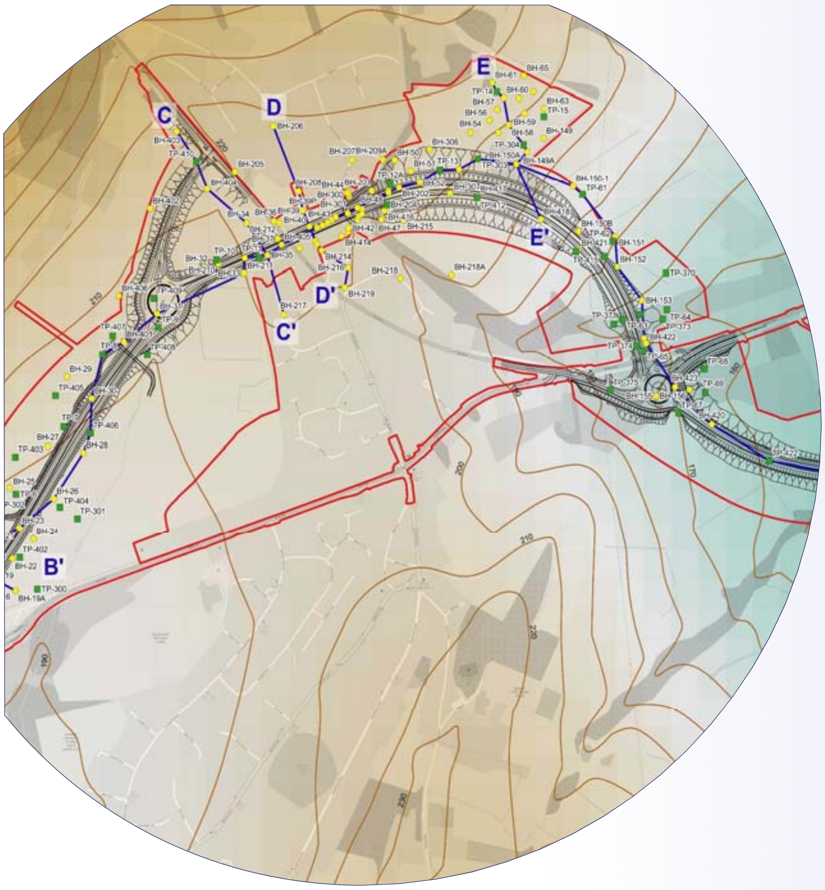
A57 Link Roads
TR010034
6.5 Environmental Statement
Appendix 6.6 Geoarchaeological Assessment and Deposit Model Report

APFP Regulation Regulation 5(2)(a)
Planning Act 2008 Infrastructure Planning (Applications: Prescribed

Forms and Procedure) Regulations 2009

June 2021



TRANS-PENNINE UPGRADE

Geoarchaeological Assessment and Deposit Model Report

August 2018

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Trans-Pennine Upgrade

Geoarchaeological Assessment and Deposit Model Report

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Summary

Oxford Archaeology North was commissioned by Arcadis Consulting (UK) Ltd to undertake geoarchaeological deposit modelling along the route of the proposed Trans-Pennine Upgrade Scheme (Mottram Moor Link Road and A57(T) to A57 Link Road Schemes), Greater Manchester. The Scheme covers an area of *c* 90 hectares, stretching between the M67/A57 roundabout and the A57 Brookfield Road.

The primary aim of the deposit modelling was to provide preliminary baseline data on the nature of the sub-surface sediment sequences and their geoarchaeological and palaeoenvironmental potential, and to identify any horizons within these deposits with the potential to preserve evidence for human occupation.

Records from, in total, 179 geotechnical interventions, including historical borehole data, have been used to compile the deposit model. The modelling revealed a basal sequence of mudstone/sandstone bedrock (of Carboniferous age) overlain by Glacial Till deposits, probably dating to the Devensian, the last glacial episode in the Pleistocene. The surface of these deposits defines the topography of the early Holocene landscape (*c* 12,000 years BP).

The model shows that no Holocene sediments were found over large areas of the Scheme, however, areas of probable peat and alluvial sediments were recorded at both the western end and eastern end of the site, coinciding with floodplain areas for Hurstclough Brook and the River Etherow. The peat deposits have high potential for radiocarbon dating and palaeoenvironmental work. Deposits of made ground and/or topsoil overlie the natural sequences.

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Oxford Archaeology would like to thank [redacted] of Arcadis Consulting (UK) Ltd for commissioning this project. The project was managed for Oxford Archaeology by [redacted]. Deposit modelling was by [redacted] and [redacted]. The diagrams were produced by [redacted] and [redacted] wrote the report.

1 INTRODUCTION

1.1 Scope of work

1.1.1 Oxford Archaeology North (OA North) was commissioned by Arcadis Consulting (UK) Ltd to undertake geoarchaeological deposit modelling along the route of the proposed Trans-Pennine Upgrade Scheme (Mottram Moor Link Road and A57(T) to A57 Link Road Schemes), Greater Manchester.

1.1.2 The Mottram Moor Link Road and A57(T) to A57 Link Road schemes are considered to be Nationally Significant Infrastructure Projects (NSIPs). The Scheme proposes a new offline bypass of 1.12miles (1.8km) of dual carriageway road connecting the junction of the M67, A57(T) and A560 to the A57(T) Mottram Moor.

1.1.3 A new offline bypass of 0.81miles (1.3km) of single carriageway connecting the A57(T) and Mottram Moor to the A57 Woolley Bridge, is also proposed.

1.1.4 The purpose of this report is to supplement the Cultural Heritage Desk-based Assessment (DBA; Document Reference TRO10034/APP/6.7.1) currently being prepared. The DBA will inform the Environmental Impact Assessment (EIA) with regard to Cultural Heritage constraints present within the Draft Order Limits.

1.1.5 This document outlines how OA implemented the specified requirements.

1.2 Location, topography and geology

1.2.1 The Scheme lies within the Tameside district of Greater Manchester between Brookfield and Hattersley. It begins to the west of and includes the M67/A57 roundabout and then curves north-east towards Roe Cross and Spout Green across the slopes of Harrop Edge. Crossing beneath Roe Cross Road (A6018), it curves to the south, towards the A57, between Mottram in Longdendale and Hattersley. It then continues south-eastwards towards Brookfield Road, crossing open land to the south of Hattersley and Hadfield.

1.2.2 The solid geology includes several types of sedimentary sandstones and mudstones of Carboniferous age, which form a fractured pattern across the study area. At the M67/A57 roundabout the bedrock comprises mudstones and siltstones of the Marsden Formation, and sandstones of Fletcher Bank Grit and Huddersfield White Rock formations. These are the dominant bedrocks with some mudstones and siltstones of the Rossendale formation, sandstones of the Rough Rock Flags, mudstones and siltstones of the Pennine Lower Coal Measures, and sandstones of the Woodhead Hill Rock in evidence around Mottram in Longdendale (BGS, 2017).

1.2.3 Superficial deposits begin as Devensian Till (glacial deposits) around the M67/A57 roundabout with a small amount of clay, sand, and silt alluvium lying between the roundabout and Spout Green. The Devensian Till continues to dominate until the area close to Tara Brook Farm where head (periglacial, soliflucted) deposits can be found close to the River Etherow. Deposits of clay, silt and sand alluvium are found to the east of the river up to the Brookfield Road. The Devensian Till resumes to the east of Brookfield Road.

1.2.4 The bedrock geology, beneath the thick Till deposits, is folded and faulted and consequently varies across the route of the Scheme.

1.2.5 The topography is hilly with the lowest point at 120m above Ordnance Datum (AOD) and the highest point at 210m AOD, within Spout Green.

1.2.6 From the M67/A57 roundabout the land rises gently to the north and north-east, towards Spout Green following the line of a small stream, known as Hurstclough Brook, running south-west from Spout Green. Mottram Old Hall marks the highest point on the northern valley side and the land drops gently away from the hall towards the A57.

1.2.7 To the south of the A57 the topography is more gently undulating following the line of a small stream which flows east and south towards the River Etherow, the lowest point within the study area (120m AOD). The River Etherow which runs from the Peak District towards Stockport, to the south-west, crosses the Scheme at its eastern end. Multiple small unnamed steams and brooks, which rise in the surrounding higher land and flow towards the river, also cross it.

1.2.8 Larger hills surround the Scheme, with the Peak District National Park (443m AOD) located to the east and south-east, Harrop Edge (304m AOD) and Hollingworth Hall Moor (399m AOD) to the north, The Hague (235m AOD) to the south-west, and Higher Dinting (255m AOD) to the east.

1.3 Archaeological and historical background

1.3.1 Details of the archaeological background to the Scheme are provided in the DBA (Document Reference TRO10034/APP/6.7.1), from which the following has been summarised. The numbers associated with heritage assets quoted below derive from the gazetteer included in the DBA and the location figures have not been reproduced here.

1.3.2 As part of the historic landscape assessment historic mapping, LiDAR, aerial photographs, and Historic Landscape Characterisation data have been used to build up an understanding of the historic character of the study area. In addition, a walkover survey has been undertaken to identify unknown archaeological or landscape features and to assess the cohesion and condition of the historic landscape.

1.3.3 The known human activity within the 500m study area around the Scheme began in the prehistoric period, with evidence of settlement and agriculture present on the slopes of Harrop Edge (125) and within Melandra Castle (SM1/144). A scatter of Mesolithic flints (140) was found within Melandra Castle; it is likely that the gravel hill above the River Etherow was a good site for prehistoric occupation due to the commanding views over the area and access to the productive river valley.

1.3.4 Peat deposits (202) have been described from within the study area, close to the River Etherow at Woolley Bridge (SK 00944 95567), but are considered of low value due to their limited extent and unknown condition. However, the deposits have the potential to inform on past environments and inferred human activity in the area.

1.3.5 Whilst evidence for the prehistoric period, within the 500m study area, is relatively sparse, evidence from the wider area suggests that the landscape was occupied and exploited in prehistory. Based on this evidence, there is a moderate to high potential for prehistoric activity within the study area.

1.3.6 Roman activity within the 500m study area is focused to the west and south of Tara Brook Farm (LB37; SK 00776 95680) close to the River Etherow and Melandra Castle (SM1/144; SK 00914 95028). In the wider study area, there is a general lack of Roman material, reflecting the marginal nature of the landscape. There is a moderate potential for Roman archaeological activity within the study area and a high potential to the west and south of Tara Brook Farm (LB37).

1.3.7 Most of the evidence from the medieval period relates to early settlement activity with some evidence of agriculture and industry. The most notable asset in the medieval period within the study area is Mottram Old Mill (84; SJ 98895 95965). The mill is thought to date to the medieval period based on documentary evidence, but no evidence of its medieval origins was discovered during investigations (RPS 2001). There have also been some small areas of potentially medieval ridge and furrow found through LiDAR within the 500m study area. There is a low potential for unknown archaeological activity from the medieval period within the study area.

1.3.8 During the post-medieval period the landscape began to develop with the expansion of settlement, the enclosure of the landscape, and the growth of industry across the study area. The largest proportion of the archaeological resource within the 500m study area dates to the post-medieval period. However, this resource is mostly the sites of former buildings or mills which form part of the historic development of the area. Further activity within the study area also includes quarrying and mining activity in the area close to Carrhouse farm (108; SK 00205 95405; 119; SK 00305 95105), social and political divisions in the form of earthwork parish boundaries (171, 172; SK 00305 95105), and evidence of agricultural activity across the present landscape. There is a low potential for unknown archaeological activity for this period within the study area.

1.3.9 Overall there is a low to moderate potential for unknown archaeological remains within the study area. The main areas of archaeological potential are: (a)The area between Carrhouse Lane and the River Etherow; (b) The area around Mottram Old Mill (84); and (c) The area on the lower slopes of Harrop Edge, where a higher potential for prehistoric activity is noted.

1.3.10 The former course of the River Etherow (170; SK 00820 95381) was identified within the Glossop Spur Environmental Statement (Mouchelparkman 2005) as laying partially within the study area. This exists as a palaeochannel, which is represented in the field boundaries within the modern landscape, and which crosses the Scheme on a north/south alignment. Its significance rests in its potential to provide information regarding the past landscapes and its use, and to preserve evidence for human activity.

1.3.11 Palaeochannels typically host organic-rich deposits with the potential to preserve waterlogged remains. They are also of great potential as sediment traps as they can preserve long-term pollen sequences allowing for the re-creation of past environments over many periods.

1.3.12 As well as palaeoenvironmental evidence there is a good potential for palaeochannels to contain archaeological remains. Localised water sources are often the foci for activity during periods of human habitation, including for example, animal management and water sources for human settlement as well as for discard of artefacts whether votive or otherwise (Brightman and Waddington 2011).

1.3.13 Despite the common occurrence of post-medieval activity within the 500m study area, it is possible that earlier landscape elements are preserved beneath the current agricultural areas. This is due to the historic integrity on the landscape from the 1840s or earlier. These elements may be represented by archaeology that cannot be identified in the LiDAR and/or aerial photographic analysis.

1.3.14 This includes the peat deposits (202), which lie to the east of the River Etherow at Woolley Bridge (SK 00944 95567). This is also the case for deposits of alluvial sediments, which occur adjacent to Hurstclough Brook to the east and the River Etherow to the west, and there is significant potential for earlier remains and land surfaces to exist sealed within the sediment body (Brightman and Waddington 2011).

1.4 Regional vegetational history

1.4.1 The area of Mottram-in-Longdendale is located in Tameside, Greater Manchester, adjacent to the Peak District National Park, Derbyshire, which lies to the east and south. Both Ashton Moss (SJ 920 985) and Denton Moor (SJ 904 950) are located to the west of Mottram in the north-eastern part of Greater Manchester, and to south-west of Mottram lie Stockport Little Moor (SJ 911 896), Bramhall Moor (SJ 912 871) and Norbury Moor (SJ 918 860). These moors are comprised of peaty deposits that overlie superficial glacial deposits beneath which the bedrock is dominantly of Carboniferous (Coal Measures) age (Hall *et al* 1995).

1.4.2 Ashton Moss is recorded as containing extensive, deep and well-preserved peat deposits, with high potential for detailed palaeoecological work (Hall *et al* 1995). The Moss is a former ombrotrophic intermediate mire. Stratigraphic surveys have shown that peat formation began in an irregularly-contoured shallow basin, with aquatic and fen communities. After a period of scrub woodland domination, peat forming vegetation became established, with later wetland conditions promoting the spread of *Sphagnum* moss. Despite truncation in recent times, it is likely that a pollen record covering some, if not all, of the prehistoric period exists. It is also possible that some post-Roman records may be present in pollen records, however, to date, the pollen profile of the moss has not been established (Hall *et al* 1995).

1.4.3 Following barren periglacial conditions that existed during Late Devensian times (the last glacial stage in Britain within the Pleistocene Epoch), climatic amelioration during the early Holocene (current geological Epoch) was characterised by the spread of mixed deciduous woodland over much of the Derbyshire and Peak District landscape (Tallis and Switsur 1990; Brightman and Waddington 2011). In the area of Robinson's Moss (SK0499), north of Longdendale, Derbyshire, Tallis and Switsur (1990) interpreted pollen assemblages to infer the dominance of alder, lime and possibly beech woodland, on the lower hillslopes (below *c* 425m OD). On the valley floors, early woodland composition of pine and birch was replaced by alder carr on the wetter parts of floodplains from *c* 7000 cal BC, while oak, elm and hazel-type may have occupied drier areas including sand and gravel terraces (Howard 2005). From *c* 5000 cal BC, a combination of wetter climatic conditions, soil deterioration and possible impact of Mesolithic woodland disturbance, led to the development of blanket peat at higher altitudes in the South Pennines, a process that by *c* 3500-3000 cal BC resulted in blanket peats in the region approaching their modern extent (Tallis 1991). The palaeoenvironmental record for the period *c* 4000-1500 cal BC, (Neolithic to Middle Bronze Age) may be interpreted to suggest the arrival of agricultural economies to the South Pennines, resulting in a transformation of valley floor and hillslope landscapes (Tallis 1991; Brightman and Waddington 2011).

2 AIMS AND METHODOLOGY

2.1 Aims

2.1.1 The aims and objectives of the deposit modelling were to supplement the geotechnical sediment logs with archaeologically relevant detail to provide additional base-line data for assessing the archaeological and palaeoenvironmental potential of sub-surface deposits that may be impacted on by the Scheme. Specifically:

i. To characterise the sequence of sediments and patterns of accumulation along the route, including the depth and lateral extent of major stratigraphic units.
ii. To identify significant variations in the deposit sequence indicative of localised features such as palaeochannels, topographic highs or buried 'islands';
iii. To clarify the relationships between sediment sequences and other deposit types, including periods of 'soil' or peat growth, and the effects of relatively recent human disturbance, including the location, extent and date of 'made ground';
iv. To identify the location and extent of any waterlogged organic deposits and/or buried soils or land-surfaces and address the potential for the preservation and the likely location of archaeological and palaeoenvironmental remains; and
v. To discuss the results in the wider landscape context, of known Quaternary geology and geomorphology, referencing previous geoarchaeological work carried out in the area.

2.2 Methodology

2.2.1 The geotechnical ground investigation comprised excavation of cable percussion and rotary boreholes, trial pits and dynamic (windlowless) sampling. This report covers the stratigraphic sequences interpreted from the borehole lithological descriptions, from which a deposit model has been compiled. Of the small number of BGS boreholes in the vicinity of the Scheme, the majority were unavailable from the BGS website due to commercial confidentiality and/or were too old to be considered reliable. A summary of the geotechnical interventions is provided in Table 1 and the array is illustrated in Figures 2-5.

Table 1: Summary of geotechnical interventions

Type	Quantity	Depth range (m)	Exploratory hole IDs
Cable Tool / Cable Percussion Boring	43	5.02-22.5	BH14-19A, BH22-35, BH37, BH44, BH150-1, BH153-156, BH218, BH306-307, BH401-404, BH406, BH420, BH427-431, BH434
Cable Tool / Cable Percussion Boring extended by Rotary Core Drilling/Open Hole Drilling	64	1.2-55.2	BH20-21, BH36, BH38-43A, BH45-65, BH149-149A, BH150A, BH150B-BH152, BH201, BH205-217, BH219, BH405, BH407-410, BH413, BH415, BH422-423, BH432-433, BH435
Rotary Open Hole	17	4.30-60.2	BH39P, BH41P, BH43P, BH202-204, BH213, BH218A, BH300-303, BH411-412A, BH414, BH416
Machine dug Trial Pits	52	1.35-4.80	TP4-15, TP-61-65, TP67-69, TP300-304, TP369-375, TP401-412, TP415, TP422-424, TP427, TP430-432
Dynamic (windowless) Sampling and Rotary Core	3	20-25	BH-417-418, BH-421
Total	**179**		

2.2.2 The lithological data from the geotechnical logs were entered into geological modelling software (Rockworks™ v17.0) to allow correlation of broad stratigraphic units. A representative west-east linear transect (Transect A) has been created to illustrate the distribution and extent of these stratigraphic units across the Scheme (Fig. 5). No 3d surface/thickness plots of the stratigraphic architecture was carried out due to the linear nature of the Scheme. Where the Scheme footprint did broaden out, Holocene deposits were for the most part restricted to topsoil and recent made ground over Till, as illustrated in Transects C-E (Fig 5). The results of the modelling were imported in GIS software for comparison with current BGS mapping and OS topgraphical data. Environment Agency LiDAR Digital Terrain Modelling coverage was incomplete for much of area and therefore has not been included in the figures.

2.2.3 It should be noted that all data derive from paper records and no sediment samples were available to corroborate the interpretation of the sediments. The problems associated with using geotechnical records in geoarchaeological deposit models have been outlined by Bates (1998) and recently reviewed for linear corridors in Carey *et al.* (2018). However, the detail in the geotechnical logs for this Scheme is considered sufficient to provide a preliminary indication of the nature of the sub-surface stratigraphy and deposit survival from which inferences about the likely environments of deposition can be made.

3 RESULTS

3.1 Introduction and presentation of results

3.1.1 A deposit model has been created from the geotechnical logs outlined above and is presented as a stratigraphic transect of the Holocene to bedrock sequences (Fig. 5, Section A-A’). Shorter stratigraphic transects (B-B’, C-C’ and D-D’) were taken at right-angles (approximately) to the main transect (A-A’) to check the integrity of the data. Appendix A provides details of the geotechnical locations and the interpreted stratigraphy for each intervention.

3.1.2 The following stratigraphic sequence has been identified:

Bedrock

Glacial Till

Alluvium

Peat

Made Ground

Topsoil

3.2 Stratigraphic sequence

3.2.1 Bedrock in the area comprises mudstones, sandstones and siltstones of the Marsden Formation of Carboniferous Age (this includes local deposits such as the Fletcher Band Grit, Rossendale Formation, Huddersfield White Rock Formation and the Woodhead Hill Formation). The bedrock geology is folded and faulted and varies across the Scheme. Bedrock is generally preserved under a depth of between approximately 1m and 25m of Glacial Till deposits.

3.2.2 The bedrock is overlain by Glacial Till deposits, probably dating to the last glacial period (Devensian). During the Devensian period, Derbyshire and the Peak District lay immediately beyond the southerly ice limits except for the north and west margins of the Peak District western fringe, which experienced localised glacial erosion and significant deposition of Till (Brightman and Waddington 2011). Glacial Till (Boulder Clay) deposits, deposited through the action of ice and meltwater, occur extensively in the area. The Till is described, in general, as comprising firm, purple to orange-brown or brown sandy clay with gravel of siltstone, mudstone, sandstone, quartzite and rare coal. Devensian Glacial Till deposits form a mantle of sediments, up to approximately 25m thick, overlain by Holocene deposits.

3.2.3 To the south of the Devensian ice limits, the region experienced cold periglacial conditions that promoted localized freeze-thaw erosion of exposed rocky crags and tors and accumulation of talus and ‘head’ deposits on valley slopes (Brightman and Waddington 2011). Head deposits have been mapped by the BGS as occurring in the eastern part of the Scheme (Fig. 4), but the lithological descriptions available from the borehole logs do not permit distinction of head deposits from Glacial Till, so data from boreholes across the mapped head deposits (BH427 and BH431-433) have been recorded in the interpreted stratigraphy for this work as Glacial Till deposits.

3.2.4 The surface of the Devensian Glacial Till deposits defines the topography of the early Holocene landscape. The shape of this surface would have affected sedimentation patterns throughout the Holocene epoch and influenced the unique sedimentary sequence of any given location. By understanding the nature of this surface, it is possible to develop a better understanding of landscape evolution and archaeological potential.

3.2.5 The Glacial Till deposits are overlain locally by variable peat deposits. Peat is described from BH-15 as a very soft black amorphous peat deposit, with frequent fine rootlets and is 1.3m thick. Elsewhere, peat is mixed with clay deposits, as in BH-14, BH-18 and BH-33 and varies in depth from 0.3m (BH-14) to 1.4m (BH-18) to 0.6m (BH-33). Peat deposits appear to be confined to a small zone in the south-west (BH-14, BH-15 and BH-18) and in the north-west (BH-33).

3.2.6 In other areas, alluvial clay and sand deposits overlie Glacial Till deposits. Alluvial clay is described broadly as brown slightly sandy very silty clay. Alluvial sand may be orange-brown slightly silty clayey fine-medium sand and gravel. Alluvial deposits are described from areas adjacent to the River Etherow in the east, and Hurstclough Brook, which runs east of the south-western arm of the study area, and are broadly consistent with BGS mapped alluvial sedimentation across the Scheme (Fig. 4). Alluvial deposits of approximately 8m may be present in the vicinity of the River Etherow and lesser amounts of approximately 1m thickness are recorded along the south-western part of the Scheme.

3.2.7 Across most of the Scheme, Glacial Till deposits are directly overlain by made ground or topsoil. Deposits of recent made ground vary in composition from paving stones and tarmacadam, to brown gravelly clayey fine and medium sand with a low cobble content including brick, limestone and mudstone. In the area around BH-422 and TP374, there is evidence for depth of made ground up to approximately 2m thick; such deposits including gravel, sand, brick and clinker, could be indicative of deposition of large quantities of waste material at this location. It is possible that a build-up of made ground materials could preserve an underlying land surface.

3.2.8 The topsoil sealing the natural sequence is described as soft, dark brown, slightly sandy, slightly gravelly clay with frequent rootlets, and is generally *c* 0.2-0.5m thick.

3.2.9 The deposit model (Fig. 5) illustrates the topographical variation across the study area from west to east, with altitudes just less than 200m OD in the south-west close to Hurstclough Brook, to higher ground of approximately 210m OD near Spout Green and then a steady fall in altitude towards the valley of the River Etherow, south of Woolley Bridge, recording altitudes of 120m OD.

4 DISCUSSION

4.1 Deposit model

4.1.1 Overall, the deposit modelling has resulted in a broad characterisation of the nature and extent of the sub-surface stratigraphy along the route of the Scheme. However, several points are worthy of note regarding the reliability of the model.

4.1.2 The modelling is based on historical records from several phases of previous geotechnical ground investigations. The lithological description and interpretation has been carried out by several geotechnical engineers resulting in variation which required reassessment based on geomorphological parameters. This was particularly so for the most recent phase of works which was supplied as draft records.

4.1.3 The distribution of interventions across the Scheme was relatively good in the western and central sections, although quite patchy to the east.

4.1.4 The majority of the interventions were deep enough to reach Pleistocene deposits and/or bedrock sequence to allow assessment of the thickness of the full Holocene sequence.

4.1.5 The BGS has mapped Head deposits at the eastern extent of the Scheme, but it was impossible to distinguish these from the Till based on geotechnical descriptions. It is likely that there is more complexity in some of the sequences (eg Head deposits may include colluvial ploughwash) that can only be discerned by purposive ground truthing.

4.1.6 The sediment sequences on a superficial level are relatively consistent with the BGS mapping of the area. In summary, the key findings are as follows:

4.1.7 No significant swathes of Holocene alluvial or peat deposits were found to be present over large areas of the Scheme, particularly on higher ground where topsoil and/or made ground directly overlies Glacial Till and/or Head deposits.

4.1.8 Alluvium and peat were generally found to be present at the western and eastern extent of the Scheme associated with extant watercourses – the Hurstclough Brook and River Etherow respectively.

4.1.9 There is an area on the high ground (Transect E, Fig.5) that appears to contain alluvial-type deposits, but these do not seem to be associated with organic sediments and there is no clear associated watercourse. This could be a discrete hollow filled with sediments, which could be confirmed by ground truthing.

4.1.10 Recent made ground was present as localised discontinuous deposits of variable thicknesses throughout the route. This may suggest disturbance and truncation of underlying ground surfaces, although where these deposits are of significant thickness due to ground raising activities they can act as a protective blanket, preserving underlying archaeological horizons.

4.1.11 Peat naturally accumulates in stable low-energy conditions, and consequently any archaeological remains found in association are likely to be stratified and preserved *in situ*. The marginal location of the peat deposits, associated with a tributary valley is archaeologically significant, occupying an ecotonal zone at the interface between dry ground and wetland. Such areas may have provided a focus for activity in the past due to the abundance of natural resources available for exploitation, and preserved remains could include waterlogged timber structures.

4.1.12 The peat deposits are considered to have high potential for the preservation of palaeoenvironmental remains (for example, pollen, plant remains and insects). Peat can mask archaeological remains resulting from human activity prior to the formation of the peat, which implies that there is the potential for possible and well-preserved earlier prehistoric remains below the peat (Brightman and Waddington 2011). The peat deposits have excellent potential for radiocarbon dating which can provide a chronological framework for palaeoenvironmental work and any associated archaeological remains.

4.1.13 Where topsoil is present over the peat deposits, it is possible that agricultural activity may have truncated some of the peat. Made ground overlying peat deposits may have caused disturbance to the deposits, however, build-up of thick deposits of made ground may potentially preserve an underlying land surface.

4.1.14 Alluvial sediments, which occur adjacent to Hurstclough Brook to the east and the River Etherow to the west, may represent significant potential for earlier remains and land surfaces to be preserved within the sediment body.

5 RECOMMENDATIONS

5.1 Targeted fieldwork

5.1.1 The data produced in the deposit model should be used to inform future evaluation work. As such, it is recommended that areas identified on the deposit model as containing peat deposits as well as areas identified from previous works as containing peat deposits (for example, adjacent to Woolley Bridge) should be the focus of targeted fieldwork, with a view to determining the extent of any deposits and collection of suitable representative samples.

5.1.2 The palaeochannel of the River Etherow, identified in previous studies, should be subject to further study, to establish the nature of sediments present within the palaeochannel. This could be achieved through a series of borehole transects across the area or through trenching. Organic rich deposits, if present, should be collected for palaeoenvironmental assessment. If possible, this should be achieved using a hand-held Russian-type auger but may require use of a mechanical rig.

5.1.3 Deposits recorded at shallower depths should be accessible by test-pitting and/or evaluation trenching which are reliable methods of detecting stratified archaeological remains, due to the greater visibility and access to section faces they provide. Trial trenches would enable archaeologists to look for indicators of human activity such as charcoal inclusions or artefacts. Should sediments be excavated during test pitting and/or evaluation trenching, an archaeologist should attend site to record the sequences and advise on sampling in line with Historic England guidelines (2015).

5.1.4 Any future borehole and trench stratigraphy should be integrated to allow the current deposit model to be updated as part of any forthcoming evaluation works.

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APPENDIX A DEPOSIT MODEL DATASET - LOCATION DETAILS

Borehole	Easting	Northing	Elevation	Total Depth (m)
BH-14	398446	395389	198.44	25.5
BH-149	399566	396204	205.64	20.35
BH-149A	399536	396181	205.84	20.46
BH-15	398444	395465	198.27	11.5
BH-150-1	399620	396122	195.82	3.8
BH-150A	399516	396160	199.95	15.6
BH-150B	399630	396045	189.01	15.05
BH-151	399697	396036	181.02	20.5
BH-152	399701	395984	178.22	20.1
BH-153	399746	395928	169.1	10
BH-154	399750	395863	172.21	6.2
BH-155	399772	395764	168.95	6
BH-156	399833	395775	164.51	6
BH-16	398544	395409	193.32	8
BH-17	398529	395446	194.4	25
BH-18	398509	395471	195.69	25
BH-19	398548	395458	194.56	25
BH-19A	398599	395432	192.15	15
BH-20	398542	395489	195.78	40
BH-201	399207.3	396113.4	212.82	27
BH-202	399301.2	396119.7	213.27	59.7
BH-203	399281.7	396114.2	213.15	60.1
BH-204	399278.9	396090.1	211.92	60.2
BH-205	399000.8	396146.9	220.36	23.3
BH-206	399071	396225	219.72	10.6
BH-207	399215	396167	214.85	10.4
BH-208	399117.5	396113.1	214.37	31
BH-209A	399271.7	396167.9	211.35	20
BH-21	398551	395513	196.12	40
BH-210	398970.4	395989.4	209	36
BH-211	399018.5	395999.2	210.82	25.3
BH-212	399081.6	396058.7	215.67	23
BH-213	399338.9	396129.1	212.63	25.2
BH-214	399159.4	396012.1	212	20
BH-215	399308.9	396063.7	209.63	20
BH-216	399207.8	395982.8	210.79	20
BH-217	399089.9	395903.9	210.7	20.2
BH-218	399304	395965.1	204.73	5.61
BH-218A	399397.1	395970.9	205.14	18.9
BH-219	399201.9	395949.8	210.23	20.1

Borehole	Easting	Northing	Elevation	Total Depth (m)
BH-22	398593	395487	194.28	12
BH-23	398606	395540	194.63	25
BH-24	398632	395521	194.55	22.5
BH-25	398588	395609	198.49	12
BH-26	398669	395590	196.51	8
BH-27	398658	395679	200.12	8
BH-28	398723	395668	198.96	15
BH-29	398693	395797	204.6	15
BH-30	398738	395760	201.58	15
BH-300	399193	396092	212.85	9
BH-301	399210	396104	212.5	11.95
BH-302	399225	396085	209.51	25
BH-303	399233	396083	209.59	25
BH-306	399357	396185	215.1	3
BH-307	399395	396110	209.5	8.1
BH-31	398858	395905	204.09	10
BH-32	398945	395983	205.6	8
BH-33	399017	395974	209.7	12
BH-34	399022	396059	212.6	10
BH-35	399060	396004	211.23	12
BH-36	399072	396062	216.13	30.4
BH-37	399079	396032	212.36	16.5
BH-38	399119	396016	213.67	25.3
BH-39	399126	396080	213.63	25.3
BH-39P	399125	396081	213.63	10.56
BH-40	399137	396053	213.07	25.3
BH-401	398797.2	395856.9	205.92	10.45
BH-402	398845.2	396083.7	212.89	10
BH-403	398894.2	396215.8	217.88	11.32
BH-404	398949.8	396117.5	211.48	11.45
BH-405	399086.2	396022	212.52	35
BH-406	398788	395935.6	209.73	17.33
BH-407	399177.9	396063.8	212.69	35.3
BH-408	399185.4	396069.3	212.59	24.9
BH-409	399207.2	396075.3	212.27	35.3
BH-41	399148	396028	212.47	41.35
BH-410	399225.1	396064.4	209.69	55.2
BH-411	399209.3	396107.5	212.71	53.2
BH-412	399224.6	396084.6	209.6	2.98
BH-412A	399225	396085	209.6	35
BH-413	399227.9	396070.3	210.1	35.7
BH-414	399195.7	396036.3	212.15	35

BH-415	399208.4	396044.1	211.57	20.6
Borehole	Easting	Northing	Elevation	Total Depth (m)
BH-416	399274.3	396079.7	211.46	40
BH-417	399445.4	396104	206.87	25
BH-418	399561	396065.2	197.29	20
BH-41P	399151	396023	212.32	8.35
BH-42	399209	396050	211.66	25
BH-420	399874	395715.9	165.03	15.3
BH-421	399628.7	396014	186.92	20
BH-422	399753.9	395854.5	172.37	35
BH-423	399806.3	395779.3	166.86	29.9
BH-427	400797.1	395571.4	122.2	14.15
BH-428	400153.8	395658.3	151.68	22.38
BH-429	400153.2	395624.9	150.05	19.65
BH-43	399170	396059	212.47	40.2
BH-430	400456.3	395678.4	129.58	5.02
BH-430A	400456	395678	129.6	11.3
BH-431	400551.9	395636.9	126.26	13.5
BH-432	400894.7	395595.5	120.55	25.5
BH-433	400870.1	395541.6	120.35	20
BH-434	400941	395598	120.03	15.6
BH-435	400974	395544	119.7	20
BH-43A	399151	396051	212.77	41
BH-43P	399161	396055	212.65	7
BH-44	399205	396111	212.83	11
BH-45	399207	396110	212.71	14
BH-46	399233	396074	209.51	25
BH-47	399269	396065	209.78	29.9
BH-48	399251	396114	209.27	25
BH-49	399282	396111	213.12	40.05
BH-50	399293	396167	215.02	25
BH-51	399323	396148	214.64	20.55
BH-52	399340	396114	211.74	25.4
BH-53	399411	396151	210.88	20.6
BH-54	399432	396214	213.06	20.2
BH-55	399483	396214	210.4	30
BH-56	399467	396235	212.35	25.2
BH-57	399481	396253	212.99	25.9
BH-58	399502	396227	210.27	20.25
BH-59	399531	396247	210.45	25.55
BH-60	399493	396273	213.45	20.3
BH-61	399472	396298	216.01	20.5
BH-62	399521	396272	212.17	40.25
BH-63	399567	396255	209.25	25.25

BH-64	399547	396283	211.58	25.5
Borehole	Easting	Northing	Elevation	Total Depth (m)
BH-65	399530	396310	214.02	30.1
TP-10	398967	395996	209.42	4.5
TP-11	399045	396000	211.14	4.5
TP-12A	399285	396126	213.76	4.5
TP-13	399376	396150	212.24	4.5
TP-14	399480	396283	214.56	3
TP-15	399566	396241	208.56	0.85
TP-300	398639	395435	192.5	2.7
TP-301	398712	395556	194.7	2.2
TP-302	398564	395593	198.55	2.4
TP-303	399446	396169	210.1	3
TP-304	399529	396193	206.85	2.2
TP-369	399677	396002	181.8	2.7
TP-370	399790	395974	169.45	2.7
TP-371	399694	395887	165.8	2
TP-372	399743	395904	165.4	2.1
TP-373	399784	395896	162.2	2.2
TP-374	399736	395850	171.35	3.3
TP-375	399688	395774	179.65	3
TP-4	398462	395421	198.98	2.6
TP-401	398494.1	395534.3	198.87	4
TP-402	398606.3	395489.3	194.26	2
TP-403	398598	395660.8	200.35	3.6
TP-404	398679.9	395575.7	196.02	3.6
TP-405	398672.1	395764.9	203.77	4.8
TP-406	398736.1	395701.1	199.78	3.7
TP-407	398776.9	395867.5	206.22	4.1
TP-408	398840.3	395834.8	201.81	4
TP-409	398851.8	395931.5	206.44	4.6
TP-410	398930.4	396164.4	213.45	3.6
TP-411	399279.7	396090.1	212.23	2.5
TP-412	399444.3	396102	206.71	2.8
TP-415	399625.4	396010.7	186.88	4
TP-422	399979.5	395654.8	159.77	4
TP-423	400139.6	395647.8	152.02	4
TP-424	400306.4	395653.3	142.9	4
TP-427	400665.3	395597.4	125.37	4
TP-430	401011	395595.1	119.95	1.7
TP-431	401004.5	395557.7	119.45	2
TP-432	401025.7	395515	119.33	1.35
TP-5	398552	395474	195.15	3

TP-6	398600	395598	197.9	2
TP-61	399637	396108	193.73	2.4
Borehole	Easting	Northing	Elevation	Total Depth (m)
TP-62	399693	396028	181.88	3.1
TP-63	399711	395895	166.19	3
TP-64	399792	395912	161.77	3
TP-65	399749	395842	172.88	1.98
TP-67	399813	395735	170.72	3
TP-68	399860	395810	167.38	3
TP-69	399862	395770	163.54	3
TP-7	398687	395712	201.07	2
TP-8	398758	395835	205.43	3
TP-9	398861	395882	203.46	3

APPENDIX B DEPOSIT MODEL DATASET – INTERPRETED STRATIGRAPHY

Borehole	Top (m)	Base (m)	Stratigraphy
BH-14	0	0.3	TOPSOIL
BH-14	0.3	2.3	MADE GROUND
BH-14	2.3	2.6	PEAT
BH-14	2.6		TILL
BH-149	0	0.35	TOPSOIL
BH-149	0.35	1.2	TILL
BH-149	1.2		BEDROCK
BH-149A	0	0.25	TOPSOIL
BH-149A	0.25	1.4	TILL
BH-149A	1.4		BEDROCK
BH-15	0	0.2	TOPSOIL
BH-15	0.2	1.5	PEAT
BH-15	1.5	4.8	ALLUVIUM
BH-15	4.8	11.5	TILL
BH-150-1	0	0.2	TOPSOIL
BH-150-1	0.2	2.7	TILL
BH-150-1	2.7		BEDROCK
BH-150A	0	0.3	TOPSOIL
BH-150A	0.3	1.1	TILL
BH-150A	1.1		BEDROCK
BH-150B	0	0.2	TOPSOIL
BH-150B	0.2	1.6	TILL
BH-150B	1.6		BEDROCK
BH-151	0	0.1	TOPSOIL
BH-151	0.1	2.5	TILL
BH-151	2.5		BEDROCK
BH-152	0	0.2	TOPSOIL
BH-152	0.2	6.5	TILL
BH-152	6.5		BEDROCK
BH-153	0	0.2	TOPSOIL
BH-153	0.2	8.8	TILL
BH-153	8.8		BEDROCK
BH-154	0	2.6	MADE GROUND
BH-154	2.6		TILL
BH-155	0	0.3	TOPSOIL
BH-155	0.3		TILL
BH-156	0	0.4	TOPSOIL
BH-156	0.4		TILL
BH-16	0	0.4	TOPSOIL

BH-16	0.4		TILL
Borehole	Top (m)	Base (m)	Stratigraphy
BH-17	0	0.3	TOPSOIL
BH-17	0.3	1.5	ALLUVIUM
BH-17	1.5		TILL
BH-18	0	0.3	TOPSOIL
BH-18	0.3	1.7	PEAT
BH-18	1.7		TILL
BH-19	0	0.3	TOPSOIL
BH-19	0.3		TILL
BH-19A	0	0.3	TOPSOIL
BH-19A	0.3		TILL
BH-20	0	0.3	TOPSOIL
BH-20	0.3	1.6	ALLUVIUM
BH-20	1.6	26.4	TILL
BH-20	26.4		BEDROCK
BH-201	0	1	MADE GROUND
BH-201	1	10	TILL
BH-201	10		BEDROCK
BH-202	0	0.2	TOPSOIL
BH-202	0.2	4.3	TILL
BH-202	4.3		BEDROCK
BH-203	0	0.2	TOPSOIL
BH-203	0.2	3.6	TILL
BH-203	3.6		BEDROCK
BH-204	0	0.2	TOPSOIL
BH-204	0.2	4.3	TILL
BH-204	4.3		BEDROCK
BH-205	0	8.8	MADE GROUND
BH-205	8.8		TILL
BH-206	0	2	MADE GROUND
BH-206	2	10.5	TILL
BH-206	10.5		BEDROCK
BH-207	0	1	MADE GROUND
BH-207	1	10.2	TILL
BH-207	10.2		BEDROCK
BH-208	0	2.5	MADE GROUND
BH-208	2.5	17.7	TILL
BH-208	17.7		BEDROCK
BH-209A	0	0.5	MADE GROUND
BH-209A	0.5	2.1	TILL
BH-209A	2.1		BEDROCK
BH-21	0	0.3	TOPSOIL
BH-21	0.3	26.5	TILL

BH-21	26.5		BEDROCK
Borehole	Top (m)	Base (m)	Stratigraphy
BH-210	0	0.25	TOPSOIL
BH-210	0.25	22	TILL
BH-210	22		BEDROCK
BH-211	0	0.2	TOPSOIL
BH-211	0.2	18.6	TILL
BH-211	18.6		BEDROCK
BH-212	0	4	MADE GROUND
BH-212	4	22.8	TILL
BH-212	22.8		BEDROCK
BH-213	0	0.2	TOPSOIL
BH-213	0.2	3.2	TILL
BH-213	3.2		BEDROCK
BH-214	0	0.5	MADE GROUND
BH-214	0.5	7	TILL
BH-214	7		BEDROCK
BH-215	0	0.3	TOPSOIL
BH-215	0.3	2.5	TILL
BH-215	2.5		BEDROCK
BH-216	0	0.7	MADE GROUND
BH-216	0.7	3	TILL
BH-216	3		BEDROCK
BH-217	0	0.75	MADE GROUND
BH-217	0.75	6.5	TILL
BH-217	6.5		BEDROCK
BH-218	0	0.7	MADE GROUND
BH-218	0.7	5.5	TILL
BH-218	5.5		BEDROCK
BH-218A	0	0.9	MADE GROUND
BH-218A	0.9	5.4	TILL
BH-218A	5.4		BEDROCK
BH-219	0	0.3	MADE GROUND
BH-219	0.3	5	TILL
BH-219	5		BEDROCK
BH-22	0	0.3	TOPSOIL
BH-22	0.3	12	TILL
BH-23	0	0.3	TOPSOIL
BH-23	0.3	0.6	ALLUVIUM
BH-23	0.6		TILL
BH-24	0	0.25	TOPSOIL
BH-24	0.25		TILL
BH-25	0	0.3	TOPSOIL

BH-25	0.3		TILL
BH-26	0	0.2	TOPSOIL
Borehole	Top (m)	Base (m)	Stratigraphy
BH-26	0.2		TILL
BH-27	0	0.2	TOPSOIL
BH-27	0.2		TILL
BH-28	0	0.3	TOPSOIL
BH-28	0.3		TILL
BH-29	0	0.2	TOPSOIL
BH-29	0.2		TILL
BH-30	0	0.5	TOPSOIL
BH-30	0.5		TILL
BH-300	0	0.2	TOPSOIL
BH-300	0.2	9	TILL
BH-301	0	0.2	TOPSOIL
BH-301	0.2	9.2	TILL
BH-301	9.2		BEDROCK
BH-302	0	0.5	MADE GROUND
BH-302	0.5	1.2	TILL
BH-302	1.2	25	BEDROCK
BH-303	0	1.2	MADE GROUND
BH-303	1.2		BEDROCK
BH-306	0	0.5	TOPSOIL
BH-306	0.5	2.5	TILL
BH-306	2.5	3	BEDROCK
BH-307	0	0.5	TOPSOIL
BH-307	0.5	6.8	TILL
BH-307	6.8		BEDROCK
BH-31	0	0.4	TOPSOIL
BH-31	0.4		TILL
BH-32	0	0.3	TOPSOIL
BH-32	0.3		TILL
BH-33	0	0.3	TOPSOIL
BH-33	0.3	1.7	MADE GROUND
BH-33	1.7	2.3	PEAT
BH-33	2.3		TILL
BH-34	0	0.4	TOPSOIL
BH-34	0.4		TILL
BH-35	0	0.4	TOPSOIL
BH-35	0.4		TILL
BH-36	0	3.7	MADE GROUND
BH-36	3.7	22.4	TILL
BH-36	22.4		BEDROCK
BH-37	0	0.2	TOPSOIL

BH-37	0.2	0.5	MADE GROUND
BH-37	0.5	15.3	TILL
Borehole	Top (m)	Base (m)	Stratigraphy
BH-37	15.3		BEDROCK
BH-38	0	2.8	MADE GROUND
BH-38	2.8	11.4	TILL
BH-38	11.4		BEDROCK
BH-39	0	0.6	MADE GROUND
BH-39	0.6	14.6	TILL
BH-39	14.6		BEDROCK
BH-39P	0	0.2	TOPSOIL
BH-39P	0.2		TILL
BH-40	0	0.6	MADE GROUND
BH-40	0.6	11.9	TILL
BH-40	11.9		BEDROCK
BH-401	0	0.2	TOPSOIL
BH-401	0.2		TILL
BH-402	0	0.7	TOPSOIL
BH-402	0.7		TILL
BH-403	0	0.7	TOPSOIL
BH-403	0.7	10.3	TILL
BH-403	10.3		BEDROCK
BH-404	0	0.05	TOPSOIL
BH-404	0.05	0.8	MADE GROUND
BH-404	0.8		TILL
BH-405	0	0.05	TOPSOIL
BH-405	0.05	1.5	MADE GROUND
BH-405	1.5	15.6	TILL
BH-405	15.5		BEDROCK
BH-406	0	0.15	TOPSOIL
BH-406	0.15	17.2	TILL
BH-406	17.2		BEDROCK
BH-407	0	1.25	MADE GROUND
BH-407	1.25	9.6	TILL
BH-407	9.6		BEDROCK
BH-408	0	0.25	TOPSOIL
BH-408	0.25	9.4	TILL
BH-408	9.4		BEDROCK
BH-409	0	0.5	TOPSOIL
BH-409	0.5	8.5	TILL
BH-409	8.5		BEDROCK
BH-41	0	0.6	MADE GROUND
BH-41	0.6	8.3	TILL

BH-41	8.3		BEDROCK
BH-410	0	0.6	MADE GROUND
BH-410	0.6	1.2	TILL
Borehole	Top (m)	Base (m)	Stratigraphy
BH-410	1.2		BEDROCK
BH-411	0	0.45	MADE GROUND
BH-411	0.45	0.55	ALLUVIUM
BH-411	0.55	9.82	TILL
BH-411	9.82		BEDROCK
BH-412	0	0.22	MADE GROUND
BH-412	0.22	1.4	TILL
BH-412	1.4		BEDROCK
BH-412A	0	0.22	MADE GROUND
BH-412A	0.22	2	TILL
BH-412A	2		BEDROCK
BH-413	0	0.5	MADE GROUND
BH-413	0.5	2.8	TILL
BH-413	2.8		BEDROCK
BH-414	0	0.3	TOPSOIL
BH-414	0.3	4.6	TILL
BH-414	4.6		BEDROCK
BH-415	0	0.6	MADE GROUND
BH-415	0.6	3.2	TILL
BH-415	3.2		BEDROCK
BH-416	0	0.2	TOPSOIL
BH-416	0.2	2.4	TILL
BH-416	2.4		BEDROCK
BH-417	0	0.15	TOPSOIL
BH-417	0.15	7.6	TILL
BH-417	7.6		BEDROCK
BH-418	0	0.2	TOPSOIL
BH-418	0.2	3.55	TILL
BH-418	3.55		BEDROCK
BH-41P	0	0.6	MADE GROUND
BH-41P	0.6		TILL
BH-42	0	0.1	TOPSOIL
BH-42	0.1	0.8	MADE GROUND
BH-42	0.8	3.6	TILL
BH-42	3.6		BEDROCK
BH-420	0	0.1	TOPSOIL
BH-420	0.1		TILL
BH-421	0	0.25	TOPSOIL
BH-421	0.25	4.25	TILL
BH-421	4.25		BEDROCK

BH-422	0	0.1	TOPSOIL
BH-422	0.1	1.7	MADE GROUND
BH-422	1.7	22.11	TILL
Borehole	Top (m)	Base (m)	Stratigraphy
BH-422	22.11		BEDROCK
BH-423	0	0.1	TOPSOIL
BH-423	0.1	22.9	TILL
BH-423	22.9		BEDROCK
BH-427	0	0.3	TOPSOIL
BH-427	0.3	13.7	TILL
BH-427	13.7		BEDROCK
BH-428	0	0.3	TOPSOIL
BH-428	0.3	22.2	TILL
BH-428	22.2		BEDROCK
BH-429	0	0.3	TOPSOIL
BH-429	0.3	19	TILL
BH-429	19		BEDROCK
BH-43	0	0.5	TOPSOIL
BH-43	0.5	9.1	TILL
BH-43	9.1		BEDROCK
BH-430	0	0.3	TOPSOIL
BH-430	0.3		TILL
BH-430A	0	0.3	TOPSOIL
BH-430A	0.3	10.6	TILL
BH-430A	10.6		BEDROCK
BH-431	0	0.3	TOPSOIL
BH-431	0.3	1.4	ALLUVIUM
BH-431	1.4	13.1	TILL
BH-431	13.1		BEDROCK
BH-432	0	0.4	MADE GROUND
BH-432	0.4	15	TILL
BH-432	15		BEDROCK
BH-433	0	0.3	TOPSOIL
BH-433	0.3	17	TILL
BH-433	17		BEDROCK
BH-434	0	0.2	TOPSOIL
BH-434	0.2	8.6	ALLUVIUM
BH-434	8.6	14.7	TILL
BH-434	14.7		BEDROCK
BH-435	0	0.4	TOPSOIL
BH-435	0.4	4.7	ALLUVIUM
BH-435	8.7	14.3	TILL
BH-435	14.3		BEDROCK

BH-43A	0	0.4	TOPSOIL
BH-43A	0.4	9	TILL
BH-43A	9		BEDROCK
BH-43P	0	0.5	TOPSOIL
Borehole	Top (m)	Base (m)	Stratigraphy
BH-43P	0.5		TILL
BH-44	0	1.5	MADE GROUND
BH-44	1.5	9	TILL
BH-44	9		BEDROCK
BH-45	0	0.3	MADE GROUND
BH-45	0.3	8.2	TILL
BH-45	8.2		BEDROCK
BH-46	0	1.6	MADE GROUND
BH-46	1.6		BEDROCK
BH-47	0	0.1	TOPSOIL
BH-47	0.1		BEDROCK
BH-48	0	2.6	MADE GROUND
BH-48	2.6		BEDROCK
BH-49	0	0.2	TOPSOIL
BH-49	0.2	1.6	TILL
BH-49	1.6		BEDROCK
BH-50	0	0.2	TOPSOIL
BH-50	0.2	2.4	TILL
BH-50	2.4		BEDROCK
BH-51	0	0.2	TOPSOIL
BH-51	0.2	1.2	TILL
BH-51	1.2		BEDROCK
BH-52	0	0.2	TOPSOIL
BH-52	0.2	2.4	TILL
BH-52	2.4		BEDROCK
BH-53	0	0.2	TOPSOIL
BH-53	0.2	6.9	TILL
BH-53	6.9		BEDROCK
BH-54	0	0.2	TOPSOIL
BH-54	0.2	1	? MADE GROUND
BH-54	1	5	TILL
BH-54	5		BEDROCK
BH-55	0	0.3	TOPSOIL
BH-55	0.3	5.4	TILL
BH-55	5.4		BEDROCK
BH-56	0	0.3	TOPSOIL
BH-56	0.3	1.4	ALLUVIUM
BH-56	1.4	4.1	TILL
BH-56	4.1		BEDROCK

BH-57	0	0.2	TOPSOIL
BH-57	0.2	3.65	TILL
BH-57	3.65		BEDROCK
BH-58	0	0.2	TOPSOIL
Borehole	Top (m)	Base (m)	Stratigraphy
BH-58	0.2	0.9	ALLUVIUM
BH-58	0.9	4.5	TILL
BH-58	4.5		BEDROCK
BH-59	0	0.4	TOPSOIL
BH-59	0.4	3.78	TILL
BH-59	3.78		BEDROCK
BH-60	0	0.3	TOPSOIL
BH-60	0.3	2.9	TILL
BH-60	2.9		BEDROCK
BH-61	0	0.4	TOPSOIL
BH-61	0.4	1.5	TILL
BH-61	1.5		BEDROCK
BH-62	0	0.2	TOPSOIL
BH-62	0.2	2.9	TILL
BH-62	2.9		BEDROCK
BH-63	0	0.35	TOPSOIL
BH-63	0.35	1.5	TILL
BH-63	1.5		BEDROCK
BH-64	0	0.3	TOPSOIL
BH-64	0.3	2.8	TILL
BH-64	2.8		BEDROCK
BH-65	0	0.3	TOPSOIL
BH-65	0.3	2.3	TILL
BH-65	2.3		BEDROCK
TP-10	0	0.5	TOPSOIL
TP-10	0.5		TILL
TP-11	0	0.42	TOPSOIL
TP-11	0.42		TILL
TP-12A	0	2	TOPSOIL
TP-12A	2		BEDROCK
TP-13	0	0.25	TOPSOIL
TP-13	0.25	3.9	TILL
TP-13	3.9		BEDROCK
TP-14	0	0.3	TOPSOIL
TP-14	0.3		TILL
TP-15	0	0.28	TOPSOIL
TP-15	0.28		TILL
TP-300	0	0.3	TOPSOIL

TP-300	0.3	2	MADE GROUND
TP-300	2		TILL
TP-301	0	0.3	TOPSOIL
TP-301	0.3		TILL
TP-302	0	0.3	TOPSOIL
Borehole	Top (m)	Base (m)	Stratigraphy
TP-302	0.3		TILL
TP-303	0	0.2	TOPSOIL
TP-303	0.2		TILL
TP-304	0	0.3	TOPSOIL
TP-304	0.3		TILL
TP-369	0	0.3	TOPSOIL
TP-369	0.3		TILL
TP-370	0	0.3	TOPSOIL
TP-370	0.3		TILL
TP-371	0	1.6	MADE GROUND
TP-371	1.6		TILL
TP-372	0	0.25	TOPSOIL
TP-372	0.25		TILL
TP-373	0	0.4	TOPSOIL
TP-373	0.4	1	MADE GROUND
TP-373	1		TILL
TP-374	0	2	MADE GROUND
TP-374	2		TILL
TP-375	0	0.3	TOPSOIL
TP-375	0.3		TILL
TP-4	0	2.6	MADE GROUND
TP-401	0	0.2	TOPSOIL
TP-401	0.2	0.5	ALLUVIUM
TP-401	0.5		TILL
TP-402	0	0.2	TOPSOIL
TP-402	0.2		TILL
TP-403	0	0.15	TOPSOIL
TP-403	0.15	0.55	ALLUVIUM
TP-403	0.55		TILL
TP-404	0	0.1	TOPSOIL
TP-404	0.1		TILL
TP-405	0	0.2	TOPSOIL
TP-405	0.2		TILL
TP-406	0	0.15	TOPSOIL
TP-406	0.15	0.3	ALLUVIUM
TP-406	0.3		TILL
TP-407	0	0.2	TOPSOIL
TP-407	0.2		TILL

TP-408	0	0.15	TOPSOIL
TP-408	0.15	1.2	ALLUVIUM
TP-408	1.2		TILL
TP-409	0	0.1	TOPSOIL
TP-409	0.1		TILL
Borehole	Top (m)	Base (m)	Stratigraphy
TP-410	0	0.1	TOPSOIL
TP-410	0.1		TILL
TP-411	0	0.25	TOPSOIL
TP-411	0.25	0.5	ALLUVIUM
TP-411	0.5	2.3	TILL
TP-411	2.3		BEDROCK
TP-412	0	0.2	TOPSOIL
TP-412	0.2		TILL
TP-415	0	0.2	TOPSOIL
TP-415	0.2	3.9	TILL
TP-415	3.9		BEDROCK
TP-422	0	0.3	TOPSOIL
TP-422	0.3		TILL
TP-423	0	0.3	TOPSOIL
TP-423	0.3		TILL
TP-424	0	0.3	TOPSOIL
TP-424	0.3		TILL
TP-427	0	0.3	TOPSOIL
TP-427	0.3		TILL
TP-430	0	0.3	TOPSOIL
TP-430	0.3	1.7	ALLUVIUM
TP-431	0	0.15	TOPSOIL
TP-431	0.15	2	ALLUVIUM
TP-432	0	0.3	TOPSOIL
TP-432	0.3	0.7	MADE GROUND
TP-432	0.7	1.35	ALLUVIUM
TP-5	0	0.35	TOPSOIL
TP-5	0.35	3	TILL
TP-6	0	0.32	TOPSOIL
TP-6	0.32	2	TILL
TP-61	0	0.3	TOPSOIL
TP-61	0.3	2.2	TILL
TP-62	0	0.2	TOPSOIL
TP-62	0.2	1.05	TILL
TP-62	1.05	2.4	BEDROCK
TP-63	0	0.27	TOPSOIL
TP-63	0.27	3	TILL

TP-64	0	0.35	TOPSOIL
TP-64	0.35	0.5	MADE GROUND
TP-64	0.5	3	TILL
TP-65	0	0.55	MADE GROUND
TP-65	0.55	1.98	TILL
TP-67	0	0.2	TOPSOIL
Borehole	Top (m)	Base (m)	Stratigraphy
TP-67	0.2	3	TILL
TP-68	0	0.28	TOPSOIL
TP-68	0.28	3	TILL
TP-69	0	0.35	TOPSOIL
TP-69	0.35	3	TILL
TP-7	0	0.28	TOPSOIL
TP-7	0.28	2	TILL
TP-8	0	0.15	TOPSOIL
TP-8	0.15	3	TILL
TP-9	0	0.1	TOPSOIL
TP-9	0.1	3	TILL

APPENDIX C SITE SUMMARY DETAILS

Site name:	Trans-Pennine Upgrade
Site code:	L11159
Grid Reference	SJ 99635 95767
Type:	Geoarchaeology
Date:	August 2018
Area of Site	*c* 90 hectares
Summary of Results:	Oxford Archaeology North was commissioned by Arcadis Consulting (UK) Ltd to undertake geoarchaeological deposit modelling along the route of the proposed Trans-Pennine Upgrade Scheme (Mottram Moor Link Road and A57(T) to A57 Link Road Schemes), Greater Manchester. the Scheme covers an area of *c* 90 hectares, stretching between the M67/A57 roundabout and the A57 Brookfield Road.

The primary aim of the deposit modelling was to provide preliminary baseline data on the nature of the sub-surface sediment sequences and their geoarchaeological and palaeoenvironmental potential, and to identify any horizons within these deposits with the potential to preserve evidence for human occupation.

Records from, in total, 179 geotechnical interventions, including historical borehole data, have been used to compile the deposit model. The modelling revealed a basal sequence of mudstone/sandstone bedrock (of Carboniferous age) overlain by Glacial Till deposits, probably dating to the Devensian, the last glacial episode in the Pleistocene. The surface of these deposits defines the topography of the early Holocene landscape (*c* 12,000 years BP).

The model shows that no Holocene sediments were found over large areas of the Scheme, however, areas of probable peat and alluvial sediments were recorded at both the western end and eastern end of the study area, coinciding with floodplain areas for Hurstclough Brook and the River Etherow. The peat deposits have high potential for radiocarbon dating and palaeoenvironmental work. Deposits of made ground and/or topsoil overlie the natural sequences.

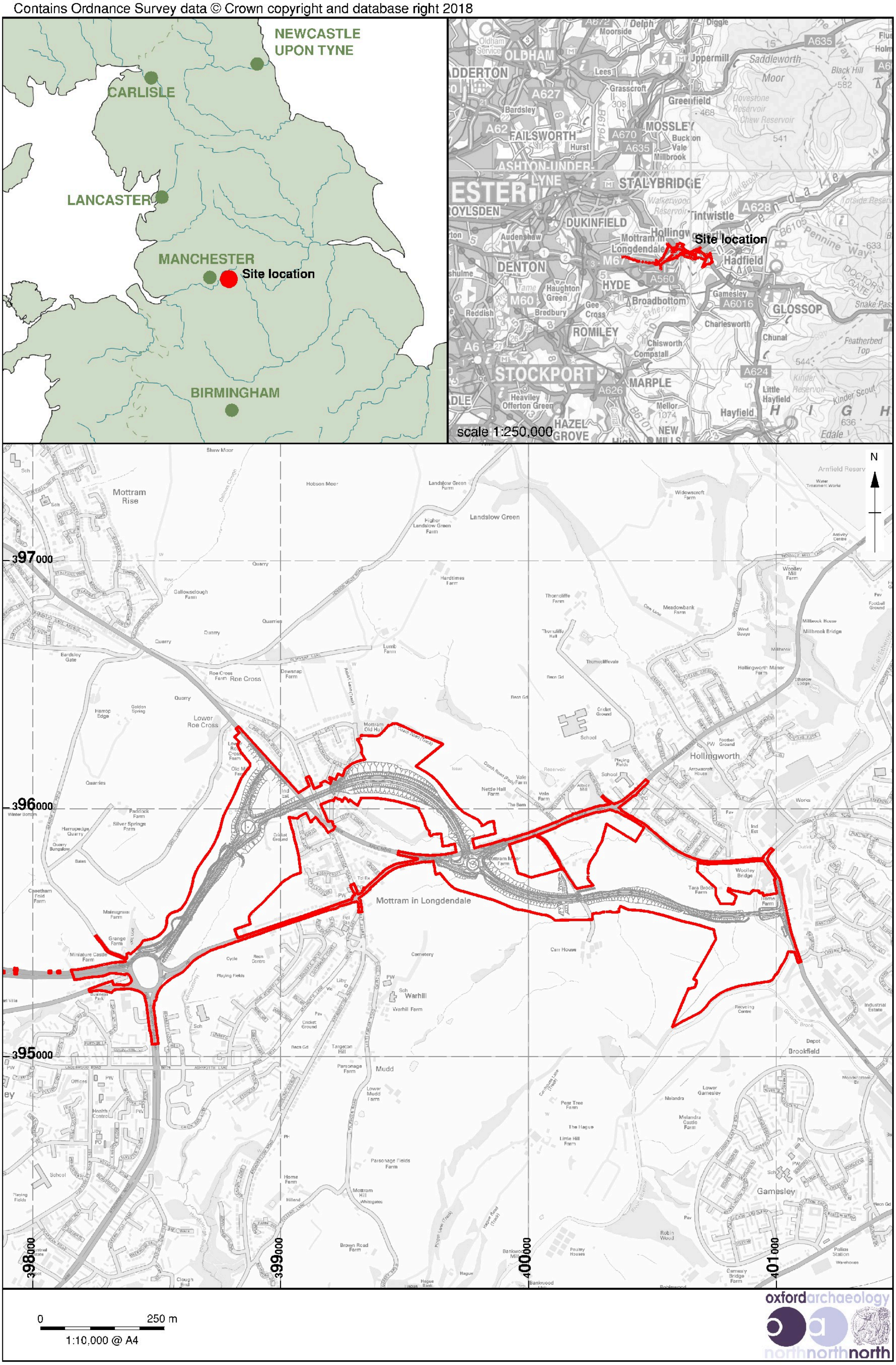
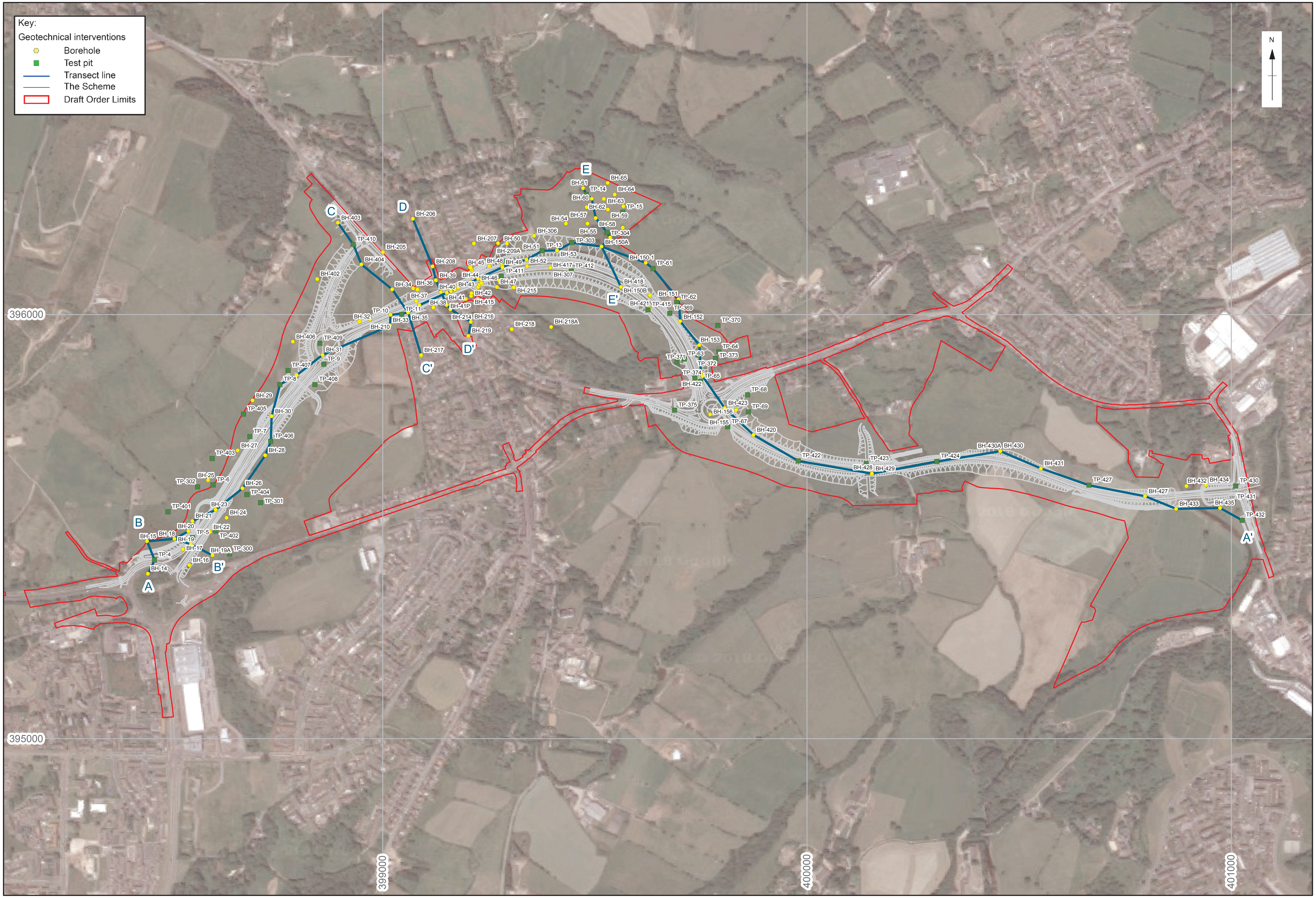


Figure 1: Site location



0 200 m
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Figure 2: Borehole location plan

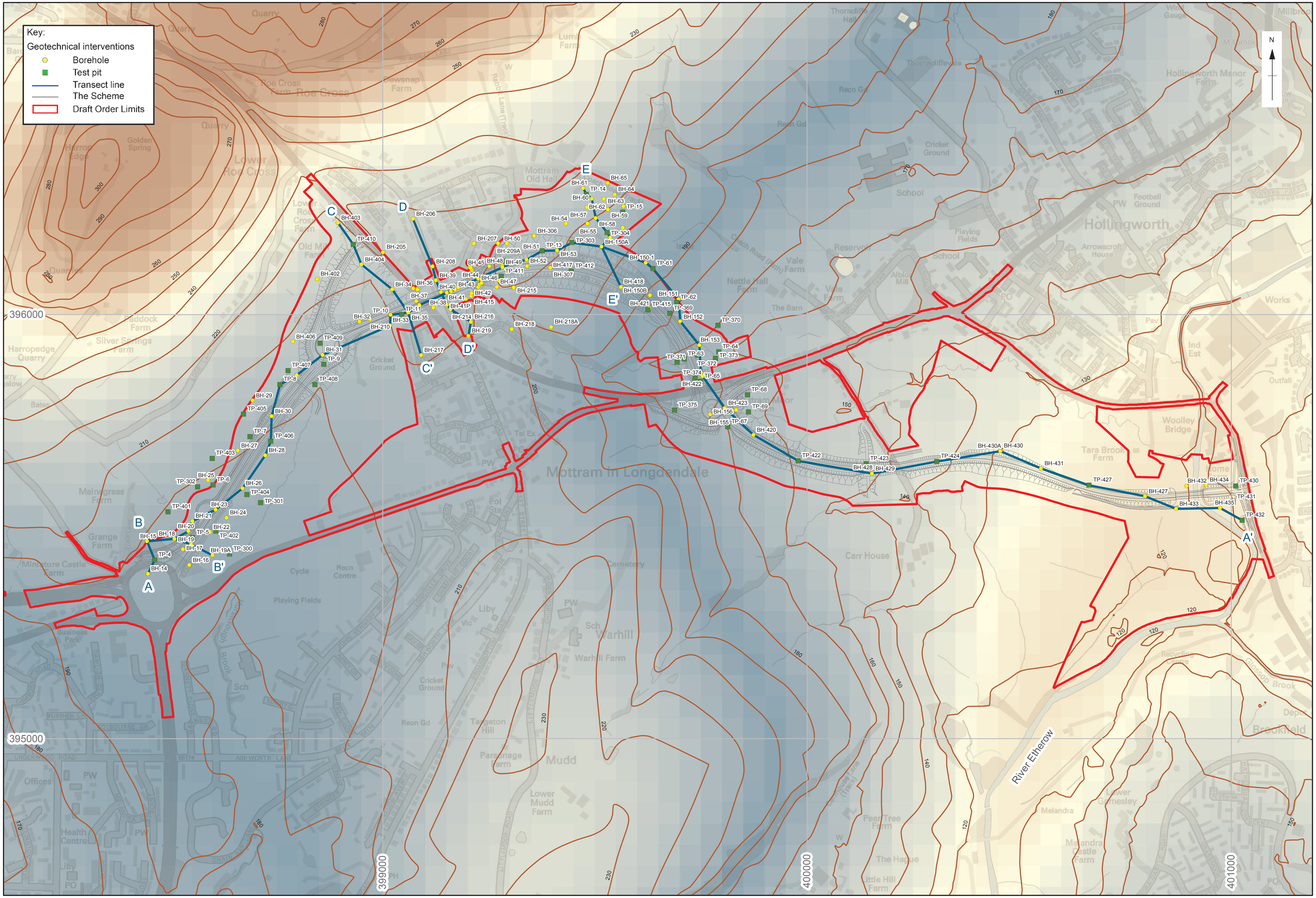

Figure 3: Borehole location and surface topography (mOD)

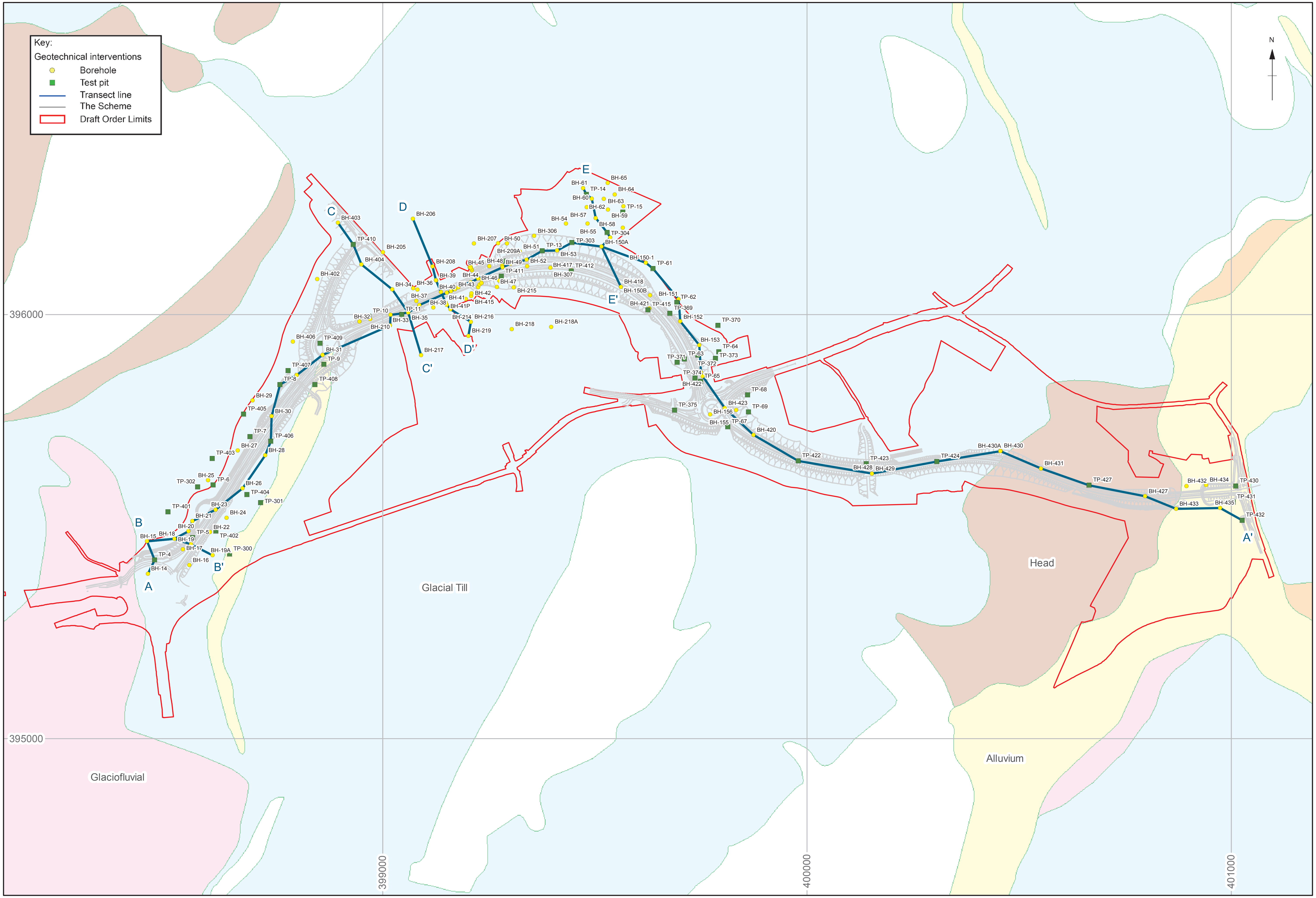

Figure 4: Superficial surface geology mapped by the BGS

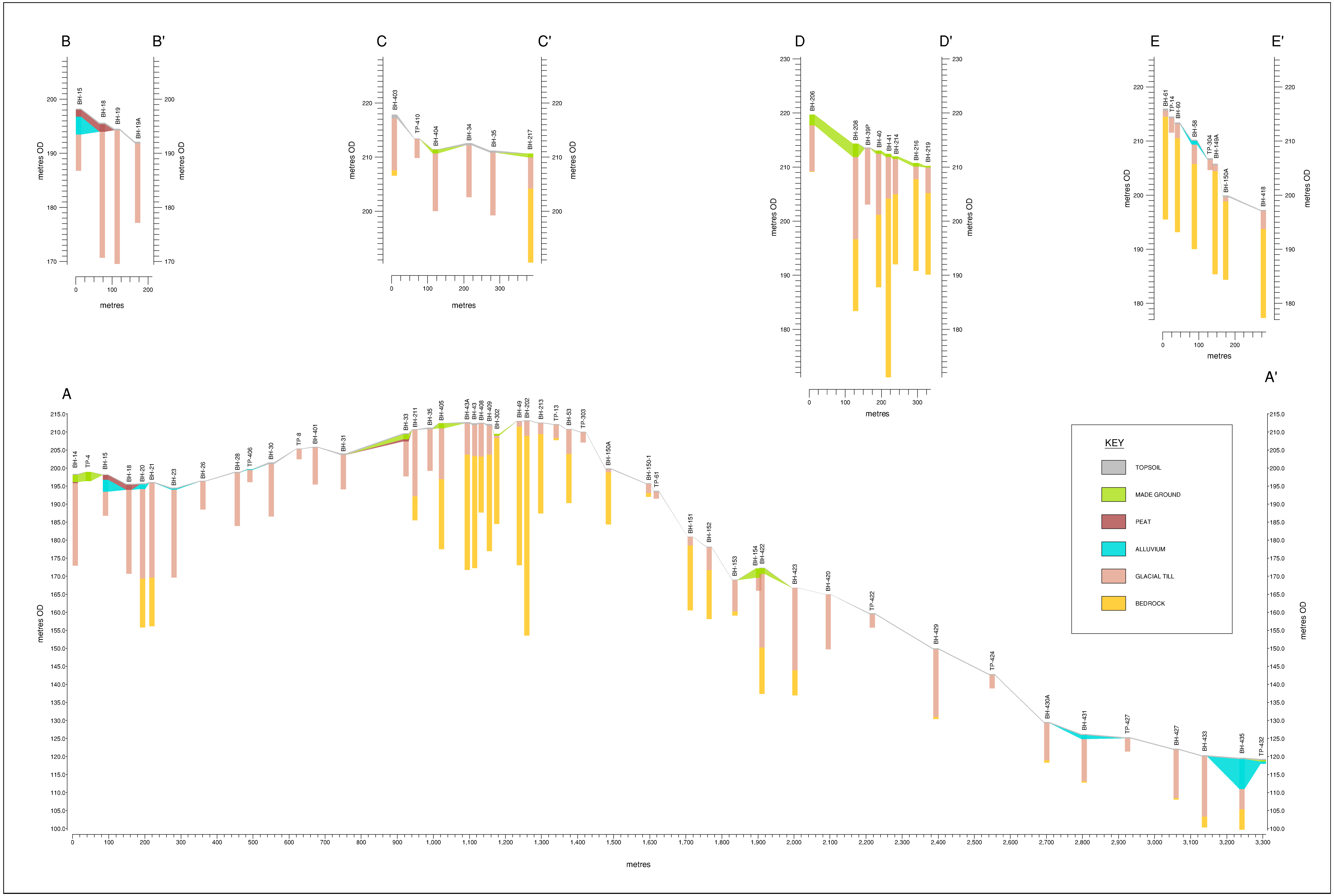

Figure 5: Stratigraphic transects

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