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# **Northern Archaeological Associates**

**SALTFLEETBY GAS STORAGE PROJECT  
LINCOLNSHIRE**

**GRAYFLEET GAS STORAGE FACILITY**

**ARCHAEOLOGICAL TRIAL TRENCHING REPORT**

**prepared for**

**WINGAS STORAGE UK LTD**

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## GRAYFLEET GAS STORAGE FACILITY

## ARCHAEOLOGICAL TRIAL TRENCHING REPORT

Summary	2
1.0 Introduction	4
2.0 Location, topography and geology	4
3.0 Archaeological background	5
4.0 Evaluation objectives	7
5.0 Methodology	7
6.0 Trial trenching results	10
7.0 Discussion and statement of potential	13
8.0 Conclusion and recommendations	15
References	18
Appendix A Context and finds catalogue	20
Appendix B Roman pottery	22
Appendix C Post-Roman pottery	28
Appendix D Fired clay and ceramic building materials	29
Appendix E Conservation assessment report	34
Appendix F Recorded finds	36
Appendix G Environmental remains	38
Appendix H Animal bone and shell	43
Appendix I Geomorphological study	47

## SALTFLEETBY GAS STORAGE PROJECT, LINCOLNSHIRE

### GRAYFLEET GAS STORAGE FACILITY

### ARCHAEOLOGICAL TRIAL TRENCHING REPORT

#### *Summary*

*This document presents the results of archaeological trial trenching carried out at the proposed Grayfleet Gas Storage Facility (GSF) in June and July 2006. The proposed Grayfleet GSF site lies in South Cockerington civil parish within the East Lindsey District of Lincolnshire (TF 4285 9090). It forms part of the proposed larger Saltfleetby Gas Storage Project (Lincolnshire County Council planning reference E.0625.06). The trial trenching was undertaken in accordance with an agreed scheme of works.*

*An associated geomorphological study carried out during the trial trenching confirmed the presence of peat deposits of late Neolithic date in the field to the north of the evaluated area at a minimum depth of 3.75m below ground level (-1.9m OD) and at a depth of 5.4m below ground level (-3.75m OD) in the very north-west corner of the proposed Grayfleet GSF. These deposits appear to be limited to an area of former higher ground where they have not subsequently been removed by a later scour channel as elsewhere within the site area.*

*The nine trial trenches excavated identified localised activity dating to the Romano-British and medieval periods. In the north-western corner of the proposed development ditches and finds suggestive of occupation during the Romano-British period were recorded at a depth of approximately 0.7m below the ground surface (0.9m OD). The finds recovered indicate a mid to late 3rd century date and the presence of probable structures within the vicinity. However, the geomorphological reconstruction suggests that any further settlement within the vicinity is likely be limited to the area of former higher ground based upon the recorded sub-surface contours.*

*A large pit containing articulated cattle skeletons was recorded on the northern boundary of the proposed construction compound. Pottery recovered from within the fills of the feature dated to the 13th- to early or mid 14th-century. The pit appears to be an isolated feature peripheral to the moated site recorded to the north, and there is no evidence of further medieval activity within the proposed construction compound or Grayfleet GSF site.*

*The presence of a post-medieval field system was confirmed within two of the trenches, while the remaining five were devoid of archaeological features.*

*No archaeological remains of prehistoric, Romano-British or medieval date were identified by the trial trenching within the proposed development area except for the very north-western part of the site. The construction works would not however impact upon the peat deposits as these are both limited in extent and lie below the depth of the groundworks. The area of*

*Romano-British occupation is located beneath landscape mounding around the perimeter of the site and likewise will not be affected by construction works. However, there is a potential for these remains to extend into adjacent areas, and particularly the route of the proposed pipelines linking the Grayfleet GSF with the Saltfleetby A and B Wellsites. Should it not be feasible to preserve the pit containing medieval cattle burials in situ on the northern boundary of the construction compound then this feature would require further specialist investigation and recording.*

*The results of the trial trenching provide the necessary information to prepare a detailed mitigation strategy for the investigation, recording and publication of any archaeological remains affected by the proposed Grayfleet GSF and the associated construction compound and adjacent pipelines. The scale, scope and methodology of the final mitigation proposals would be agreed in writing with Lincolnshire County Council.*

## 2.4 LOCATION, TOPOGRAPHY AND GEOMORPHOLOGY

2.4.1 The proposed site is located to the west of Saltfleetby St Clement and forms part of the proposed larger Saltfleetby Gas Storage Project. It is located to the west of the of the Grayfleet Drain and will extend over an area of some 7.5 ha with maximum dimensions of 475m north-south and 125m east-west.

2.4.2 The site is situated on a gentle slope, rising from the south-west towards the north-east. The topography is relatively flat, with the highest point being the northern boundary of the site. The site is bounded to the south by the Grayfleet Drain, which is a 1.5m wide, 1.5m deep, open ditch. The site is bounded to the east by the proposed pipeline route, which is a 1.5m wide, 1.5m deep, open ditch. The site is bounded to the north by the proposed pipeline route, which is a 1.5m wide, 1.5m deep, open ditch. The site is bounded to the south by the proposed pipeline route, which is a 1.5m wide, 1.5m deep, open ditch.

2.4.3 The proposed development area lies within a relatively flat landscape at a typical height of 2.3m AOD. The underlying geology comprises Cretaceous Chalk (formation of Geological Survey 1979; this is overlain by a thin layer of alluvium).

## **1.0 INTRODUCTION**

- 1.1 This document presents the results of evaluation by archaeological trial trenching carried out at the proposed Grayfleet Gas Storage Facility (GSF) between 26th June and 10th July 2006. The proposed Grayfleet GSF site is centred at TF 4285 9090 and lies in South Cockerington civil parish within the East Lindsey District of Lincolnshire (Figure 1). The facility forms part of the proposed larger Saltfleetby Gas Storage Project (Lincolnshire County Council planning reference E.0625.06).
- 1.2 Lincolnshire County and English Heritage were consulted at the pre-application stage regarding the proposed gas storage project. The cultural heritage desk-based assessment, incorporated within the Environmental Statement (ES) for the development (Langham 2006), indicated that the proposed development site at Grayfleet GSF was within an area of archaeological potential. Evaluation of the site area comprising trial trenching was proposed prior to the determination of the planning application.
- 1.3 The trial trenching was undertaken in accordance with a project design (NAA 2006) agreed with Lincolnshire County Council and was carried out in accordance with the relevant codes of practice issued by the Institute of Field Archaeologists (IFA 2000; 2001).

## **2.0 LOCATION, TOPOGRAPHY AND GEOLOGY**

- 2.1 The proposed site is located to the west of Saltfleetby St Clement and forms part of the proposed larger Saltfleetby Gas Storage Project. It is located to the west of the of the Grayfleet Drain and will extend over an area of some 8.4ha with maximum dimensions of 410m north-east to south-west and 120m north-west to south-east (Figure 2).
- 2.2 This site would primarily contain a gas inlet building, three compressor buildings, gas coolers, utility, office and maintenance buildings, condensate and water tanks, a vent and ground flare together with a fire water pond, wetland area and associated mounding. Excavations for block foundations for the buildings within the facility would extend to a depth of up to 2m below the existing ground level within the area of the compressor buildings, and up to 1m below ground level within the area of the office and other buildings. Piling for all building foundations would extend to a depth of up to 20m below ground level, with the piles some 1m apart within the area of the compressor buildings and 2.5m apart within the area of the office and other buildings. The associated construction compound is a roughly triangular area and would extend over a further 1.1ha to the south-west of the main site.
- 2.3 The proposed development area lies within a relatively flat landscape at a typical height of 2-3m AOD. The underlying geology comprises Cretaceous Chalk (Institute of Geological Sciences 1979). This is overlain by a complex sequence of Holocene

(post-glacial) marine sediments and peats (see section 3 below). The soils within the site are mapped as being of the Wallasea 2 Association, deep stoneless clayey soils, with groundwater controlled by ditches and pumps, and generally used for arable (Soil Survey of England and Wales 1983).

### 3.0 ARCHAEOLOGICAL BACKGROUND

- 3.1 The information derived from the cultural assessment was supplemented by a geophysical survey of selected areas of the proposed development site, including a probable medieval settlement site (Figure 2). A summary of these is presented below.

#### Prehistoric

- 3.2 While most of the Lincolnshire Outmarsh was probably unsuitable for permanent settlement before the medieval period, activity of both prehistoric and Romano-British date is recorded within this zone. The 'typical' sequence of deposits during the post-glacial period commences with the development of a forest bed over the glacial till deposits, which was in turn sealed by a discontinuous lower peat deposit. Both Mesolithic and Neolithic dates for the forest bed and the onset of the development of the lower peat deposit have been inferred (Ellis *et al* 2001, 21; LAS 2004, 13).
- 3.3 The lower peat deposit was sealed by a silt deposit up to 2.4m thick indicative of a significant episode of marine transgression (LAS 2004, 15). From the dating of the upper peat deposit sealing these silts, it appears that this period of transgression dates to the Bronze Age (Ellis *et al* 2001, 21). Ground investigations between the proposed Grayfleet GSF and the Saltfleetby B Well site identified a layer of peat up to 0.5m thick at a depth of between 4.2m and 4.7m below the existing ground level which may equate with this lower peat deposit (Costain 2005).
- 3.4 The penultimate horizon in the sequence of deposits along the Lincolnshire Marsh was the upper peat layer, which has been dated at some locations to the Iron Age and may represent a period of marine regression. However, at other locations the peat has been dated to the Bronze Age with the upper silt layer that seals it being dated to the early Iron Age. This could suggest two separate periods of peat formation separated by a period of intervening inundation, reflecting the variability in the chronology of the landscape development (Ellis *et al* 2001, 21-22).
- 3.5 An upper silt layer up to 2m in depth represented the final phase of deposition within the Outmarsh. Towards the base of this layer numerous marine shells were present at some locations, as identified in a borehole test pit within the area of the proposed Grayfleet GSF (Costain 2005). The timing of the deposition of this silt layer however again seems variable, probably representing localised marine flooding and regressive episodes over a period of time which have been dated to both the early Iron Age and the Romano-British or later periods (LAS 2004, 9).

### Romano-British

- 3.6 There were no Romano-British sites recorded within the study area. A possible Roman road from Stixwold to Saltfleetby (Margary 273) passed some 1.3m to the south-east of the Grayfleet GSF (Margary 1973, 241-242). The nearest evidence of occupation of this date was suggested by the recovery of pottery (including samian and amphora), animal bone and shell (LHER 46243) during a watching brief in Saltfleetby St Peter, suggestive of high status settlement within the vicinity (Heritage Lincolnshire 2003).

### Early medieval

- 3.7 The deposition of marine and freshwater silts affected most areas of the Outmarsh at the end of the Roman period. These gradually formed a new land surface as the coastline retreated eastwards, with some of the upper silt deposits being post-Roman in date (Ellis *et al* 2001, 164; LAS 2004, 19).
- 3.8 Direct documentary evidence of settlement within the vicinity of the development proposals was largely restricted to the period immediately preceding the Norman Conquest, but some settlements were likely to pre-date this period by several centuries. The area was referred to in the Domesday Book and settlements are inferred to have existed at the time of the Norman Conquest (Foster and Longley 1921).

### Later medieval

- 3.9 A probable moated site (Site 6) lay immediately to the south-west of the proposed Grayfleet GSF. This is recorded as a cropmark from aerial photographs and is interpreted as a possible moat enclosing an area of some 80m by 60m with an associated building platform on the east side and enclosures to the west. Further to the west two pounds are also recorded. A very slight rise was noted in the area of the moated site during the site inspection, within which pottery, animal bone, oyster shell, coal and some chalk was noted. The pottery collected principally dated to between the 13th-15th centuries, together with a smaller number of post-medieval sherds (J Young, written communication).
- 3.10 A magnetometer survey of the moated site and the surrounding area was subsequently undertaken (GSB 2005). This recorded a group of strong anomalies (A) within the area of the cropmark complex which have clear archaeological potential (Figure 3). In addition to the cropmark features the survey also identified a broad curving band (E) to the east of the moat which may have represented a change in geology or natural soil variation. Two smaller features (M and N) to the north of the curving band were considered to be possibly archaeological in origin. All the remaining anomalies were considered to have a natural origin with the exception of a linear anomaly (I) which accorded with a former field boundary dated to at least 1793 from cartographic sources and only recently infilled.

### **Post-medieval and modern**

- 3.11 The landscape surrounding the proposed Grayfleet GSF was enclosed by 1766 (Russell and Russell 1983, 79-80). The earliest surviving maps of the area were those of the Scrope estates in South Cockerington. Dating from 1793, they depicted the field boundaries in the area of the proposed Grayfleet GSF to be largely as today with the exception of where some boundaries have been removed, drains infilled and fields enlarged.

## **4.0 EVALUATION OBJECTIVES**

- 4.1 The evaluation trenching was designed to ascertain whether there are any archaeological constraints that may affect the proposed development. The purpose of the trial excavation was to establish the presence or absence of archaeological remains, their date, quality, depth and preservation.
- 4.2 The predicted impacts of the proposed Grayfleet GSF and construction compound have in part already been mitigated during the design and layout of the development to avoid recorded archaeological remains where other constraints permit. The results of the geophysical survey in particular have influenced the location of the proposed construction compound.
- 4.3 Objectives of the trial trenching were:
- to determine the presence or absence of archaeological features within each area
  - to determine the nature, depth, state of preservation and date of any archaeological deposits
  - to determine the presence of any important palaeoenvironmental deposits
  - to inform the final archaeological mitigation strategy for the proposed development

## **5.0 METHODOLOGY**

- 5.1 The trial trenching consisted of the excavation of a total of nine trenches (1 to 9), the location and dimensions of which were designed to evaluate specific anomalies of potential archaeological significance recorded by the geophysical survey (Figure 3). The trenches also targeted areas outwith the geophysical survey and areas where deeper foundations were proposed, in order to confirm the actual extent of the archaeology. The trenches were approximately 15m long and between 3m and 4m wide. Each trench had a deeper slot machine-excavated at least 1m away from the trench edges to create a stepped section where deeper deposits could be recorded

(Plate 1). These deeper slots were cut at either end of empty trenches, but only a single deep section was possible within trenches 1, 6 and 9 due to archaeological features and field drains. The total area of excavation amounted to some 454m<sup>2</sup>.

### **Trial trenching methodology**

- 5.2 The location of each trench was surveyed using a Leica TC 500 total station linked to a Fujitsu Stylistic 1200 pen computer using PenMap software. Information was transferred to AutoCAD 2000iLT software and reproduced for incorporation within this report. The trenches were located to Ordnance Survey Grid. Levels were tied in to Ordnance Survey Datum.
- 5.3 The trenches were stripped of topsoil using a mechanical excavator with a wide, toothless bucket, under archaeological supervision at all times. Topsoil was removed to the edge of each trench and kept separate from subsoil. Upon conclusion of the work, damaged field drains were repaired and the trenches were backfilled.
- 5.4 The machine removed topsoil down to a level at which significant archaeological deposits were first identified or down to a depth of 1m, whichever was first. Deeper sections within the trenches were then machine excavated using a narrower bucket a further metre in depth. All subsequent excavation was carried out by hand.
- 5.5 Trench surfaces were cleaned sufficiently by hand to establish the presence or absence of archaeological deposits. Features were then planned and photographed. All features exposed were sample excavated except for the large pit in Trench 1 containing articulated animal skeletons. As this pit extended beyond the area of the trench (and proposed development), after consultation with the environmental specialist (James Rackham, Appendix H) and the Principal Archaeologist for Lincolnshire County Council (Beryl Lott) it was agreed that the skeletons would be exposed and recorded but not further excavated. Hand excavation was undertaken of other archaeological features to evaluate depth, dimension and preservation of remains, and to ensure recovery of sufficient artefactual and environmental evidence to enable dating and assessment of the archaeology to be achieved. It excavated sample sections constituted 50% of discrete features and at least 20% of linear or curvilinear features.
- 5.6 Provision was made for a visit by a James Rackham, the palaeoenvironmental specialist to assess the significance of the articulated bones uncovered within Trench 1 and to profile the sedimental history across the proposed development site. To facilitate the latter, hand augered boreholes were sunk in the base of the deep sections of Trenches 5, 6 and 7 (Appendix I).

### **Archaeological recording**

- 5.7 All archaeological features were photographed and recorded at an appropriate scale. Sections were drawn at a scale of 1:10, except for a section across a substantial modern field boundary, which was drawn at a scale of 1:20. Archaeological plans were drawn at a scale of 1:20, although trenches largely devoid of archaeological

- features were recorded at a scale of 1:50. Representative sections of all trenches containing no archaeological features were drawn.
- 5.8 A written description of features was recorded on pro forma sheets using the NAA context recording system.
- 5.9 The site code was SGS06.
- 5.10 A photographic record of the site was taken using monochrome prints and colour slide at a minimum format of 35mm.
- 5.11 The trial trenching included a metal detector survey of trench locations in advance of topsoil stripping and detecting of the cleaned trench surfaces and spoil heaps after stripping. No metal finds were recovered during this survey.
- 5.12 No human remains (inhumations and cremations) were encountered during the trial trenching but articulated animal skeletons dated to the medieval period were revealed within Trench 1. After an assessment of the exposed skeletons was carried out (Appendix H) they were planned and recorded, but were left *in situ*. After recording within the trench was finished, a layer of soft sand was deposited by hand over the skeletons, in order to protect them during backfilling. This was overlain by a sheet of felt which was in turn overlain by more sand.
- 5.13 Forty-litre bulk palaeoenvironmental samples were taken from appropriate deposits (such as ditch and pit fills) and submitted for assessment. Particular attention was paid to the recovery of samples from the features in Trench 6. Recovery and sampling of environmental remains was in accordance with guidelines prepared by English Heritage (2002) and was further advised on site by James Rackham (see Appendix I).
- 5.14 A peat deposit from the hand augered borehole in Trench 6 was submitted for radiocarbon dating (see Appendix I).
- 5.15 Pottery and animal bone was collected as bulk samples whilst significant artefacts were three-dimensionally recorded prior to processing. Finds were recorded, processed and submitted to specialists for post-excavation assessment.
- 5.16 All finds recovered were appropriately packaged and stored under optimum conditions. Finds recovery and storage strategies were in accordance with published guidelines (English Heritage 1995; Watkinson and Neal 1998).
- 5.17 In accordance English Heritage guidance (1991), all iron objects were X-radiographed before assessment.

## 6.0 TRIAL TRENCHING RESULTS

### Trench 1 (Figure 4)

- 6.1 This trench was aligned from north-east to south-west and was located at the north-western edge of the proposed construction compound area. It measured 15m long by 4.5m wide and was positioned to evaluate a discrete geophysical anomaly considered to be of probable archaeological origin and to determine its nature and date, and also to establish if the recorded medieval moated site (Site 6) extended to the south.
- 6.2 The earliest deposit recorded within this trench was a layer of mid greyish brown fine marine silts with sand laminae-partings (101) which was over 1.8m thick. The layer contained a lens (106), and was cut by a large amorphous pit (103). The pit had a light grey silt fill (105) of unknown depth, containing animal bone and daub. Above this, the upper fill of the pit was a mid grey brown silt (102) containing up to eleven articulated cattle skeletons (104; Plate 2), possibly an articulated pony skeleton, medieval pottery, fired clay or daub and a fragment of tile. Due to the complex nature of the burials, which extended beyond the area of excavation to the north and west, the feature was recorded but not further excavated (see paragraph 5.5). A quantity of disarticulated bone was however recovered during the initial investigation of the feature. The skeletons were protected by layers of soft sand before the trench was back-filled. A layer of topsoil (100) up to 0.32m thick sealed the deposits within this trench.

### Trench 2 (Figure 4)

- 6.3 This trench was aligned from north-east to south-west and measured approximately 15m by 5m wide. It was located near the north-western side of the proposed construction compound area to evaluate a linear geophysical anomaly (I) that corresponded to a former field boundary recorded in 1793. The trench was also positioned to establish if the recorded medieval moated site extended to the south.
- 6.4 A layer of dark mid greyish brown fine marine silts with sand laminae-partings (205), over 0.3m thick, was recorded within a deeper section of this trench. This was overlain by a lighter layer of mid greyish brown fine marine silts with sand laminae-partings (204) which was up to 1.2m thick. Cut into this silt was a ditch (206) which corresponded with the known field boundary. The ditch was only partially excavated to assess its depth and fills. It measured some 9m across and was over 0.96m deep containing modern in-filled deposits (201, 202 and 203). Deposit 201 was dark grey brown silt containing modern rubbish including rotted wood and drinks cans. The deposit was mixed indicating it was backfilled and was contemporary with deposits 202 and 203. Deposit 202 was a dark grey black silt, deposit 203 consisted of partially decomposed vegetable matter. The trench was sealed by 0.25m of modern topsoil (200) that thickened to 0.8m where the fills of ditch 206 had settled.

**Trench 3 (Figure 5)**

- 6.5 This trench was aligned from north-west to south-east and measured 13m by 3.5m wide. It was located to transect the line of a curvilinear geophysical anomaly (E), in order to assess whether the anomaly was of archaeological origin and to determine its nature and date.
- 6.6 On excavation of this trench there was no evidence of any archaeological feature corresponding to the geophysical anomaly. A layer of mid greyish brown fine marine silts with sand laminae-partings (301) over 1.5m thick was recorded within the deep sections of the trench. This was sealed by up to 0.35m of topsoil (300).

**Trench 4 (Figure 5)**

- 6.7 This trench measured 15m by 3m and was aligned from west-north-west to east-south-east. As with Trench 3, this trench was located to transect the line of the curvilinear geophysical anomaly (E).
- 6.8 On excavation there was no evidence of any archaeological feature corresponding to the geophysical anomaly within the trench. A layer of dark greyish brown fine marine silts with sand laminae-partings (403), over 0.2m thick, was recorded at the base of the deep section of the trench. This was overlain by up to 1.2m light brown marine silts with sand laminae-partings (402), which in turn was sealed by a further 0.4m of lighter marine silts (401). A layer of topsoil (400), some 0.45m thick overlay these deposits.

**Trench 5 (Figure 5)**

- 6.9 Trench 5 was aligned from north-east to south-west and measured 16m by 3m wide. It was located at the south-western end of the proposed Grayfleet GSF in order to evaluate a geophysical anomaly (N) and to assess whether the anomaly corresponded to an archaeological feature.
- 6.10 As with Trenches 4 and 5, there was no evidence of an archaeological feature that corresponded to the geophysical anomaly. A hand augered borehole was taken from the base of the deep section of this trench (see Appendix I) down to boulder clay at -5.17m OD. This was overlain by grey and blue grey silts containing frequent organic matter at -5.02m OD. This in turn was overlain by dark grey soft silts with sand laminae-partings (502), which was recorded at the base of the deep sections of the trench. Above this was up to 0.5m light grey brown marine silts (504), which in turn was sealed by a further 0.35m of lighter grey brown marine silt (503) containing very pronounced laminations of sand. A further layer of silt (501) some 0.9m thick overlay this and was in turn sealed by up to 0.4m topsoil (500).

**Trench 6 (Figure 6)**

- 6.11 This trench measured 15m by approximately 3m wide and was aligned from north-west to south-east. It was located towards the north-western corner of the proposed

Grayfleet GSF in order to evaluate a discrete curvilinear geophysical anomaly (M) to assess whether this was archaeological in origin and to determine its nature and date.

- 6.12 A hand augered borehole was taken from the base of the deep section of this trench (see Appendix I) down to boulder clay at a depth of 5.91m below ground (-4.2m OD). The deposits immediately above this were grey blue sands of possible glacial origin. These in turn were capped by slightly banded grey silts with organics indicating a freshwater environment with a band of peaty silts within it. The organic component increased upwards until a rich brown peat including some small wood formed at approximately -3.63m OD in a marshy environment. This peat is just over half a metre thick but became siltier, and slightly laminated towards the top, indicating a return to freshwater conditions. A sample was taken from the upper few centimetres of this peat for radiocarbon dating and produced a date of 3350 – 2900 cal BC (Beta 220591). Above this was a sequence of banded black stained silts (608), with fine laminae developing indicating the onset of tidal conditions and a saltmarsh environment. This was overlain by a mid orange brown layer of marine silts with sand laminae-partings (607) which was up to 1.4m thick, the horizon between the two layers was uneven.
- 6.13 Cut into layer 607 were two ditches (603 and 610). The intersection between these ditches was located too close to the trench edge to investigate (Plate 3) and the two ditches may be the same feature. Ditch 603 (Plate 4) measured 1.15m wide by 0.5m deep and seemed to be slightly curved, running across the trench from east to west. It was filled with a mid brown clayey silt (604) containing Romano-British pottery, oyster shell and animal bone. Ditch 610 was approximately 0.6m wide and 0.3m deep and was aligned north to south along the north-western half of the trench. It was also filled with a mid brown clayey silt (611), but contained no finds. Both ditches were cut by a narrower re-cut (606) of ditch 603 measuring approximately 0.75m wide and 0.31m deep, which was filled by a greyish brown deposit (605) containing shell, animal bone, daub, Romano-British pottery, brick and two metal objects.
- 6.14 A dark grey brown buried soil (601) sealed these features and extended beyond the trench edges in all directions. It was up to 0.17m thick and contained a fragment of tile, pieces of daub and sherds of Romano-British pottery. This soil was overlain by a 0.4m thick layer of mid orange brown marine silts (609) which was in turn overlain by up to 0.35m of modern topsoil (600).

#### **Trench 7 (Figure 5)**

- 6.15 This trench was aligned from north-west to south-east and was located towards the centre of the proposed Grayfleet GSF, within the area of a proposed compressor building. It measured 14m by 3.5m wide and was positioned to evaluate an area not included within the geophysical survey, to assess the area for the presence or absence of unrecorded archaeological features or deposits.
- 6.16 A hand augered borehole was taken from the base of the deep section of this trench (see Appendix I) down to boulder clay at -5.36m OD. A freshwater silt with organic

fragments and wood occurred below -5.21m OD and was overlain by silts containing fragments of marine shell, including oyster, marking the beginning of the marine phase. The sediments above these developed well laminated silts and sands. These silts were recorded in the trench section as a dark grey brown marine silt (702) which was overlain by up to 1.5m of light brown marine silts (701), which in turn was sealed by up to 0.4m topsoil (700).

#### **Trench 8 (Figure 5)**

- 6.17 Trench 8 was aligned from north-west to south-east and measured 14m by 3m wide. It was located towards the centre of the proposed Grayfleet GSF within the area of a proposed compressor building. Similar to Trench 7, it was positioned to evaluate the area not included within the geophysical survey.
- 6.18 A layer of marine silts (801) over 1.7m thick was recorded within the deep sections of the trench. This was sealed by up to 0.4m of topsoil (800).

#### **Trench 9 (Figure 6)**

- 6.19 This trench was aligned from north-east to south-west and measured 13.5m by 3m wide. It was located to transect the line of a former field boundary, recorded in 1793 and recorded as a linear geophysical anomaly (Q). The trench was also located to assess this area for the presence or absence of other unrecorded archaeological features or deposits.
- 6.20 A layer of marine silts (901), over 1.35m thick, was recorded within a deeper section of this trench. Cut into this silt was a ditch (902) that corresponded to the known field boundary. Half of the width of the feature was excavated to assess its depth and fills. The ditch measured some 2.5m across and 0.77m deep and contained modern in-filled deposits (903 and 904). Deposit 904 was a dark grey brown silt containing partially decomposed vegetable matter. Above this was a mixed deposit (903) comprised of mid orange brown silt and mid grey brown redeposited natural silts, containing asbestos tiles and modern brick. The trench was sealed by up to 0.8m of modern topsoil (900).

## **7.0 DISCUSSION AND STATEMENT OF POTENTIAL**

- 7.1 Apart from Trenches 1 and 6, the majority of the nine trenches were devoid of archaeological features other than the known post-medieval field boundaries recorded in Trenches 2 and 9. However, these 'blank' trenches, together with information derived from augering within selected trenches and previous boreholes within the proposed Grayfleet GSF site and the field to the north, have provided evidence that has enabled a reconstruction of a broad sedimentary history of the site to be formulated (Appendix I).

- 7.2 A freshwater phase was indicated by organic silts overlying the glacial sediments in the auger holes in Trenches 5, 6 and 7. These deposits were probably laid down by a river draining the land to the west and running beneath the present Grayfleet Drain. In four of the bore and auger holes a peat deposit occurred over the slightly higher glacial sediments. This deposit extended into the area of the trial trenching and may underlie Trenches 1 and 2 and the moated medieval site (Figure 7). In the eastern half of the evaluated area the peats may have been lost to marine erosion or were never deposited in this area because of the channel. The upper level of the peat was dated to the late Neolithic period (3350 – 2900 cal BC) and was followed by a marine transgression and the build up of marine silts and fine sands across the site. A scour channel may have existed beneath the southern edge of the evaluated area that removed any organic sediments in this area. A short period of marine regression occurred in the Romano-British period allowing occupation in the north-western part of the southern field on the slightly higher ground, within the vicinity of Trench 6 (see below). It seems likely that a Romano-British coastline (tideline) actually ran across the site, probably following the edge of the channel feature to the south.
- 7.3 Trench 6 was located to investigate a geophysical anomaly thought to have represented an archaeological feature. Upon excavation it was found that the anomaly corresponded to two ditches, one with a re-cut, which were sealed by a buried soil, all of which were dated to the mid to late 3rd-century by pottery found within their fills. Artefactual and environmental evidence recovered from within the fills of these ditches was indicative of a low status settlement site. These included fragmentary animal bone, charred grains of wheat and barley, oyster shells, fired clay, a single fragment of Roman brick and three iron objects.
- 7.4 Although small the pottery assemblage provided good evidence for mid to late 3rd century occupation at this site. The bulk was composed of primarily local grey ware fabrics in a range of forms. The assemblage also included Dales type and at least two fine ware beakers in Nene Valley colour-coated style indicating a settlement that had access to markets that imported pottery from the Peterborough area, and were sophisticated enough to want good quality fine wares. The bulk of the vessels consisted of cooking wares, with some oven-to-tableware in the form of plain-rimmed dishes. Also included was a handled jar that may have been used for holding liquids, and there were several beakers used for drinking. The assemblage, however lacked the imported wares of the higher status site at Saltfleetby St Peter and was much smaller in size (Precious 2003).
- 7.5 Fired clay from within these features was probably from a wattle and daub structure and a single fragment of tile along with a single Roman brick may also suggest that buildings were nearby. Domestic activity was inferred from the environmental remains recovered from the fills of the features, with probable food residues having been discarded into ditch 606. The concentration of rubbish in this feature indicated that this ditch could be associated with a domestic structure. There was some indication of crop processing among the charred plant remains but whether these related to domestic cleaning of the grain or agricultural processing cannot be established at this stage of the assessment, although processing of the remainder of the samples will permit further interpretation in this area. The identification of

animal bone supports the inference that the features contain domestic debris. The bones indicated the presence of all the main farm animals. Recorded Romano-British activity was isolated to within Trench 6, however the geomorphological survey suggests that further archaeological features of this date are likely to exist to the north and west of Trench 6.

- 7.6 A late or post-Roman marine advance again inundated the site and was responsible for the accumulation of a further 0.5m to 1.0m of marine sediments across the site, sealing the Romano-British features. Finally, another phase of regression or reclamation made the site available for recolonisation in the medieval period on the slightly higher silts that appear to overlie the slight ridge of glacial till beneath.
- 7.7 The large pit containing articulated animal skeletons, recorded within Trench 1, was dated to the 13th- to early or mid 14th-century by pottery found within its fills. The condition and evidence for articulation of the cattle recorded within the feature clearly indicated that at least some of the ten animals recognised during the field observations were buried as carcasses. The clear evidence for fire having impacted upon the sediments surrounding the bones suggested that some attempt may have been made to fire the contexts of the pit or put ash over them. The fact that animals of all age groups were represented in the pit suggested that the cattle may have died through disease. The pit fills also contained fired clay probably associated with the destruction of mud-walled structures by fire.

## **8.0 CONCLUSION AND RECOMMENDATIONS**

### **Archaeology**

- 8.1 Archaeological trial trenching carried out at the proposed Grayfleet Gas Storage Facility has indicated that the majority of the proposed site area does not contain any significant archaeological remains. However, evidence of localised activity dating to the Roman-British period has been identified within the north-western extremity of the site, together with activity of medieval date on the northern boundary of the proposed construction compound which is probably peripheral to the moated site recorded to the north.
- 8.2 The geomorphological study carried out during the trial trenching confirmed the presence of peat deposits in the field to the north of evaluated area at a minimum depth of 3.75m below ground level (-1.9m OD) and beneath Trench 6 at a depth of 5.4m below ground level (-3.75m OD). These deposits appear to be limited to an area of former higher ground where they have not subsequently been removed by a later scour channel as elsewhere within the site area.
- 8.3 The Romano-British occupation activity identified in Trench 6 appears to date to the mid to late 3rd-century and is preserved at a minimum depth of some 0.7m (0.9m OD) below a layer of marine silts in the vicinity of the trench. No further archaeological features dated to this period were recorded in any of the other

trenches. The geomorphological reconstruction (see Appendix I) suggests that any further Romano-British settlement within the vicinity is likely be limited to a similar area as the peat deposits which occupy former higher ground based on the recorded sub-surface contours.

- 8.4 The pit containing cattle burials recorded in Trench 1 is located to the south of the recorded moated site (Site 6) and probably relates to this feature. However, the pit appears to be an isolated and peripheral feature, and the finds of medieval pottery and evidence for cob-built structures recovered from the trench most probably derive from the moated site itself. Based upon the lack of medieval evidence recorded within the other eight trenches, together with the results of the earlier geophysical survey, it does not appear that any significant evidence of settlement related to the moated site extends into other parts of the proposed construction compound or Grayfleet GSF site.
- 8.5 The presence of a post-medieval field system recorded from both historic map sources and the geophysical survey was confirmed within Trenches 2 and 9. Trenches 3, 4, 5, 7 and 8 were devoid of archaeological features.
- 8.6 In the event of further archaeological work on the site, any further analysis of the results of the trial trenching and the artefacts recovered could be combined with that of any subsequent archaeological investigation and recording within the area of the proposed Grayfleet GSF site. If the site is not developed, then a brief narrative report should be submitted for publication in a relevant archaeological journal and the finds deposited in the appropriate receiving museum together with the site archive.

#### **Potential impacts**

- 8.7 On the basis of a review of alternative site locations the proposed Grayfleet GSF was positioned in order to avoid any of the archaeological sites recorded within the area from aerial photographic evidence. As a consequence the potential impact of the construction upon archaeological remains has already been largely mitigated.
- 8.8 The late Neolithic peat deposits recorded within the area of the proposed development were identified at a depth of 5.4m below the existing ground level (-3.75m OD). These deposits do not extend into the main area of the site and would furthermore be located beneath the deeper foundations (up to 5m) that would be excavated for the construction of the foundations of the proposed compressor buildings. No significant impacts upon these peat deposits within the proposed Grayfleet GSF are therefore predicted.
- 8.9 The trial trenching has identified archaeological features relating to Romano-British occupation activity within the north-western corner of the proposed Grayfleet GSF at a depth of some 0.7m below the existing ground surface (0.9m OD). Unless the area of occupation is more extensive than recorded then it is not anticipated that the proposed development would impact upon the features investigated within Trench 6 as these will be located beneath part of the landscape mounding around the perimeter of the site.

- 8.10 The medieval pit containing cattle burials is located on the very northern boundary of the proposed construction compound. Should it not be feasible to preserve this feature *in situ* then any further investigation and recording of the burial pit should be by an expert familiar with the cattle skeleton, its individual bones and ageing characteristics (see Appendix H).
- 8.11 No archaeological remains other than post-medieval field boundaries were recorded within the other seven trenches excavated. This information, combined with the results of both the earlier sample geophysical survey (Figure 3) and the geomorphological study (Appendix I), suggest that the potential for previously unrecorded archaeological remains within most of the proposed Grayfleet GSF site is probably limited.
- 8.12 The excavation of the pipe trench (to a depth of up to 1.8m) for the proposed pipelines linking the Grayfleet GSF with the Saltfleetby A and B Wellsites has the potential to impact upon archaeological remains of Romano-British settlement activity located to the north of those recorded in Trench 6, as well as any previously unrecorded archaeological remains that may exist in this area. However the pipe trench will not be excavated to the depth of the recorded prehistoric peats, which to the north of the Grayfleet GSF are at a minimum of 3.75m below the existing ground surface.
- 8.13 The results of the trial trenching will enable the preparation of a detailed mitigation strategy for the investigation, recording and publication of any archaeological remains affected by the construction of the proposed Grayfleet GSF and associated construction compound and pipelines. The results suggest that any potential impacts could be adequately mitigated by further archaeological fieldwork (such as a 'watching brief'). The scale, scope and methodology of the final mitigation proposals would be based upon a scheme of works agreed in writing with Lincolnshire County Council.

Northern Archaeological Associates

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Date: September 2006  
Text: Gav Robinson  
Illustrations: Dawn Knowles and Damien Ronan  
Edited by: Peter Cardwell

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### **Maps and plans**

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1983 Soil Survey of England and Wales *Soils of England and Wales 1:250 000 Sheet 4 Eastern England*

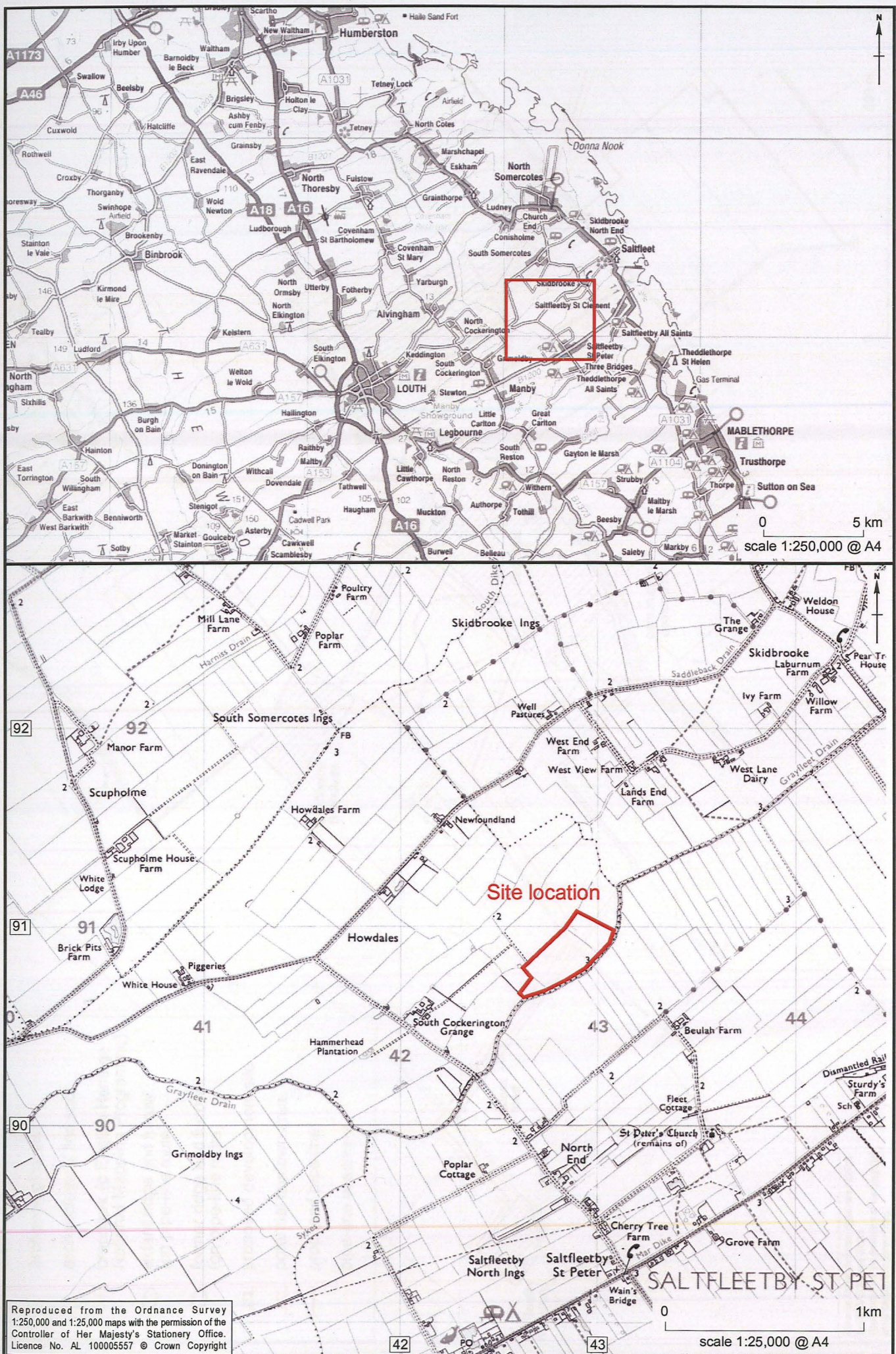


Figure 1 Grayfleet Gas Storage Facility: site location

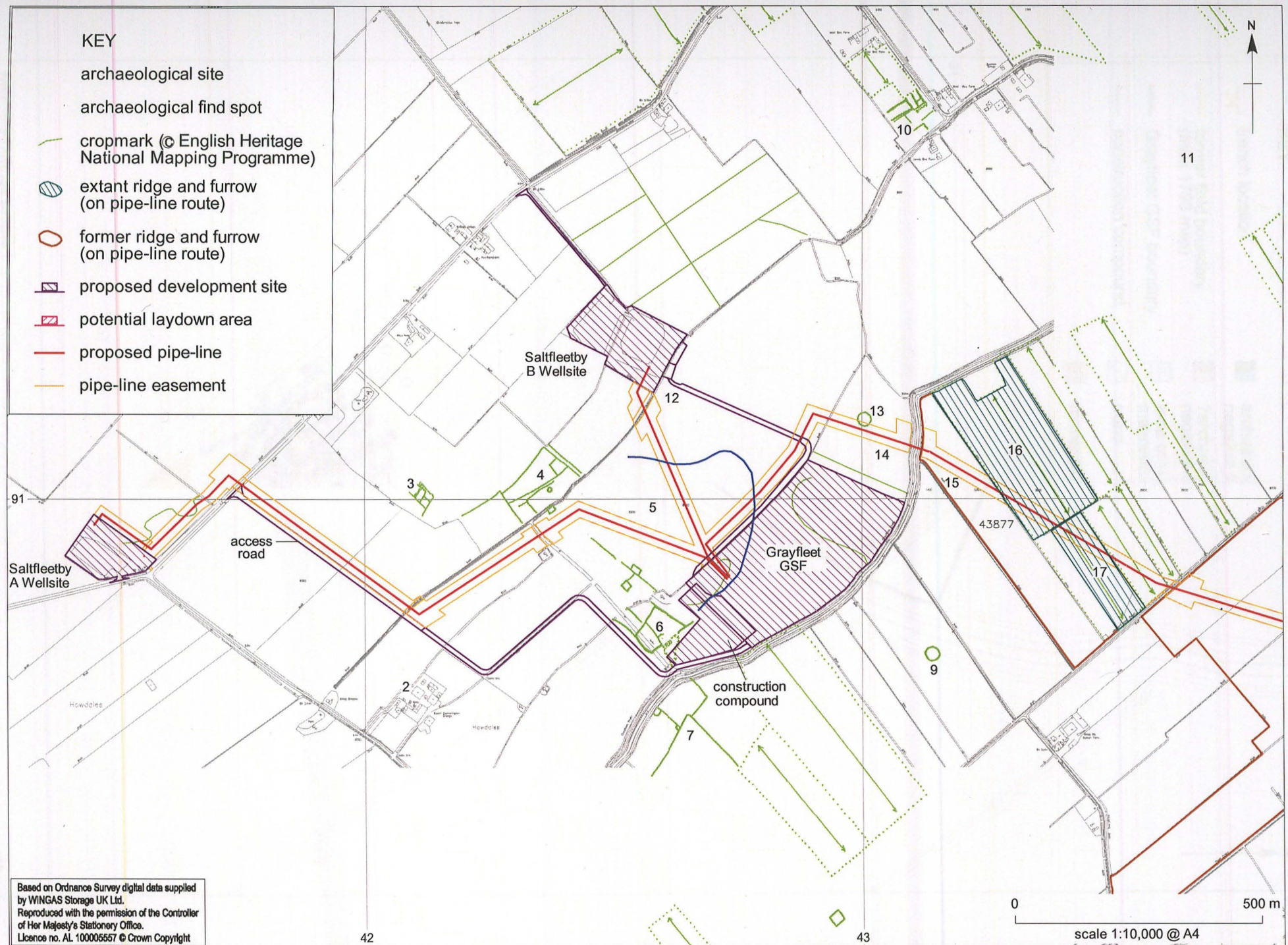


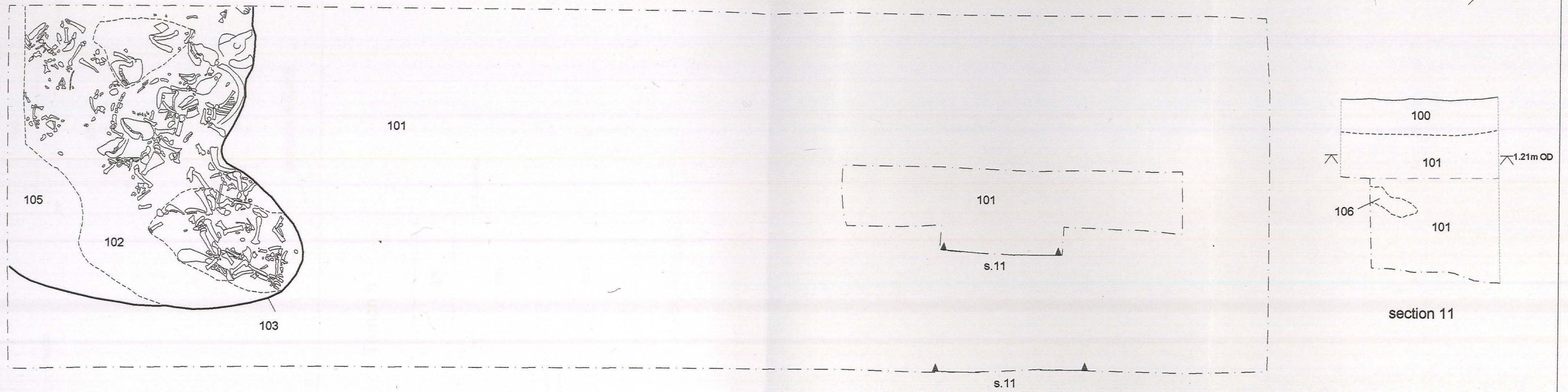
Figure 2 Grayfleet Gas Storage Facility: archaeological sites in the vicinity.



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Figure 3 Grayfleet Gas Storage Facility: trial trench locations overlain on geophysical survey results

# Trench 1



# Trench 2

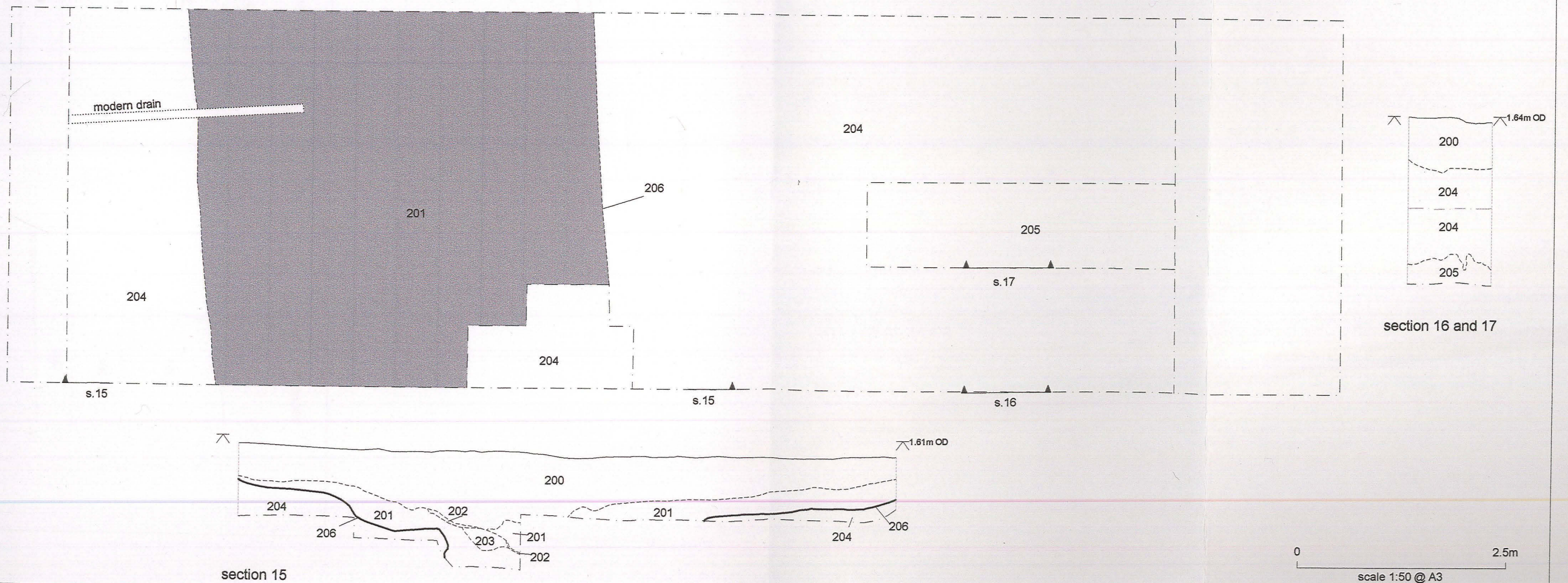
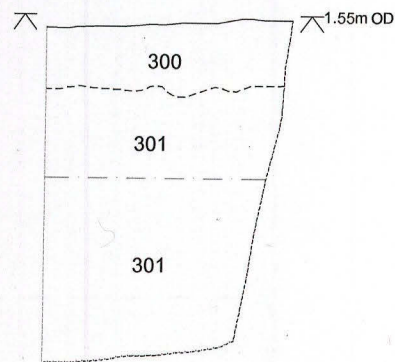


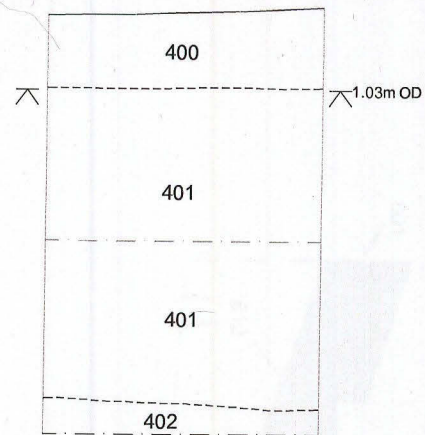
Figure 4 Grayfleet Gas Storage Facility: plan and representative section drawings for Trenches 1 and 2

Trench 3



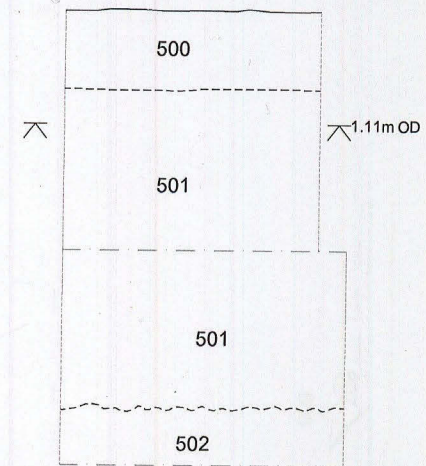
sections 3 and 6

Trench 4



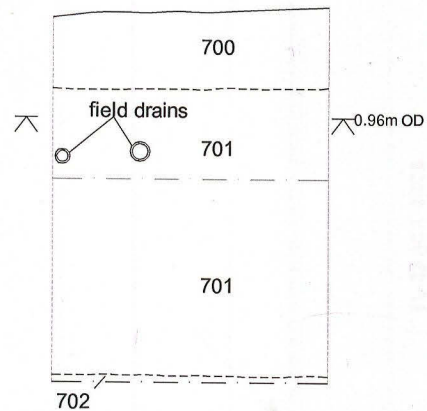
sections 1 and 2

Trench 5



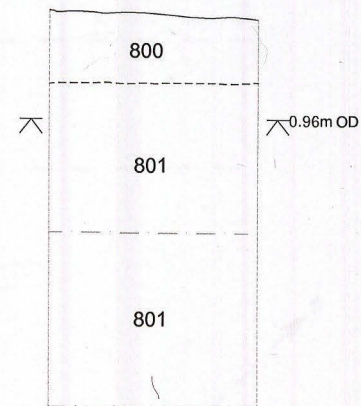
sections 4 and 5

Trench 7



sections 7 and 8

Trench 8

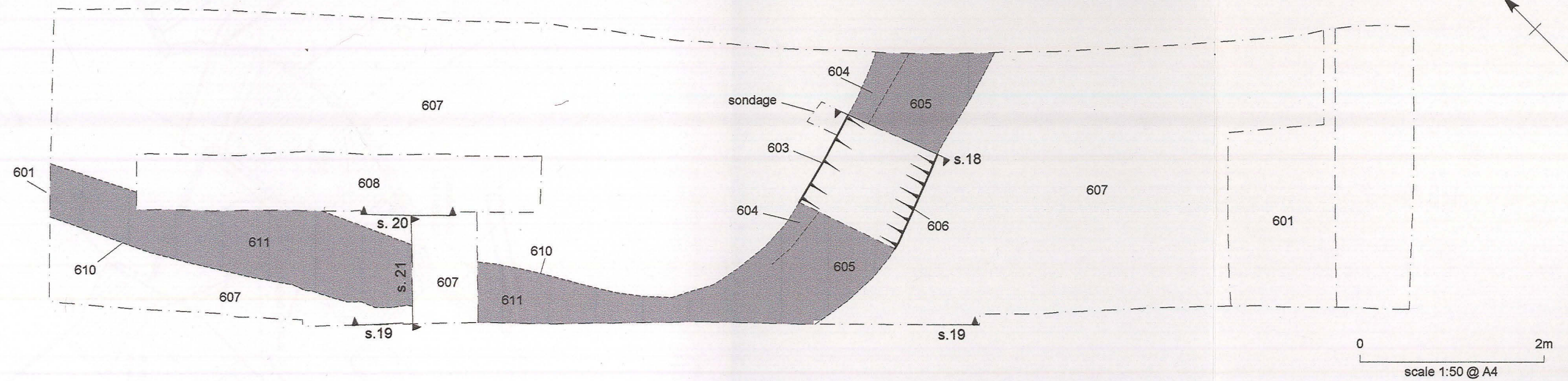
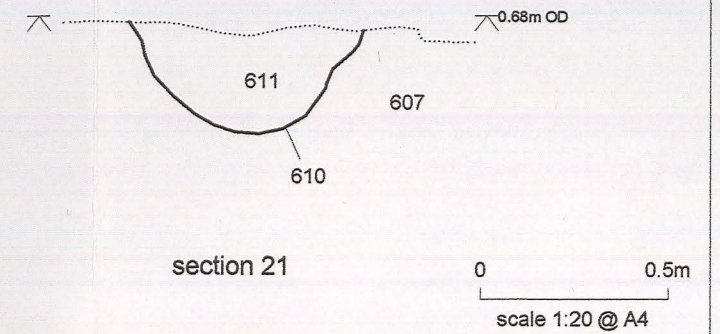
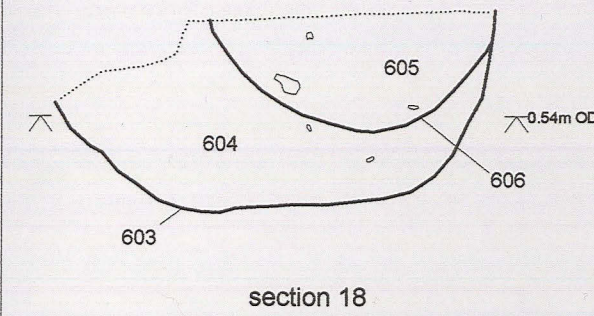
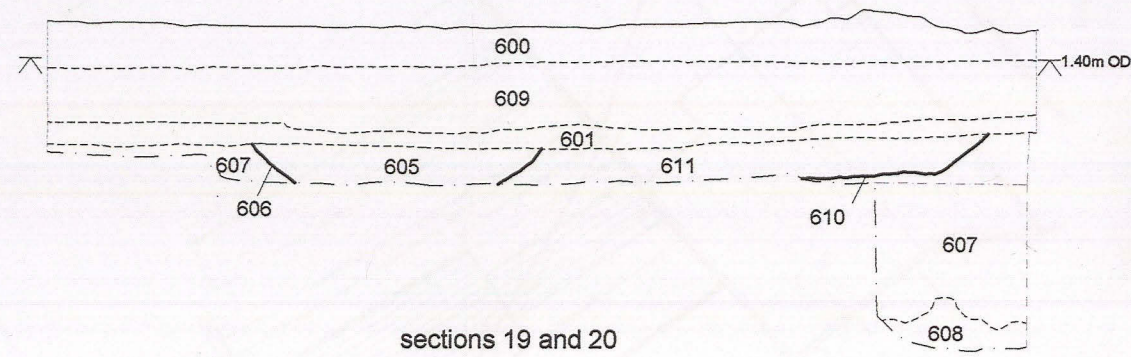


sections 9 and 10

0 2m  
scale 1:40 @ A4

Figure 5 Grayfleet Gas Storage Facility: representative section drawings

# Trench 6



# Trench 9

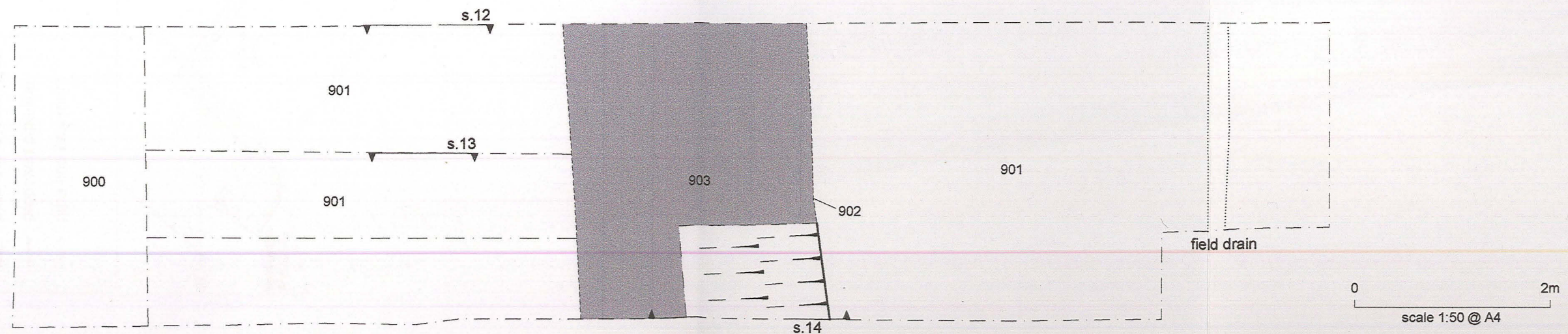
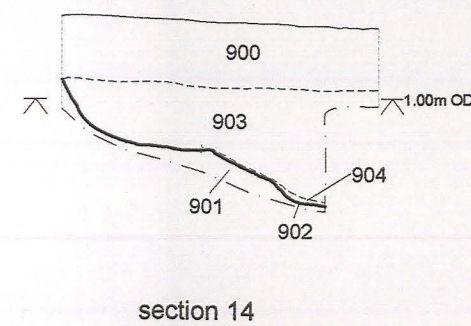
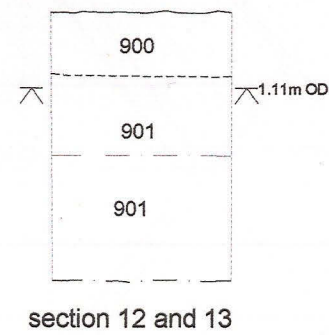


Figure 6 Grayfleet Gas Storage Facility: plan and section drawings for Trenches 6 and 9

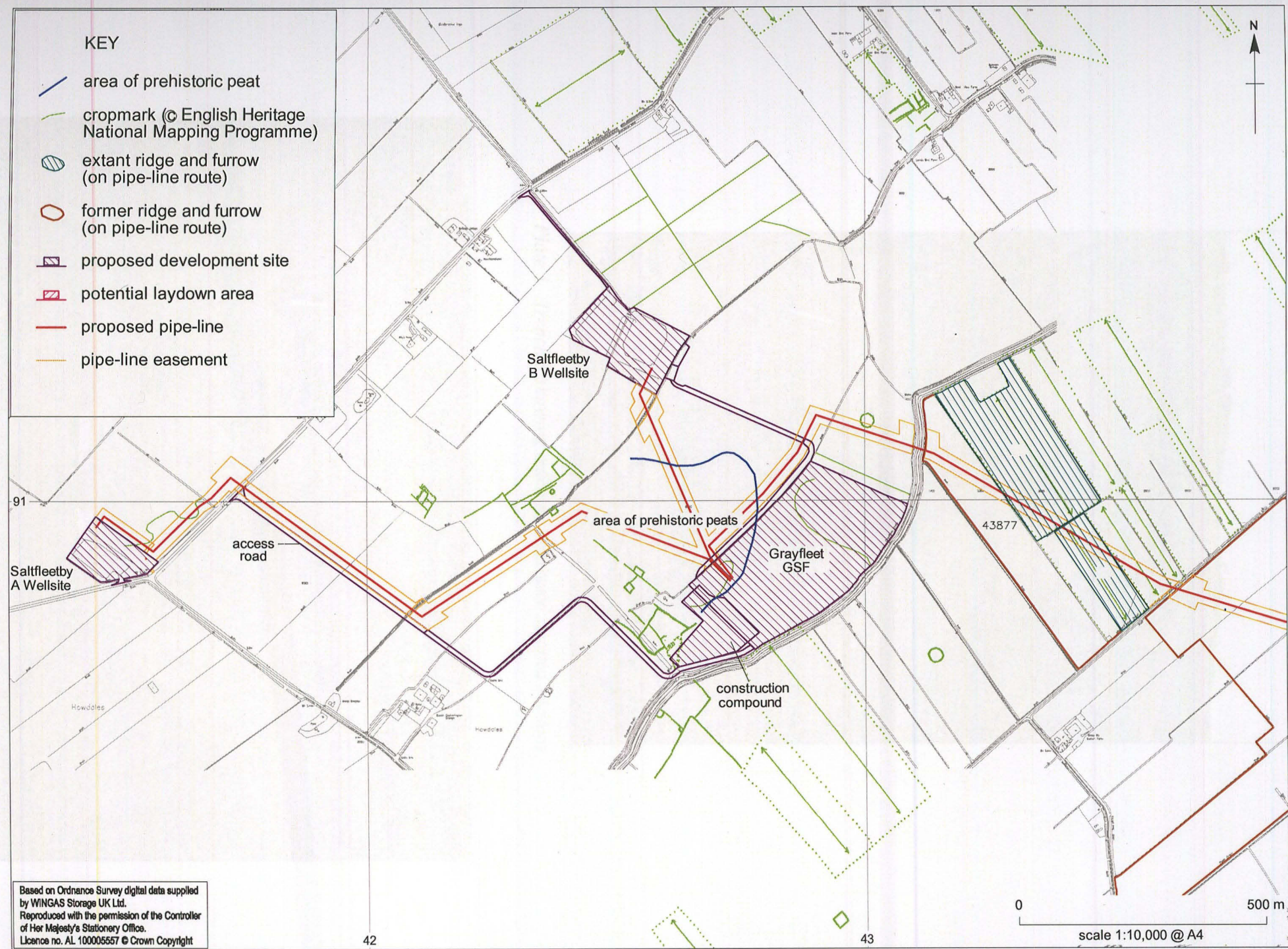


Figure 7 Grayfleet Gas Storage Facility: archaeological sites in the vicinity.



*Plate 1 Trench 3 showing machine excavated stepped sections*



*Plate 2 Trench 1 showing animal bones exposed within pit 103*



*Plate 3 General view of Trench 6 showing Romano-British features*



*Plate 4 Trench 6 section showing ditch 603 and re-cut 606*

## Appendix A

### CONTEXT AND FINDS CATALOGUE

*S. Wilkinson*

Context	Description	Trench	Animal bone	Cbm	Ceramic	Charcoal	Fired clay	Fe	Pottery	Sample	Shell
100	Topsoil	1									
101	Silt layer	1									
102	Fill of pit 103	1	722	3		4	182	1	4		1
103	Cut of large pit	1									
104	Animal skeletons	1									
105	Fill of pit 103	1	20				32				
106	lens within 101	1									
200	Topsoil	2						1			
201	Fill of ditch 206	2	4		3						2
202	Fill of ditch 206	2									
203	Fill of ditch 206	2									
204	Silt layer	2									
205	Silt layer	2									
206	Cut of ditch	2									
300	Topsoil	3									
301	Silt layer	3									
400	Topsoil	4									
401	Silt layer	4									
402	Silt layer	4									
403	Silt layer	4									
500	Topsoil	5									
501	Silt layer	5									3
502	Silt layer	5									
503	Silt layer	5									
504	Silt layer	5									
600	Topsoil	6									
601	Buried soil layer	6					1		13	4	
602	Number not used										
603	Cut of ditch	6									
604	Fill of ditch 603	6	2				2		17		14
605	Fill of ditch 606	6	22	1			7	3	32	4	14
606	Cut of ditch	6									
607	Silt layer	6									
608	Silt layer	6									
609	Silt layer	6									
610	Cut of ditch	6									
611	Fill of ditch 610	6								4	
700	Topsoil	7									
701	Silt layer	7									
702	Silt layer	7									
800	Topsoil	8									
801	Silt layer	8									

Context	Description	Trench	Animal bone	Cbm	Ceramic	Charcoal	Fired clay	Fe	Pottery	Sample	Shell
900	Topsoil	9									
901	Silt layer	9									
902	Cut of ditch	9									
903	Fill of ditch 902	9									
904	Fill of ditch 902	9									
	TOTALS		770	4	3	4	224	5	66	12	34

## Appendix B

### ROMAN POTTERY

*B J Precious*

#### Introduction

The Roman pottery recovered during the evaluation excavation carried out at the proposed Grayfleet Gas Storage Facility was submitted for assessment. It was recorded according to the Study Group for Roman Pottery (SGRP) guidelines, using codes currently in use by the City of Lincoln Archaeology Unit (CLAU), with sherd count and weight as measures. The data was entered onto an Excel spreadsheet and reproduced as Appendix B1

#### Dating

Roman pottery was confined to Trench 6, and consisted of a group totalling 70 sherds weighing 1427g from three contexts, 601, 604 and 605. Although the assemblage was on the small side there was sufficient diagnostic material to provide reasonable dating evidence for occupation on the site in the mid to late 3rd-century AD (Table B1).

The dating is discussed according to the stratigraphic sequence. Context 604, the fill of ditch 603, was the earliest deposit and consisted of a group of seventeen sherds weighing 754g of mid to late 3rd-century date. Evidence for this date was provided by a rim to girth sherd of a wide mouthed bowl in grey ware (GREY, BWM). This was a large vessel with a rim diameter of 39cm, but the depth of the defined neck of 2cm typologically falls within the range of those from the Rookery Lane kilns in Lincoln, generally dated to the mid to late 3rd-century (Webster 1960), rather than the deeper neck of those from the Swanpool kilns, dating from the later 3rd- to the 4th-century (Webster and Booth 1947). However, it must be noted that the bulk of the grey wares were in a range of grey fabrics (see below, Potential) that are likely to be from a more local source (possibly Thealby – Rigby and Stead 1976) rather than from the Lincoln kilns although they are typologically similar. The virtual profile of a GREY plain-rimmed dish that has a chamfered exterior rim-edge, and sherds Dales ware (DWSH), fit well within this date range.

The largest group of pottery came from 605, the fill of ditch 606, that cuts ditch 603, and was very similar in composition to that of 604. Plain-rimmed dishes in grey ware, both with and without chamfered rims, the rim of a Dales ware jar, a GREY cooking pot with lattice decoration, and beakers in Nene Valley colour-coated ware in post- AD 250 fabrics. However, there was a probable earlier form, a tall-necked bowl with a slight angle at the girth of later 2nd- to early 3rd-century date (similar to fig 66, nos 31 and 32, Roxby pottery - Rigby and Stead 1976). The grey ware wide-mouthed bowl from this context also appeared to be of this date with a shorter defined neck of 1.5cm.

**Table B1: The dating of the Roman pottery by sherd count and weight**

Context	Description	Sherds	Grams	Date range	Sh/wt	Drawing	Join
601	Buried soil	13	207	ML3	15.921		
601S	Samples from 601	2	2	RO	1		
604	Fill of ditch 603	17	754	ML3	44.35		
605	Fill of ditch 606	32	459	ML3	14.34		
605S	Samples from 605	6	5	M3+	0.83		
TOTAL		70	1427		20.39		

Pottery from buried soil 601 that sealed these two layers was composed of the same type of fabrics and forms as 604 and 605. The small groups of pottery from samples of 601 and 605, 601S and 605S, respectively were of the same mid to late 3rd-century date range

### Condition

There was a small amount of pottery that was either abraded or very abraded from all three groups, often noted with the shell-tempered wares. Burnt vessels occurred in both 604 and 605, so much so that reduced wares have turned partly oxidised indicating a fierce heat. Deposits of possible mortar were attached to two sherds from 601 and 605, respectively.

The average sherd/weight ratio was moderately high overall at over 20g per sherd. This was markedly higher in the group from 604 suggesting minor redistribution of the pottery. However, this group also included a single sherd from a large vessel weighing 533g. Nevertheless this sherd was relatively fresh and could form part of a display.

There were no obvious sherd joins.

### Archaeological potential

Although small this assemblage provides good evidence for mid to late 3rd century occupation at this site. The bulk was composed of grey ware fabrics in a range of forms, including cooking pots with lattice decoration, a handled jar, plain-rimmed dishes, and wide-mouthed bowls. There was some diversity within these grey ware fabrics that consist of those with black or dark grey cores, other with light grey cores, as well as those with solid grey cores, indicating several sources or different technologies, but primarily local.

Dales type fabrics some with the typical Dales ware rims form the second largest group. This fabric generally appears in assemblages dating to the mid to late 3rd-century in the City of Lincoln. However, as Saltfleetby is situated closer to the main source of these wares in North Lincolnshire and the Scunthorpe area the arrival of Dales ware may be earlier than in the city assemblages.

**Table B2: The Roman fabrics by sherd count and weight**

Fabric	Code	Sherds	%	Grams	%	Sh/wt
Dales ware	DWSH	14	20.00%	104	7.29%	7.43
Dales ware?	DWSH?	5	7.14%	36	2.52%	7.2
Grey ware	GREY	45	64.29%	1275	89.35%	28.33
Nene Valley colour-coat	NVCC	3	4.29%	3	0.21%	1
Oxidised ware	OX	1	1.43%	7	0.49%	7
Parisian-type ware	PART?	1	1.43%	1	0.07%	1
Shell-tempered ware	SHEL	1	1.43%	1	0.07%	1
	TOTAL	70	100.00%	1427	100.00%	

There were no imported wares at this site, which is mainly a reflection of the later Roman date, but also of a rural rather than higher status occupation. However, there were at least two fine ware beakers in Nene Valley colour-coated ware with rouletted decoration indicating a settlement that had access to markets that imported pottery from the Peterborough area, and were sophisticated enough to want good quality fine wares. A beaker sherd in the same fine fabric as Parisian-type ware but without any stamped decoration also fits within this category.

In common with the wares the bulk of the vessels consisted of cooking wares, with some oven-to-tableware in the form of plain-rimmed dishes. A handled jar may have been used for holding liquids, and there were several beakers used for drinking.

**Table B3: The Roman forms by sherd count and weight**

Form	Code	Sherds	%	Grams	%	Sh/wt
Undiagnostic		15	21.43%	32	2.24%	2.13
Closed forms	CLSD	20	28.57%	212	14.86%	10.6
Beaker	BK	4	5.71%	4	0.28%	1
Cooking pot	CP	1	1.43%	2	0.14%	2
Jar	J	9	12.86%	108	7.57%	12
Large jar or bowl	JBL	4	5.71%	64	4.48%	16
Dales ware jar	JDW	2	2.86%	22	1.54%	11
Dales ware jar?	JDW?	1	1.43%	28	1.96%	28
Everted rim jar	JEV	1	1.43%	8	0.56%	8
Handled jar	JH	1	1.43%	12	0.84%	12
Bowl or dish	BD	1	1.43%	10	0.70%	10
Bowl 334 variant	B334V	1	1.43%	12	0.84%	12
Wide mouth bowl	BWM	6	8.57%	819	57.39%	136.5
Plain rim dish	DPR	4	5.71%	94	6.59%	23.5
	TOTAL	70	100.00%	1427	100.00%	

This assemblage lacks the imported wares of the higher status site at Saltfleetby St Peter (Precious 2003), and is much smaller in size. This is mainly due to the later date of the site a period when imported wares are much less common.

## Recommendations

There is no further work envisaged. The pottery is in good condition and should be retained for further study.

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## Appendix B1

Table B4: The Roman pottery archive

Cxt	Fabric	Form	Dec	Vess no	Alter	Comments	Join	Shs	Wt
601	DWSH	JDW				RIM DKGRY		1	12
601	GREY	BD			ABR	BASE		1	10
601	GREY	BWM				RIM		1	54
601	GREY	BWM			VABR	RIM FRAG		1	8
601	GREY	CLSD			VABR	BS		1	14
601	GREY	DPR			ABR;MORTAR?	RIM LWR WALL		1	33
601	GREY	J				BASE; SLIGHT OXID		1	18
601	GREY	J		1		BASE		3	32
601	GREY	J	B			BS SHLDR CP?		1	13
601	GREY	JH			VABR	HANDLE FLAKE; MULT GROOVES		1	12
601	PART?	BK			ABR	BS THIN DKGRY CORE FFINE		1	1
601	ZDATE					ML3			
601	ZZZ					FRAG CBM AGV DATABASE			
604	DWSH	J		1		BSS DKGRY EXT RDBN INT		2	16
604	DWSH	J				BS DKGRY		1	12
604	DWSH	JDW?			VABR	BS NECK DKGRY		1	28
604	DWSH				VABR	FRAGS GRY		3	4
604	GREY	BWM				RIM GIRTH; DK GRY CORE; BWM2;39 DIAM		1	533
604	GREY	BWM			ABR	BS DK GRY CORE		1	48
604	GREY	CLSD				BSS 1 W GROOVE		3	40
604	GREY	DPR			VBURNT	RIM LWR WALL CHAMFRD RIM;BURNT OXID		1	17
604	GREY	J			BURNT	BASE; SLIGHT OXID		1	17
604	GREY	JBL				BSS POSS BWM		2	32
604	OX				ABR	BS RDBN		1	7
604	ZDATE					ML3			
604	ZZZ					BWM2; ML3 DEPTH NECK;DISPLAYABLE			
605	DWSH	CLSD				BS DKBN		1	8
605	DWSH	JDW				RIM; DKBN		1	10
605	DWSH				ABR;SOOT	BSS; DKBN		4	14
605	DWSH?	JBL		1		BSS DKBN RDBN CORE		2	32
605	DWSH?				ABR;MORTAR?	BS;RDBN		1	2
605	GREY	B334V				BS SLIGHT ANGLE;LTGRY CORE		1	12
605	GREY	BWM		1		RIMS HIGH FIRED SHINY; DK GRY CORE; BWM1/2		2	176
605	GREY	CLSD		1?		BSS LTGRY CORE; SHINY		3	30
605	GREY	CLSD				BS LTGRY CORE; SHINY		1	42
605	GREY	CLSD			VABR	BSS FLAKES MISC; MOST DKGRY CORE		3	13
605	GREY	CLSD				BSS GRY CORE		2	9
605	GREY	CLSD				BSS BNCORE		2	14
605	GREY	CLSD				BS DKGRY CORE		1	13
605	GREY	CLSD	BDL			BS GROOVED ZONE		1	19
605	GREY	CLSD	BIWL			BS LTGRY CORE; SHINY		1	9
605	GREY	CP	LA			BS BN CORE		1	2
605	GREY	DPR			BURNT	RIM LWR WALL; BURNT OXID		1	18

27

## Appendix C

### POST-ROMAN POTTERY

*Jane Young*

#### Introduction

A total of five sherds of post-Roman pottery weighing 220g was recovered from excavations at Saltfleetby. The data was entered onto an Access database and reproduced in Table C1.

#### Discussion

A small group of five post-Roman vessels, each represented by a single sherd, was recovered from fill 102 of pit 103. The small group contained two medieval Toynton ware, two South Lincolnshire Shell-tempered ware and one Beverley Orange ware Fabric 2 vessels. With the exception of the Beverley ware jug sherd, vessels were represented by small slightly abraded fragments (up to 3g). The 13th- to early/mid 14th-century Beverley ware jug sherd is larger (212g) and of fresher appearance. The presence of Toynton ware suggests that the material was deposited after the late 13th-century.

#### Recommendations

No further work is recommended but the pottery should be retained for further study.

**Table C1: Post-Roman pottery data**

Context	Name	Full name	Sub fabric	Form type	Sherds	Vessels	Wt (g)	Part	Description	Date
102	BEVO2	Beverley Orange ware Fabric 2	B	jug	1	1	212	BS	bright copper green glaze; thick internal deposit	13th to early/mid 14th
102	TOY	Toynton Medieval Ware		jug	1	1	3	BS		late 13th to 14th
102	TOY	Toynton Medieval Ware		small jug /jar	1	1	1	BS	very thin walled;no glaze	late 13th to 14th
102	SLST	South Lincolnshire Shell Tempered ware		jar/ bowl	1	1	1	BS	flake;? ID	late 12th to 14th
102	SLST	South Lincolnshire Shell Tempered ware		jar/ bowl	1	1	3	BS	leached;? ID	late 12th to 14th

## **Appendix D**

### **FIRED CLAY AND CERAMIC BUILDING MATERIALS**

*Alan Vince and Kate Steane*

#### **Introduction**

A small collection of fired clay and ceramic building material was recovered during archaeological trial trenching carried out at the proposed Grayfleet Gas Storage Facility by Northern Archaeological Associates.

The ceramic building material included Roman brick, medieval flat roof tile and fragments of 19th-century field drain and probably modern brick.

The fired clay came from two trenches. Trench 6 (Roman) produced a small quantity of what might be daub whilst Trench 1 (late medieval or later) produced a collection which probably came from a mud-walled structure.

#### **Description**

The finds were examined at x20 magnification using a binocular microscope and recorded by fragment count and weight and the data reproduced in Appendix D1.

#### **CERAMIC BUILDING MATERIAL**

##### *Roman*

A single fragment of brick of Roman character was recovered, from context 605. The fabric of the brick contained abundant rounded quartz sand, including several matt-surfaced grains of Permo-Triassic origin. The groundmass consisted of fine-textured red-firing clay with light-coloured lenses and laminae.

The brick was made in a sanded mould and the upper surface was slightly darkened and spalled. This suggests that the brick has been reused in a hearth or oven. There is no sign of mortar on any face.

The fabric characteristics of the brick indicated the use of a Jurassic clay, probably one of the Middle Jurassic estuarine beds. These do not outcrop in the Lindsey Marshes area and the most likely source was therefore in the vicinity of Lincoln. Similar fabrics were produced at Washingborough and Fiskerton, both on the edge of the Lincolnshire Fens with easy access to the Witham.

The chemical and petrological characteristics of the sandy boulder clay which outcrops in the Lindsey Marshes is known from samples taken from Grimsby and Barton-upon-Humber. The characteristics of the products of the Lincoln area tileries are known from analyses of Roman tiles from Partney, in the southern Wolds, and post-medieval bricks from a brick yard at North Hykeham. Thin section and chemical analysis of the brick recovered from Trench 6 could therefore determine the origin of this

brick and provide information about the distribution of ceramic building materials in Roman Lincolnshire.

### **Medieval**

A single fragment of flat roof tile was recovered from context 601. The tile contained sparse rounded quartzose sand, including some polished quartz grains and sparse angular flint and angular red ironstone. The groundmass was slightly calcareous and contained sparse burnt calcareous pellets whose original character was indeterminate. The surfaces had slight salt-surfacing.

The fabric characteristics of this tile were similar to those of medieval roof tiles from Partney where analysis indicated that they were the result of tempering an Upper Jurassic clay with a mixed cover sand which included grains derived from Lower and Upper Cretaceous strata. The Partney tiles were thought to have a local origin. As with the Roman tile, these characteristics were probably not matched with deposits in the Lindsey Marshes and indicate that in the medieval period ceramic building material was imported to the area.

### **Post-Medieval or later**

Two fragments of brick were recovered from context 102. Both had a similar appearance and could come from the same brick. The fabric contained sparse organic voids and burnt-out calcareous inclusions surrounded by a yellow reaction rim. The groundmass consisted of an overfired calcareous, silty clay.

The characteristics of this brick were matched with bricks produced in the Lincolnshire Fens from local estuarine silts and the brick could therefore have been produced locally.

Handmade bricks of this sort were produced locally from at least the mid 15th century and continued to be produced in numerous brickyards well into the 19th century (Robinson 1999).

### **Modern**

A fragment of U-sectioned field drain was recovered from context 201. The fabric contained few inclusions larger than c.0.1mm and had a silty, micaceous groundmass. This differed from the post-medieval brick in that the fabric contained more mica and was not noticeably calcareous.

Field drains in Lincolnshire are probably mostly of mid 19th century and later date.

## **FIRED CLAY**

### **Roman**

Small collections of fired clay were recovered from contexts 601, 604 and 605 (including numerous small rounded fragments recovered from sieved samples from contexts 601 and 605).

One of the fragments had a coarse sandy fabric, the sand including angular flint and subangular quartz grains, with a silty micaceous groundmass. This fabric seemed to be a mixture of estuarine silt with sandy, non-calcareous boulder clay. The remaining fragments were much finer in texture and contained numerous thin organic voids (filled with carbonised organic material where the fragments are reduced). Their groundmass was silty and micaceous with no noticeable calcareous content and was probably produced using local estuarine silt.

Most of the fragments were completely featureless but a few had flat surfaces. The firing pattern indicated that most of the fragments were burnt in a fragmentary condition giving an oxidized surface and recorded core. There was slight evidence for salt surfacing but less than is typically found in collections of fired clay associated with salt-production.

### **Medieval**

Collections of fired clay were obtained from contexts 102 and 105. There was no appreciable difference in the material from either context, all of which had similar characteristics.

The fragments all had moderate organic inclusions, either surviving as voids where the clay was oxidized or as carbonise fragments in the reduced cores. The groundmass was silty, micaceous with little sign of calcareous content. However, the range of colours of the oxidized clay indicates the presence of a minor salt and calcareous content. A few fragments had roughly flat or curved surfaces but most of the fragments had irregular surfaces and their firing pattern indicated that most were already fragmentary when burnt.

The material appeared to be cob, the result of the burning of a structure with unfired mud walls (known locally as "mud and stud" architecture). The organic inclusions probably indicate the deliberate tempering of the mud with straw (as opposed to the much finer organic matter in the Trench 6 fired clay, which was probably present in the parent clay). The clay was probably obtained close to the place of use.

### **Archaeological potential**

Fired clay is a common find on sites in the Lindsey Marshes and is often debris from prehistoric and early Roman salt working. The large saltern mounds contain large quantities of burnt clay, together with recognisable briquetage fragments (containers, pedestals, clips, spacers and oven wall fragments). These mounds were often subsequently chosen for settlement, since they were raised above their surroundings and afforded some protection against flooding, and the fired clay originally present in these mounds is often redeposited in later deposits. Neither of the two collections from Grayfleet appears to have this origin.

Fired clay was also a by-product of medieval and post-medieval salt production and this material either takes the form of unworked blocks of subsoil or clay mixed with large quantities of straw. Again, neither of the two Grayfleet collections is similar to this material.

It is likely that in both cases the fired clay was associated with housing. That from Trench 6 was probably of Roman date and probably from a wattle and daub structure. However, the lack of wattle impressions and the breakage pattern are similar to the material from Trench 1 where it is more certain that the clay comes from a mud-walled structure. The presence of brick alongside this fired clay may suggest that certain features in the structure were made of brick (e.g. chimney stacks, or a dwarf wall

on which the structure rested). The brick also suggests that the structure was no earlier than the later 14th century and probably much later.

The Roman and medieval tile fragments were both probably imports to the area. In the case of the Roman tile, the nearest likely sources were about 40 miles away, involving overland transport across the Wolds or a longer but probably easier coastal journey. The nearest source for the medieval tile was probably over 20 miles away overland and longer if water transport was used.

### **Recommendations**

The suggested sources for the Roman and medieval tiles should be tested using thin section and chemical analyses. No further work is recommended on the fired clay.

### **References**

Robinson, D. N., (1999) *Lincolnshire Bricks, History and Gazetteer*, The Heritage Trust of Lincolnshire, Lincoln.

## Appendix D1

Table D1: Fired clay and ceramic building material

Trench	Period	Feature	Context	Type	Subfabric	Description	Form	Part	Qty
1	Med+	Pit 103	102	FCLAY	Reed and poss wood impression	Irregular frag		BS	1
1	Med+	Pit 103	102	FCLAY	Many organics	Possible flat surface		BS	1
1	Med+	Pit 103	102	FCLAY		Irregular frags		BS	2
1	Med+	Pit 103	102	FCLAY	Many organics and salted sheres	Irregular frags		BS	2
1	Med+	Pit 103	102	FCLAY	Reed impressions and other organics	Irregular frags		BS	10
1	Med+	Pit 103	102	FCLAY	Small blobs of clay evident (and organics)	Irregular frags		BS	19
1	Med+	Pit 103	102	FCLAY	Many organics	Irregular frags		BS	133
1	Mod	Pit 103	102	BRICK			brick	BS	2
1	Med+	Pit 103	102	FCLAY	Few organics	Irregular frags		BS	11
1	Med+	Pit 103	102	FCLAY	Small blobs of clay evident	Two roughly curved surfaces		BS	1
1	Med+	Pit 103	105	FCLAY		Possible flat surfaces	daub?	BS	2
1	Med+	Pit 103	105	FCLAY	Small blobs of clay evident			BS	10
1	Med+	Pit 103	105	FCLAY		Roughly curved pieces	daub?	BS	3
1	Med+	Pit 103	105	FCLAY	Many organics	Irregular frags		BS	15
1	Med+	Pit 103	105	FCLAY		Irregular frags		BS	2
2	Mod	Ditch 206	201	FDRAIN	U - shaped		field drain	BS	3
6	Rom	Buried soil	601	RTIL			teg	BS	1
6	Rom	Buried soil	601	FCLAY		Frag		BS	1
6	Rom	Buried soil	601	FCLAY			?	BS	1
6	Rom	Buried soil	601	FCLAY		Rounded frags from sample		BS	34
6	Rom	Ditch 603	604	FCLAY		Irregular frag		BS	1
6	Rom	Ditch 603	604	FCLAY	Reed impression	Irregular frag		BS	1
6	Rom	Ditch 606	605	RTIL			brick	BS	1
6	Rom	Ditch 606	605	FCLAY		Sub-rounded frags from sample		BS	40
6	Rom	Ditch 606	605	FCLAY		Possible flat surface		BS	1
6	Rom	Ditch 606	605	FCLAY		Irregular frags		BS	6

## **Appendix E**

### **CONSERVATION ASSESSMENT REPORT**

*Jennifer Jones*

#### **Quantification and Condition**

Five iron objects were received for examination, conservation assessment and X-radiography. The objects were briefly visually examined to assess their condition and stability, to determine the material from which they were made, and to look for surface and technological detail.

The objects were found to be moderately or highly corroded when examined, and all five were stable.

Moderately corroded metallic material is defined as having the surface detail, but not usually the general form of the object, obscured by corrosion products, and has some metal remaining below the corrosion.

Highly corroded metallic material is defined as either having both the form and the surface detail of the object obscured by corrosion, and/or having little or no metal remaining in its core.

Details of the artefacts examined, including an identification of the material and of the object where possible, the condition of the object when examined, its XR plate number, and any technological or other observations, were added to the attached site database (Table E1).

#### **X-Radiography**

The objects were sorted into groups of a similar density, which were X-rayed together. Two XR plates were used.

When viewing the XR plates, they should be orientated with the bright spot (a lead marker) in the top left hand corner, to correspond with the annotated XR sleeve.

#### **Results**

X-radiography confirmed two of the objects as nails, and a third as a broken hobnail. The horseshoe calkins appear to be formed by a slight thickening of the iron.

Object 605AC has a tentative identification as a blade fragment. Under x16 examination, a slightly wedge-shaped broken section can be seen, but this is not confirmed by the X-radiograph, which shows few details of the object's form.

#### **Recommendations**

No further conservation work is recommended on objects 102AA, 200AA, 605AB and 605AD. Investigative conservation in the form of selective air abrasion could be used to confirm the identification of 605AC as a blade fragment.

## Appendix E1

Table E1: Conservation and X-ray

Context	Finds code	Material	Object type	Artefact description	Period	Qty	Wt (g)	Condition	XR no
102	AA	fe	nail	incomplete	?	1	2	hc/st	5534
200	AA	fe	horseshoe	complete	?modern	1	347	mc/st	5533/34
605	AB	fe	hobnail	in 2 frags	Roman	1	1	hc/st	5534
605	AC	fe	blade frag	very corroded	?	1	3	hc/st	5534
605	AD	fe	nail	from sample AA, complete	Roman	1	3	mc/st	5534

## Key

mc:moderately corroded

hc:highly corroded

st:stable

## Appendix F RECORDED FINDS

*Sarah Wilkinson*

### Introduction

This report follows the guidelines issued by the Finds Research Group 700–1700, relating to the ‘assessment of potential for analysis’ as set out by English Heritage (1991). All the finds were examined, with reference to the conservation assessment report and the XR plates (Jones 2006), in order to make recommendations for any further investigative analysis.

All the finds have been well packaged for short to medium term storage in accordance with conservation and museum guidelines.

### Summary

Only five iron objects were recovered from three contexts. Of these, three of the objects were from a Romano-British ditch 606, in Trench 6; one object was recovered from a medieval pit in Trench 1, and one modern object was unstratified (Table F1).

### Catalogue

1. Hobnail. Context 605 AB. Fill of ditch 606. Roman.

An incomplete hobnail in two pieces with a rounded and dome-shaped head. A common type from Roman footwear.

Head diameter 10mm. Shank width 3mm × 3mm.

2. Blade? fragment. Context 605 AC. Fill of ditch 606. Roman.

A small fragment of a possible blade. The wedge-shaped section was visible under x16 magnification but not confirmed by X-radiograph.

Length 19mm, width 14mm × 14mm.

3. Nail. Context 606 AD. Fill of ditch 605. Roman

A structural, hand-made, near-complete nail with a rounded, flat head and a square-sectioned, tapering shank. Nails are the commonest finds on most Roman sites and the majority display a high degree of standardisation. This particular example conforms to Manning ‘s type Ib.

Length 29mm, head diameter 17mm, shank width 5mm × 5mm.

4. Nail shank. Context 102 AA. Fill of pit 103. Medieval.

A bent nail shank with a square, tapering section.

Length 32mm, width 6mm × 6mm.

5. Horseshoe. Context 200 AA. Topsoil. Modern.

A complete riding shoe fullered all the way round indicating that it was probably made from factory-fullered bar. Four rectangular-shaped nail holes were visible on either side but no toe clips survived.

Length 117mm, width 119mm.

## Conclusion

The small assemblage of ironwork is indicative of Roman presence in the vicinity, although the quantity and quality of objects recovered does not allow an interpretation as to the extent or type of activity. The possible blade fragment could be investigated further to confirm the identification but otherwise no further work is recommended for the remaining objects. A short summary and catalogue of the small finds should be included in any future publication of the site.

## Recommendations

All the objects should be kept and deposited in the appropriate receiving museum together with the rest of the archive.

## References

- English Heritage (1991) *Management of Archaeological Projects*. English Heritage, London.
- East Anglian Archaeology, (1993). *Norwich Households, Medieval and Post-Medieval Finds From Norwich Survey Excavations 1971-78*.
- Manning, W.H., (1976) *Catalogue of Romano-British Ironwork in the Museum of Antiquities Newcastle upon Tyne*.
- Sparkes, I.G., (1998) Old Horseshoes Shire Publications Ltd.
- Wilson, P.R., (2002) *Cataractonium: Roman Catterick and its Hinterland. Excavations and Research, 1958-1997. Part II*. CBA Research Report 129. (English Heritage).

## Appendix F1

Table F1

Context	Context Description	Finds code	Object type	Artefact description	Qty	Wt (g)
200	Topsoil	AA	horseshoe	complete, modern	1	347
102	Fill of pit 103	AA	nail	incomplete	1	2
605	Fill of ditch 606	AB	hobnail	in 2 pieces	1	1
605	Fill of ditch 606	AC	blade?	very corroded fragment	1	3
605	Fill of ditch 606	AD	nail	complete, from sample AA	1	3

## Appendix G

## ENVIRONMENTAL REMAINS

*Gemma Martin and James Rackham***Introduction**

Northern Archaeological Associates (NAA) conducted an archaeological evaluation at the site of the proposed Grayfleet Gas Storage Facility (GSF), near Saltfleetby St Peter, Lincolnshire in order to investigate a series of anomalies recorded by geophysical survey and gauge the extent of the archaeology in locations not covered by the geophysical survey, where deeper foundations were proposed. A Romano-British ditch sealed by a Romano-British buried soil was identified in Trench 6 from which three environmental bulk-soil samples were selected for environmental investigation and submitted to the Environmental Archaeology Consultancy (EAC) for processing and assessment (Table G1). In addition three spot samples were taken from what appears to be a multiple burial pit of probable medieval date.

*Table G1: Samples taken for environmental assessment*

Sample	Context	Sample vol. in L.	Sample wt. in kg	Description/Provisional Interpretation	Provisional date
AA	601	12	9.5	Buried soil	Romano-British
AA	605	10	10	Fill of ditch [606]	Romano-British
AA	611	10	9	Fill of ditch [610]	Romano-British
AA	105	2	1.7	fill of bone pit	medieval
AB	105		0.63	fill of bone pit	medieval
AC	105		1.45	fill of bone pit	medieval
AA	101		1	sediment bone pit cut through	post-Roman?

**Methods**

The three bulk soil samples were processed by NAA. The three samples consist of four, ten-litre tubs of soil, amounting to approximately forty litre samples. For the purposes of this assessment, one tub from each sample was processed with the initial sample volume and weight measured prior to processing. The samples were washed using a flotation sieve with a 0.5mm mesh and an internal wet sieve of 0.5mm mesh for the residue. Both the residues and flots were dried and the residues were not re-floated. The dry volume of the flots was measured and the volume and weight of the residue recorded. A total of 32 litres of soil was processed in this way.

The residues were sorted by NAA, with the environmental and archaeological finds picked out, noted on the assessment sheet and bagged independently. The residues, sorted finds and flots were then passed onto EAC for assessment. The residues were noted to consist of concreted sediment and the largest (601 AA) was refloated to ensure the maximum recovery of the charred botanical remains. A magnet was run through each residue in order to recover magnetised material such as hammerscale and prill. The flot of each sample was studied using x10 magnifications and the presence of environmental finds (i.e. snails, charcoal, carbonised seeds, bones etc) was noted and their abundance and species diversity recorded on the assessment sheet. The flots were then bagged and along with the finds from the sorted residue, constitute the material archive of the samples.

The individual components of the samples were then preliminarily identified and the results are summarised below in Tables G2 and G3. Botanical nomenclature follows Clapham *et. al.* (1962).

Of the three samples collected from the probable medieval burial pit (105) and the control sample from the surrounding silts (101) small sub-samples of each were tested with hydrochloric acid for the presence of calcium carbonates. The samples from context 105 failed to effervesce while that from the natural marine silts on the site effervesced strongly. Sample 105 AA was washed and floated and the float studied under the binocular microscope.

## Results

The Romano-British deposits have been described as compact clays and washed down to produce residues of concreted sediment with very occasional inclusions of fired earth/daub, charcoal and fragmented bone. A limited number of finds were recovered from the samples and consist of a small amount of pot and an iron tack along with small quantities of fired earth/daub, coal and bone (Table G1). In addition, several fragments of marine shell, small amounts of comminuted charcoal, charred cereal grain, cereal chaff and weed seeds are also present (Table G3). The residues contain no magnetic material.

The remains of bone, including burnt bone, are fragmented and in a poor state of preservation and are confined to buried soil (601) and the fill (605) of ditch 606. The only identifiable bone is from buried soil 601 and includes fragments of cattle tooth from an animal aged between 2-4 years at death. The charcoal recovered so far consists of comminuted charcoal with only occasional fragments of herbaceous stem, including a single culm node, and do not constitute assemblages suitable for further analysis. The overall preservation of the charred cereal grain is also poor, with many of the intact grains being clinkered and distorted in appearance. In instances where identification to genus has been possible, wheat (*Triticum* spp.) has been recorded with preliminary identifications of spelt (*Triticum spelta*) and grains sharing similar morphological characteristics to those of spelt and emmer (*T. dicoccum*) wheat were also recorded. Two grains of hulled barley (*Hordeum* sp. var. *vulgare*.), are present in the fill of ditch 606, one of which is twisted in appearance, which is indicative of six-row barley (*H. vulgare* var. *vulgare*). The cereal chaff assemblages appear to consist entirely of wheat chaff, much of which is very fragmented. The identifiable chaff is that of a glume wheat species (such as emmer or spelt), with several glume bases positively identified as spelt wheat, which seems to correspond with the grain assemblages.

The weed seed assemblages are limited to several seeds including goosefoot type (*Chenopodiaceae*) and abraded indeterminate legumes from buried soil 601, a single grass seed from ditch fill 611 and a small quantity from ditch 606 which includes very abraded legumes with a number provisionally identified as vetch/vetchling/pea (*Vicia/Lathyrus/pisum* spp.) and medick/trefoil (*Medicago/Trifolium* spp.) as well as single seeds of meadow/creeping/bulbous buttercup (*Ranunculus* Section *Ranunculus*), knotgrass (*Polygonum aviculare* agg.) and grass.

Traces of coal have been noted in the flots of 601 and 605, and it is unlikely to be part of the natural soil matrix. The coal is generally small, shiny and angular and may have been brought onto the site by means of a human agent since one would expect the coal to be dull, weathered and less angular if it had been washed onto the site by the tide. Alternatively the traces of coal may represent later intrusive material since coal, although available and mined in the Romano-British period, was not a resource extensively used until the medieval period.

The presence of uncharred root material along with small numbers of uncharred seeds, including those of the nightshade family (Solanaceae) have also been recorded in the flots and have been treated as contaminants in this instance.

**Table G2: Archaeological finds from processed samples**

Sample	Context	Vol. in L.	Residue vol. in ml	Pot*	Fe No.	Coal wt.g.	Fired earth/daub wt.g.	Bone wt g.	Comment
AA	601	12	600	1-10/2		+	5	8	
AA	605	10	300	1-10/4	1-10	+	10	2	Iron tack, 4g.
AA	611	10	<50						
AA	105	2					87		Lots fuel ash slag

\* - Count/weight of pot; + = present

**Table G3: Environmental finds from processed samples.**

Sample	Context	Vol. in L.	Flot Vol in ml.	Char-coal \$	Charred grain *	Charred chaff *	Charred seed *	Marine shell wt.g.	Comment
AA	601	12	<1	1/2	1	1	1	1	Wheat, wheat chaff, goosefoot family, indet. legume?; cow; oyster.
AA	605	10	5	2/5	2	2	2	2	Wheat, barley, wheat chaff, meadow/creeping/ bulbous buttercup, vetch/ vetchling/ pea, indet. legumes, medick/trefoil, knotgrass, grass family; indet. bone; oyster.
AA	611	10	<1	0/1			1		Grass family.
AA	105	2	55	0/2			1		Carex sp., grass type and stem fragments

\$ = abundance >2mm/abundance < 2mm; \* = abundance: 1=1-10, 2=11-50, 3=51-150, 4=151-250, 5=250+; # = species diversity: 1=1-3, 2=4-10, 3=11-25, 4=26-50, 5=>50

The single sample from the medieval bone pit, 105, produced a large piece of hard fired earth with a little organic temper which may be a brick fragment, a little charcoal and a small number of charred seeds including grasses and sedges (*Carex* sp.). The flot was also full of small fragments of fuel ash slag and fired earth indicating that the soil had been heated/fired. The lack of any effervescence in this context also suggests that the calcareous component originally present in the natural silts had been lost from the fills in the pit.

## Discussion

The fill (605) of ditch 606 proved to be the richest sample in terms of both archaeological and environmental finds, and to a lesser degree buried soil 601, and full processing of these samples would expand the archaeobotanical data from the site. At this stage of assessment, the charcoal and weed seed assemblages are too small to aid in characterising the local and wider ecology of the site, but further evidence might be gained if sample (601 AA) and (605 AA) were fully processed.

The fragmented state of the bone, botanical remains and charcoal indicates that the remains may have been exposed to mechanical action such as trampling and redeposition, prior to final interment. The deposits appear to contain material derived from domestic residues, such as from hearth rakings, due to the presence of fired earth/daub, which have then subsequently been discarded into ditch 606. The apparent concentration of charred botanical remains, oyster shell, and fired earth/daub further suggests that the inferred domestic activity took place within close proximity of ditch 606 as opposed to ditch 610. Evidence for crop processing is possibly indicated by the presence of cereal chaff, but unfortunately the cereal and weed seed assemblages are too small to identify which stages of processing the assemblages may have undergone, although the cereals provisionally identified are typical of those cultivated during the Romano-British period.

The inferred settlement occupies a marginal environment; the preliminary assessment of the sedimentary sequence (Rackham 2006) using the borehole survey conducted by Costain Geotechnical Services (2005), suggests that a possible Romano-British coastline (tideline) ran across the site which may have followed the edge of a channel feature identified to the south. The site was then situated in close proximity to the sea, within a saline, exposed environment, with the surrounding land available for agricultural purposes, possibly prone to fresh-water and marine inundations. In areas that tend to be saline, exposed and poorly drained, hardier crops such as barley are generally grown more commonly than wheat, yet despite this, wheat seems to dominate the limited cereal assemblages, and this apparent dominance should be explored if the opportunity arises in future work.

The results from the sample from the fill of the medieval bone pit indicate that the calcium carbonate component of the natural silts on the site had been lost from the sediment filling the pit and the deposit is composed of a high proportion of partially fired sediment responsible for its grey colour and the presence of fine fired earth and fuel ash debris. There is however a lack of charcoal or burnt organic material in the feature. This lack perhaps belies a possible interpretation that the carcasses buried in the pit or pits were burnt, which might possibly indicate that they had died of disease.

### **Archaeological potential**

The range and quantity of archaeological and environmental remains recovered from the three Romano-British samples provides limited scope for understanding the nature and extent of the activity identified on the site. Domestic activity is inferred, with probable food residues having been discarded into ditch 606, although the size, status and longevity of the occupation cannot be determined on the basis of the evidence recovered so far. The concentration of rubbish in this feature indicates that this ditch could be associated with a domestic structure. There is some indication of crop processing among the charred plant remains but whether these relate to domestic cleaning of the grain or agricultural processing cannot be established on this limited evidence although processing of the remainder of the samples may permit some interpretation in this area.

### **Recommendations**

The feature types sampled and assemblage size negates further analysis of the charcoal. In the event of future work, however, consideration of the potential for charcoal analysis in terms of issues relating to availability of woodland resources, local environs, trade and species selection for fuel and structural purposes for use in domestic, industrial and ritual contexts, should be included in the sampling strategy. Identifying potential local resources, possible woodland management strategies or the importation of wood is particularly significant during the Romano-British period in this area of Lincolnshire, as it would have been a largely treeless environment, with settlers exploiting new areas of land exposed during a short episode of marine regression.

Placing the site within its environmental context such issues relating to subsistence in a marginal environment, as well as examining potential links with the possible high-status Romano-British settlement site within the vicinity of Saltfleetby St Peter, and the implications for status, trade and exchange should also be considered if further work arises.

### Acknowledgements

We should like to thank the staff of NAA for the processing of the three Romano-British samples.

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## Appendix H

### ANIMAL BONE AND SHELL

*James Rackham*

#### Introduction

Northern Archaeological Associates (NAA) conducted an archaeological evaluation at the site of the proposed Grayfleet Gas Storage Facility (GSF), near Saltfleetby St Peter, Lincolnshire in order to investigate a series of anomalies recorded by geophysical survey and gauge the extent of the archaeology in locations not covered by the geophysical survey, where deeper foundations were proposed. During these excavations animal bone and marine shells were recovered from several features and a large feature/pit revealed a large number of animal bones with many articulated. It was decided to leave most of this material in the ground during the evaluation but the surface of the pit was cleaned and drawn and the contents were observed and noted and a short report produced on these field observations (Rackham 2006). During the initial excavation prior to the decision to leave the remains in situ and during the cleaning a small additional collection of bones were removed. This report details the observations made in the report on the field visit and an assessment of the animal bones that were lifted.

#### The animal bone

Bones and teeth were recovered by hand excavation from five contexts during the evaluation (102, 105, 201, 604 and 605). Contexts 102 and 105 are associated with the large bone pit (discussed below) in Trench 1, while contexts 604 and 605 derive from the Romano-British ditch in Trench 6.

##### *Context 201*

One piece of bone weighing 6g. was collected from this context, but is broken into four fragments. The fragment has not been identified but derives from a cattle sized animal.

##### *Context 604*

One fragment of sheep mandible and a broken pig permanent mandibular premolar were collected from this context. A small unidentifiable bone fragment is also present. The mandible is very small suggesting an immature animal while the pig tooth indicates a sub-adult or young adult.

##### *Context 605*

Twenty seven fragments of bone weighing 252g. were recovered from context 605. These include an adult horse radius, fragments of cattle metacarpus, humerus, ulna and 1st phalanx, a fragment of burnt adult cattle 1st phalanx, a dog gnawed fragment of pig thoracic vertebra spine, a rodent gnawed sheep/goat humerus fragment, a sheep/goat mandibular molar 1 and an unworn maxillary molar 3.

### The cattle burial pit

A large feature under investigation during the evaluation had revealed a large number of animal bones, many articulated. The dating evidence included fragments of medieval pottery. The feature may include more than one cut, perhaps two adjacent inter-cutting pits, and a possible third unexposed pit is suggested by a deposit of grey silts in the south west corner of the trench very similar to those filling the exposed pit(s). The surface of the pit has been truncated by the machine and presumably also the ploughing on the site. For the purposes of the evaluation it was decided to leave the pit unexcavated, but clean up and plan the exposed bones. However during the initial evaluation and cleaning bone was recovered by hand from contexts 102 and 105.

#### Context 102

Seven hundred and twenty two bone fragments weighing 3080g. were collected from context 102 the upper fills of the bone pit. These were scanned and preliminarily sorted and although there are a fairly large number of bone fragments that have not been identified nearly all of these derive from cattle sized animals. Among the identifiable fragments all the bones are cattle except the third phalanx of a pony, a femur of a pig, fragments of a cat skull and a distal fragment of a sheep/goat humerus.

Amongst the cattle bones most parts of the skeleton are present although skull, pelvis, scapula and tibia fragments are uncommon. A minimum of four cattle are represented among the remains and include a small calf, represented by several bones from the same foot, juvenile, immature and adult animals, including at least one aged or elderly animal.

Considering the survival of the bones in context 105 below it seems likely that the bones in 102 have been subject to some disturbance and their fragmentation may be due to disturbance by the plough or compression by the machine used on site and damage during the stripping.

#### Context 105

Twenty fragments of bone weighing 46g. were collected from this context including three cattle sesamoids, a cattle ulna and several large ungulate rib fragments. The three sesamoid bones are likely to derive from the same foot.

An on-site assessment was made of the species in the pit, the number of animals that could be recognised from the exposed bones and the approximate ages at death of these individuals. All the visible bones bar two metapodials could be identified as cattle. The two metapodials lying adjacent in the eastern end of the feature appear to be from a small pony, the remainder of whose skeleton may still lie buried and the third phalanx may have been recovered from context 102 above. An assessment of the exposed cattle bones indicates the presence of at least ten animals. Considerable disturbance of the exposed bones makes it difficult to associate the non-articulating bones with any particular individual, but it is clear that pairs of limbs and articulating vertebrae, such as the front limbs of an adult and the hind limbs of an immature animal and a calf, show that some at least of these animals were buried as carcasses, and quite possibly all were. One neonate, five juveniles, one immature and three adult cattle could be identified from their jaws and bones. Three adult long bones were measured *in situ* to establish the general size of the cattle. These included a metacarpus, a metatarsus and a tibia and produced estimated withers heights of 1,107, 1,133 and 1,110mm, all of which are consistent with medieval stock (see for instance Bond and O'Connor 1999, 403). There is evidence of burning in the sediment infilling the feature which is confirmed by the results of the study on the soil sample (Martin and Rackham 2006) but none of the bones appear burnt. The grey colour of the silts infilling the feature is probably due to this burning which may have been responsible in combination with the

carcass decomposition for the loss of the calcium carbonate component of the sediments indicated in the analysis of the soil samples (Martin and Rackham 2006).

There is no evidence for butchery of the cattle carcasses, and the number of animals and range of ages suggests that these animals may have died of disease and been buried together, although the possibility of more than one pit suggests two or three similar events. The association of evidence for fire in the sediments filling the feature is possibly supporting evidence for this if it indicates that the carcasses were burnt or at least partly fired although very little charred material has survived in the fills.

### **Marine shell**

Marine shells were recovered by hand excavation from contexts 102, 201, 501, 604 and 605, the latter two associated with the Romano-British ditches in Trench 6.

- 102 - one cockle shell - *Cardium edule* L.
- 201 - oyster, two upper valves - *Ostrea edulis* L.
- 501 - oyster, two lower and one upper valve
- 604 - oyster, seven lower and seven upper valves; one upper valve with an artificial puncture, possibly ancient although it could have been made by a trowel
- 605 - oyster, three lower and six upper valves plus fragments

While it is possible that the cockle shell could be a natural occurrence in these tidally deposited sediments, although associated with the bone pit and medieval pottery, the oyster shells are almost certainly evidence for human exploitation and the discard of shell waste after consumption. Their occurrence in the Romano-British contexts of Trench 6 is further confirmation of the presence of settlement and domestic waste that is suggested from the soil samples (Martin and Rackham 2006).

### **Discussion**

The condition and evidence for articulation of the cattle in the medieval bone pit clearly indicates that at least some of the ten animals recognised during the field observations were buried as carcasses and the clear evidence for fire having impacted upon the sediments surrounding the bones suggests that some attempt may have been made to fire the contexts of the pit or put ash over them. The absence of any burnt bone indicates that any such fire was not sufficiently intense to have burnt the carcasses and charred their bones. This evidence along with the evidence that animals of all age groups are represented in the pit suggests that the cattle may have died through disease. The presence of cattle to the exclusion of almost all other animals, except a possible pony and a possible cat carcass, and single fragments of sheep/goat and pig shows that the pit(s) was excavated primarily for the disposal of these cattle and not general domestic rubbish. Considering that the identifiable cattle bones observed among the hand collected bone and left in situ on site probably constitute over 1000 identifiable bones compared to six bones of other taxa this assemblage is clearly anomalous.

The results of the identification of the animal bone and shell from the Romano-British features in Trench 6 tend to support the inference from the soil samples that the features include domestic debris. The bones indicate the presence of all the main farm animals and also by inference dogs.

## Recommendations

If these features are returned to in a future phase of archaeological investigation at the site it would be advisable for the excavation to be carried out by someone familiar with the cattle skeleton, its individual bones and ageing characteristics. This would ensure that the unarticulated bones, or dispersed articulating material can be re-assigned to the relevant individual, and notes of in situ relationships recorded as the excavation progresses. Such an excavation is more likely to permit a final interpretation of the feature and will ensure that the value of the bone assemblage that is recovered will be enhanced, with details of animal conformation, relative age development of the dentition and post-cranial skeleton, and completeness of each individual can be assessed. A number of complete or partial skeletons of medieval date would be a useful comparanda for archaeo-zoologists studying material in the east midlands.

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## Appendix I

### GEOMORPHOLOGICAL STUDY

*James Rackham*

#### Introduction

A brief preliminary assessment of the sedimentary sequence on the site was made using the geotechnical data from the borehole survey conducted by Costain Geotechnical Services (Costain 2005), observation of the deposits in two evaluation trenches, and hand augered boreholes through the base of three of the trenches. The borehole logs have been used, but the accuracy of the sediment descriptions is not guaranteed. The location of all the boreholes is plotted on Figure I1

#### Results

The borehole logs indicate a bedrock of boulder clay or glacial till composed of sandy slightly gravelly clay with chalk, mudstone and sandstone inclusions. A similarly described deposit beneath the topsoil in GNM5 has been treated as recent since the deposit beneath is suggestive of marine sediments. If the interpretation of this data is correct then the till rises from the NW to a high of just below -2.0m OD in GNM4, then falls to the south and east dropping to -6.55m OD in GEM1 (Figure I2). This appears to reflect a post-glacial channel broadly following the alignment of the existing Grayfleet Drain. In boreholes GNM1, 2, 3 and 4 a peat or organic horizon up to 0.6m thick overlies the till (Fig. I3). Above the peats and tills the sequence is composed entirely of intertidal and marine silts and fine sand laminae. The borehole sunk to approximately -2.0m OD in one of the evaluation trenches on 30th June showed a series of laminated silts and fine sands typical of intertidal sediments, and these are also described in the borehole log for GNM4. The borehole log descriptions of 'clay' are probably in fact fine silts, since no clays were observed during the site visit. In the upper metre of the sequence in Trench 6 a Romano-British ground surface is present, sealed by later marine silts (Figure I5).

The geotechnical data has been used to construct a profile of the sediments across the site from the NNW to the SSE (Figure I3) showing the freshwater and peat deposits overlying the glacial till.

In order to further test the evidence from the geotechnical survey and establish whether the peat deposits extend across, and how far, the area being evaluated three further hand augered boreholes were sunk in Trenches 5, 6 and 7. The detailed field logs for these boreholes and the sections in the side of evaluation Trenches 6 and 7 can be found in Appendix I1.

In Trench 6 the deposits in the trench side were described and then the sediments beneath the trench floor were augered. A bedrock of boulder clay was recorded at a depth of 5.91m below ground level or at -4.2m OD. The deposits immediately above this are grey blue sands of possible glacial origin. These in turn are capped by slightly banded grey silts with organics indicating a freshwater environment with a band of peaty silts within it. The organic component increases upwards until a rich brown peat (Figure I4) including some small wood forms at approximately -3.63m OD in a marshy environment. This peat is just over half a metre thick but becomes siltier, and slightly laminated towards the top, indicating a return to freshwater conditions. A sample was taken from the

upper few centimetres of this peat for radiocarbon dating and produced a date of  $4420 \pm 70$  BP (Beta 220591). Above this is a sequence of banded black stained silts, with fine laminae developing indicating the onset of tidal conditions and a saltmarsh environment. The deposits coarsen upwards into medium silts with fine sand laminae indicating lower saltmarsh and mudflat conditions reflecting a transgressive marine episode. In the upper part of the sequence there is a fining upwards indicating a regressive phase, the development of upper saltmarsh and finally terrestrial conditions in the Roman period that allowed the development of a soil. The upper sediments in the profile indicate a transgressive phase and the return of the site to saltmarsh before the final reclamation of the area in the medieval period.

In Trench 5 approximately 50m to the south a similar sequence is recorded (see Appendix I1) but although the lower organic freshwater silts overlying the boulder clay were recorded the peat was absent and had either never formed here or was washed away by later tidal flow up and down the channel that occupied this southern part of the site (Figure I2).

A discrepancy of 1.4m between the base of the peats in Trench 6 and the upper surface of the freshwater silts in Trench 5 indicates that any peats at this point in Trench 5, if they ever existed, would have been removed by later tidal erosion. In this trench there was little evidence for the Roman ground surface identified in Trench 6 although a darker horizon (Figure I7) may reflect this level. The Roman ground surface in Trench 6 lies at approximately 1.01m OD while this darker horizon in Trench 5 occurs at approximately 0.7m OD and would be consistent with a fall of about 0.3m across the 50m between the two trenches.

In Trench 7 the upper surface of the boulder clay lies at -5.36m OD, 1.16m lower than in Trench 6 and 0.19m below its surface in Trench 5. This shows a fall in the underlying geological sediments to the south and to the east of Trench 6 reflecting the channel or valley running along a similar alignment to the present Grayfleet Drain already suggested by the earlier geotechnical work (Figure I2). A freshwater silt with organic fragments and wood occurs below -5.21m OD and is overlain by silts containing fragments of marine shell, including oyster, marking the beginning of the marine phase. The sediments above these develop well laminated silts and sands (Figure I6) including somewhat coarser deposits than those cored in Trenches 5 and 6 perhaps reflecting the slightly more seaward location of Trench 7 or its position in a tidal channel.

## **Discussion**

The preliminary interpretation of this sequence can be summarised as follows. A freshwater phase is indicated by the organic silts overlying the till in the auger holes in Trenches 5, 6 and 7. These deposits were probably laid down by a river draining the land to the west and running beneath the present Greyfleet Drain. In four of the bore and auger holes a peat deposit occurs over the slightly higher glacial sediments (see Figure I2). This deposit extends into the evaluated area (Figure I8) and may underlie Trenches 1 and 2 and the medieval site (Site 6). The radiocarbon date from the upper few centimetres of this peat (see Appendix I2) has produced a date of 3350-2900 cal BC (Beta-220591). In the eastern half of the evaluated area the peats may have been lost to marine erosion or were never deposited in this area because of the channel. This peat dates to the Neolithic period and is followed by a marine transgression and the build up of marine silts and fine sands across the site, but with a possible scour channel beneath the southern field that removed any organic sediments in this area. The date on the peat indicates that the marine transgression at this location commenced sometime in the later Neolithic. An extensive sequence of marine sediments built up, over 6m in borehole GEM2. A short period of marine regression occurred in the Romano-British period allowing occupation (see Appendix H) of some sort in the north-western part of the southern field on the

slightly higher ground but probably not elsewhere in this field although the soil horizon may be recognisable in Trench 5.

Although this buried ground surface was not noted or recognised in any of the boreholes undertaken by Costain (a geotechnical team would not normally record such a horizon unless it was accompanied by recognisable debris) it is plausible to assume that the Romano-British land surface may be preserved intact over a similar area to that of the underlying peat deposits with any archaeological evidence that it contains. More extensive Romano-British archaeology may occur to the north-west in the adjacent field, and perhaps beneath the medieval site.

It seems likely that a Romano-British coastline (tideline) actually ran across the site, probably following the edge of the channel feature to the south. A late or post-Roman marine advance again inundated the site and was responsible for the accumulation of a further 0.5 to 1.0m of marine sediments across the site, sealing the Romano-British surface. Finally another phase of regression or reclamation made the site available for recolonisation in the medieval period on the slightly higher silts that appear to overlie the slight ridge of glacial till beneath. The traditional sequence on this part of the Lincolnshire Coast (Swinerton 1936) records a lower peat and forest bed and a higher freshwater marsh clay and upper peat sandwiched between saltmarsh clays and tidal silts. This upper peat has not been recognised at the site although it may be represented by the Romano-British horizon.

### Acknowledgements

I should like to thank Gavin Robinson for assistance with levels and information concerning the site and one of the site team for help with the augering.

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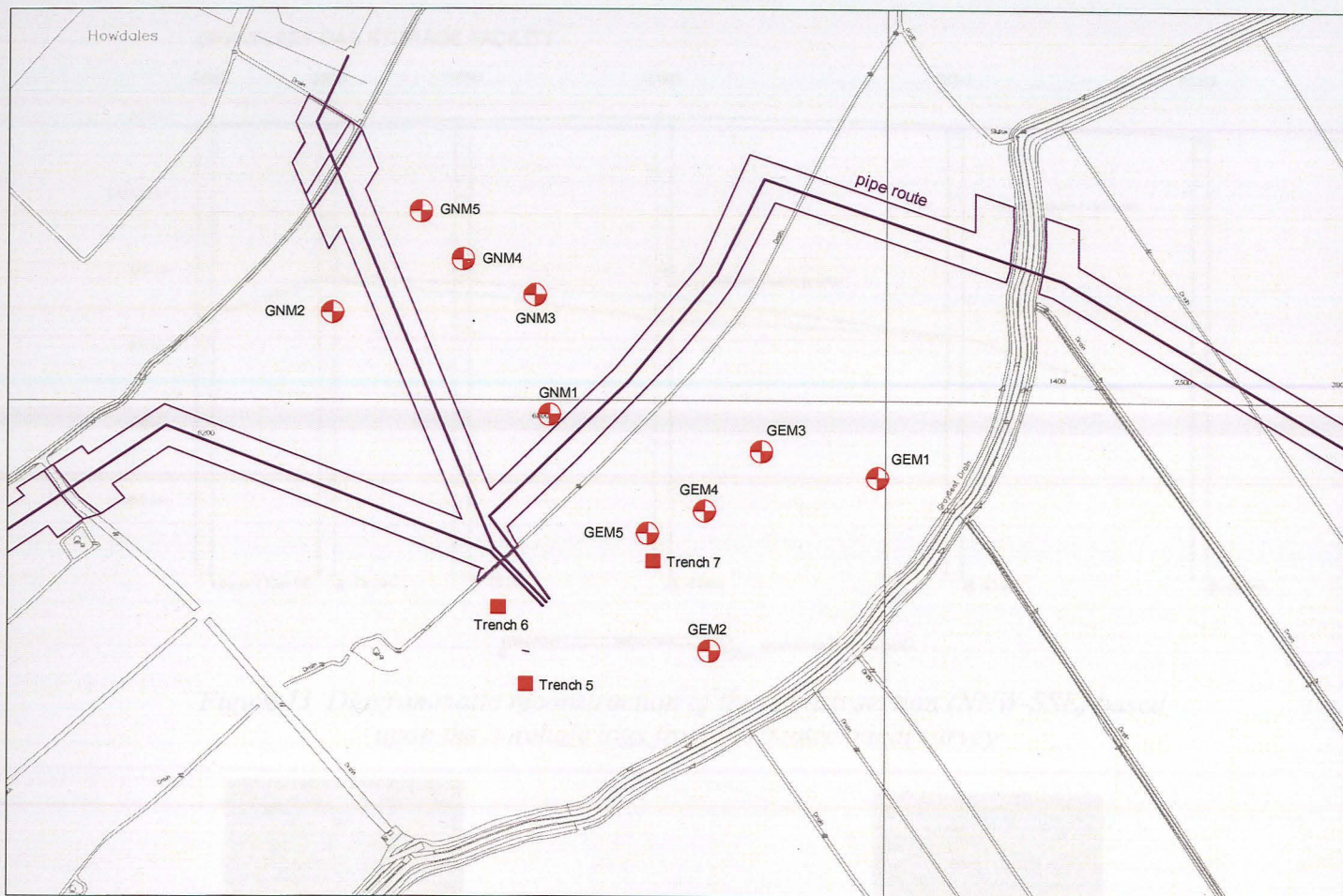


Figure I1 Grayfleet Gas Storage Facility - borehole locations (circles - Costain Geotechnical; squares - archaeological auger holes)

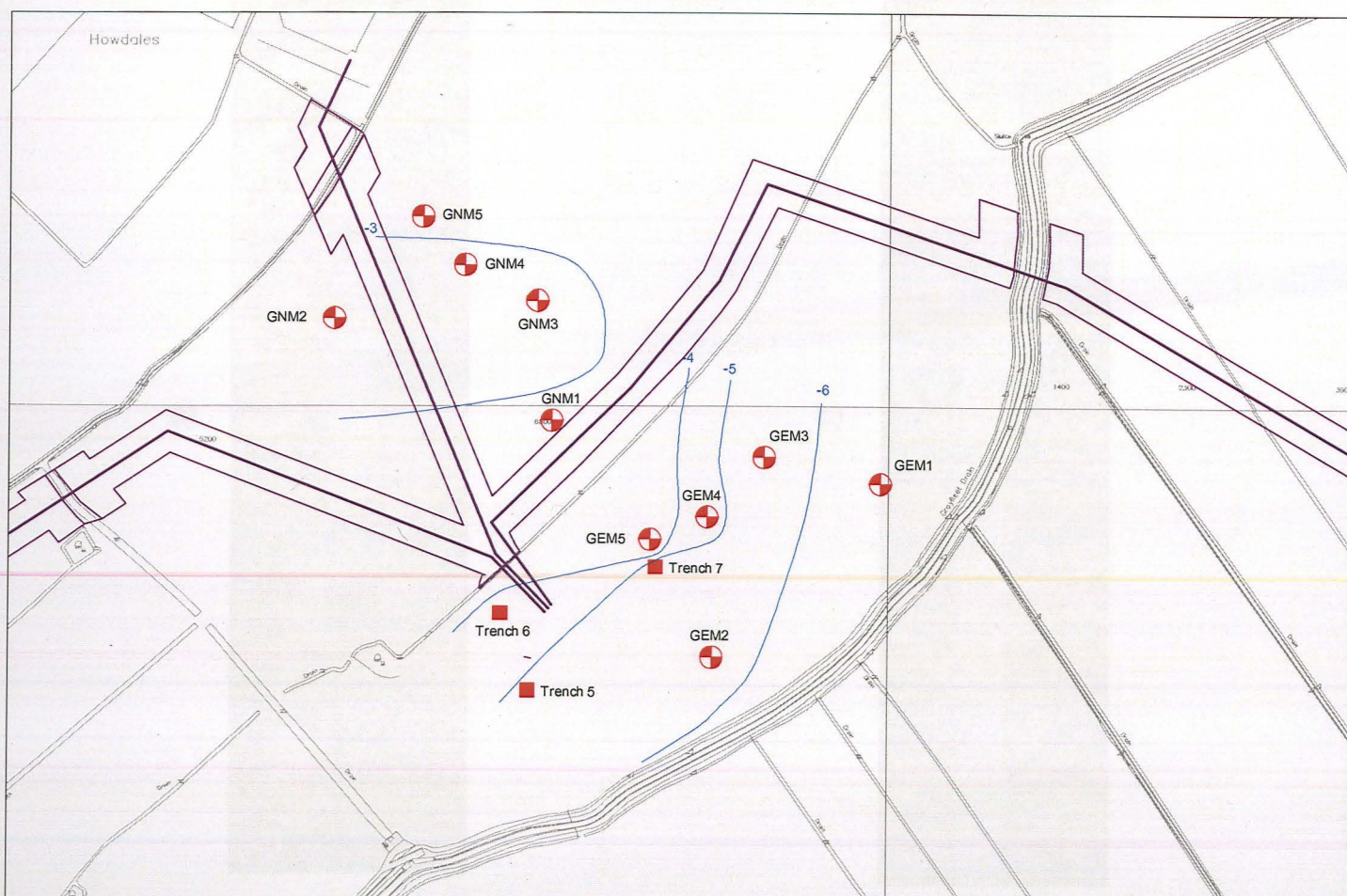


Figure I2 Approximate extrapolated contours for the upper surface of the boulder clay in metres OD, and hence the base of the post-glacial sediments ©NAA 2006

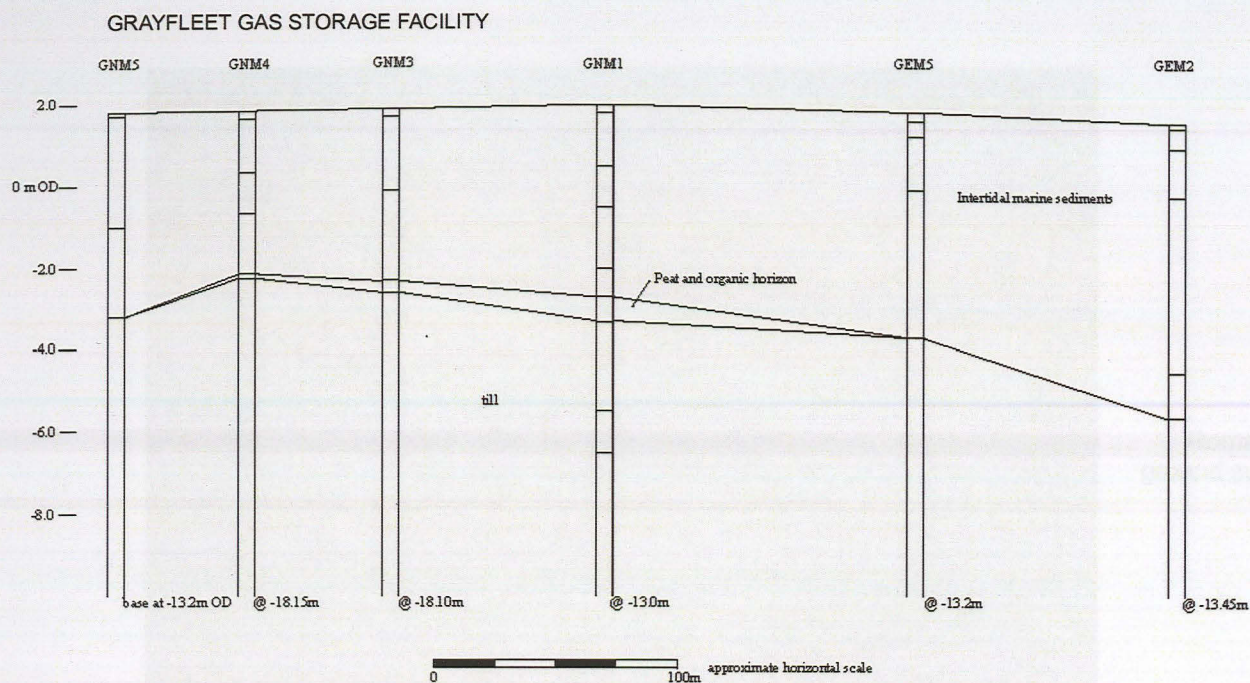


Figure I3 Diagrammatic reconstruction of the deposit section (NNW-SSE) based upon the borehole logs from the geotechnical survey

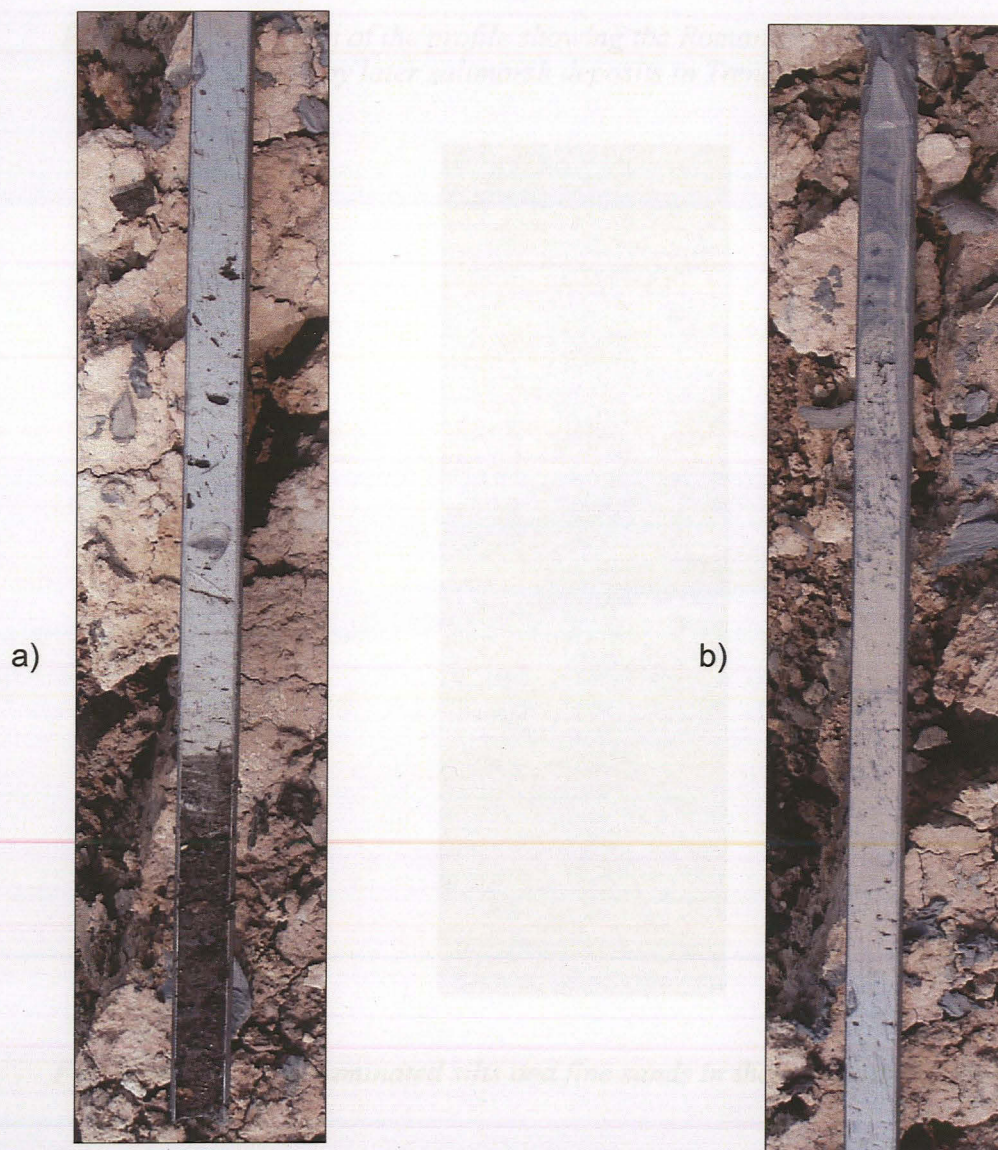


Figure I4 Upper surface of peats and overlying organic silts (a) and saltmarsh silts and the beginning of intertidal sediments (b) from the same 1m core in the borehole beneath Trench 6



— Roman  
ground surface

*Figure I5 Illustration of the profile showing the Roman ground surface covered by later saltmarsh deposits in Trench 6*



*Figure I6 Intertidal laminated silts and fine sands in the borehole from Trench 7*



Figure 17 The south facing section in Trench 5 with a possible old ground surface at the level of the top of the trowel handle, overlain by later marine sediments (the trowel is approx 29cm long including handle)

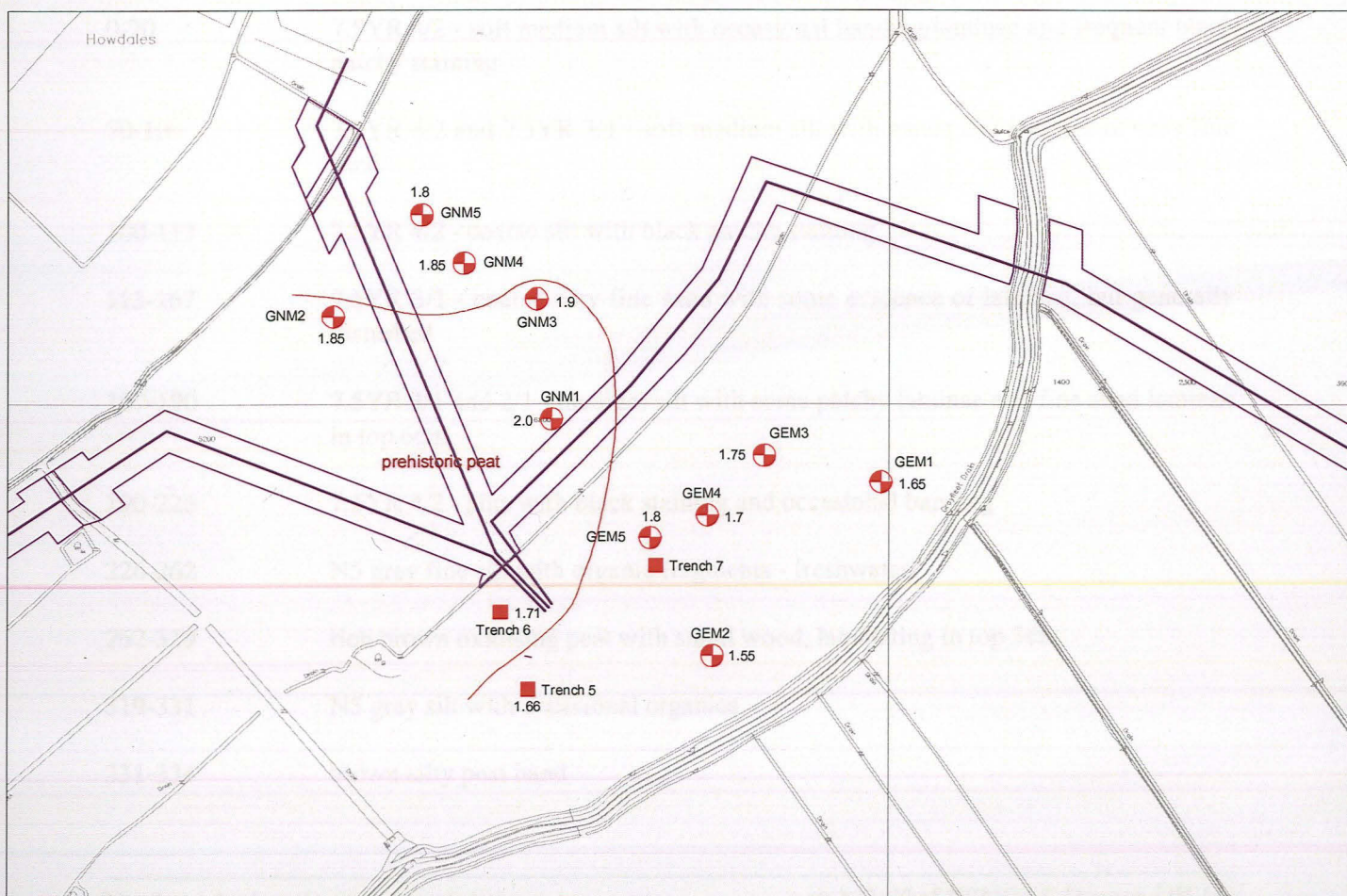


Figure 18 Suggested distribution of prehistoric peats across the site and the OD height in metres of the ground surface at each borehole

## Appendix II

All measurements listed are in centimetres

### TRENCH 6

Upper part of section (not cored)

0	modern ground level
0-70	7.5YR 5/3 - stiff very fine silt - upper saltmarsh?
70-110	10YR 5/1 compacted fine silt - Roman ground surface - dried out upper saltmarsh 7.5YR 5/3 sandy fine silt with occasional sand partings 7.5YR 4/4 - silty laminae
110-183	7.5YR 4/3 - soft fine silt - saltmarsh?
183-215	10YR 4/1 - fine soft silt

Core taken in base of trench at bottom of above sequence - top of core -0.44m OD

0-70	7.5YR 4/2 - soft medium silt with occasional banding/laminae and frequent black patchy staining
70-100	7.5YR 4/2 and 7.5YR 3/1 - soft medium silt with bands and laminae of very fine sand
100-113	7.5YR 4/2 - coarse silt with black patchy staining
113-167	7.5YR 3/1 - coarse silty fine sand with some evidence of laminae, but generally disturbed
167-190	7.5YR 3/1 and 2/1 - medium silt with some patchy laminae and fine sand laminae in top 6cm
190-226	7.5YR 4/2 - silts with black staining and occasional banding
226-262	N5 grey fine silt with organic fragments - freshwater?
262-319	rich brown oxidising peat with small wood, laminating in top 3cm
319-331	N5 grey silt with occasional organics
331-334	brown silty peat band

334-358	grey silt with slightly banded and frequent organics
358-370	grey blue silty fine to medium sand
370-376	grey blue sands
376-390	boulder clay

## TRENCH 7

Upper part of section - not cored

0-90	7.5YR 4/4 - fine silt with occasional sand laminae-partings 7.5YR 5/4 - medium silt with frequent sand partings/laminae
90-170	7.5YR 4/3 - fine and medium silt with frequent sand laminae 7.5YR 4/3 - medium laminated silts with very fine sand partings

Core taken in base of slot in Trench - top of core -0.61m OD

0-100	dark grey 7.5YR 3/1 silts with frequent fine sand laminae
100-200	10YR 4/1 - fine silts with frequent laminae with fine sands and some medium sands
200-210	10YR 4/1 - silts with occasional fine sand laminae
210-330	10YR 3/1 - laminated silts and sands, medium to fine sands with silt laminae
330-400	10YR 3/1 - fine silts with occasional fine sand laminae and disturbed sandy areas coarsening upwards
400-415	laminated silts with occasional very fine sand laminae
415-425	sandy silts - disturbed with shell fragments and occasional organics
425-445	dark grey black slightly sandy silts with oyster shell fragments
445-460	black - 10YR 3/1 - silts with oyster shell and rare organics
460-475	dark grey silts with traces of organics and wood
475-495	boulder clay - angled upper surface - erosional

## TRENCH 5

Core sunk to locate any peat or organic horizon - not recorded until 429cm - top of core = -0.73m OD

- |         |   |
|---------|---|
| 400-429 | dark grey - 10YR 3/1 - soft silts erosional surface at base of this layer |
| 429-444 | grey and blue grey silts with frequent organic matter - freshwater?       |
| 444-454 | weathered boulder clay - 7.5YR 4/2 - possible old ground surface?         |

Appendix I2

## CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-27.6‰; lab. mult=1)

Laboratory number: Beta-220591

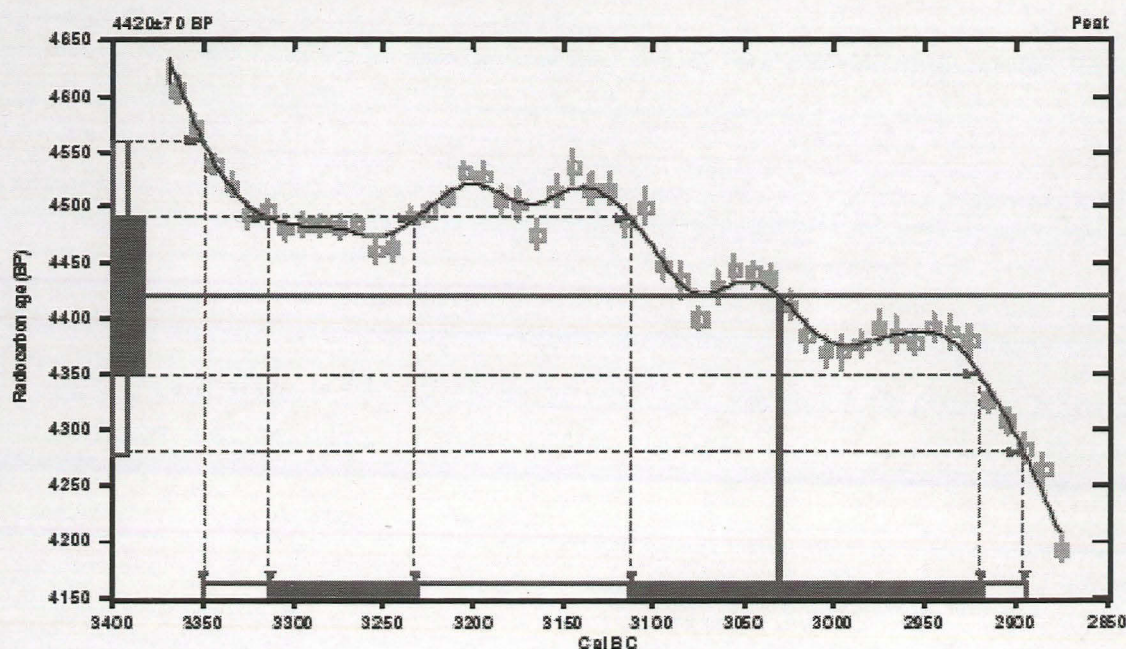
Conventional radiocarbon age: 4420±70 BP

2 Sigma calibrated result: Cal BC 3350 to 2900 (Cal BP 5300 to 4840)  
(95% probability)

Intercept data

Intercept of radiocarbon age  
with calibration curve: Cal BC 3030 (Cal BP 4980)

1 Sigma calibrated results: Cal BC 3310 to 3230 (Cal BP 5260 to 5180) and  
(68% probability) Cal BC 3110 to 2920 (Cal BP 5060 to 4870)



### References:

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INTCAL98
- Calibration Database
- Editorial Comment  
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