

ALKHAM VALLEY MAIN

Archaeological Desk Based Assessment

prepared by

NETWORK ARCHAEOLOGY LTD

for

DALCOUR MACLAREN

on behalf of

FOLKESTONE AND DOVER WATER SERVICES

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NON-TECHNICAL SUMMARY

This archaeological desk-based assessment relates to a proposed water pipeline to be built between Buckland Mill (NGR 628870 143521) and Drellingore (NGR 624321 141255) in Kent. It will form the basis of the Archaeology and Heritage section of a non-mandatory feasibility assessment and will represent one stage in what is expected to be a detailed investigative programme of archaeological research, investigation and mitigation.

The proposed pipeline is approximately 5 km long and runs along the Alkham Valley. A search of national and local records has been made for sites within 500m of the route. This revealed sixty-two sites of archaeological importance, thirty-eight of which are legally protected.

Four of these sites would be directly impacted by the pipeline and the impact on another five is uncertain.

Recommendations are made for the consideration of field reconnaissance, fieldwalking and geophysical survey along parts of the proposed route, following consultation with Kent County Council's Archaeological Service.

1 INTRODUCTION

This report presents the results of an archaeological desk-based assessment of the proposed Alkham Valley Main in south Kent (figure 1).

This desk based assessment is divided into ten main chapters:

- Chapter 1 explains the layout of this report.
- Chapter 2 introduces the organisations involved in this stage and describes the proposed pipeline scheme.
- Chapters 3 and 4 describe the physical environment through which the pipeline is to be built and outlines the broad aims and specific objectives of the archaeological assessment.
- Chapter 5 provides details on the procedures and standards adopted during this assessment and include an explanation of the site coding used throughout this document.
- Chapter 6 presents the broad archaeological background of the region to provide a context for the following chapters.
- Chapters 7 and 8 focus on the archaeological sites within the study corridor and their potential. The chapters are divided into sections covering the archaeological remains, the built environment and historic landscapes and boundaries.
- Chapters 9 and 10 deal with the impacts of the proposed development on the archaeological sites within the study corridor and explain the approaches adopted for dealing with them.

2 PROJECT BACKGROUND

2.1 Proposed pipeline scheme

The water main is required in order to ensure security of supply to the Folkestone area, and also to act as back up to the existing Dover Spine Main.

2.2 Pipeline specifications

The proposed main is to be installed for a length of 4.51 km along the Alkham Valley between Buckland Mill and Chiltern Farm. The proposed main will also include a 1.3 km long spur pipeline from Chiltern Farm to Buckland Mill.

2.3 Archaeological procurement

This archaeological assessment was commissioned by Dalcour Maclaren Ltd on behalf of Folkestone and Dover Water Services Ltd. The archaeological contractor was Network Archaeology Ltd, a professional organisation that provides consultancy advice and undertakes archaeological field services, specialising in the archaeological management of linear infrastructure.

2.4 Previous archaeological stages of work and route selection

This document represents the first stage of archaeological work on the proposed pipeline.

3 DESCRIPTION OF PROPOSED PIPELINE ROUTE

3.1 Location and topography

The proposed route lies in south east Kent approximately 5 km west of Dover (figure 1). The pipeline runs for approximately 5 km from Buckland Mill (NGR 628870 143521) and Drellingore (NGR 624321 141255)

Commencing in Kearsney (c. 50m AOD) the route runs south-west along the floor of the Alkham Valley through mixed farmland, south of Alkham Road. It crosses Hogbrook Hill Lane on the southern outskirts of Alkham then turns north-west briefly, crossing perpendicular to the Alkham Valley Road to pass around the northern outskirts of South Alkham, before resuming a south-westerly course to Drellingore, where it terminates on the south side of the Alkham Valley Road at approximately 70m OD (figures 2 - 3).

3.2 Solid geology

Upper chalk: cretaceous sedimentary rock, soft compact calcite, with varying amounts of silica, quartz, feldspar, or other mineral impurities, generally grey-white or yellow-white and derived chiefly from fossil seashells.

3.3 Drift geology

The solid geology is overlain by:

Brickearth: mainly loess, buff to grey windblown deposit of fine-grained, calcareous silt or clay alluvium, specifically, a common deposit in southern England, yielding a fertile soil

3.4 Soils and land use

The proposed route crosses three soil types, which are described below in relation to the geology over which they are derived and the association to which they belong (SSEW 1983).

Andover 1 (343h): shallow well drained calcareous coarse loamy and sandy soils over chalk on slopes and crests. Deep calcareous and non-calcareous fine silty soils in valley bottoms.

Batcombe (582a): fine silty over clayey and fine loamy over clayey soils with slowly permeable subsoils and slight seasonal water logging. Some well drained clayey soils over chalk, variably flinty

Hamble 2 (571z): Deep stoneless well drained silty soils and similar soils affected by groundwater; over gravel locally.

4 PROJECT AIMS

The purpose of this assessment is to consider the cultural heritage implications of the proposed pipeline route, to assist in the selection of an archaeologically least damaging route, and to provide a basis for further stages of investigation and mitigation.

The specific objectives are to:

- identify and define the extent of known archaeological remains within and immediately outside the proposed study corridor;
- provide a preliminary assessment of their significance; and
- assess the overall impact of the proposed pipeline route on the known and potential archaeological constraints;
- assess the need for further evaluation and mitigation prior to and during construction; and
- make recommendations for further evaluation and mitigation, where necessary.

5 PROCEDURES

5.1 Standards

This assessment has been conducted according to the Institute of Field Archaeologists *Code of Conduct* (2000) and *Standard and Guidance for Archaeological Desk-based Assessment* (2001).

5.2 Study Corridor

Data collection focused on a kilometre-wide study corridor, centred on the proposed pipeline. Background archaeological and historical information for the localities through which the corridor passed was also studied to provide a broader archaeological context.

5.3 Data collection

Data and views have been sought from statutory and non-statutory bodies during the assessment process (see 5.3.1 – 5.3.6). Those sources marked with an ‘*’ were consulted but did not contain relevant data:

5.3.1 Defence of Britain Database

A search for WWII archaeological features was carried out on the internet.

5.3.2 English Heritage

- National Monuments Record (NMR) Monarch database of registered archaeological sites
- NMR collection of vertical and oblique aerial photographs
- Schedule of Ancient Monuments of England
- The Register of Historic Battlefields *
- The Register of Parks and Gardens

5.3.3 Images of England

- Listed buildings: historic buildings listed by the Department of Culture, Media and Sport

5.3.4 Kent County Council Sites and Monuments Record

- Aerial photographs
- Archaeological reports
- Conservation Areas
- County list of known archaeological sites and finds
- The National Mapping Programme (NMP) for archaeological sites shown on aerial photographs

5.3.5 Portable Antiquities Database

A search request was submitted but unfortunately data was not made available in time to include within this report version.

5.3.6 Shepway District Council

- Listed buildings: maps showing historic buildings Listed by the Department of Culture, Media and Sport

5.3.7 The Centre for Kentish Studies

- Archaeological reports and journals
- Early maps
- Ordnance Survey maps
- Secondary printed sources

5.3.8 The Public Record Office, Kew

- Tithe maps and apportionments

5.3.9 Reliability of the data

Information held by public data sources can normally be assumed to be reliable, but uncertainty can arise in a number of ways:

- The SMR can be limited because it depends on random opportunities for research, fieldwork and discovery.
- Documentary sources are rare before the medieval period, and the few that do exist must be considered carefully for their veracity and accuracy.
- Primary map sources, especially older ones often fail to locate sites accurately to modern standards.
- There may be a lack of dating evidence for sites.
- The usefulness of aerial photographs depends upon the geology and land use of the areas being photographed and also the weather conditions when the photographs were taken. Many types of archaeological remains do not produce crop, soil or vegetation marks and the aerial photographs themselves necessarily involve some subjective interpretation of the nature of sites.

5.4 Data management and presentation

5.4.1 Definition of a 'site'

The term 'site' is used throughout this report to refer to ancient monuments, buildings of architectural and historical importance, parks, gardens, designed landscapes, battlefields, public spaces, historic landscapes, historic townscapes, findspots of artefacts and any other heritage asset.

5.4.2 Reference conventions

The information gathered from the data sources (listed in section 5.3) is uniquely referenced throughout this report and on all the figures. Information retrieved from public databases is prefixed by a two, three or four letter code, followed by their original source number. Sites found during the course of this desk based assessment that are not currently listed in a public database are referred to as DBA sites, identified by a two-letter suffix:

- DBA Desk Based Assessment site (e.g. DBA:AA)
- DBP Defence of Britain Project (e.g. DBP:S0013298)
- LS Listed Structure (e.g. LS 3/5)
- MON English Heritage MONARCH database (e.g. MON 242075)
- SAM Scheduled Ancient Monument (e.g. SAM 31432)
- SMR County Council Sites and Monuments Record (e.g. SMR KE7700)

5.4.3 Archaeological constraint gazetteer

Known archaeological sites lying within the Study Corridor are summarised within a gazetteer in appendix C. The gazetteer is structured in alphanumerical order. The gazetteer provides the source, cross-references, description, period and location of each site. The location is given as a 12 figure national grid reference to the centre of the point, area or linear. The gazetteer also gives a category of importance (see section 5.5.1), an assessment of impact (section 5.5.2) and an assessment of the significance of impact (section 5.5.3).

5.4.4 Archaeological constraint figures

The archaeological sites listed in the gazetteer are presented on A3 constraint figures (2 - 3). Each site is represented by a star, shaded area or dashed line, depending on the type of data held. The symbols and corresponding labels are coloured according to the importance of the site (see section 5.5.1).

5.4.5 Accuracy of displayed data

Site data may have been originally captured at a different scale to that which it is now displayed. This should be borne in mind when interpreting the exact location of constraint points and polygonal boundaries. The table below (5.1) presents estimated accuracy levels based upon visual comparison with plots.

Table 5.1: Summary of accuracy levels for displayed data

Source	Source type	Source scale	Positional accuracy in relation to current OS mapping	Accuracy in relation to position on the ground
DBA	OS map	1:10,000 1:10,560	1mm	± 10m
DBA	OS map	1:2,500	1mm	± 2.5m
DBA	AP vertical	1:5,000 - 1:10,000	1-5mm	± 5 - 50m
DBA	AP oblique	1:1,000 - 1:2,500	1-5mm	± 5 - 50m
DBA	Tithe/enclosure map	1:5,000 - 1:10,000	1-5mm	± 5 - 50m
DBP	digital points	-	?	?

LS	annotated OS map	1:2,500	1mm	± 2.5m
MON	digital points	-	?	?
SMR	digital vector points, polygons and lines	-	?	?

5.5 Impact assessment process

Archaeological impact assessment is the process by which the impacts of a proposed development upon the archaeological resource are identified. Each individual site has been assessed in its wider heritage landscape, taking account of identity, place, and past and present perceptions of value.

A three stage process was adopted:

- Stage 1: assessment of importance (see 5.5.1)
 Stage 2: assessment of the impact of the proposed development (see 5.5.2)
 Stage 3: assessment of significance of impact (see 5.5.3)

5.5.1 Importance

The sites listed in the gazetteer have been rated according to their perceived importance into categories A to D (as shown in table 5.2). Where possible, each site has been assessed on the following characteristics:

- physical form
- survival (i.e. level of completeness)
- condition (i.e. current stability and management)
- complexity (i.e. diversity of elements and relationships)
- setting
- period

Table 5.2: Site category definitions

Grade	Description	Examples	Investigation and mitigation
A	Legally protected site	Scheduled Ancient Monuments, Listed Buildings, Conservation Areas	To be avoided
B	Nationally significant site, currently not legally protected	Major settlements (e.g. villas, deserted medieval villages), burial grounds, standing historic buildings	To be avoided
C	Regionally significant site	Some settlements, finds scatters, Roman roads, sites of historic buildings, locally listed buildings	Avoidance desirable, otherwise investigation recommended
D	Locally significant site	Field systems, ridge and furrow, trackways, wells	Avoidance /investigation not envisaged

The grade awarded to each site considered the scale at which the site may be judged significant (i.e. in terms of local, regional and national policies, commitments and objectives);

representational value, diversity and potential; and existing local, regional and national designations (e.g. Scheduled Ancient Monuments). Some sites within the study corridor benefit from statutory protection and other protection (see appendix B).

The process of importance categorisation has been adopted as a tool in determining appropriate mitigation. The categories should not be taken as a statement of fact regarding the importance or value of a particular site. The use of examples of types of site is simply a guideline. The inclusion of a site in a particular category often involves a degree of subjective judgment and is based upon the current level of information. Categories are not fixed or finite, and there is every possibility that the classification of a site may change as a result of findings made during later stages of investigation.

5.5.2 Impact of the proposed development

The potential impact of the proposed scheme upon a site has been assessed at three levels:

- nature of impact (see table 5.3)
- type of impact (see table 5.4): a nominal 30m working width has been allowed.
- magnitude of impact (see table 5.5)

Table 5.3: Nature of impact definitions

Positive	Beneficial contribution to the protection or enhancement of the archaeological and historical heritage
Negative	Detrimental to the protection of the archaeological and historical heritage
Neutral	Where positive and negative impacts are considered to balance out
None	No or negligible impact due to distance from proposed scheme, and/or construction technique which negates the impact

Table 5.4: Impact type definitions

Direct	Physical damage, including compaction and/or partial or total removal. Severance, in particular linear sites
Indirect	Visual intrusion affecting the aesthetic setting of a site, Disturbances caused by vibration, dewatering, or changes in hydrology <i>etc.</i>
Uncertain	Where the physical extent or survival of a site is uncertain, or where the visual impact of the proposed scheme on the setting of sites or the landscape has not been determined

Table 5.5: Magnitude of impact definitions

Severe	Entire or almost entire destruction of the site
Major	A high ratio of damage or destruction to the site
Minor	A low ratio of damage to the site
Indeterminate	Where the data level does not allow any secure calculation (e.g. because the quality and extent of the site is unknown, or because construction techniques have not yet been decided)

Factors affecting the assessed magnitude of impact include:

- the proportion of the site affected
- the integrity of the site; impacts may be reduced if there is pre-existing damage or disturbance of a site
- the nature, potential and heritage value of a site

5.5.3 Significance of impact

The ‘significance’ of the impact has been assessed as the product of the importance of each site, and the impact of the proposed scheme upon each site. The levels of significance of impact are defined in table 5.6. Significance of impact definitions are provided only for negative impacts, as these were the only type on this particular scheme. The significance of impact rating takes no account of potential mitigation.

Table 5.6: Significance of impact definitions

Stage 1	Stage 2			Stage 3
Importance of site	Nature of impact	Type of impact	Magnitude of impact	Significance of impact
A	negative	direct	severe	high
			major	high
			minor	high
			indeterminate	high
		indirect	severe	high
			major	high
			minor	medium
			indeterminate	high or medium
uncertain	indeterminate	unknown		
B	negative	direct	severe	high
			major	high
			minor	medium
			indeterminate	high or medium
		indirect	severe	high
			major	medium
			minor	medium
			indeterminate	high or medium
uncertain	indeterminate	unknown		
C	negative	direct	severe	medium
			major	medium
			minor	low
			indeterminate	low or medium
		indirect	severe	medium
			major	low
			minor	low
			indeterminate	low or medium
uncertain	indeterminate	unknown		
D	negative	direct	severe	medium
			major	low
			minor	low
			indeterminate	low or medium
		indirect	severe	medium
			major	low
			minor	low
			indeterminate	low or medium
uncertain	indeterminate	unknown		

5.5.4 Potential limitations of an impact assessment

Limitations of impact assessment include:

- inaccuracies of map sources which make it difficult to provide a precise assessment of potential impact
- uncertainty regarding the survival and current condition of some sites. This means that the importance of some sites cannot be ascertained until reconnaissance and/or evaluation has taken place on the ground
- uncertainty regarding the precise methodologies of the quarrying proposal
- the possibility that hitherto unknown archaeology will be encountered

6 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

6.1 Previous archaeological work in the vicinity of the proposed scheme

English Heritage's National Mapping Programme (NMP) maps the archaeology identified in the National Monuments Record's collection of aerial photographs. South east Kent was one of the first areas covered by the programme. A GIS layer showing the archaeology identified is held by the County's SMR, but the sites have not been entered individually into the SMR database.

Field surveys in the Hougham area by the Dover Archaeological Group between 1972-74 identified six concentrations of struck flints in the fields south east of Alkham (SMR KE5889).

Field surveys and a watching brief were conducted in 1996 when a water pipeline was constructed to the south west of the study area, between Standen and Drellingore (RPS Clouston 1996). A few artefacts were recovered, including worked flints but no archaeological remains were discovered.

Archaeological investigations at the former Hawkinge Aerodrome, to the south west of the study corridor, have recently been conducted by Archaeology South East.

6.2 Palaeolithic (c. 500,000 - 8,300 BC)

Palaeolithic culture flourished during the Pleistocene. It was a period of glaciation interspersed with long periods of slightly warmer climate. Britain was still joined to continental Europe at this time. In periods of intense cold – such as the Last Glaciation (25,000 – 18,000 years ago) - populations retreated to the warmer parts of the continent. Palaeolithic people lived by hunting and gathering. Even during the glacial periods they made seasonal food-gathering forays into the area that is present-day Britain.

Kent was accessible from northern France and is unique in southeast England in having a large number of rock shelters (Hubbard 1982). These natural caves were used by Palaeolithic people on hunting forays.

The county has produced many Palaeolithic stone tools, some of which appear to have been washed in from elsewhere. The tool types are typically associated with hunting and gathering processes – axes, spears and scrapers for preparing skins.

Remains of this period are found beside the Thames and the Medway but rarely occur away from the major watercourses. On the gravels south of the Thames important Clactonian and Acheulian flints were found at Swanscombe, one of only two British sites with Palaeolithic human remains. Beyond the southern bank of the Thames the land becomes chalky and unfavourable to bone preservation.

6.3 Mesolithic (c. 8,300 BC - 4,000 BC)

The separation of Britain from the Continent occurred gradually at the end of the last Ice Age (c. 8,000-6,000 BC). A land-bridge survived where the Dover and Folkestone cliffs now stand until some time after 5,000 BC, but thereafter the English Channel formed a strait (Collins 1992).

The climate became warmer and wetter. By 6,500 BC, pine forests had given way to denser, deciduous woodland. Towards the end of the Mesolithic, new habitats were being formed by the waterlogging of some lowland areas. Small communities of hunter-gatherers migrated seasonally between different areas. Their tools were fashioned from stone, wood or bone. Spears were still used, but bows and arrows were now widespread. In addition, greater reliance was placed on composite tools, particularly small flint blades (microliths) set in wooden shafts. A warmer climate encouraged the spread of coniferous forest, small areas of which were cleared using hafted flint axes.

6.4 Neolithic (c. 4,000 - 2,500 BC)

The shift from hunting and gathering to a settled agrarian society characterises the Neolithic period. In the archaeological record, this change is manifested by the appearance of new artefact types – querns, sickles, pottery and polished stone axes. These began to replace the microliths, spears and digging sticks used throughout the Mesolithic period.

Environmental remains support the artefactual evidence, indicating land clearance, the introduction of wheat and sheep and the domestication of native species such as cattle and pigs. New types of site emerged, including settlements and large ceremonial monuments, such as long barrows, long mortuary enclosures and causewayed camps.

Megalithic remains in Kent are concentrated around Maidstone. These Neolithic chambered tombs are known as the ‘Medway group’. There are no known examples of these monuments in the study area. Much of the evidence for Neolithic activity in Kent comes from isolated pits and flint scatters; there are very few well provenanced assemblages. The majority of the Late Neolithic sites are located in the west of the county (Clarke 1982).

6.5 Bronze Age (c. 2,500 - 700 BC)

Metalworking technology, along with new types of flint-tool and pottery design was introduced from continental Europe at the start of this period. Cereal crops and stock rearing remained the mainstays of the economy. Changes in society were reflected in the emergence of new methods of burial, particularly the construction of round barrows as funerary monuments in the Early Bronze Age.

Pollen evidence is poorly preserved in chalk areas such as Kent, so greater reliance is placed on mollusc data (Clarke 1982). Organic deposits from valley sites, however, have yielded pollen sequences showing that land clearance was underway by the Early Bronze Age. At other sites in Kent, Neolithic tools have been found in hillwash deposits dated to c.2590 BC, indicating that land clearance was already causing soil erosion (*ibid.*).

Round barrows were a common feature of the Bronze Age landscape and it is for this reason that circular cropmarks are often interpreted as belonging to this period. Some, however, may prove to be of Roman or Saxon date.

Unlike the other chalkland counties, Kent has no large corpus of Bronze Age material from the barrow-digging enthusiasts of the 18th and 19th centuries. Many barrows were excavated, but most were Saxon (Champion 1982). This suggests that the majority of Bronze Age barrows had been destroyed, or at least disappeared, by the 18th century. Barrows tended to occupy prominent situations. These were sites likely to attract later development - such as fortresses or beacons - which would obliterate their earthworks.

In the Middle Bronze Age, cremation replaced inhumation and globular and bucket-shaped urns replaced the biconical and collared urns of the Early Bronze Age. It is thought that the Bronze Age spread of human activity in Kent had reached its maximum in the Middle period, with the widest range of soil types being exploited (Champion 1982).

In the Late Bronze Age radical social and economic change led to the abandonment of the old funerary practices in favour of less traceable rites and to the introduction of new ceramic styles, including jars bowls and cups using both coarse and fine fabrics. At the same time, the power base shifted from Wessex to eastern England. The remarkable number of hoards and gold objects found attest the wealth of Kent during this period, but they are concentrated in the north of the county (Champion 1982).

The main focus of Bronze Age activity was along coasts and river valleys, but subsequent marine transgressions are thought to have destroyed or swamped much of the coastal area occupied in the Bronze Age (Champion 1982). A graphic reminder of the importance of rivers and estuaries, and of the potential for contacts across the North Sea, is the discovery of a Bronze Age boat in Dover (Brown and Murphy 1996).

Burial evidence is dominated during this period by cremations which were either unaccompanied or in urns or; often, focused on earlier or contemporary round barrows. In north-east Essex there is a remarkable series of cemeteries characterised by tight clusters of numerous ring-ditches, with burials often placed between rather than within the ring-ditches (Brown 1995 & 1996).

6.6 Iron Age (c. 700 BC - 43 AD)

Iron-working was among the new technologies introduced to Britain from the Continent in this period. Population growth led to competition for land and the development of a more territorial society. Hillforts and defensive enclosures are manifestations of this social shift. Improved farming technology and the scarcity of land in turn brought about the cultivation of heavier and poorer soils.

Most enclosures are thought to have been built as a defence against stock-raiders. Enclosed settlements often appear as cropmarks, but without excavation their date remains uncertain. Hillforts are not common in Kent. Their main distribution lies west of the study area. However, at the low-lying sites of Canterbury and Rochester there are remains of large enclosed settlements (oppida) beneath the Roman towns. The oppidum at Rochester was sufficiently important to possess a mint and to present in itself “an important military objective” to the Roman army (Frere 1974).

Links with Europe led to the introduction of coinage and the potter's wheel and the rite of urned cremation became widespread in Kent. The rapid development of long distance trade with continental Europe c.100 BC gave Kent a key geographical advantage, for it lay on two major trade routes: between central and southern Britain and Atlantic France, and between the Thames estuary and the Low Countries.

A few British names have survived in the county. The River Medway is first recorded as Meddeuuaege in an 8th century document. It is a compound of the ancient pre-English river-name Wey and the Old English or Celtic word medu (mead) and is thought to refer to the colour or sweetness of the water. The River Thames was recorded in 51 BC as Tamesis and is an ancient Celtic river-name, possibly meaning "the dark one" (Mills 1998).

Kent is itself an ancient Celtic name. It was recorded as Cantium in 51 BC but its meaning is uncertain. The Iron Age Kentish tribes were known to the Romans as the Cantiaci (Darvill 1987), but there were more complex tribal subdivisions within the county.

The North Downs Way runs along the ridge of the North Downs escarpment and is believed to follow the line of a Prehistoric track (MON 1042740).

Undated defensive earthworks, possibly belonging to the Iron Age period, have been recorded in Lousyberry Wood, Temple Ewell, just north east of the study corridor. The remains were recorded in 1908 and even then were vague and badly damaged, but there appears to have been a low-banked nearly rectangular enclosure with an outer line of bank on the north-east and south-east side (SMR KE5875).

6.7 Romano-British (43 - 410 AD)

The east coast of Kent was the first Roman land-fall. Caesar's invasions of 55 and 54 BC came ashore near Deal and in AD 43 the Claudian army landed at Richborough (RVTVPPIAE). The focus of the conquest moved rapidly northwards, beyond Kent, but it was always necessary to defend the eastern seaboard against attack from the Continent.

The network of Kentish supply bases and administrative centres established by the Romans were centred on an existing settlement at Canterbury (DVROVERNVM). Roads ran from the town to the coastal bases at Dover (MON 1041196), Lympne and Richborough, while Watling Street, now the A2, linked it to Rochester and London.

Kent's countryside was densely settled in the Roman period. Villas concentrated along the river valleys and Watling Street.

6.8 Early medieval (410 - AD 1066)

In AD 407, the Emperor Constantine sailed from Richborough to Gaul, leaving Britain prey to 'barbarians from beyond the Rhine' (Zosimus). The appearance in the archaeological record of immigrants from the continent, particularly from Angeln and Saxony begins about this time. By the middle of the 5th century, large tracts of midland and eastern Britain had been taken over. East Kent was settled by Jutes, the other districts became Saxon (Hawkes 1982). Following initial conflict with the local Britons, a Germanic kingdom was established in Kent. It was the first of the English kingdoms to develop a stable monarchical structure (ibid.).

Kent had a geographical advantage over other counties. The archaeological record demonstrates that the incoming English maintained links with their Scandinavian homelands to the east at the same time as they developed new trade contacts with the Merovingian Franks to the south (ibid.). The Kingdom of Kent grew wealthy as a result of its stable government and trade monopoly. It reached the height of its power when the Kentish King Ethelbert became overlord of southern England in the late 6th century. Kent enjoyed an influx of exotic and luxury goods, particularly gold, under Ethelbert (ibid.).

Kent's situation and influence made it the natural starting point for St. Augustine's mission. Conversion to Christianity led to more contact with the rest of England. The 7th century saw a wider distribution of luxury goods, accompanied by the gradual breakdown of Kent's trade monopoly (ibid.).

By the end of the 7th century, Wessex had smashed Kent's commercial stranglehold. The death of King Wihtred in AD 725 marked the end of Kentish independence and the final victory of Christian burial rite over the pagan custom of depositing grave goods (ibid.).

Settlement tended to concentrate in the river valleys, with associated cemeteries lying on the higher ground above, usually at around 50m OD. Traces of the settlements themselves are relatively rare, but place names and written evidence indicate that the study area was well populated in the Early Medieval period.

Temple Ewell, like Ewell Minnis, originally came from the Old English *æwell* 'river-source'. Temple was a later addition, alluding to its possession by the Knights Templar from the twelfth century. The place first appears on record as *Æwille* in 772.

6.9 Medieval (1066 to 1540)

Land ownership became increasingly fragmented during the Medieval period. Initially, the Church owned much of the county. Between the 9th and 13th centuries, ecclesiastical land holdings spread into the forests from the early settlement areas. In most parts of Kent, assarting land is thought to have reached its limit by the late 13th century (Rigold 1982).

The "hundreds" referred to in the Domesday Book were essentially tax districts. In Kent hundreds were grouped into "lathes". These lathes were administrative districts similar to the Sussex rapes. Boundaries often dated back many centuries.

Pope Nicholas VI's taxation of 1291 and the lay subsidy of 1334 indicate that Kent ranked sixth amongst the English counties in terms of ecclesiastical wealth, but there were significant variations within the county. It is thought that the population tended to move away from the northern parts of Kent towards the central and southern districts during the 14th to 16th centuries (Pearson 1994).

The 14th century saw increasing instability; Richard II set up a system of beacons in Kent in 1377 to warn of coastal attacks. William Lambarde's "Carde" of c.1570 shows 52 beacons in Kent. The system continued in operation until 1640.

The Pilgrim's Way is track at the foot of the North Downs escarpment, running parallel to the North Downs Way for much of its course. It is traditionally associated with a pilgrim route to Canterbury and lies just south of the study corridor (MON 1042740).

From the early 14th century onwards, recurrent epidemics and poor harvests resulted in depopulation, rising wages and higher prices for the products of animal husbandry. This encouraged both landlords and peasants to turn their arable lands over to pasture (Pearson 1994). During the 15th century, sheep disease and trade disruptions acted as a check on prosperity, but the wool market recovered in the last quarter of the century.

Most of Kent's open fields were enclosed by the late Medieval period. This was brought about by the adoption of the one-way plough which made it easy to produce square plots. These could be more easily enclosed than furlongs and could be turned over to pasture when the need arose (Hoskins 1977).

6.10 Post-medieval (1540 – 1900)

Dene holes are a common feature in Kent, they are thought to be prehistoric, but many are simply chalk-workings opened in the 19th century to obtain a top-dressing for the land (Jessup 1974). They are notoriously difficult to date.

6.11 Modern (1900 to present)

The Kent coast was an important target in both World Wars and a significant number of defences from the Cold War survive in the region. Hawkinge Airfield, to the south west of the study corridor, was opened in 1915 and became the Aeroplane Dispatch Centre in 1919, remaining in use until 1962. It was involved in the Battle of Britain in 1940 and suffered heavy air attacks and much destruction (MON 1396952).

The remains of a WW2 underground Auxiliary Unit Operational base survive in a small wood overlooking Stombers Lane, north-east of Drellingore (DBP S0002736). A fortified house of the same period (DBP S0014844) lies to the north of Alkham.

7 ARCHAEOLOGY WITHIN THE STUDY CORRIDOR

7.1 Archaeological remains

7.1.1 Prehistoric

Moseling's Hole is a well-preserved denehole approximately 300m north of Mount Ararat Farm. Deneholes were created by flint quarrying during the Prehistoric period and were sometimes used as storage pits. The shaft is driven through clay with flints and measures c.2m in diameter with a present depth of 11.5m. Three chambers are visible at the base. A depression about 10m in diameter lies 11m away and probably marks the site of a collapsed denehole (SMR KE5846).

Field surveys by the Dover Archaeological Group identified a concentration of struck flints east of Moseling's Hole (SMR KE5889). Further scatters of struck flint were found at the western end of the study corridor during fieldwalking in advance of construction of the Lower Standen to Drellingore Water Main in 1996 (SMR KE15332).

A series of steep banks on the north west side of Alkham Valley, possibly formed by ploughing, have been interpreted as cultivation terraces (SMR KE15893).

7.1.2 Palaeolithic (c. 500,000 – 8,300 BC)

An Acheulian handaxe was found in 1948 on the surface of a ploughed field on the north side of the road between St. Radigund's Abbey and Capel-le-Ferne (SMR KE5851).

7.1.3 Mesolithic (c. 8,300 - 4,000 BC)

There are no known Mesolithic remains within the study corridor.

7.1.4 Neolithic (c. 4,000 - 2,500 BC)

About fifty Neolithic flint flakes were found in loam excavated in widening the Alkham Valley Road (SMR KE5885).

7.1.5 Bronze Age (c. 2,500 - 700 BC)

There are no known Bronze Age remains within the study corridor.

7.1.6 Iron Age (c. 700 BC - 43 AD)

An archaeological excavation in Alkham in 1990 uncovered an Iron Age cremation pit with a bucket (MON 660158).

A crescent shaped copper alloy bead or pendant with a circular perforation and decorated with dots, was found by a metal detectorist in fields above Chilton Farm, Alkham in 1974. Its date is uncertain, though possibly Iron Age (SMR KE17988).

7.1.7 Roman (AD 43 - 410)

A terracotta whipping top or turbo was found in a field at River in 1869. It is thought to be Roman in date (SMR KE5856).

7.1.8 Early medieval (AD 410 - 1066)

Metal detector finds made in 1974 in fields above Chilton Farm, Alkham, suggest Anglo-Saxon activity in this area and may indicate the presence of a cemetery (SMR KE17989). They included a fragment of silver gilt disc brooch (SMR KE17989), a cast copper shoe-shaped belt rivet (SMR KE17987) and a cast copper buckle tongue with punched ring-and-dot ornament (SMR KE15207). All these finds date from the sixth century AD.

The place-names of the study area are nearly all derived from Old English, with two exceptions; Kearsney (La Kerseneye 1323), which comes from the Old French *cressuniers*; 'the place where water-cress grows', referring to its position near the River Dour, which is derived from the Celtic *dubras* 'the waters'.

Alkham (Ealhham 1100), has been interpreted as 'a homestead in a sheltered place or sanctuary' (Mills 1998), and as 'a settlement at a heathen temple' (Glover 1976). Both are based on the *ealh*, 'sanctuary' element but the position of Alkham on the lower slopes of a hill in a fold of a valley and the lack of any other evidence for a pre-Christian place of worship in the locality, make the former, topographically based interpretation the most likely. Other names based on topography are found in Ewell (Ewell 1226), 'a spring' and Poulton (Poletone 1086), 'farmstead by a pool'.

Settlements and estates associated with personal names are found in Wolverton (Wolverintone 1086), 'settlement of Wolfere', Drellingore (Dyillynger 1264), 'Dyllas' boundary' and Chilton (Cildetun 1086) 'farmstead of a young nobleman'. Minnis is derived from the Old English *maennas* 'common land'

1.1.9 Medieval (AD 1066 - 1540)

The parish church of St. Anthony the Martyr in Alkham dates from c.1200. It is listed grade 1 and has late 13th, 14th and 15th century additions and alterations. It was appropriated to St. Radigund's Abbey in 1258 (SMR KE5847). A late 15th century end-jetty house, Halton Court, stands east of the church (SMR KE13780). It is listed grade II.

Hogbrook farmhouse in Alkham is a large, half timbered T-shaped house of 15th century origin, with alterations of the late 18th century (SMR KE5886). It is listed grade II and comprises parts of an aisled hall.

7.1.9 Post medieval (AD 1540 - 1900)

St. Peter's Church is a flint-built structure of 1832 (MON 1250922). An archaeological evaluation in advance of construction of a new south aisle found a high density of Post-medieval burials (SMR KE17795). The church was grade C listed in 1973. The SMR gives the dedication as SS Peter and Paul. It is not currently listed.

A single kiln at the edge of Limekiln Wood is shown on the Ordnance Survey first edition map of 1868 (SMR KE16822).

The first London to Dover main line (MON 1357885) was built by the South Eastern Company in 1844. It ran from Dover to Folkestone and Ashford, then through the Vale of Kent to Redhill via Tonbridge.

Kearsney railway station (SMR KE8366) lies at the north eastern edge of the study corridor. It was built in 1861 to serve the Chatham and Dover Railway (MON 1357899). The line was

built by the East Kent Railway Company as an extension from the North Kent Line, which ran between Strood and Canterbury. The Chatham-Strood section was opened in 1858 and the extension to Dover via Shepherds Well was opened three years later.

Originally part of the Kearsney Court Estate, Russell Gardens were laid out in 1901 by Thomas Mawson. Terraces and steps lead down from the house, towards a large ornamental canal and pavilions (SMR KE15196).

At the east end of the Study Corridor Kearsney Abbey Park (DBA:AD) Kearsney Court Park (DBA:AC) and Bushy Ruff Park (DBA:AB) form a continuous east-west strip of registered parkland some 1500m long by 300m wide. The OS 1st Ed map of 1877 shows the original southerly extent of Kearsney Abbey Park to be Minnis Lane. It also shows an east-west track, which forms the present southern boundary, along which the pipe route runs.

A former track was identified from the 2nd Ed. OS map of 1899, where it was named as 'The Avenue' (DBA:AH). It ran from Chilton Farm to Kearsney where it is aligned with a modern street of the same name.

7.1.10 Modern (1900 to present)

A WW2 anti-tank roadblock (DBP S0001905) consisting of eleven concrete cones, survives at Wolverton.

7.1.11 Unknown

Numerous undated sites, which cannot be ascribed to specific periods, are located within the study corridor.

7.2 Built Environment

7.2.1 Conservation Areas

The Alkham Conservation Area lies to the north of the pipeline route (DBA:AA).

7.2.2 Listed structures

There are 37 listed structures within the study corridor, including houses, churches, stretches of wall, a bridge and a memorial. Most are concentrated in Alkham Conservation Area and Kearsney with a smaller number in Drellingore.

7.3 Historic landscapes and boundaries

Three parks identified within the Study Corridor have been included in English Heritage's *Register of Parks and Gardens of Special Historic Interest in England*: Bushy Ruff Park (DBA:AB), Kearsney Court Park (DBA:AC) and Kearsney Abbey Park (DBA:AD).

The corridor includes land in the parishes of River, Temple Ewell and Alkham, lying within the Hundred of Folkestone.

7.3.1 Hedgerow Regulations

The Hedgerow Regulations (1997) define a set of archaeological and historical criteria used for determining whether hedges are ‘important’ (see Appendix B). These hedgerows are considered to be of at least regional importance, and some may be nationally important.

7.3.2 Existing field boundaries

Numerous existing field boundaries lie within the Study Corridor. Generally, these boundaries are of local importance, but some could potentially be of regional or even national importance.

7.3.3 Former field boundaries

Numerous former field boundaries are visible on tithe maps, early OS maps and aerial photographs. Generally, these boundaries are of local importance, but some may be regionally or even nationally important.

8 ARCHAEOLOGICAL POTENTIAL

8.1 Archaeological Remains

8.1.1 Prehistoric

Undated sites, such as those suggested by the flint scatters in the western half of the study corridor, and the likelihood that the Alkham Valley, with its sheltered aspect, was used as a route through this part of southern Kent, indicate a moderate potential for prehistoric settlement.

8.1.2 Palaeolithic (c.500,000 – 8,300 BC)

The landscape through which the pipeline passes is fairly unlikely to produce in-situ remains of Palaeolithic camps or activity areas, but unstratified flint or stone artefacts may be discovered occasionally, and a handaxe (SMR KE5851) has been found at the southern-centre of the corridor. Ancient stone tools are often found in drift deposits and may have travelled some distance from the site at which they were originally deposited. Nevertheless, this handaxe may indicate Palaeolithic activity in this area and there is a low to moderate potential for further finds of this date to be recovered.

8.1.3 Mesolithic (8,300 - 4,000 BC)

The total lack of Mesolithic remains within the study corridor suggests a low potential for remains of this period. Occasional flint artefacts could be discovered.

8.1.4 Neolithic (c.4,000 - 2,500 BC)

The flint flakes found east of Alkham (SMR KE5885) suggests a moderate potential for remains of this period being found in that area, probably in the form of artefacts, with a low potential for the discovery of an occupation site.

8.1.5 Bronze Age (c.2,500 - 700 BC)

The lack of Bronze Age remains within the study corridor suggests a low potential for remains of this period. Occasional flint artefacts of this date are found in most areas.

8.1.6 Iron Age (c.700 BC - AD 43)

The cremation discovered in Alkham (MON 660158), suggests a high potential for the presence of a settlement in the vicinity. The only other find from the corridor is a bead or pendant of uncertain date found near Chilton Farm, 2 km to the east. Since it was the only possible Iron Age artefact recovered during a metal detector survey that picked up several identifiable Saxon objects, there is not a strong potential for Iron Age remains in the Chilton Farm area.

8.1.7 Roman (AD 43 - 410)

The single possible Roman find – the child's toy (SMR KE5856) - came from River parish but is not accurately provenanced. This suggests a low potential for the survival of Roman remains. However, Kent's countryside was densely settled in this period, and the Alkham valley has geographical advantages that may have drawn Roman settlers: the Roman road north from Dover to Canterbury is only 2.5 km from the study corridor, while DVBRIS itself

is just 4 km away. Furthermore, the road along the valley bottom from Kearsney to Drellingore is probably of considerable antiquity and another old track runs along the top of the slope past Mount Ararat. The favoured south facing slopes of the Alkham valley suggest a moderate potential for settlement.

8.1.8 Early medieval (AD 410 - 1066)

The parishes crossed by the pipeline have documentary evidence of Saxon settlement, and the six parish boundaries crossed, are all potentially early medieval. However, as Anglo-Saxon sites are typically located away from contemporary areas of settlement, their locations are notoriously difficult to predict. Early medieval burials, in the form of family or community cemeteries are unlikely to be located close to their associated settlements, and may be focussed along ridge tops.

Finds from the valley slope south of Chilton suggests a moderate to high potential for the presence of a cemetery and associated settlement in the vicinity.

8.1.9 Medieval (AD 1066 - 1540)

The pipeline has been routed to avoid the centre of Alkham, which has surviving medieval buildings.

The corridor in general has a moderate potential for the occasional buried remains of former farm buildings and tracks, and a high potential for former field boundaries.

8.1.10 Post medieval (AD 1540 to 1900)

Extant buildings of this period are found throughout the corridor but are avoided by the route.

The former extent of Kearsney Abbey Park is crossed by the pipe route with a high potential for encountering the park track and the remains of park trees.

The potential for occasional buried remains of former farm buildings and tracks is moderate, with a high potential for former field boundaries. The former quarry pits at Chilton Farm are directly affected by the route.

8.1.11 Modern (1900 to present)

The only significant remains of this period within the corridor are of a WWII anti-tank roadblock (DBP S0001905), c.180m north-west of the pipe-route at Wolverton. This is unlikely to be affected by the proposed works. There is a moderate potential for further military defensive structures to be encountered, and also for unrecorded aircraft crash sites and ordnance, since the Hawkinge Airfield lay to the south west of the corridor.

8.2 Built Environment

There is a low potential for encountering and recording the built environment as the pipeline has been routed to avoid extant structures.

8.3 Historic landscapes and boundaries

The route crosses the historic parish boundary between River and Alkham and Kearsney Abbey Park. The majority of historic landscape features that are likely to be encountered are

former and extant field boundaries in the form banks, ditches and hedges. Such remains generally offer only limited potential in terms of understanding medieval and post-medieval field systems through the study of the archaeological remains themselves, whereas palaeo-environmental and organic remains contained within the ditches may offer a higher potential (see 8.4).

8.4 Palaeo-environmental and organic remains

Waterlogged soils that collect in hollows, pits and water channels may contain preserved organic material such as seeds, wood, leather, fabrics and animal tissue. These items can shed important light on past human activities. This type of evidence is rare nationally, and therefore of great significance. Such deposits may be archaeologically important in their own right, or may have increased value following the discovery of associated archaeological remains. Former field boundary ditches present the highest potential for remains of this kind.

9 ASSESSMENT OF IMPACT

9.1 Impacts of the proposed scheme

The following construction activities will have direct and indirect impacts on known and potential archaeological remains:

- Fencing
- Topsoil stripping
- Subsoil benching
- Soil storage
- Movement of heavy machinery
- Excavation of the pipe trench
- Working width reinstatement (e.g. subsoil ripping)

These activities could have direct and/or indirect impacts on known and potential archaeological remains within the working width.

9.2 Beneficial impacts

The proposed pipeline is unlikely to result in short or long term beneficial impacts on the archaeological resource.

9.3 Adverse impacts

Sixty-two sites have been identified within the Study Corridor. The known sites have been graded A to D, and the level of impact assessed for each site. This information is summarised below in tables 9.1 and 9.2

Table 9.1 Summary of impacts of the scheme by grade

Grade	Description	Total no. sites collated	No. sites within study corridor	No. sites within nominal 30m wide working width		
				Uncertain impacts	Indirect impacts	Direct impacts
A	Legally protected site	38	38	0	0	0
B	Nationally significant site, currently not legally protected	3	3	0	0	1
C	Regionally significant site	2	2	1	0	0
D	Locally significant site	19	19	2	0	3
TOTALS		62	62	5	0	4

Table 9.2 Summary of significance of impacts

Significance of impact	Count
None	0
Unknown	3
Low	3
Low or Medium	0
Medium	1
High	0
Total	7

The following sections (9.3.1 to 9.3.4) deal in category order with sites that are directly, or indirectly or possibly affected by the proposed pipeline.

9.3.1 Category A Sites

Thirty-eight legally protected sites are located within the study corridor (table 9.1). No category A sites would be affected by the proposed pipeline.

9.3.2 Category B Sites

Three nationally important sites (not legally protected) are located within the study corridor. One of these will be directly affected (table 9.1):

DBA:AD

(figure 2, NGR 628831 143671)

Kearsney Abbey historic park

Impact: Negative, direct, minor; the pipeline crosses a small section of the park and could impact on parkland features such as trees, earthworks and structures (e.g. park pale).

Significance of impact: medium

9.3.3 Category C Sites

Two category C sites are located within the study corridor, one of which is possibly impacted by the proposed pipeline (table 9.1):

MON 660158

(figure 3, NGR 625000 142000)

Cremation pit and bucket

Impact: Negative, uncertain; the precise location of this burial is not known but there is a potential for further graves to survive in its vicinity.

Significance of impact: unknown

9.3.4 Category D Sites

Nineteen category D sites are located within the study corridor, of which three are directly affected by the proposed pipeline and the impact on a further two is uncertain (table 9.1). The sites are discussed below in alphanumeric order:

DBA:AE

(figure 3, NGR 624508 141683)

Farm

Impact: Negative, direct, minor; a group of buildings is shown on the 1838 tithe map and the 1st edition Ordnance Survey map, close to the proposed route of the pipeline. The buildings are not shown on later maps and were therefore probably demolished between 1877 and 1899. Their foundations may survive within the working width and could be affected by the pipe trench excavation.

Significance of impact: low

DBA:AF

(figure 2, NGR 628811 143572)

Tree-lined avenues

Impact: Negative, direct, minor; the 1st edition Ordnance Survey map shows lines of parkland trees to the east of Chilton Farm. Some of these trees may still be standing, whilst others may be marked by stumps. The remains of others may survive below ground.

Significance of impact: low

DBA:AI

(figure 2, NGR 627182 143035)

Nursery

Impact: Negative, direct, minor; a nursery garden with paths and beds is shown on the 1908 Ordnance Survey map. The proposed pipeline runs through a small proportion of the nursery area.

Significance of impact: low

DBA:AJ

(figures 2 & 3, NGR 626826 142622)

Boundary stone

Impact: Negative, uncertain; a stone is marked on the 1908 Ordnance Survey map and may mark an old boundary. Its omission from the tithe and 1st edition Ordnance Survey maps does not necessarily indicate that it was not then present. It is uncertain whether the stone survives in situ.

Significance of impact: unknown

SMR KE5856

(figure 2, NGR 628000 143000)

Terracotta whipping-top

Impact: Negative, uncertain; the impact of the pipeline upon this archaeology is uncertain as the object was found somewhere in the parish of River.

Significance of impact: unknown

10 RECOMMENDATIONS

10.1 Staged approach to mitigation

The most cost-effective means of managing archaeological risk is to implement a staged approach to investigation and mitigation, as laid out in Table 10.1 and explained in greater detail in Appendix A. It is important, however, to avoid an overly mechanistic approach and to ensure a focus on gaining understanding and information relevant to key issues.

Table 10.1 Staged approach to investigation and mitigation

Archaeological Stages of Investigation		Phase of works
Stage 1	<i>feasibility study</i> of route corridor option(s) an appraisal of archaeological potential	feasibility assessment
Stage 2	<i>desk-based assessment</i> of route corridor a thorough synthesis of available archaeological information	conceptual design
Stage 3	<i>field surveys</i> of preferred pipeline route, including: field reconnaissance survey, field walking survey, geophysical survey, metal detector survey, auger survey, as appropriate	detailed design
Stage 4	<i>field evaluation</i> of targeted areas along preferred pipeline route, including: machine-excavated trenches, hand-dug test-pits, as appropriate	
Stage 5	<i>excavation</i> detailed excavation of those sites which it is not possible to avoid or desirable to preserve	
Stage 6	<i>watching brief</i> permanent presence monitoring of all ground disturbing activities	construction
Stage 7	<i>archive and publication</i> synthesis and dissemination of results, leading on from each of the stages outlined above	post-construction

10.2 General Recommendations

The next recommended stages of work are field surveys, as shown in table 10.2. The selection and application of these surveys should take account of:

- the nature of the known and potential archaeology and its distribution along the pipeline (see chapter 8);
- the nature of the local geology and soils (see chapter 3); and
- the proposed construction methodology.

In addition to the proposed pipeline's working width, investigation should also cover the sites proposed for associated engineering works, such as pipe storage areas, site compounds and road crossing areas as these become known.

The land through which the pipeline is currently routed is suited to all survey types.

Agreement over the precise survey strategy should be reached with the County Council's archaeological service (see below 10.7 and 10.8).

Table 10.2: Proposed field surveys

Proposed survey type	Proposed survey area
field walking survey	<i>arable areas</i>
field reconnaissance	<i>entire route</i>
recorded magnetometer survey and magnetic susceptibility survey	<i>targeted areas lying within the working width of the proposed pipeline</i>

10.3 Site/area-specific recommendations

10.3.1 Archaeological remains

Archaeological investigation and mitigation, beyond that outlined above (10.2), may be appropriate at specific sites where the significance of impact has been determined to be medium or high (see 5.5.2). In all cases, agreement over the need for targeted work should be reached with the County Council's archaeological service (see below 10.7 and 10.8).

10.3.2 Historic Landscapes and Boundaries

The proposed pipeline crosses Kearsney Abbey Park (DBA:AD). The parkland should be thoroughly searched for features such as trees, earthworks and structures and where feasible and desirable such remains should be avoided by the pipeline.

The short lead time for the production of this report has not allowed an assessment of existing field boundaries according to the five criteria for archaeological and historical importance (The Hedgerow Regulations, 1997 – see appendix B). The base data for such an assessment has been collected and will be included in any subsequent versions of this report. The result of such an assessment is very unlikely to affect the routing of the pipeline.

The construction programme should aim to minimise the disturbance of historic boundaries, particularly those marked by an Important Hedge (e.g. by minimisation of the working width – see 10.6). Cross sections of those boundaries which are unavoidable could be recorded during the course of a watching brief. Archaeologically significant layers sealed beneath banks may require sampling. Earthworks, such as banks and ditches, should be sensitively reinstated.

Former field boundaries identified as being potentially historic could also be targeted for detailed recording during the course of a watching brief.

10.3.3 Built Environment

No recommendations are made at present, although this situation should be reviewed if built remains are encountered on the proposed route during any field surveys or construction.

10.4 Route selection

The final pipeline route should be determined in relation to sites of national and regional significance (i.e. sites of category A, B and C) and to sites where the significance of impact is deemed to be medium or high.

10.5 Avoidance

Where feasible and desirable, minor alterations to the proposed route or the engineering design should be considered in response to the findings of this assessment and any future survey or evaluation, in order to avoid an impact upon nationally important archaeological remains and other sites where the significance of impact is deemed to be high.

10.6 Minimisation of impact

The impact upon unavoidable archaeological sites should be minimised by reduction of the working width to the minimum practical level, and/or the laying of geotextile matting or bog mats, and/or careful reinstatement procedures (e.g. avoidance of subsoil ‘ripping’ at archaeological sites).

10.7 Written Schemes of Investigation

An archaeological Written Scheme of Investigation (WSI) should be produced for each stage of any future archaeological work (see 10.1).

10.8 Liaison with statutory consultees

Liaison should be maintained with Kent County Council’s archaeological service in order to agree future archaeological investigation, approve and monitor the implementation of any archaeological WSIs, review reports, monitor fieldwork in progress, and also to visit the construction site.

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Organisation	Name	Position
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	Martin Lightfoot	Project Manager
	Rosey Burton	Project Officer
	Frank Martin	Project Officer
	Adam Holman	IT/GIS Officer

12 BIBLIOGRAPHY

12.1 Primary sources

Table 12.1 Summary table of non-OS maps

Document		Year	Record Office Reference
Alkham	Tithe Map	1838	PRO IR30/17/6
Ewell	Tithe Map	1841	PRO IR30/17/131
River	Tithe Map	1844	PRO IR30/17/304
Andrew and Dury	County Map	1769	N/A

Table 12.2 Summary table of OS maps

Ordnance Survey				
Year	County series	Edition	Sheet	Scale
1877	Kent	1 st	67 NE	6" to 1 mile
1898	Kent	2 nd	67 NE	6" to 1 mile
1908	Kent	3 rd	67 NE	6" to 1 mile
1877	Kent	1 st	67 SE	6" to 1 mile
1898	Kent	2 nd	67 SE	6" to 1 mile
1908	Kent	3 rd	67 SE	6" to 1 mile
1950	Kent	Prov.	67 SE	6" to 1 mile
1877	Kent	1 st	68 NW	6" to 1 mile
1899	Kent	2 nd	68 NW	6" to 1 mile
1908	Kent	3 rd	68 NW	6" to 1 mile
1938	Kent	Prov.	68 NW	6" to 1 mile
1877	Kent	1 st	68 SW	6" to 1 mile
1898	Kent	2 nd	68 SW	6" to 1 mile
1908	Kent	3 rd	68 SW	6" to 1 mile

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13 STATEMENT OF INDEMNITY

Every effort has been taken in the preparation and submission of this report in order to provide as complete an assessment as possible within the terms of the brief, and all statements and opinions are offered in good faith. Network Archaeology Ltd cannot accept responsibility for errors of fact or opinion resulting from data supplied by any third party, or for any loss or other consequences arising from decisions or actions made upon the basis of facts or opinions expressed in this report and any supplementary papers, howsoever such facts and opinions may have been derived, or as a result of unknown and undiscovered sites of artefacts.

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APPENDIX A

EXPLANATION OF PHASED APPROACH TO ARCHAEOLOGICAL INVESTIGATION AND MITIGATION

Stage 1:

Feasibility Assessment

An appraisal of archaeological potential

Stage 2:

Desk-based Assessment

A thorough desk based synthesis of available information

Aerial photographic study:

Identification and mapping of palaeochannels from aerial photographs should be undertaken as part of the desk-based assessment.

Stage 3:

Field Surveys

Field reconnaissance survey

This is a visual inspection of the proposed pipeline route, in order to:

- locate and characterise archaeology represented by above ground remains (e.g. earthworks and structures); and
- record the nature and condition of existing field boundaries crossed by the route, to establish their potential antiquity.
- A walkover of the entire pipeline route should normally take place.

Fieldwalking survey

The distribution of finds found by fieldwalking can indicate areas of archaeological activity, which are not represented by above ground remains.

A programme of structured fieldwalking should normally take place across all available arable land to recover archaeological artefacts. A minimum of five transects at 10m separation based upon the centreline of the proposed pipeline should normally be walked.

Geophysical survey

Geophysical survey methods are non-intrusive and can detect and precisely locate buried archaeological features.

Magnetometry is the most cost-effective technique for large scale surveys. *Recorded* magnetometer survey, supplemented by background magnetic susceptibility survey is normally recommended. The surveys should sample the entire length and a proportion of the width of the working width of the proposed pipeline route, except in wetland areas, such as marshland, tidal areas and floodplains.

Only a *recorded* magnetometer survey can provide direct and objective evidence of the presence and character of individual archaeological features.

Unrecorded magnetometer scanning is not recommended because it requires spontaneous, subjective interpretation as the unrecorded scanning survey progresses. This method does not therefore provide a secure basis for eliminating areas that produce negative results from further consideration.

Electro-magnetic survey

This technique could produce a three-dimensional geomorphological sub-surface map of wetland areas. Survey should take place along a minimum of five transects, and measurements should be calibrated by absolute readings collected by borehole and/or hand auger survey.

Auger survey

Geotechnical borehole survey supplemented by hand auger survey could:

- generate stratigraphic profiles and establish the depth of alluvium;
- look for 'islands' of solid geology which are elevated in comparison with their contemporary landscape;
- look for former river channels;
- look for evidence of buried land surfaces;
- calibrate an EM survey; and
- assess the viability of using targeted magnetometer survey on the floodplain.

Ideally, an environmental archaeologist would consult with the geotechnical team in order to develop a strategy which would enable the opportunistic and immediate examination of the geotechnical team's soil cores, in conjunction with a *hand auger survey* tailored to meet archaeological objectives listed above. The location and frequency of the hand augers should be determined by the results of the EM survey, but generally should be taken at regular intervals, no greater than 50m separation, along the centreline of the proposed route.

Radiocarbon dating and palaeo-environmental assessment

Soil samples recovered may require radiocarbon dating and assessment of potential for preservation of palaeo-environmental important remains.

Stage 4

Evaluation

Field evaluation should normally take place at the sites of positive findings made during earlier stages of archaeological assessment and field survey, which it may not be possible or desirable to avoid. Evaluation might involve machine-excavated trenches, hand-dug test-pits and/or hand auguring. The objectives are to confirm the presence or absence of archaeological

remains, to determine their character, extent, date and state of preservation, and to produce a report on the findings. The choice of technique(s) will depend upon site-specific factors.

Stage 5

Excavation

It may not be possible or desirable to avoid significant archaeological sites identified by previous survey work and/or evaluation. Ideally, *excavation* of such sites should take place in advance of construction. Excavation would involve machine-stripping of limited, open areas, followed by archaeological investigation. The objectives would be to obtain a full record of the archaeological remains prior to construction, and to produce a report on the findings.

Stage 6

Watching Brief

A permanent-presence watching brief will be required during all ground disturbing activities of the construction phase of the project, to record unexpected discoveries, and known sites which did not merit investigation in advance of construction. The main phases of monitoring for the pipeline will be topsoil stripping, trench excavation and the opportunistic observation of the pre-construction drainage. The objectives are to obtain a thorough record of any archaeological remains found during construction, and to produce a report on the findings. Contingencies should allow for salvage excavation of significant, unexpected archaeological sites found during construction.

Stage 7

Archive, Report and Publication

A post-excavation programme for dealing with all records of investigated archaeological remains and recovered artefacts usually follows each of the stages outlined above. This includes the collation and cataloguing of all site records, the processing, conservation and cataloguing of artefacts, the production of an archive report, and, where appropriate, the drafting of articles for publication.

APPENDIX B

STATUTORY AND NON-STATUTORY PROTECTION OF
ARCHAEOLOGICAL SITES

Scheduled Ancient Monuments

Under the *Ancient Monuments and Archaeological Areas Act 1979* (as amended by the National Heritage Act of 1983), the Secretary of State, in consultation with English Heritage, maintains a schedule of monuments deemed to be of national importance. In practice, most Scheduled Monuments fall into the category of Scheduled Ancient Monuments (SAMs), defined as ‘any Scheduled Monument and any other monument which in the opinion of the Secretary of State is of public interest by reason of the historic, architectural, traditional, artistic or archaeological interest attaching to it’ (Section 61 [12]). Scheduled Monuments also includes Areas of Archaeological Importance (AAIs). Only portable items are beyond the protection of scheduling.

The present schedule of just over 13,000 sites has been compiled since the first statutory protection of monuments began in 1882. The criteria for scheduling have been published but there are many sites of schedulable quality, which have not yet received this status.

Any action which affects the physical nature of a monument requires Scheduled Monument Consent, which must be sought from the Secretary of State. Consent may be granted after a detailed application to the Secretary of State. Failure to obtain Scheduled Monument Consent for any works is an offence, the penalty for which may be a fine, which may be unlimited.

Other Archaeological Sites

The County Sites and Monuments Record is used in conjunction with Planning Policy Guidance Note, PPG 16, Planning and Archaeology, as the basis upon which decisions on the archaeological impact of development are made. The basic premise of the Guidance is that archaeological deposits are a finite non-renewable resource that must be protected. It also points out the unknown nature of archaeological deposits and allows Planning Authorities to include within planning conditions, archaeological evaluation, to determine the full impact on the archaeological resource. The evaluation can be required prior to determination of the planning decision. This evaluation may detail any measures that can be implemented to mitigate the damage and help to decide whether excavation is required of the threatened archaeological remains.

Listed Buildings

Under the *Planning (Listed Buildings and Conservation Areas) Act, 1990*, the Secretary of State, in consultation with English Heritage, is responsible for the compilation of the List of Buildings (and other structures) of Special Architectural or Historic Interest. Listing gives buildings important statutory protection.

Buildings are classified in grades to show their relative importance as follows:

- Grade I Buildings of exceptional interest
- Grade II* Particularly important buildings of more than special interest
- Grade II Buildings of special interest, which warrant every effort being made to preserve them

The grading of listed buildings is non-statutory; the awarding of grades is simply a tool to assist in the administration of grants and consents. The list is used by local planning authorities in conjunction with PPG 15 Planning and the Historic Environment as the basis

upon which decisions on the impact of development are made on historically and architecturally significant buildings and their settings.

Any work that involves the demolition, alteration or extension of a listed building (or its curtilage) requires listed building consent, which must be sought from the Secretary of State, usually via the local planning authority. Consent may be granted after a detailed application to local planning authority or the Secretary of State. Carrying out work on a listed building (or its curtilage) without consent is an offence and can be punishable by an unlimited fine.

Conservation Areas

There are activities that may be considered inappropriate within or adjacent to Conservation Areas; for example by disrupting important views, or generating excess traffic. Development within a Conservation Area is likely to be resisted if considered inappropriate in terms of scale, setting, massing, siting, and detailed appearance in relation to surrounding buildings and the Conservation Area as a whole. High standards of design are expected in all Conservation Areas, whether for new or replacement buildings, extensions, alterations or small scale development. Planning permission is normally resisted for small scale development which could lead to a number of similar applications, the cumulative effect of which would be detrimental to the character and appearance of the area. Demolition of unlisted structures within Conservation Areas is usually only permitted where removal or replacement would preserve or enhance the character and appearance of the area, or where the structure is beyond economic repair. Development which would adversely affect the character or appearance of buildings of local interest is likely to be resisted. Demolition would almost certainly only be permitted in exceptional circumstances.

Registered Parks and Gardens

The *Register of Parks and Gardens of Special Historic Interest in England* was compiled by English Heritage between 1984 and 1988 and is maintained by them. Parks and gardens of special historic interest have no statutory protection.

Listed parks and gardens are classified in grades to show their relative importance as follows:

- Grade I –international historic interest
- Grade II* - exceptional historic interest
- Grade II –national historic interest

The listing and grading process is designed to draw attention to important historic parks and gardens as an essential part of the nation's heritage for use by planners, developers, statutory bodies and all those concerned with protecting the heritage. However, no new controls apply to parks and gardens in the register, nor are existing planning controls to listed building affected in any way. It follows that structures such as fountains, gates, grottos and follies within gardens can also be listed as 'Listed Buildings' and whole parks and gardens can also be scheduled as Ancient Monuments.

Any work that affects the physical nature of registered parks and gardens requires consultation with the Garden History Society. English Heritage should be consulted in the case of those designated as Grade I or Grade II*.

The Register of Historic Battlefields

The *Register of Historic Battlefields* is maintained by English Heritage and currently includes forty sites. Registered battlefields have no statutory protection. Planning Policy Guidance note 15, however, offers a degree of protection to many of the known battle sites within England.

Structure Plan and Local Plan Protection

Scheduled and non-scheduled sites of archaeological importance, listed buildings, and historic parks and gardens and their settings are also protected under policies contained within the relevant Structure Plan and Local Plans for the area.

Important Hedgerows

Under the *Hedgerow Regulations 1997* (Section 97 of the Environment Act 1995), prior to work, which may damage or remove hedgerows, it is required to categorise the hedgerows according to a number of historical and ecological criteria which are laid out in the Regulations. District Councils are required to administer the Regulations and to maintain a map of hedgerows deemed to be 'important' under the criteria of the Regulations. Under the regulations, a hedgerow is regarded as 'important' on archaeological or historical grounds if it:

- marks a pre-1850 parish or township boundary;
- incorporates an archaeological feature;
- is part of, or associated with, an archaeological site
- marks the boundary of, or is associated with, a pre-1600 estate or manor; or
- forms an integral part of a pre-Parliamentary enclosure field system (DOE, 1997).

An archaeological site is defined as a Scheduled Ancient Monument (SAM) or a site recorded in a County Sites and Monuments Record (SMR);

The Hedgerow Act defines a pre-Parliamentary enclosure field system as any field boundary predating the *General Enclosure Act of 1845*.

The implication of this legislation is that virtually all hedgerows can be classified as being 'important' for historical purposes under the Hedgerows Regulations 1997.

The historical criteria, however, are presently under review.

APPENDIX C

ARCHAEOLOGICAL CONSTRAINTS GAZETTEER

Reference	Source	Cross references	Description	Period	Importance	Impact	Significance of impact	National grid reference
DBA:AA	KCC		Alkham conservation area	Undetermined	A	none	n/a	625594 142417
DBA:AB	KCC		Bushy Ruff historic park	Undetermined	B	none	n/a	627936 143700
DBA:AC	KCC	SMR KE15196	Kearsney Court historic park	Undetermined	B	none	n/a	628299 143705
DBA:AD	KCC		Kearsney Abbey historic park	Undetermined	B	adv d min	medium	628831 143671
DBA:AE	T. 1838	OS. 1877	Farm	Post-medieval	D	adv d min	low	624508 141683
DBA:AF	OS. 1877		Tree-lined avenues	Post-medieval	D	adv d min	low	628811 143572
DBA:AG	OS. 1898		Small building and well	Post-medieval	D	none	n/a	628326 143568
DBA:AH	OS. 1908		Avenue	Modern	D	none	n/a	627841 143324
DBA:AI	OS. 1908		Nursery	Modern	D	adv d min	low	627182 143035
DBA:AJ	OS. 1908		Boundary stone	Modern	D	adv unc	unknown	626826 142622
LS AL10	DDC		Four headstones, grade II	Undetermined	A	none	n/a	625543 142354
LS AL11	DDC		Two headstones, grade II	Undetermined	A	none	n/a	625543 142354
LS AL12	DDC		Memorial, grade II	Undetermined	A	none	n/a	625543 142354
LS AL13	DDC		Listed structure, grade II	Undetermined	A	none	n/a	625610 142319
LS AL14	DDC	SMR KE13780, MON 949011	'Halton Court' hall with end jetty, grade II	Medieval	A	none	n/a	625638 142368
LS AL15	DDC		Listed structure, grade II	Undetermined	A	none	n/a	625729 142330
LS AL16	DDC		Listed structure, grade II	Undetermined	A	none	n/a	625719 142333
LS AL17	DDC		Listed structure, grade II	Undetermined	A	none	n/a	625743 142305
LS AL19	DDC		Listed structure, grade II	Undetermined	A	none	n/a	625026 141620
LS AL2	DDC	SMR KE5886, MON 466222	Hogbrook Farmhouse, C16-17, grade II	Post-medieval	A	none	n/a	625648 142127
LS AL20	DDC		Listed structure, grade II	Undetermined	A	none	n/a	625547 142521
LS AL21	DDC		Listed structure, grade II	Undetermined	A	none	n/a	625428 142579
LS AL22	DDC		Listed structure, grade II	Undetermined	A	none	n/a	625583 142452
LS AL23	DDC		Listed structure, grade II	Undetermined	A	none	n/a	625498 142446
LS AL24	DDC		Listed structure, grade II	Undetermined	A	none	n/a	624691 141637
LS AL25	DDC		Listed structure, grade II	Undetermined	A	none	n/a	624726 141633
LS AL3	DDC	SMR KE13773, MON 949000	'Hogbrook' aisled hall and later modification, grade II	Medieval	A	none	n/a	625678 142118
LS AL4	DDC		Listed structure, grade II	Undetermined	A	none	n/a	625590 142300
LS AL5	DDC	SMR KE5847, MON 466149	Church of St Anthony the Martyr, C13, grade I	Medieval	A	none	n/a	625546 142363


Reference	Source	Cross references	Description	Period	Importance	Impact	Significance of impact	National grid reference
LS AL6	DDC		Four headstones, grade II	Undetermined	A	none	n/a	625543 142354
LS AL7	DDC		Headstone, grade II	Undetermined	A	none	n/a	625543 142354
LS AL8	DDC		Two headstones, grade II	Undetermined	A	none	n/a	625543 142354
LS AL9	DDC		Headstone, grade II	Undetermined	A	none	n/a	625543 142354
LS RV111a	DDC		Wall, grade II	Undetermined	A	none	n/a	628642 143734
LS RV111b	DDC		Wall, grade II	Undetermined	A	none	n/a	628650 143765
LS RV112	DDC		Arch, grade II	Undetermined	A	none	n/a	628908 143687
LS RV144	DDC	MON 1250922	Church of St Peter, 1832, grade II	Post-medieval	A	none	n/a	629059 143480
LS RV59	DDC		Listed structure, grade II	Undetermined	A	none	n/a	629325 143447
LS RV60	DDC		Listed structure, grade II	Undetermined	A	none	n/a	629276 143418
LS RV64	DDC		Building wing, grade II	Undetermined	A	none	n/a	628738 143798
LS RV65	DDC		Bridge, grade II	Undetermined	A	none	n/a	628824 143699
LS RV66	DDC		Wall, grade II	Undetermined	A	none	n/a	628912 143651
LS RV67a	DDC		Wall, grade II	Undetermined	A	none	n/a	628652 143759
LS RV67b	DDC		Mock ruin, grade II	Undetermined	A	none	n/a	628651 143762
LS RV67c	DDC		Wall, grade II	Undetermined	A	none	n/a	628650 143765
LS RV68	DDC		Listed structure, grade II	Undetermined	A	none	n/a	628545 143695
LS TM80	DDC		Listed structure, grade II	Undetermined	A	none	n/a	628284 143742
MON 660158	EH		Cremation pit and bucket	Iron age	C	adv unc	unkown	625000 142000
SMR KE15207	KCC		Copper buckle, C6	Saxon	D	none	n/a	627800 143100
SMR KE15332	KCC		Worked flint scatter	Prehistoric	D	none	n/a	624250 141095
SMR KE15893	KCC		Cultivation terraces	Undetermined	D	none	n/a	624600 142100
SMR KE16822	KCC		Limekiln	Post-medieval	D	none	n/a	628770 143190
SMR Ke17795	KCC		Graves	Post-medieval	C	none	n/a	629050 143460
SMR Ke17987	KCC		Copper belt rivet, C6	Saxon	D	none	n/a	627850 143150
SMR Ke17988	KCC		Copper alloy bead or pendant	?Iron age	D	none	n/a	627830 143130
SMR Ke17989	KCC		Silver gilt brooch, C6	Saxon	D	none	n/a	627806 143105
SMR KE5846	KCC	MON 466146	Denehole	Undetermined	D	none	n/a	626320 141990
SMR KE5851	KCC	MON 466159	Acheulian handaxe	Palaeolithic	D	none	n/a	626700 142000
SMR KE5856	KCC	MON 466174	Terracotta whipping-top	?Roman	D	adv unc	unkown	628000 143000
SMR KE5885	KCC	MON 466221	Worked flint scatter	Neolithic	D	none	n/a	626200 142600
SMR KE5889	KCC	MON 466225	Worked flint scatter	Undetermined	D	none	n/a	626600 142000
SMR KE8366	KCC	MON 501811	Kearnsey Station, 1861	Post-medieval	D	none	n/a	628900 143900

Site category definitions

Grade	Description	Examples
A	Legally protected site	Scheduled Ancient Monuments, Listed Buildings, Conservation Areas
B	Nationally significant site, currently not legally protected	Major settlements (e.g. villas, deserted medieval villages), burial grounds, standing historic buildings
C	Regionally significant site	Some settlements, finds scatters, Roman roads, sites of historic buildings, locally listed buildings
D	Locally significant site	Field systems, ridge and furrow, trackways, wells

APPENDIX D
FIGURES 1 – 3



 Proposed pipeline

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Figure 3

Figure 2

Ver	Date	Description	Drn	Chk	App
0.01	10/08/04	First draft	AH	-	-

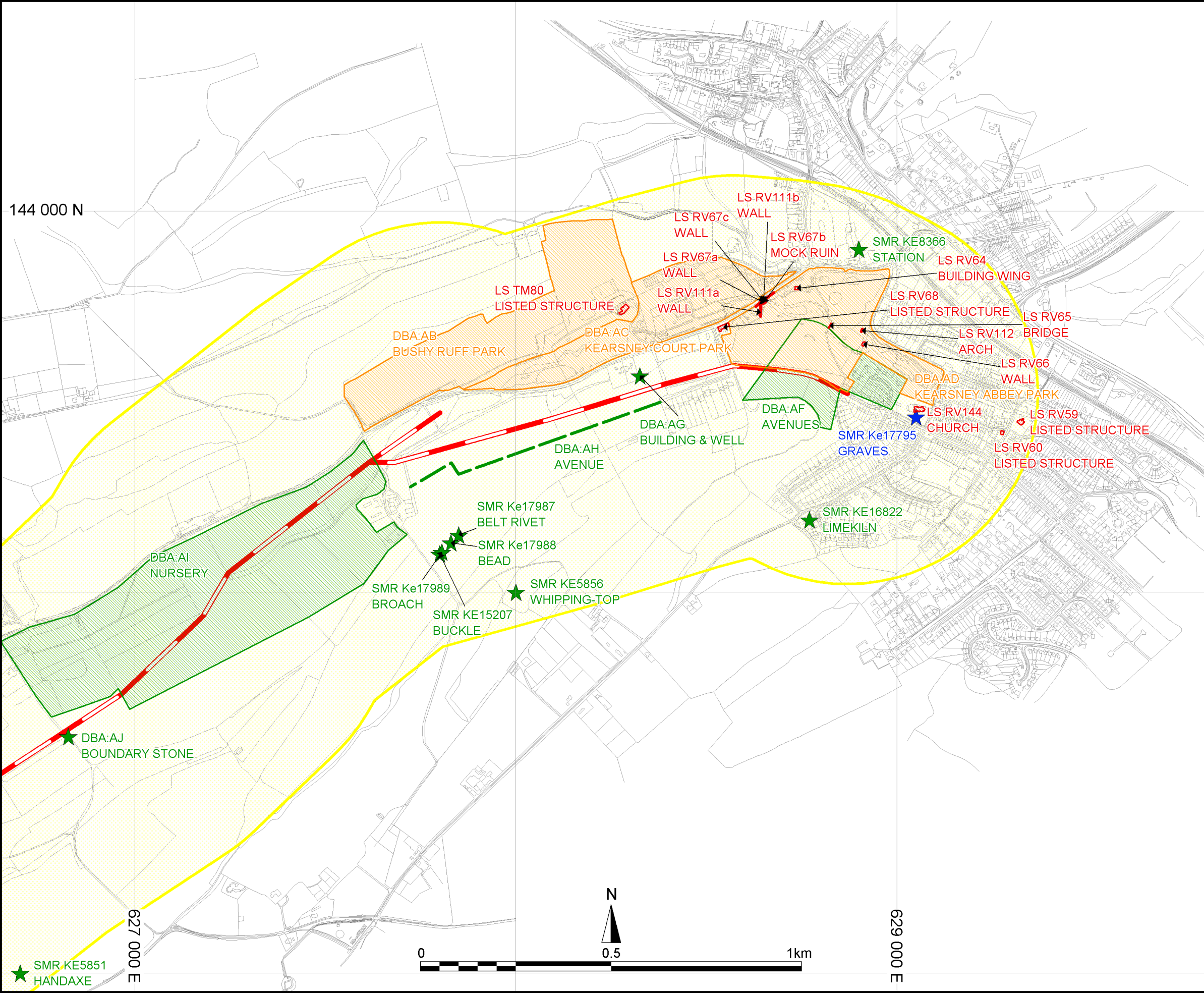


Alkham Valley Main

Figure 1
Location of proposed pipeline and figures 2-9

Scale: 1:50 000

FILE NAME: avm\stage2\gis\workspaces\ver00_01\figure01 wor



- Proposed pipeline
- Study Area
- Archaeological constraints**
- A grade
- B grade
- C grade
- D grade

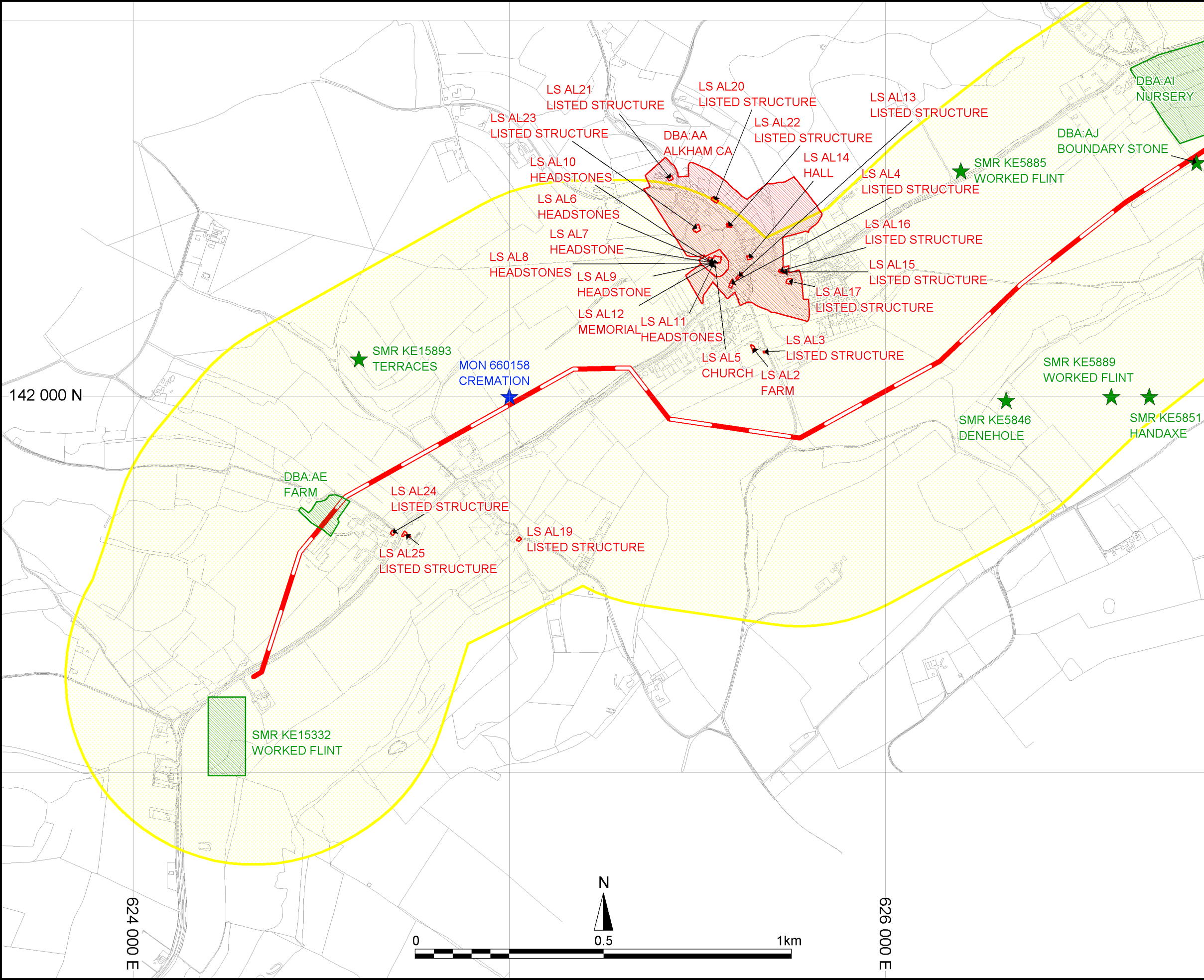
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Ver	Date	Description	Drn	Chk	App
0.01	10/08/04	First draft	AH	-	-



Alkham Valley Main
 Figure 2
 Archaeological constraints

Scale: 1:10 000



Proposed pipeline

Study Area

Archaeological constraints

- ★ A grade
- ★ B grade
- ★ C grade
- ★ D grade

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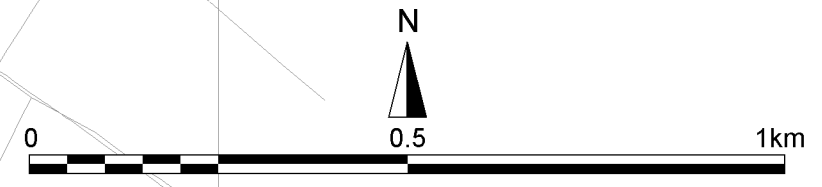
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0.01	10/08/04	First draft	AH	-	-



Alkham Valley Main

Figure 3
Archaeological constraints

Scale: 1:10 000



624 000 E

626 000 E

142 000 N

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