cumulative or continuous section to be recorded. Particular attention will be made to establishing the vertical extent of layers of archaeological and/or palaeoenvironmental potential and must remain aware that horizons of cultural activity could be interlaced within layers of sterile alluvium. Archaeologically significant horizons will be cleaned and hand excavated.

7.4.6 ARS Ltd shall ensure that any water is discharged and arisings stored in accordance with Fusion JV's environmental protection requirements and any other relevant consents for the site. ARS Ltd will monitor discharge rates and if necessary conductivity of discharge waters to ensure compliance.

7.4.7 Where sondages into alluvium are unsafe to enter, ARS Ltd shall direct excavation in a manner that will allow excavated sediments to be adequately sampled and interpreted by their geo-archaeologist. Material to be sampled will be placed by the excavator at a safe distance from both the sondage and plant, and scanned for finds. The sedimentary sequence will be recorded by ARS Ltd's geo-archaeologist according to standard conventions (HE 2015c) to include sediment structure, colour, texture, sorting and any identifiable boundary characteristics. Depths of each stratigraphic boundary will be recorded, or where full access is unsafe estimated and recorded as such. Should in-situ lithic horizons be discovered, and access to deep excavation be deemed necessary in prior consultation with Fusion JV's Historic Environment Manager, there may be a need for trenches to be stepped or temporary works to be installed, to provide safe access and working environment to adequately evaluate the archaeological horizons.

7.4.8 Where entry to a sondage is safe and practicable, buried soils will be inspected and recorded by the ARS Ltd's geo-archaeologist to provide data for understanding formation processes. Procedures and techniques for this data capture will be as outlined in Historic England guidance (Campbell et al. 2011 and HE 2015c). Samples for laboratory assessment, analysis and dating shall be collected where appropriate following agreement with the Fusion JV Historic Environment Manager.

7.4.9 All sondages into alluvium will be backfilled as soon as their stratigraphy has been recorded and arisings inspected/sieved for artefacts.

7.4.10 Where significant alluvial deposits are identified within a sondage by the geo-archaeologist, or archaeological remains are encountered, ARS Ltd with Fusion shall implement a change-control process (see Section 11) for additional sondages and, where appropriate, further surveys.

7.5 Hand Excavation

7.5.1 Archaeological hand excavation and recording shall be undertaken to the general requirements as described in the GWSI: HERDS and the Technical Standard Specification for historic environment investigations (HS2-HS2-EV-STD-000- 000035; section 4.14 and 4.17). The sufficient sample strategy will be guided by the CIfA Standard and guidance for archaeological field evaluation (2014), as well as, where applicable, Local Planning Authority guidance. ARS Ltd will ensure that sufficient sample of the features and deposits encountered are sampled/fully excavated to allow the resolution of the aims and objectives of the work. Structures, features, or finds which might reasonably be considered to merit preservation in situ are not be unduly damaged.

7.5.2 Where areas of extensive archaeological stratification are encountered, the horizontal and vertical extent of archaeological stratification shall be through implementation of an appropriate strategy including, either the excavation of features cut into horizontal stratification, limited test pitting or auguring. The aim shall be to recover suitable stratigraphic, finds and environmental samples from the first archaeological horizon of the trench. The exact methodology for stratified layers/deposits will need to be discussed with Fusion JV and a change-control process implemented should layers of archaeology require excavation and removal so that underlying layers of archaeology can be cleaned, sampled and recorded.

7.5.3 All investigation of archaeological layers will usually be by hand, with cleaning, examination and recording both in plan and section.

7.5.4 Within significant archaeological layers, the minimum number and proportion of features required to meet the aims of the evaluation will be sample excavated by hand. Pits and postholes will usually be subject to a 50% sample by volume. Linear features will be sectioned as appropriate. More complex features such as those associated with funerary activity will usually be sampled, but any human burials will be left in situ and the Fusion JV Historic Environment Manager informed (see below 9.2). The sample volume of features may be increased, in some circumstances, should the archaeological content or value of a feature warrant further investigation at the evaluation stage, following agreement with Fusion JV.

7.5.5 It is not necessarily the intention that all trial trenches will be fully excavated to natural stratigraphy, but the depth of archaeological deposits across the site will be assessed. The stratigraphy of a representative sample of the evaluation trenches will be recorded even where no archaeological deposits have been identified. Any excavation, both by machine and by hand, will be undertaken with a view to avoiding damage to any archaeological features or deposits, which appear to be worthy of preservation in situ.

7.5.6 Where deposits are investigated, and found to be undated, and where these have the potential to be of archaeological significance (e.g. of earlier prehistoric or early medieval date, or any other deposit types notable for artefactual scarcity) appropriate samples will be taken

for artefact recovery. The soil will be hand excavated and then sieved or screened through 10mm wire mesh to recover artefacts. Samples will be sieved on site or retained for immediate sieving off-site.

7.5.7 In order to protect any waterlogged remains during the works, ARS Ltd may identify a requirement for trial excavations to be allowed to refill with water overnight. In such cases, the ARS Ltd shall ensure that any hazards to staff or 3rd parties are minimised.

8 Recording

8.1 Fieldwork Recording

8.1.1 The site will be tied into the National Grid and located on a 1:2500 or 1:1250 map of the area. The site will be recorded in accordance with the ARS Ltd. field recording manual and Fusion JV requirements.

8.1.2 Archaeological recording is to include, as a minimum:

- At least one representative section at (1:10 or 1:20 scale) of each evaluation trench, from ground level to the base of the excavation;
- the written record of individual context descriptions on appropriate pro-forma;
- plans at appropriate scales (1:10, 1:20 or 1:50);
- single context planning will be used only if appropriate;
- photographs and other appropriate drawn and written records; and ·
- other sections, including the half-sections of individual layers or features shall be drawn as appropriate to 1:10 or 1:20.

8.1.3 A 'site location plan', indicating site north shall be prepared at 1:1250. Individual as dug 'trench plans' at 1:200 (or 1:100) will be prepared which show the location of archaeology investigated in relation to the investigation area. The location of site plans will be identified using OSGB co- ordinates.

8.1.4 Section drawings shall be located on the relevant plan and OSGB co-ordinates recorded. The locations of the PGM bench marks used to relate the survey to and any site TBM shall also be indicated.

8.1.5 A record of the full extent in plan of all archaeological deposits as revealed in the investigation shall be made. These plans will be based on digital survey data and supplemented where appropriate by hand drawn records on polyester based drawing film (at a scale of 1:10 or 1:20 unless otherwise agreed with Fusion JV's Historic Environment Manager and HS2 Ltd). All hand drawn information shall be digitised (or preferably generated digitally in the first instance), and final deliverables will be supplied in an Esri format and adhere to standards set

out in the HS2 Ltd's Cultural Heritage GIS Standard (HS2-HS2-GI-SPE-000-000004). Single context planning shall be used where complex stratigraphy is encountered.

8.1.6 A 'Harris matrix' stratification diagram shall be employed to record stratigraphic relationships (Harris et al. 1993) where appropriate. This record shall be compiled and fully checked during the course of the excavations. Spot dating shall be incorporated onto this diagram.

8.1.7 Recording of structural evidence revealed below ground level will vary according to the level of special interest of the structure and its relationship to archaeological remains. Structures of little or no significance shall be noted on a site plan. Detailed drawings of important features revealed in investigations may be required in accordance with the aims and objectives of the investigation as defined in the Project Plan.

8.1.8 The photographic record will be in digital format, resulting in high resolution TIFF (uncompressed) images. Photographs will illustrate both the detail and context of the principal archaeological features discovered. In addition, ARS Ltd shall take appropriate record photographs to illustrate work in progress. All photographic records will include information detailing: site name and number/code, date, context, scale and orientation. A selection of progress photos of publication quality will be submitted with the weekly progress report.

8.2 Human Remains

8.2.1 Where human remains are identified, all subsequent work must be undertaken in accordance with HS2 Ltd's Human remains and monuments procedure (HS2-HS2-EV-PRO-0000- 000008) and Technical Standard Specification for historic environment investigations (HS2- HS2-EV-STD-000-000035 section 4.18 Methodology for archaeological excavation of human burials). Whilst previous investigations have not recorded any burials, the site is located on the periphery of a posited prehistoric/Roman settlement and, therefore, the potential for encountering human remains within the site cannot be ruled out. Should human remains be discovered, ARS Ltd shall notify Fusion JV's Historic Environment Manager immediately, who will notify HS2 Ltd, so that the procedures set out in HS2 Ltd's Human Remains and Monuments Procedure (HS2-HS2-EV-PRO-0000-000008) can be implemented. This notification may be initially made personally or by telephone but shall be confirmed in writing (including email) within 24 hours of discovery.

8.2.2 In the event that human remains are identified, all works will cease at that location until further instruction is provided by HS2 Ltd and communicated by Fusion JV's Historic Environment Manager. ARS Ltd shall undertake an initial in situ observation and assessment of the remains and shall advise Fusion JV's Historic Environment Manager of the course of action required. Fusion JV's Historic Environment Manager will then notify HS2 Ltd.

8.3 Treasure

8.3.1 Finds of "treasure" will be reported to Fusion JV for onward contact to the Coroner in accordance with the Treasure Act (DCMS 2008). Fusion JV will also notify the Local Planning Archaeologist and the Portable Antiquities Finds Liaison Officer.

8.3.2 Fusion JV will agree and arrange, if necessary, a site meeting with the Local Planning Archaeologist and the Portable Antiquities Liaison Officer to determine if further investigation in the vicinity of the findspot is required.

9 Sampling Strategy

9.1 Environmental Samples

9.1.1 In line with HS2 Ltd's Technical Standard Specification for Historic Environment Investigations (HS2-HS2-EV0STD-000-000035) an initial sampling strategy is set out below for the site. This strategy is based on the existing information about the site, gathered from non-intrusive surveys and the HERDS objectives outlined in Table 1.

9.1.2 This sample strategy, along with the HERDS objectives outlined in Table 1, identify the key elements that should, where present, be sampled during the evaluation. However, the strategy will need to be reviewed throughout the on-site work and, where unexpected features or deposits are identified, revised accordingly to take these into account.

9.1.3 The purpose of sampling at the evaluation stage is to identify the range of environmental materials present on site, their preservation, significance and distribution.

9.1.4 The site has the potential for features associated with prehistoric/Roman activity as well as with medieval and post-medieval archaeological remains, which could include enclosures, land boundaries, trackways, and ridge and furrow earthworks as identified in Section 5.1. Sampling will, therefore, target the following, where present, as a minimum:

- Archaeological features identified as cropmarks or geophysical anomalies which are likely associated with potentially prehistoric, Roman or medieval activity, including settlement-related features (i.e. ditches, gullies, earthworks) as well as other relevant remains (i.e. pits or postholes); and
- Deposits representing the main phases of activity on site (to assess whether there are changes in rates of deposition or material survival over time).

9.1.5 Sampling will not only target organic-rich or wet deposits, but will be undertaken on those features outlined above, taking into account advice from Fusion JV's environmental archaeologist. This will ensure that samples are recovered from a representative range of contexts, which adequately characterise past activities on site and allow an assessment to be

made of the extent to which they help address palaeoenvironmental and palaeoeconomic questions.

9.1.6 Where unexpected deposits or features are identified during the evaluation which are not covered in the initial sampling strategy above, the need for sampling will be assessed in terms of the specific objectives (both those in Table 1 as well as the remaining HERDS objectives), the sampling strategy will be updated as necessary and the features will be sampled accordingly.

9.1.7 All samples will be taken to address a specific question. The purpose of the sample, and the question it has been taken to address will be recorded on ARS Ltd's sample record sheet.

9.1.8 Samples will be taken using ten litre plastic buckets (with lids and handles), or strong polythene bags (double bagged) secured at the neck, for the recovery of bulk 'disturbed' environmental samples. Labelling will follow guidance set out in the Technical Standard Specification for Historic Environment Investigations (HS2-HS2-EV-STD-000-000035).

9.1.9 For non-waterlogged deposits bulk samples will normally be taken in the range of 40-60 litres. Where contexts have a volume of less than that stated above, then 100% of the context will be sampled. Each bulk sample will only contain sediment derived from a single context. Where waterlogged deposits are encountered, sample sizes will usually be in the range of 10-20 litres, which is suitable for the recovery of macrofossils from these contexts. Samples shall be protected at all times from temperatures below 5°C and above 25°C and from wetting and drying out due to weather exposure.

9.1.10 Where house floor deposits or other buried land-surfaces are encountered and these are sampled, appropriately sized monolith or kubiena boxes will be used for the recovery of 'undisturbed' monolith samples for soil micromorphology and to sub-sample for microfossils (e.g. pollen and spores, diatoms, ostracods). Where longer sequences are sampled, contiguous column samples will be collected for the retrieval of macrofossils (e.g. molluscs, plant remains and insects). Further guidance on specialist samples is provided in the Technical Standard Specification for Historic Environment Investigations (HS2-HS2-EV-STD-000-000035 – Sections 4.21.22-26).

9.1.11 Processing of all soil samples collected for biological assessment, or subsamples of them, will be completed within two weeks of collection. The preservation state, density and significance of material retrieved shall be assessed by an ARS Ltd palaeoenvironmental specialist. Special consideration shall be given to any evidence for recent changes in preservation conditions that may have been caused by alterations in the site environment. Unprocessed sub-samples shall be stored in appropriate conditions in accordance with ARS Ltd's method statement.

9.2 Metallic Objects and Residue

9.2.1 Where works are intended to address specific objectives, or any further objectives identified during the course of the investigation, relating to industrial activity and there is evidence for

industrial activity, macroscopic technological residues (or a sample of them) shall be collected by hand. Separate samples (c. 10ml) shall be collected for micro-slags (hammer-scale and spherical droplets). Reference should be made to the guidance on Archaeometallurgy (Historic England guidance, 2015). Assessment of any technological residues shall be undertaken. Assessment of finds assemblages shall, where appropriate to the specific objectives being addressed, include x-radiography of all iron objects (after initial screening to exclude obviously recent debris) and, where appropriate, nonferrous artefacts (including all coins). Where necessary, active stabilisation/consolidation shall be carried out to ensure long-term survival of the material, but with due consideration to possible future investigations.

9.3 Geoarchaeology

9.3.1 Samples collected for geoarchaeological assessment will be processed promptly by the ARS Ltd's specialist, and appropriate assessment undertaken as agreed with FUSION JV and HS2 Ltd.

9.4 Preservation of Archaeological Remains

9.4.1 Where preservation has been identified as an option for areas of the site, or it becomes clear during the evaluation that certain parts of the site might be retained in situ within the scheme design, ARS Ltd will ensure that suitable samples are taken to assess the state of preservation (as set out in Historic England guidance on preserving archaeological remains). Where it is proposed that waterlogged deposits are preserved, discussion will be held with Fusion JV about initiating a water environment study. If preservation is considered to be a viable and desirable option, the areas proposed should be excluded from further plant/vehicle movement, to minimise the possible effects of compression and loading on the physical integrity of the site. Thought should also be given to whether the proposed construction works will have any short or long term hydrogeological or chemical impacts on the archaeological remains.

10 Backfilling

10.1.1 Trenches shall only be backfilled following approval by Fusion JV. The trenches shall be pumped dry (under a permit to pump as per Fusion JV's procedure) and any necessary protection measures for archaeological remains (in addition to those for below ground infrastructure, services or utilities) shall be completed prior to backfilling. Backfilling shall be undertaken in layers of 250mm whilst being adequately compacted. Trenches shall be commonly reinstated with arising, comprising subsoil first then topsoil (i.e. reverse order of excavation).

10.1.2 Generally, all backfill material shall consist of non-toxic, uncontaminated, non-putrescible, natural and inert material which shall be compacted and (if necessary) tested (dynamic

compaction test or other) in accordance with a specification provided by Fusion JV. Surface conditions shall be reinstated to the required standard.

10.1.3 Sondages into alluvium will be excavated and recorded rapidly so that deep trenches are not left overnight. These deeper pits will be backfilled as soon as their stratigraphy has been recorded.

10.1.4 Fusion JV shall ensure, in liaison with HS2 Ltd, that adequate protection is provided for any archaeological remains. Any specific archaeological requirements relating to backfilling including use of materials to mark excavated depth, such as geotextiles, shall be specified.

11 Finds Processing and Storage

11.1.1 All finds processing, conservation work and storage of finds will be carried out in accordance with the CIfA (2014c) Standard and Guidance for the collection, documentation, conservation and research of archaeological materials and the UKIC (1990) Guidelines for the Preparation of Archives for Long-Term Storage.

11.1.2 Artefact collection and discard policies will be appropriate for the defined purpose.

11.1.3 Bulk finds which are not discarded will be washed and, with the exception of animal bone, marked. Marking and labelling will be indelible and irremovable by abrasion. Bulk finds will be appropriately bagged, boxed and recorded. This process will be carried out no later than two months after the end of the excavation.

11.1.4 All small finds, except ceramic sherds, will be recorded as individual items and appropriately packaged (e.g. lithics in self-sealing plastic bags and ceramic in acid-free tissue paper). Ceramic sherds will be recorded together by context. Vulnerable objects will be specially packaged and textile, painted glass and coins stored in appropriate specialist systems. This process will be carried out within two days of the small find being excavated.

11.1.5 During and after the evaluation excavation all objects will be stored in appropriate materials and storage conditions to ensure minimal deterioration and loss of information (including controlled storage, correct packaging, and regular monitoring, immediate selection for conservation of vulnerable material). All storage will have appropriate security provision.

11.1.6 The deposition and disposal of artefacts will be agreed by Fusion JV with the legal owner and appropriate recipient museum prior to the work taking place. All finds except treasure trove are the property of the landowner.

11.1.7 All retained artefacts and ecofacts will be cleaned and packaged in accordance with the requirements of the recipient museum.

12 Post-Investigation reporting and Archiving

12.1 Interim Report

12.1.1 ARS Ltd shall submit an interim statement to HS2 Ltd within two weeks of completion of the evaluation. The interim statement will be consistent with the requirements detailed in the Specification for historic environment investigations (Document no. HS2-HS2-EV-STD-000-000035) and will provide HS2 with the information necessary to inform design decisions relating to:

a. the next stage of archaeological works (if required) and

b. engineering design.

12.1.2 Interim reports are only used to inform on decision-making for further works in programme-critical areas and when confidence in the geophysical survey and trial trenching results has indicated that a site has no significant archaeological potential. It is preferable that all decisions for further works are based on the full factual fieldwork reports.

12.2 Trial Trench Technical Report

12.2.1 The C01 fieldwork report will be produced within 6 weeks of completion of fieldwork, compliant with the following structure:

- Non-technical summary;
- Introduction;
- Summary of project's background;
- Description and illustration of the site location;
- Previous work(s) brief summary relevant to the archaeology of the site (e.g. previous surveys);
- Geology and topography of the site;
- Aims and Specific Objectives;
- Methodology of site-based and off-site work;
- Results and observations, including quantitative report, stratigraphic report and any constraints on site;
- Assessment and interpretation of results against original expectations and objectives and, where appropriate, a review of evaluation strategy;

- Statement of potential archaeology;
- Conclusions and recommendations for appropriate archaeological investigation strategy or post–excavation assessment in light of Specific Objectives;
- Considerations of the results and conclusions within the wider context;
- Evaluation of methodology employed and results obtained (i.e. a confidence rating);
- Publication and dissemination proposals (in addition to fieldwork report);
- Archive deposition;
- Bibliography
- Acknowledgements;
- OASIS/HER form;
- Site matrices, where appropriate;
- Specialist assessment or analysis reports where undertaken;
- Illustrations, including location plans with scale and grid co-ordinates.

12.2.2 The trial trenching report will contain figures accompanied by supporting text. All figures within the report shall be on the same paper size, where appropriate. All categories of anomaly identified will be labelled with the appropriate assigned number code on the figures, which will be referred to in the text document.

12.2.3 The following figures will be included in trial trenching reports:

- General plan (mandatory)
- Engineering design (mandatory)
- Site location
- Survey extent and trial trench locations
- Survey results to include plans and sections of archaeological features, deposits and sequences
- Selected photographs of representative and/or significant features and finds

12.2.4 With regard to Digital Archival Material including OASIS/Historic Environment Record summary sheets, ARS Ltd will provide the required data, metadata and digital material as

specified in the Historic Environment Digital Data Management and Archiving Procedure (C262-ARP-EVSPE-000-000003).

12.3 Survey Report

12.3.1 A survey report will include a written and graphic survey report for the works upon completion of fieldwork as an appendix to the Fieldwork report. Evidence shall be provided for check measurements and results of levelling for establishment of any TBMs where used. Unless otherwise agreed, the survey report shall be submitted by ARS Ltd to Fusion JV and HS2 Ltd within two weeks of completion of fieldwork.

12.3.2 ARS Ltd shall prepare and submit site area outlines and levels in accordance with HS2 Ltd's Cultural Heritage GIS Standard (HS2-HS2-GI-STD-000- 000010) and BIM requirements. Each drawing shall identify the relevant event code and sub- site division, if applicable.

12.4 Archaeological Summary Report

12.4.1 A short summary report of no more than 500 words (the Summary Report) for the works shall be prepared by ARS Ltd for submission to Fusion JV for subsequent publication within an appropriate journal or publication outlet specified by HS2 Ltd.

12.4.2 ARS Ltd shall submit the draft summary report to Fusion JV for approval within 8 weeks of the completion date of the fieldwork event. Fusion JV will review the draft summary report and then issue it to HS2 Ltd for comment and approval. ARS Ltd shall allow two weeks in the programme of works for Fusion JV and HS2 Ltd to provide comments.

12.4.3 ARS Ltd shall include any amendments required by Fusion JV and HS2 Ltd in the final Summary Report which shall be submitted within one week of receiving comments on the draft report.

12.5 GIS Deliverables

GIS Deliverables will be provided to Fusion JV for approval within 8 weeks of the completion date of the fieldwork. The specific requirements of this deliverable are provided by HS2 in the Technical Standard Specification for historic environment investigations (HS2- HS2-EV-STD-000-000035) and the GWSI: HERDS (HS2-HS2-EV-STR-000-000015).

13 Information Management

13.1.1 GIS deliverables will be provided in accordance with HS2 Ltd's Cultural Heritage GIS Specification (HS2-HS2-GI-SPE-000-000004). CAD files will be GIS compatible and follow standards set out in the same specification. Figures may be produced using CAD but final deliverables will be supplied in GIS format.

13.1.2 Mapping and spatial data deliverables will conform to HS2 Ltd's GIS Standards as set out in HS2-HS2-GI-STD-000-000002 and other associated referenced documents.

13.1.3 HS2 Ltd's standard template for reports (HS2-HS2-PM-TEM-000-000004) will be used.

14 Quality Assurance Processes

14.1.1 All archaeological works will be delivered in accordance with Fusion JV's AWH Quality Plan (ref. 1EW03-FUS-QY-PLN-C000-001658). The trial trenching report will be prepared and conducted by suitably qualified, experienced and competent professionals.

14.1.2 The trial trenching report will be checked and then reviewed by senior qualified, experienced and competent professionals prior to issue to HS2 Ltd for acceptance. Final reports, following comments, will be checked and reviewed again prior to issue.

15 Change Control

15.1.1 During the course of the archaeological investigation unexpected, complex or undated archaeological remains may be encountered. In order to inform the decision making process and to minimise delays to the enabling works construction programme it may be necessary to implement a contingency or vary the methodology or extent of the archaeological investigation.

15.1.2 The GWSI: HERDS establishes the need to manage unexpected discoveries and regularly review ongoing fieldwork events (Sections 7.6.5 and 7.6.17; Document no.: HS2-HS2-EV-STR-000-000015). In order to promote rapid decision making and to minimise delays a clearly defined change control process will be followed. This change control process will enable:

- rapid decision making during historic environment investigations;
- the implementation of contingencies;
- the variation of methodologies being used on site;
- the localised extension of investigation areas: and
- the rapid implementation of mitigation measures.

15.1.3 The change control process will also enable effective cost control while minimising the risk to the enabling works programme.

15.1.4 The change control process will be recorded using the proforma Historic Environment Fieldwork Change Control Acceptance Sheet at Appendix B of this project plan and will comprise the following steps:

1. ARS Ltd will:

- prepare an interim summary of the investigation results noting key features or elements of the archaeological remains or structure;
- provide a proposal for the variation to the works or methodologies; and
- suggest any new or existing HERDS objectives to which the variation may provide opportunities for knowledge gain;

2. The interim summary will be submitted to Fusion JV's Historic Environment Manager who will disseminate the results and arrange a meeting on site with HS2 Ltd's Historic Environment Manager and local authority (stakeholder) archaeologist;

3. At the site meeting all parties will:

- review the nature, extent and significance of the archaeological remains;
- review and agree the proposed variation to the works; and
- signify their endorsement or approval of the variation by signing the Historic Environment Fieldwork Change Control Acceptance Form.
- Following agreement with the Fusion commercial team a work instruction will be issued to the subcontractor via the Fusion Package Manager.

4. Following the site meeting Fusion JV will submit a copy of the completed Historic Environment Fieldwork Change Control Acceptance Form to HS2 Ltd via eB.

5. Where the rapid implementation of mitigation measures is required Fusion JV will, prior to completion of the ongoing archaeological investigation:

- prepare a new Project Plan detailing the aims, HERDS objectives and specification of the archaeological mitigation and submit it to HS2 Ltd for acceptance;
- Request a new site code from HS2 Ltd; and
- Update and resubmit the existing LSWSI to include the archaeological mitigation works.

16 Archive Deposition

16.1.1 Should the project produce no archaeologically significant finds, then Fusion JV will be advised accordingly that it would be the intention of ARS Ltd that no site archive be placed with a recipient museum.

16.1.2 If the project produces archaeologically significant finds, then Fusion JV will be notified at the earliest opportunity. A paper and artefactual archive and any appropriate digital archive will be prepared by ARS Ltd, consisting of all primary written documents, plans, sections, photographs and electronic data (in a format required by Fusion JV).

16.1.3 All artefacts and associated material will be cleaned, recorded, properly stored and deposited in the archive.

16.1.4 A full set of annotated, illustrative pictures of the site, excavation, features, layers and selected artefacts will be deposited with the archive as digital images on a CD ROM.

16.1.5 At the start of work (immediately before fieldwork commences) an OASIS online record http://ads.ahds.ac.uk/project/oasis/ will be initiated and key fields completed on Details, Location and Creators forms. All parts of the OASIS online form will be completed for submission to the HER. This will include an uploaded .pdf version of the entire report (a paper copy will also be included within the archive).

17 Monitoring Arrangements

17.1.1 Archaeological Research Services Ltd. acknowledges that it is the responsibility of the Fusion JV to monitor the archaeological works. Reasonable notice shall be provided before the commencement of works and to arrange monitoring visits with the ARS Ltd Project Manager.

17.1.2 ARS Ltd will liaise with the Fusion JV Historic Environment Manager at regular intervals throughout the course of the work.

18 Timetables, Staffing and Resources

18.1.1 The Project Manager for the work is Will Throssel and the Archaeological Technical Lead is Lawrence Pontin. The Fieldwork Project Officer will be Caitlin Halton () or Dr. Rebecca Trow (ACIfA) or another as may be appointed by ARS Ltd. An outline timetable for project implementation is presented below

18.1.2	Task	18.1.3	Commencement date
18.1.4	Evaluation trenching on site	18.1.5	See Project Programme
18.1.6	Trial trenching post-excavation analysis, including any specialist reporting required	18.1.7	See Project Programme
18.1.8	Trial trenching report preparation and completion	18.1.9	See Project Programme

Table 2. Outline timetable for project implementation

18.1.10 Finds analysis will be carried out by appropriately qualified specialists as detailed subject to availability.

• Flint and prehistoric pottery:	Dr Robin Holgate MCIfA
• Romano-British pottery:	Ian Rowlandson
• Samian ware:	Dr Gwladys Monteil
• Medieval and post-medieval pottery:	Dr Chris Cumberpatch/Dr Robin Holgate MCIfA
• Clay pipes:	Dr Rebecca Trow
• Metalliferous materials	Dr Simon Timberlake
• Plant macros, charcoals & pollen:	Luke Parker / Denisa Cretu
• Geoarchaeologist	Luke Parker
• Insects	Denisa Cretu
• Human and animal bone:	Milena Grzybowska
• Radiocarbon dating:	Prof Gordon Cook (SUERC)
• Finds conservation:	Vicky Garlick (Durham University)

19 General Items

19.1 Health and Safety

19.1.1 All work will be carried out in accordance with The Health and Safety at Work Act 1974. Specific health and safety policies exist for all out workplaces and all staff employed will be made aware of the policy and any relevant issues. The particular risks involved with this project have been assessed, recorded and relevant mitigation measures put in place as part of the risk assessment and Method Statement submitted as part of this project.

19.2 Insurance Cover

19.2.1 ARS Ltd has full insurance cover for employee liability (£10 million) public liability (£10 million), professional indemnity (£10 million) and all-risks cover.

19.3 Changes to the Written Scheme of Investigation

19.3.1 See 15. Change Control.

19.4 Copyright

19.4.1 Any publicity will be handled by the client. ARS Ltd will retain the copyright of all documentary and photographic material under the Copyright, Designs and Patent Act (1988).

20 Constraints

20.1.1 Given the present status of the Site as arable and pasture land it will be necessary for ARS Ltd to ensure that the fields are in a suitable condition for the investigations (i.e. no mature crops or livestock) prior to commencement. Several of the constraints listed below include existing services and this information has been prepared from data provided by Fusion JV. It is the responsibility of ARS Ltd to conduct a review of the services including new searches before works commence.

20.1.2 Survey data indicates there is a low potential for unexploded ordnance (UXO) on the Site.

20.1.3 Site specific constraints/hazards include:

- Otter holts. Several otter holts have been identified near the boundaries of the Site along the course of the River Itchen and fishponds at the Chapel Bank Cottage (Figure 8). The scheme design takes account of the identified otter holts, and 30m exclusion zones have been created around them, which will need to be visibly demarcated on Site. In order to protect animals against falling into trenches, fencing will need to be erected and ramps left overnight within each trench. Each trench will also need to be checked for animals daily prior to starting work.
- Overhead services. Medium voltage overhead services have been identified crossing the central part of the site parallel to the road between Lower and Upper Radbourne Farms, and along the Site's eastern boundary (Figure 9). A buffer of 10m was applied for the overhead service lines when designing the trench layout, however appropriate measures will need to be implemented when manoeuvring machinery in the vicinity of the overhead cables.
- Buried services. A series of buried telecom ducts have been recording crossing the Site (Figure 9). This has been taken into account in the scheme design, and a 10m buffer was applied.
- Watercourses. The River Itchen crosses the southern part of the Site. A buffer of 8m will be established from this watercourse in which no excavation or spoil storage will be undertaken (Figure 8). The buffer has been taken into account in trench design and will need to be visibly demarcated on site.

- Unknown service. A possible buried service which does not figure in the available service datasets has been identified by geophysical surveys as crossing the southern part of the site on an east-west axis. This has been taken into account in the scheme design, and a 5m buffer was applied.
- Public right of way. A public right of way crosses the southern part of the site on an east to west axis and has been taken into account in the scheme design (Figures 1 and 9). However, the aerial photography and Ordnance Survey indicates that no formal public paths have been established, and actual public access may take a slightly different route, presumably along the field boundary backing onto the River Itchen to the north. ARS Ltd his will ensure that access will remain open to the public during the course of the evaluation.
- Hedgerows. A number of hedgerows partition parts of the Site and an n area of mature woodland is located in the southern part of the Site surrounding Chapel Bank Cottage. Appropriate measures will be implemented to avoid disturbing these features.

21 Temporary works

21.1.1 It is anticipated that most trial trenches excavated within the site will be shallow and that they will not require temporary works. However, should the access to deep excavation be deemed necessary in prior consultation with Fusion JV's Historic Environment Manager, and a need for temporary works identified, works will cease at that location, and the trench will be temporarily backfilled. Fusion JV will assess the requirement for temporary works and will be responsible for their design, installation and maintenance.

21.1.2 Temporary works will be co-ordinated by Fusion JV's Temporary Works Co-ordinator (TWC) who will be responsible for ensuring that the planning, erection, use, maintenance and dismantling of temporary works is undertaken in line with Fusion JV's temporary works process and as agreed with the relevant Temporary Works Manager (TWM). A temporary works schedule produced at tender stage will be reviewed and updated at regular intervals.

21.1.3 All temporary works will be designed and installed in accordance with HS2 Ltd's Technical Standard for Temporary Works (Document No. HS2-HS2-CV-STD-000-000005), Fusion JV's IMS and Construction Phase Health and Safety Plan.

22 Glossary of Terms

AIMS	Asset Information Management System
ANA	Archaeological Notification Area
ASZ	Archaeological Sub-Zone

BGS	British Geological Survey
CCB	Consolidated Construction Boundary
CFA	Community Forum Area
CIfA	Chartered Institute for Archaeologists DDBA Detailed Desk Based Assessment
ES	Environmental Statement
GIS	Geographical Information Systems
GWSI:	HERDS Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy
HER	Historic Environment Record
LSWSI	Location Specific Written Scheme of Investigation NGR National Grid Reference
PDF	Portable Document Format
QA	Quality Assurance

23 References

Title	Reference
Brachi, M 1959 In Cake and Cockhorse: The Magazine of the Banbury Historical Society Vol. 1. Banbury	Brachi 1959
British Geological Survey, Geology of Britain viewer http://mapapps.bgs.ac.uk/geologyofbritain/home.html	BGS Online 2019
Brunning, R and Watson, J 2010 Waterlogged Wood: Guidelines on the recording, sampling, conservation and curation of waterlogged wood. Historic England guidance	Brunning and Watson 2010

Campbell, G, Moffett, L and Straker, V 2011 Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and recovery to Post-excavation (2nd ed.). Historic England guidance	Campbell et al. 2011
CIfA 2014 Standard and guidance for archaeological field evaluation. Chartered Institute for Archaeologists	CIfA 2014
Cranfield Soil and Agrifood Institute, Soilscapes http://www.landis.org.uk/soilscapes/index.cfm	Soilscapes 2019
Fusion AWH Quality Plan	1EW03-FUS-QY-PLN-C000-001658
Fusion Construction Phase Health and Safety Plan	1EW03-FUS-HS-PLN-C000-000053
Fusion Incident & Emergency Preparedness Plan	1EW03-FUS-HS-PLN-C000-000001
Fusion Project Plan and LSWSI Contents Structure. Adjustment to align with delivery	1EW03-FUS-EV-SPE-C000-008268
Fusion Standard for Accident and Incident Investigation and Reporting	SH2 STD1
Garwood, P 2011 The Earlier Prehistory of the West Midlands. In Watt, S (ed) The Archaeology of the West Midlands: A framework for Research. Oxbow Books: Oxford	Garwood 2011
Harris, E C 1989 Principles of Archaeological Stratigraphy (2nd ed.) Academic Press	Harris 1989
Hey, G and Lacey, M 2001 Evaluation of archaeological decision-making processes and sampling strategies. Kent County Council	Hey and Lacey 2001

High Speed Rail (London-West Midlands) Environmental Minimum Requirements Annex 1: Code of Construction Practice	CS755 02/17
High Speed Rail (London-West Midlands) Environmental Minimum Requirements Annex 3: Heritage Memorandum	CS755 02/17
Historic England 2010 Waterlogged Wood: Guidelines on the recording, sampling, conservation and curation of waterlogged wood. Historic England	Historic England 2010
Historic England 2011 Environmental Archaeology: A Guide to the Theory and Practice of Methods, from Sampling and recovery to Post-excavation (2nd ed.). Historic England	Historic England 2011
Historic England 2012 Waterlogged Organic Artefacts: Guidelines on their Recovery, Analysis and Conservation. Historic England	Historic England 2012
Historic England 2014 Animal Bones and Archaeology: Guidelines for Best Practice. Historic England	Historic England 2014
Historic England 2015a Management of Research Projects in the Historic Environment: The MoRPHE Project Managers' Guide	Historic England 2015a
Historic England 2015b Management of research projects in the historic environment (and associated guides and planning notes)	Historic England 2015b
Historic England 2015c Geoarchaeology: Using earth sciences to understand the archaeological record	Historic England 2015c
HS2 Central - NIT2 Final Report for Geophysical Magnetometer Survey at Lower Radbourne Farm, Ladbroke Grove Farm and west of Lady Hill, Warwickshire (AC320/5)	1EW03-FUS-EV-REP-CS07_CL23-007769

HS2 Cultural Heritage GIS Specification	HS2-HS2-GI-SPE-000-000004
HS2 Cultural Heritage GIS Standard	HS2-HS2-GI-STD-000-000002
HS2 *Employer's* Technical Standard - Route wide soil resources plan	HS2-HS2-EV-STD-000-000008
HS2 *Employer's* Technical Standard – Temporary Works	HS2-HS2-CV-STD-000-000005
HS2 Enabling Works Information WI0200 General Constraints	1E001-HS2-PR-ITT-000-000098
HS2 Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy	HS2-HS2-EV-STR-000-000015
HS2 Human remains and monuments procedure	HS2-HS2-EV-PRO-0000-000008
HS2 Ltd, 2015. Heritage Risk Model Phase 1 Review 2014 - Volume I	C253-ATK-EV-REP-000-000002
HS2 Phase One Environmental Statement and Supplementary Environmental Statements	ES 3.5.2.16.4 ES 3.5.2.16.5 ES 3.5.2.16.6 CH-001-016 CH-002-016 - ES 3.5.2.16.4 CH003-016 CH004-016 CH001-016 CH002-016 CH004-016
HS2 Phase 1 EWC Central Geophysical Survey Report for Chapel Bank Cottage (CRO1477), Warwickshire, Site Code C17CPBMG	1EW03-FUS-EV-REP-CS07_CL23-001959
HS2 Phase 1 EWC Central Geophysical Survey Report for Lower Radbourne Farm East (1078), Warks, Site Code 1C17LRFMG	1EW03-FUS-EV-REP-CS07_CL23-002502
HS2 Standard Template for Reports	HS2-HS2-PM-TEM-000-000004

HS2 Technical Standard Specification for Historic Environment Investigations	HS2-HS2-EV-STD-000-000035
HS2 Technical Standard: - Route wide soil resources plan	HS2-HS2-EV-STD-000-000008
HS2 Technical Standard: – Temporary Works	HS2-HS2-CV-STD-000-000005
HS2 Technical Standard: Cultural Heritage GIS Specification	HS2-HS2-GI-SPE-000-000004
HS2 Technical Standard: Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy	HS2-HS2-EV-STR-000-000015
HS2 Technical Standard: Historic Environment Digital Data Management and Archiving Procedure	HS2-HS2-EV-STD-000-000040
HS2 Technical Standard: Historic Environment Physical Archive Procedure	HS2-HS2-EV-STD-000-000039
HS2 Technical Standard: Specification for Project Plans and Location Specific Written Scheme of Investigations	HS2-HS2-EV-STD-000-000036
Karsten, A, Graham, K, Jones, J, Mould, Q and Walton- Rogers, P 2012 Waterlogged Organic Artefacts: Guidelines on their Recovery, Analysis and Conservation. Historic England	Karsten et al. 2012
Margary, I 1973 Roman Roads in Britain. J Baker, London	Margary 1973
Report: Detailed Desk Based Assessment at Lower Radbourne, near Ladbroke, Warwickshire	1D037-EDP-EV-REP-040-000035
Ryland, W , Adkins, D and Serjeantson, R 1902. The Victoria History of the County of Northamptonshire Volume 1. VCH London	Ryland et al. 1902

24 Appendices

24.1 Project Plans

Document Number	Project Plan	Status
1EW03-FUS-EV-REP-CS07_CL23-007797	AWHf Project Plan for a Trial Trench Evaluation at Lower Radbourne DMV Warwickshire AC320 Document no.: 1EW03-FUS-EV-REP-CS07_CL23-007797 Revision: C02	Code 1 Accepted

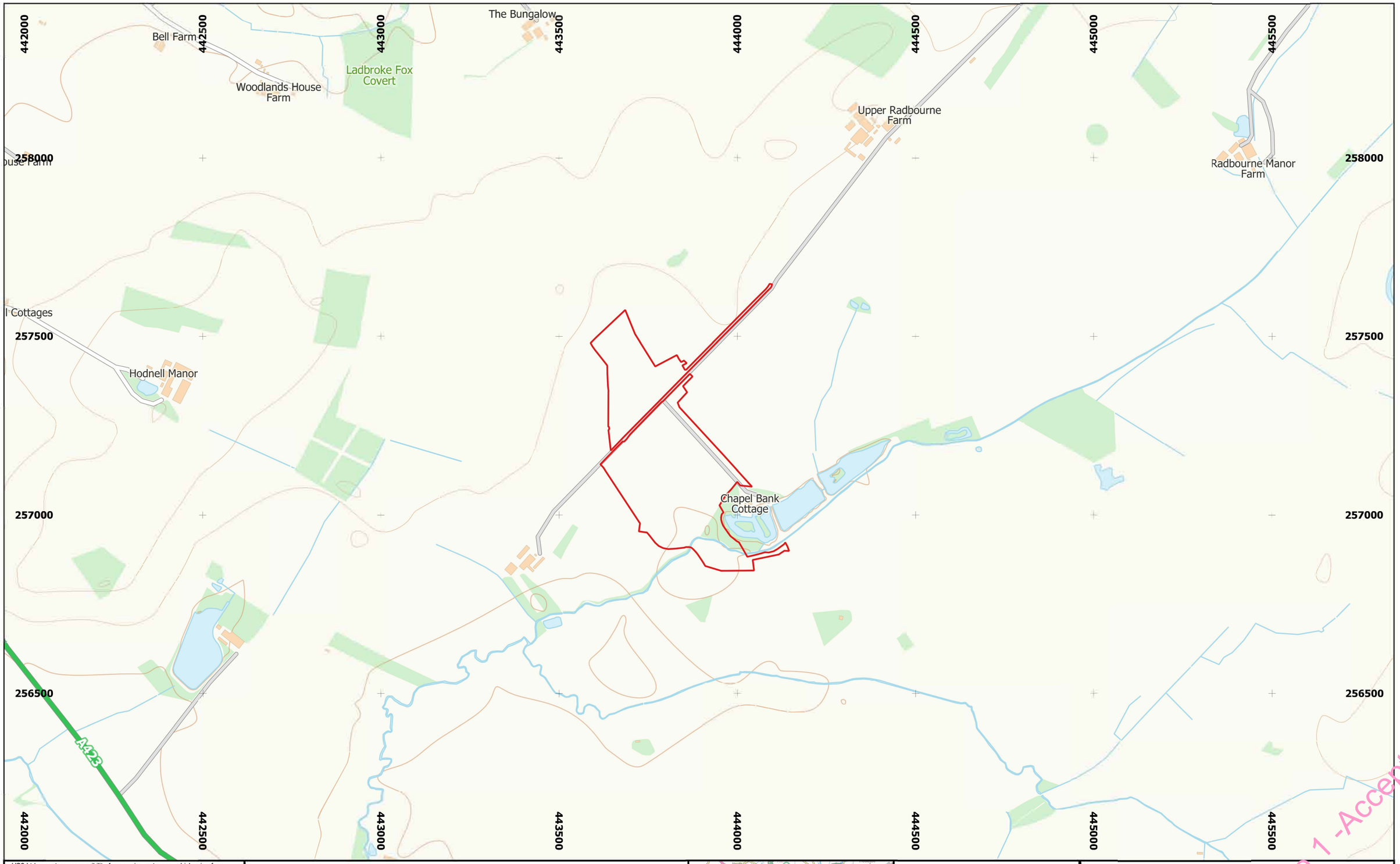
24.2 Appendix B - Fieldwork Change Control Acceptance Sheet

Historic Environment Fieldwork Change Control Acceptance Sheet	
Site Code:	
Site Name:	
Historic Environment Investigation Type:	
Contractor:	
Project Plan Doc. No.:	
LSWSI Doc. No.:	
Summary of Results	
Fieldwork Director:	Date:
Description of Proposed Change:	

24.3 Appendix C -Figures

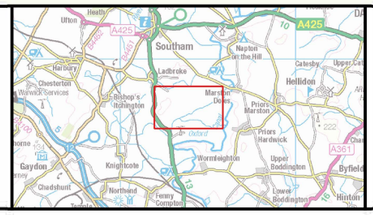
Figure title	Drawing No.
Figure 1 Site Location	1EW03-FUS_ARC-GI-MAP-CS07_CL23-000001
Figure 2 Trench location plan	1EW03-FUS_ARC-GI-MAP-CS07_CL23-000001
Figure 3 Heritage assets	1EW03-FUS_ARC-GI-MAP-CS07_CL23-000001
Figure 4 LiDAR survey and remote sensing interpretation	1EW03-FUS_ARC-GI-MAP-CS07_CL23-000001
Figure 5 Geophysical surveys	1EW03-FUS_ARC-GI-MAP-CS07_CL23-000001
Figure 6 1st edition OS map	1EW03-FUS_ARC-GI-MAP-CS07_CL23-000001
Figure 7 Lower Radbourne 1972 OS map	1EW03-FUS_ARC-GI-MAP-CS07_CL23-000001
Figure 8 Ecological constraints	1EW03-FUS_ARC-GI-MAP-CS07_CL23-000001
Figure 9 Utilities constraints	1EW03-FUS_ARC-GI-MAP-CS07_CL23-000001

Figure 10	1EW03-FUS_ARC-GI-MAP-CS07_CL23-000001



Legend

Lower Radbourne C32021 boundary



High Speed Two

Figure 1. Lower Radbourne C32021 location

Internal

HS2

Registered in England. Registration number 06791686.
Registered office: 2 Snowhill, Queensway, Birmingham B4 6GA

Scale at A3: 1:1000

0 50 100 150 200 250 m

Doc Number: 1EW03-FUS_ARC-GI-MAP-CS07_CL23-000001

Date: 04/02/20

443200 443400 443600 443800 444000 444200 444400 444600

257600 257400 257200 257000 256800

Chapel Bank Cottage

Marston Doles

Canal

Oxford

Legend

Lower Radbourne C32021 boundary

Trench locations

High Speed Two

Figure 2. Lower Radbourne C32021 trench locations

Internal

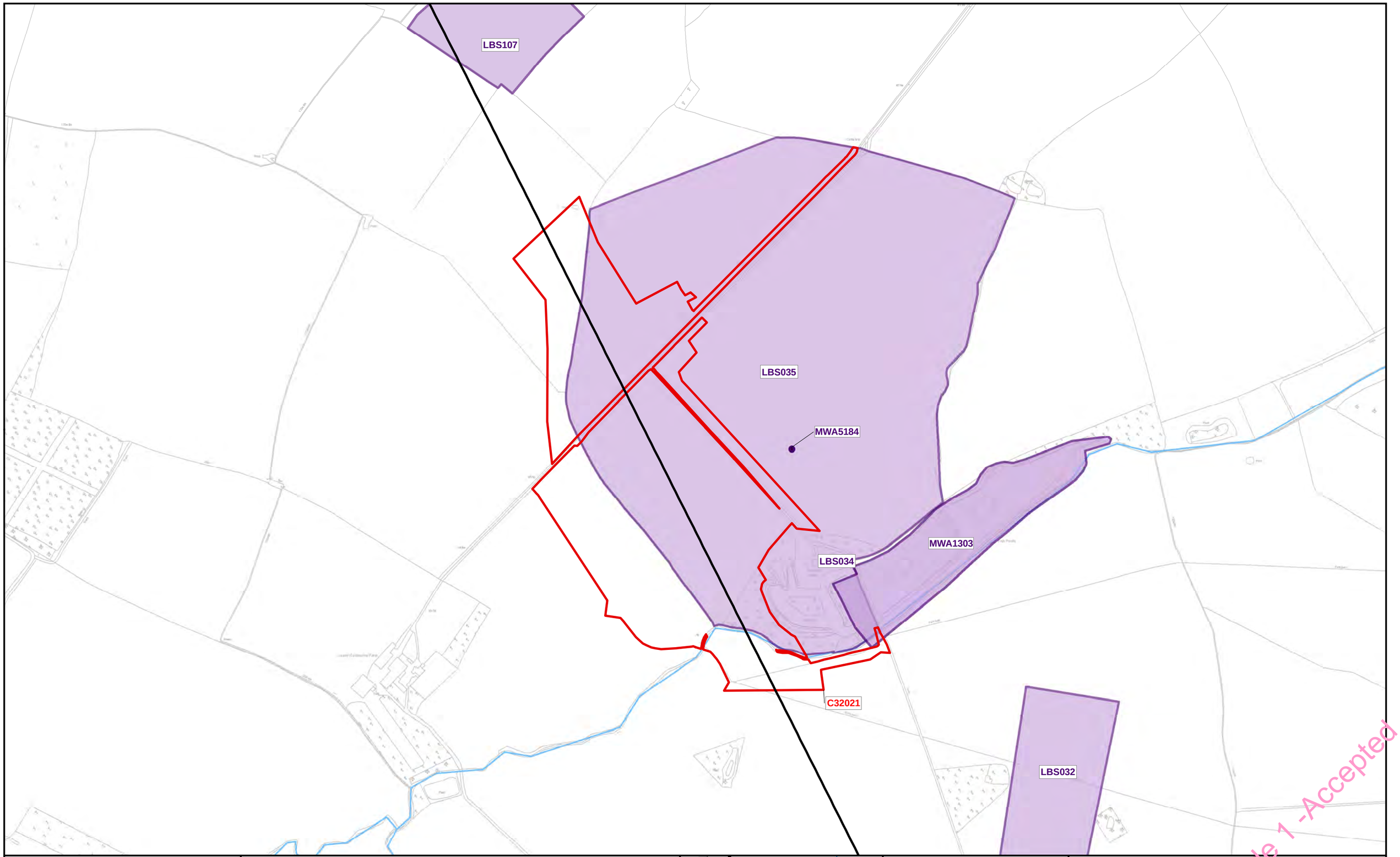
HS2

Scale at A3: 1:4000

0 25 50 75 100 m

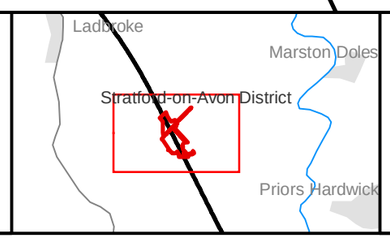
Registered in England. Registration number 06791686.
Registered office: 2 Snowhill, Queensway, Birmingham B4 6GA

Doc Number: 1EW03-FUS_ARC-GI-MAP-CS07_CL23-000001 Date: 04/02/20



Legend

- Route
- Site
- CXXX Fusion Site GIS ID No.
- Local Authority Boundary
- Watercourse
- Waterbody
- Non Designated Heritage Asset_pt
- Non Designated Heritage Assets_ln
- Non Designated Heritage Asset_ply



High Speed Two

FIG. 3
Lower Radbourne:
Heritage assets

Community Forum Area (CFA16)
Ladbroke & Southam

Internal

Scale at A3: 1:5,000

0 50 100 150 200
Meters

Doc Number: 1EW03-FUS_ARC-GI-MAP-CS07_CL23-000001 **Date:** 04/02/20

WA16.31
WA16.25
WA16.26
WA16.26
WA16.26
WA16.26
WA16.24
WA16.23
C32021
WA16.22
WA16.22

Legend

- Route
- Site
- CXXX Fusion Site GIS ID No.
- Local Authority Boundary
- Watercourse
- Waterbody
- Remote sensing interpretation
- Remote sensing interpretation

Ladbroke
Marston Doles
Stratford-on-Avon District
Priors Hardwick

High Speed Two

FIG. 4
Lower Radbourne:
LiDAR survey

Community Forum Area (CFA16)
Ladbroke & Southam

Internal

HS2

Registered in England. Registration number 06791686.
Registered office: 2 Snowhill, Queensway, Birmingham B4 6GA.

Scale at A3: 1:5,000

0 50 100 150 200
Meters

Doc Number: 1EW03-FUS_ARC-GI-MAP-CS07_CL23-000001

Date: 04/02/20

AC320/5

CRO1477

C32021

AC320/5

CRO1078

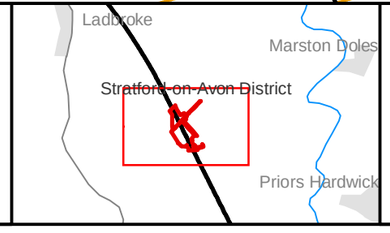
Code 1 -Accepted

Legend

- Route
- Site
- CXXX Fusion Site GIS ID No.
- Local Authority Boundary
- Watercourse
- Waterbody

Geophysics results

- Ditch (fill)
- Ditch (fill)
- Land drain
- Service
- Former cultivation
- Former cultivation
- Known former boundary



High Speed Two

FIG. 5
Lower Radbourne:
Geophysical survey

Community Forum Area (CFA16)
Ladbroke & Southam

Internal

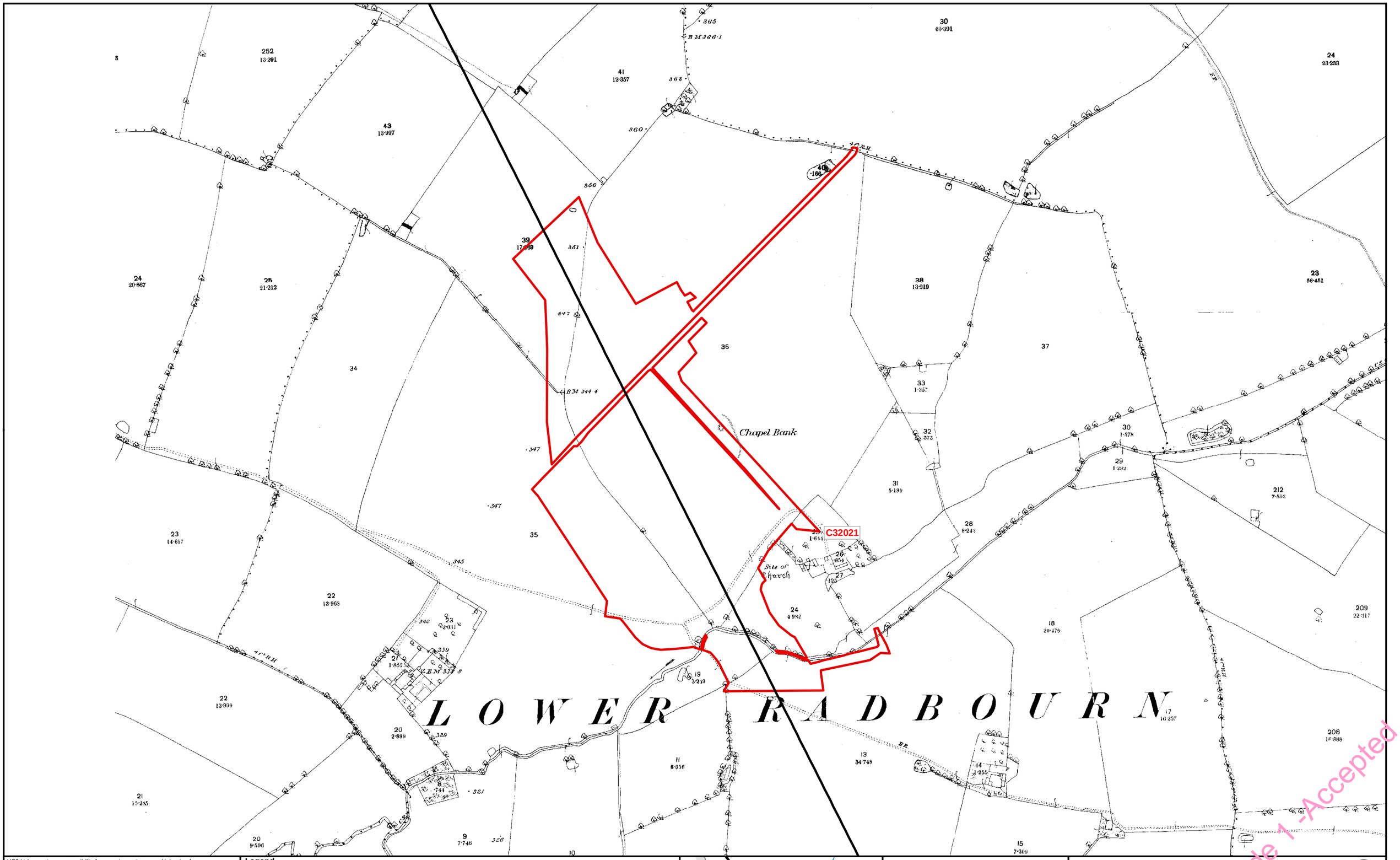
HS2

Registered in England. Registration number 06791686.
Registered office: 2 Snowhill, Queensway, Birmingham B4 6GA.

Scale at A3: 1:5,000

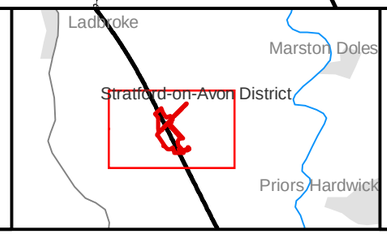
0 50 100 150 200
Meters

Doc Number: 1EW03-FUS_ARC-GI-MAP-CS07_CL23-000001 **Date:** 04/02/20



Legend

- Route
- Site
- CXXX Fusion Site GIS ID No.



High Speed Two

FIG. 6
Lower Radbourne:
1st edition OS map

Community Forum Area (CFA16)
Ladbroke & Southam

Internal

HS2

Registered in England. Registration number 06791686.
Registered office: 2 Snowhill, Queensway, Birmingham B4 6GA.

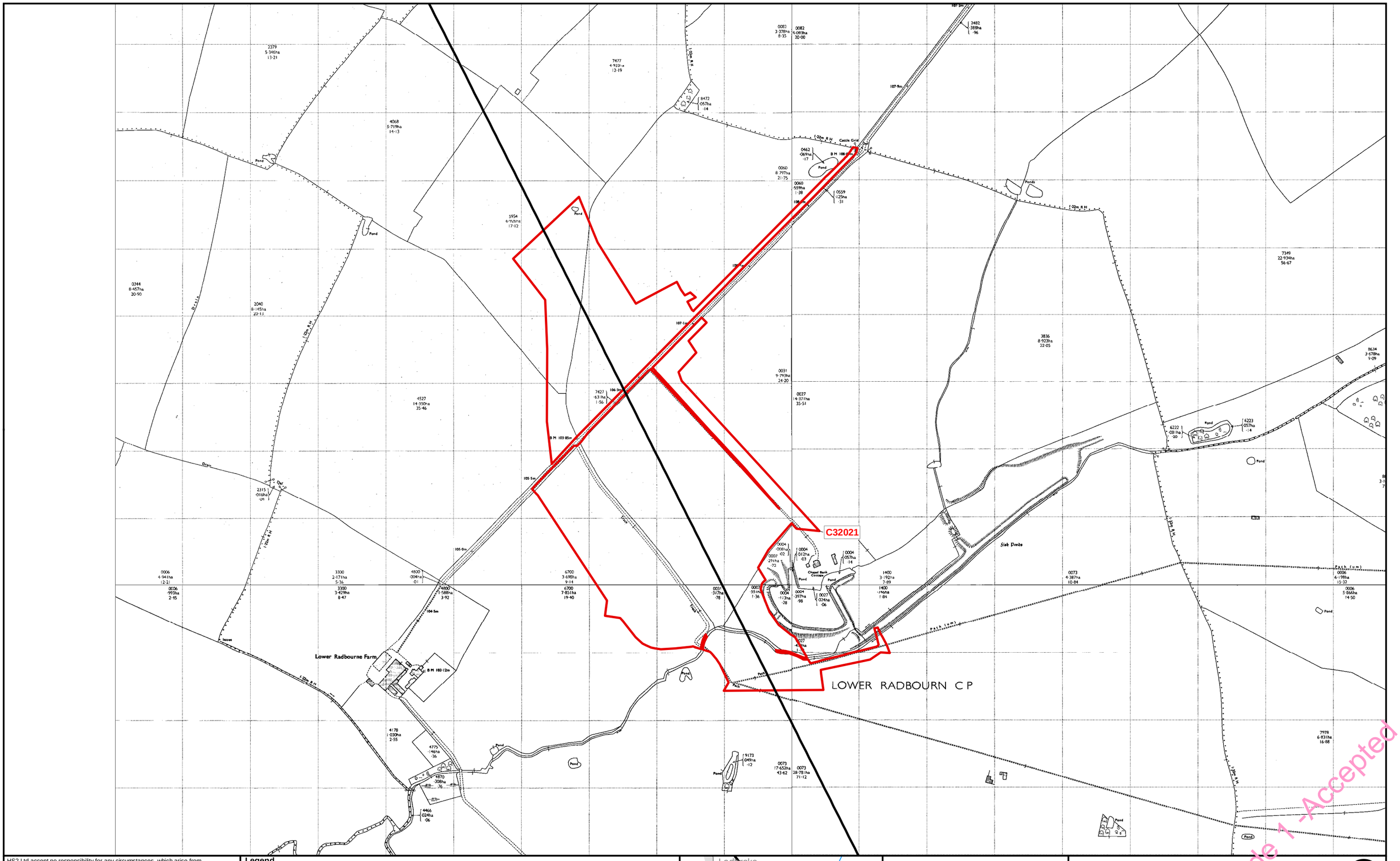
Scale at A3: 1:5,000

0 50 100 150 200
Meters

Doc Number: 1EW03-FUS_ARC-GI-MAP-CS07_CL23-000001

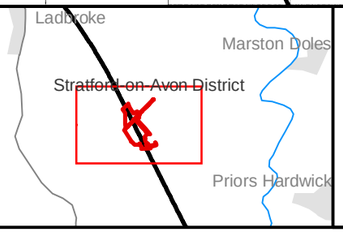
Date: 04/02/20

Code 1-Accepted



Legend

- Route
- Site
- CXXX Fusion Site GIS ID No.



High Speed Two

FIG. 7
Lower Radbourne:
1972 OS map

Community Forum Area (CFA16)
Ladbroke & Southam

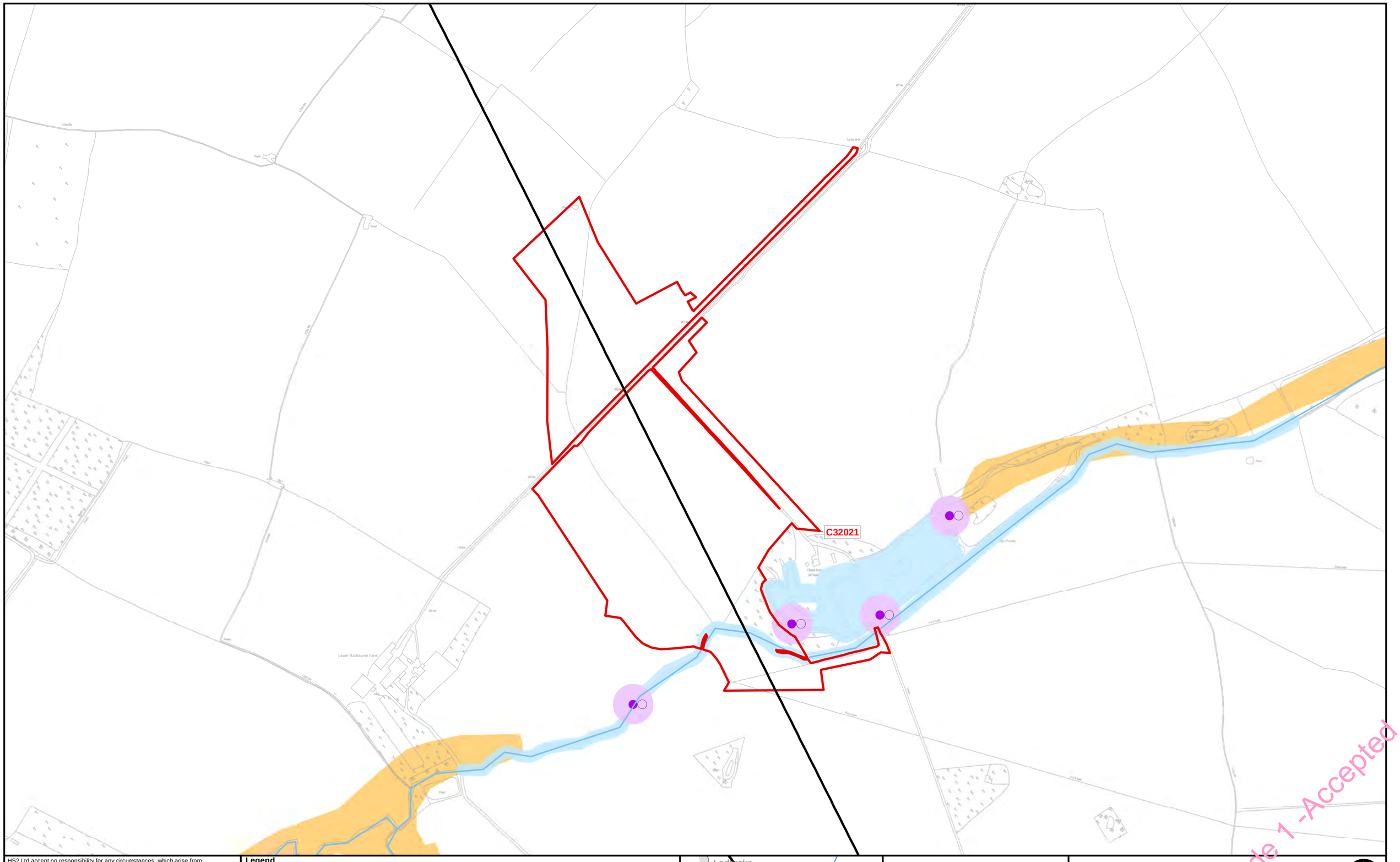
Internal

HS2

Scale at A3: 1:5,000

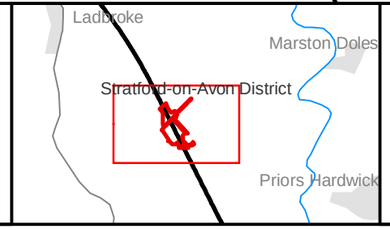
0 50 100 150 200
Meters

Doc Number: 1EW03-FUS_ARC-GI-MAP-CS07_CL23-000001 **Date:** 04/02/20



Legend

- Route
- Site
- CXXX Fusion Site GIS ID No.
- Local Authority Boundary
- Watercourse
- Watercourse buffer 8m
- Waterbody
- Otters holt
- Otters holt buffer 30m
- Alluvium



High Speed Two

FIG. 8
Lower Radbourne:
Ecological constraints

Community Forum Area (CFA16)
Ladbroke & Southam

Internal

HS2

Scale at A3: 1:5,000

0 50 100 150 200
Meters

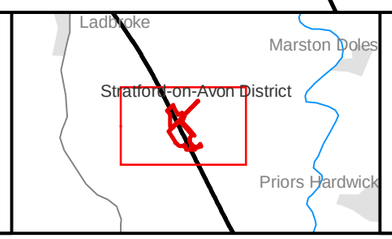
Registered in England. Registration number 06791686.
Registered office: 2 Snowhill, Queensway, Birmingham B4 6GA.

Doc Number: 1EW03-FUS_ARC-GI-MAP-CS07_CL23-000001 **Date:** 04/02/20

C32021

Legend

- Route
- Site
- CXXX Fusion Site GIS ID No.
- Local Authority Boundary
- Watercourse
- Waterbody
- MV Overhead line
- Possible service
- Telecom duct
- MV Overhead buffer 10m
- Possible service 5m
- Telecom duct buffer 10m
- Proposed trench location



High Speed Two

FIG. 9
Lower Radbou9ne:
Utilities constraints

Community Forum Area (CFA16)
Ladbroke & Southam

Internal

HS2

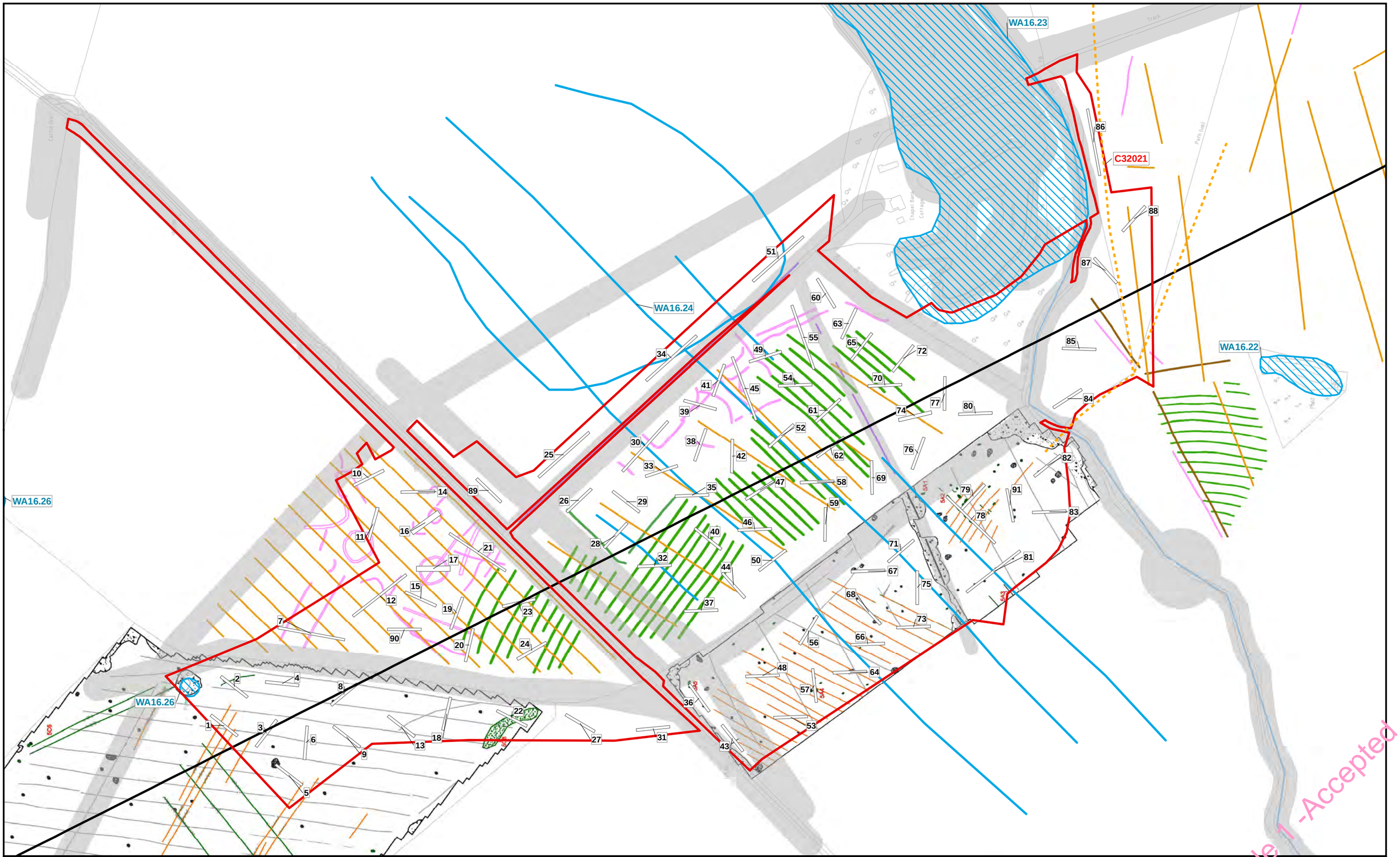
Registered in England. Registration number 06791686.
Registered office: 2 Snowhill, Queensway, Birmingham B4 6GA.

Scale at A3: 1:5,000

0 50 100 Meters

Doc Number: 1EW03-FUS_ARC-GI-MAP-CS07_CL23-000001 **Date:** 04/02/20

Code 1 -Accepted

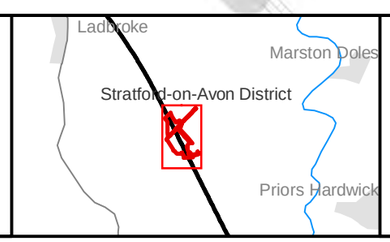


Legend

- Route
- Site
- CXXX Fusion Site GIS ID No.
- Local Authority Boundary
- Watercourse
- Waterbody
- Public Right of Way
- Constraints
- Proposed trench location
- Remote sensing interpretation
- Remote sensing interpretation
- Known former boundary
- Former cultivation
- Ditch (fill)

Geophysics results

- Ditch (fill)
- Land drain
- Service



High Speed Two

FIG. 10
Lower Radbourne:
Proposed trench layout overlain on geophysical and remote sensing results

Community Forum Area (CFA16)
Ladbroke & Southam
Internal

HS2

Registered in England. Registration number 06791686.
Registered office: 2 Snowhill, Queensway, Birmingham B4 6GA.

Scale at A3: 1:2,500

0 25 50 75 100
Meters

Doc Number: 1EW03-FUS_ARC-GI-MAP-CS07_CL23-000001 **Date:** 04/02/20

24.4 Appendix D – 3D recording Proforma

Date, initials	Find ID - Δ	Square E - XXX...	Square N - XXX...	Spit	Context	Material	L-axis dir/dip	Tr-axis dir/dip	Description (+ details of any excavation damage)	Max L - mm
		...	...				/	/		
		...	...				/	/		
		...	...				/	/		

24.5 Appendix E – Resource Plan