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HS2

High Speed Rail (Crewe to Manchester)

Background information and data

Historic environment

BID HE-004-0MA01

MA01: Hough to Walley's Green

Historic environment field survey report

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Department for Transport

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Contents

Tables

Figures

1 Introduction

1.1.1 This report presents the results of analysis of field survey data relating to the historic environment.

1.1.2 Baseline data has been collected for Proposed Scheme in relation to the Hough to Walley's Green area (MA01).

1.1.3 All identified heritage assets discussed in this report are shown in the Volume 5, Historic environment Map Book, Map Series HE-01, HE-02 and HE-03[1].

1.1.4 The historic environment detailed gazetteer is set out in Appendix A of the Historic environment baseline report (see Background Information and Data: BID HE-001-0MA01). It sets out Unique gazetteer identifier (UID) codes for the heritage assets considered in the baseline data; these are used for reference across all the historic environment reports and maps in the Environmental Statement (ES)[2] and BID reports.

1.1.5 The approach to assessing the archaeological potential of the landscape is outlined in the Historic environment summary gazetteer, impact assessment table and archaeological character areas report (HE-002-0MA01[3]). This breaks the study area down into areas of archaeological character; initially into broad Archaeological Character Areas (ACA), and then more narrowly defined Archaeological Sub-zones (ASZ).

1.1.6 The approach used for assessing historic landscape character (HLC) is described in the historic landscape character areas report (HE-003-0MA01[4]). The approach is used to determine historic landscape character areas (HLCA). HLCA are areas of coherent or distinctive historic landscape characteristics.

1.1.7 Within the historic environment reporting, various reference numbers have been used to provide a unique identifier to the heritage assets, HLCA, ACA/ASZ, geophysical survey anomalies and remote sensing features identified. These unique identifiers are referenced throughout the ES, BID reports and Map Books, and in summary are as follows:

[1] High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement, Volume 5 Historic environment Map Book*. Available online at: https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement.

[2] High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement*. Available online at: https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement.

[3] High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement, Hough to Walley's Green, Summary gazetteer, impact assessment table and archaeological character areas, Volume 5: Appendix HE-002-0MA01.* Available online at: https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement.

[4] High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement, Hough to Walley's Green, Historic landscape character areas, Volume 5: Appendix HE-003-0MA01.* Available online at: https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement.

- heritage assets have been given a Unique gazetteer identifier (UID), for example MA01_0001. These have been allocated to all heritage assets within the gazetteer of heritage assets, provided in Volume 5: Appendix HE-002-0MA01 (summary gazetteer) and BID HE-001-0MA01 (detailed gazetteer);
- historic landscape character areas have been given a unique identifier, for example MA01_HLCA02. These have been allocated to all HLCA within the historic landscape character assessment, provided in Volume 5: Appendix HE-003-0MA01;
- archaeological character areas and archaeological sub-zones have been given a unique identifier, for example: archaeological character area MA01_AC01; and archaeological sub zone MA01_AC01.002. These have been allocated to all of the assessed archaeological character areas and archaeological sub-zones, provided in Volume 5: Appendix HE-002-0MA01;
- geophysical survey areas and features identified through the geophysical survey have been allocated a unique identifier, for example: geophysical survey area MA01_GP001, and geophysical survey feature MA01_GP001.001. These have been allocated to all of the identified geophysical survey areas and features, provided in BID HE-004-0MA01; and
- features identified through remote sensing have been allocated a unique identified, for example MA01_RS001. These have been allocated to all of the identified remote sensing features, provided in BID HE-005-0MA01.

2 Geophysical survey

2.1 Introduction

2.1.1 This report provides the results of a geophysical survey undertaken within the Hough to Walley's Green area.

2.1.2 The geophysical survey was undertaken in accordance with the guidance and standards set out in:

- Generic written scheme of investigation (GWSI) for non-intrusive archaeological survey (HE-006-00000[5]);
- Standards and Guidance for Archaeological Geophysical Survey[6];
- Geophysical Survey in Archaeological Filed Evaluation: Research and Professional Services Guidelines[7]; and
- Guidelines for the Use of Geophysics in Archaeology, Questions to Ask and Points to Consider[8].

2.1.3 The aims and general method for the geophysical survey are as set out in the GWSI (HE-006-00000).

2.1.4 Survey locations were identified in accordance with the method for risk assessment and survey prioritisation presented in Technical Note: Risk-based approach to prioritising archaeological surveys which is in the Environmental Impact Assessment Scope and Methodology Report (SMR)[9].

[5] High Speed Two Ltd (2022), High Speed Rail (Crewe – Manchester), *Environmental Statement, Volume 5, Appendix HE-006-000000, Generic written scheme of investigation for non-intrusive archaeological survey.* Available online at: https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement.

[6] Chartered Institute for Archaeologists (CIfA) (2020), *Standards and Guidance for Archaeological Geophysical Survey,* Reading.

[7] David, A., Linford, N. and Linford, P. (2008), *Geophysical Survey in Archaeological Field Evaluation: Research and Professional Services Guidelines*, English Heritage, Swindon. On 1 April 2015 the part of English Heritage responsible for this guidance note changed its name to Historic England, this note remains valid but has not been updated to reflect this rebranding.

[8] Schmidt, A. R., Linford, P., Linford, N., David, A., Gaffney, C. F., Sarris, A. and Fassbinder, J. (2016), *Europae Archaeologogiae Consilium (EAC) Guidelines for the Use of Geophysics in Archaeology, Questions to Ask and Points to Consider*, Namur, Belgium.

[9] High Speed Two Ltd (2022), High Speed Rail (Crewe - Manchester), *Environmental Statement*, *Volume 5, Appendix CT-001-00001, Environmental Impact Assessment Scope and Methodology Report*. Available online at: https://www.gov.uk/government/collections/hs2-phase-2b-crewe-manchester-environmental-statement.

2.2 Survey objectives

Aims of the survey

2.2.1 The aim of this survey is to establish the presence/absence, extent and character of detectable archaeological assets within the survey area, including both the testing of previously recorded sites and the identification of additional locations of archaeological potential not previously recorded.

Objectives of the survey

2.2.2 The results of the surveys have been combined with data from other archaeological assessments carried out as part of the project, such as desk-top studies, aerial photographic transcription and LiDAR[10] data, in order to analyse the archaeological potential of the survey locations.

2.3 Survey methodology

2.3.1 This section provides an overview of the used survey methods.

Data collection

2.3.2 The detailed magnetic survey was chosen as an efficient and effective method of location archaeological anomalies. The survey was undertaken between 19 August 2019 and 21 August 2019 using Bartington Grad-01-1000L sensors, variously configured for use on a manually carried frames (four sensors at 1m intervals).

Data processing

2.3.3 A zero median traverse function was used to remove the striping apparent in the raw data. In some cases, where beneficial, a high-pass filter was also applied to smooth the data.

2.3.4 The unprocessed and processed data sets have been presented in this report in greyscale format, the unprocessed data at a range of -8nT to 8nT and the processed at -3nT to 3nT. A comparison of the plots shows how the processing has removed the effects of drift in instrument calibration and maximised the clarity and interpretability of the detected anomalies.

[10] LiDAR (meaning 'light detection and ranging') is a surveying method that measures distance to a target by illuminating the target with pulsed laser light and measuring the reflected pulses with a sensor; this can be used to identify archaeological earthwork evidence.

Data presentation

2.3.5 A general site location plan showing the survey area is shown on Figure 1 at a scale of 1:75,000. Large-scale, fully processed (greyscale) data, unprocessed magnetometer data and accompanying interpretative plots of each individual survey area are presented at a scale of 1:2,500 in Figures 2 to 7 inclusive.

2.3.6 When interpreting the results, several factors are taken into consideration, including the nature of archaeological features being investigated and the local conditions at the site (geology, phenology, topography etc.). Anomalies are categorised by their potential origin and divided into categories that are used in the graphical interpretation of the magnetic data:

- archaeology definitive/probable;
- archaeology possible;
- industrial/burnt flint;
- extraction;
- agricultural historic;
- agricultural modern;
- natural;
- ferrous;
- magnetic disturbance;
- uncertain; and
- modern service.

Assumptions and limitations

2.3.7 The magnetic background of the survey area has proven conducive to good results, with a variety of anomalies detected from varying sources, with various strengths across the length of the survey corridor.

2.3.8 The geological background does not affect the intelligibility of the data.

2.3.9 A band of magnetic disturbance has been recorded where the survey area borders the West Coast Main Line (WCML). This disturbance, composed mainly of strong magnetic halos from fences and other metal structures, has the potential to mask weaker anomalies of archaeological origin.

3 Geophysical survey results

3.1 Introduction

3.1.1 Geophysical Survey was undertaken at one location in the Hough to Walley's Green area, comprising Moss Farm to Coppenhall Junction (MA01_GP002), see Figures 2 to 7.

3.1.2 The survey results are presented for this area, providing a brief background to the survey location, the results obtained and a brief discussion of those results.

3.1.3 In the following paragraphs, magnetic anomalies identified in the course of the survey across the area are discussed within classification types based on their origin. Only anomalies that are distinctive or unusual are discussed individually. Where appropriate, such congruent groups of anomalies and individual anomalies have been identified by alphanumeric identifiers, e.g. MA01_GP002.001 refers to a feature or group of features within survey area MA01_GP002.

3.2 Moss Farm to Coppenhall Junction – MA01_GP002

Survey location

3.2.1 The survey area comprised nine fields located to the east of the WCML and west of Moss Farm at NGR 369865 359061. The survey area covered 23.6ha. At the time of the survey, the fields were serving as pasture. The survey area has a generally flat topography with a slight slope east to west, with elevations ranging between 49m Above Ordnance Datum (mAOD) in the west and 53mAOD in the east. The surrounding land around the survey area is relatively flat in use as pasture and arable. The underlying geology of the site comprises mudstone, which is overlain by superficial deposits of glacial till.

3.2.2 The survey area was located within the Warmingham and Coppenhall Moss ASZ (MA01_AC03.001). The ASZ covers areas of former wetland mosses to the north of present-day Crewe. The ASZ is within HLCA MA01_HLCA03: Crewe Mosslands, and the current use is agricultural land, with medieval field systems evident around Church Coppenhall and distinctive linear, post-medieval moss room enclosures around Warmingham Moss. Otherwise, the ASZ is characterised by former post-medieval houses such as Bradfield Green (MA01_0081), Moss Lane (MA01_0164) and Warmingham Moss (MA01_0165). The construction and maintenance of the Grand Junction Railway built in 1837 (MA01_0038, now the WCML) that runs north by north-east to south by south-west across the ASZ will have removed earlier archaeological remains in proximity to it. The extent of the surviving wetland moss is unknown. However, there is the potential for preserved archaeological remains and organic deposits as identified during the Cheshire Wetland Survey undertaken

in the 1990s[11]. These have the potential for palaeoenvironmental remains that can provide evidence of past environments dating to the prehistoric to medieval periods. The Cheshire HER records a single Neolithic axe find spot within the ASZ.

Survey results

Archaeology possible

3.2.3 Towards the eastern side of the survey area, in the central field, a 40m long linear anomaly (see Figures 3 and 4, MA01_GP002.001) of unknown origin has been identified. This is aligned broadly east to west on a slightly different alignment to the surrounding extant field boundaries. This linear anomaly does not appear on historic mapping so cannot be interpreted as an old field boundary. Its position in relation to the concentration of anomalies at the north-west, however, indicates a pattern of long thin enclosures which may reflect former peat cutting boundaries[11].

3.2.4 Concentrated in the north-west and south of the survey area, a complex of 14 linear anomalies have been identified. These anomalies are orientated on both north to south and east to west alignments, and are parallel with both extant and historic field boundaries. Their positions are not detailed on historic mapping. The pattern depicts long thin moss-room enclosures (see Figures 3, 4, 6 and 7, anomalies MA01_GP002.002 to MA01_GP002.015).

3.2.5 A further group of linear anomalies, on a differing alignment and not respecting any documented field system, can be seen in the northern two fields. The linear anomalies turn 90 degrees where they appear to form two trackways, around 4m in width, and form a routeway between the systems of moss-room enclosures (see Figures 3, 4, 6 and 7, anomalies MA01_GP002.016 to MA01_GP002.018). Similarly, anomaly MA01_GP002.007 forms a trackway with anomaly MA01_GP002.050 (see Figures 3, 4, 6 and 7) south of the aforementioned and may be contemporary in date.

3.2.6 Situated within the northernmost field are a series of six sub-rectangular anomalies of unknown origin (see Figures 3, 4, 6 and 7, anomalies MA01_GP002.019 to MA01_GP002.022). Within the same area, a 10m diameter sub-circular anomaly (see Figures 3, 4, 6 and 7, MA01_GP002.023) was also identified within the northernmost field, this may be from peat cutting or represent marl pits[12].

3.2.7 Finally, the survey area also contains 108 pit-like anomalies; their origins are unknown but due to their association with the linear anomalies they have been interpreted as extraction

[11] Leah, M. D. Wells, C. Huckerby, E. and Appleby. C. (1997), *North West Wetlands Survey 4: The Wetlands Survey 4: The Wetlands of Cheshire,* Lancaster University Archaeological Unit.

[12] Marl pits were an early method of agricultural improvement. They were dug in Cheshire from the medieval period onwards to extract marl, a calcareous soil, which was then spread on fields to improve soil fertility.

pits or small burnt like features, a process associated with when the peat was cut (see Figures 3, 4, 6 and 7, anomalies MA01_GP002.024, to MA01_GP002.026).

Industrial/burnt fired

3.2.8 Situated across the survey area, but concentrated towards the west, are a series of 93 small oval or kidney shaped discrete anomalies. Their distinct 'double shouldered' appearance suggest a large oven, kiln, or furnace remains. Given the nearby Halite geology, it is possible that these anomalies are evidence of historic brine working in the area, (see Figures 3, 4, 6 and 7, anomalies MA01_GP002.027, MA01_GP002.028, MA01_GP002.029 and MA01_GP002.058).

Agricultural historic

3.2.9 A series of strong linear anomalies observed across the survey area exhibit both positive and negative elements, running on broadly north to south and east to west alignments, in some cases continuing the line of extant field boundaries. These correspond with former field boundaries depicted on the 1849 Minshull Vernon Tithe Map[13] (see Figures 3, 4, 6 and 7, anomalies MA01_GP002.030 to MA01_GP002.057).

3.2.10 Areas of extant ridge and furrow (MA01_RS009) identified during remote sensing analysis (see BID HE-005-0MA01) have not been identified during the geophysical survey.

Agricultural modern

3.2.11 Throughout the survey area are a series of parallel linear anomalies, aligned parallel with or perpendicular to the extant field boundaries. These were interpreted as late post-medieval/modern field drains. Interestingly the alignment of the drains follows the pattern of former ploughing regimes.

Natural

3.2.12 Numerous low magnitude discrete anomalies have been identified across the survey area. These are likely due to the variation in depth and composition of the soils and superficial deposits from which the soil was partly derived.

Ferrous

3.2.13 Ferrous anomalies, characterised as individual 'spikes' in the data set, are identified across the survey area. These spikes are typically caused by ferrous (magnetic) material, either on the ground surface or in the plough-soil.

[13] Unknown (1849), *Tithe Map of Minshull Vernon in the Parish of Middlewich in the County of Chester,* Cheshire Archives and Local Studies, Ref: EDT 273/2.

Magnetic disturbance

3.2.14 Areas of magnetic disturbance around the field edges were due to ferrous material within, or adjacent to, the boundaries. A large zone of magnetic disturbance located along the west of the survey is caused by the presence of the adjacent WCML. A second large area of magnetic disturbance, in the north-east of the survey area, is caused by the presence of an electricity pylon.

Conclusions

3.2.15 The survey has identified numerous previously un-mapped linear anomalies, interlinked by trackways, with associated pit-like features. The linear anomalies which do not appear on historic mapping represent a previously unidentified field pattern. A similar pattern has been identified on other areas of Coppenhall Moss, with the long thin enclosures reflecting former peat cutting boundaries known as moss rooms.

3.2.16 Situated across the survey area, but concentrated towards the west, are a series of small oval or kidney shaped discrete anomalies, which suggest the presence of a large oven, kiln or furnace remains, possibly evidence of historic brine working in this area.

3.2.17 The large pond-like features are likely marl pits, which are common within these parts of Cheshire.

3.2.18 A series of field drains have also been identified and represent the modern campaign to drain traditionally wet areas of land.

3.3 Geophysical survey conclusions

3.3.1 The geophysical survey has provided an overview of the archaeological character of the Hough to Walley's Green area. Despite being limited to a single survey area, several previously unrecorded (by the HER) linear anomalies and associated pit like features were identified. The pattern is concurrent with long thin enclosures, reflecting former peat cutting boundaries known as moss rooms. Moss rooms were divisions of land on mosses in Cheshire, such as at Coppenhall, where local inhabitants held turbary rights[14]. The moss-room system was very well developed in Cheshire and is well documented, both on cartographic sources and turbary right documents[11]. These moss rooms were not fenced, initially, but were likely defined by a series of regular drainage ditches, creating a very distinctive field pattern of long and narrow fields, as seen on the Hough to Walley's Green survey results.

3.3.2 Situated across the survey area, but concentrated towards the west, are a series of small oval or kidney shaped anomalies, which suggest the presence of a large oven, kiln, or furnace remains. Given the nearby Halite geology, it is possible that these anomalies are

[14] The right to take peat or turf for fuel on an area of common land.

evidence of historic salt production. The salt industry in Cheshire is known to have developed within the central and southern parts of the county during the Roman period, when salt-working districts such as Middlewich developed around brine springs. Initially, the brine was either collected from a brine well or stored in a brine tank to allow the impurities to settle out. Then the brine water was put into a saltpan, either a lead or maybe a briquetage vessel[15], which was then evaporated over a hearth, fuelled with charcoal, and the salt removed and put into a container for transport[16]. Recent finds of salt pan fragments within the southern extent of the Hough to Walley's Green area, at Shavington[17], suggest that rural sites such as the survey area may have played a role in salt production or trade.

3.3.3 Despite the survey area occupying flat, open pasture known for being heavily waterlogged during winter, the survey detected strong magnetic archaeological anomalies relating to the post-medieval period. The effectiveness of geophysical survey in north-west England has been questioned due to the underlying geology and waterlogged nature, which lead to deep soil accumulations such as along the Middlewich Eastern Bypass and Welsh Row, Nantwich[18]. The survey results have succeeded in providing positive evidence of locating moss-room enclosures at Moss Farm to Coppenhall Junction.

[15] Handmade ceramic vessels used to dry brine and transport salt.

[16] Nevell, M. and Fielding, A. (eds.), (2005), *Recent Archaeological Work on the Roman Salt Industry in Cheshire, Archaeology North West, Issue 17, for 2004-5*, P21-22.

[17] Penny, S. and Shotter, D. C. A. (1996), *An inscribed Roman Salt-Pan from Shavington*, Cheshire, Britannia 27, P360-365.

[18] Jordan, D. (2008), *How Effective is Geophysical Survey?* A Regional Review, Archaeological Prospection 16, P77-90.

4 Gazetteer of identified features in MA01

4.1.1 Table 1 provides a summary of the features identified during the field surveys described above.

Table 1: Gazetteer of identified features in MA01

Reference	Asset UID	Anomaly category	Feature type	Period	Comment	Figure	NGR
MA01_GP002.001	MA01_0430	Archaeology possible	Ditch	Post-medieval	40m long linear anomaly	Figures 3 and 4	370193 358942
MA01_GP002.002	MA01_0430	Archaeology possible	Ditch	Post-medieval	One of a group of fourteen linear anomalies, parallel with both extant and historic field boundaries not shown on historic mapping, moss-room division.	Figures 6 and 7	369634 359625
MA01_GP002.003	MA01_0430	Archaeology possible	Ditch	Post-medieval	One of a group of fourteen linear anomalies, parallel with both extant and historic field boundaries not shown on historic mapping. See MA01_GP002.002.	Figures 6 and 7	369601 359609
MA01_GP002.004	MA01_0430	Archaeology possible	Ditch	Post-medieval	One of a group of fourteen linear anomalies, parallel with both extant and historic field boundaries not shown on historic mapping. See MA01_GP002.002.	Figures 6 and 7	369589 359547
MA01_GP002.005	MA01_0430	Archaeology possible	Ditch	Post-medieval	One of a group of fourteen linear anomalies, parallel with both extant and historic field boundaries not shown on historic mapping. See MA01_GP002.002.	Figures 6 and 7	369615 359526
MA01_GP002.006	MA01_0430	Archaeology possible	Ditch	Post-medieval	One of a group of fourteen linear anomalies, parallel with both extant	Figures 6 and 7	369589 359457

Reference	Asset UID	Anomaly category	Feature type	Period	Comment	Figure	NGR
					and historic field boundaries not shown on historic mapping. See MA01_GP002.002.		
MA01_GP002.007	MA01_0430	Archaeology possible	Ditch	Post-medieval	One of a group of fourteen linear anomalies, parallel with both extant and historic field boundaries not shown on historic mapping. See MA01_GP002.002.	Figures 3, 4, 6 and 7	369752 359078
MA01_GP002.008	MA01_0430	Archaeology possible	Ditch	Post-medieval	One of a group of fourteen linear anomalies, parallel with both extant and historic field boundaries not shown on historic mapping. See MA01_GP002.002.	Figures 3, 4, 6 and 7	369799 359076
MA01_GP002.009	MA01_0430	Archaeology possible	Ditch	Post-medieval	One of a group of fourteen linear anomalies, parallel with both extant and historic field boundaries not shown on historic mapping. See MA01_GP002.002.	Figures 3 and 6	369801 359053
MA01_GP002.010	MA01_0430	Archaeology possible	Ditch	Post-medieval	One of a group of fourteen linear anomalies, parallel with both extant and historic field boundaries not shown on historic mapping. See MA01_GP002.002.	Figures 3 and 4	369815 358970
MA01_GP002.011	MA01_0430	Archaeology possible	Ditch	Post-medieval	One of a group of fourteen linear anomalies, parallel with both extant and historic field boundaries not shown on historic mapping. See MA01_GP002.002.	Figures 3 and 4	369856 358962
MA01_GP002.012	MA01_0430	Archaeology possible	Ditch	Post-medieval	One of a group of fourteen linear anomalies, parallel with both extant and historic field boundaries not	Figures 3 and 4	369991 358830

Reference	Asset UID	Anomaly category	Feature type	Period	Comment	Figure	NGR
					shown on historic mapping. See MA01_GP002.002.		
MA01_GP002.013	MA01_0430	Archaeology possible	Ditch	Post-medieval	One of a group of fourteen linear anomalies, parallel with both extant and historic field boundaries not shown on historic mapping. See MA01_GP002.002.	Figures 3 and 4	370008 358827
MA01_GP002.014	MA01_0430	Archaeology possible	Ditch	Post-medieval	One of a group of fourteen linear anomalies, parallel with both extant and historic field boundaries not shown on historic mapping. See MA01_GP002.002.	Figures 3 and 4	369944 358798
MA01_GP002.015	MA01_0430	Archaeology possible	Ditch	Post-medieval	One of a group of fourteen linear anomalies, parallel with both extant and historic field boundaries not shown on historic mapping. See MA01_GP002.002.	Figures 3, 4, 6 and 7	369933 358786
MA01_GP002.016	MA01_0430	Archaeology possible	Trackway	Post-medieval	Part of a group on differing alignments not corresponding with any documented field system. Appears to form two trackways between group of fourteen anomalies. See MA01_GP002.002.	Figures 3, 4, 6 and 7	369688 359207
MA01_GP002.017	MA01_0430	Archaeology possible	Trackway	Post-medieval	Part of a group on differing alignments not corresponding with any documented field system. Appears to form two trackways. See MA01_GP002.016.	Figures 3, 4, 6 and 7	369695 359150 369579 359459
MA01_GP002.018	MA01_0430	Archaeology possible	Trackway	Post-medieval	Part of a group on differing alignments not corresponding with any documented field system. Appears to	Figures 3, 4, 6 and 7	369707 359119 369576 359497

Reference	Asset UID	Anomaly category	Feature type	Period	Comment	Figure	NGR
					form two trackways. See MA01_GP002.016.		
MA01_GP002.019	MA01_0430	Archaeology possible	Ditch	Post-medieval	Part of a series of six sub-rectangular anomalies. Classified due to their proximity to other features assigned a possible archaeological origin. Part of moss-room land divisions.	Figures 6 and 7	369652 359521
MA01_GP002.020	MA01_0430	Archaeology possible	Ditch	Undated	Part of a series of six sub-rectangular anomalies. Classified due to their proximity to other features assigned a possible archaeological origin. See MA01_GP002.019.	Figures 6 and 7	369665 359579
MA01_GP002.021	MA01_0430	Archaeology possible	Ditch	Undated	Part of a series of six sub-rectangular anomalies. Classified due to their proximity to other features assigned a possible archaeological origin. See MA01_GP002.019.	Figures 6 and 7	369667 359617
MA01_GP002.022	MA01_0430	Archaeology possible	Ditch	Undated	Part of a series of six sub-rectangular anomalies. Classified due to their proximity to other features assigned a possible archaeological origin. See MA01_GP002.019.	Figures 6 and 7	369604 359607
MA01_GP002.023		Archaeology possible	Marl Pit	Post-medieval	10m diameter sub-circular anomaly, may be associated with possible field system. Size likely to indicate a former Marl Pit.	Figures 6 and 7	369593 359565
MA01_GP002.024	MA01_0430	Archaeology possible	Pit	Post-medieval	Origins unknown but association with both the linear anomalies and the burnt/fired anomalies. Peat burning feature.	Figures 3, 4, 6 and 7	369817 359082

Reference	Asset UID	Anomaly category	Feature type	Period	Comment	Figure	NGR
MA01_GP002.025	MA01_0430	Archaeology possible	Pit	Post-medieval	Origins unknown but association with both the linear anomalies and the burnt/fired anomalies. See MA01_GP002.024.	Figures 3, 4, 6 and 7	369876 359103
MA01_GP002.026	MA01_0430	Archaeology possible	Pit	Post-medieval	Origins unknown but association with both the linear anomalies and the burnt/fired anomalies. See MA01_GP002.024.	Figures 3 and 4	369794 358957
MA01_GP002.027	MA01_0430	Burnt fired	Pit	Post-medieval	Appearance suggests areas of burning this may indicate peat burning associated with moss-room divisions.	Figures 3 and 4	369812 359007
MA01_GP002.028	MA01_0430	Burnt fired	Pit	Post-medieval	Appearance suggests areas of burning this may indicate peat burning associated with moss-room divisions.	Figures 3 and 4	369874 358973
MA01_GP002.029	MA01_0430	Burnt fired	Pit	Post-medieval	Appearance suggests areas of burning this may indicate peat burning associated with moss-room divisions.	Figures 3 and 4	369968 358757
MA01_GP002.030		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 3 and 4	370156 359039
MA01_GP002.031		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 3 and 4	370133 359015
MA01_GP002.032		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with	Figures 3 and 4	370111 358986

Reference	Asset UID	Anomaly category	Feature type	Period	Comment	Figure	NGR
					former field boundaries shown on historic maps.		
MA01_GP002.033		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 3 and 4	370076 358975
MA01_GP002.034		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 3 and 4	370170 358882
MA01_GP002.035		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 3 and 4	370124 358886
MA01_GP002.036		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 3 and 4	370101 358851
MA01_GP002.037		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 3 and 4	370228 358841
MA01_GP002.038		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with	Figures 3 and 4	370154 358805

Reference	Asset UID	Anomaly category	Feature type	Period	Comment	Figure	NGR
					former field boundaries shown on historic maps.		
MA01_GP002.039		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 3 and 4	369967 358848
MA01_GP002.040		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 3 and 4	369966 358812
MA01_GP002.041		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 3 and 4	369985 358765
MA01_GP002.042		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 3 and 4	370025 358868
MA01_GP002.043		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 3 and 4	369769 358975
MA01_GP002.044		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with	Figures 3 and 4	369741 358967

Reference	Asset UID	Anomaly category	Feature type	Period	Comment	Figure	NGR
					former field boundaries shown on historic maps.		
MA01_GP002.045		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 3 and 4	369792 358936
MA01_GP002.046		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 3 and 4	369876 359038
MA01_GP002.047		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 3, 4, 6 and 7	369826 359073
MA01_GP002.048		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 3, 4, 6 and 7	369735 359065
MA01_GP002.049		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 3, 4, 6 and 7	369772 359161
MA01_GP002.050		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with	Figure 3, 4, 6 and 7	369733 359145

Reference	Asset UID	Anomaly category	Feature type	Period	Comment	Figure	NGR
					former field boundaries shown on historic maps.		
MA01_GP002.051		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 3, 4, 6 and 7	369682 359121
MA01_GP002.052		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 3, 4, 6 and 7	369667 359239
MA01_GP002.053		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 6 and 7	369658 359311
MA01_GP002.054		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figure 6	369658 359363
MA01_GP002.055		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figure 6	369604 359451
MA01_GP002.056		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with	Figures 6 and 7	369563 359533

Reference	Asset UID	Anomaly category	Feature type	Period	Comment	Figure	NGR
					former field boundaries shown on historic maps.		
MA01_GP002.057		Agricultural historic	Field boundary	Post-medieval	Series of strong linear anomalies observed with both positive and negative elements corresponding with former field boundaries shown on historic maps.	Figures 6 and 7	369600 359556
MA01_GP002.058	MA01_0430	Burnt fired	Pit	Post-medieval	Appearance suggests areas of burning this may indicate peat burning associated with moss-room divisions.	Figures 3, 4, 6 and 7	369786 359161

5 List of acronyms

5.1.1 The following acronyms in Table 2 have been used in this report.

Table 2: List of acronyms

Acronym	Meaning
ACA	Archaeological Character Areas
mAOD	metres above Ordnance Datum
ASZ	Archaeological Sub-zones
BID	Background Information and Data
CALS	Cheshire Archives and Local Studies
CIfA	Chartered Institute for Archaeologists
EAC	Europae Archaeologogiae Consilium
GWSI	Generic Written Scheme of Investigation
HER	historic environment record
HLC/ HLCA	historic landscape character/ Historic Landscape Character Area
LiDAR	Light Detection and Ranging
NGR	National Grid Reference
UID	Unique gazetteer identifier
WCML	West Coast Main Line

6 References

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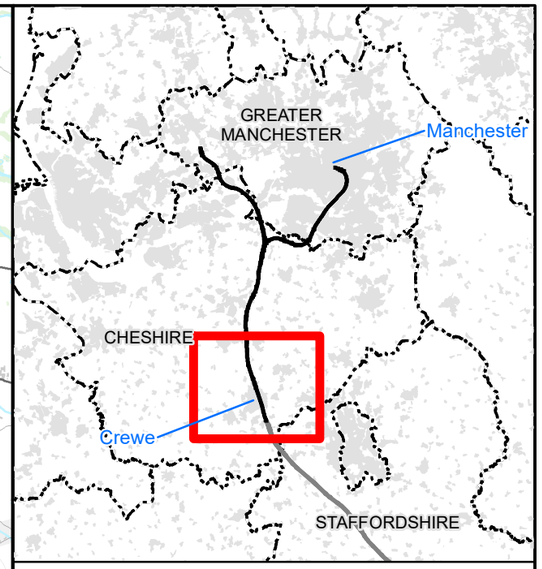
WORK IN PROGRESS

WIMBOLDSLEY TO LOSTOCK GRALAM

HOUGH TO WALLEY'S GREEN

WINSFORD
Winsford
MIDDLEWICH
Holmes Chapel
Houses Chapel
Swettenham
Brereton Green
Little Budworth
Hebden Green
CHESHIRE WEST AND CHESTER
Wettenhall
Crewe North Rolling Stock Depot
Sandbach
SANDBACH
Arclid
Warmingham
Church Minshull
Alpraham
HE-004_MA01_Figure7
Warmingham Moss Southbound Viaduct
CHESHIRE EAST
Wheelock
HE-004_MA01_Figure4
Crewe Tunnel North Portal
Wardle
CHESHIRE
Middlewich Street Vent Shaft
Worleston
CREWE
Haslington
ALSAGER
Crewe
Cowley Way Vent Shaft
Alsager
Wistaston
Crewe Tunnel
Brindley
NANTWICH
Willaston
Crewe Tunnel South Portal
NEWCASTLE-UNDER-LYME BOROUGH
Weston
Barthomley
Nantwich
Shavington
Connection To HS2 Phase 2a
Ravensmoor
Hough
Audley
Wybunbury
STAFFORDSHIRE
Hack Green
Betley



Map Series Information:

These maps show the results of the geophysical surveys in relation to the land required for the construction of the Proposed Scheme.

Note: Not all data layers in the legend are represented on every map.

Main Map Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Community area boundary
- Existing railway station
- County boundary
- District/Borough boundary
- Map sheets included in this community area
- Map sheets not included in this community area
- Survey areas

Map Number: HE-004_MA01_Figure1

Map Name: Geophysical Survey Index map

Community Area MA01: Hough to Walley's Green

Scale at A3: 1:75,000

0 750 1,500 2,250 3,000 Metres

Doc Number: 2DE01-MWJ-EV-MAP-M000-002800-P01

Date: 22/06/21

WORK IN PROGRESS

253+000

BLEASDALE ROAD

AYSGARTH AVENUE

MA01_GP002

CHESHIRE EAST

MOSS LANE

HS2

Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Land potentially required during construction
- Community area boundary
- County boundary
- District/Borough boundary
- Watercourse
- Water body
- Survey area

Unprocessed Greyscale (nT)

Value

High : 8

Low : -8

Map Number: HE-004_MA01_Figure2

Map Name: Site MA01_GP002 Unprocessed Greyscale

Community Area MA01: Hough to Walley's Green

HS2

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

Scale at A3: 1:2,500

0 25 50 75 100 Metres

Doc Number: 2DE01-MWJ-EV-MAP-M000-002801-P01

Date: 22/06/21

WORK IN PROGRESS

253+000

BLEASDALE ROAD

AYSGARTH AVENUE

MA01_GP002

CHESHIRE EAST

MOSS LANE

HS2

Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Land potentially required during construction
- Community area boundary
- County boundary
- District/Borough boundary
- Watercourse
- Water body
- Survey area

Processed Greyscale (nT)

Value

High : 3

Low : -3

Map Number	HE-004_MA01_Figure3
Map Name	Site MA01_GP002 Greyscale
	Community Area MA01: Hough to Walley's Green

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

Scale at A3: 1:2,500

0 25 50 75 100 Metres

Doc Number: 2DE01-MWJ-EV-MAP-M000-002802-P01

Date: 22/06/21

WORK IN PROGRESS

253+000

BLEASDALE ROAD

AYSGARTH AVENUE

CHESHIRE EAST

MOSS LANE

MA01_GP002

MA01_GP002.001
MA01_GP002.002
MA01_GP002.003
MA01_GP002.004
MA01_GP002.005
MA01_GP002.006
MA01_GP002.007
MA01_GP002.008
MA01_GP002.009
MA01_GP002.010
MA01_GP002.011
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MA01_GP002.024
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MA01_GP002.026
MA01_GP002.027
MA01_GP002.028
MA01_GP002.029
MA01_GP002.030
MA01_GP002.031
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MA01_GP002.041
MA01_GP002.042
MA01_GP002.043
MA01_GP002.044
MA01_GP002.045
MA01_GP002.046
MA01_GP002.047
MA01_GP002.048
MA01_GP002.049
MA01_GP002.050
MA01_GP002.051
MA01_GP002.052
MA01_GP002.058

Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Land potentially required during construction
- Community area boundary
- County boundary
- District/Borough boundary
- Watercourse
- Water body

Geophysical survey results

- Archaeology definitive/probable
- Archaeology possible
- Industrial/burnt-fired
- Extraction
- Agriculture historic
- Natural
- Ferrous
- Magnetic disturbance
- Uncertain
- Modern service
- Archaeology definitive/probable
- Archaeology possible
- Agricultural historic
- Agricultural modern
- Natural
- Uncertain
- Modern service
- Survey area

Map Number: HE-004_MA01_Figure4

Map Name: Site MA01_GP002 Interpretation

Community Area MA01: Hough to Walley's Green

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

Scale at A3: 1:2,500

0 25 50 75 100 Metres

Doc Number: 2DE01-MWJ-EV-MAP-M000-002803-P01

Date: 22/06/21

WORK IN PROGRESS

254+000

MA01_GP002

CHESHIRE EAST

Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Land potentially required during construction
- Community area boundary
- County boundary
- District/Borough boundary
- Watercourse
- Water body
- Survey area

Unprocessed Greyscale (nT)

Value

High : 8

Low : -8

Map Number: HE-004_MA01_Figure5

Map Name: Site MA01_GP002 Unprocessed Greyscale

Community Area MA01: Hough to Walley's Green

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

Scale at A3: 1:2,500

0 25 50 75 100 Metres

Doc Number: 2DE01-MWJ-EV-MAP-M000-002804-P01

Date: 22/06/21

WORK IN PROGRESS

254+000

MA01_GP002

CHESHIRE EAST

Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Land potentially required during construction
- Community area boundary
- County boundary
- District/Borough boundary
- Watercourse
- Water body
- Survey area

Processed Greyscale (nT)

Value

High : 3

Low : -3

Map Number: HE-004_MA01_Figure6

Map Name: Site MA01_GP002 Greyscale

Community Area MA01: Hough to Walley's Green

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

Scale at A3: 1:2,500

0 25 50 75 100 Metres

Doc Number: 2DE01-MWJ-EV-MAP-M000-002805-P01

Date: 22/06/21

WORK IN PROGRESS

254+000

MA01_GP002.018
MA01_GP002.051
MA01_GP002.017
MA01_GP002.016
MA01_GP002.048
MA01_GP002.056
MA01_GP002.004
MA01_GP002.023
MA01_GP002.003
MA01_GP002.022
MA01_GP002.058
MA01_GP002
MA01_GP002.055
MA01_GP002.006
MA01_GP002.052
MA01_GP002.005
MA01_GP002.050
MA01_GP002.054
MA01_GP002.019
MA01_GP002.053
MA01_GP002.007
MA01_GP002.009
MA01_GP002.057
MA01_GP002.020
MA01_GP002.008
MA01_GP002.049
MA01_GP002.021
MA01_GP002.024
MA01_GP002.058
MA01_GP002.002
MA01_GP002.058
CHESHIRE EAST
MA01_GP002.025
MA01_GP002.047

HS2

Legend

- Route in tunnel
- Route on surface
- Depot, station, headhouse or portal building
- Land potentially required during construction
- Community area boundary
- County boundary
- District/Borough boundary
- Watercourse
- Water body

Geophysical survey results

- Archaeology definitive/probable
- Archaeology possible
- Industrial/burnt-fired
- Extraction
- Agriculture historic
- Natural
- Ferrous
- Magnetic disturbance
- Uncertain
- Modern service
- Archaeology definitive/probable
- Archaeology possible
- Agricultural historic
- Agricultural modern
- Natural
- Uncertain
- Modern service
- Survey area

Map Number: HE-004_MA01_Figure7

Map Name: Site MA01_GP002 Interpretation

Community Area MA01: Hough to Walley's Green

HS2

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

Scale at A3: 1:2,500

0 25 50 75 100 Metres

Doc Number: 2DE01-MWJ-EV-MAP-M000-002806-P01

Date: 22/06/21