Castle Hill, Bransholme, Hull:
An Archaeological Trial Trench Evaluation

Produced for JBA Bentley on behalf of the Environment Agency

Prepared by J. Reeves

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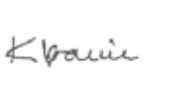
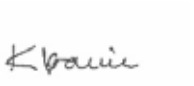
Checked by **Signed** **Date**	Kristina Krawiec  26/11/20
Updated by **Signed** **Date**	Kristina Krawiec  07/01/21
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Summary

- Trent & Peak Archaeology was commissioned by JBA Bentley on behalf of the Environment Agency to conduct an archaeological trial trench evaluation ahead of a proposed flood storage area on land at Castle Hill, Bransholme, Kingston Upon Hull, East Riding of Yorkshire (henceforth referred to as 'the site'). The work was carried out between the 7th and the 11th September 2020.

- Initially, the evaluation works comprised the excavation of fourteen 50m x 1.8m trial trenches and up to seven 5m x 5m test pits across the site, as well as a hand augur survey within two of the trenches to establish the depths of the underlying deposits. The trenches were positioned according to the results of a 2018 geophysical survey which identified a number of anomalies of possible archaeological origin.

- However, upon starting the evaluation works it was quickly established that these geophysical anomalies represented changes within the underlying geology and that no archaeological features were present within the trenches. This led to a change in methodology and all remaining trenches were replaced by test pits to establish the underlying sediment sequence and to update an existing deposit model of the area.

- The underlying glacial till was shown to have an irregular surface with the southern end of the site exhibiting more pronounced undulations. The till was overlain by occasionally laminated silt clay alluvium which was heavily oxidised and dry in the upper part of the sequence. In addition, the deposits proximal to the Holderness/Ganstead Drain were also extremely dry and stiff which is probably due to the draw-down effects of the drain. The anomalies identified in the geophysical data are related to the irregularities in the till surface rather than archaeological features.

- The deposit modelling has further established the nature of the sub-surface topography. The proposed impacts have also been incorporated into the model and show that in areas of deeper impact the underlying peat deposits will be encountered. Further work relating to the minerogenic sequence at the site is required in order to better understand the timing and nature of the inundation of the site.

Contents

List of Plates

List of Figures

List of Tables

1 Introduction

1.1 Trent & Peak Archaeology was commissioned by JBA Bentley on behalf of the Environment Agency to conduct an archaeological trial trench evaluation and updated geoarchaeological deposit modelling ahead of the construction of a proposed flood storage area on land at Castle Hill, Bransholme, Kingston Upon Hull, East Riding of Yorkshire, as part of the Holderness Drain Flood Alleviation Scheme (FAS) (centred on TA 12820 34159, Figure 1).

1.2 The evaluation was conducted between the 7th and 11th September 2020, and involved the excavation, monitoring and recording of six trenches and eleven test pits (Figure 2). Initially, the evaluation was planned to include fourteen 50m x 1.8m trenches and up to seven 5m x 5m square test pits, but this was altered during the works with the approval of the Humberside Archaeological Partnership (HAP) and the NEAS Archaeologist when it became evident that there were no archaeological remains within the site and deep test pits would better reveal the underlying geological layers.

1.3 In addition, monitoring of geotechnical test pits was also carried out and this data along with the geotechnical logs from the survey as a whole was entered into an existing deposit model.

1.4 The evaluation was conducted in line with the methodology prescribed in the approved Written Scheme of Investigation produced by JBA Bentley (2020).

2 Site Background

2.1 Location, Geology and Topography

2.1.1 The site is located on the eastern outskirts of Bransholme, approximately 5 miles north-east of Hull city centre (Figure 1). It consists of a large arable field which covers approximately 10.8 hectares. The north-western boundary of the site comprises mature hedgerow which separates the site from the path of the Trans-Pennine and Hornsea Rail Trail. The eastern side of the site is bounded by the Swine Church Drain with further arable fields beyond. The southern edge of the site is bordered by the Swine South Side Drain with the Country Golf driving range beyond. The south-western boundary of the site is parallel to the Holderness Drain.

2.1.2 The majority of the site is situated at 0m Above Ordnance Datum (AOD), with the north-western corner of the site at 1m AOD.

2.1.3 A recent programme of deposit modelling has been carried out for the Holderness area (Burke et al 2010). This has laid down a sequence of deposits for the area (Table 1). The complexity of much of the area has necessarily been simplified to allow a generalised model to be developed; this is particularly acute in relation to deposits dating to the Holocene.

2.1.4 The underlying geology of the site as mapped by the British Geological Survey (BGS) comprises chalk of the Flamborough Chalk Formation formed during the Cretaceous Period (approximately 86.3-72.1 million years ago) in warm seas.

2.1.5 This is overlain by superficial deposits of Devensian Till of which three units have been distinguished but are accepted to be almost impossible to identify in most borehole logs (Catt 2007, Burke et al 2010, 15). The underlying chalk is characterised as a wave-cut platform, the palaeo-cliffline of which lies on the western side of Hull and Beverley, incised during the Ipswichian (c.128kya, MIS 5e).

Unit	Subdivision	Model code	General lithological characteristics
Artificial Ground	Made Ground	MGR	Artificially raised deposits above the surrounding area (not including levees). See Modelling Methodology for details.
	Made Ground	LEVEE	Flood embankments along the River Hull and its tributaries. See Modelling Methodology for detail
	Worked Ground	WGR	Excavations which have not been backfilled. See Modelling Methodology for details.
	Worked and Made Ground	WMGR	Excavations which have been backfilled, includes water-filled ponds. See Modelling Methodology for details.
	Made Ground	MADE_A	Only modelled in the Hull project area. Comprises man-made deposits raised above the surrounding area or filling excavations. Captured as polygons and cross-sections.
Beach Deposits		BCHD	Sand and gravel. Modern and interglacial shoreline deposits
Alluvium		ALV	Clay, silt, sand and gravel
Peat		PEAT	Peat
Tidal Flat Deposits	Clay	CLAY_C	Soft clay, peaty and silty
	Silt	SILT_B	Soft silt and sandy silt
	Peat	PEAT_A	Soft peat
Basal Clay		CLAY_A	Soft clay, often laminated
River Terrace Deposits		RTDU	Sand and gravel
Head		HEAD	Clay, silt, sand and gravel
Glaciolacustrine Deposits at or near surface		LDE	Laminated clay, silt, sand and gravel
Marine Deposits		MDU	Sand and gravel
Glaciofluvial Deposits		GFDUD	Sand and gravel
Channel		CHANNEL	Sand and gravel
Glaciofluvial sand and gravel at surface – morainic deposits		MORAINE_B	Sand and gravel with till and clay in places.
Glacial Till (upper)		TILL_A	Firm to stiff sandy, silty clay with gravel and boulders
		SAND_A	Lenses of sand and gravel, silty sand in parts

Unit	Subdivision	Model code	General lithological characteristics
Glaciofluvial sand and gravel lenses in Glacial Till		MID_SAND	Intra-till deposits of sand with some gravel and silt
		MID_GRAVEL	Intra-till deposits of gravel with some sand and silt
Glaciolacustrine Clay near middle of glacial sequence		GLLD	Laminated clay and silt; sand in places
Glacial Till (lower)		TILL_B	Firm to stiff sandy, silty clay with gravel and boulders
Glaciolacustrine Clay near base of glacial sequence		CLAY_BAS	Laminated clay and silt
Glaciofluvial Sand and Gravel at base of glacial sequence		PG_LAG_A	Clayey sand and gravel
Weathered bedrock (marl and putty chalk)		MARL_A	Weathered chalk that reduces to a clayey chalk (marl) or soft chalk (putty chalk)

Table 1: Deposits for the Holderness area as defined by the BGS (Burke et al 2010), deposits expected on the site highlighted in blue.

2.1.6 The onset of the Devensian saw an ice front which extended to just east of the Yorkshire Wolds and led to the deposition of moraine and pro-glacial lake deposits. As the ice sheet contracted towards the end of the Devensian, it would have left an uneven land surface with differential sediment settlement/compaction as well as buried ice melt processes. In addition, meltwater channels also formed which are likely to have followed the course of sub-glacial streams (Burke et al 2010,18).

2.1.7 These coarse glacial deposits are overlain by Alluvium consisting of clay, silt and sand which were formed in an environment dominated by rivers during the Holocene. As sea levels began to rise a fining-up sequence of tidal flats developed around Hull. Within this mainly minerogenic sequence basal peat deposits are also recorded infilling the lower levels of river valleys. These organic deposits relate to periods of marine regression with silts and clays representing a return to marine-dominated conditions.

2.1.8 The soils within the site are loamy and clayey coastal soils with naturally high groundwater (Cranfield Soils and Agrifood Institute 2020).

2.2 Archaeological and Historical Background

2.2.1 The archaeological potential of the site was fully evaluated within two previous desk-based assessments carried out by Humber Field Archaeology (HFA) in 2011 and the York Archaeological Trust (YAT) in 2017; all archaeological background information has been taken from these documents unless otherwise specified.

Palaeolithic (650, 000BC – 10, 000BC), Mesolithic Period (10, 000BC – 4, 000BC), Neolithic Period (4, 000BC – 2, 400BC), and Bronze Age (2, 400BC – 700BC)

2.2.2 No records of Palaeolithic, Mesolithic or Neolithic activity were identified within the site; however, the probable character of silt marshland during this period would have been attractive to hunter-gatherer

communities as a source of fauna and flora. Archaeological evidence from this period may survive beneath the alluvium and consist of timber features with organic and inorganic artefacts.

2.2.3 A Bronze Age barrow (SM21180) is located to the north-west of the site. This monument is situated on a ridge and it has been suggested that either alluvial deposition ceased prior to its construction or that it occupied an area of higher ground within a wetland landscape. If the alluvial deposition continued, then it is possible that this Scheduled Monument is part of a larger complex, the lower parts of which have been buried by these alluvial deposits and are yet to recognised. Geophysical survey undertake to the northwest of the barrow in 2017 identified a number of possible prehistoric rectilinear enclosures.

Iron Age (700BC – AD43) and Romano-British Period (AD43 – AD410)

2.2.4 Cropmark evidence including a possible trackway and a double-ditch were identified as representing possible Iron Age/Romano-British activity to the west of the site beneath what is now the Bransholme housing estate. Excavations within the general area in 1975 identified a ditch containing 3rd century pottery, several Romano-British coins and a lead spindle whorl.

2.2.5 Two Romano-British coins have been recorded in the immediate area. Given the wetland character of the local area, it is likely that any Romano-British activity surrounding the site was likely to be related to agriculture rather than to settlement.

Early Medieval Period (AD410 – AD1065)

2.2.6 No known archaeological remains of early medieval date exist within the area surrounding the site. However, place name evidence within the Domesday Survey such as 'Sutton' and 'Swine' suggests that these areas were occupied from at least the 11th century. Settlements were only documented on areas of higher ground during these periods, suggesting that this area was a wetland landscape at this time. This is furthered by the fact that the 'holme' in Bransholme comes from the Old Scandinavian 'holmr' meaning 'water meadow' or 'island in marshy place'.

2.2.7 The drainage of the area was dominated by the presence of the Old Fleet, a creek which drained into the Humber estuary (Shephard 1976). This was subject to the tidal regime of the Estuary with probable regular inundation during high tides and storm surges. The area upstream was likely to have been characterised by open marshland with a sinuous creek system now replaced by extensive field drains. The area of the site was likely to have been subject to the seasonal effects of rainfall and runoff from the surrounding till.

Medieval Period (AD 1066-AD1539

2.2.8 The Scheduled Monument of Castle Hill (SM21181) to the north of the site is believed to have been constructed by Sir John Sayer of Sutton prior to 1200. His family were the lords of the Manor of Sutton from at least the 12th to the 14th century. The monument is formed of a single motte and surrounding ditch.

2.2.9 During the medieval period works began to drain the wetlands of the Hull valley. The Abbey of Meaux was responsible for cutting numerous channels including: Eschdike between 1160-1182, Monkdike between 1210-1220, the Forthdike (Foredyk; Foredike) between 1221-1235, and Skernedike between 1210-1220. However, it is possible that these channels were primarily cut for navigation and that drainage was only a secondary function as they all cut east-west across the valley rather than being aligned to the natural north-south gradient. The area was regularly flooded throughout the 14th century

and the resultant wetland resources such as fish, reads and peat would have been used by the medieval population. The area was utilised seasonally as summer pasture.

2.2.10 It is possible that several small local drains may have existed surrounding the castle, including one which is identified as a spring on the 1768 enclosure map and is still extant as an earthwork.

Post-Medieval Period (AD1540 – AD1799)

2.2.11 From 1660 carr lands to the north of the site were drained whilst the lands to the south were not. Prior to the late 17th century a bank known as 'Gold Dike' was constructed between Ganstead and Sutton to keep the freshwater floods from the reclaimed silt marshes to the south. 'Gold Dike Stock' was the name given to the opening which controlled the flow. This was closed in winter allowing the natural drainage of the area to the south, which would also have resulted in the increased inundation of the site.

19th Century (AD1800 – AD1899) and Modern Period (AD1900 – Present Day)

2.2.12 In 1832 the construction of the Holderness Drain was completed. This lead to a separation of lowland and upland drainage. The construction and improvement works to the Holderness and Sutton Cross drains included the construction of several new bridges, one of which was that on Castle Hill Road. These new drains allowed the site to be used for arable agriculture for the first time and Castle Hill Farm was built between 1832 and 1855.

2.2.13 In 1864 the Hull to Hornsea railway was constructed directly north of the site along what is now the Trans-Pennine and Hornsea Rail trails. The line was closed in 1964.

Previous Archaeological Investigations

2.2.14 The first phase of archaeological monitoring for the Holderness Drain FAS was undertaken in 2013 by Humber Field Archaeology (HFA 2013); it consisted of 6 monitored test pits and 6 core penetration tests within the area surrounding the site which indicated the presence of a buried land surface.

2.2.15 The next phase of archaeological investigation in 2018 included the excavation of 45 test pits to a maximum depth of 3m and 9 boreholes (FAS 2019). The majority of these test pits and boreholes were located to the west of the Holderness drain, where it was established that a 0.05-0.35m band of peat exists between -0.25m to -2.01m OD. The underlying glacial till was found to have an undulating profile which resulted in the peat being up to 1.55m thick in some low-lying areas. The deposit represents a reed swamp deposit which accumulated within hollows in the till from the Late Neolithic to the Early Bronze Age.

2.2.16 The poor preservation of these peat deposits meant that the material recovered was unsuitable for carbon dating. The macrofossil remains were restricted to decayed fragments of wood. The preservation of the waterlogged remains suggests the deposits have been subjected to repeated drying out and re-wetting, the preservation and potential was altered by the resulting influx of oxygenated water. Preservation of the microfossil remains was also poor; however, some interpretively valuable assemblages existed, for diatoms in particular.

2.2.17 During this phase of works in 2018 two test pits and one borehole were excavated within the site (Test Pits 05 and 09, Borehole 08).

Test Pit 05

2.2.18 0.2m of topsoil covered the test pit which overlaid a silty clay present down to 0.6m below ground level (BGL). Beneath this was another layer of firm bluish grey silty clay to a depth of 1.4m BGL. Soft silty clay

decayed and non-decayed organics were then present below this to 1.95m BGL. All lower deposits were sterile down to 3m.

Test Pit 09

2.2.19 0.25m of topsoil covered this test pit. A yellow brown silty clay was then present between 0.2m – 0.45m BGL. Laminated alluvial deposits which contained plant material were below this down to 0.75m BGL, and beneath this was a soft silty clay down to 1.6m BGL. The bottom layer in the sequence was a bluish grey silty clay with occasional black organic inclusions down to 3.6m BGL.

Borehole 08

2.2.20 No organic deposits were encountered within the borehole sequence. Sterile deposits were revealed down to a depth of 4.8m BGL where the natural glacial till clay was encountered.

2.2.21 The latest archaeological work within the site was a geophysical survey completed in November 2019 by Magnitude Surveys (Figures 2 and 3). A number of curvilinear features were identified and their proximity to Castle Hill led to them being identified as possible earthworks, droveways or broad ditches. However, it was also stated that the alternating positive and negative anomalies which were identified may be the result of natural soil changes within paleochannels. Palaeochannels and palaeo-landforms would be of geoarchaeological interest. A large curvilinear anomaly identified as a possible oxbow or paleochannel was also present, as was a field boundary known from historic mapping and a number of small linear anomalies (Rigby 2019).

3 Relevant Planning Policy and Guidance

3.1.1 The proposed scheme of flood alleviation works is currently in the pre-planning stage, but will be subject to national planning policy when it proceeds. The results of this archaeological evaluation and deposit modelling will help to inform the local authority during the planning process.

National Planning Policy Framework (NPPF)

3.1.2 Developments of this nature, and their impact upon the historic environment, are addressed by the revised 2019 *National Planning Policy Framework* (NPPF) published by the Ministry of Housing, Communities and Local Government (MHCLG), and the *NPPF Planning Practice Guide: Conserving and Enhancing the Historic Environment* (DCLG 2014). This now supersedes the 2012 *National Planning Policy Framework* (NPPF).

3.1.3 Section 16 of NPPF, paragraph 187 states:

> *Local planning authorities should maintain or have access to a historic environment record. This should contain up-to-date evidence about the historic environment in their area and be used to:*
>
> *a) assess the significance of heritage assets and the contribution they make to their environment; and*
>
> *b) predict the likelihood that currently unidentified heritage assets, particularly sites of historic and archaeological interest, will be discovered in the future.*

3.1.4 In addition, paragraph 189 states:

> *In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their*

setting. The level of detail should be proportionate to the assets importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant historic environment record should be consulted and the heritage assets assessed using appropriate expertise where necessary. Where a site on which development is proposed includes, or has the potential to include, heritage assets with archaeological interest, planning authorities should require developers to submit appropriate desk-based assessment and where necessary a field evaluation.

4 Aims and Objectives

4.1 Aims of trial trench evaluation

- To identify the presence of any archaeological or geoarchaeological remains to be affected by any intrusive aspects of the proposed scheme of works.
- To attempt to quantify any such archaeological or geoarchaeological remains which are encountered by identifying their character, date, significance and preservation.
- To inform the HAP and the NEAS Archaeologist as to the need for further archaeological mitigation works prior to the proposed development.
- To meet the specific aim of each trench and test pit as set out in section 5.1 of the relevant WSI (Amy 2020).

4.2 Objectives of trial trench evaluation

- To excavate fourteen archaeological trial trenches and up to seven test pits within the site; these were positioned to rapidly assess the archaeological and geoarchaeological potential of the site giving the broadest possible coverage in relation to a number of anomalies identified within the 2018 geophysical survey (Magnitude 2018).
- To complete an auger survey within trenches 07 and 09 to establish the presence/depth of a possible paleochannel identified by the 2018 geophysical survey (Magnitude 2018).
- To accurately record any and all archaeological features revealed to an appropriate level in order to ensure their 'preservation by record'.
- To recover artefacts and ecofacts in order to help determine the date of any archaeological features which were identified.
- To ensure any features of geoarchaeological significance were recorded, and where there was the potential for palaeoenvironmental data, an appropriate level of sampling would be undertaken.

4.3 Aims of the deposit modelling

- To specifically record the absence or presence of peat deposits and the variation in depth of these deposits where they are encountered to refine the deposit model set out in FAS 2019 and better understand the historic development of the landscape;
- To assess the potential impact of the proposed works on the archaeological and palaeoenvironmental deposits across the site.

4.4 Regional Research Framework

4.4.1 If archaeological remains were uncovered during the evaluation, their significance would have been assessed against the published research frameworks for the region. This report will aim to identify the relevant research questions in relation to the research framework with regard to the sediment sequence encountered at the site. The relevant document for the region is provided by the Yorkshire Archaeological Research Framework: research agenda (Roskams and Whyman 2007a and 2007b).

5 Methodology

5.1 Overview

5.1.1 A total of 6 trenches and 9 test pits were excavated (Figure 2). Trenches 01, 04, 06, 07, 09 and 13 measured 50m x 1.8m, Trenches 02, 03, 05, 08, 10, 12 and 14 were replaced by test pits measuring 4m x 1.8m. In the original scheme test pits were also proposed of which Test pits 02 and 07 were excavated and measured 5m x 5m square. All trenches and test pits were excavated with a toothless ditching bucket under archaeological supervision.

Trench/Test Pit Number	Rationale	Predicted depth to the till
Trench 1	To investigate east to west geophysical anomaly	3-4m?
Trench 2	Control to test apparent blank area	3-4m?
Trench 3	To investigate north to south geophysical anomaly	4.80m
Trench 4	To investigate curvilinear feature and two smaller east to west anomalies	3-4m?
Trench 5	To investigate archaeological potential adjacent to proposed access route	3m+
Trench 6	To investigate curvilinear anomaly and interface of possible oxbow	3-4m?
Trench 7	To investigate curvilinear anomaly and use auger holes at 4m centres to provide a profile and recover paleoenvironmental samples as conditions dictate	3-4m?
Trench 8	Control to test apparent blank area	4.80m
Trench 9	To investigate curvilinear anomaly and using auger holes at 4m centres provide a profile and recover paleoenvironmental samples as conditions dictate	3-4m?
Trench 10	Control to test apparent blank area	3-4m?
Trench 11	Control to test apparent blank area	3-4m?
Trench 12	To investigate curvilinear anomaly and any relationship between it and anomaly to the north	3m+
Trench 13	To investigate southern curvilinear feature	3m
Trench 14	Control to test apparent blank area	3-4m?
Trial Pit 1	1 of 4 interventions to investigate geophysical anomaly and provide a profile and recover paleoenvironmental samples as conditions dictate	
Trial Pit 2	2 of 4 interventions to investigate geophysical anomaly and provide a profile and recover paleoenvironmental samples as conditions dictate	
Trial Pit 3	3 of 4 interventions to investigate geophysical anomaly and provide a profile and recover paleoenvironmental samples as conditions dictate	

Trial Pit 4	4 of 4 interventions to investigate geophysical anomaly and provide a profile and recover paleoenvironmental samples as conditions dictate	
Trial Pit 5	As required, to investigate deposits in Trench 9 if anomaly is too deep to excavate by hand, machine or conditions dictate an auger survey is not feasible	
Trial Pit 6	As required, to investigate deposits in Trench 7 if anomaly is too deep to excavate by hand, machine or conditions dictate an auger survey is not feasible	
Trial Pit 7	As required, to investigate deposits in Trench 13 if anomaly is too deep to excavate by hand or machine	

Table 2: Rationale for original trench locations

5.1.2 The trenches were positioned in order to achieve the most widespread evaluation across the site and to target a number of anomalies identified during the 2018 geophysical survey carried out by Magnitude Surveys (Magnitude 2018).

5.1.3 Trenches were machined in spits no greater than 200mm, to either a maximum of 1.2m BGL, the maximum reach of the machine arm, the level at which archaeological deposits were present, the level at which services were present, or the level at which the natural substratum was clearly visible.

5.1.4 The topsoil and subsoil were kept at a safe distance from the trench edge and checked for artefacts; all artefacts found within the topsoil and subsoil were recorded by context. The trenches were located by GNSS after excavation.

5.1.5 All fieldwork was carried out in accordance with CIfA guidance documents *Standard and Guidance for an Archaeological Field Evaluation* (2020) and *Code of Conduct* (2019).

5.1.6 Features were hand-cleaned. Sections of features were hand-drawn at 1:20 and planned using GNSS. Features were excavated in such a way as to determine the stratigraphic sequence within each trench. Post-medieval finds or abundant redeposited structural material were recorded by context/spit.

5.1.7 Trenches were hand cleaned where appropriate and three representative sections of each trench were photographed and drawn at 1:20. Sections of all contexts including features were drawn on permatrace drafting film in pencil at a scale of 1:20, and show at least: context numbers; all colour and textural changes; principal slopes represented as hachures; levelling information is given in the form of a datum line with OD/arbitrary value; the locations of all sections have been shown on the plan.

5.1.8 Digital photography was carried out with general views illustrating the principal features of the excavations. Written records were maintained as laid down in the TPA recording manual (Trent & Peak Archaeology 2015).

5.1.9 The hand auger survey was undertaken using and Eikjelcamp gouge auger. The lithology was recorded using the Troels-Smith (1955) system of sediment classification (Appendix 4). The scheme breaks down a sediment sample into four main components and allows the inclusion of extra components that are also present, but that are not dominant. Key physical properties of the sediment layers are darkness (Da), stratification (St), elasticity (El), dryness of the sediment (Sicc) and the sharpness of the upper sediment boundary (UB). The core logs are provided in Appendix 4.

5.1.10 The existing deposit model was updated using the results of the GI and archaeological works undertaken at the site. This followed procedures set out within the *Historic England Guidance for Deposit Modelling and Archaeology* (Historic England 2020). The deposits recorded in the logs were categorised into stratigraphic units.

5.1.11 The data was entered into a pre-existing Rockworks database in order to generate 3-D fence diagrams and cross sections. In addition, surfaces were created to aid visualisation using ArcGis incorporating

available lidar data as digital terrain models with multi-directional hillshading and/or local relief modelling used to aid interpretation.

5.1.12 The data is archived in an excel spreadsheet.

5.2 Fieldwork constraints

5.2.1 Originally, the evaluation was to consist of fourteen 50m x 1.8m trenches and up to an additional seven 5m x 5m square test pits. These trenches and test pits were located in order to investigate a number of anomalies identified by the geophysical survey carried out by Magnitude Surveys in November 2018 (Rigby 2018). It was thought that some of these anomalies may have been caused by either archaeological or geoarchaeological features. However, it was quickly established during the course of the evaluation that no such archaeological features existed within the site, and that these geophysical anomalies where likely caused by changes within the geology. In light of this, the remaining trenches were instead excavated as small, deep test pits to investigate the underlying geological layers. All changes to the methodology were agreed with HAP and the NEAS Archaeologist.

5.2.2 Trenches 01, 04, 06, 07, 09 and 13 were all opened as planned and measured 50m x 1.8m. Auguring was conducted within trenches 7 and 9 to establish the depth of the underlying alluvium.

5.2.3 Trenches 02, 03, 08, 10, and 14 were all opened as test pits measuring 4m x 1.8m and were positioned within the centre of their planned locations. Trenches 05 and 12 were excavated to the same dimensions, but had to be slightly re-sited to the east of the planned locations due to their proximity to the Holderness Drain which bordered the south-western boundary of the site.

5.2.4 Test pits 02 and 07 were opened as planned and measured 5m x 5m square. Test pit 04 was excavated in its planned location but with altered dimensions and measured 4m x 1.8m. Test pits 01, 03, 05 and 06 were not excavated as they were deemed unnecessary.

6 Results

6.1 Overview

6.1.1 The underlying glacial till was identified in the base of the majority of the trenches and test pits. This was overlain a series by a thinly laminated alluvial clay layer of varying thickness. The till was not reached within the easternmost trenches (01, 08, and 1), suggesting that the alluvial cover was thicker on the eastern side of the site. Trenches 07 and 09 were subject to a hand auger transect in order to investigate the alluvial deposits.

6.1.2 In addition to the alluvial sequence, fragments of wood were recovered from the upper oxidised till layers (3004) and (5004) within Trenches 3 and 5. These were in poor condition and are likely to represent root activity within the alluvial sequence.

6.2 Trenches and Test Pits

6.2.1 Each trench and test pit was opened with a specific aim which was set out in a table included within section 5.1 of the relevant WSI (Amy 2020). Each trench and test pit has been discussed with regard to their stratigraphy and their success in meeting these aims.

Trench 01 (50m x 1.8m, Plate 1, Figures 04 and 11)
Aim: To investigate east to west geophysical anomaly.

6.2.2 Trench 01 was orientated north-east to south-west in the north-eastern corner of the site. The trench was positioned on a slope with the north-eastern end at an elevation of 0.67m OD, whilst the south-western end was at 0.23m OD.

6.2.3 The underlying till was not reached in the base of the trench which was excavated to a maximum depth of 1.2m BGL (-0.53m NE & -0.97m SW OD). The deepest deposit encountered was a laminated, firm, mid red brown clay (1002). This trended into an alluvial layer of friable, mid greyish brown clay which was also laminated (1001).

6.2.4 A possible east-west linear feature, [1003], was investigated within the centre of the trench. Upon investigation this was found to be a natural seam within alluvial layer (1002). This natural feature is likely to correlate with an east-west geophysical anomaly (Magnitude 2018).

6.2.5 The alluvium was sealed by a layer of topsoil (1000) 0.14-0.2m thick from which a fragment of a 18th-19th century dark green glass bottle was recovered.

Trench 02 (Test Pit) (4.1m x 1.8m)
Aim: Control to test apparent blank area.

6.2.6 Trench 02 was excavated as a small test pit in the northern portion of the site. The test pit was located at an elevation of 0.5m OD.

6.2.7 The underlying glacial till (2003) was encountered at 3.28m BGL (-2.78 OD) and comprised a compact, light bluish grey clay. This was overlain by alluvial layer (2002), a sticky, dark bluish grey clay 1.00m thick. This trended into an oxidised mid greyish brown clay with laminations (2001) 1.76m thick.

6.2.8 The alluvial sequence was sealed by the topsoil (2000).

6.2.9 No archaeological features were present within this test pit. The alluvial deposits were sealed by a layer of topsoil (2000) which was recorded to a depth of 0.34m BGL (0.16m OD). The geophysical anomaly is likely to represent a depression in the till, perhaps a large pool.

Trench 03 (Test Pit) (4m x 1.8m, Plate 2)
Aim: To investigate north to south geophysical anomaly.

6.2.10 Trench 03 was excavated as a small test pit orientated east to west within the northern portion of the site, and was excavated to a depth of 4.4m BGL (-3.79m OD).

6.2.11 The underlying glacial till (3005) was encountered at 4.29m BGL (-3.68m OD) and comprised a compact, dark greyish blue clay with moderate medium-large angular stones. This was overlain by a smooth, mid grey blue sandy clay (3004) with occasional rootwood fragments 1.51m thick. This trended into (3003), a sticky, mid blue grey silt clay 0.67m thick which in turn was overlain by laminated and oxidised alluvial silt clays (3001) (3002) 1.68m thick.

6.2.12 The geophysical anomaly is likely to represent a depression in the till, perhaps a large pool, and no archaeological features were encountered.

Trench 04 (50m x 1.8m, Plate 3, Figures 5 and 10)
Aim: To investigate curvilinear feature and two smaller east to west anomalies.

6.2.13 Trench 04 was orientated north-east to south-west within the north-western corner of the site. The trench was located on a level plateau of 1.3m OD.

6.2.14 In the north-eastern part of the trench, a layer of weathered upper till (4004) was encountered at 0.58m BGL which comprised loose, light brownish grey clayey sand with moderate small-medium rounded stones. This was further investigated to a depth of 1.48m BGL and the unweathered till (4005) was encountered which comprised compact, mid reddish brown clay with medium-very large rounded stones and cobbles and occasional lignite flecks.

6.2.15 The till was sealed by alluvial layer (4003) which comprised a compact, mid grey clay with evidence of fine sand laminations. This trended into a compact, mid brownish grey clay (4002) with laminations to a depth of 0.88m BGL (0.42 OD). This was then overlain by firm, mid brownish grey laminated clay (4001)

6.2.16 The trench was sealed by a layer of topsoil (4000) which extended to a depth of 0.35m BGL (0.95m OD).

6.2.17 The varying layers within the trench, in particular the weathered upper layer of glacial till (4004), are likely to correlate with the various geophysical anomalies identified within the survey. No archaeological features were present within this trench.

Trench 05 (Test Pit) (4m x 1.8m, Plate 4)
Aim: To investigate archaeological potential adjacent to proposed access route.

6.2.18 Trench 05 was excavated as a small test pit within the north-western corner of the site, and was located at an elevation of 1.18m OD. The test pit was re-located several meters east of the original planned position of the trench due to its proximity to the Holderness Drain along the south-western boundary of the site.

6.2.19 The underlying glacial till (4005) was encountered at the base of the test pit between 4.35m BGL (-3.17m OD) and 4.85m BGL (-3.67m OD) and comprised a compact, mid bluish grey clay. This was overlain by a weathered till layer composed of a light bluish green clay sand with occasional medium wood fragments

1.45m thick (5004). This was overlain by mid bluish grey clay 0.60m thick (5003), which trended into a laminated mid grey brown alluvial clay with fine sand laminations 1.50m thick (5002).

6.2.20 No archaeological features were identified within this test pit.

Trench 06 (50m x 1.8m, Figures: 6 and 10)
Aim: To investigate curvilinear anomaly and interface of possible oxbow.

6.2.21 Trench 06 was orientated north-west to south-east in the north-western corner of the site. The trench was located on a slight incline which sloped from 1.01m OD to 0.78m OD.

6.2.22 At the north-western end of the trench the till (6004) was encountered at 1.40m BGL. This was overlain by a weathered upper till deposit (6003) which comprised a mid-brownish grey silty clay with occasional sand. This was overlain by an oxidised, laminated alluvial deposit 0.82m thick (6002) which trended into a laminated grey brown silt clay 0.18m thick, (6001).

6.2.23 The alluvial sequence was sealed by a layer of topsoil which existed to a depth of 0.2m BGL (0.81m NW OD & 0.58m SE OD).

6.2.24 The geophysical anomalies which were identified within the area of the trench were probably due to changes in the underlying till. The 'oxbow ' identified in this area is more likely to be a large pool infilling a depression in the till. No archaeological features were identified within this trench.

Trench 07 (50m x 1.8m, Plate 5, Figures: 7 and 10)
Aim: To investigate curvilinear anomaly and use auger holes at 4m centres to provide a profile and recover paleoenvironmental samples as conditions dictated.

6.2.25 Trench 07 was orientated east to west within the north-western corner of the site. The trench was located on a slope with the western end at an elevation of 1.6m OD and the eastern end at 0.76m OD.

6.2.26 The underlying till was not encountered in the base of the trench, which was excavated to a depth of 1.20m BGL. The deeper deposits were recorded using a hand auger (Cores 5-7, Appendix 4) which recorded the till at 3.8m BGL at the western end of the trench and 2.70m BGL at the eastern end of the trench. This was overlain by a stiff, greyish brown laminated silt clay 1.00m thick, (7004). This trended into the alluvial deposit (7003) a compact orange brown silt clay, which in turn was overlain by a further oxidised alluvial deposit (7001).

6.2.27 The alluvial sequence here was extremely compact and dry making further investigation by hand impossible. This is likely to be due to the proximity of the Holderness Drain causing extensive dewatering of the sediments. This is likely to have had a detrimental effect on the preservation of environmental proxies within the vicinity of the drain, in addition this process may also be responsible for the anomalies in the geophysics survey. No archaeological features were identified within the trench.

6.2.28 The sequence was sealed by a layer of topsoil (6000) which was present to a depth of 0.18m BGL (1.42m W & 0.58m E OD).

Trench 08 (Test Pit) (4m x 1.8m)
Aim: Control to test apparent blank area.

6.2.29 Trench 08 was excavated as a small test pit orientated north-east to south-west within the central part of the site and was located at an elevation of 0.53m OD.

6.2.30 The underlying till was not encountered and the test pit was excavated to a maximum depth of 5.80m BGL (-5.27m OD). The deepest deposit encountered was a sticky, dark bluish black clayey sand 1.85m thick (8004). This was overlain by sticky-wet, dark bluish grey sandy clay 2.3m thick (8003).

6.2.31 These more saturated deposits were then overlain by the same oxidised alluvial deposits seen elsewhere across the site (8001-8002). No archaeological features were present within this test pit. The alluvial sequence was sealed by a topsoil layer (8000) down to a depth of 0.4m BGL (0.13m OD).

Trench 09 (50m x 1.8m, Plate 6, Figures: 8 and 10)
Aim: To investigate curvilinear anomaly and using auger holes at 4m centres provide a profile and recover paleoenvironmental samples as conditions dictate.

6.2.32 Trench 09 was orientated east to west on the western side of the site. The trench was situated on a slope; the western end was at an elevation of 1.36m OD whilst the eastern end was at a much lower height of 0.77m OD.

6.2.33 The till was not encountered in the base of the trench, which was excavated to 1.20m BGL, but the deposit was recorded using a hand auger (Cores 1-4, Appendix 4). The alluvial sequence deepened towards the eastern end of the trench with the till reached at 4.80m BGL (-3.44m OD), which was overlain by a smooth grey brown silt 2.25m thick. This was overlain by an oxidised laminated silt clay (9002) 1.57m thick; this deposit recorded frequent sand lenses (9003) demonstrating changes in depositional energy over time.

6.2.34 (9002) was overlain by a further alluvial deposit (9001) 0.40m thick representing the upper desiccated surface of the sequence. This trench was located over a curvilinear anomaly within the geophysical data, but lithologically the deposits recorded here were no different to those seen across the rest of the site. The anomaly probably corresponds to the irregular surface of the till coupled with the effects of the Holderness drain to the west of the trench. No archaeological features were identified within the trench.

The alluvial sequence was sealed by a layer of topsoil (9000) which was present to a depth of 0.24m BGL (1.12m W & 0.53m E OD).

Trench 10 (Test Pit) (4m x 1.8m, Plate 7)
Aim: Control to test apparent blank area.

6.2.35 Trench 10 was excavated as a small test pit orientated north to south within the central area of the site, and located at an elevation of 0.55m OD.

6.2.36 The underlying till (1013) was encountered at 2.60m BGL (-2.05m OD) and comprised a compact, mid bluish grey clay with frequent medium-very large sub-angular stones. This was overlain by sticky, mid-dark bluish grey clay (1012) 0.70m thick. This trended into a grey brown clay with sand laminations (1011) 1.55m thick. No archaeological features were present within this test pit.

6.2.37 The alluvial sequence was sealed by a layer of topsoil (1010) down to a depth of 0.35m BGL (0.2m OD).

Trench 11 (Test Pit) (4m x 1.8m)
Aim: Control to test apparent blank area.

6.2.38 Trench 11 was excavated as a small test pit orientated north to south in the south-eastern part of the site, at an elevation of 0.11m OD.

6.2.39 The test pit was initially excavated to a depth greater than 4.6m BGL (-4.49m OD), but it immediately collapsed owing to the unstable sands encountered at the base (1104) and (1105). These sands were 2.83m thick and are thought to directly overlie the till; they were sealed by a smooth silt clay (1103)

recorded to a depth of 1.77m BGL (-1.66m OD), which in turn was overlain by an oxidised laminated silt clay alluvium (1102). No archaeological features were present within this test pit.

6.2.40 The alluvial sequence was sealed by a layer of topsoil (1101) down to a depth of 0.32m BGL (-0.21 OD).

Trench 12 (Test Pit) (4m x 1.8m, Plate 8)
Aim: To investigate curvilinear anomaly and any relationship between it and the anomaly to the north.

6.2.41 Trench 12 was excavated as a small test pit orientated north-west to south-east on the south-western side of the site at an elevation of 1.31m OD.

6.2.42 The underlying till (1205) was reached at 4.9m BGL (-3.59m OD). This was overlain by a sticky, dark blue grey clay (1204) which trended into a mid blue grey silt clay (1203) 1.20m thick, which was overlain by a light grey silt clay (1202). This was in turn was overlain by a desiccated laminated silt clay alluvium (1201). No archaeological features were recorded in the trench and the geophysical anomalies in the area are likely due to changes in hydrology related to the Holderness Drain.

6.2.43 The alluvial sequence was sealed by a layer of topsoil (1200) which extended to a depth of 0.4m BGL (0.91m OD).

Trench 13 (50m x 1.8m, Figures: 09 and 10)
Aim: To investigate southern curvilinear feature.

6.2.44 Trench 13 was orientated north-east to south-west in the south-western corner of the site. The trench was positioned on a slope; its south-western end was at a height of 1.47m OD and the north-eastern end was at a much lower elevation of 0.31m OD.

6.2.45 The weathered till (1305) was encountered at 1.30m BGL (0.17m OD) at the north-eastern end of the trench. This was overlain by a laminated blue grey silt clay alluvium (1303), which was in turn overlain by a compact blue grey silt clay alluvium (1303) 1.10m thick with occasional sand lenses and laminations. This was overlain by a laminated blue grey silt clay alluvium (1303). This trended into the oxidised upper alluvium (1302) which in turn was overlain by a further weathered alluvial deposit (1301) 0.46m thick.

6.2.46 The alluvial sequence was sealed by a layer of topsoil to a depth of 0.36m BGL (1.11m SW & -0.05m NE OD).

6.2.47 It is likely that the varying geology within the trench, in particular the oxidised upper till layer (1305), was responsible for the geophysical anomalies which were identified within the area of the trench. No archaeological features were recorded within the trench.

Trench 14 (Test Pit) (4m x 1.8m)
Aim: Control to test apparent blank area.

6.2.48 Trench 14 was excavated as a small test pit orientated north to south in the south-western corner of the site. It sat at a height of 0.24m OD.

6.2.49 The underlying till (1403) was reached at 2.25m BGL (-2.71m OD) and was overlain by a mid-grey blue silt clay (1402) 0.40m thick. This was overlain by a desiccated grey brown laminated silt clay (1401) 1.45m thick.

6.2.50 The alluvial sequence was sealed by the topsoil layer (1400) down to a depth of 0.4m BGL (-0.16m OD). 2.01m OD). No archaeological features were present within this test pit.

Test Pit 02 (5m x 5m, Plate 9)
Aim: 2 of 4 interventions to investigate geophysical anomaly and provide a profile and recover paleoenvironmental samples as conditions dictate.

6.2.51 Test Pit 02 was a square, stepped test pit at the northern end of the site located at an elevation of 0.48m OD. This test pit was completed prior to the change in methodology for the site and so was excavated to a maximum depth of 3m. A hand auger was used to probe the base of the trench in order to record the depth of the till; this reached a maximum depth of 4.10m BGL (-1.6m OD) (Appendix 2).

6.2.52 The underlying glacial till (0203) and was overlain by a sticky, smooth, dark blue-grey alluvial silt clay (0202). This was in turn overlain by alluvial layer of crumbly, mid grey brown silt clay with fine sand laminations (0201) which was heavily oxidised towards the top of the sequence.

6.2.53 No archaeological features were present within this test pit. The alluvial deposits were sealed by a layer of topsoil (0200) which was recorded to a depth of 0.34m BGL (0.16m OD).

6.2.54 The geophysical anomaly within the area of this test pit is likely to be related to thick layers of alluvium and does not represent a former oxbow lake but rather a depression in the till representing a pool or mire. No archaeological features were revealed.

Test Pit 04 (4m x 1.8m)
Aim: 2 of 4 interventions to investigate geophysical anomaly and provide a profile and recover paleoenvironmental samples as conditions dictate.

6.2.55 Test Pit 04 was a small test pit orientated east to west within the centre of the site and located at an elevation of 0.66m OD.

6.2.56 The underlying till (0404) was located at a depth of 5.4m BGL (-4.74m OD). This was overlain by a compact, dark bluish grey alluvial sand (0403) 2.15m thick, which was in turn overlain by a sticky light grey blue alluvial silt lay (0402) 0.95m thick. This trended into a desiccated upper alluvium (0401) 0.90m thick.

6.2.57 The alluvial sequence was sealed by the topsoil layer (0400) which was present to a depth of 0.4m BGL (0.26m OD).

6.2.58 The geophysical anomaly within the area of this test pit is likely to be due to deep layers of alluvium and does not represent a former oxbow lake, but again the wider edge of a pool or mire. No archaeological features were revealed within this test pit.

Test Pit 07 (5m x 5m, Plate 10)
Aim: As required, to investigate deposits in Trench 13 if anomaly is too deep to excavate by hand or machine.

6.2.59 Test Pit 07 was a square, stepped test pit located in the south-western corner of the site at an elevation of 0.7m OD. This test pit was completed prior to the change in methodology for the site and was excavated to a maximum depth of 3m BGL.

6.2.60 The underlying till (0704) was reached at of 2.6m BGL (-1.9m OD). This was overlain by a compact yellow brown silt clay (0703) 0.70m thick which trended into a compact, mid brownish grey clay (0702) which in turn was overlain by the upper desiccated alluvium (0701).

6.2.61 The alluvial sequence was sealed by a layer of topsoil (0700) which extended to a depth of 0.4m BGL (0.3m OD).

6.2.62 It is likely that the deep alluvial layers which blanket the area of the test pit are responsible for the geophysical anomaly which was identified. The till here is shallower than that recorded in TP12 indicating complex hydrological processes relating to the undulating sub-surface topography. No archaeological features were revealed within this test pit.

7 Deposit modelling

7.1 Updated model

7.1.1 The existing deposit model presented in the previous archaeological survey work (FAS 2019) was updated using both the GI and archaeological data detailed above (Figures 12 and 13). The model now encompasses the area to the west of that subject to archaeological evaluation and demonstrated variations in the sub-surface topography (Figure 12: blue representing low points, red representing high points). It is clear the surface of the underlying till is uneven which is likely to be due to differential weathering during the late Devensian and Early Holocene.

Proposed impacts

7.1.2 The proposed FAS impacts are shown in relation to the model as far as is possible with the information currently available for the scheme (Figure 13). These comprise shallow ponds (-0.20m OD), an embankment, the realignment of the Sutton Cross Drain (SCD) and two deep ponds (c 2-3m BGL). The impacts are shown in relation to the deposits in Figures 14-19. Transect A shows that the proposed Sutton Cross Drain will impact the peat deposit recorded in the northern part of the site but that the proposed wetland creation will only directly impact the upper oxidised alluvial deposits (Figure 14).

7.1.3 Transect B demonstrates that the large pond to the north of the site will directly impact the unoxidised alluvial deposits and possibly the edge of the peat (Figure 15).

7.1.4 The middle section of the proposed scheme encompassing ponds and the diverted SCD will impact the oxidised alluvial deposits and is only likely to encounter the peat deposit at the base (Figures 16 and 17). The level of oxidation in the upper alluvium here may be due to the changes in the underlying till, with thicker sand deposits present in combination with modern patterns of drainage.

7.1.5 The southern end of the scheme shows the wetland area will have a relatively shallow impact (Figure 18) but that the deep pond (Figure 19) will encounter the top of the sandy alluvium at the base of the sequence. Should there be any subtle variations in the till surface which the deposit model was unable to detect the proposed pond may also impact this deposit.

Geophysical anomalies

7.1.6 The supposition that the area investigated by Trenches 7 and 9 (Figure 2) represents a palaeochannel is not supported by the results of the modelling. This geophysical anomaly is merely another undulation in the till surface (Figure 13). This is also the case for the area identified as an oxbow (TP2 and 3). The hand auger cores carried out in this area did not record the presence of a peat deposit despite the depth of deposits at this location. The dewatering effects of the large Holderness Drain were evident in the compact and oxidised nature of the overlying alluvium with at least two cores unable to achieve full depth (Trench 7).

7.1.7 Instead of interpreting the area as a true 'river valley' of the Old Fleet it would perhaps be more helpful to regard it as an area of low relief which drains the surrounding high points in the till with additional inputs from localised springs. These low spots are likely to have held water for much of the Holocene allowing localised peat deposits to accumulate. These areas were then subsumed by a minerogenic sequence likely to have been driven by changes in sea level which led to the estuarine expansion of the

Humber. The fine-grained sand laminations recorded throughout the upper sequence of alluvium probably represents the effects of tidal inundation at the site.

7.1.8 The subsequent drainage and management of the area from the medieval period onwards has completely altered the early prehistoric character of the landscape, effectively smoothing out any topographic variations at the site which now, for the most part, lie deeply buried.

7.2 Previous palaeoenvironmental assessment

7.2.1 The palaeoenvironmental assessment already carried out at the site indicated that freshwater peat development was occurring within hollows in the till from at least the Neolithic and into the Early Bronze Age (FAS 2018). The pollen assemblage recorded from the peat demonstrated poor preservation, however indications of the surrounding vegetation were characterised as sedge, alder, lime and hazel, with the latter two species probably located on slightly higher and drier areas of the site. Also recorded within the peat were diatoms indicating a marine influence or possible inundation of the area. Marine diatoms were also recorded in the overlying alluvial silts and clays in addition to ostracod fragments.

7.2.2 The microfossil component of the deposits was assessed using the 'squash' test method and whilst this can provide valuable indications of presence/absence, full processing of samples for more detailed microscopy is likely to yield more informative results. In addition, the lack of identifiable macrofossils within the overlying silts makes dating these deposits problematic. The presence of sand laminations in the alluvium may, however, indicate that dating via OSL is possible.

8 Finds

8.1.1 A single find was recovered during the archaeological trial trench evaluation at Castle Hill, Bransholme, Hull. This comprised a large base fragment of a 18th-19th century dark green glass bottle. It was probably a kick-up base but not enough remains to be certain.

8.1.2 This item was recovered from the topsoil layer (1000) within Trench 01 and was not associated with any archaeological remains. No further work is necessary and discard is recommended.

9 Discussion and Conclusions

9.1 Overview of deposits

9.1.1 The trial trench evaluation carried out at the site has demonstrated thick alluvial cover to be present across the site. The exceptions to this were in the north-western corner of the site in the vicinity of Trench 4. No archaeological remains were recorded during the evaluation and it is likely that any such remains are buried at a significant depth below current ground level.

9.1.2 The altered methodology for the evaluation works allowed for the investigation of the alluvial sequence at the site which was dominated by minerogenic deposition. The lack of organic deposits at the site suggests that such deposits are localised accumulations within significant depressions in the till surface. The overlying silts were frequently laminated suggesting tidal influence at the site.

9.1.3 The geophysical anomalies identified in the north-western part of the site which were identified as possible paleochannels are likely to be expressions the sub-surface topography of the till and are not representative of an oxbow lake or palaeochannel.

9.2 Discussion of deposits

9.2.1 The underlying till was unable to be reached in the southern half of the site with a maximum depth of 5.8m BGL (-5.27m OD) achieved in Trench 8 (Figures 2 and 3). None of the test pits recorded the presence of the peat deposits seen in the previous phase of work (FAS 2018). The deposits directly overlying the till comprised either a smooth grey silt or, in areas of deeper sedimentation, a black sand which collapsed readily. This was then overlain by a frequently laminated alluvial sequence which demonstrated extensive oxidation at the top of the profile (Plate 9).

9.2.2 The laminations within the upper alluvium were composed of fine sands and had previously been suggested to indicate regular tidal inundation (FAS 2018). The lower, unoxidised portion of the sequence is likely to preserve microfossil remains (diatoms and ostracods). The previous rapid palaeoenvironmental assessment demonstrated good preservation of diatoms and ostracod remains, although these were not examined in detail. Such remains have the potential to elucidate valuable information regarding levels of salinity at the site as well as determining the presence of springs and other freshwater sources.

9.2.3 The undulations in the deeply buried till surface, as demonstrated by the deposit model, indicate that during late prehistory the site would have been characterised by more pronounced topographic variation than the present character of the site would suggest (Figure 12). The pollen assemblage, again only rapidly assessed, suggests that during the Neolithic-Early Bronze Age the drier areas of site were characterised by birch, lime and hazel woodland. The depressions in the till represented intermittent pools with fringing alder and sedge. This presents a classic wetland-dryland interface that has long been the focus of human activity particularly in the prehistoric period.

9.2.4 The pools represented by the peat deposits are likely to have been affected by seasonal changes in hydrology leading to cycles of wetting and drying which has had a detrimental effect on the preservation of the macrofossil assemblage. The pollen and diatoms were also affected to a certain extent, however only a full assessment of the samples will allow this to be understood. The diatoms in particular have the potential to allow a better understanding of the onset of minerogenic sedimentation at the site.

9.2.5 The changes in sea level from the Late Bronze Age onwards clearly resulted in increasing tidal influence at the site leading to minerogenic deposition. This process has led to a blanketing effect, creating a smoothed-out topographic profile of the landscape. What is not able to be demonstrated by the deposit model is the creek system which is likely to have characterised the site in the early historic period. These creeks are in part the precursor to the later Old Fleet drainage system (Shephard 1976). A simple model of inundation has been constructed previously for Holderness, demonstrating that the early stages of inundation may not have initially been perceptible with minimal changes to the landscape (Chapman and Lilie 2004). The rate of landscape change is likely to have increased where areas remained inundated for longer periods and large volumes of sediment were laid down. Essentially the early prehistoric landscape of the site lies deeply buried beneath this minerogenic sediment, apart from in areas of higher outcrops of till to the north of the site (Figure 12).

9.2.6 The level of desiccation recorded, particularly in proximity to the Holderness Drain, is likely to have had a detrimental effect on the palaeoenvironmental potential of the deposits. The lack of organic material suggests the area evaluated demarcates the limit of the organic deposits recorded to the west. However, the more deeply-buried elements of the minerogenic sequence have the potential to preserve microfossil remains which may help to better understand the nature and timing of the marine transgressions at the site. The presence of sand within the laminated deposits makes these potentially suitable for OSL dating thereby overcoming the issues of chronology highlighted in the previous stage of work and potentially understanding the timing of the change to minerogenic deposition. (FAS 2018).

9.2.7 The lack of archaeological remains in the area evaluated suggests that any evidence of human activity may be more deeply buried. Prospecting for such remains is notoriously difficult within deeply alluviated environments unless substantial impacts are proposed that allow for deep excavation.

9.3 Consideration of impacts

9.3.1 The impacts have been presented against the results of the deposit modelling (Figure 13). This has demonstrated that areas of deeper impact, for example the ponds and Sutton Cross Drain, are likely to encounter the underlying organic deposits and perhaps even the surface of the till (Figures 18 and 19). The previous rapid palaeoenvironmental assessment demonstrated good preservation of diatom and possibly ostracod remains in BH7a and BH8 located to the north and northeast of the proposed drain (Figure 13). A more detailed assessment of these deposits is required in order to better understand the significance of the sequence to be impacted by the scheme. The lack of organic remains within the deposits prevents the use of radiocarbon dating to establish a chronology and therefore OSL dating is recommended.

9.3.2 The shallow pond areas are unlikely to impact on sensitive deposits and are confined to the oxidised upper alluvium (Figures 15 and 16). This deposit has low paleoenvironmental and archaeological potential.

9.4 Consideration of aims

9.4.1 Despite the changes to the methodology, the evaluation and deposit modelling have met the aims and objectives by establishing that any archaeological remains in the area are likely to be deeply buried. No features associated with the motte and bailey castle to the north of the site were identified. In addition, no further peat deposits were recorded suggesting that these are confined to the western areas of the site.

9.4.2 The lack of a robust chronology in relation to the minerogenic alluvium prevents further comment regarding the significance of the deposits in relation to any specific time period. It is clear that these deposits contain valuable microfossil data relating to the inundation of the site and that further work is required in order to fully characterise this potential. Full assessment of the diatoms and ostracods within a chronological framework established with OSL could help to better understand the significance of the deposits. This is a key issue within the region where a lack of chronological resolution in the later prehistoric period has been highlighted (Roskams and Whyman 2007a, 23).

9.5 Conclusions

9.5.1 The evaluation and deposit modelling have demonstrated that although no archaeological remains were encountered, the site has the potential to include palaeoenvironmental data within the alluvial sequence. The extent of the direct impacts to the area (to the west of the proposed drain) from the scheme have been modelled and, in several locations, the underlying peat and possibly the till will be encountered. A full assessment of the microfossil assemblage and a chronological framework established using OSL dating could allow the significance of the deposits to be better understood in the areas to the west of the proposed drain.

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Appendix 1: Trench Logs

Trench 01					
Trench Dimensions (LxW)	50m x 1.8m	**Trench Alignment**	NE-SW	**Trench Depth**	1.2m
Context	**Type**	**Description**			**Depths Below Ground Level (BGL)**
(1000)	Layer	Topsoil layer.			0-0.14-0.2m
(1001)	Layer	Alluvial layer: friable, mid greyish brown clay, with lamination.			0.2-0.5m
(1002)	Layer	Alluvial layer: firm, mid reddish brown clay, with visible lamination.			0.5-1.2m (bottom of trench)
(1003)	Cut	Cut of ditch: cut of what was initially identified as a possible small linear ditch, but was found to be a seam within the natural layer (1002) upon investigation.			N/A
(1004)	Fill	Fill of ditch [1003]: fill of what was initially identified as a possible small linear ditch, but was found to be a seam within the natural layer (1002) upon investigation. The fill (1004) is actually part of the layer (1002).			N/A

Trench 02 (Test Pit)					
Trench Dimensions (LxW)	4m x 1.8m	**Trench Alignment**	E-W	**Trench Depth**	3.28m
Context	**Type**	**Description**			**Depths Below Ground Level (BGL)**
(2000)	Layer	Topsoil layer.			0-0.34m
(2001)	Layer	Alluvial layer: crumbly, mid greyish brown clay, with lamination.			0.34-2.1m
(2002)	Layer	Alluvial layer: sticky, dark bluish grey clay.			2.1-3.1m
(2003)	Layer	Natural till layer: compact, light bluish grey clay.			3.1-3.28m

Trench 03 (Test Pit)					
Trench Dimensions (LxW)	4m x 1.8m	**Trench Alignment**	E-W	**Trench Depth**	4.4m
Context	**Type**	**Description**			**Depths Below Ground Level (BGL)**
(3000)	Layer	Topsoil layer.			0-0.43m
(3001)	Layer	Alluvial layer: crumbly, mid greyish brown clay with lamination.			0.43-1.33m
(3002)	Layer	Alluvial layer: friable-sticky, mid brownish grey clay with lamination.			1.33-2.11m
(3003)	Layer	Alluvial layer: sticky, mid bluish grey clay.			2.11-2.78m

(3004)	Layer	Alluvial layer: sticky, mid greyish blue sandy clay.	2.78-4.29m
(3005)	Layer	Natural till layer: compact, dark greyish blue clay with moderate medium-large angular stones.	4.29-4.4m (bottom of trench)

Trench 04					
Trench Dimensions (LxW)	50m x 1.8m	**Trench Alignment**	NE-SW	**Trench Depth**	1.48m
Context	**Type**	**Description**			**Depths Below Ground Level (BGL)**
(4000)	Layer	Topsoil layer.			0-0.26m
(4001)	Layer	Alluvial layer: firm, mid brownish grey clay with lamination.			0.26-0.46m
(4002)	Layer	Alluvial layer: compact, mid brownish grey clay with lamination.			0.46-0.88m
(4003)	Layer	Alluvial layer: compact, mid grey clay with lamination.			0.88-1.2m
(4004)	Layer	Natural oxidised upper till layer: loose, light brownish grey clayey sand with moderate small-medium rounded stones.			0.58-1.05m
(4005)	Layer	Natural till layer: compact, mid reddish brown clay with moderate medium-very large rounded stones and cobbles and occasional lignite flecks.			1.04-1.48m (bottom of trench)

Trench 05 (Test Pit)					
Trench Dimensions (LxW)	4m x 1.8m	**Trench Alignment**	NW-SE	**Trench Depth**	4.85m
Context	**Type**	**Description**			**Depths Below Ground Level (BGL)**
(5000)	Layer	Topsoil layer.			0-0.35m
(5001)	Layer	Alluvial layer: crumbly, mid brownish grey clay with lamination.			0.35-0.8m
(5002)	Layer	Alluvial layer: crumbly, mid greyish brown clay with lamination.			0.8-2.3m
(5003)	Layer	Alluvial layer: sticky, mid bluish grey clay.			2.3-2.9m
(5004)	Layer	Natural oxidised upper till layer: soft-crumbly, light bluish green clayey sand with occasional medium wood fragments.			2.9-4.35m
(5005)	Layer	Natural till layer: compact, mid bluish grey clay.			4.35-4.85m (bottom of trench)

Trench 06					
Trench Dimensions (LxW)	50m x 1.8m	**Trench Alignment**	NW-SE	**Trench Depth**	1.4m

Context	Type	Description	Depths Below Ground Level (BGL)
(6000)	Layer	Topsoil layer.	0-0.2m
(6001)	Layer	Alluvial layer: compact, mid brownish grey silty clay with lamination and occasional lignite flecks.	0.2-0.38m
(6002)	Layer	Alluvial layer: compact, light orangish brown silty clay with lamination.	0.38-1.2m
(6003)	Layer	Alluvial layer: compact, mid brownish grey silty clay with occasional sand pockets.	1.2-1.40m
(6004)	Layer	Natural oxidised upper till layer: loose, mid yellowish brown silty sand with rare large rounded stones.	1.40m

Trench 07					
Trench Dimensions (LxW)	50m x 1.8m	**Trench Alignment**	E-W	**Trench Depth**	1.31m
Context	**Type**	**Description**			**Depths Below Ground Level (BGL)**
(7000)	Layer	Topsoil layer.			0-0.18m
(7001)	Layer	Alluvial layer: compact mid greyish brown silty clay with lamination.			0.18-0.76m
(7002)	Layer	Alluvial layer: compact, mid orangish brown silty clay with lamination.			0.76-1.31m
(7003)	Layer	Alluvial layer: compact, mid bluish grey silty clay with occasional orange clay pockets.			0.34-1m
(7004)	Layer	Alluvial layer: compact, mid greyish brown silty clay.			Unknown

Trench 08 (Test Pit)					
Trench Dimensions (LxW)	4m x 1.8m	**Trench Alignment**	NE-SW	**Trench Depth**	5.8m
Context	**Type**	**Description**			**Depths Below Ground Level (BGL)**
(8000)	Layer	Topsoil layer.			0-0.4m
(8001)	Layer	Alluvial layer: crumbly, mid greyish brown clay with lamination.			0.4-1m
(8002)	Layer	Alluvial layer: sticky, mid brownish grey clay.			1-1.82m
(8003)	Layer	Alluvial layer: sticky-wet, dark bluish grey sandy clay.			1.82-3.95m
(8004)	Layer	Alluvial layer: sticky-wet, dark bluish black clayey sand.			3.95-5.8m

Trench 09					
Trench Dimensions (LxW)	50m x 1.8m	**Trench Alignment**	E-W	**Trench Depth**	1.2m
Context	**Type**	**Description**			**Depths Below Ground Level (BGL)**
(9000)	Layer	Topsoil layer.			0-0.24m
(9001)	Layer	Alluvial layer: firm, mid brownish grey clay.			0.24m-0.62
(9002)	Layer	Alluvial layer: firm, mid greyish brown clay with moderate-frequent sand lenses.			0.62-1.22m
(9003)	Layer	Alluvial layer: firm, mid yellowish brown sandy clay.			Unknown

Trench 10 (Test Pit)					
Trench Dimensions (LxW)	4m x 1.8m	**Trench Alignment**	N-S	**Trench Depth**	2.72m
Context	**Type**	**Description**			**Depths Below Ground Level (BGL)**
(1010)	Layer	Topsoil layer.			0-0.35m
(1011)	Layer	Alluvial layer: crumbly, mid greyish brown clay with lamination.			0.35-1.9m
(1012)	Layer	Alluvial layer: sticky, dark-mid bluish grey clay			1.9-2.6m
(1013)	Layer	Natural till layer: compact, mid bluish grey clay with frequent medium-very large sub-angular stones			2.6-2.72m

Trench 11 (Test Pit)					
Trench Dimensions (LxW)	4m x 1.8m	**Trench Alignment**	N-S	**Trench Depth**	4.6m (collapsed at base)
Context	**Type**	**Description**			**Depths Below Ground Level (BGL)**
(1101)	Layer	Topsoil layer.			0-0.32m
(1102)	Layer	Alluvial layer: crumbly, mid greyish brown clay with lamination.			0.32-1.13m
(1103)	Layer	Alluvial layer: sticky, light bluish grey clay.			1.13-1.77m
(1104)	Layer	Alluvial layer: loose-wet, mid bluish grey sand.			1.77-2.94m
(1105)	Layer	Alluvial layer: loose-wet, dark bluish black sand.			2.94-4.6m

Trench 12 (Test Pit)					
Trench Dimensions	4m x 1.8m	**Trench Alignment**	NW-SE	**Trench Depth**	5.1m

(LxW)					
Context	**Type**	**Description**			**Depths Below Ground Level (BGL)**
(1200)	Layer	Topsoil layer.			0-0.4m
(1201)	Layer	Alluvial layer: crumbly, mid greyish brown clay with lamination.			0.4-2.04m
(1202)	Layer	Alluvial layer: firm, light bluish grey clay.			2.04-2.3m
(1203)	Layer	Alluvial layer: sticky, mid bluish grey clay.			2.3-3.9m
(1204)	Layer	Alluvial layer: sticky, dark bluish grey clay.			3.9-4.9m
(1205)	Layer	Natural till layer: firm, light bluish grey clay.			Unknown

Trench 13					
Trench Dimensions (LxW)	50m x 1.8m	**Trench Alignment**	NE-SW	**Trench Depth**	1.3m
Context	**Type**	**Description**			**Depths Below Ground Level (BGL)**
(1300)	Layer	Topsoil layer.			0-0.36m
(1301)	Layer	Alluvial layer: compact, mid brownish grey silty clay with lamination.			0.36-0.82m
(1302)	Layer	Alluvial layer: compact, mid orangish brown silty clay.			0.82-1.21m
(1303)	Layer	Alluvial layer: compact, mid bluish grey silty clay with lamination and sand pockets.			0.2-1.3m
(1304)	Layer	Alluvial layer: compact, mid brownish grey clay with occasional sand pockets.			Unknown
(1305)	Layer	Natural oxidized upper till layer: compact, mid yellowish brown sand with occasional large stones.			Unknown

Trench 14 (Test Pit)					
Trench Dimensions (LxW)	4m x 1.8m	**Trench Alignment**	N-S	**Trench Depth**	2.6m
Context	**Type**	**Description**			**Depths Below Ground Level (BGL)**
(1400)	Layer	Topsoil layer.			0-0.4m
(1401)	Layer	Alluvial layer: crumbly, mid greyish brown clay with lamination			0.4-1.85m
(1402)	Layer	Alluvial layer: sticky, mid bluish grey clay.			1.85-2.25m
(1403)	Layer	Natural till layer: compact, mid brownish grey clay with moderate medium- very large sub-angular stones.			2.25-2.6m

Test Pit 02					
Trench Dimensions (LxW)	5m x 5m	**Trench Alignment**	N/A	**Trench Depth**	3m
Context	**Type**	**Description**			**Depths Below Ground Level (BGL)**
(0200)	Layer	Topsoil layer.			0-0.4m
(0201)	Layer	Alluvial layer: crumbly, mid greyish brown clay with lamination.			0.4-1.3m
(0202)	Layer	Alluvial layer: sticky, mid orangish brown clay.			1.3-1.9m
(0203)	Layer	Alluvial layer: sticky, mid bluish grey clay.			1.9-3m

Test Pit 04					
Trench Dimensions (LxW)	50m x 1.8m	**Trench Alignment**	E-W	**Trench Depth**	5.4m
Context	**Type**	**Description**			**Depths Below Ground Level (BGL)**
(0400)	Layer	Topsoil layer.			0-0.4m
(0401)	Layer	Alluvial layer: crumbly, mid greyish brown clay with lamination.			0.4-2.3m
(0402)	Layer	Alluvial layer: sticky, light bluish grey clay.			2.3-3.25m
(0403)	Layer	Alluvial layer: compact, dark bluish grey sand.			3.25-5.4m
(0404)	Layer	Natural oxidized upper till layer: compact, mid grey sand.			Unknown

Test Pit 07					
Trench Dimensions (LxW)	5m x 5m	**Trench Alignment**	N/A	**Trench Depth**	3m
Context	**Type**	**Description**			**Depths Below Ground Level (BGL)**
(0700)	Layer	Topsoil layer.			0.4m
(0701)	Layer	Alluvial layer: crumbly, mid greyish brown clay with lamination.			0.4-1.2m
(0702)	Layer	Alluvial layer: compact, mid brownish grey clay.			1.2-1.9m
(0703)	Layer	Alluvial layer: compact, mid brownish yellow clay.			1.9-2.6m
(0704)	Layer	Natural till layer: compact, mid bluish grey clay.			2.6-3m

Appendix 2: Plates

Plate 1: South-east facing section of [1003] (1004) which was found to be a geological seam. Scale: 1 x 1m.

Plate 2: East facing section Trench 03. Scale: 1 x 1m.

Plate 3: South-east facing Representative Section Trench 04. Scale: 1 x 1m.

Plate 4: South-east facing section of Trench 05. Scale: 1 x 1m.

Plate 5: Plan view of Trench 07. Scale: 2 x 1m.

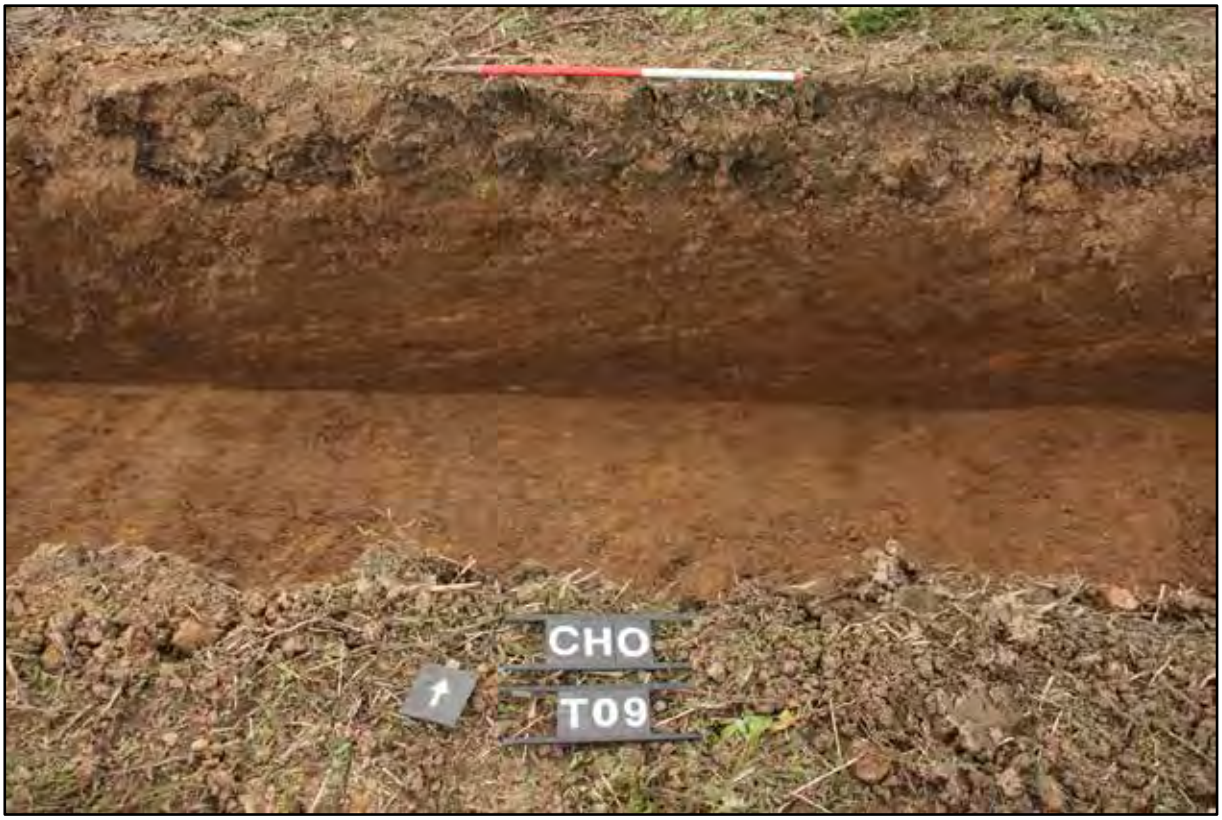


Plate 6: South facing Representative Section Trench 09. Scale: 1 x 1m.

Plate 7: South facing section Trench 10. Scale: 1 x 1m.

Plate 8: South facing section of Trench 12. Scale: 1 x 1m.

Plate 9: South facing section of Test Pit 02. Scale: 2 x 1m & 1 x 2m.

Plate 10: South facing section of Test Pit 07. Scale: 2 x 1m & 1 x 2m.

Appendix 3: Index of Archive and Arrangements for Deposition

Field Records	***Description***	***Number***
Trench record sheets	Register of context numbers and descriptions	17
Context sheets	Record of features and deposits	85
Photo record sheet	Record of photographs taken	2
Digital photographs	All views	208
Site drawings	Section drawings	13
Documents	*Description*	*Number*
Written scheme of investigation	Statement of the aims, objectives and methodology for the project.	1
Health & Safety	Safe working statement & risk assessment.	1
Report to client	Report of findings of the evaluation and watching brief.	1
Find	Description	Number
Artefact	Glass bottle base	1

The site archive is currently held at the offices of Trent & Peak Archaeology, Unit 1, Holly Lane, Chilwell, Nottingham, NG9 4AB. It will be deposited with the relevant repository upon completion of the project.

Appendix 4: Core logs and Troels-Smith table

Trench 9

Core 1

0-1.30m	Oxidised alluvium removed by machine				
1.30-2.25m	DA	ST	EL	SICC	UB
	2	3	0	4	/
	Ag2 Ag2 Ga+				
	Laminated oxidised silt clay, fine sand laminations				
2.25-4.80m	DA	ST	EL	SICC	UB
	2/3	2	0	3	1
	Ag2 Ag2 Ga+				
	Laminated grey brown silt clay, fine sand laminations, refusal at base				

Core 2

0-1.30m	Oxidised alluvium removed by machine				
1.30-2.30m	DA	ST	EL	SICC	UB
	2	3	0	4	/
	Ag2 Ag2 Ga+				
	Laminated oxidised silt clay, fine sand laminations				
2.25-4.50m	DA	ST	EL	SICC	UB
	2/3	2	0	3	1
	Ag2 Ag2 Ga+				
	Laminated grey brown silt clay, fine sand laminations, laminations thicker at base				
4.50-4.65m	DA	ST	EL	SICC	UB
	3	0	0	3	1
	Ag2 Ag2				
	Soft grey brown smooth silt, refusal at base				

Core 3

0-1.30m	Oxidised alluvium removed by machine

1.30-2.50m	DA	ST	EL	SICC	UB
	2	3	0	4	/
	Ag2 Ag2 Ga+				
	Laminated oxidised silt clay, fine sand laminations, mineralised root channels				
2.50-4.50m	DA	ST	EL	SICC	UB
	2/3	2	0	3	1
	Ag2 Ag2 Ga+				
	Laminated grey brown silt clay, fine sand laminations, water strike at base, refusal				

Core 4

0-1.30m	Oxidised alluvium removed by machine				
1.30-2.50m	DA	ST	EL	SICC	UB
	2	3	0	4	/
	Ag2 Ag2 Ga+ Gmaj				
	Laminated oxidised silt clay, fine sand laminations, occasional gravel				
2.50-3.50m	DA	ST	EL	SICC	UB
	2/3	2	0	4	1
	Ag2 Ag2 Ga+				
	Laminated grey brown silt clay, fine sand laminations, too dry to core further				

Trench 7

Core 5

0-1.20m	Oxidised alluvium removed by machine				
1.20-2.70m	DA	ST	EL	SICC	UB
	2	3	0	4	/
	Ag2 Ag2 Ga+				
	Laminated oxidised silt clay, fine sand laminations, extremely dry and compact				
2.70-3.80m	DA	ST	EL	SICC	UB
	2/3	2	0	3	1
	Ag2 Ag2 Ga+				

Laminated pale grey brown silt clay, thick silt laminations, very dry and sandy at base

Core 6

0-1.20m	Oxidised alluvium removed by machine				
1.20-2.50m	DA	ST	EL	SICC	UB
	2	3	0	4	/
	Ag2 Ag2 Ga+				
	Laminated oxidised silt clay, fine sand laminations, very dry				
2.50-2.70m	DA	ST	EL	SICC	UB
	2/3	2	0	3	1
	Ag2 Ag2 Ga+				
	Laminated grey brown silt clay, occasional fine sand laminations,				
2.70-2.90m	Till, soft gravelly sandy clay with chalk fragments				

Core 7

0-1.20m	Oxidised alluvium removed by machine				
1.20-2.50m	DA	ST	EL	SICC	UB
	2	3	0	4	/
	Ag2 Ag2 Ga+				
	Laminated oxidised silt clay, fine sand laminations, very dry				
2.50-2.70m	DA	ST	EL	SICC	UB
	2/3	2	0	3	1
	Ag2 Ag2 Ga+				
	Laminated grey brown silt clay, occasional fine sand laminations,				
2.70-2.90m	Till, soft gravelly sandy clay with chalk fragments				

Darkness	
nig.4	black
nig.3	
nig.2	
nig.1	
nig.0	white

Degree of Stratification	
strf.4	well stratified
strf.3	
strf.2	
strf.1	
strf.0	no stratification

Degree of Elasticity	
elas.4	very elastic
elas.3	
elas.2	
elas.1	
elas.0	no elasticity

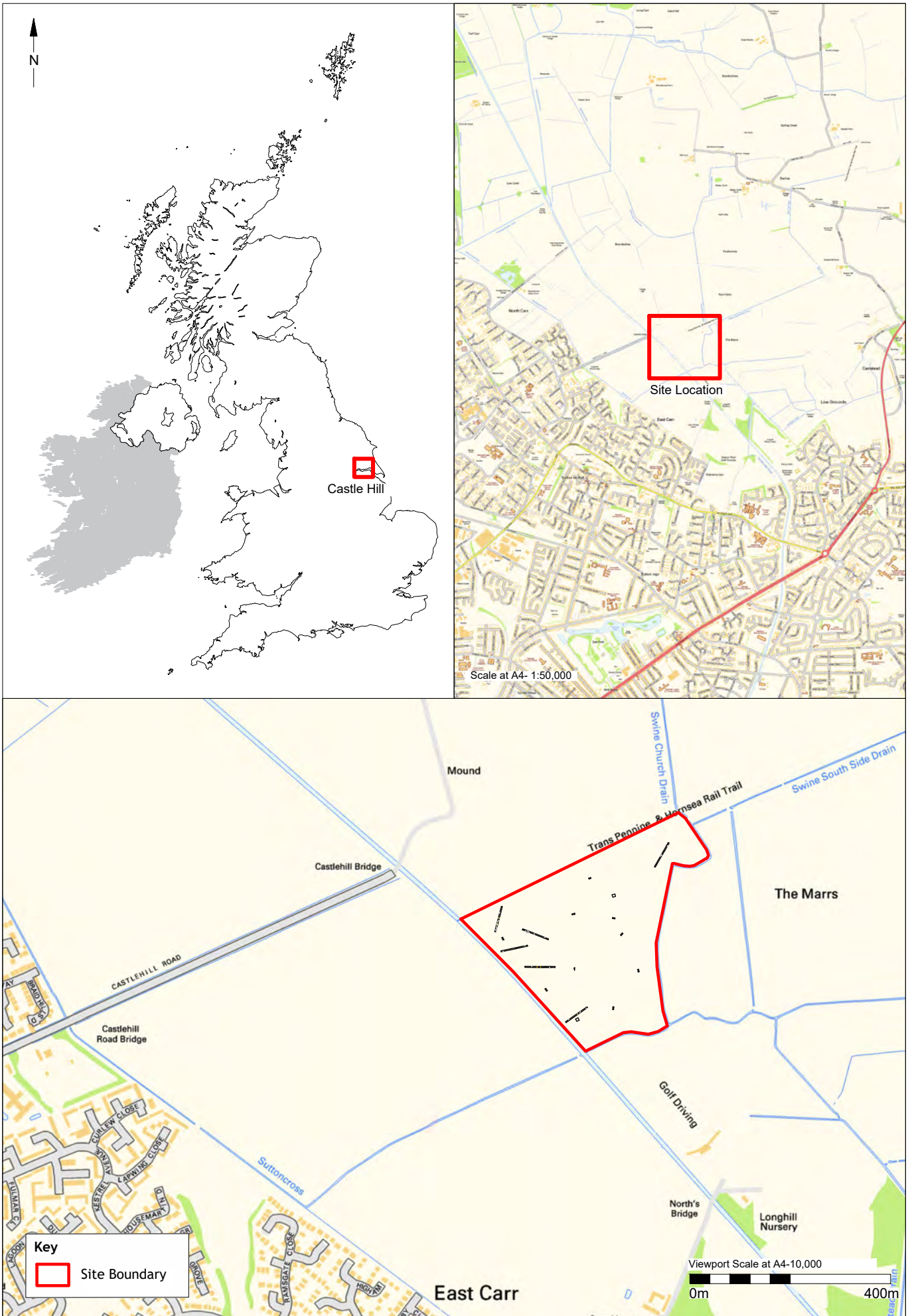
Degree of Dryness	
sicc.4	very dry
sicc.3	
sicc.2	
sicc.1	
sicc.0	water

	Sharpness of Upper Boundary
lim.4	< 0.5mm
lim.3	< 1.0 & > 0.5mm
lim.2	< 2.0 & > 1.0mm
lim.1	< 10.0 & > 2.0mm
lim.0	> 10.0mm

	Sh	*Substantia humosa*	Humous substance, homogeneous microscopic structure
I Turfa	*Tb*	*T. bryophytica*	Mosses +/- humous substance
	Tl	*T. lignosa*	Stumps, roots, intertwined rootlets, of ligneous plants
	Th	*T. herbacea*	Roots, intertwined rootlets, rhizomes of herbaceous plants
II Detritus	*Dl*	*D. lignosus*	Fragments of ligneous plants >2mm
	Dh	*D. herbosus*	Fragments of herbaceous plants >2mm
	Dg	*D. granosus*	Fragments of ligneous and herbaceous plants <2mm >0.1mm
III Limus	*Lf*	*L. ferrugineus*	Rust, non-hardened. Particles <0.1mm
IV Argilla	*As*	*A.steatodes*	Particles of clay
	Ag	*A. granosa*	Particles of silt
V Grana	*Ga*	*G. arenosa*	Mineral particles 0.6 to 0.2mm
	Gs	*G. saburralia*	Mineral particles 2.0 to 0.6mm
	Gg(min)	*G. glareosa minora*	Mineral particles 6.0 to 2.0mm
	Gg(maj)	*G. glareosa majora*	Mineral particles 20.0 to 6.0mm
	Ptm	*Particulae testae molloscorum*	Fragments of calcareous shells

Physical and sedimentary properties of deposits according to Troels-Smith (1955)

Appendix 5: Figures



Trent & Peak ARCHAEOLOGY

Figure 01 - Site Location
CHO - Castle Hill

Scale at A4 - 1:Various
Drawn by MV

Trench 04
Test Pit 02
Test Pit 03
Test Pit 04
Trench 06
Test Pit 08
Test Pit 05
Trench 07
Swine Drain
SD
Trench 09
Test Pit 10
Test Pit 11
Test Pit 12
Def
Test Pit 14
Trench 13
Test Pit 07
0
100m

Trent & Peak ARCHAEOLOGY

Figure 02 - Geophysics Site Plan 1/2
CHO - Castle Hill

Scale at A3 - 1:1,000
Drawn by MV

Trench 01

Trench 02

Test Pit 02

Test Pit 03

Test Pit 04

Trench 06

Test Pit 08

Trench 07

Test Pit 07

Swine Drain

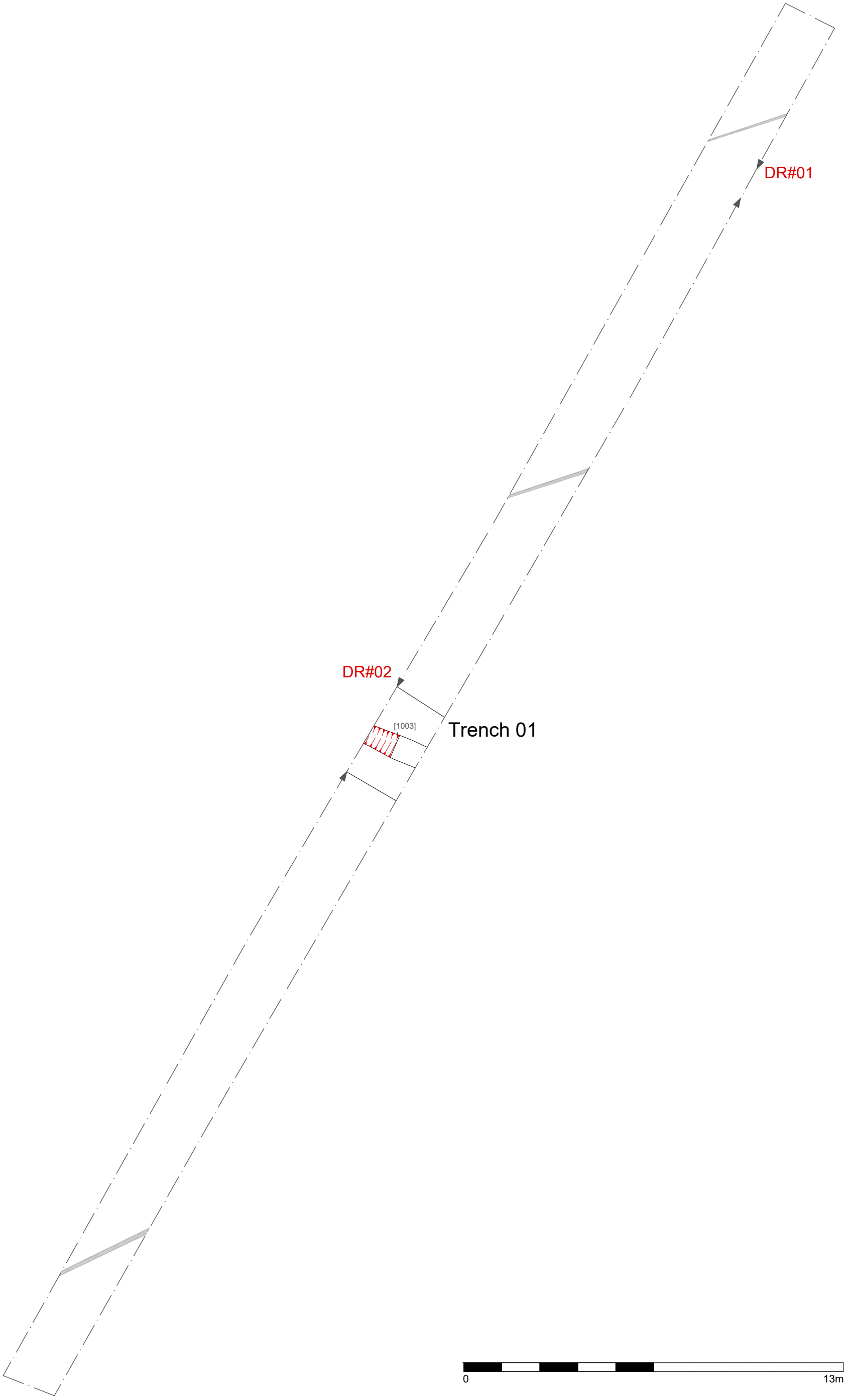
0

100m

Figure 03 - Geophysics Site Plan 2/2
CHO - Castle Hill

Trent & Peak ARCHAEOLOGY

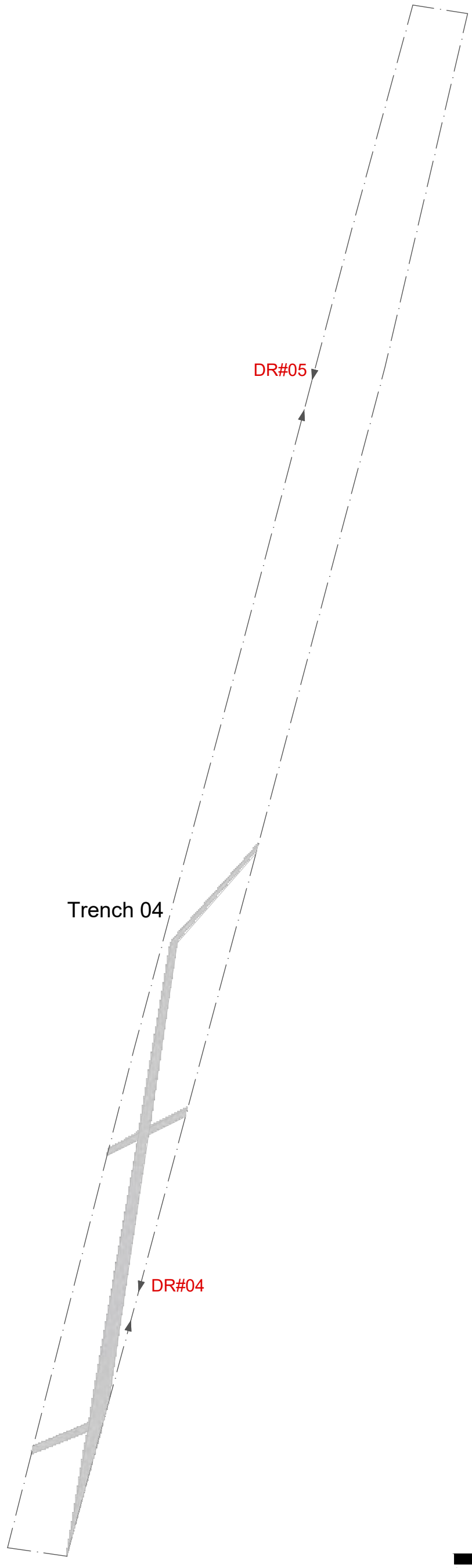
Scale at A3 - 1:1,000
Drawn by MV



Trent & Peak ARCHAEOLOGY

Figure 04 - Plan of Trench 01
CHO - Castle Hill

Scale at A3 - 1:133
Drawn by MV



Key

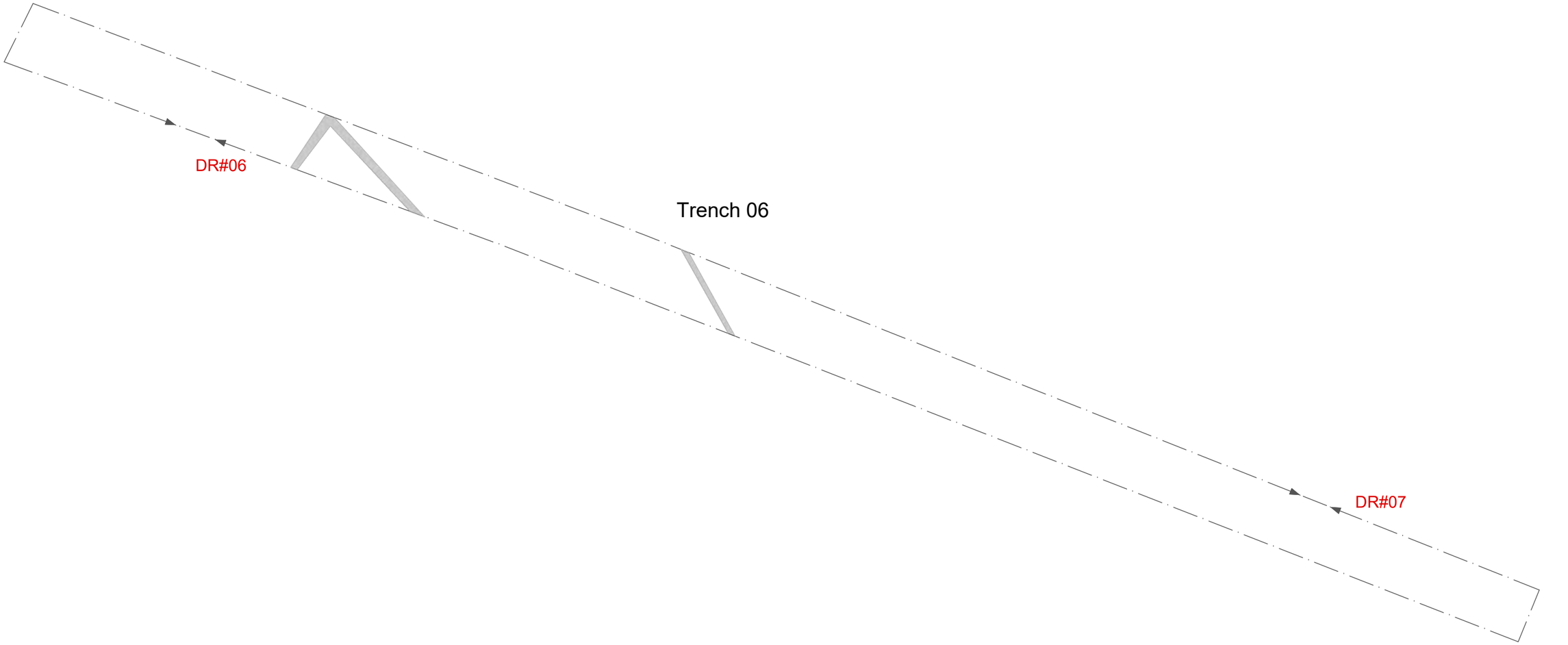
Field Drain

0 14m

Trent & Peak ARCHAEOLOGY

Figure 05 - Plan of Trench 04
CHO - Castle Hill

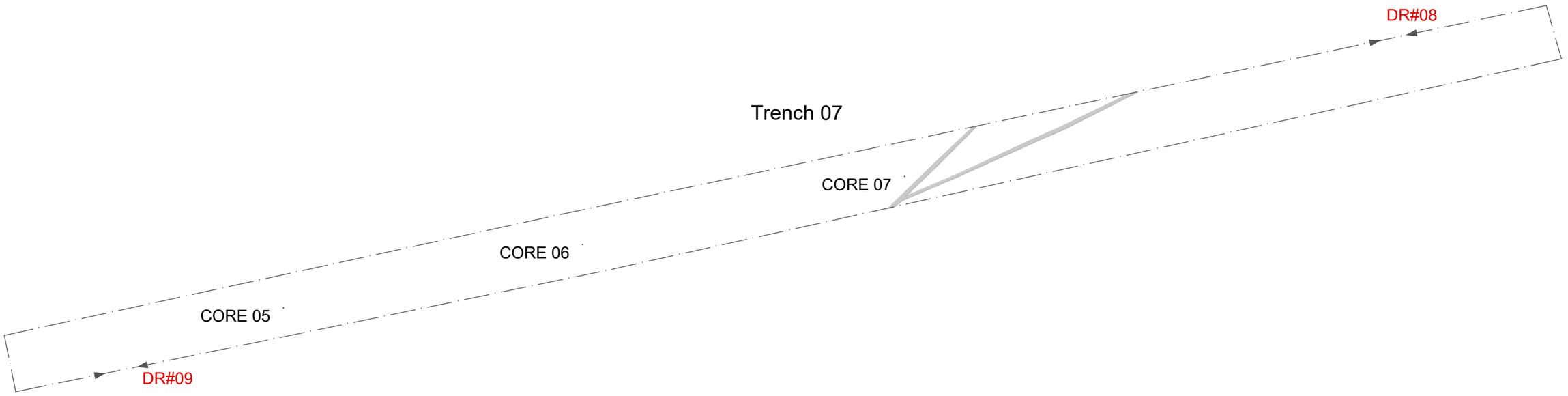
Scale at A3 - 1:142
Drawn by MV



Trent & Peak ARCHAEOLOGY

Figure 06 - Plan of Trench 06
CHO - Castle Hill

Scale at A3 - 1:142
Drawn by MV



Key

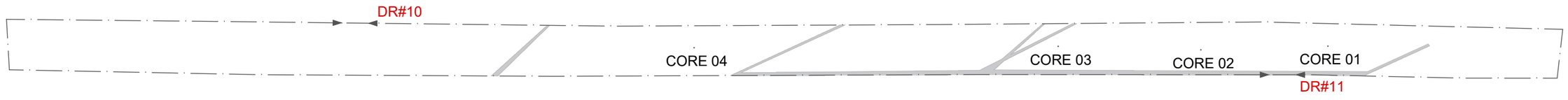
Field Drain

0 14m

Trent & Peak ARCHAEOLOGY

Figure 07 - Plan of Trench 07
CHO - Castle Hill

Scale at A3 - 1:142
Drawn by MV



Trench 09

Key

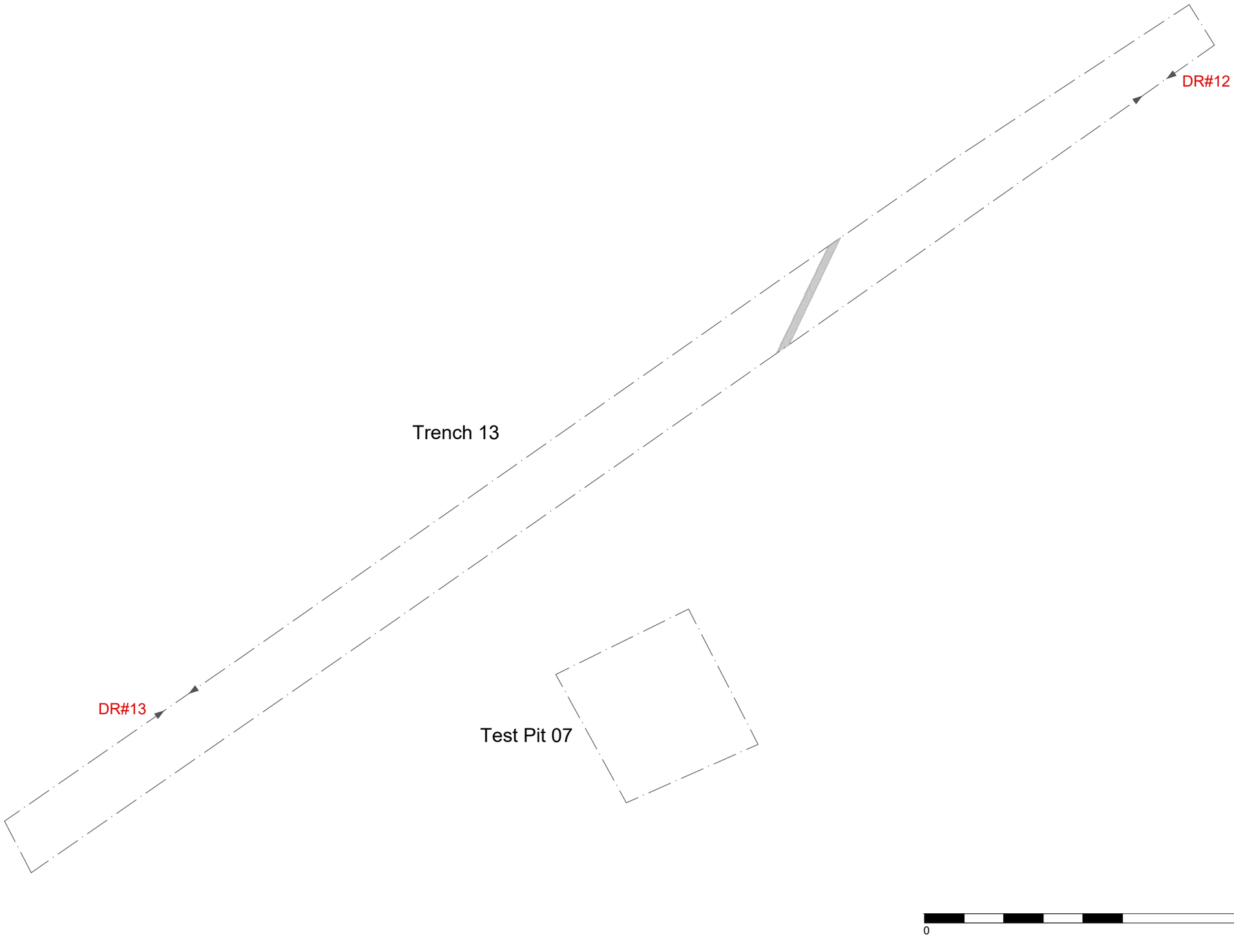
Field Drain

0 16m

Trent & Peak ARCHAEOLOGY

Figure 08 - Plan of Trench 09
CHO - Castle Hill

Scale at A3 - 1:166
Drawn by MV

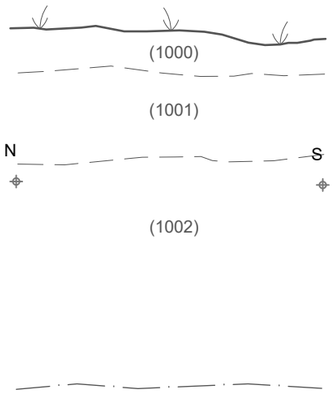


Trent & Peak ARCHAEOLOGY

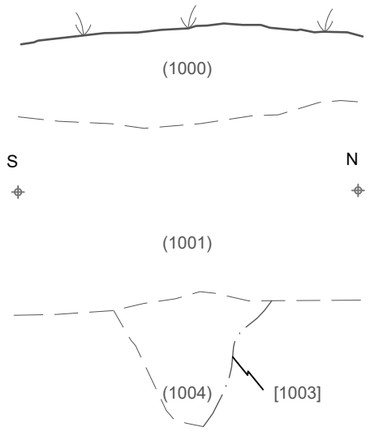
Figure 09 - Plan of Trench 13
CHO - Castle Hill

Scale at A3 - 1:142
Drawn by MV

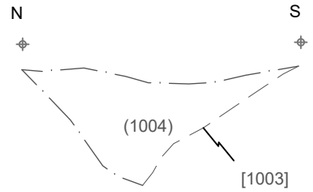
DR#01
West Representation Section of Trench 01



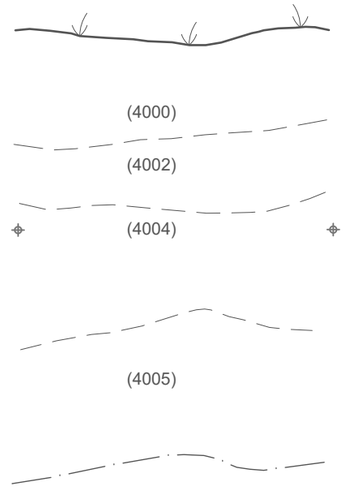
DR#02
East Representation Section Trench 01



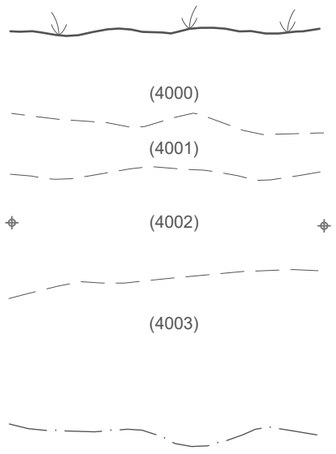
DR#03
West Section of Ditch



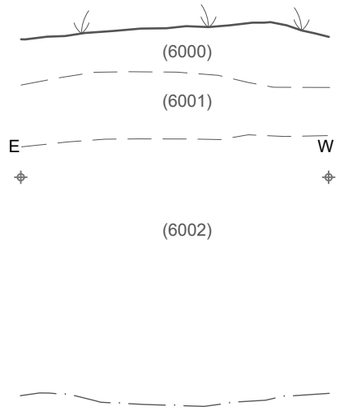
DR#04
East Representation Section Trench 04



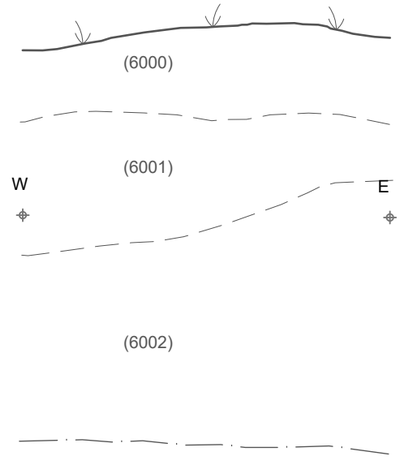
DR#05
West Representation Section Trench 04



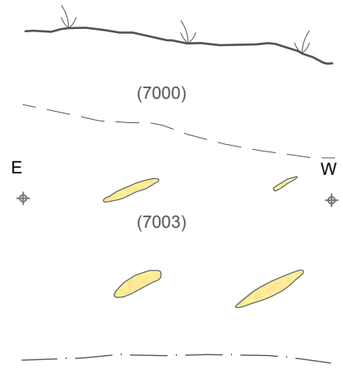
DR#06
North West Representation Section Trench 06



DR#07
South East Representation Section Trench 06



DR#08
North Representation Section Trench 07



Key
Sand Lenses

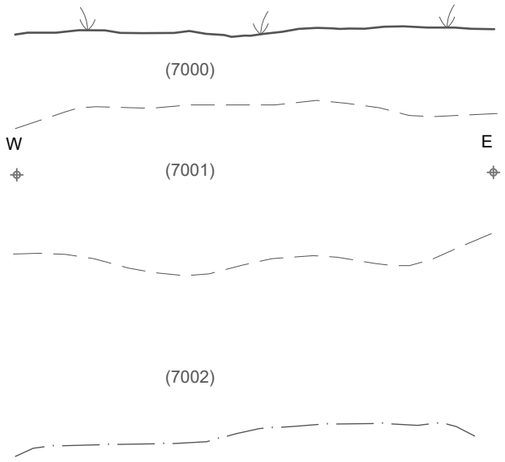
0 2m

Trent & Peak ARCHAEOLOGY

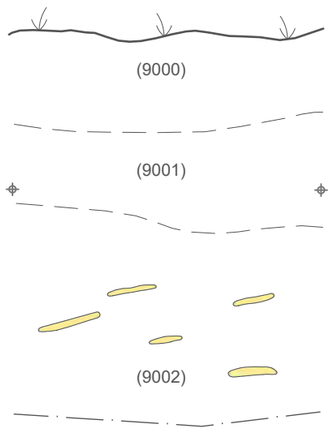
Figure 10 - Section Drawings 01-08
CHO - Castle Hill

Scale at A3 - 1:20
Drawn by MV

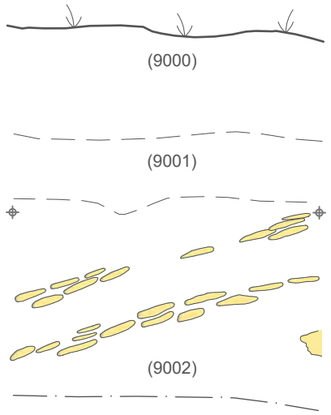
DR#09
South Representation Section Trench 07



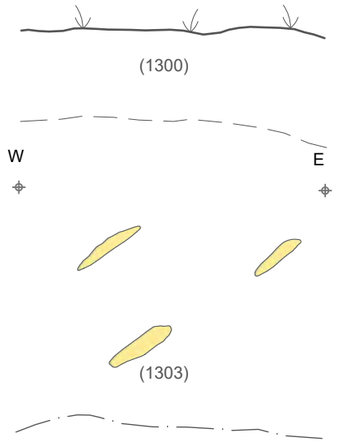
DR#10
North West Representation Section of Trench 09



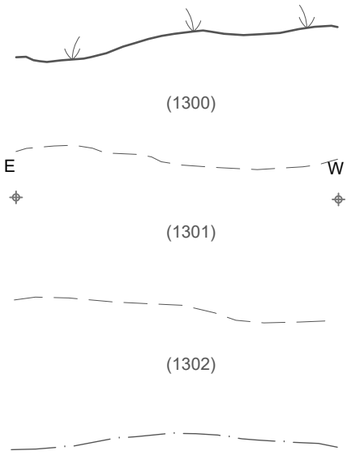
DR#11
South East Representation Section Trench 09



DR#12
North Representation Section Trench 13



DR#13
South Representation Section Trench 13



Key
Sand Lenses

0 2m

Trent & Peak ARCHAEOLOGY

Figure 11 - Section Drawings 09-13
CHO - Castle Hill

Scale at A3 - 1:20
Drawn by MV

N

Till Not Reached In This Area

0 50 100 150 m

0 100 200 300 400 500 m

- Site Boundary
- Modelled Till Surface Boundary
- TPA Evaluation Area
- TPA Interventions
- TPA Auger Cores
- SI Boreholes (~10m BGL)
- SI Window Samples (~5m BGL)
- SI Test Pits (~3-4m BGL)

LIDAR 0.50m DSM	Elevation of Devensian Till
-2.0m OD	-8.51m OD
-0.25m OD	-4.75m OD
1.50m OD	-1.00m OD
3.25m OD	2.75m OD
5.0+ m OD	6.51m OD

Trent & Peak ARCHAEOLOGY

Figure 12 - Location of SI (Site Investigation) and Archaeological Interventions and Modelled Till Surface
Site Code: CHO

Scale at A3 - 1:7000; Inset 1:5000
Drawn by: TK

N

A
B
A'
B'
C
C'
D
D'
E
E'
F
F'

Site Boundary
Modelled Till Surface Boundary
Proposed Realigned SCD
Proposed Wetland Areas
Cross Sections (Figures 14-19)

LIDAR 0.50m DSM
-2.0m OD
-0.25m OD
1.50m OD
3.25m OD
5.0+ m OD

Elevation of Devensian Till
-8.51m OD
-4.75m OD
-1.00m OD
2.75m OD
6.51m OD

0 100 200 300 400 500 m

Trent & Peak ARCHAEOLOGY

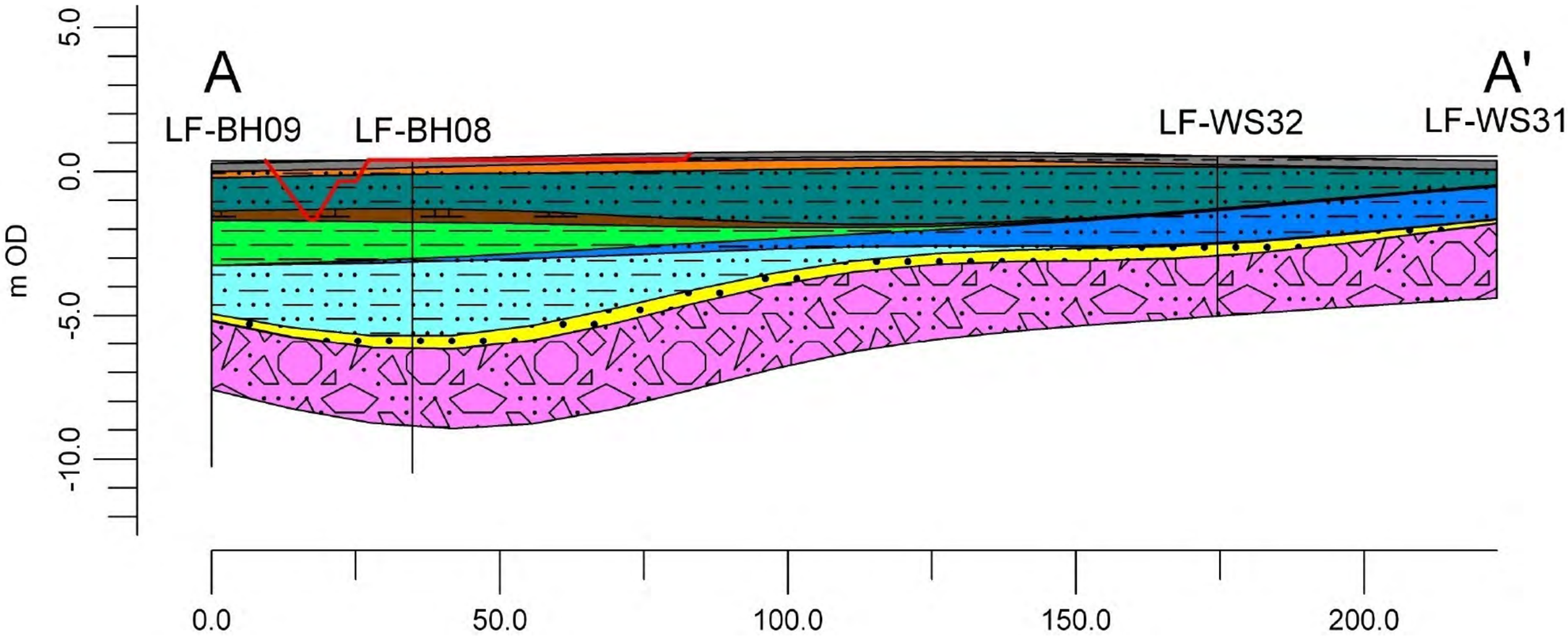
Figure 13 - Proposed Below Ground Impacts In Relation To Modelled Elevation Of Devensian Till Surface
Site Code: CHO

Scale at A3 - 1:5000
Drawn by: TK

Proposed Realigned SCD
Proposed Wetland Areas
Proposed Embankment
Cross Sections

Lithostratigraphy

- Ploughsoil
- Oxidised alluvium
- Alluvium
- Peat
- Clay alluvium
- Silty/sandy alluvium
- Clay silt
- Sand
- Coarse Sand and gravel
- Till

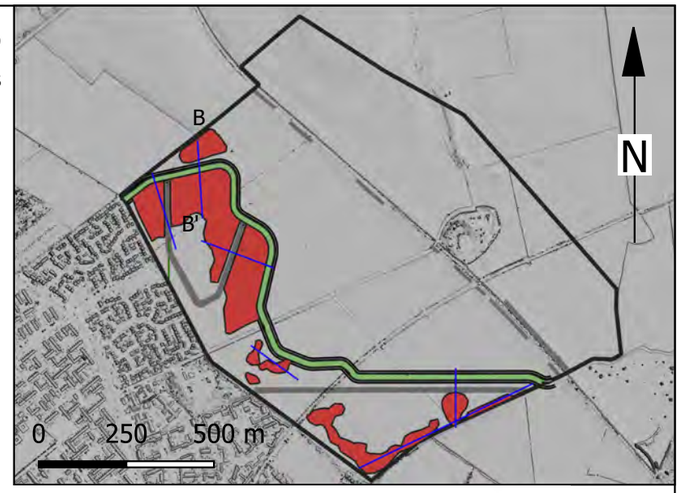


Below Ground Level Impacts

Figure 14 - Cross Section A-A' Showing Indicative Below Ground Level Impacts In Relation To Sub-Surface Modelled Deposits. VE:5.00
Site Code: CHO

Scale of inset at A3 - 1:1750
Drawn by: TK

Proposed Realigned SCD
Proposed Wetland Areas
Proposed Embankment
Cross Sections



Lithostratigraphy

- Ploughsoil
- Oxidised alluvium
- Alluvium
- Peat
- Clay alluvium
- Silty/sandy alluvium
- Clay silt
- Sand
- Coarse Sand and gravel
- Till

Below Ground Level Impacts

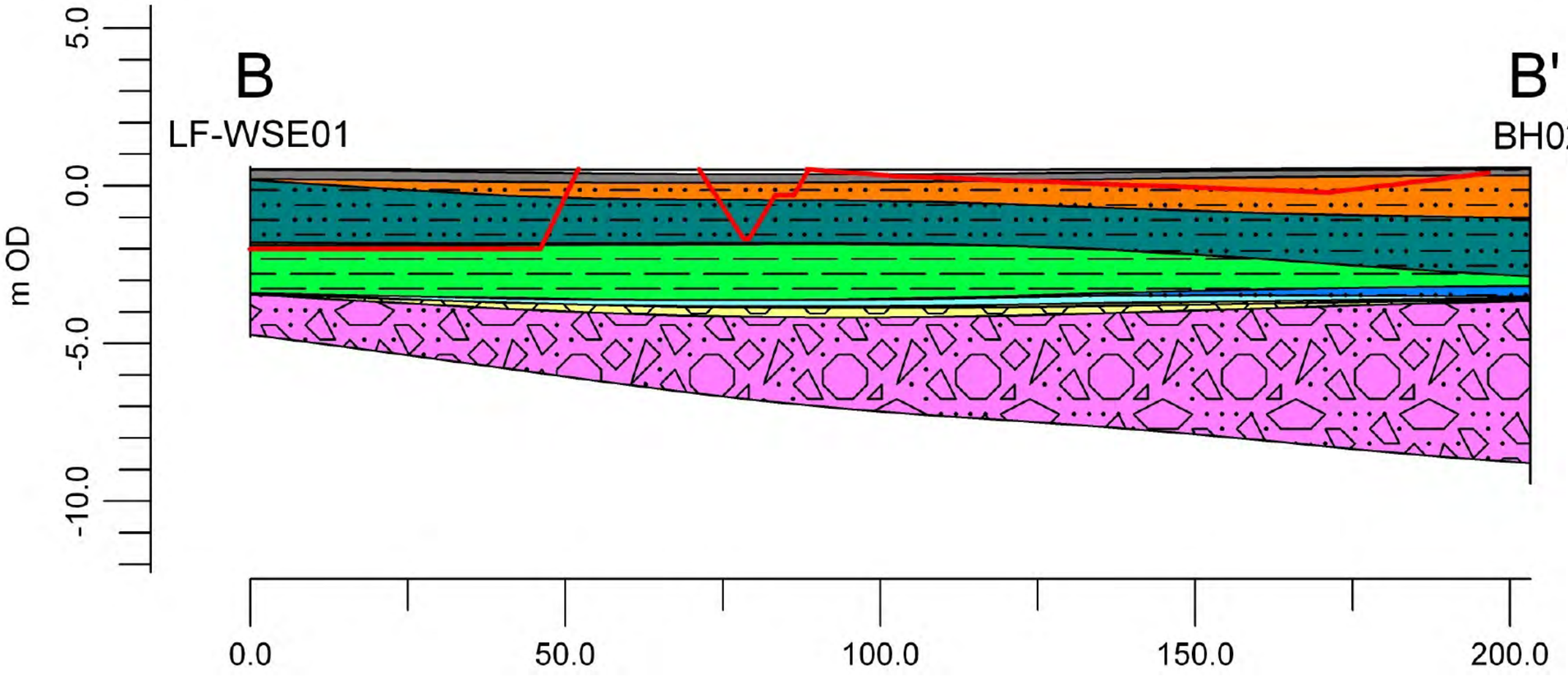


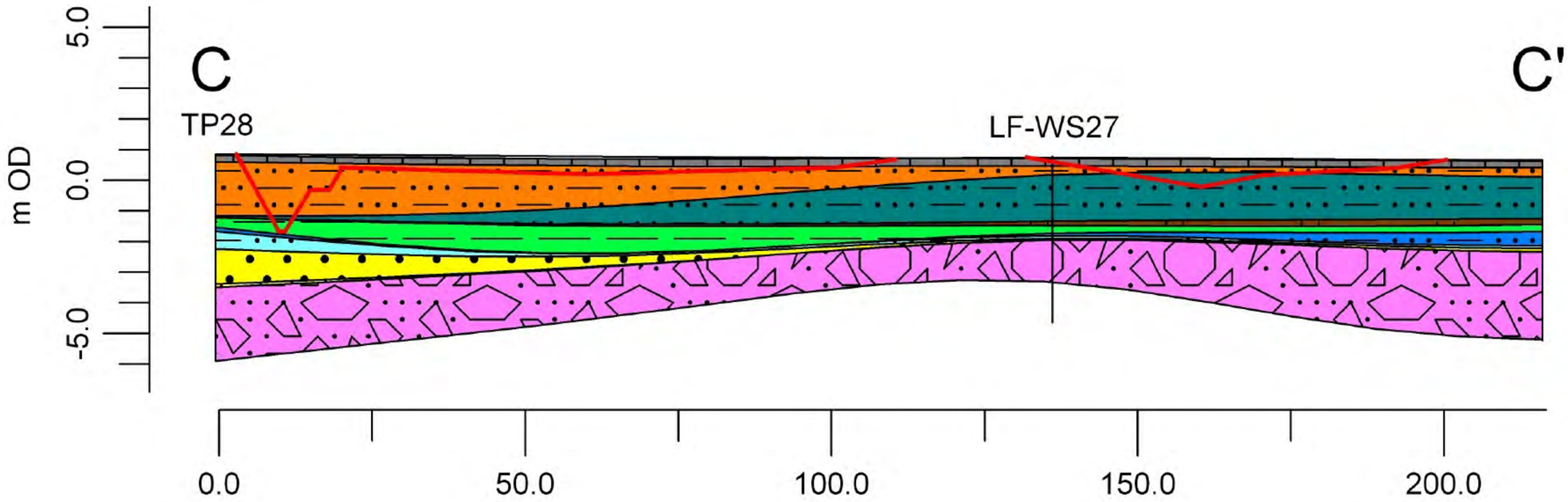
Figure 15 - Cross Section B-B' Showing Indicative Below Ground Level Impacts In Relation To Sub-Surface Modelled Deposits. VE:5.00
Site Code: CHO

Scale of inset at A3 - 1:17500
Drawn by: TK

Proposed Realigned SCD
Proposed Wetland Areas
Proposed Embankment
Cross Sections

Lithostratigraphy

- Ploughsoil
- Oxidised alluvium
- Alluvium
- Peat
- Clay alluvium
- Silty/sandy alluvium
- Clay silt
- Sand
- Coarse Sand and gravel
- Till



Below Ground Level Impacts

Figure 16 - Cross Section C-C' Showing Indicative Below Ground Level Impacts In Relation To Sub-Surface Modelled Deposits. VE:5.00
Site Code: CHO

Scale of inset at A3 - 1:17500
Drawn by: TK

Proposed Realigned SCD
Proposed Wetland Areas
Proposed Embankment
Cross Sections

Lithostratigraphy

- Ploughsoil
- Oxidised alluvium
- Alluvium
- Peat
- Clay alluvium
- Silty/sandy alluvium
- Clay silt
- Sand
- Coarse Sand and gravel
- Till

Below Ground Level Impacts

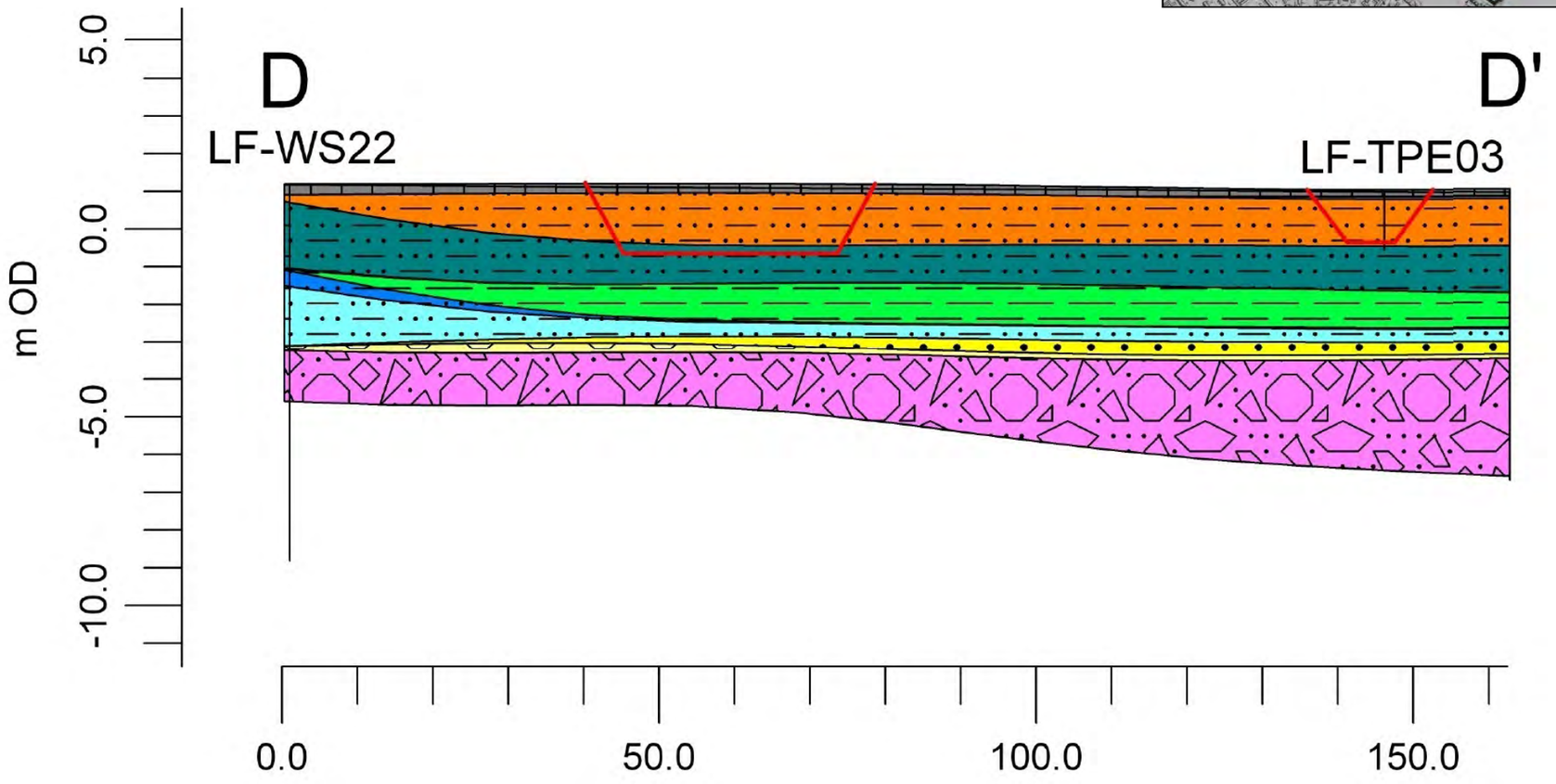


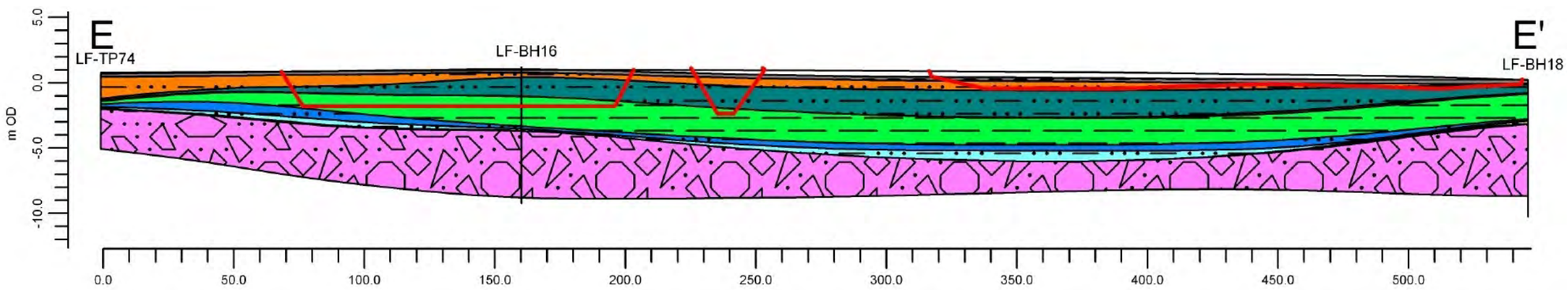
Figure 17 - Cross Section D-D' Showing Indicative Below Ground Level Impacts In Relation To Sub-Surface Modelled Deposits. VE:5.00
Site Code: CHO

Scale of inset at A3 - 1:17500
Drawn by: TK

Proposed Realigned SCD
Proposed Wetland Areas
Proposed Embankment
Cross Sections

Lithostratigraphy

- Ploughsoil
- Oxidised alluvium
- Alluvium
- Peat
- Clay alluvium
- Silty/sandy alluvium
- Clay silt
- Sand
- Coarse Sand and gravel
- Till



Below Ground Level Impacts

Figure 18 - Cross Section E-E' Showing Indicative Below Ground Level Impacts In Relation To Sub-Surface Modelled Deposits. VE:5.00
Site Code: CHO

Scale of inset at A3 - 1:17500
Drawn by: TK

Proposed Realigned SCD
Proposed Wetland Areas
Proposed Embankment
Cross Sections

Lithostratigraphy

- Ploughsoil
- Oxidised alluvium
- Alluvium
- Peat
- Clay alluvium
- Silty/sandy alluvium
- Clay silt
- Sand
- Coarse Sand and gravel
- Till

Below Ground Level Impacts

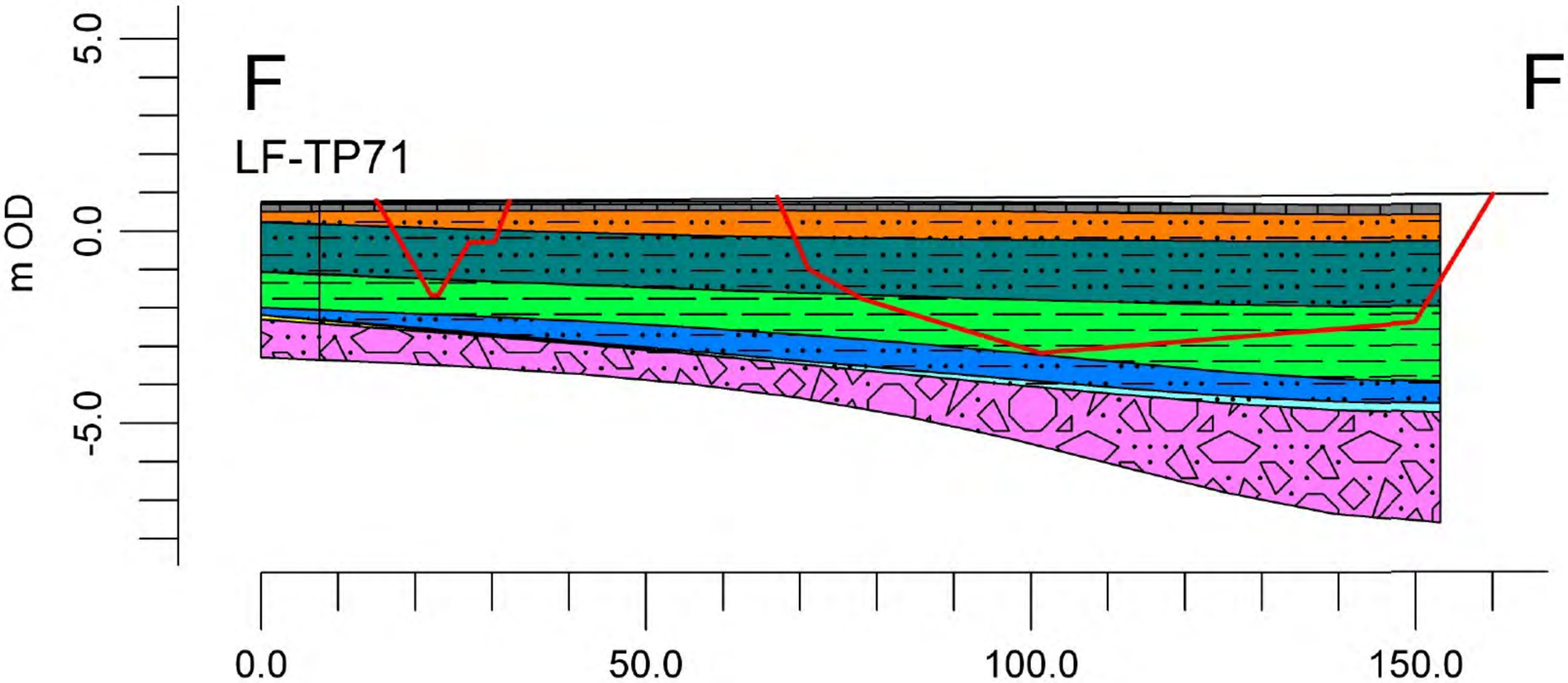


Figure 19 - Cross Section A-A' Showing Indicative Below Ground Level Impacts In Relation To Sub-Surface Modelled Deposits. VE:5.00
Site Code: CHO

Scale of inset at A3 - 1:17500
Drawn by: TK