

**Calor Gas LPG Pipeline,**

**Coryton,**

**Essex**

## **Archaeological Evaluation Report**

**ASE Project No: 8397**

**Site Code: THCP15**

**ASE Report No: 2015275**



**July 2015**

**Calor Gas LPG Pipeline,  
Coryton, Essex.**

**Archaeological Evaluation,**

**NGR: 57385,183205**

**Planning Ref: 13/00005/FUL**

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**ASE Report No: 2015275  
OASIS id:**

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**Abstract**

Archaeology South-East (ASE) was commissioned by RPS Consulting on behalf of Calor Gas Ltd. to undertake an archaeological evaluation along a corridor of land at Coryton, Essex. The site crosses an area of grazing marsh where visible earthworks of 'stetch' cultivation are present along with an area of low-mounds which had been provisionally identified as, 'red hills'- mounds of waste products arising from slat production in the Roman period. The nearby farm, Oozedam, is situated on a slight rise and is documented from the 16<sup>th</sup> century.

Three trenches and a two test pits were excavated by machine to the top of the natural deposits. Trench 1 investigated an area of 'stetch' and Trench 2 and 3 the low mounds.

Trench 1 was devoid of archaeological material. The trench was excavated to 1.2m deep and the Holocene alluvial geological sequence recorded.

Trench 2 and Trench 3 identified layers of burnt clays, ash and charcoal which overlay the natural alluvial clays. These characteristics, along with the presence of briquetage, established that the layers were associated with a salt works. The artefacts, including an assemblage of late Roman pottery and box-flue tile may suggest the presence of a nearby settlement.

The report concludes that:

- Archaeological remains survive along the pipeline corridor;
- These are of late Roman date;
- The mound in FM 20 (Trenches 2 and 3) is likely to be part of a salt working site;
- The artefactual assemblage would suggest that there may be late Roman occupation nearby;

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## **1.0 INTRODUCTION**

### **1.1 Site Background**

1.1.1 Archaeology South-East (ASE), the contracting division of the Centre for Applied Archaeology (CAA), Institute of Archaeology (IoA), University College London (UCL) was commissioned by RPS Consulting on behalf of Calor Gas Ltd. to conduct an archaeological evaluation in the vicinity of Coryton, Essex (Fig. 1).

1.1.2 The site is a corridor of land of approximately 900m in total length which links an existing LPG pipeline to the north; (NGR 573921, 183505) to the Calor filling plant at Coryton on the northern bank of the River Thames (NGR 573890 182656). The development proposals are for the installation of a new section of pipeline running along this corridor.

### **1.2 Geology and Topography**

1.2.1 The British Geological Survey geology of Britain viewer (<http://mapapps.bgs.ac.uk/geologyofbritain/home.html> accessed 28/07/2015) shows the solid geology of the site as London Clay. This is part of the Thames Group of clays, silts, sands and gravels, which in-filled the London Basin and date to the Eocene (55 to 34 million years ago). Superficial deposits are mapped as Alluvium (clay, silt and sand) 625K, distinguished on 10K mapping as Tidal Flat Deposits, that is "...consolidated soft silty clay, with layers of sand, gravel and peat." (BGS Lexicon of Rock Units; <http://www.bgs.ac.uk/Lexicon/lexicon.cfm?pub=TFD>). These deposits are of Holocene date. The northern limit of these deposits lies c. 2km to the north-west of the site where the Pleistocene Thames Terrace deposits outcrop above the floodplain. The Holocene deposits accumulated within the template provided by the underlying Pleistocene topography in the London Basin. Thus the Holocene sediments can be found in a thickening wedge, from c. 2m in central London to c 35m in the vicinity of Canvey Island to the east of the site.

1.2.2 The Holocene sediments have been deposited in a variety of environments (e.g. alder carr, reed-swamp, saltmarsh and mudflats) the sediments consequently been found in intercalated sequences, typically of clay-silts and peat/mineralogenic peat deposits. Devoy related these sediments as representing sequences of marine transgression and regression, the Thames-Tilbury model (GTESC 2010). More recent work has suggested a tri-partite model, where waterlogging of the floodplain began in the late Devensian causing the accumulation of freshwater peats in some places. River levels then began to rise but did not have widespread impact as the extensive glacial floodplain was encroached upon only gradually. Marine waters progressed through the middle estuary from before 5000 cal BC, causing raised water tables in the floodplain, and leading to peat formation. From approximately 4000 to 1500 cal BC, the rate of rise seems to have decreased for as yet unknown reasons, and is taken as the second phase of the model. This led to an expansion of wetlands in which much important archaeology was preserved (e.g. GTESC 2010).

- 1.2.3 Reference to recent geotechnical studies at Bowers Marsh, a very similar coastal marshland environment c. 2km to the north-west of the site, identified a basic deposit sequence of agricultural soils (generally to 0.2m), compact brown blocky clay, with some partings of sand and becoming siltier with depth, blue grey clays (1.4-1.8m below the surface) becoming increasingly sandy. Peat deposits, perhaps associated with the Tilbury III regression (late Neolithic-early Bronze Age), were present in some areas, at c. -2.5 to -3.6m OD (Heppell 2009). These geotechnical studies would suggest that in these earlier periods much of Bowers Marsh would have been a complex of mud and sand flats, which were inter or supra tidal. The degree of exploitation of this landscape in the prehistoric periods is unknown. Depending on the tidal regime it may have been used for foraging or perhaps grazing, activities that leave few archaeological traces. Elsewhere around the Essex coast evidence of utilisation has included the presence of, for example, wattle or broom trackways that have been dated to the Bronze Age (e.g. Wilkinson and Murphy 1995; Heppell and Brown 2004). The environment of Coryton Marshes may well have been similar.
- 1.2.4 Subsequent millennia have seen the further accumulation of alluvial deposits; developing from the intra and supra tidal flats to lower saltmarsh (daily tidal flooding) and ultimately to upper saltmarsh, only flooded at the highest tides, this would ultimately developed into grazing marsh which was eventually embanked. This environment would not have been a flat featureless landscape but rather a complex environment of large creeks (generally known locally as 'Fleets'), sinuous creeks and rills. There would have been some variations in level resulting from varying patterns of erosion and deposition. Embankment typically followed the edges of the fleets, and in areas of extensive marshland would effectively have created a series of embanked islands.
- 1.2.5 The northern c.650m of the site crosses an area of this extensive grazing marsh, historically part of Fobbing Marsh and a detached portion of Laindon Marsh. The southern section of the route crosses the large sinuous marshland creek; the Manorway and Salt Fleet. It also crosses a number of drainage ditches, and ponds. It then crosses the northern access road from the A1014 and into the Coryton Refinery complex. A north south aligned farm track runs from a roundabout on the A1014 to Oozedam, a farmstead lying to the west of the site.
- 1.2.6 The site is low-lying with the ground surface level in the vicinity of Trench 1 being c.1.7-1.9mOD, at Trench 2 c.2.3-2.4mOD and Trench 3 at 2.1-2.24mOD. Oozedam is situated on slightly higher ground, at c.3mOD.

### **1.3 Planning Background**

1.3.1 The application site is shown on the Proposals Map of the Thurrock Local Plan (1997) as forming part of the areas that are designated as 'Oil Refineries' as well as an 'Oil Refinery Expansion Area'.

1.3.2 Planning Permission was granted by Thurrock Council on 28 March 2013 (Ref 13/00005/FUL) subject to planning conditions. Condition 8 of the Planning Consent reads:

*No development or preliminary groundworks of any kind shall take place until the applicant has secured the implementation of a programme of archaeological work in accordance with a written scheme of investigation which has been submitted by the applicant, and approved by the planning authority.*

*Reason: To ensure that investigation and recording of any remains takes place prior to commencement of development*

1.3.3 The development proposals are for the installation of a new section of welded steel pipeline, approximately 900m in length. The pipeline is propose to be installed by a combination of Horizontal Directional Drilling (HDD) and open trenching with a minimum surface cover of 1.2m (RPS 2015).

### **1.4 Scope of Report**

1.4.1 This report presents the results of the three archaeological evaluation trenches excavated on the site between 01-02/07/2015 (Fig. 1-2). It followed the methodology laid out in the Written Scheme of Investigation (RPS 2014) and the Risk Assessment Method Statement (ASE 2015).

## **2.0 ARCHAEOLOGICAL BACKGROUND**

### **2.1 Introduction**

2.1.1 The archaeological and historical background is set out in detail in the archaeological WSI (RPS 2014) which includes information from the following studies:

- A Contemplation of Things Wide and Infinite; A report to the RSPB on archaeological desk-top and walkover surveys of proposed new reserves in south Essex (Essex County Council 2006)
- London Gateway; Northern Triangle East Habitat Creation and Enhancements Archaeological Investigation Report (Oxford Archaeology 2008)
- Gateway Energy Centre Gas Pipeline. Heritage Assessment (Oxford Archaeology 2011)

The archaeological background is summarised below.

### **2.2 Chronological Narrative**

2.2.1 The geomorphological development of the area, summarised in section 1.2 above, would suggest that, if present, Neolithic land surfaces and peat/mineralogenic peats associated with rising water level and the breakdown of vegetation lie at depth below the present surface level. At Bowers Marsh the highest peat deposits were encountered at -2.5mOD.

2.2.2 Following the inundation of the area by the rising sea level, deposits of silts and clays accumulated, with the gradual development of high salt marsh and, ultimately, grazing mars. Whilst unlikely to be settled, the natural resources of this landscape are likely to have been exploited, with transient activities, such as hunting and fishing taking place.

2.2.3 The deceleration or regression of sea-level rise, coupled with the establishment of higher marsh allowed greater accessibility. The Roman period saw the Essex coast become the location of numerous salt-making sites, the mounds of debris from which are known as 'red hills'. In south Essex such monuments have been identified at Bowers Marsh (to the north-east), Canvey Island (to the east) and Tilbury marshes (to the west). Such exploitation can pre-date the Roman period; at Stanford Marshes, c. 4.5km to the west of the site, middle Iron Age, early Roman, and late Roman salt-working features were identified, along with other features.

2.2.4 By the Norman Conquest the extensive marshland around Essex was valuable sheep pasture, with the Domesday Book recording it as 'pasture for sheep', the capacity of the Essex marshes on this basis being some 18,000 sheep. Such marshes were not however necessarily embanked.

2.2.5 The 'inning' (embankment) of marshland around Essex was being undertaken in some places by the medieval period, by 1210 the 'law of the



marsh' set out the important principle that each man should contribute to the upkeep of the defences from which he benefited, in proportion to his land or rights on the marsh, a principle which endured till the passing of the Land Drainage Act of 1930. The embankment of marshland would typically have taken place once high/grazing marsh was present that was rarely flooded rather than being reclamation in the sense of the importation of material. Embankment would have typically utilised the readily available clays, with wooden piles used to key the bank into particularly soft areas. Where relict banks are present they would typically follow the main creeks, which often also act as parish boundaries. Within these embanked areas the drainage system often utilised the existing creeks rather than excavating new ditches.

- 2.2.6 The history of the embankment of Fobbing Marshes is largely conjectural due to a scarcity of fixed dates. In 1066 and 1086 there was sufficient pasture in the vills of Fobbing and Corringham for 1500 sheep, and it is probable that much, if not all, of this pasture was on the salt-marsh (ECC 2006). Rippon's (2000) study of the place-names associated with marshes in Essex suggests that a broad division can be drawn on the Essex marshes, roughly at Corringham, with the marshland to the east un-embanked. Fobbing marshes would lie to the east of such a line.
- 2.2.7 The embankment of Fobbing Marshes is most likely to have taken place in the 17<sup>th</sup> or 18<sup>th</sup> centuries and had certainly been undertaken by 1777 when Chapman and Andre depict a sea wall around Fobbing and Corringham Marshes. Within the embanked area it is likely that the sinuous marsh creeks would have been utilised for drainage initially.
- 2.2.8 In May 1754 Thomas Crow and his landlord were ordered to 'Breast and turf fifteen rods of their wall leading from Oozey House to the south corner of Shell-Haven by Xmas' (quoted in ECC 2006), thus Oozedam had also been established by this date. The earliest reference to the site is as Ose (et Warwycke), in the time of Henry VIII (1509-47), the Ose element of the name means 'marsh land' and the Warwycke probably means 'dairy-farm by the weir'. The site of Oozedam house (EHER 45737) is raised, possibly artificially, above the general level of the marsh. It is thought that the late medieval or Tudor house would have occupied the same site.
- 2.2.9 The post-medieval period saw the area continue in use as pasture, perhaps occasionally ploughed up in times of crisis. The presence of what has been identified as 'stetch', which are visible as wide shallow ridges (c. 2m wide) and furrows (c. 1m) wide with a c. 2m variation in height (ECC 2006). The 'stetch' is the bank itself and the furrows between act as drainage gutters, typically used in cultivation of heavy soils. On the Essex marshes a similar technique was used for drainage prior to the development of under-drainage in the 18<sup>th</sup>-19<sup>th</sup> century, these were locally known as 'grips' (Gramolt 1960).
- 2.2.10 Post-medieval and modern development to the south of the site has seen the increasing industrialisation of the area with the establishment of the Kynochtown explosives factory (no longer extant), Shellhaven Oil Refineries. This industrialisation made the area a significant target for bombing raids World War II and there are a number of sites of this date in

the vicinity, including the base of a spigot mortar (next to Oozedam) and numerous anti-aircraft ditches as well as bomb craters.

### **2.3 Archaeological Walkover Survey**

2.3.1 The pipeline route crosses the two fields lying to the east of Oozedam (Fig. 2), FM20 and FM23 (ECC 2006). Archaeological survey has identified a number of features within these fields (ECC 2006).

2.3.2 FM 20 (RLR 8932) was meadow in the 19<sup>th</sup> century and is now improved pasture, its boundaries are partly straightened and the presence of slight banks by some of these are likely to be arising from dredgings. The sinuous routes of former marsh creeks can be seen on the ground and on Lidar plots despite the presence of 'stetch' (2m wide ridges and furrows) and surface drains which together form a criss-cross pattern. World War II anti-aircraft ditches are also present. Low earthwork mounds are visible in the centre of the field, the approximate extents of which are illustrated on Fig. 2. Similar raised areas may be present in the field to the west of the farm, perhaps most clearly visible on aerial photographs of the 1953 floods when they provided a refuge for cattle. To the south of these mounds lies a further area of 'stetch' and a group of small raised mounds, likely to be derived from creek dredging.

2.3.3 FM 22 (RLR 9854) also recorded as meadow in the 19<sup>th</sup> century lies to the north and is slightly lower lying. Former saltmarsh creeks and rills are also visible in this field, along with 'stetch' and a relict seawall along its eastern boundary.

### **2.4 Project Aims and Objectives**

2.4.1 The aims and objectives of the evaluation were set out in the WSI (RPS 2014) as follows:

2.4.2 The overriding archaeological strategy is to undertake archaeological evaluation works on the site in order to gain an understanding of the archaeological potential of the site and, if necessary, devise a mitigation strategy to mitigate the effects of development.

The aims of the evaluation are defined as being:

- To establish the presence/absence of archaeological remains within the site.
- To determine the extent, condition, nature, character, quality and date of any archaeological remains encountered.
- To record and sample excavate any archaeological remains encountered.
- To assess the ecofactual and environmental potential of any archaeological features and deposits.

- To determine the extent of previous truncations of the archaeological deposits.
- To enable the Archaeological Advisor to Thurrock Council, to make an informed decision on the status of the condition, and any possible requirement for further work in order to satisfy that condition.
- To make available to interested parties the results of the investigation.

2.4.3 The extents and scope of the trial trenching works were agreed between RPS and ECC Place Service. Trenches were positioned to investigate the following:

- The two large mounds/raised platforms in FM 20, where impacted (Fig. 2).
- The 'stetch' and headland type features in FM22

Subsequent to the approval of the WSI by the LPA, there was a site meeting/walk-over on 8th June 2015 (with Calor Gas Ltd, the Calor Gas pipeline contractor, RPS, ASE, the LPA's Senior Historic Environment Advisor and the Farmer) where it was agreed that due to the reduced impact of the pipeline the scope of trenching could be reduced from that set out in the WSI to the three trenches that are reported on in this report. This reduction in scope was confirmed by e-mail from Richard Havis (Senior Historic Environment Advisor Essex County Council) to RPS on 15th June 2015.

### **3.0 ARCHAEOLOGICAL METHODOLOGY**

#### **3.1 Fieldwork Methodology**

- 3.1.1 The trenches were positioned in accordance with a plan provided by RPS following a site meeting/walkover which took place on the 15<sup>th</sup> June 2015 and as agreed with ECC Place Services. Trench 1 was located in FM 22 and Trenches 2 and 3 in FM 20.
- 3.1.2 All trenches were excavated using a tracked 360 excavator with a toothless bucket. The topsoil and overburden were stripped under archaeological supervision down to the top of archaeological or geological deposits, whichever was encountered first, and cleaned using hand tools where appropriate.
- 3.1.3 Given the geomorphology of the site, outlined above, which potentially results in intercalated sequence of alluvial deposits which can contain palaeoenvironmental or archaeological material, each trench was excavated to 1.2m below the present surface level either along its length or by means of machine excavated test pits.
- 3.1.4 The trenches were recorded using standard ASE trench sheets. Archaeological deposits were recorded using the standard context record sheets. Archaeological deposit sequences were identified in trenches 2 and 3; a machine excavated test pit was dug through these deposits to establish their thickness. They were planned and levelled using a Digital Global Positioning System (DGPS).
- 3.1.5 Finds were securely bagged and labelled with the appropriate site code and context number on site.
- 3.1.6 Trench 1 was 10m long and 2.2m wide, 2 and 3 were 5m long and 2.3-2.4 m wide. The trenches were accurately located and levelled using a Digital Global Positioning System (DGPS).
- 3.1.7 All trenches were excavated by strata with the arisings stored separately on the trench sides as requested by the Land Agent acting for Calor Gas. Backfilling was undertaken in sequence and arisings compacted and turf placed back over the trenches.

#### **3.2 Archive**

- 3.2.1 Subject to agreement with the legal landowner ASE will arrange with Thurrock Museum for the deposition of the archive and artefact collection. Any items requiring treatment will be conserved. The landowner will be asked to donate the finds to the local museum.

Number of Contexts	18
No. of files/paper record	1
Plan and sections sheets	2
Bulk Samples	0
Photographs	58

Registered finds	1
Environmental flots/residue	0

Table 1: Quantification of site archive

## 4.0 RESULTS

### 4.1 Trench 1

Context	Type	Description	Max. Length m	Max. Width m	Deposit Thickness m	Height m AOD (Max)
1/001	Turf/Topsoil	Meadow pasture turf over dark grey friable blocky clayey topsoil	>10	>2.2	0.15	1.93
1/002	Layer	Brown grey silty clay, blocky and compact. Dry and compact	>10	>2.2	0.41	1.78
1/003	Layer (Natural)	Brownish grey silty clay, plastic, becoming softer and wetter with depth.	>10	>2.2	0.59	1.37
1/004	Layer (Natural)	Slightly blueish grey silty clay, soft, with occasional fragments of <i>Scrobicularia shell</i> .	>5	>2.2	>0.1	0.64
1/005	Layer (Natural)	Orangish grey silty clay, soft.	>5	>2.2	>0.1	0.83

Table 2: Trench 1 list of recorded contexts

#### Summary of results

4.1.1 Trench 1 was located in FM 22, orientated north-south. It was 10m long x 2.2m wide and a maximum of 1.2m deep. The trench was targeted on an area of 'stetch', in the field. No archaeological features or deposits were recorded.

4.1.2 The alluvial sequence in the trench was excavated to a maximum depth of 1.3m below the present surface level. The lowest deposits, 1/004 and 1/005 were identified at the base of the trench. The slight variation in colour of 1/004, which has a bluish tinge (characteristic of anaerobic conditions), and inclusion of very occasional shell fragments of *Scrobicularia* within it may hint at the presence of an underlying creek. The boundaries between the lower deposits, that is 1/003-1/005 are generally merging in character.

## 4.2 Trench 2

Context	Type	Description	Max. Length m	Max. Width m	Deposit Thickness m	Height m AOD
2/001	Topsoil	Meadow pasture turf over dark grey friable blocky clayey topsoil	>5	>2.3	0.13	2.3-4
2/002	Layer	Dark greyish brown friable silty clay	>5	>2.3	0.23	2.27
2/003	Layer	Brownish grey friable silty clay with patches of burnt, clay and ash becoming more prevalent with depth. Merging boundary with 2/004	>20	>2.3	0.22	2.04
2/004	Layer	Brown/black friable silty clay patches with ashy silt, charcoal and burnt clay.	>5	>2.3	0.45	1.82
2/005	Layer (Natural)	Yellowish brown clay, soft.	>1.5	>1.5	>0.3	1.37

Table 3: Trench 2 list of recorded contexts

### Summary of results (Fig. 3)

4.2.1 Trench 2 was orientated north-south and situated on the visible northern edge of the low mounds noted in FM 20. It was 5m long x 2.3m wide (Fig. 3) and on a slight slope. The northern end of the trench was at 2.3mOD and the southern at 2.4m OD. The trench was excavated by machine by layer to a depth of c. 0.6m, through the topsoil and subsoil and 2/003. The latter was an interface layer between the subsoil and the top of 2/004. A large number of finds, of Roman/late Roman date were recovered from this layer (see section 5 below).

4.2.2 Layer 2/004, a brown black silt clay with patches of ash, burnt clay and vitrified material extended across the full length and width of the trench. It was hand cleaned and finds recovered from its surface. A test pit was dug through the deposit and established that, at this point, the deposit was 0.45m thick.

### 4.3 Trench 3

Context	Type	Description	Max. Length m	Max. Width m	Deposit Thickness m	Height m AOD
3/001	Turf and topsoil	Meadow pasture turf and loose crumble brownish grey topsoil	>5	>2.4	0.2	2.24
3/002	Layer	Brownish grey friable silty clay becoming blocky with depth	>5	>2.4	0.5	2.04
3/003	Layer	Brownish grey friable silty clay with patches of burnt, clay becoming more prevalent with depth.	>5	>2.4	0.2	1.54
3/004	Layer	Black/brown silty clay with frequent patches of burnt clay and ash	>5	>2.4	0.2	1.34
3/005	Layer	Clean soft grey clay with occasional charcoal and burnt clay	>0.8	>1.5	0.3	1.24
3/006	Layer	Burnt clay with frequent charcoal and ash	>1.4	>1.5	0.1	0.94
3/007	Layer	Soft grey clay	>1.4	>1.5	0.15	0.64
3/008	Layer (natural)	Yellowish brown clay, soft.	>1.4	>1.5	>0.3	0.49

Table 4: Trench 3 list of recorded contexts

#### Summary of results (Fig. 4)

4.3.1 Trench 3 was orientated north-south and situated on the visible southern edge of the low mounds noted in FM 20. It was 5m long x 2.4m wide (Fig. 4) and on a slight slope. The northern end of the trench was at 2.24 m OD and the southern at 2.10m OD. The trench was excavated by machine by layer to a depth of c. 0.7m. Layer 3/003 was the uppermost archaeological deposit.

4.3.2 A 1.2mx 1.5m test pit was excavated to a depth of 1.4m at the northern edge of the trench. This established that layer 3/003 was the uppermost of a series of layers, characterised by the presence of burnt clay and charcoal and likely to be associated with a salt working site.



## 5.0 FINDS

### 5.1 Summary

5.1.1 A moderate sized assemblage of finds was recovered during the evaluation at the site. All finds were washed and dried or air dried as appropriate. They were subsequently quantified by count and weight and were bagged by material and context (Table 5). All finds have been packed and stored following ClfA guidelines (2014). No further conservation is required.

Context	Pottery	Wt (g)	CBM	Wt (g)	Fe	Wt (g)	Briquetage	Wt (g)	Slag	Wt (g)
2/003	30	594	16	2728			9	234		
2/004	4	50					5	118	2	18
3/001	5	112	2	146			5	134		
3/003					1	74	4	36		
<i>Total</i>	39	756	18	2874	1	74	23	522	2	18

Table 5: Overview of the finds assemblage

### 5.2 Roman Pottery by Anna Doherty

5.2.1 A reasonably large assemblage, given the small sized of the investigation area, of late Roman pottery was recovered during the evaluation, mainly from the 5m long Trench 2 (quantified by fabric and form in Tables 7 and 8). Most of the pottery was recovered from context [2/003], a disuse layer, with a few sherds noted in the directly underlying saltern deposit, [2/004] which was only subject to hand cleaning. A few sherds of Late Roman pottery were also recovered from the topsoil in Trench 3, [3/001].

5.2.2 The pottery was examined using a x 20 binocular microscope and recorded according to the Essex regional type-series. This uses a series of mnemonic codes for fabrics and incorporates the existing published form series from Chelmsford (Going 1987). The hand-collected pottery was quantified by sherd count, weight, Estimated Vessel Equivalent (EVE) and Estimated Vessel Number (ENV). Data was recorded on pro-forma records for the archive and in an Excel spreadsheet.

5.2.3 Undiagnostic grey wares (GRS) of probable local origin are the most common fabric type and other local or unsourced coarse wares include black-surfaced (BSW), storage jar (STOR) and Rettenden-style (RET) fabrics. One or two examples of regionally-traded Hadham grey (HAR) and black-burnished style (HAB) fabrics were also recorded. A fairly large proportion of the assemblage is made up by regionally-traded fine wares including Hadham (HAX) and Oxfordshire (OXRC) red wares and Nene Valley colour-coated ware (NVCC), something is fairly typical of 4<sup>th</sup> –early 5<sup>th</sup> century assemblages.

Fabric	Sherd	Weight (g)	ENV
BSW	3	62	3
GRS	16	274	16
HAB	1	25	1
HAR	1	3	1
HAX	4	116	3
NVCC	6	77	2
OXRC	2	27	2
RET	4	58	4
STOR	2	111	1
Total	39	753	33

Table 7: Quantification of fabrics

5.2.4 The range of form and decoration is also indicative of a very late Roman date. Although a number of poorly-dated generic necked (G) or storage jar forms (G37) were noted, many of the jars are more recognisably late, including necked hooked rim types (G24 1.2) and an example of a tall pedestal-based form with incised wavy line decoration (loosely similar to Going's G31-G33 forms, which are generally dated to AD350+ in Chelmsford). Also represented are wide-mouth bowl/jar forms, including a very small example in Hadham red ware (E6) and another in a grey ware fabric. The finewares include a bead-and-flange bowl (B6) and some fragmentary sherds possibly from a flagon (J) with white-painted decoration in Nene Valley colour-coated ware. White painted arcs and dots were also noted on necked bowl (C25) in Oxfordshire red-slipped ware, closely paralleled by Young (1977) form C77 (dated c.AD340-410).

Form	ENV	EVE
B6	1	0.14
C25	1	0.08
E4	1	0.08
E6	1	0.31
G	4	0.25
G24 1.2	2	0.36
G31-33	1	
G37	1	0.25
J	1	
Total	13	1.47

Table 8; Quantification of form

5.2.5 Overall then, the largest and most diagnostic group, from context [2/003], can be fairly confidently dated to c.AD350-410; the pottery from the underlying saltern deposit, [2/004], is also clearly of late Roman origin although it contains fewer diagnostic sherds so the date range assigned to it is broader (c.AD270—410). Although the assemblage as whole is not very large, the average sherd weight is quite high (19g) and the condition of the pottery is notably unabraded. The occurrence of 30 sherds in a single layer also tends

to indicate that the pottery derives from areas of settlement in the immediate vicinity.

### **5.3 Ceramic Building Material by Trista Clifford**

5.3.1 A small assemblage of 18 fragments of Roman ceramic building materials weighing 2871g was recovered from two separate contexts, disuse layer [2/003] and topsoil [3/001]. The assemblage is in good condition with several forms present, predominantly box flue tile fragments. These exhibit five- and six-toothed combed keying, either linear or S- shaped and occasionally display knife trimmed edges.

5.3.2 Context [2/003] also contained a roughly square brick, probably a pedalis (a flat, square brick, 0.30m square) but cut to roughly bessalis (a flat, square brick, 0.20m square) size. Presumably this was once used in the construction of a pilae (pillars or piers mounted on the floor of the hypocaust to hold up the floor above: usually formed of bessalis brick); sooting is evident at one corner. The original edges are knife trimmed in places and it measures 45mm thick. The context also contained fragments of tile or brick 30mm thick, flat tile measuring 13mm in thickness and a fragment of curved tile which could derive from imbrex.

5.3.3 Although small, the assemblage is fairly unabraded and includes the forms associated with cavity wall and hypercaust construction. This would indicate the presence of a building in the vicinity.

### **5.4 Briquetage by Trista Clifford**

5.4.1 The evaluation produced 23 briquetage fragments weighing 522g in total, recovered from four separate contexts. All material present, apart from a 3g abraded lump from [3/001] derived from vessels. Wall fragments in organic chaff tempered fabric, occasionally with calcareous inclusions and grain imprints dominate. Median wall thickness is 12mm with a range of 11-18mm. Three rim fragments were identified; topsoil [3/001] contained a rim from a straight sided vessel (thickness 11mm) while fragments from [2/003] and [2/004] exhibit a slight curve and may come from a cylindrical container. The latter also exhibits shallow fluting along the surface. The site is located close to Stanford Wharf, where similar vessel forms were recovered in abundance from later Roman contexts (Poole 2012).

### **5.5 Slag by Luke Barber**

5.5.1 Context [2/004] produced two green-grey pieces (16g) of lightweight aerated fuel ash slag with some surface vitrification. These are not diagnostic of date and could have been formed from any high temperature process, including domestic hearths.

### **5.6 Geological Material by Luke Barber**

5.6.1 A single piece of stone was recovered from the site (context [2/003]): 1/98g). This consists of a fragment from a 19mm thick bed of light green-grey fine non-calcareous Tertiary sandstone with some mica. Although the piece is not

shaped, the upper face shows some wear polish and there is further possible wear down one edge. The basal surface is only worn through natural processes and the other edges have all been broken away in recent times. The piece has undoubtedly been used as a sharpening/polishing stone but is not diagnostic of any particular period.

## **5.7 Registered Finds**

- 5.7.1 A whittle tanged tool handle, RF<2>, was recovered from layer [2/004]. The handle is formed from an antler in one piece (incomplete length 70mm), the corroded tang is visible at both ends. The handle has been burnt, which probably accounts for its' preservation, and there is evidence of use wear polish in places. This form of handle is typical of the Roman period.

## **6.0 DISCUSSION AND CONCLUSIONS**

### **6.1 Overview of Geological Sequence**

6.1.1 The geological sequence identified at the site, particularly in Trench 1, comprises Holocene alluvial deposits. These are typical of the sequences found in the extensive marshes to the east of Corringham, where the wedge of Holocene deposits thicken out (1.2.1 above).

6.1.2 The geological deposit sequence can be summarised as follows (top to bottom):

- Meadow pasture and topsoil: Agricultural soils
- Compact silt clays, brown grey in colour, blocky: high/grazing marsh deposits subject to drying and pedological processes
- Silty clays, less compact and becoming soft with depth. Colours are brownish and yellowish greys: Salt-marsh deposits.
- Silty clay, slightly sandy occasionally. Bluish in colour with occasional fragmentary *Scrobicularia* shell: Predominantly anaerobic conditions. These deposits could be associated with intra or supra tidal flats or localised variations within the marshland, such as creeks or ponds/pools.

6.1.3 No prehistoric landsurfaces, peats or mineralogenic peats were identified in the trenches. The geoarchaeological work at Bowers Marsh, to the east, identified such deposits at a level of c.-2.5mOD, below thick intra or supra tidal sediments. Should similar deposits be present on the site at Coryton at roughly the same altitude this would place them at c. 5m below the present surface level.

6.1.4 Whilst geoarchaeological and archaeological work at Stanford Wharf Nature Reserve has identified prehistoric buried land surfaces at c. 0.5m to 1.5mOD (Biddulph et al 2012) the underlying Pleistocene topographic template differs. The Stanford site lies closer to the edge of the Thames terrace deposits and thus the alluvial sequences are not as thick as those further out in the estuary, being on the edge of the floodplain. Thus a correlation between the altitude of the old land surface from one site to the other is not possible.

### **6.2 Deposit survival and existing impacts**

6.2.1 Whilst the area has been agricultural land since its embankment in the 17<sup>th</sup> or 18<sup>th</sup> centuries the land had been primarily used as pasture and as such the level of disturbance arising from agricultural activity has been minimal. The 'stetch' was introduced to aid drainage, probably prior to the 19<sup>th</sup> century, but has not disturbed the archaeological horizons. These are Roman in date and have been protected from erosion and disturbance by the subsequent accumulation of alluvial deposits.

6.2.2 The archaeological deposits identified in Trench 2 and 3, and discussed below, (6.3), occurred at a 1.54-2.04m OD and were sealed by 0.36-0.70m of overburden. The evaluation has demonstrated that these deposits are between 0.67m (Trench 2) and c.0.80m (Trench 3) in thickness.

### **6.3 Discussion of archaeological remains by period**

- 6.3.1 Archaeological remains, comprising a sequence of layers, were identified in Trenches 2 and 3 in the area of low mounds (Fig. 2).
- 6.3.2 The archaeological deposits in Trench 2, [2/003] and [2/004], contained material derived from hearths; such as ash, charcoal and burnt clay. Briquetage, coarse ceramic material used to make vessels and pillars utilised in salt-making, would appear to confirm the initial interpretation of the mounds as being a saltern site. Layer [2/004] would appear to represent a dumped spread of material rather than a working floor.
- 6.3.3 The majority of the artefacts were recovered from Trench 2 and, with the exception of the briquetage, were domestic rather than industrial in character. The Roman pottery, a reasonably sized assemblage, given that the majority was recovered from a single context and also given the small size of the trench and limited excavation, was in good condition. This, particularly when coupled with the presence of box flue tile, brick and a tool handle, would suggest that there was a settlement nearby. The presence of box-flue tile could suggest that it derived from a building nearby. Alternatively the tile could perhaps originate from a tile hearth used in a saltern, a late Roman example of which was identified at Stanford Marsh (Biddulph et al 2012, 129). However the absence of burning or vitrification on the Coryton examples and its identification as box-flue rather than flat tiles would suggest that this is unlikely.
- 6.3.4 Assuming a settlement was nearby, the date range of the pottery would suggest it was present in the late Roman period. Given the limited investigation the possibility that such a settlement may have its origins in early/middle Roman period cannot be discounted. The putative presence of a building is of particular interest as this would perhaps suggest a permanent rather than seasonal settlement. Whilst the existence and indeed location of any such settlement remains unconfirmed it is possible that such a site may have been situated at Oozedam, with this historic farm being established on the site of an earlier settlement.
- 6.3.5 The archaeological deposit sequence in Trench 3 was more complex and contained far fewer artefacts. There was a greater volume of burnt clay and charcoal. Overall this would suggest that these deposits were associated with a working rather than living area and are associated with salt-making.
- 6.3.6 The saltern waste and/or in situ deposits at Coryton are typically brown or black in colour rather than the distinct red waste mounds which have given the Essex 'red hills' their name. This pattern is consistent with the results of the excavations at Stanford Wharf where the late Roman salterns lacked 'red hills' which has been interpreted as being the result of changes in technology (Biddulph 2012, 164).

### **6.4 Consideration of research aims**

- 6.4.1 Insofar as the aims of the project were to establish the presence, date and quality of any surviving remains, the evaluation has successfully shown that:

- Archaeological remains survive along the pipeline corridor;
- These are of late Roman date;
- The mound in FM 20 (investigation within Trenches 2 and 3) is likely to be part of a salt working site;
- The artefactual assemblage would suggest that there may be a late Roman settlement nearby;

## **6.5 Mitigation options**

- 6.5.1 Following discussions with RPS Consulting, Richard Havis (Senior Historic Environment Advisor Essex County Council) proposed mitigation options are HDD or archaeological excavation of the impact area where archaeology was recorded in the evaluation (approximately a 90m long trench, measuring 1.6m wide, to a maximum depth of 1.2m, see Figure 2).

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**HER Summary Form**

<b>Site name/Address:</b> <i>Petroleum Gas Pipeline, Coryton, Essex</i>	
<b>Parish:</b>	<b>District:</b> <i>Thurrock</i>
<b>NGR:</b> <i>57385,183205</i>	<b>Site Code:</b> <i>THCP15</i>
<b>Type of Work:</b> <i>Archaeological Evaluation</i>	<b>Site Director/Group:</b> <i>E. Heppell Archaeology South-East</i>
<b>Date of Work:</b> <i>01-02 July 2015</i>	<b>Size of Area Investigated:</b> <i>20m x 2.2m</i>
<b>Location of Finds/Curating Museum:</b> <i>Thurrock Museum</i>	<b>Funding source:</b> <i>Developer</i>
<b>Further Seasons Anticipated?:</b> <i>unknown</i>	<b>Related HER Nos:</b> <i>4537 (Oozedam)</i>
<b>Final Report:</b> <i>EAH roundup</i>	<b>OASIS No:</b>
<b>Periods Represented:</b> <i>Roman</i>	
<b>SUMMARY OF FIELDWORK RESULTS:</b>	
<p>Archaeology South-East (ASE) was commissioned by RPS Consulting on behalf of Calor Gas Ltd. to undertake an archaeological evaluation along a corridor of land at Coryton, Essex. The site crosses an area of grazing marsh where visible earthworks of 'stetch' cultivation are present along with an area of low-mounds which had been provisionally identified as, 'red hills'- mounds of waste products arising from slat production in the Roman period. The nearby farm, Oozedam, is situated on a slight rise and is documented from the 16th century.</p> <p>Three trenches and a test pit were excavated by machine to the top of the natural deposits. Trench 1 investigated an area of 'stetch' and Trench 2 and 3 the low mounds.</p> <p>Trench 1 was devoid of archaeological material. The trench was excavated to 1.2m deep and the Holocene alluvial geological sequence recorded.</p> <p>Trench 2 and Trench 3 identified layers of burnt clays, ash and charcoal which overlay the natural alluvial clays. These characteristics, along with the presence of briquetage, established that the layers were associated with a salt works. The artefacts, including an assemblage of late Roman pottery and box-flue tile may suggest the presence of a nearby settlement.</p> <p>The report concludes that:</p> <p>Archaeological remains survive along the pipeline corridor; These are of late Roman date; The mound in FM 20 (Trenches 2 and 3) is likely to be part of a salt working site; The artefactual assemblage would suggest that there may be late Roman occupation nearby;</p>	
<b>Previous Summaries/Reports:</b> <i>ECC 2006 A Contemplation of things wide and infinite.</i>	
<b>Author of Summary:</b> <i>E. Heppell</i>	<b>Date of Summary:</b> <i>July 2015</i>

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**OASIS ID: archaeol6-219354**

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**Project details**

Project name	Petroleum Gas Pipeline Coryton
Short description of the project	Archaeological evaluation recorded the Holocene alluvial deposit sequence and identified layers associated with a salt working site of late Roman date.
Project dates	Start: 01-07-2015 End: 01-09-2015
Previous/future work	Yes / Not known
Any associated project reference codes	8397 - Contracting Unit No.
Type of project	Field evaluation
Current Land use	Cultivated Land 1 - Minimal cultivation
Monument type	SALTERN Roman
Significant Finds	POTTERY Roman
Significant Finds	CBM Roman
Methods & techniques	""Targeted Trenches""
Development type	Pipelines/cables (e.g. gas, electric, telephone, TV cable, water, sewage, drainage etc.)
Prompt	Direction from Local Planning Authority - PPS
Position in the planning process	After full determination (eg. As a condition)

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**Project location**

Country	England
Site location	ESSEX THURROCK CORRINGHAM Petroleum Gas Pipeline, Coryton
Postcode	SS17 9HT
Study area	0 Square metres
Site coordinates	TQ 73850 18325 50.9375333922 0.474646408809 50 56 15 N 000 28 28 E Point
Height OD / Depth	Min: 1.70m Max: 2.00m

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**Project creators**

Name of Organisation	Archaeology South-East
Project brief originator	RPS Consulting
Project design originator	RPS Consulting
Project director/manager	Adrian Scruby

Project supervisor E Heppell

Type of sponsor/funding body Developer

### Project archives

Physical Archive recipient or Landowner

Physical Contents "Ceramics", "Metal", "Worked stone/lithics", "other"

Digital Archive recipient Thurrock Museum

Digital Contents "Stratigraphic", "Survey", "other"

Digital Media available "Images raster / digital photography", "Spreadsheets", "Survey", "Text"

Paper Archive recipient Thurrock Museum

Paper Contents "other"

Paper Media available "Context sheet", "Correspondence", "Map", "Notebook - Excavation", "Research", "General Notes", "Plan", "Report", "Section", "Survey "

### Project bibliography

1

Publication type Grey literature (unpublished document/manuscript)

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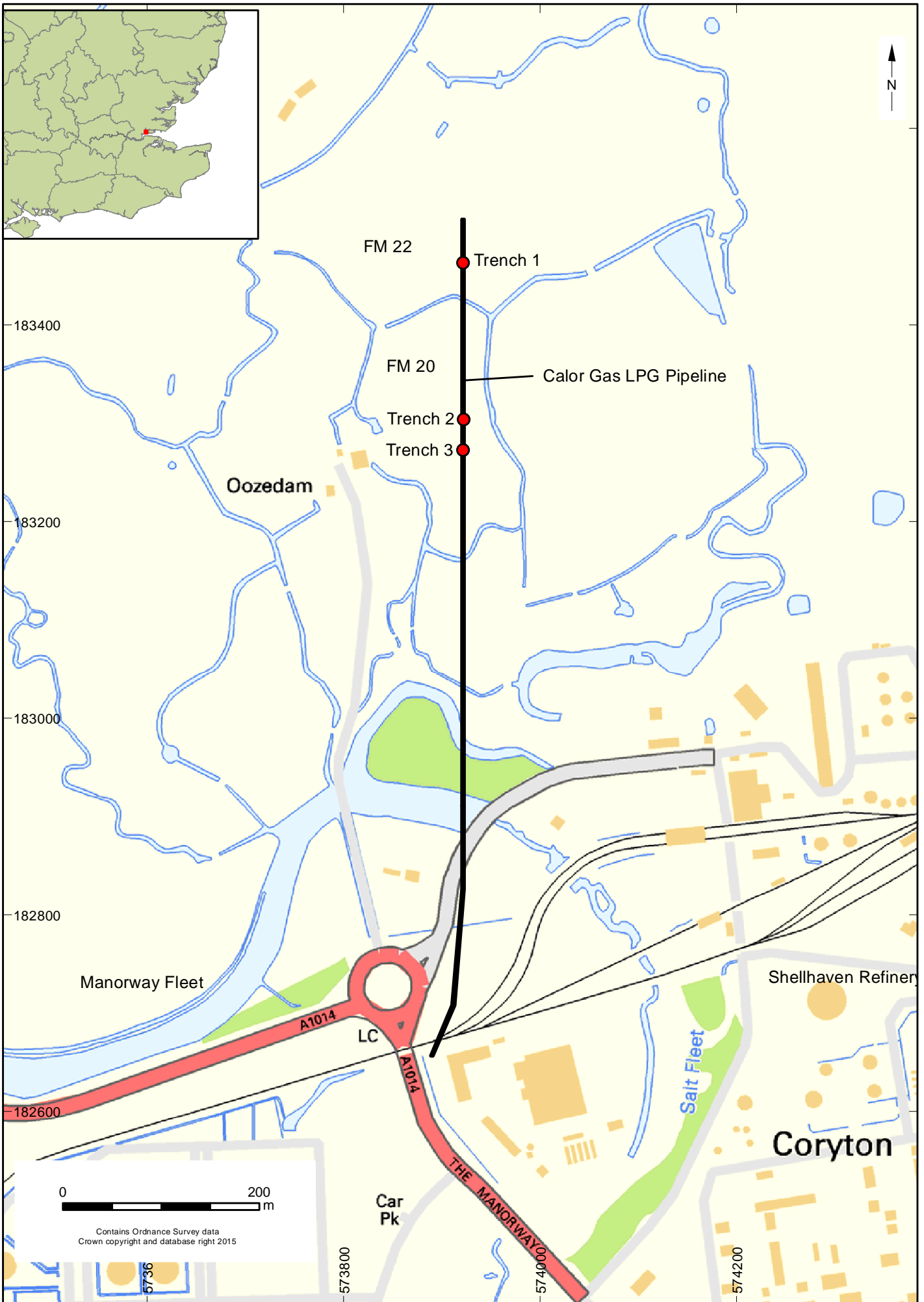
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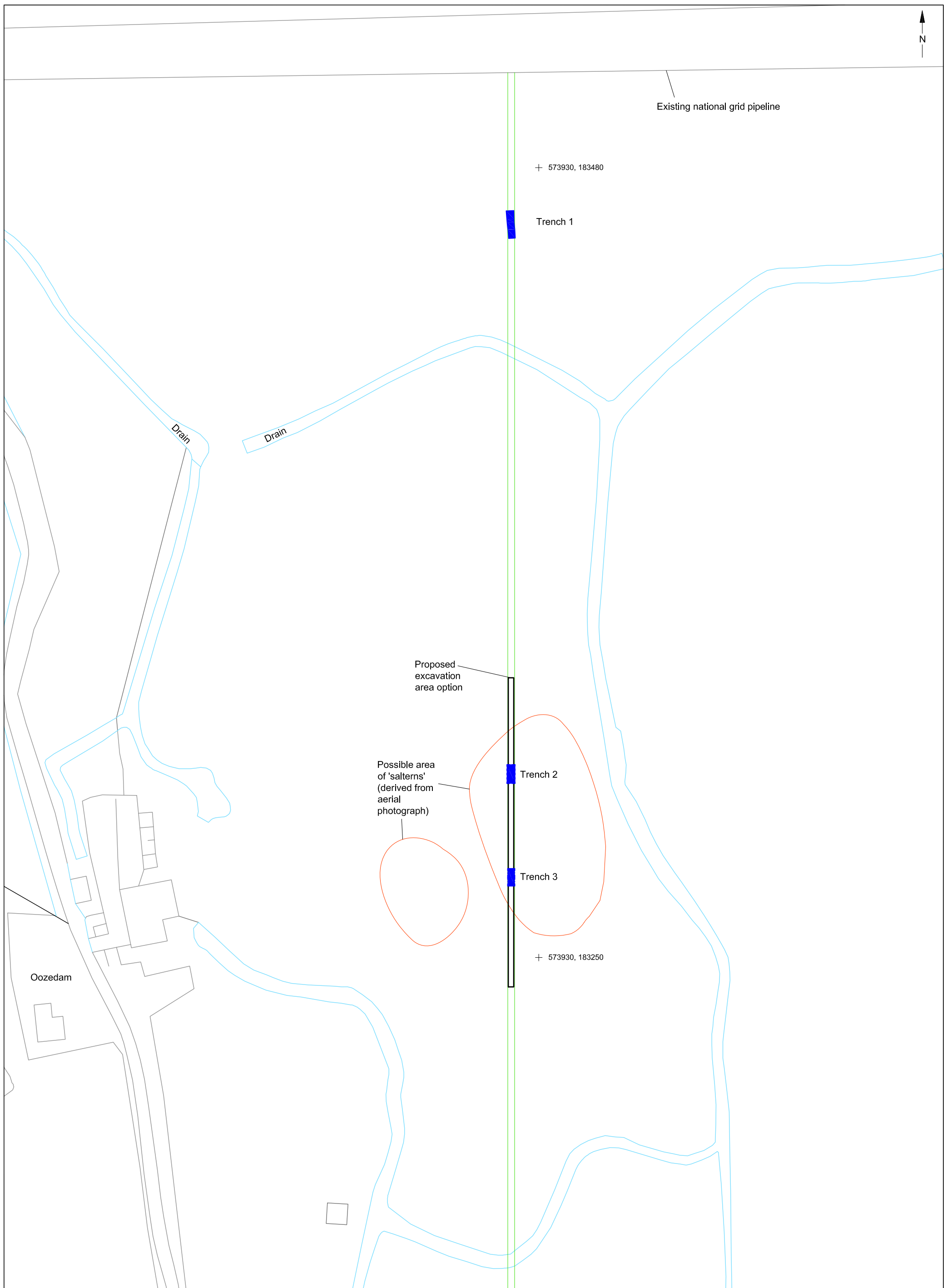
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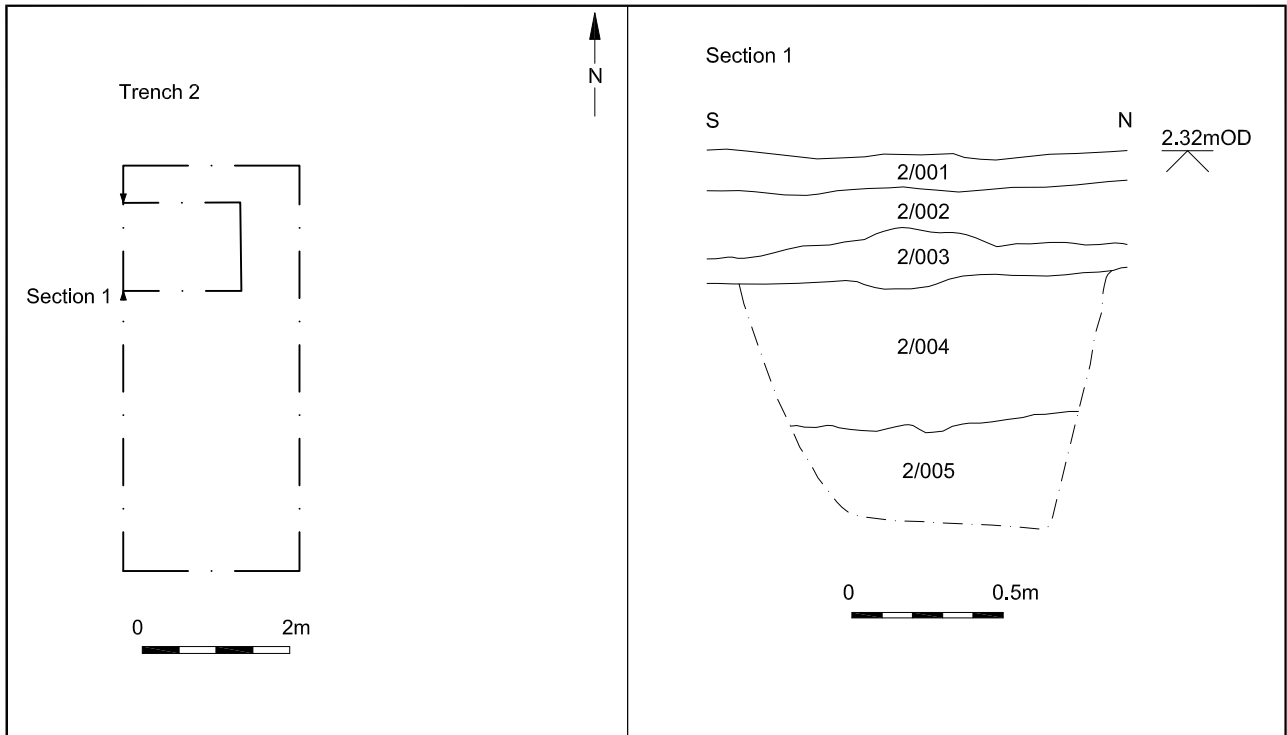
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Project Ref: 8397	July 2015	Site location	
Report No: 2015275	Drawn by: APL		



© Archaeology South-East		Calor Gas LPG Pipeline, Coryton	Fig.2
Project Ref: 8397	June 2015	Trench location	
Report Ref: 2015275	Drawn by: APL		



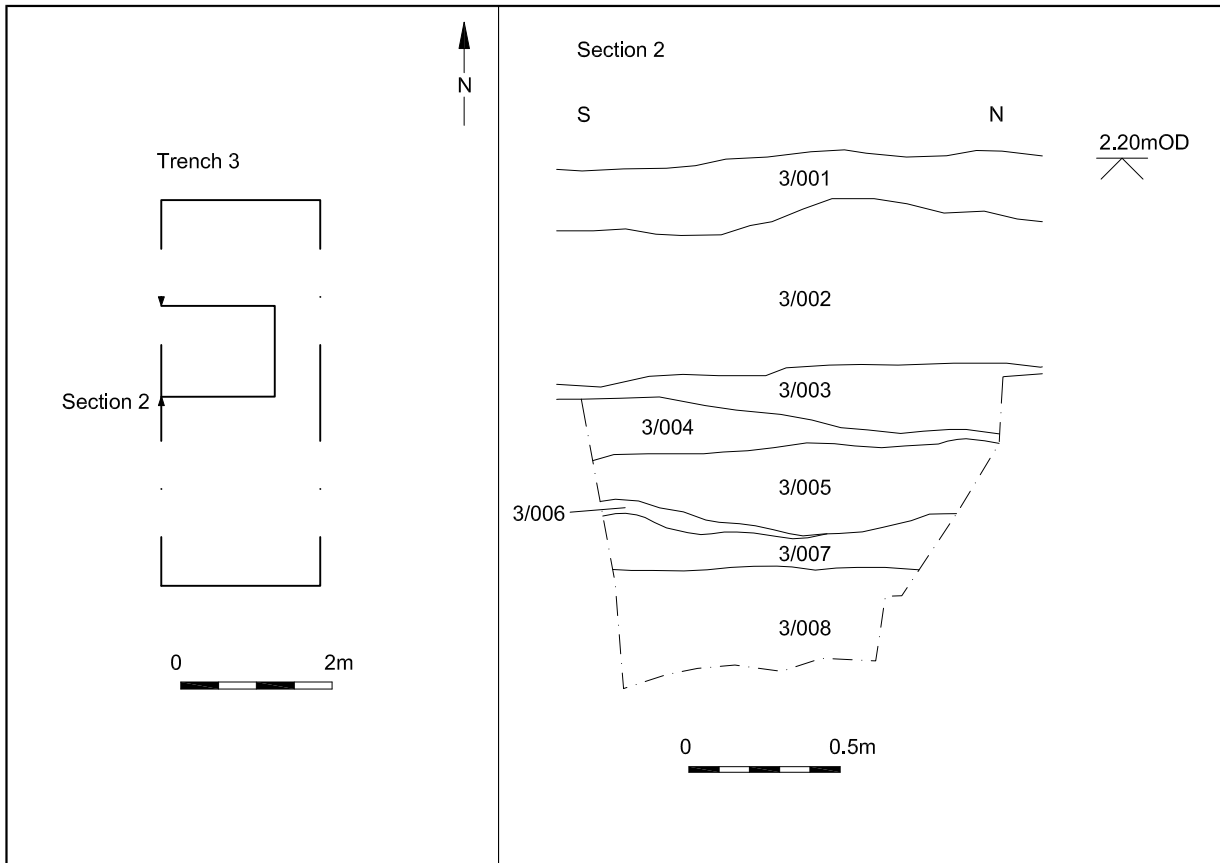
Trench 2, looking south, 1m scales



Section1 looking west, 1m scale

© Archaeology South-East		Calor Gas LPG Pipeline, Coryton	Fig.3
Project Ref: 8397	June 2015	Trench 2 plan, section and selected photographs	
Report Ref: 2015275	Drawn by: APL		





Trench 3, looking north, 1m scales



Section 2, looking west 1m scale

© <b>Archaeology South-East</b>		Calor Gas LPG Pipeline, Coryton	Fig.4
Project Ref: 8397	June 2015	Trench 3 plan, section and selected photographs	
Report Ref: 2015275	Drawn by: APL		

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