

Location Specific Written Scheme of Investigation for Trial Trenching at Chiltern Tunnel (M25 slip roads)

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1 Executive Summary

- 1.1.1 This Location Specific Written Scheme of Investigation (LSWSI) sets out the methodology, deliverables, programme, health, safety and environmental requirements, resources and interfaces necessary to deliver an archaeological evaluation defined in the Project Plan for Trial Trench Investigation at the Colne Valley South Embankment (M25 slip roads) (Document No. 1D037-EDP-EV-REP-040-000018). The project plan established the scope, aims, contribution to the Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy (GWSI: HERDS) objectives, techniques, deliverable and reporting mechanism for the trial trench investigation.
- 1.1.2 The trial trench investigation will be undertaken on land located either side of the M25, to the east of Chalfont St. Peter (Figure 1); hereafter referred to as the 'Site'. The Site comprises three land parcels measuring c. 5.1ha to the west of the M25 and 9.7ha to the east. The land is required for the construction of slip-roads and bell-mouths which will allow access to the Chiltern Tunnel South Portal main construction compound and construction site located to the south.
- 1.1.3 The Site is located in the vicinity of ditches and pits relating to prehistoric and/or Romano-British activity, the route of a possible Roman road and lies within the wider archaeological landscape of the Colne Valley. As such it has potential for the survival of archaeological remains of Mesolithic to Roman date. Trial trenching is therefore required to identify the location, extent, survival and significance of any heritage assets at the Chiltern Tunnel (M25 slip roads), Hertfordshire (Figure 2).
- 1.1.4 In addition to trial trenching the topsoil/ploughsoil is to be sampled within each trench for the retrieval of artefacts and identification of finds scatters.
- 1.1.5 The results of the trial trench evaluation will inform the archaeological resource assessment for the Site and whether any archaeological remains present have the potential to contribute to the aims, objectives and knowledge gain defined in the GWSI: HERDS.
- 1.1.6 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-000-000036) and Specification for Historic Environment Investigations (Document No. HS2-HS2-EV-STD-000-000035) and relevant ClfA Standards.

2 Location and Site Background

2.1 Project Background

- 2.1.1 Speed Two (HS2) is a new railway network proposed by Government to provide a new link between London, the West Midlands, the East Midlands, South Yorkshire, Leeds and Manchester. Phase One of HS2 will involve the construction of a new railway approximately 230km (143 miles) in length between London and the West Midlands. Powers for the construction, operation and maintenance of Phase One are conferred by the High Speed Rail (London - West Midlands) Act 2017.
- 2.1.2 The overall framework within which archaeological work will be undertaken is set out in the Environmental Minimum Requirements (EMR), in particular the Heritage Memorandum, the Code of Construction Practice (CoCP) for HS2 Phase One and the GWSI: HERDS. Accordingly the nominated undertaker or the Early Works Contractor are required to implement appropriate and reasonable measures to identify, avoid or where practicable reduce impacts to the significance of heritage assets prior to the start of construction.

2.2 Site Location

- 2.2.1 The trial trench investigation will be undertaken on land either side of the M25, to the west of West Hyde, Hertfordshire (NGR TQ 02157 91967).
- 2.2.2 The areas to be trial trenched form part of three land parcels. The western area comprises part of a single field (for ease referred to within this LSWSI as Field 1); the eastern area is divided between two fields (referred to as Fields 2 and 3) (Figure 1). The land is required for the construction of slip-roads and bell-mouths which will allow access to the M25 and main construction compound and construction site for the southern portal of the Chiltern Tunnel located to the south. The area to be trial trenched measures:
- Field 1: c. 5.1 ha;
 - Field 2: c.5.7 ha; and
 - Field 3: 4.00 ha.
- 2.2.3 Each area of trial trenching has a separate point of access described at Section 6. 3 of this LSWSI and shown on Figure 1.

2.3 Geology and Topography

- 2.3.1 The Site is located with arable farmland on the western side of the Colne Valley. The solid geology of the Site comprises chalk of the Seaford and Newhaven Formation¹. The chalk forms a ridge which extends eastwards from the Chilterns south-eastwards between the confluence of the River Misbourne with the River Colne.²
- 2.3.2 On the eastern side of the M25 the British Geological Survey (BGS) holds no records of superficial deposits across the majority of Field 2 and 3. The exception being the southwest corner of Field 2 adjacent to the Shire Lane/Chalfont Lane overbridge where Gerrards Cross gravels are recorded. The soils overlying the natural geology are free draining lime-rich loam³.
- 2.3.3 To the west of the M25 the BGS records variable superficial deposits overlying the chalk across Field 1. Beconsfield gravels are recorded extending into the northwest corner of the field, while superficial deposits are absent from the central part of the field adjacent to the M25 cutting. Gerrards Cross gravels are recorded at the southern end of the Field 1 extending into the footprint of the western Bell Mouth. Free draining slightly acidic loamy soils are recorded to the west of the M25.
- 2.3.4 The topography of the Site is gently undulating with the principal trend being a relatively gentle slope eastwards into the Colne Valley from a height of c.85m OD on the western side of the M25 within Field 1 to c.60m OD at the eastern extent of Field 3. An undulating east-west aligned dry valley crosses the centre of the Site.

2.4 Current Site Conditions

- 2.4.1 The Site comprises parts of three arable fields. To the west of the M25 motorway Field 1 is bounded by Hornhill Road to the north, where a short section of Heras fencing has been erected either side of the gated entrance to the field; the M25 cutting to the east, which is defined by a post and wire fence; Shire Lane to the south and a mature hedged boundary to the west. The field is currently under cereal crop approximately 0.20m in height.
- 2.4.2 To the west of the M25 motorway Field 2 is bounded to the north by Hornhill Road alongside which is a mature hedgerow; the east side of the Site is open to the remainder of the arable field; to the south lies Chalfont/Shire Lane and to the west the cutting of the M25 which is separated from the Site by a post and wire fence and low hedge. A line of 132Kv high voltage overhead cables cross Field 2 aligned north to south. The cables are carried on several pylons located with the archaeological evaluation area. The southern half of Field 2 appears to be planted with rape seed approximately 0.30m in height. The northern end of the field is grassed and not under crop.

¹ British Geological Survey 2017, *Geology of Britain Viewer*[online] accessed 15 March 2017 <http://mapapps.bgs.ac.uk/geologyofbritain/home.html?>

² HS2 Ltd, 2015. Heritage Risk Model Phase 1 Review 2014 - Volume I Document no.: C253-ATK-EV-REP-000-000002

³ Cranfield Soil and Agrifood Institute 2017 *Soilscapes* [online] accessed 15 March 2017 from <http://www.landis.org.uk/soilscapes/>

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- 2.4.3 At the southern end of the Site Field 3 is bounded by and low discontinuous hedge and open arable farmland to the north, to the east by Sunnyhill Road and a number of private residential properties; to the south by the hedged boundary along Chalfont Lane and to the west by Field 2. Field 3 is, at the time of writing ploughed but with no crop visible.

2.5 Archaeological Background

- 2.5.1 The archaeological background and context of the Site is described in Section 2 of the Project Plan and is summarised here.
- 2.5.2 The Colne Valley terrace deposits form part of the wider complex of Thames Valley terrace deposits. These deposits are acknowledged to have a high potential for Palaeolithic and later deposits and finds from the Upper Palaeolithic (c.30,000 to 10,000 BC) have been recovered during gravel extraction and road construction in the Colne Valley⁴.
- 2.5.3 No known archaeological assets are recorded within the area of the bell-mouths and M25 slip roads north of Chalfont Lane; however, the HS2 Environmental Statement (ES) does record the presence of ditches and pits relating to prehistoric and/or Romano-British activity (CVA087; see Figure 2), located approximately 50-60 m to the northeast of the trial trenching area within Field 3.
- 2.5.4 In addition Shire Lane (CVA094), which forms the boundary between Hertfordshire and Buckinghamshire, has been identified as the probable course of a Roman road. Lie line of the road passes immediately to the south of the Site. Roman roads are well established as being a focus for Romano-British settlement. Any evidence for settlement activity that survives alongside the line of Shire Lane may, therefore, extend into the Site.
- 2.5.5 Analysis of aerial photography and LiDAR data to support the ES⁵ has identified a possible bank (G37), crossing Field 3 on a northwest to southeast alignment. This feature is likely to represent a former field boundary, although none are depicted on historic Ordnance Survey mapping. Several large cut features interpreted as probable quarry or extraction pits (Go8) have also been identified immediately west of the trial trenching areas in Fields 2 and 3 to the east of the M25.
- 2.5.6 To the south of the Site and Chalfont Lane a 2015 geophysical survey (CS001: West Hyde Geophysical Survey) identified extensive disturbance across the area, which land-use and LiDAR data would suggest relates to gravel extraction. A copy of the report for this survey was not available at the time of writing but grey-scale plots and interpretative plans available on HS2 G-viewer appear to support this interpretation.

⁴ Project Plan for Trial Trenching at Colne Valley South Embankment (M25 slip roads). Document no.: 1D037-EDP-EV-REP-040-000018

⁵ HS2 Ltd, 2013. London-West Midlands Environmental Statement Volume 5 Technical Appendices CFA7 Colne Valley Survey reports (CH-004-007) Cultural heritage

3 Overview of Project Plan

- 3.1.1 This LSWSI has been prepared to provide the necessary specification and site specific information to enable the delivery of the archaeological evaluation defined in the Project Plan for Trial Trench Investigation at the Chiltern Tunnel (M25 slip roads) (Document No. 1D037-EDP-EV-REP-040-000018). A copy of the project plan can be found at Appendix 1 of this LSWSI.
- 3.1.2 The project plan establishes the scope, aims, objectives, methodology and deliverables for the archaeological evaluation in accordance with the commitments made in Environmental Minimum Requirements (EMRs) for HS2 Phase One; the objectives set out in the GWSI: HERDS and HS2 Technical Standards (see section 11 of this LSWSI). It also establishes the requirements for information management, quality assurance and the results of engagement with the archaeological advisor to the local planning authority.
- 3.1.3 In this instance the Project Plan established that a detailed desk-based assessment (DDBA) was not required for this Site. The work undertaken as part of the ES is sufficient to understand the potential for archaeological survival and to determine an appropriate archaeological response.
- 3.1.4 Although there are no known heritage assets within the Site, it lies within the Colne Valley, an area with a high potential for currently unknown buried archaeological remains. The project plan therefore identifies a requirement to undertake archaeological trial trenching in advance of construction of the Chiltern Tunnel (M25 slip roads) to identify the location, extent, survival and significance of any heritage assets present within the evaluation area (Figures 1 and 2).
- 3.1.5 The trial trench investigation will comprise the excavation of 110 No. trial trenches measuring 30m in length and between 1.8 and 2.1m wide as detailed in Table 2 and on Figure 4 of the Project Plan. Two trenches Nos. 012 and 022 located within the proposed bell mouths have been identified as a priority.
- 3.1.6 Section 3 of the project plan identifies the contribution the results of the trial trench investigation can make to a number of specific research objectives set out in the GWSI: HERDS. Trial trench investigation including soil sampling for the recovery of artefacts from the plough soil will provide the most suitable method for the recovery of archaeological evidence to inform the research objectives. Sections 4 and 5 of the project pan provide a methodology and deliverables for the trial trench evaluation.
- 3.1.7 Table 1 of the project plan lists each of the GWSI: HERDS objectives and the contribution the trial trench investigation will make to meet them. It is repeated here reference.

Table 1 - Schedule of Trial Trenches

Specific Objective	Contribution
KC5: Identifying settlement location and developing models for settlement patterns for the Mesolithic, Neolithic and Early Bronze Age.	The results of the trial trench evaluation and artefact collection will provide a level of baseline data to assist in addressing this objective, in formulating strategies for further investigation, and in refining the objective.
KC11: Does the high density of prehistoric settlement evidence in the Colne Valley reflect a genuine focus of activity or does it reflect a bias in the archaeological record?	Trial trench evaluation and artefact collection will clarify the location, extent, survival, condition and significance of any heritage assets present on the site. The results, whether positive or negative, will contribute to our understanding of prehistoric settlement distribution densities and help address the question of bias in the archaeological record.
KC15: Can we identify regional patterns in the 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.	The results of the trial trench evaluation and artefact collection will provide a level of baseline data to assist in addressing this objective, in formulating strategies for further investigation, and in refining the objective. The results of the trial trench evaluation will provide a level of baseline data to assist in addressing this objective, in formulating strategies for further investigation, and in refining the objective.
KC24: To what extent are the patterns of settlement, landholding and enclosure in West London and the Colne Valley in the Iron Age and Romano-British period determined by those established in the Bronze Age?	The results of the trial trench evaluation will provide a level of baseline data to assist in addressing this objective, in formulating strategies for further investigation, and in refining the objective.

4 Scheme Design Elements

- 4.1.1 The Chiltern Tunnel (M25 slip roads) will provide new temporary access roads to/from the Chiltern Tunnel South Portal construction site, the diversion of Chalfont Lane and new bell mouths and merge/diverge slip roads onto and off of the M25.
- 4.1.2 On the western side of the M25 cutting a bell mouth and 'on slip road' will enable construction traffic to join the clockwise carriage way of the M25. The alignment of Chalfont Lane will also be diverted northwards to join Hornhill Lane.
- 4.1.3 To the east of the M25 cutting the 'off slip road' and bell mouth will allow construction traffic to leave the anti-clockwise carriageway of the M25 and enter the Chiltern Tunnel South Portal construction site.
- 4.1.4 The construction of the access slip roads, diversion of Chalfont Lane and associated landscaping works has the potential to impact any surviving archaeological remains located within the Site resulting in their loss or disturbance.

5 Programme

- 5.1.1 The Archaeological Contractor will be able to access the Site on Thursday 6th April. The outline programme and sequence of the archaeological works below has been developed to ensure Jackson's Critical Path activities can be commenced when required:

06 and 07.04.17 (Week 1)

Site inductions, site set up and artefact collection test pitting prioritising Troo8 and Tro22.

Week Commencing 10.04.17 (Week 2)

Plant delivery (10.04.17), continue artefact collection test pitting and machine excavation, investigation and recording of trial trenches:

- Field 1 prioritising Troo8 then the row of trenches adjacent to the M25 before moving onto the remaining trenches. Sign-off and backfill Troo8; and
- Field 2 prioritising Tro22 then the row of trenches adjacent to the M25 before moving onto the remaining trenches. Sign-off and backfill Tro22.

Week commencing 17.04.17 (Week 3)

Continue artefact collection test pitting, machine excavation, investigation and recording of trial trenches:

- Field 1 machine excavation, investigation and recording of any remaining trial trenches, sign-off and commence backfilling of trenches.
- Field 2 machine excavation, investigation and recording of any remaining trial trenches, sign-off and commence backfilling of trenches.
- Field 3 start artefact collection test pitting

Week commencing 24.04.17 (Week 4)

Machine excavation, investigation and recording of trial trenches:

- Field 1 complete backfilling of remaining trenches and demobilise Field 1;
- Field 2 complete backfilling of remaining trenches; and
- Field 3 continue artefact collection test pitting and commence machine excavation of trenches.

Week commencing 01.05.17 (Week 5)

Machine excavation, investigation and recording of trial trenches:

- Field 3 complete machine excavation, investigation and recording of trenches. Sign-

off completed trenches and commence backfilling.

Week commencing 08.05.17 (Week 6)

- Field 3 Sign-off remaining trenches and complete backfilling.
- Fields 2 and 3 strike fencing, collection of plant and demobilise from Site.

6 Methodology

6.1 Scope

- 6.1.1 The scope and method for the artefact recovery and trial trench evaluation are set out in Section 4 of the Project Plan. This section of the LSWSI develops that methodology to provide a clear site specific methodology and information to enable the *Archaeological Contractor* to successfully deliver the programme of archaeological evaluation.
- 6.1.2 The trial trench investigation will comprise the excavation of 110 No. trial trenches measuring 30m in length and between 1.8 and 2.1m wide. The trenches will be excavated across the Site on both sides of the M25 corridor. 32 No. trenches will be excavated within Field 1 to the west of the M25 and 72 No. trenches will be excavated to the east of the M25 within Fields 2 and 3. This represents a 4% sample of the Site. Table 2 of the Project Plan (see p.8 of Appendix 1) lists each of the trenches.
- 6.1.3 In addition to the 4% trial trenching sample the *Archaeological Contractor* shall make provision for an additional contingency of 1% of the Site area, or, 740 linear metres of trenching. The purpose of the contingency will be to investigate any significant or unexpected remains (see Section 6.13 of this LSWSI) during the archaeological evaluation.
- 6.1.4 The extension of trial trenches under this contingency shall not be undertaken without a written instruction from the *Contractor's Historic Environment Manager*.

6.2 General Methodology

- 6.2.1 The scope and method for the artefact recovery and trial trench evaluation are set out in Section 4 of the Project Plan. This section of the LSWSI develops that methodology to provide a clear site specific methodology and information to enable the *Archaeological Contractor* to successfully deliver the programme of archaeological evaluation.
- 6.2.2 All archaeological works will be carried out in accordance with the Project Plan, this LSWSI and any further instructions from the *Contractor*. This design takes account of the guidance and specifications set out in the HS2 Phase One EMRs, CoCP, GWSI: HERDS and Technical Standards principally the Technical Standard Specification for historic environment investigations (HS2-HS2-EV-STD-000-000035), and the guidance provided by the Chartered

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Institute for Archaeologists (CIfA) Code of Conduct (CIfA 2014a) and the Standard and Guidance for Archaeological Field Evaluation (CIfA 2014b).

- 6.2.3 Prior to the start of the trial trench evaluation a site meeting and walkover will be held between the *Contractor* and the *Archaeological Contractor* to confirm that each of the indicative trench locations remain accessible and clear of obstruction. Access routes, safe working areas and any constraints to the trial trenching works will also be identified.
- 6.2.4 The *Archaeological Contractor* shall ensure that the archaeological investigations are undertaken in an organised, efficient and professional manner. The *Archaeological Contractor* shall therefore have full regard for the safety of all personnel on site, including measures to ensure the safety of all, including any effects the archaeological evaluation may have on the daily operations of the landowner, other contractors engaged in the construction of HS2 Phase One and members of the general public.
- 6.2.5 The on-site archaeological recording and recovery techniques will be in line with the methods set out in the Project Plan, this LSWI and current industry best practice and should be fully understood by all.
- 6.2.6 All paper and digital records made during the course of the archaeological evaluation, and the treatment of artefacts and environmental remains, will be reviewed continuously. Record checking and collation will be completed at regular intervals, as appropriate, and before an area is considered complete, abandoned, backfilled or the site closed. Errors or omissions in recording discovered during post-excavation cannot be recovered. The *Archaeological Contractor* must make suitable allowance for this task.

6.3 Site Access

- 6.3.1 The Site will be in the possession of HS2 and under the control of Jackson Civil Engineering, the Principal Contractor for the M25 access/slip road works. However, it is understood that Jackson will not be undertaking any construction activities within the Site during the archaeological evaluation and that the *Archaeological Contractor* will have free and unrestricted access to the Site.
- 6.3.2 Access to the Site will be undertaken through an access permission granted to Jackson for the construction of the M25 access/slip roads.
- 6.3.3 Each area of trial trenching is accessed/aggressed via a separate point of access from the public highway (Figure 1):
- Field 1 is accessed directly from Hornhill Road via a gated entrance at the northern end of the land parcel adjacent to the Hornhill Road over bridge (NGR TQ 02130, 92321);
 - Field 2 is also accessed via directly from Hornhill Road via a gated entrance at the

northern end of the land parcel at the eastern end of the Hornhill Road over bridge (NGR TQ 02248, 92312). 132Kv high voltage overhead cables cross the Site to the west of the access point but will not impede access/egress; and

- Field 3 is accessed directly via the private Sunnyhill Road/Chalfont Road (NGR TQ 02900, 91509).

6.3.4 Both Hornhill Lane and Chalfont Lane are narrow single track highways with passing places at regular intervals. The *Archaeological Contractor* should note that there is a steep gradient when turning into Chalfont Lane from the A412.

6.3.5 The two gated access points on Hornhill Lane are both wide enough for plant to access/egress and are secured by a chain and padlock. The keys/combination for these locks will be provided to the *Archaeological Contractor* prior to the start of the works.

6.3.6 The *Archaeological Contractor* will satisfy themselves that each access point is suitable and safe for the delivery of plant prior to the start of the archaeological evaluation and will undertake all due care when loading or unloading plant from either the public highway or private road. The loading or unloading plant will be supervised by certified Banksman. The method for and controls placed on the delivery and movement of plant within the Site will be set out in the *Archaeological Contractor's* Method Statement and will comply with the *Contractor's* Construction Phase Health and Safety Plan.

6.4 Site Set-up

6.4.1 Prior to the start of the archaeological evaluation the *Archaeological Contractor* will attend a pre-works site meeting with the *Contractor's Historic Environment Manager*. The purpose of this meeting will be to allow the *Archaeological Contractor* confirm the access points, ground conditions, site specific hazards and to agree the location for the welfare facilities and the storage of plant and materials.

6.4.2 Site set up will be conducted following the relevant guidance set out in the Enabling Works Information W10200 General Constraints (Document No. 1E001-HS2-PR-ITT-000-000098) in particular Sections 6 *Construction site layout and good housekeeping*.

6.4.3 Prior to the start of the trench excavation the *Archaeological Contractor* will erect temporary fencing (e.g. Netlon fencing):

- along the perimeter of the evaluation area to provide a clear separation between the archaeological works and any adjacent agricultural activities and to prevent persons or plant inadvertently traversing across the evaluation area; and
- along the route of the public footpath that crosses the northern boundary of the Site in order to ensure that persons cannot inadvertently enter the area of evaluation while the archaeological works are in progress. .

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- 6.4.4 The temporary fencing will be regularly inspected and maintained until the archaeological works have been completed.

6.5 Setting Out

- 6.5.1 All 110 No. trial trenches will be excavated at the locations indicated on Figure 4. The corner points of each trench shall be positioned to an accuracy of $\pm 500\text{mm}$ of the specified trench location using Real Time Kinematic (RTK) Global Navigation Satellite System (GNSS) equipment or other suitable automated equipment referenced from a minimum of three Permanent Ground Markers (PGM) created within the Site.
- 6.5.2 The specific requirements for setting out the trenches are set out at Section 4.2 of the Project Plan.
- 6.5.3 The *Archaeological Contractor* shall ensure that all trench or excavation limits, and significant archaeology detail are surveyed 'as dug' in relation to the project grid before leaving the site. Ground level height data shall be recorded for each trench. Survey methodology and a detailed survey record shall be provided to HS2 Ltd within the survey report.

6.6 Artefact Collection

- 6.6.1 As described in paragraph 4.2.15 of the Project Plan prior to the excavation of each trial trench the *Archaeological Contractor* will sample the topsoil/ploughsoil for the recovery of artefacts.
- 6.6.2 Three sample locations are required at each trench location and should be recovered from each end of the trench and at its centre. The samples will be of equivalent volume to a 0.5m square test pit through the full depth of the topsoil/ploughsoil.
- 6.6.3 Each sample will be recovered by hand, this can be by shovel, and will be sieved or screened through a $\frac{1}{4}$ " or 6mm wire mesh to recover artefacts. The samples shall be sieved on site. Where samples are being recovered for sieving off-site they will be stored in 10 litre plastic buckets or strong polythene bags (double bagged) as described at paragraph 4.2.35 of the Project Plan.
- 6.6.4 The location of each sample will be accurately recorded by the *Archaeological Contractor* prior to mechanical excavation of each trial trench to enable the spatial distribution and density of any artefactual material to be captured.
- 6.6.5 In the event that a potentially significant artefact scatter of Palaeolithic or Mesolithic date is identified by the soil test pitting, the *Archaeological Contractor* will postpone trial trench excavation at that location and inform *Contractor's Historic Environment Manager*. The *Contractor's Historic Environment Manager* will, in consultation with the Employer, assess how the discovery might contribute to the research objectives of the GWSI: HERDS and whether an change to the investigation strategy is required, in accordance with the procedure for unexpected or significant discoveries set out in Section 6.13 of this LSWSI.

6.7 Machine Excavation

- 6.7.1 No machine excavation will be undertaken without a current and valid Permit to Dig issued by the Principal *Contractor*. All trench locations must be CAT scanned to detect the presence of buried services and utilities prior to machine excavation.
- 6.7.2 All trial trenches will be excavated by a mechanical excavator fitted with a toothless ditching bucket as set out at section 4.2.6 of the Project Plan and as defined in section 3.14 of the HS2 Technical Standard for Historic Environment Investigations (Document No. HS2-HS2-EV-STD-000-000035). All machine excavation will comply with the *Employer's* Technical Standard - Route wide soil resources plan (Document No. HS2-HS2-EV-STD-000-000008)
- 6.7.3 In addition to the methodology set out in the Project Plan the *Archaeological Contractor* will ensure that:
- The mechanical excavator is of an appropriate size and specification to excavate each trench cleanly;
 - That plant is only operated by trained, certified and competent drivers;
 - That mechanical excavation is only undertaken under the constant supervision of an sufficiently experienced and competent archaeologist and certified banksman;
 - That all operatives are briefed daily on the risks of working with the mechanical excavator and proposed plant movements for each day; and
 - That operatives do not enter or work within the swinging arm radius of the plant. When approaching the mechanical excavator operatives must only do so from a direction where both the driver and banksman can clearly see the operative (i.e. not from the rear or blind side) and must alert the banksman to their presence. If necessary the banksman will signal to the driver who will ground the machine bucket.
- 6.7.4 All trenches will be excavated in spits onto the first archaeological horizon or the surface of the natural geology, whichever is encountered first. Spoil will be banked at a safe working distance of at least 1m from the trench edge, with topsoil banked separately from subsoil and made ground.
- 6.7.5 If during the machine excavation of a trial trench a significant artefact scatter is encountered, excavation will cease at that horizon until the extent, date, character and significance of the artefacts has been established by the *Archaeological Contractor* as set out in the procedure for unexpected or significant discoveries at Section 6.13 of this LSWSI.

6.8 Plant Movement

- 6.8.1 Once delivered to the Site the mechanical excavator will only operate within the limits of the Site as shown on Figure 1. Plant movement will only be undertaken under the supervision of a certified banksman
- 6.8.2 The mechanical excavator will move across the Site following the most direct route from trench to trench. Where the excavator cannot track directly between trenches i.e. across field boundaries it will track along the field margins to a suitable crossing point. The excavator will then track back along the field margin to the next trial trench.
- 6.8.3 To aid plant movement across the site it will be beneficial for the *Archaeological Contractor* to mark the location of each trench with ranging rods or coloured canes/flags.
- 6.8.4 When working across the site the mechanical excavator will avoid slewing its tracks where possible to minimise disturbing the plough soil.

6.9 Backfilling

- 6.9.1 The general requirements for backfilling the trial trenches are set out in paragraphs 4.2.48 and 4.2.49 of the Project Plan. Backfilling will comply with the Employer's Technical Standard - Route wide soil resources plan (Document No. HS2-HS2-EV-STD-000-000008). For the purposes of the archaeological evaluation simple backfilling will be appropriate.
- 6.9.2 The trial trenches shall not be backfilled and reinstated without the prior approval of the *Contractor's Historic Environment Manager*, although in exceptional circumstances some backfilling would be permitted if health and safety or ground stability reasons warrant this.
- 6.9.3 Prior to backfilling the trenches shall be pumped dry (by the *Archaeological Contractor*) 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.
- 6.9.4 The trial trenches shall only be backfilled by machine under appropriate conditions and with direct archaeological supervision. Arisings from the trench will be replaced strictly in the correct sequence, with the ploughsoil being replaced last. The arisings will be levelled with the blade of the excavator bucket and tracked over, but will not be compacted.
- 6.9.5 Where excavation has made into the subsoil to investigate a feature- earth should be backfilled and firmly compacted prior to replacement of subsoil and topsoil layers (uncompacted).
- 6.9.6 Land drains or drainage where encountered should not be disturbed. Accidental damage to land/mole drains shall be immediately notified to the *Contractor*. The *Archaeological Contractor* will repair any damage to the satisfaction of the landowner or his agent. If a

specialist contractor is required to meet this requirement the Contractor will be informed immediately.

6.10 Recording

- 6.10.1 The requirements for fieldwork recording are set out in paragraphs 4.1.14 to 4.1.25 of the project plan. The archaeological contractor will undertake all archaeological recording in accordance with the general requirements as described in the GWSI: HERDS and the HS2 Technical Standard for Historic Environment Investigations (Document No. HS2-HS2-EV-STD-000-000035).
- 6.10.2 A sufficient sample of the archaeological features and deposits revealed must be sampled/or fully excavated meet the aims and objectives of the archaeological evaluation. Structures, features, or finds which might reasonably be considered to merit preservation in-situ shall not be unduly damaged⁶.
- 6.10.3 As a minimum the *Archaeological Contractor* will record:
- 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 should 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.
- 6.10.4 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 *Employer's* Cultural Heritage GIS Standard (HS2-HS2-GI-SPE-000-000004). Single context planning shall be used where complex stratigraphy is encountered.
- 6.10.5 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, the *Archaeological Contractor* shall take appropriate record photographs to illustrate work in progress. All photographic records

⁶ Project Plan for Trial Trenching at Colne Valley South Embankment (M25 slip roads). Document no.: 1D037-EDP-EV-REP-040-000018

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will include information detailing: site name and number/code, date, context, scale and orientation.

6.11 Completion of the Works

6.11.1 The *Archaeological Contractor* will complete a fieldwork sign-off sheet (see Section 13 of this LSWSI) within 24 hours of completion of the fieldwork. The sign-off sheet will be submitted to the *Contractor* who will check details and forward to the *Employer's Project Manager* for approval.

6.12 Deliverables

6.12.1 All post-excavation archaeological reporting will be completed by the *Archaeological Contractor* in accordance with the Section 4 of the Technical Standard for Historic Environment Investigations (Document No. HS2-HS2-EV-STD-000-000035) and relevant ClfA standards and guidance.

6.12.2 The deliverables for this archaeological evaluation will be:

- A weekly written progress report throughout the duration of the programme of archaeological works including annotated trench plan (submitted by midday each Monday);
- An Interim Report summarising the results of the completed archaeological evaluation within 5 working days of completion on site;
- A Trial Trenching (Fieldwork) Report within 6 weeks of completion of fieldwork;
- An HER Summary Report within 8 weeks of the completion of fieldwork; and
- Digital Archival Material including OASIS/Historic Environment Record summary sheets within 8 weeks of the completion of fieldwork.

Interim Report

6.12.3 Unless otherwise agreed, the *Archaeological Contractor* shall submit an interim statement to the *Contractor* within seven days of completion of a fieldwork event.

6.12.4 The interim statement will provide the *Contractor* and *Employer* with the information necessary to inform design decisions relating to:

- a. the next stage of archaeological works (if required); and
- b. engineering design.

6.12.5 The interim statement shall be brief, and the information contained commensurate with the timescale for production. The report shall be written in a manner which will avoid duplicating

effort at a later date and shall draw on the data gathered during the initial assessment undertaken during fieldwork.

- 6.12.6 A site plan indicating all the extent of fieldwork investigations shall be provided.
- 6.12.7 For archaeological interventions a plan indicating 'as-dug' investigations shall be provided. For archaeological excavation key stratigraphic profiles and topographic templates of any major stratigraphic units shall be provided.
- 6.12.8 The interim statement including illustrations shall be submitted as an MS Word and PDF file to the *Contractor*. CAD files will be GIS compatible and follow standards set out in the *Cultural Heritage GIS Standard* (HS2-HS2-GI-STD-000-000010).
- 6.12.9 The interim statement shall be submitted in a HS2 Ltd template as a digital document in MS Word file format and PDF file in accordance with the *Employer's* BIM requirements.
- 6.12.10 The interim statement shall include an approved report title sheet and QA page.

Archaeological Trial Trenching Report

- 6.12.11 The contents of the archaeological trial trenching report are defined at Section 5 of the Project Plan. As set out in the Section 4 of the Technical Standard for Historic Environment Investigations (Document No. HS2-HS2-EV-STD-000-000035) the archaeological trenching report will include each component of the works (e.g. stratigraphic/structural, artefactual and environmental/economic) which shall be supported by a statement setting out:
- a quantification of the resource (tabulated and cross referenced as appropriate);
 - provisional dating and evidence for residuality and intrusiveness;
 - the range of material, including sampling and/or taphonomic biases; and
 - the condition of the material, including preservation bias.
- 6.12.12 The assessment of results and statement of potential shall include the *Archaeological Contractor's* conclusions based on the recorded data, e.g. the monument/site class represented, site/feature function and relevant parallels. The statement shall primarily comment on the potential of the data to address the Specific Objectives set out in the GWSI: HERDS. As appropriate, comment shall be made on the site as a whole and the individual components (e.g. artefactual, palaeo-environmental, economic).
- 6.12.13 In reporting the results of the works, the accuracy of the original expectations and the appropriateness of the methods adopted shall be assessed by the *Archaeological Contractor* in order to illustrate what level of confidence can be placed on the information. The *Contractor's Historic Environment Manager* will use that information as the basis for developing any further archaeological investigation strategy and/or further analysis and publication.

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- 6.12.14 When submitted at evaluation stage, the report shall set out an outline recommendation for further archaeological investigation to meet the Specific Objectives of the GWSI: HERDS, if required. This may include further investigation and recording of the remains and/or archaeological monitoring. Preservation in situ will only be considered where it can be integrated into the engineering design.

Archaeological Survey Report

- 6.12.15 The *Archaeological Contractor* shall provide 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 TBM's. Unless otherwise agreed, the survey report shall be submitted by the *Archaeological Contractor* to the *Contractor* and *Employer* within 2 weeks of the completion of fieldwork.
- 6.12.16 The *Archaeological Contractor* shall prepare and submit 'site area outlines and levels in accordance with the *Employer'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.

Archaeological Summary Report

- 6.12.17 A short summary report of no more than 500 words (the summary report) for the works shall be prepared by the *Archaeological Contractor* for submission to the *Contractor* for subsequent publication within an appropriate journal or publication outlet specified by the *Employer*.
- 6.12.18 The *Archaeological Contractor* shall submit the draft summary report to the *Contractor* for approval within 8 weeks of the completion date of the fieldwork event. The *Contractor* will review the draft summary report and then issue it to the *Employer* for comment and approval. The *Archaeological Contractor* shall allow two weeks in the programme of works for *Contractor* and *Employer* to provide comments.
- 6.12.19 The *Archaeological Contractor* shall include any amendments required by the *Contractor* and *Employer* in the final Summary Report which shall be submitted within one week of receiving comments on the draft report.

Digital Archival Material including OASIS/Historic Environment Record summary sheets

- 6.12.20 Following completion of the archaeological evaluation the *Archaeological Contractor* will provide the *Contractor* with the required data, metadata and digital material as specified in the Historic Environment Digital Data Management and Archiving Procedure (C262-ARP-EV-SPE-000-000003).

6.13 Unexpected Remains

- 6.13.1 Unexpected discoveries (including assets, artefacts, monuments, built heritage elements and other features) may be found either in the course of carrying out historic environment works or during the construction works themselves.
- 6.13.2 The Chiltern Tunnel (M25 slip roads) is an archaeological evaluation aimed at confirming the presence/absence, extent, character and significance of any surviving archaeological remains within the Site. It is anticipated that archaeological features associated with late prehistoric or Roman settlement and artefactual remains of Mesolithic to post-medieval date may be encountered.
- 6.13.3 In the event that unexpected or significant archaeological remains are encountered the *Archaeological Contractor* will immediately inform the *Contractor's Historic Environment Manager* who will notify the *Employer* who may seek external advice. For the purpose of this LSWI unexpected or significant archaeological remains may include stratified occupation deposits, in situ prehistoric to medieval structural remains or human remains.

Remains not of National Importance

- 6.13.4 For remains which are not demonstrably of national importance an assessment will be made to determine how the unexpected remains can contribute to the objectives and priorities of GWSI: HERDS and the specific objectives for the Chiltern Tunnel (M25 slip roads). In the first instance it may simply be necessary to extend a trial trench to expose the full extent of the significant remains encountered.
- 6.13.5 Once the extent, date, character and significance of the remains is understood the *Contractor's Historic Environment Manager*, in consultation with the *Employer*, will assess the possible contributions to the GWSI: HERDS. At this archaeological evaluation stage it is likely that any programme of further archaeological investigation and recording that may be required will be developed by the *Contractor's Historic Environment Manager* who will prepare new or updated project plan and LSWI for approval by the *Employer*.
- 6.13.6 Where the Contractor cannot demonstrate that the remains will contribute to the knowledge creation objectives for the Site then the need for any further investigation will be reviewed to determine whether it would lead to new objectives that could make a meaningful contribution; if not, further investigatory works would not be undertaken.

Remains of National Importance

- 6.13.7 In the case of the discovery of unexpected archaeological remains of national importance the procedure set out at Section 6 of the HS2 Procedure for the Unexpected Discovery of Archaeological Remains of National Importance (Document No. HS2-HS2-EV-PRO-000-000009) will be followed. The *Archaeological Contractor* will immediately inform the *Contractor's Historic Environment Manager* who will inform the *Employer*. All works that may

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impact the significance of the remains will immediately cease. The discovery of the remains will be confirmed in writing within 24 hours.

- 6.13.8 On receipt of an assessment of the significance of the remains and appropriate proposal for delivering suitable mitigation and/or investigation and recording *Employer* will engage with the Department of Culture Media and Sport (DCMS), its Executive Agency Historic England and the relevant local authority as set out in Section 5 of the High Speed Rail (London-West Midlands)Heritage Memorandum.
- 6.13.9 On receipt of a written instruction from the *Contractor* the *Archaeological Contractor* will deploy appropriate resources in order to successfully undertake the archaeological recording and sampling with minimal delay to the *Contractor's* construction programme.

6.14 Human Remains

- 6.14.1 In the event that human remains are encountered the *Archaeological Contractor* will immediately inform the *Contractor's Historic Environment Manager*, who will in turn inform the *Employer*. Work at the location where human remains have been discovered will not recommence until further instruction has been received from the *Contractor's Historic Environment Manager*. The discovery of human remains will be confirmed in writing within 24 hours.
- 6.14.2 In all situations where human remains are considered to be present (prior to works commencing) or encountered unexpectedly during works the Burial grounds, human remains and monuments procedure (HS2-HS2-EV-PRO-000-000008) shall be complied with.

6.15 Treasure

- 6.15.1 In the event of the discovery of 'treasure' as defined below, the Treasure Act 1996 will apply to works for Phase One of HS2 and the *Archaeological Contractor* shall comply with it. The Treasure Act defines 'Treasure' as:
- any object at least 300 years old when found which is not a coin but has metallic content of which at least 10 per cent by weight is precious metal;
 - When found, is one of at least two coins in the same find which are at least 300 years old at that time and have that percentage of precious metal; or
 - When found, is one of at least ten coins in the same find which are at least 300 years old at that time.
 - any object at least 200 years old designated as treasure by the Secretary of State under section 2(1) of the Treasure Act 1996.
 - Any object that would have been 'Treasure Trove'.

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- Any object found with any of the above.

6.15.2 The Treasure (Designation) Order 2002 extends the definition of treasure to include:

- Finds of least two base metal objects (other than coins) of prehistoric date; and
- Any object (other than a coin) of prehistoric date with any precious metal content.

6.15.3 All finds falling within the definitions of treasure shall be reported immediately to the *Contractor's Historic Environment Manager* who will inform the *Employer*. All subsequent works must be undertaken in accordance with the relevant legislative requirements of the Treasure Act and all necessary measures taken to comply with those requirements and any project specific requirements will be implemented.

6.15.4 To protect the finds from theft, the *Archaeological Contractor* shall record the finds and remove them to a safe place. Where recording and removal is not feasible or appropriate on the day of discovery, the *Archaeological Contractor* shall ensure, on liaison with the *Contractor's Historic Environment Manager* that adequate site security is provided by the *Contractor*.

6.15.5 Subject to the Provisions of the Treasure Act 1996, all material that is defined as Treasure is vested in the franchisee or, if none, the Crown.

6.16 Sampling facilities

6.16.1 The *Archaeological Contractor* shall set out in their Method Statement the method of recovery (including on-site sieving of soil samples for artefact collection), equipment and storage of soil and environmental samples collected during the archaeological evaluation, in line with Section 4 of the Project Plan.

6.16.2 The *Archaeological Contractor* shall be responsible for the protection of all samples and finds and for their transport (including loading and unloading) to the processing facilities or other location as agreed with HS2 Ltd. 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.

6.16.3 The *Archaeological Contractor* will provide suitable off-site facilities in which to store, process and analyse artefacts and environmental samples. This will include:

- Secure locked, cool storage for finds and samples ;
- Wet sieving/floatation equipment;
- Finds washing facilities;
- Drying room; and
- Suitable office/laboratory space for analysis and reporting.

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- 6.16.4 These facilities will meet the guidance set in Historic England's Environmental Archaeology (2011) and ClfA's Standard and guidance for the collection, documentation, conservation and research of archaeological materials (2014).

7 Delivery Interfaces

- 7.1.1 In to deliver the works the *Archaeological Contractor* will need to work closely with the *Contractor* and Jackson Civil Engineering. All parties will follow the *Employer's* protocols for intra- and inter-project communication.
- 7.1.2 In preparing this LSWSI the *Contractor* has consulted with Jackson to confirm whether there are any site specific hazards or constraints that the *Archaeological Contractor* should be aware of and the key contacts, controls and processes for the archaeological works. The results of this consultation are incorporated into Section 8 below.
- 7.1.3 The key interfaces and contacts for the Chiltern Tunnel (M25 slip roads) trial trench evaluation are:
- **The Contractor** - Fusion is responsible for managing the delivery of the Area Central Enabling Works on behalf of the Employer. Fusion have provided a Works Manager who will be the first point of contact for the Archaeological Contractor:
 - **Colin Dunkerton** – Fusion Works Manager (Email: colin.dunkerton@bamnuttal.co.uk Tel. 07920 496878)
 - **Jackson** – are the civil engineering contractor appointed by Connect Plus (the Highways England DBFO contract to manage the M25) on behalf of the Employer to construct the M25 access slip road. Jackson will be the licence holder and principal contractor under the CDM regulations 2015 for the Site. Jackson's Site Agent for the works will be:
 - **Michael Carr** – Site Agent (Email: mcarr@jackson-civils.co.uk; Tel. 07970172484)

8 Health, Safety and Environment

8.1 Health and safety values

- 8.1.1 Safety is a core HS2 Ltd value, and is expressed as caring for your workforce, our passengers and the public by creating an environment where no one gets hurt.
- 8.1.2 The HS2 Health and Safety Strategy (Document: HS2-HS2-HS-STR-000-000002) describes HS2's approach, vision, mission, and values with respect to health and safety.
- 8.1.3 All archaeological works will be undertaken in accordance with the Employer's Health and Safety Policy (Document No. HS2-HS2-HS-POL-000-000001), the policies and guidance set

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out in the Enabling Works, Works Information (Wlog00) and the *Contractor's* Health and Safety Policy and Construction Phase Health and Safety Plan.

8.2 Risk Assessment and Method Statement

- 8.2.1 Prior to the start of the archaeological evaluation the *Archaeological Contractor* shall prepare and submit a draft Health and Safety Plan and Risk Assessment and Method Statement (RAMS) for the works to the *Contractor* for review and approval.
- 8.2.2 The *Archaeological Contractor's* Method Statement will clearly identify the methods and processes that will be implemented to fulfil the aims, objectives and requirements of the Project Plan and this LSWSI. The Method Statement will be prepared in liaison with the *Contractor* and Jackson Civil Engineering, taking account of the *Contractor's* Urgent Works Package 1 Environmental Management Plan and other relevant site information provided by them and requirements for the works set out in the Works Information (e.g. relating to health and safety, security, engineering design requirements and attendances).
- 8.2.3 The Method Statement shall include, as appropriate:
- A resource plan and programme and CV's;
 - The *Archaeological Contractor's* IT capability and proposed IT plan (including specific survey methods for on-site recording of stratigraphic profiles and sub-surface topographic modelling;
 - The *Archaeological Contractor's* approach to Archaeological Science;
 - The methods for survey and setting out works;
 - The methods to address the specific event types required (trial trench, area excavation etc);
 - The safe method of working whilst excavating trenches or pits including any temporary works required;
 - The method for disposing of water from trenches and test pits in waterlogged ground;
 - Site management plan to include details of the method for preparing safe access route to the working areas, the proposed site accommodation, services and welfare;
 - The retention and disposal policies for samples and artefacts recovered during the work;
 - The method for excavating and recording inhumations and cremations in compliance with the HS2 Human Remains and Monuments Procedure (Document No. HS2-HS2-EV-PRO-000-000008);
 - The method for preparation of the required reports, archive and all associated deliverables;
 - The procedures for assessment of potential for analysis (post-excavation assessment); analysis and publication proposals;

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- m) The method for preparation of the digital dataset, digital drawings, and digital report deliverables in line with the *Employer's* Technical Standards ;
- n) The *Archaeological Contractor's* methods and approach for undertaking the site based works and off site processes to completion.
- o) The Health and Safety Plan and Site-Specific Risk Assessment (including unexploded ordnance);
- p) The Quality Assurance Plan;
- q) The procedures for on- and off- site security and emergency response plan (including environmental incidents);
- r) The method for complying with project generic and site specific environmental and consent requirements; and
- s) The *Archaeological Contractor's* requirements and specification for services and facilities and attendances required to be supplied by the *Contractor* or the *Employer*.

8.2.4 The *Archaeological Contractor* will prepare the Risk Assessment and Method Statement in liaison with both the *Contractor* and Jackson to ensure the health and safety requirements of both stakeholders are fulfilled. The Risk Assessment and Method Statement will be submitted to the *Contractor* for comment and approval.

8.2.5 No ground intervention or other survey shall be made without approval of the *Archaeological Contractor's* Health and Safety Plan, Risk Assessment and Method Statement by the *Contractor*.

8.3 Site Inductions

8.3.1 Prior to the start of the archaeological works the *Archaeological Contractor's* site operatives will complete an Area Central Enabling Works induction provided by the *Contractor* and undertake a mandatory drugs and alcohol test.

8.3.2 The *Archaeological Contractor's* site operatives will also be required to complete a site induction provided by Jackson. A mandatory drugs and alcohol test for Jackson may also be required.

8.4 PPE

8.4.1 Mandatory PPE to be worn by all members of the *Archaeological Contractor's* personnel will comprise:

- Full orange High Visibility jacket/vest and trousers;
- Hard Hat;
- Gloves;

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- Light Eye Protection;
- Lace-up boots with ankle support, steel insoles and toe caps (rigger boots are not permitted).

8.4.2 For further information please refer to the Works Package Information for the Enabling Works Contract.

8.5 Site Specific Constraints

Agriculture

8.5.1 The Site is located within arable farmland. The *Archaeology Contractor* will follow the methodology for mechanical excavation and backfilling set out above to maintain the agricultural quality of the land.

Services and Utilities

8.5.2 During preparation of this LSWSI the *Contractor* has completed a review of known services and utilities present within the Site this information is provided below. However, it remains the responsibility of the *Archaeological Contractor* to identify and avoid any buried underground or overhead services and to carry out CAT scanning at each trench location prior to the start of the works and during the excavation of the trenches.

Overhead Services

8.5.3 A line of 132Kv high voltage overhead electricity cables are present crossing the centre of Field 2 (to the east of the M25 motorway) on a north to south alignment (Figure 9). The cables are carried on several pylons located with Field 2.

8.5.4 Prior to the start of the archaeological evaluation the *Archaeological Contractor* will inspect the Site and will prepare a safe method of working in proximity to the overhead cables for review and approval by the *Contractor*. The works shall be planned and conducted in accordance with the guidance provided in HSE guidance note GS6 - *Avoiding danger from overhead power lines* (Fourth edition).

8.5.5 The Project Plan identifies the 13No. trenches listed below or in close proximity to the overhead cables. The *Archaeological Contractor* will as part of their pre-works Site inspection assess which of these trenches can be moved and safely excavated or which trenches it is not possible to excavate safely.

Table 2 - Trial Trenches below or in close proximity to overhead cables

Trench No.	Trench No.
Tro19	Tro33
Tro20	Tro35
Tro21	Tro36
Tro22 (Critical Path	Tro37

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Trench No.	Trench No.
Bellmouth location)	
Tr023	Tr050
Tr031	Tr052
Tr032	

Buried Services and Utilities

- 8.5.6 A review of available combined utility plans has identified no known buried services or utilities within the Site.

Live Motorway

- 8.5.7 The Site is located in agricultural fields either side of the operational M25. There is no access to the Site from the M25 and no archaeological works are planned within the live motorway corridor or on land owned by Highways England.

- 8.5.8 The *Archaeological Contractor* shall ensure that:

- No archaeological works are undertaken within 2m of the Highways England boundary fence and that this safe working distance is maintained at all times; and
- No plant or archaeological operatives enter land owned by Highways England.

Mechanical Plant

- 8.5.9 Site plant and equipment operated by the *Archaeological Contractor* will be must be physically inspected, along with the required documentation, before being offloaded upon delivery to, and before being used on Site.
- 8.5.10 Records of daily/weekly plant inspections, including fault reporting, will be maintained on Site by the *Archaeological Contractor* and will be available for inspection by the *Contractor*.
- 8.5.11 Details of plant and equipment operators shall be maintained by the *Archaeological Contractor* and evidence of periodic checks from plant hirers that the plant has been adequately maintained shall be obtained. Copies of all plant operators certification will be provided to the *Contractor* prior to the start of the archaeological evaluation.

Construction Traffic

- 8.5.12 The archaeological works will be undertaken in advance of Enabling Works and Main Works construction activity. With the exception of plant provided by the *Archaeological Contractor*, it is not anticipated that there will be any other construction traffic operating within the Site during the trial trench investigation.

Unexploded Ordnance (UXO)

8.5.13 A review of UXO Risk assessment data held on HS2's gViewer GIS system has been undertaken by the *Contractor*. This has identified the site specific UXO risk as being a Low Hazard.

8.5.14 In the unlikely discovery of any UXO's the Archaeological Contractor's site supervisor will follow the *Contractor's* emergency procedure⁷:

- Evacuate the area ensuring the completion of a roll call.
- Verify the location of the UXO and ensure it is quarantined.
- Contact the most *Contractor's* Project Manager to report issue and await instruction. The *Contractor's* Silver or Gold Command will contact the appropriate emergency services and contact any 3rd parties who have an interest in the site e.g. the *Employer's* Project Manager
- The *Contractor's* Silver or Gold Command will contact UXO Specialists.

8.5.15 The emergency procedure will be described in the *Archaeological Contractor's* Risk Assessment and Method Statement.

Public Rights of Way

8.5.16 The Rickmansworth 005 public footpath extends along the northern boundary of the Site. The *Archaeological Contractor* will ensure that:

- The route of the footpath is clearly demarcated and fenced to ensure separation of the general public and the archaeological works activities. Netlon or similar waist high crowd control fencing should be used along the length of the footpath.
- Appropriate signage e.g. Danger Deep Excavation, is displayed on the fencing where necessary;
- Plant, materials and welfare facilities will not obstruct or be stored within the route of the footpath, which will be kept clear at all times; and
- Particular care is taken when loading or unloading plant and materials from Hornhill Lane across the route of the public footpath. Sufficient staff including certified banksmen will be present to supervise the plant movement and alert any members of the public of the hazard.

⁷ Fusion, 2017. Incident Management Plan (Document No. 1EW03-FUS-HS-PLN-C000-000001)

Temporary Works

- 8.5.17 It is anticipated that all trial trenches excavated within the Site will be shallow and that they will not require temporary works. If during the excavation of the trial trenches a need for temporary works is identified works will cease at that location, the trench temporarily backfilled and the *Contractor's Historic Environment Manager* informed. The *Contractor* will assess the requirement for temporary works and will be responsible for their design, installation and maintenance.
- 8.5.18 Temporary works will be co-ordinated by the *Contractor'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 the *Contractor'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.
- 8.5.19 All temporary works will be designed and installed in accordance with the *Employer's* Technical Standard for Temporary Works (Document No. HS2-HS2-CV-STD-000-000005), the *Contractor's* IMS and Construction Phase Health and Safety Plan.

Interaction with the general public

- 8.5.20 If approached by members of the public or local residents about any aspect of the archaeological evaluation the *Archaeological Contractor* shall maintain a cautious and polite response and, in the first instance, direct enquiries to the *Contractor's Historic Environment Manager* (Email: jaycarver@4adconsultants.com; Tel. 07870 191705).
- 8.5.21 For general enquiries regarding the HS2 Phase One, the *Archaeological Contractor* should advise members of the public to HS2 Helpline 020 7944 4908.

Ecology

- 8.5.22 An ecological survey of the Site has been completed by a Connect Plus Services ecologist in January 2017. This survey confirmed the following potential ecological constraints to the archaeological works:
- There are a number of birds' nests in trees within the western margin of the M25 and hedgerow at the southern end of Field 2;
 - There are two badger setts, one outside of the Site boundary to the west of the M25 and one on the Site boundary at the southern end of Field 2 adjacent to Chalfont Lane. Neither sett appeared to be active at the time of the survey; and
 - That no invasive species were present at the time of the survey.
- 8.5.23 The *Archaeological Contractor* will be provided with copies of the survey reports provided by Connect Plus Services and prior to the start of the archaeological evaluation will review the findings and brief all site personnel on the location and nature of the ecological issues.

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- 8.5.24 If during the course of the works the Archaeological Contractor becomes aware of evidence for protected species such as, *inter alia*, reptiles or Great Crested Newts are revealed, works shall be suspended in that location and area fenced to clearly demarcate the ecological constraint. The Archaeological Contractor will immediately inform the *Contractor*, who will notify the *Employer*.
- 8.5.25 The *Contractor* will assess the requirements for ecological mitigation and advise the *Archaeological Contractor* on the appropriate measures to changes to their working method that should be adopted. All archaeological works will be undertaken in accordance with the *Contractor's* Urgent Works Package 1 Environmental Management Plan.

8.6 Plant noise

- 8.6.1 The *Archaeological Contractor* shall only use plant that meets industry standards for noise and pollutant emissions and shall limit the operation of plan to the core working hours.

8.7 Site safety and security

- 8.7.1 Following site set-up the archaeological evaluation will be conducted in accordance with the information provided in the Project Plan and LSWSI and the safe methods of work described in the *Archaeological Contractor's* Risk Assessment and Method Statement.
- 8.7.2 In addition to the site induction provide by Jackson the *Archaeological Contractor's* site supervisor will give daily start of shift briefings and will maintain a record of site attendance for each day that there is a team in the field.
- 8.7.3 All staff involved in the fieldwork should be CSCS qualified to a minimum standard as an 'Operative'. Staff CVs will include CSCS qualifications.
- 8.7.4 All site personnel will be provided with the *Archaeological Contractor's* Risk Assessment and will familiarise themselves with the following:
- Site emergency and evacuation procedures;
 - The Site's health and safety coordinator;
 - The first aiders; and
 - The location of the nearest hospital and doctor's surgery.
- 8.7.5 The *Archaeological Contractor* shall take precautions to ensure that all plant and materials are securely stored within the limits of the Site. Particular care should be taken to lock welfare and site accommodation when not occupied and for plant to be fitted with lockable screens and fuel caps.

Accident and incident reporting

- 8.7.6 Accident and incident reporting will follow the guidance and procedures set out in the *Employer's Works Information* and the *Contractor's Standard for Accident and Incident Investigation and Reporting* (Document No. SH2 STD1) and *Incident & Emergency Preparedness Plan* (Document No. 1EW03-FUS-HS-PLN-C000-000001).
- 8.7.7 The *Archaeological Contractor's Risk Assessment and Method Statement* will include a clear procedure for responding to an incident and list of emergency contacts including the *Contractor's Duty Manager* and *SHEQ Manager*.
- 8.7.8 All accidents and incidents must be recorded in the site accident book and entered onto the *Contractor's SHEQ Tracker* within 24 hours as well as the HS2 AssessNet incident reporting database. All incidents MUST be reported to the *Contractor's Duty manager* and *SHEQ* department immediately in person or by telephone.
- 8.7.9 Accidents and incidents defined by the *Employer* as level 1 or 2 are also to be immediately reported to the employers helpdesk on 0207 944 6570 which is available 365 days of the year, and open 24 hours.
- 8.7.10 Records of accidents or incidents reportable under the Reporting of Incidents Diseases and Dangerous Occurrences Regulations (RIDDOR) are confidential and must be stored securely on site.
- 8.7.11 Should the public or a utility be involved in an accident or incident, ensure that public liability claim forms are completed if necessary. All near misses and learning events MUST also be reported to the *Contractor's SHEQ* department

Core Working Hours

- 8.7.12 The *Archaeological Contractor* shall adhere to the core working hours below unless otherwise agreed with the *Contractor* and *Employer's Project Manager* and the relevant Third Party through a Consent.
- 8.7.13 The core working hours are from 08:00 to 18:00 on weekdays (excluding public holidays) and from 08:00 to 13:00 on Saturdays.
- 8.7.14 The *Archaeological Contractor* may utilise a period of up to one hour before and up to one hour after core working hours for start-up and close down of activities. Start-up and close down activities shall not include operation of plant or machinery likely to cause a disturbance and shall not be considered an extension of core working hours.

8.8 Welfare and First Aid

- 8.8.1 The *Archaeological Contractor* will provide adequate that welfare and first aid in-line with the *Contractor's Integrated Management System (IMS)* standards and guidance. The welfare and

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first aid provision must be detailed in the *Archaeological Contractor's* Method Statement and Risk Assessment.

8.8.2 The *Archaeological Contractor* will ensure that appropriate numbers of first aid trained personnel and first aid kits are available at:

- All site locations
- In vehicles where this has been identified as necessary or good practice
- In strategic locations within office setups.

8.8.3 Posters will be displayed in the *Archaeological Contractor's* welfare/site accommodation stating the location of first aid boxes, first aiders, appointed persons and action to be taken in case of an incident.

8.9 Neighbouring properties and businesses.

8.9.1 A number of residential properties are located immediately to the east of Field 3 on Sunnyhill Road. The *Archaeological Contractor* shall conduct the works in professional and considerate manner, and with the minimum disturbance to the adjacent residents.

8.9.2 The guidance for good housekeeping set out at Section 6 of the Enabling Works Information Wlo200 General Constraints (Document No. 1E001-HS2-PR-ITT-000-000098) ; including locating site accommodation/welfare facilities to avoid overlooking residential property and the management of staff congregating outside of the Site prior to commencing or leaving work, will be followed.

9 Information Management

9.1.1 GIS deliverables will be provided in accordance with the *Employer'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 must be supplied in GIS format.

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

9.1.3 The *Employer's* standard template for reports (HS2-HS2-PM-TEM-000-000004) will be used.

10 Site Monitoring and engagement

10.1.1 Prior to commencing the works the *Archaeological Contractor* shall agree a programme of weekly written progress reports and periodic progress meetings with the *Contractor's Historic Environment Manager* and shall be represented at such meetings to the satisfaction of the

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Contractor. The *Archaeology Contractor* shall provide information describing progress on-site to date, the processing of samples and artefacts and feedback from any initial assessment.

- 10.1.2 Where required the *Contractor's Historic Environment Manager* shall arrange site visits with specialist stakeholders and expert bodies to provide advice on-site where this is considered beneficial and agreed with the *Employer*. This will be undertaken within the *Employer's* communication protocols set out in the *Employer's* Community Relations Strategy.
- 10.1.3 Periodic updates on the progress of the Area Central Enabling Works archaeology programme shall be submitted to the *Employer* and Local Authority Archaeologist by the *Contractor's Historic Environment Manager*. The *Archaeology Contractor* shall provide information to the *Contractor's Historic Environment Manager* as requested to inform this reporting.
- 10.1.4 The *Contractor's Historic Environment Manager* shall arrange and convene monitoring site visits with the *Employer* to assess the quality and progress of the archaeological works and their adherence to HS2 technical standards and procedures.
- 10.1.5 The *Employer* may invite the Local Authority Archaeologist to attend these meetings, as appropriate. The *Employer* will be responsible for informing Historic England and the local authority historic environment specialists on the progress of fieldwork activities and findings.
- 10.1.6 There shall be no unauthorised access to the works in any other circumstances. Any visits to the works shall be in accordance with the *Contractor's* and Jackson's health and safety, site access and security requirements.

11 Quality Assurance Processes

- 11.1.1 All archaeological works will be delivered in accordance with the *Contractor's* Urgent Works Package 1 Quality Plan (Document No. 1EW03-FUS-QY-PLN-C000-000022) and the standards and guidance set out in the following documents:
- High Speed Rail (London-West Midlands) Environmental Minimum Requirements.
 - High Speed Rail (London-West Midlands) Environmental Minimum Requirements Annex 3: Heritage Memorandum (Document No. CS755 02/17).
 - High Speed Rail (London-West Midlands) Environmental Minimum Requirements Annex 1: Code of Construction Practice (Document No. CS755 02/17).
 - HS2 Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy (Document No. HS2-HS2-EV-STR-000-000015).
 - HS2 Technical Standard - Specification for historic environment investigations. (Document No. HS2-HS2-EV-STD-000-000035).
 - HS2 Technical Standard: Historic Environment Physical Archive Procedure (Document

No. HS2-HS2-EV-STD-000-000039).

- HS2 Technical Standard: Historic Environment Digital Data Management and Archiving Procedure (Document No. HS2-HS2-EV-STD-000-000040).
- HS2 Cultural Heritage GIS Specification (Document No. HS2-HS2-GI-SPE-000-000004).
- Chartered Institute for Archaeologists (CIfA), 2014a. Code of Conduct.
- CIfA, 2014b. Standard and Guidance for Archaeological Field Evaluation.
- English Heritage, 2006. Management of research projects in the historic environment (and associated guides and project planning notes).
- English Heritage, 2007. Geoarchaeology: Using earth sciences to understand the archaeological record.
- English Heritage, 2011. Environmental Archaeology: A guide to the Theory and Practice of Methods, from Sampling and Recovery to post-excavation (second edition).

- 11.1.2 The Archaeological Contractor undertaking the trial trenching is expected to have Chartered Institute for Archaeologists (CIfA) accreditation as Registered Archaeological Organisations (RAO) and their supervisory staff to have an appropriate and relevant level of demonstrable experience for the specific task in question i.e. full members of the CIfA, or an equivalent demonstrable professional standing.
- 11.1.3 All members of the *Archaeological Contractor's* site team are expected to be suitably qualified, experienced and competent professionals. All site operatives will hold a current and valid CSCS qualification to at least 'Operative' level.
- 11.1.4 The Interim and Trial trenching reports will be prepared and conducted by suitably qualified, experienced and competent professionals. The resultant reports will be issued in draft to the *Contractor*, whose Historic Environment Manager will check and review each report prior to issue to the *Employer* for acceptance. Final reports, following comments, will be checked and reviewed again prior to issue.

12 Resourcing requirements and budget

12.1 General Requirements

- 12.1.1 The Archaeological Contractor shall provide project personnel of experience as described below. The personnel shall be approved by the Contractor. Approval may be withdrawn by the Employer at their discretion and in accordance with the contract conditions.

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- 12.1.2 The Archaeological Contractor shall submit CVs of all proposed personnel including any specialists, but excluding site technician grades, to the Contractor for approval if this has not already been done as part of the pre-qualification process.
- 12.1.3 The works shall be managed, directed and staffed by appropriately qualified and experienced personnel. The Archaeological Contractor's Key Person shall possess at least ten years relevant experience.
- 12.1.4 The excavation, sampling and recording of the works shall be directed in the field by a Fieldwork Director who is a Member of the Institute of Field Archaeologists (MIFA) The Fieldwork Director shall be on site throughout the fieldwork stages.
- 12.1.5 The Archaeological Contractor's project team shall include an environmental archaeologist suitably qualified in archaeological science and geo-archaeological sediment description methods, and on site sample processing and assessment techniques.
- 12.1.6 The Archaeological Contractor's project team shall be staffed by technician grades with minimum six months experience in appropriate aspects of excavation and recording.
- 12.1.7 Specialist staff employed on any aspect of the works, including post-excavation assessment or analysis of any kind including the writing of reports, shall be suitably qualified and shall be supervised by personnel with a minimum of ten years of relevant experience in their field (this may be inclusive of post-graduate studies).
- 12.1.8 Specialist staff shall be available, at 24 hours' notice, for the duration of the works to provide advice on any specialist tasks to be undertaken.

12.2 Site Specific Requirements

- 12.2.1 To deliver the Colne Valley South Embankment (M25 slip roads) trial trench investigation the Archaeological Contractor shall provide:
- A revised Archaeological Risk Assessment and Method Statement inclusive of safe methods of working;
 - Suitably qualified and competent staff who have valid CSCS cards;
 - Suitably qualified and competent plant operators who have valid CSCS cards and certification;
 - Two teams of suitably qualified archaeologists (one for the east side of the M25 and one for the west side of the M25), experienced in archaeological investigation, recording and the nature of archaeological deposits which are expected on this site;
 - 2No. mechanical excavators of a suitable type and size to cleanly excavate the trial trenches;

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- Appropriate welfare and first aid facilities for the number of staff deployed to the Site;
- All fencing, signage, goal posts and security measures required to fulfil the aims and objectives set out in the Project Plan and this LSWSI; and
- Any other tools or materials the Archaeological Contractor required to successfully deliver the programme of archaeological trial trench evaluation defined in the Project Plan and this LSWSI.

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13 Fieldwork sign off sheet

Historic Environment Fieldwork Sign-off Sheet			
Work Package Reference			
Historic Environment Investigation Type			
Contractor			
Fieldwork Conducted by (Site Director)		Dates	
Summary of Results			
Document References			
1.			
2.			
3.			
4.			
Compiled by	Name	Date	Signature
Checked by	Name	Date	Signature
Approved by	Name	Date	Signature

14 References and glossary of terms

14.1 Glossary of terms

14.1.1 The following terms have been used in this report:

- **Archaeological Contractor** – the organisation undertaking the specific historic environment works for the Contractor.
- **Contractor** – the organisation undertaking the Enabling Works on behalf of the Employer.
- **Detailed Desk Based Assessment (DDBA)** – analytical document that builds on the information gathered previously in the Environmental Statement to address particular issues, questions or uncertainties within a given area. It may be developed to provide a more detailed understanding of the resource in an area to inform design development or construction programming.
- **Employer** – HS2 Ltd, the organisation responsible for delivery of HS2 Phase One Scheme and all terms and conditions, policies, procedures, and payments
- **Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy (GWSI: HERDS)** – the framework for delivering all historic environment investigations undertaken as part of the HS2 Phase 1 programme.
- **Location** – a specific HS2 worksite or group of worksites that are being addressed as a combine historic environment investigation programme of assessment, evaluation and investigation.
- **Project Plans** – specification document for each specific package of activity (e.g. a survey, desk based assessment, excavation, recoding project). The plans would respond to the Specific Objectives set out in the GWSI: HERDS and be delivered within an agreed budget.
- **Works** – the specific historic environment assessment, evaluation or investigation works at each location.

14.2 References

Title	Reference
High Speed Rail (London-West Midlands) Environmental Minimum Requirements Annex 3: Heritage Memorandum	CS755 02/17

High Speed Rail (London-West Midlands) Environmental Minimum Requirements Annex 1: Code of Construction Practice	CS755 02/17
HS2 Phase One Environmental Statement and Supplementary Environmental Statements	CH-001-018, ES 3.5.2.25.4 CH002-018, ES 3.5.2.25.5 CH003-018, ES 3.5.2.25.6 CH003-018, ES 3.5.2.25.7 ES 3.5.1.4.4
HS2 Technical Standard: Cultural Heritage GIS Specification	HS2-HS2-GI-SPE-000-000004
HS2 Technical Standard: – Temporary Works	HS2-HS2-CV-STD-000-000005
HS2 Technical Standard: - Route wide soil resources plan	HS2-HS2-EV-STD-000-000008
HS2 Technical Standard: Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy	HS2-HS2-EV-STR-000-000015
HS2 Technical Standard: Specification for historic environment investigations	HS2-HS2-EV-STD-000-000035
HS2 Technical Standard: Specification for Project Plans and Location Specific Written Scheme of Investigations	HS2-HS2-EV-STD-000-000036
HS2 Technical Standard: Historic Environment Physical Archive Procedure	HS2-HS2-EV-STD-000-000039
HS2 Technical Standard: Historic Environment Digital Data Management and Archiving Procedure	HS2-HS2-EV-STD-000-000040
HS2 Enabling Works Information Wlo200 General Constraints	1E001-HS2-PR-ITT-000-000098
Fusion Standard for Accident and Incident Investigation and Reporting	SH2 STD1
Fusion Construction Phase Health and Safety Plan	
Fusion Incident & Emergency Preparedness Plan	1EW03-FUS-HS-PLN-C000-000001
Fusion Urgent Works Package 1 Quality Plan	1EW03-FUS-QY-PLN-C000-000022

14.3 List of acronyms

AIMS	Asset Information Management System
BIM	Building Information Modelling
CIfA	Chartered Institute for Archaeologists
CoCP	Code of Construction Practice

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DDBA	Detailed Desk Based Assessment
EIA	Environmental Impact Assessment
EMR	Environmental Minimum Requirement
ES	Environmental Statement
GIS	Geographical Information Systems
GWSI: HERDS	Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy
HE	Historic England (formerly English Heritage)
HER	Historic Environment Record
LLAU	Limits of Land to be Acquired or Used
LOD	Limit of Deviation
LS-WSI	Location Specific Written Scheme of Investigation
OASIS	Online Access to the Index of archaeological investigations
PDF	Portable Document Format
PGM	Permanent Ground Markers
QA	Quality Assurance
RTK	Real Time Kinematic
TBM	Temporary Bench Mark
TSA	The Survey Association
TST	Total Station Theodolite

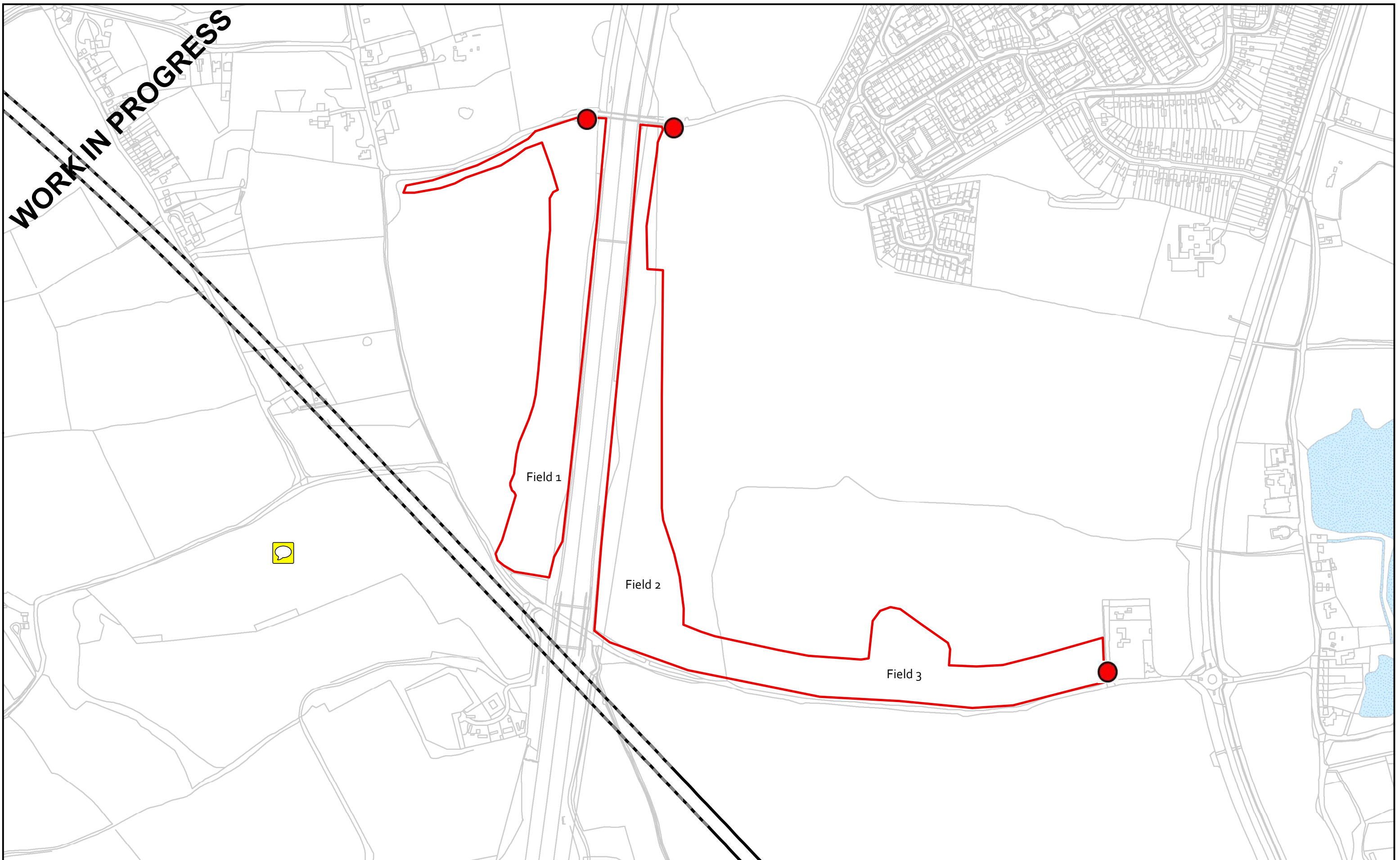
15 Figures

Table 3 - Figures

Figure title	Drawing No.
--------------	-------------

Revision: Po1

Figure title	Drawing No.
Figure 1 Site location	TBC
Figure 2 Heritage assets	See p.28 of Project Plan (1D037-EDP-EV-REP-040-000018)
Figure 3 Previous Investigations	See p.29 of Project Plan (1D037-EDP-EV-REP-040-000018)
Figure 4 Scheme design	See p.30 of Project Plan (1D037-EDP-EV-REP-040-000018)
Figure 5	Not Used
Figure 6	Not Used
Figure 7	Not Used
Figure 8	Not Used
Figure 9 Utilities locations	TBC



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Legend

- Route in tunnel
- Route on surface
- Site Extent
- Watercourse
- Water Body
- Access Point

High Speed Two
COLNE VALLEY SOUTH
EMBANKMENT

SITE LOCATION

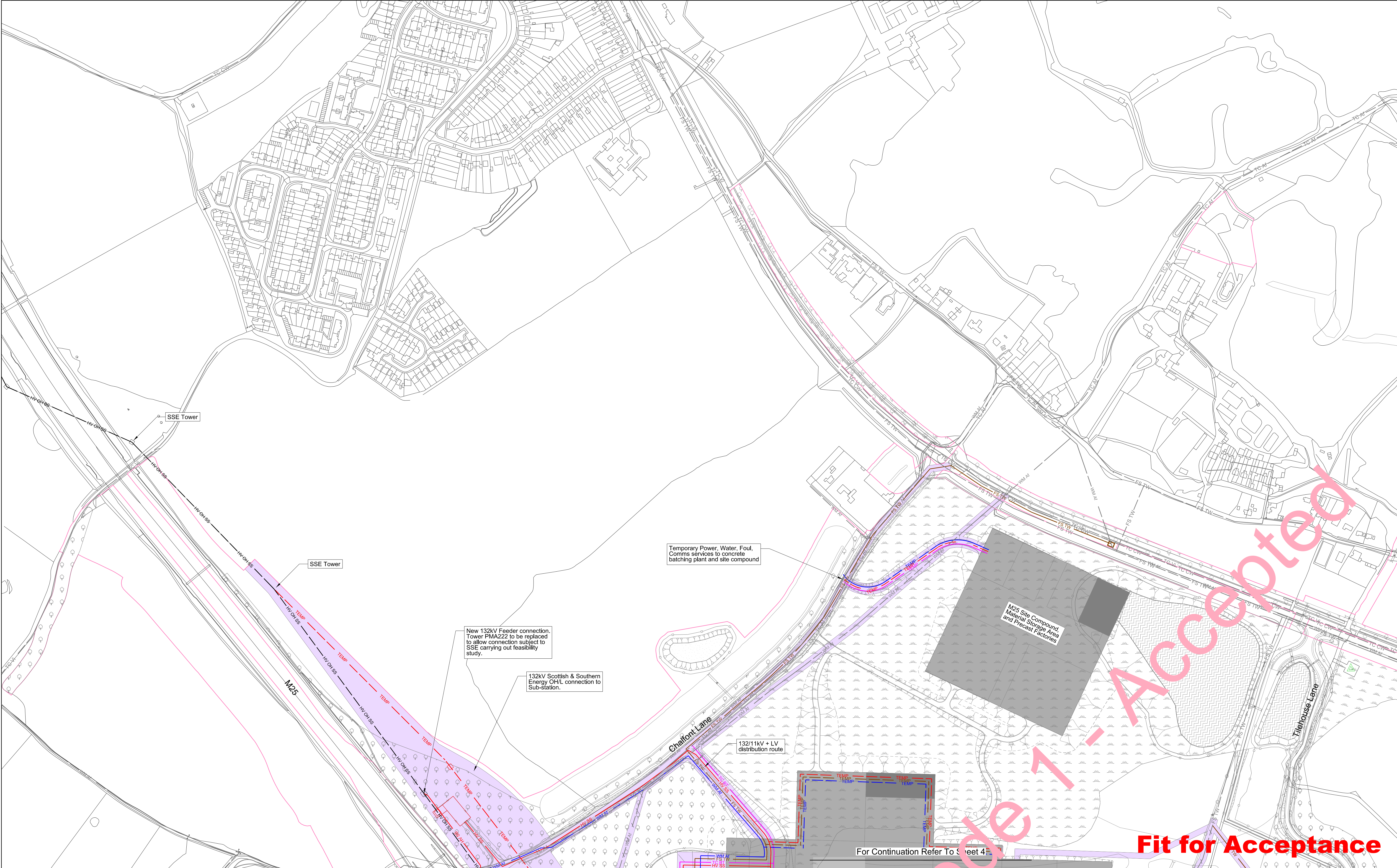
Internal

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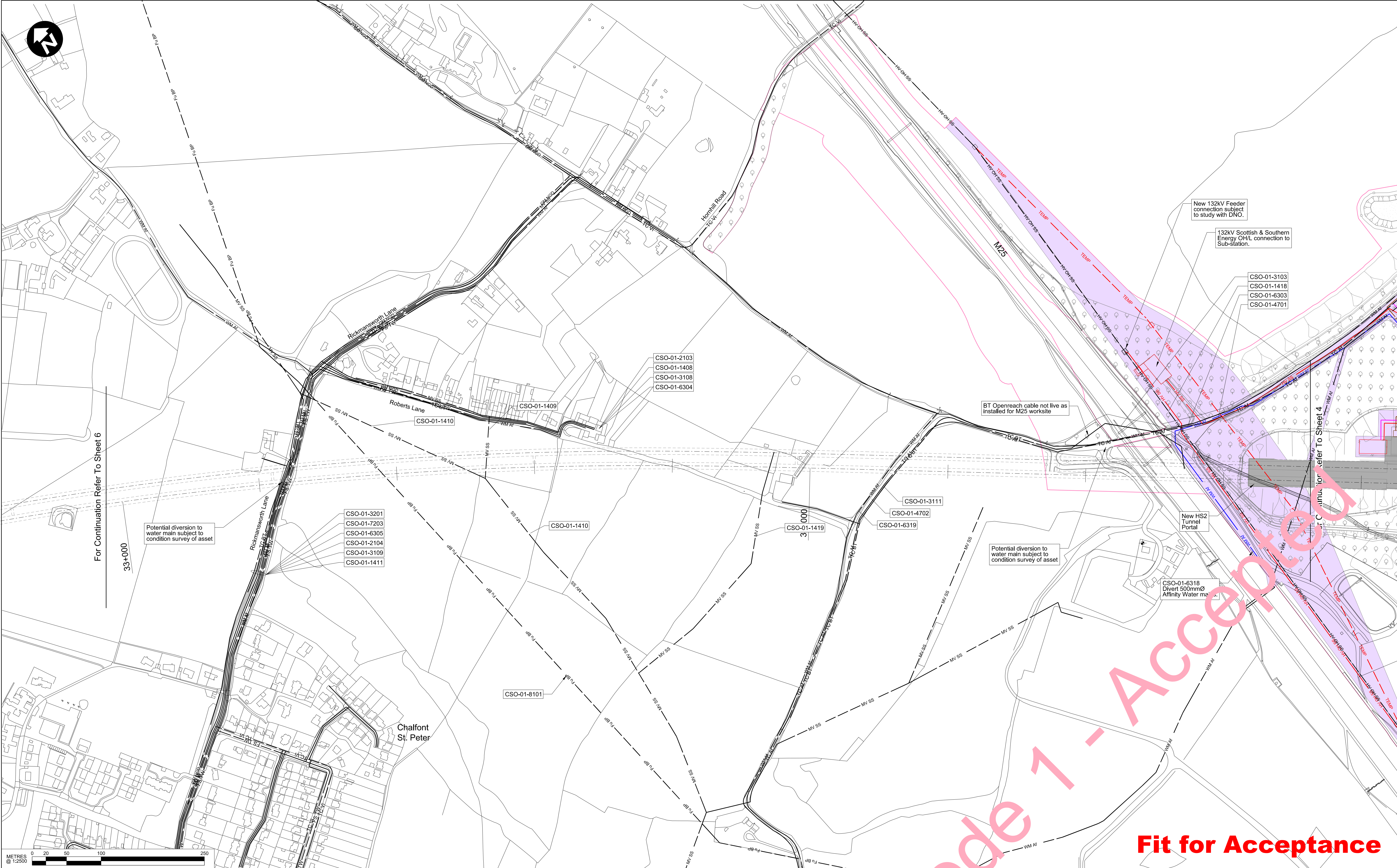
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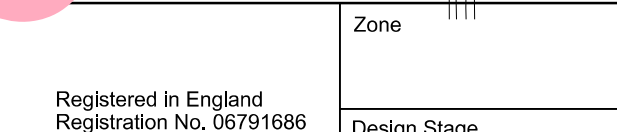
Doc Number: Figure 1

Date: 22/02/17



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P01	For Acceptance	HMG	AL	AAR					Design Stage	FINAL PRELIMINARY DESIGN			Discipline/Function			Utilities		
									Drawing Title	Country South			Drawn	Checked	Approved			
										Combined Utility Drawings			TB	AL	AAR			
													Date	Scale	Size			
Rev	Description	Drawn	Checked	Con App	HS2 App					26/02/2016	AS SHOWN	A1						
										Drawing No.	C222-ATK-UT-DPL-020-204501-FPD			Rev.	P02			



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P01	For Acceptance	HMG	AL	AAR		© Crown Copyright and database right 2015. All rights reserved. Ordnance Survey Licence number 100049190			Design Stage	FINAL PRELIMINARY DESIGN		Discipline/Function	Utilities	
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Rev	Description	Drawn	Checked	Con App		HS2 App	Scale with caution as distortion can occur.					Date	Scale	Size
										Sheet 5	26/02/2016	AS SHOWN	A1	
											Drawing No.	Rev.		
											C222-ATK-UT-DPL-020-204700-FPD	P02		

Revision: Po1

16 Appendices

16.1 Project Plans

Report: Project Plan for Trial Trenching at Colne Valley South Embankment (M25 slip roads)

Document no.: 1D037-EDP-EV-REP-040-000018

Revision	Author	Checked by	Approved by	Date approved	Reason for revision
P01	Chris Lowe and Mike Kimber	NS	CG	22/02/17	Issue
P02	Chris Lowe and Mike Kimber	NS	JD	03/03/17	Hs2 Comments Addressed
P03	Chris Lowe and Mike Kimber	NS	Jo Deegan	08/03/17	"WIP" removed from figures

SECURITY CLASSIFICATION: OFFICIAL

Handling instructions: None

Code 1-Accepted

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Project Plan for Trial Trenching at Colne Valley South Embankment (M25 slip roads)

Document no.: 1D037-EDP-EV-REP-040-000018

Revision: P03

1 Executive Summary

- 1.1.1 This Project Plan details proposed methodologies, techniques and deliverables for archaeological trial trenching at Colne Valley South Embankment (M25 slip roads) The trial trenching addresses an area of land located either side of the M25, to the east of Chalfont St. Peter (Figure 1). The land parcels for the proposed slip-roads, and the bell-mouths to allow for access to the wider construction area, extend to c. 5.1ha to the west of the M25 and 9.7ha to the east.
- 1.1.2 In addition to trial trenching the topsoil/ploughsoil is to be sampled within each trench for the retrieval of artefacts.
- 1.1.3 The trial trenching is required to identify the location, extent, survival and significance of any heritage assets at Colne Valley South Embankment (M25 slip roads), Hertfordshire (Figure 2) and it will contribute to the following specific objectives:
- KC5: Identifying settlement location and developing models for settlement patterns for the Mesolithic, Neolithic and Early Bronze Age.
 - KC11: Does the high density of prehistoric settlement evidence in the Colne Valley reflect a genuine focus of activity or does it reflect a bias in the archaeological record?
 - KC15: Can we identify regional patterns in the 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.
 - KC24: To what extent are the patterns of settlement, landholding and enclosure in West London and the Colne Valley in the Iron Age and Romano-British period determined by those established in the Bronze Age?
- 1.1.4 The purpose of this Project Plan is to:
- define the scope of work for evaluation trenching;
 - outline the aims of the investigation and how they will contribute to the specific objectives of the GWSI: HERDS;
 - describe the methodology to be employed; and
 - set out the proposed deliverables and reporting mechanisms.

2 Location and Site Background

- 2.1.1 The trial trenching addresses an area of land located either side of the M25, to the east of Chalfont St. Peter (NGR TQ 02157 91967) (Figure 1). The land parcels for the proposed slip-roads and the bell-mouths off the M25, to allow for access to the wider construction area, extend to c. 5.1ha to the west of the M25 and 9.7ha to the east. The western area comprises a single field; the eastern area is divided into two fields with separate accesses.
- 2.1.2 The Colne Valley South Embankment (M25 slip roads), east of the M25, lies within archaeological character area 3 of Community Forum Area 7 (CFA7); no archaeological character sub-zones have been identified within CFA7 due to its short length and uniformity of the archaeological character area. The area to the west of the M25 lies within archaeological character area 1 (Chiltern Dip-slope) and sub-zone ACSZ1 of Community Forum Area 8 (CFA8).
- 2.1.3 CFA7 archaeological character area 3 (west side of Colne Valley) is underlain by a solid geology of the clays, silts and sands of the Eocene Lambeth Group, overlain in parts by superficial deposits including Pleistocene Head deposits and Terrace Gravels¹. Topography is gently undulating, sloping to the Colne Valley to the east where colluvium on the lower slopes has the potential to mask archaeological features and deposits.
- 2.1.4 CFA8 archaeological character area 1 (Chiltern Dip-slope) and sub-zone ACSZ1 (fields to the west of the M25) is underlain by chalk soil geology with some colluvial deposits in valleys and extensive Clay-with-Flints strata on the upper eastern valley shoulder and plateau². Ground disturbance associated with the construction of the M25 is likely to extend within ACSZ1, although there is potential for deposits and features to survive.
- 2.1.5 Current land-use of the evaluation area consists of arable cultivation and the local soil type is freely draining slightly acid loamy soils³.
- 2.1.6 The Colne Valley terrace deposits form part of the wider Thames Valley terrace deposits which have been shown to exhibit a high potential for Palaeolithic and later deposits; finds from the Upper Palaeolithic (c.30,000 to 10,000 BC) have been recovered during gravel extraction and road construction in the Colne Valley. The Gerrard's Cross Gravel Formation extends into part of the western Bell Mouth, but otherwise no superficial deposits are mapped within the site.

¹ HS2 Ltd, 2013 "London-West Midlands Environmental Statement – Volume 5 – Technical Appendices – CFA7 Colne Valley Baseline Report (CH-001-007) Cultural Heritage", paragraph 8.2.10

² HS2 Ltd, 2013 "London-West Midlands Environmental Statement – Volume 5 – Technical Appendices – CFA8 The Chalfonts and Amersham Baseline Report (CH-001-008) Cultural Heritage", Table 1

³ Cranfield Soil and Agrifood Institute 2017 *Soilscapes* [online] accessed 01 February 2017 from <http://www.landis.org.uk/soilscapes/>

- 2.1.7 Shire Lane (CVA094), identified as possibly preserving the line of a Roman road and marking the boundary between Buckinghamshire and Hertfordshire, crosses the south edge of the evaluation area. If its identification as a Roman road is correct, it would have the potential to have formed a focal point for Romano-British settlement and activity along its length. With the exception of this site and a number of recorded find-spots in the area adjacent to Chalfont Lane, no known assets have been recorded within the area of the bell-mouths and M25 slip roads (north of Chalfont Lane). There are, however, a number of cropmark sites in the vicinity:
- CVA078: Warren Farm / Mopes Farm – Mesolithic to Bronze Age finds, and a buried ground surface, including large assemblages of flint flakes, scrapers and cores; located roughly 1 km south-south-west of the evaluation area;
 - CHA008: Horn Hill, artefacts of Neolithic and later activity indicated by flint scatters, polished flint axe-head, flint flakes, and barbed-and-tanged flint arrowheads, located roughly 500 m north-west of the evaluation area.
 - CVA076: Denham Park Farm and Chenies – Romano-British agricultural site, with Late Iron Age, Romano-British, Anglo-Saxon, medieval and later deposits, located roughly 1 km south of the evaluation area;
 - CVA080: Tilehouse Lane, enclosure and pits relating to prehistoric and/or Romano-British activity, located roughly 1.25 km south-east of the evaluation area. Evaluation trenching, however, proved inconclusive;
 - CVA087: West Hyde, ditches and pits relating to prehistoric and/or Romano-British activity, located roughly 500 m east of the evaluation area;
- 2.1.8 A large number of quarry pits have been identified from aerial photography and LiDAR⁴ in the fields to the east of the M25, either side (to north and south) of Chalfont Lane. Patches of levelled ridge-and-furrow and unmapped field boundaries have also been identified here.
- 2.1.9 The only additional work located, subsequent to that undertaken for the ES, comprises the geophysical survey (CS001: West Hyde Geophysical Survey) that was undertaken in 2015 of an extensive area of ground immediately to the south of Chalfont Lane. The full report has not yet been seen, but the grey-scale plots and interpretative plans visible on HS2 G-viewer indicate extensive disturbance across the area, which land-use and LiDAR data would suggest relates to gravel extraction.
- 2.1.10 It has been assessed that a detailed desk-based assessment (DDBA) is not required for this area in light of the work completed as part of the Environmental Statement. It has not been possible to undertake a walkover survey of the project plan area as part of the current design

⁴ HS2 Ltd, 2013 "London-West Midlands Environmental Statement – Volume 5 – Technical Appendices – CFA7 Colne Valley Survey Report (CH-004-007) Cultural Heritage", Table 4.

phase, which has necessarily relied on the ES, historic map data and GoogleEarth imagery. Access, however, will be sought as a matter of urgency on completion of the Project Plan as part of works to produce a LS-WSI.

2.1.11 Based on available imagery of the site, it appears likely that access to the western Bell Mouth area is via Hornhill Road on its northern edge. Access to the eastern Bell Mouth appears feasible from Hornhill Road to one field of this area, and separately from Chalfont Lane/Sunnyhill Road to the second field. All site accesses are subject to access arrangements agreed with landowners/tenants.

2.1.12 Imagery of the site indicates the presence of high voltage overhead cables crossing the eastern area from north to south. A safe method of working will need to be agreed to allow investigation of this area.

3 Aims and Objectives

3.1 Need and Aims

3.1.1 Trial trenching, together with sampling of the topsoil/ploughsoil for artefacts, is required to determine, as far as reasonably possible, the nature of the archaeological resource within the Site. Although there are no known heritage assets within the Site, it lies within the Colne Valley, an area with a high potential for currently unknown buried archaeological remains. If present, archaeological remains are likely to date from the Mesolithic through to the Roman period, although other periods may also be represented. Trial trenches provide the most appropriate single methodology to investigate the presence of archaeological remains from this broad range of periods.

3.1.2 The objective of the investigation is to gain information about the archaeological resource in order to support an assessment of its character, extent, knowledge value and ability to contribute to Specific Objectives. The outcomes of investigations may be used to inform the requirement and strategy of further archaeological investigation. Where present the investigation will define the character, extent, quality and preservation of archaeology in order to determine its likely ability to contribute to Specific Objectives set out in the GWSI: HERDS.

3.1.3 The aims of the trial trenching are to:

- assess the extent and nature of archaeological remains within the survey boundaries;
- characterise the nature of any archaeological remains within the survey boundaries;
- assess the significance of any archaeological remains within the survey boundaries;
- assess the change to the significance of the identified heritage assets as a result of the detailed design;

- 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 3.2.

3.2 Contribution to Specific Objectives

3.2.1 Through delivery of the works set out in Section 4 and through addressing the aims set out in 3.1.3 the trial trenching will create knowledge and outputs that would contribute to the following specific objectives in the following ways:

Table 1 Contribution to Specific Objectives

Specific Objective	Contribution
KC5: Identifying settlement location and developing models for settlement patterns for the Mesolithic, Neolithic and Early Bronze Age.	The results of the trial trench evaluation and artefact collection will provide a level of baseline data to assist in addressing this objective, in formulating strategies for further investigation, and in refining the objective.
KC11: Does the high density of prehistoric settlement evidence in the Colne Valley reflect a genuine focus of activity or does it reflect a bias in the archaeological record?	Trial trench evaluation and artefact collection will clarify the location, extent, survival, condition and significance of any heritage assets present on the site. The results, whether positive or negative, will contribute to our understanding of prehistoric settlement distribution densities and help address the question of bias in the archaeological record.
KC15: Can we identify regional patterns in the 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 results of the trial trench evaluation and artefact collection will provide a level of baseline data to assist in addressing this objective, in formulating strategies for further investigation, and in refining the 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 results of the trial trench evaluation will provide a level of baseline data to assist in addressing this objective, in formulating strategies for further investigation, and in refining the objective.
KC24: To what extent are the patterns of settlement, landholding and enclosure in West London and the Colne Valley in the Iron Age and Romano-British period determined by those established in the Bronze Age?	The results of the trial trench evaluation will provide a level of baseline data to assist in addressing this objective, in formulating strategies for further investigation, and in refining the objective.

4 Scope and Methodology

4.1 Trial Trenching Scope

4.1.1 Trial trenching 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 Generic Written Scheme of Investigation: Historic

Environment Research and Delivery Strategy (GWSI: HERDS) (HS2-HS2-EV-STR-000-000015).

- 4.1.2 All trial trenches will be between 1.8 and 2.1m in width. The survey will comprise excavation of 38 (no.) of 30m long trenches in the western area and 72 (no.) of 30m long trenches in the eastern area. This represents an approximate 4% sample by area, adequate to address the project objectives without prior geophysical survey.
- 4.1.3 All trenches are listed in Table 2. All trenches have been assigned a unique ID in accordance with the Employer's Asset Information Management System (AIMS). Trenches have been positioned to provide a representative sample of the available areas; there is no pre-existing information on potential archaeological remains on which to target trenches.
- 4.1.4 Depending on the access and construction timetable, the work may be phased. Phase One would concentrate on the two Bell Mouth locations to either side of the M25 motorway. Trenches that may be completed in Phase One are TR008 in the west and TR022 in the east, which are targeted on the Bell Mouth locations.
- 4.1.5 The Archaeological Contractor shall ensure that Trenches 12 and 92 are correctly targeted on the Bell Mouth entry points by making reference to final engineering drawings. The position of TR92 is subject to the design and agreement of an acceptable safe system of work in relation to the adjacent overhead powerlines and the proximity of the M25 carriageway.
- 4.1.6 Phase Two will comprise completion of the remaining trial trenches.

Table 2 Schedule of Trial Trenches

AIM ID	Tr No	Tr Length	Tr Width	Max Trench Depth
	Tr001	30.00	1.80	To geological horizon
	Tr002	30.00	1.80	To geological horizon
	Tr003	30.00	1.80	To geological horizon
	Tr004	30.00	1.80	To geological horizon
	Tr005	30.00	1.80	To geological horizon
	Tr006	30.00	1.80	To geological horizon
	Tr007	30.00	1.80	To geological horizon
	Tr008	30.00	1.80	To geological horizon
	Tr009	30.00	1.80	To geological horizon
	Tr010	30.00	1.80	To geological horizon
	Tr011	30.00	1.80	To geological horizon

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AIM ID	Tr No	Tr Length	Tr Width	Max Trench Depth
	Tr012	30.00	1.80	To geological horizon
	Tr013	30.00	1.80	To geological horizon
	Tr014	30.00	1.80	To geological horizon
	Tr015	30.00	1.80	To geological horizon
	Tr016	30.00	1.80	To geological horizon
	Tr017	30.00	1.80	To geological horizon
	Tr018	30.00	1.80	To geological horizon
	Tr019	30.00	1.80	To geological horizon
	Tr020	30.00	1.80	To geological horizon
	Tr021	30.00	1.80	To geological horizon
	Tr022	30.00	1.80	To geological horizon
	Tr023	30.00	1.80	To geological horizon
	Tr024	30.00	1.80	To geological horizon
	Tr025	30.00	1.80	To geological horizon
	Tr026	30.00	1.80	To geological horizon
	Tr027	30.00	1.80	To geological horizon
	Tr028	30.00	1.80	To geological horizon
	Tr029	30.00	1.80	To geological horizon
	Tr030	30.00	1.80	To geological horizon
	Tr031	30.00	1.80	To geological horizon
	Tr032	30.00	1.80	To geological horizon
	Tr033	30.00	1.80	To geological horizon
	Tr034	30.00	1.80	To geological horizon
	Tr035	30.00	1.80	To geological horizon
	Tr036	30.00	1.80	To geological horizon
	Tr037	30.00	1.80	To geological horizon
	Tr038	30.00	1.80	To geological horizon
	Tr039	30.00	1.80	To geological horizon

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AIM ID	Tr No	Tr Length	Tr Width	Max Trench Depth
	Tr040	30.00	1.80	To geological horizon
	Tr041	30.00	1.80	To geological horizon
	Tr042	30.00	1.80	To geological horizon
	Tr043	30.00	1.80	To geological horizon
	Tr044	30.00	1.80	To geological horizon
	Tr045	30.00	1.80	To geological horizon
	Tr046	30.00	1.80	To geological horizon
	Tr047	30.00	1.80	To geological horizon
	Tr048	30.00	1.80	To geological horizon
	Tr049	30.00	1.80	To geological horizon
	Tr050	30.00	1.80	To geological horizon
	Tr051	30.00	1.80	To geological horizon
	Tr052	30.00	1.80	To geological horizon
	Tr053	30.00	1.80	To geological horizon
	Tr054	30.00	1.80	To geological horizon
	Tr055	30.00	1.80	To geological horizon
	Tr056	30.00	1.80	To geological horizon
	Tr057	30.00	1.80	To geological horizon
	Tr058	30.00	1.80	To geological horizon
	Tr059	30.00	1.80	To geological horizon
	Tr060	30.00	1.80	To geological horizon
	Tr061	30.00	1.80	To geological horizon
	Tr062	30.00	1.80	To geological horizon
	Tr063	30.00	1.80	To geological horizon
	Tr064	30.00	1.80	To geological horizon
	Tr065	30.00	1.80	To geological horizon
	Tr066	30.00	1.80	To geological horizon
	Tr067	30.00	1.80	To geological horizon

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AIM ID	Tr No	Tr Length	Tr Width	Max Trench Depth
	Tro68	30.00	1.80	To geological horizon
	Tro69	30.00	1.80	To geological horizon
	Tro70	30.00	1.80	To geological horizon
	Tro71	30.00	1.80	To geological horizon
	Tro72	30.00	1.80	To geological horizon
	Tro73	30.00	1.80	To geological horizon
	Tro74	30.00	1.80	To geological horizon
	Tro75	30.00	1.80	To geological horizon
	Tro76	30.00	1.80	To geological horizon
	Tro77	30.00	1.80	To geological horizon
	Tro78	30.00	1.80	To geological horizon
	Tro79	30.00	1.80	To geological horizon
	Tro80	30.00	1.80	To geological horizon
	Tro81	30.00	1.80	To geological horizon
	Tro82	30.00	1.80	To geological horizon
	Tro83	30.00	1.80	To geological horizon
	Tro84	30.00	1.80	To geological horizon
	Tro85	30.00	1.80	To geological horizon
	Tro86	30.00	1.80	To geological horizon
	Tro87	30.00	1.80	To geological horizon
	Tro88	30.00	1.80	To geological horizon
	Tro89	30.00	1.80	To geological horizon
	Tro90	30.00	1.80	To geological horizon
	Tro91	30.00	1.80	To geological horizon
	Tro92	30.00	1.80	To geological horizon
	Tro93	30.00	1.80	To geological horizon
	Tro94	30.00	1.80	To geological horizon
	Tro95	30.00	1.80	To geological horizon

AIM ID	Tr No	Tr Length	Tr Width	Max Trench Depth
	Tr096	30.00	1.80	To geological horizon
	Tr097	30.00	1.80	To geological horizon
	Tr098	30.00	1.80	To geological horizon
	Tr099	30.00	1.80	To geological horizon
	Tr100	30.00	1.80	To geological horizon
	Tr101	30.00	1.80	To geological horizon
	Tr102	30.00	1.80	To geological horizon
	Tr103	30.00	1.80	To geological horizon
	Tr104	30.00	1.80	To geological horizon
	Tr105	30.00	1.80	To geological horizon
	Tr106	30.00	1.80	To geological horizon
	Tr107	30.00	1.80	To geological horizon
	Tr108	30.00	1.80	To geological horizon
	Tr109	30.00	1.80	To geological horizon
	Tr110	30.00	1.80	To geological horizon

4.2 Methodology

4.2.1 Tasks and activities that will be undertaken include:

Setting out

4.2.2 All spatial setting out and recording shall be in accordance with The Ordnance Survey National Grid and Ordnance Survey Newlyn Datum (ODN) as defined by the OS Active GNSS network and use of a Virtual reference system. A minimum of three Permanent Ground Markers (PGM) shall be created using this system for each trench or group of geographically related trenches.

4.2.3 Trenches shall be located to a horizontal accuracy of +/-500mm. The corner points of each trench location shall be set out with Real Time Kinematic (RTK) Global Navigation Satellite System (GNSS) equipment or other suitable automated equipment referenced from the PGMs.

- 4.2.4 Surface heights shall be recorded using RTK GNSS and related to PGMs. Ordnance Survey Bench Marks (OSBM) are not to be used. Levelling accuracy shall be within 10 mmÖk: where 'k' is the total distance levelled in kilometres.
- 4.2.5 The Archaeological Contractor shall ensure that all trench or excavation limits, and significant archaeology detail are surveyed 'as dug' in relation to the project grid before leaving the site. Ground level height data shall be recorded for each trench. Survey methodology and a detailed survey record shall be provided to HS2 Ltd within the survey report.

Mechanical excavation

- 4.2.6 Trial trenches and test pits shall be excavated to the first archaeological leve. Excavation will be undertaken using a mechanical excavator with toothless ditching bucket.
- 4.2.7 Where modern foundations are likely to be present, the Project Plan / LS-WSI shall identify whether they should be left in-situ for the purposes of the investigation or removed. Where it is clear that modern foundations have truncated certain archaeological levels they should be removed to assess lower archaeological levels. The Contractor shall take all reasonable care to ensure that any damage to archaeological deposits is limited as for as practicable. If significant damage is likely to occur the work shall be suspended and the Employer informed so that a technical solution can be agreed.
- 4.2.8 Machining shall be carried out under the constant supervision of the Archaeological Contractor to excavate the ground in spits. The Archaeological Contractor 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 Archaeological Contractor 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 Archaeological Contractor 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 the *Employer's Technical Standard - Route wide soil resources plan* (HS2-HS2-EV-STD-000-000008).
- 4.2.9 Metal detectors will be used by experienced staff to scan for metallic finds during the excavation of key archaeological features or deposits.
- 4.2.10 The Archaeological Contractor shall ensure that water is discharged and excavated material from archaeological excavations are stored in accordance with the *Contractor's* environmental protection requirements (as set out in the package Works Information and their Environmental Management Plan) and any relevant consents for the worksite. The *Contractor* shall monitor discharge rates and, if necessary, conductivity of discharge waters to ensure compliance.

- 4.2.11 In areas of deep stratigraphy, such as alluvial sequences, each intervention shall be excavated to the base of the stratigraphic sequence, and shall be appropriately shored and kept free of water to allow 'person entry' to the excavations i.e. to allow the Contractor to undertake investigation and recording to fulfil the aims of the work. The Contractor will ensure that all works undertaken in deep stratigraphy will comply with the Employer's Technical Standard – Temporary Works (HS2-HS2-CV-STD-000-000005).
- 4.2.12 Within alluvial sequences the Contractor 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 alluvium. The Contractor shall supervise the excavation of each test pit in such a manner so as to allow a cumulative or continuous section to be recorded.
- 4.2.13 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 the Contractor's environmental protection requirements (as set out in their Environmental Management Plan).

Fieldwork Recording

- 4.2.14 Archaeological recording shall be undertaken by the *Contractor* to the general requirements as described in the GWSI: HERDS. A sufficient sample of the archaeological features and deposits revealed must be sampled/or 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 shall not be unduly damaged.
- 4.2.15 In addition to the general requirements, the topsoil/ploughsoil is to be sampled for artefacts within each trench. Samples are to be taken at each end of a trench and in the centre (3 samples per trench). Samples are to be equivalent in volume to a 0.5m square test-pit to the depth of the ploughsoil. Samples can be removed by shovel digging and the soil should then be sieved or screened through ¼" or 6mm wire mesh to recover artefacts. Samples can be sieved on site or retained for immediate sieving off-site.
- 4.2.16 Where areas of extensive archaeological stratification are encountered, the horizontal and vertical extent of archaeological stratification shall be assessed by the Contractor 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 full, intended depth of the trench, as far as is practicable. The exact methodology may need to be determined by the Contractor during the excavation of individual trenches and agreed with the Employer.
- 4.2.17 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 should be

taken for artefact recovery. The soil should hand excavated and then sieved or screened through ¼" or 6mm wire mesh to recover artefacts. Samples can be sieved on site or retained for immediate sieving off-site.

- 4.2.18 In order to protect any waterlogged remains during the works, the Contractor may identify a requirement for trial excavations to be allowed to refill with water overnight. In such cases, the Contractor shall ensure that any hazards to staff or 3rd parties are minimised.
- 4.2.19 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 should 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.
- 4.2.20 A 'site location plan', indicating site north shall be prepared at 1:1250. Individual 'trench plans' at 1:200 (or 1:100) shall 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.
- 4.2.21 Section drawings shall be located on the relevant plan and OSGB co-ordinates recorded. The locations of the PGM bench markers used and any site TBM shall also be indicated.
- 4.2.22 A record of the full extent in plan of all archaeological deposits as revealed in the investigation shall be made. These plans will normally be based on digital survey data (digital planning methods shall be agreed in advance with the *Employer*) 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 the *Employer*). 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 *Employer's Cultural Heritage GIS Standard* (HS2-HS2-GI-SPE-000-000004). Single context planning shall be used where complex stratigraphy is encountered.
- 4.2.23 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 by the Contractor during the course of the excavations. Spot dating shall be incorporated onto this diagram during the course of excavations.

- 4.2.24 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.
- 4.2.25 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, the *Contractor* 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.

Human Remains

- 4.2.26 Where human remains are identified, all subsequent work must be undertaken in accordance with the Employer's Human remains and monuments procedure (HS2-HS2-EV-PRO-0000-000008).
- 4.2.27 The Contractor shall confirm how the requirements set out in the Project Plan will be implemented as part of their procedure for excavating and recording human remains in the Contractor's method statement.
- 4.2.28 At locations known to contain human burials, or that have a high potential for the presence of human remains, provision shall be made by the Contractor for site inspection by a suitably qualified osteo-archaeologist.
- 4.2.29 Should human remains be discovered, the Contractor shall notify the Employer immediately so that these procedures 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.
- 4.2.30 The Contractor will be required to cease all works at that location until further instruction is provided by the Employer. The Contractor shall undertake an initial in situ observation and assessment of the remains and shall advise the Employer of the course of action required.
- 4.2.31 Lifting of human skeletal remains shall be kept to the minimum which is compatible with an adequate evaluation or excavation, where the remains contribute to Specific Objectives and as required by the Project Plan.
- 4.2.32 Visible grave goods and other obvious artefacts, shall be recorded and lifted before the end of the working day to avoid the risk of vandalism and theft. Where this is not feasible or appropriate, the Contractor shall ensure, on liaison with the Employer that adequate site security is provided. As a minimum, this will require a 24 hour comprehensive security regime until sensitive remains have been recorded and lifted. This is a particular issue for rural sites and 'occasional burials'.

Environmental Sampling

- 4.2.33 Where required to address the Specific Objectives being addressed for by the investigation, deposits shall be sampled for retrieval and assessment of the preservation conditions and potential for analysis of biological remains following Historic England guidance (Campbell *et al.* 2011). The sampling strategy shall include a reasoned justification for selection of deposits for sampling (based on the Specific objectives being addressed), and shall be developed by the *Contractor's* environmental archaeologist or recognised osteoarchaeologist in liaison with the *Employer*. Flotation samples and samples taken for coarse-mesh sieving from dry deposits shall be processed at the time of the fieldwork, to permit variation of sampling strategies if necessary. Sampling strategies for wooden structures shall follow the methodologies presented in Brunning and Watson (2012), while other waterlogged organic materials shall be processed in accordance with guidance provided by Karsten *et al.* (2012).
- 4.2.34 The Contractor shall make provision for the sampling of a wide range of contexts for potential assessment and analysis for plant and animal micro/macro fossils and soils/sediments in order to fulfil the aims set out in the relevant Project Plan.
- 4.2.35 The Contractor shall use 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. An adhesive label recording the project event code, context number and sample information shall be securely fixed to a vertical face of the bucket only or attached to the neck of the bag. Labels shall be completed with an indelible ink pen. A duplicate non-adhesive label shall be inserted within the bucket or between the polythene bags. Alternative methods such as the use of bar codes / Q-codes will be considered by the Employer on a case-by-case basis.
- 4.2.36 The need for and focus of sampling will be determined by the Specific objectives the investigation is seeking to address. The selection, preparation for and methods of taking samples together with their size, presentation and processing shall be in accordance with current best practice (e.g. ClfA 2014; Campbell *et al.* 2011; Ayala *et al.* 2007).
- 4.2.37 The Contractor shall be responsible for the protection of all samples and finds and for their transport (including loading and unloading) to the processing facilities or other location as agreed with the Employer. 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.
- 4.2.38 Bulk samples shall normally be in the range of 10-60 litres. The size selected will depend on the likely density of macrofossils in the soil. The lower end of the range (10-20 litres) will be suitable for the recovery of macrofossils from waterlogged deposits. For non-waterlogged deposits the sample volume is likely to be in the middle to higher range (20-40 or 40-60 litres) dependent upon site activity, conditions and preservation. Where contexts have a volume of less than that stated above then 100% of the context should be sampled. Each bulk sample should only contain sediment derived from a single context.

- 4.2.39 The Contractor shall use appropriately sized monolith or kubiena boxes for the recovery of 'undisturbed' monolith samples for soil micromorphology and to sub-sample for microfossils (e.g. pollen and spores, diatoms, ostracods). Adjacent to each kubiena box (for) bulk samples of 50-100g should be taken to provide additional material for analyses such as loss-on-ignition, magnetic susceptibility, soil phosphate analysis etc. Alternatively, this could be sampled as a second monolith / kubiena box.
- 4.2.40 Care shall be taken to ensure that wherever possible only newly exposed sections are sampled to avoid contamination, desiccation and decalcification. This sampling shall be undertaken under supervision of the Contractor's environmental specialist. Boxes shall be wrapped neatly and tightly in bin-liners or plastic sacks and secured with rubber bands. A label shall be attached to the outside (in duplicate) with site name and code, feature/context number and depths of sample.
- 4.2.41 The Contractor shall record the depth of the 'undisturbed' monolith at the top and the bottom of the sample. There shall be a 50mm overlap between each monolith. This information shall be plotted onto a section drawing at an appropriate scale, with all levels reduced to heights relative to Ordnance Datum. Monoliths should be taken to ensure that context boundaries are sampled and these should be noted on the sample recording pro-forma.
- 4.2.42 Where it is not possible to insert monolith boxes, the Contractor shall take a vertical series of small 'spot' samples. Samples shall be at 20mm vertical intervals with no more than 10mm depth being sampled. In the case of deposits with a low organic content it may be necessary to take as much as 5g or even 20g per sample. If so, sampling shall be extended laterally at a given depth in 10mm deep spits.
- 4.2.43 Where appropriate, the Contractor shall take contiguous column samples for the retrieval of macrofossils (e.g. molluscs, plant remains and insects). The individual sub-samples will be of 1-10kg, depending on the nature of the deposit and the category of material to be retrieved. Where several specialists are involved it may be necessary to take separate subsamples for a range of palaeoenvironmental evidence, for example, insects, molluscs and waterlogged plant remains, to ensure that adequate sub-samples are available for specialist assessment.
- 4.2.44 Processing of all soil samples collected for biological assessment, or subsamples of them, should be completed within two weeks of collection. The preservation state, density and significance of material retrieved shall be assessed by the Contractor's recognised 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 the Contractor's method statement.

Metallic objects and residues

- 4.2.45 Where works are intended to address Specific Objectives 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-slugs (hammer-scale and spherical droplets). Reference should be made to forthcoming guidance on Archaeometallurgy (Dungworth, in prep.). 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.

Geoarchaeology

- 4.2.46 Samples collected for geo-archaeological assessment should be processed promptly by the *Contractor's* specialist, particularly where storage of unprocessed samples is thought likely to result in deterioration. Appropriate assessment shall be undertaken as agreed with the *Employer*. Where preservation *in situ* is a viable and desirable option, consideration shall be given to minimising the possible effects of compression and loading on the physical integrity of the site and any hydrological or chemical impacts of the proposed construction works (Campbell *et al.* 2011).

Other sampling

- 4.2.47 Where necessary to address Specific Objectives, animal bone assemblages, or sub-samples of them, shall be assessed by the *Contractor's* specialist with reference to Historic England guidance (Baker and Worley 2014). When employed, other palaeoenvironmental techniques, such as, but not limited to, pollen, insects, molluscs, ostracoda, diatoms and charcoal should follow standard methodologies (see Campbell *et al.* 2011) and adopt recognised standards in procedure (at both assessment and analysis stages) and agreed nomenclatures, especially where multiple specialists might be used during the life of the project. These procedures, including the minimum levels of assessment and analysis, should be defined by the *Contractor* in the Project Plan. Additional analyses, such as Oxygen (^{18}O and ^{16}O) and strontium (^{87}Sr and ^{86}Sr) isotopes, may be determined suitable during the course of the project and a suitably experienced specialist should be appointed to undertake such work. Engagement with the regional science advisor(s) can help to identify the suitability of such techniques at an early stage in the investigation process.

Backfilling

- 4.2.48 The trenches shall be pumped dry (by the *Contractor*) 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. 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 the *Contractor*. Surface conditions shall be reinstated to the required standard.

- 4.2.49 The *Contractor* shall ensure, in liaison with the *Employer* 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 by the *Contractor* in the LS-WSI.

5 Post-investigation reporting and archiving

- 5.1.1 Trial trenching reports will be produced with the following structure:

- Executive Summary
- Introduction
- Summary of project's background (including the Specific Objectives addressed)
- Assumptions and limitations
- Description and illustration of the site location
- Previous work(s) relevant to the archaeology of the site (e.g. DDBA, previous surveys)
- Geology and topography of the site
- Specific Objectives and Aims
- Scope and Methodology, to include:
 - Date(s) of fieldwork;
 - Number and dimensions of trial trenches;
- Results and observations
 - Stratigraphic report
 - Finds report
 - Environmental evidence report
 - Interpretation of results against original expectations and Specific Objectives
 - Review of evaluation strategy [where appropriate].

- Recommendations and research aims for further investigation
- Conclusions
 - Statement of potential of archaeology
 - Assessment of achievement (or not) of survey objectives.
- Evaluation of methodology employed and results obtained (i.e. a confidence rating)
- Publication and dissemination proposals, including archive deposition
- References to all primary and secondary sources consulted.
- Appendices to include illustrations, contextual summary by trench, finds reports, environmental reports, site matrices [where appropriate] and full definitions of the interpretation terms used in the report.

5.1.2 The trial trenching reports 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.

5.1.3 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

6 Information Management

6.1.1 GIS deliverables will be provided in accordance with the *Employer'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 must be supplied in GIS format.

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

6.1.3 The *Employer's* standard template for reports (HS2-HS2-PM-TEM-000-000004) will be used.

7 Quality Assurance Processes

7.1.1 Trial trenching reports will be prepared and conducted by suitably qualified, experienced and competent professionals.

7.1.2 Trial trenching reports will be checked and then reviewed by senior qualified, experienced and competent professionals prior to issue to the *Employer* for acceptance. Final reports, following comments, will be checked and reviewed again prior to issue.

8 Evidence of engagement

8.1.1 The project has been discussed with the HS2 sector environment team and in initial discussions with the EWC. The archaeological advisor to the local planning authority was contacted by email on 2 February 2017 for initial advice and comment on the proposed evaluation approach. He has noted the geophysical survey to the south and the possibility of a minerals application in the NW corner of the study area.

9 Figures

9.1.1 The following figures are included at Appendix A.

- Figure 1 Site location
- Figure 2 Heritage assets
- Figure 3 Previous investigations
- Figure 4 Scheme design
- Figure 5 [not used]
- Figure 6 [not used]
- Figure 7 [not used]
- Figure 8 [not used]
- Figure 9 Utilities locations [AWAITING UTILITIES DATA]

10 References and glossary of terms

10.1 Glossary of terms

10.1.1 The following terms have been used in this report:

- **Contractor** – the organisation undertaking the DDBA on behalf of the Employer.
- **Detailed Desk Based Assessment (DDBA)** – analytical document that builds on the information gathered previously in the Environmental Statement to address particular issues, questions or uncertainties within a given area. It may be developed to provide a more detailed understanding of the resource in an area to inform design development or construction programming.
- **Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy (GWSI: HERDS)** – the framework for delivering all historic environment investigations undertaken as part of the HS2 Phase 1 programme.
- **Location** – a specific HS2 worksite or group of worksites that are being addressed as a combine historic environment investigation programme of assessment, evaluation and investigation.
- **Project Plans** – specification document for each specific package of activity (e.g. a survey, desk based assessment, excavation, recoding project). The plans would respond to the Specific Objectives set out in the GWSI: HERDS and be delivered within an agreed budget.
- **Works** – the specific historic environment assessment, evaluation or investigation works at each location.

10.2 References

Title	Reference
"London-West Midlands Environmental Statement – Volume 5 – Technical Appendices – CFA7 Colne Valley Baseline Report (CH-001-007) Cultural Heritage"	HS2 Ltd, 2013
"London-West Midlands Environmental Statement – Volume 5 – Technical Appendices – CFA8 The Chalfonts and Amersham Baseline Report (CH-001-008) Cultural Heritage"	HS2 Ltd, 2013
Soilscapes	Cranfield Soil and Agrifood Institute 2017 [online] accessed 01 February 2017 from http://www.landis.org.uk/soilscapes/
HS2 Phase One Environmental Statement and Supplementary Environmental Statements	CH-001-018, ES 3.5.2.25.4 CH002-018, ES 3.5.2.25.5 CH003-018, ES 3.5.2.25.6 CH003-018, ES 3.5.2.25.7 ES 3.5.1.4.4

Project Plan for Trial Trenching at Colne Valley South Embankment (M25 slip roads)

Document no.: 1D037-EDP-EV-REP-040-000018

Revision: P03

Cultural Heritage GIS Specification	HS2-HS2-GI-SPE-000-000004
Technical Standard – Temporary Works	HS2-HS2-CV-STD-000-000005
Technical Standard - Route wide soil resources plan	HS2-HS2-EV-STD-000-000008
Generic Written Scheme of Investigation: Historic Environment Research and Delivery Strategy	HS2-HS2-EV-STR-000-000015
Technical Standard - Specification for historic environment investigations	HS2-HS2-EV-STD-000-000035
HS2 Technical Standard: Specification for Project Plans and Location Specific Written Scheme of Investigations	HS2-HS2-EV-STD-000-000036
Technical Standard: Historic Environment Physical Archive Procedure	HS2-HS2-EV-STD-000-000039
Technical Standard: Historic Environment Digital Data Management and Archiving Procedure	HS2-HS2-EV-STD-000-000040

10.3 List of acronyms

AIMS	Asset Information Management System
CIfA	Chartered Institute for Archaeologists
CoCP	Code of Construction Practice
DDBA	Detailed Desk Based Assessment
EIA	Environmental Impact 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
LLAU	Limits of Land to be Acquired or Used
LOD	Limit of Deviation
LS-WSI	Location Specific Written Scheme of Investigation
OASIS	Online Access to the Index of archaeological investigations
PDF	Portable Document Format
PGM	Permanent Ground Markers
QA	Quality Assurance
TBM	Temporary Bench Mark
TST	Total Station Theodolite

Appendix A - Figures



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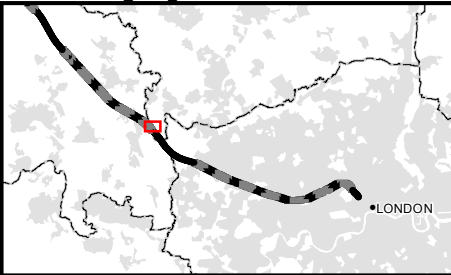
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- Legend**
- Route in tunnel
 - Route on surface
 - Site Extent
 - Watercourse
 - Water Body



High Speed Two
COLNE VALLEY SOUTH
EMBANKMENT

SITE LOCATION

Internal



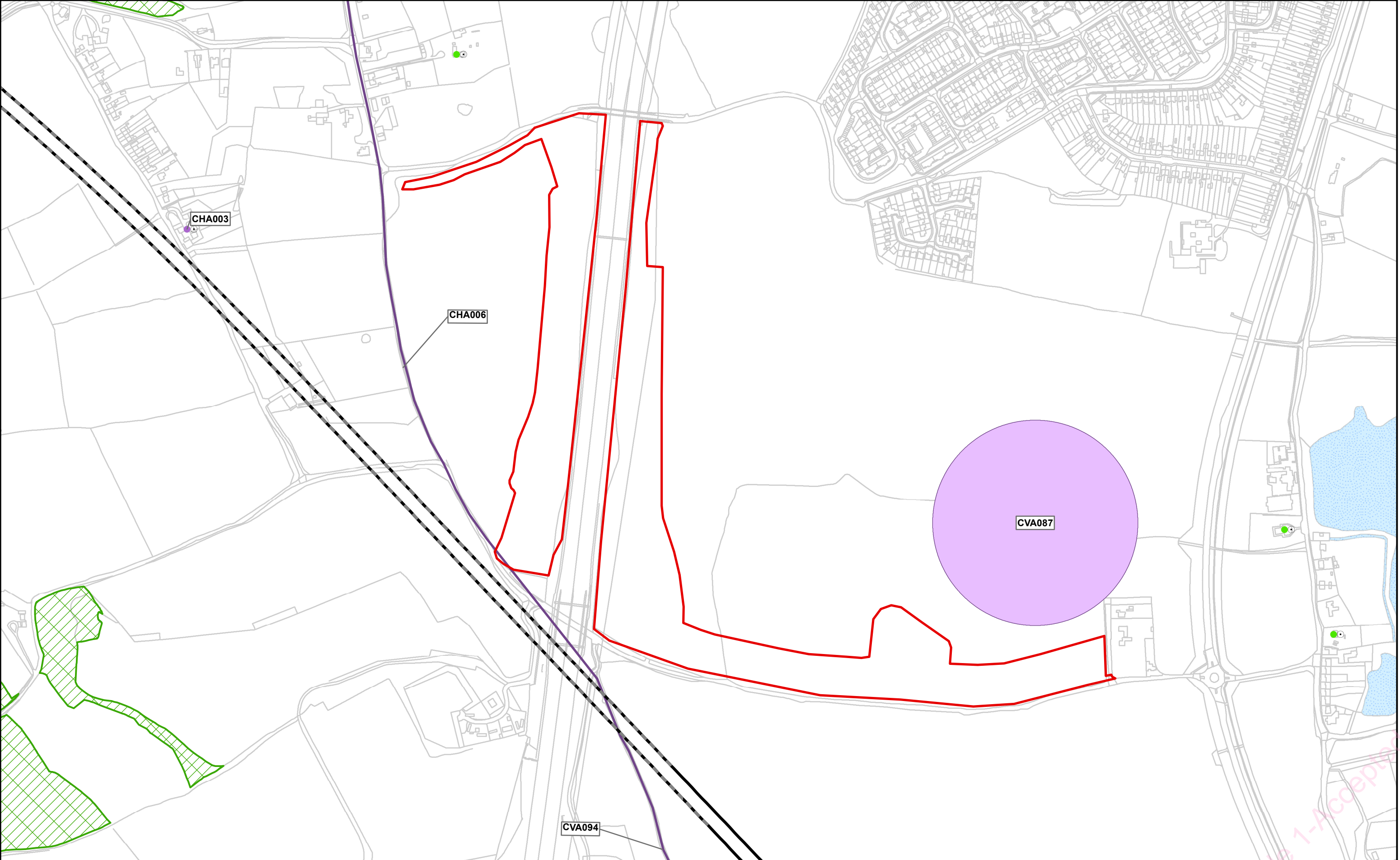
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Doc Number: Figure 1

Scale at A3: 1:5,000



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Legend

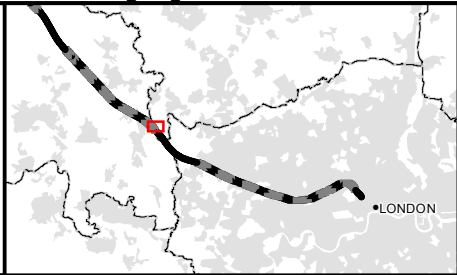
- Route in tunnel
- Route on surface
- Site Extent
- Watercourse
- Water Body
- Ancient Woodland
- Non Designated Heritage Asset

Listed Buildings

- Grade I
- Grade II*
- Grade II

Non Designated Heritage Asset

- Non Designated Heritage Asset



High Speed Two
COLNE VALLEY SOUTH
EMBANKMENT

HERITAGE ASSETS

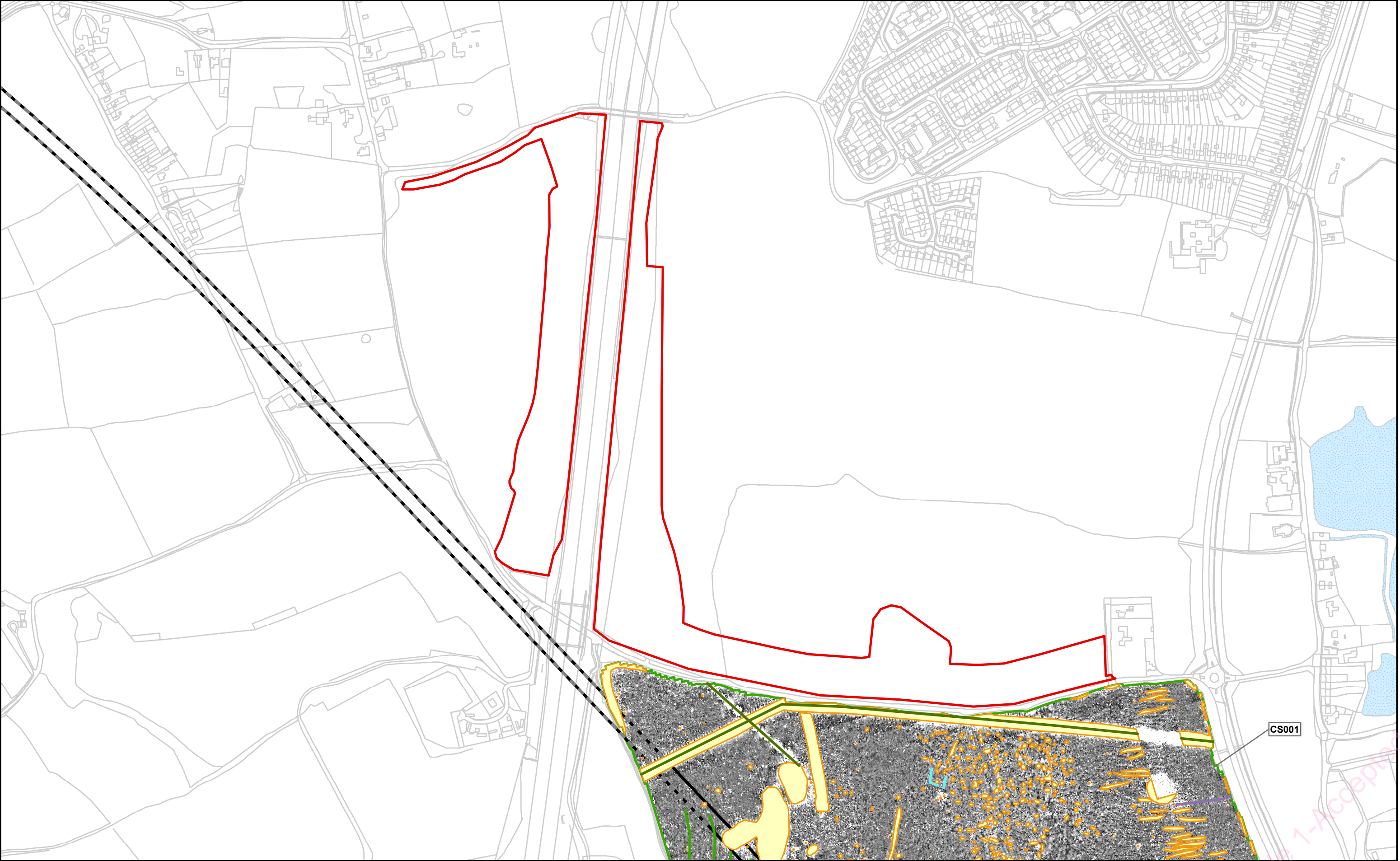
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Legend

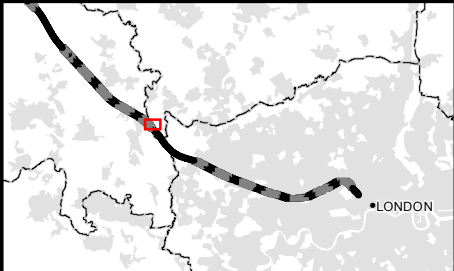
- Route in tunnel
- Route on surface
- Site Extent
- Watercourse
- Water Body

Extents required for survey

- Areas planned for surveys
- Areas planned for surveys, land access denied
- Areas surveys completed
- Geophysics Survey Results

Type of result

- Footpath
- Pipe
- Possible archaeology
- Ridge and furrow



High Speed Two
COLNE VALLEY SOUTH
EMBANKMENT

PREVIOUS INVESTIGATIONS

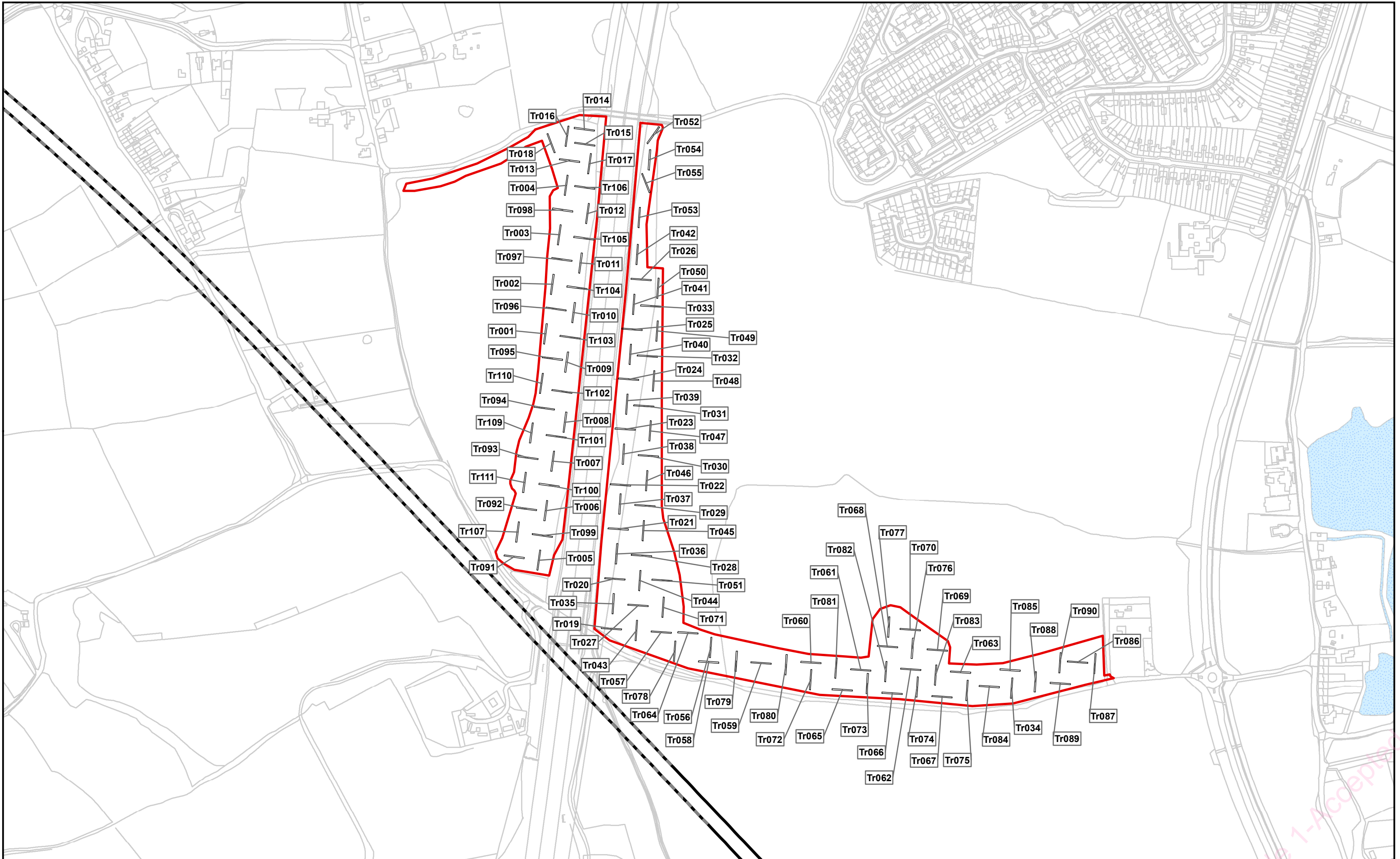
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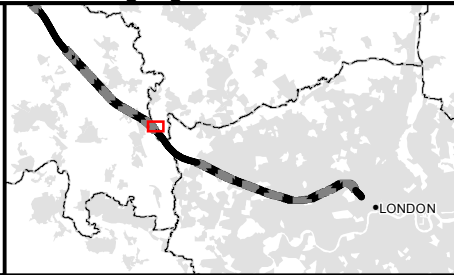
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- Legend**
- Route in tunnel
 - Route on surface
 - Site Extent
 - Watercourse
 - Water Body
 - Trench Location



High Speed Two
COLNE VALLEY SOUTH
EMBANKMENT
SCHEME DESIGN

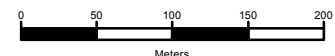
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Date: 07/03/17

Revision: Po1

16.2 Risk Assessment Method Statement (RAMS)

Refer to *Archaeological Contractor's* documentation.