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ARCHAEOLEG CAMBRIA ARCHAEOLOGY

THE LLANELLI AND LOUGHOR WETLANDS

ARCHAEOLOGICAL ASSESSMENT

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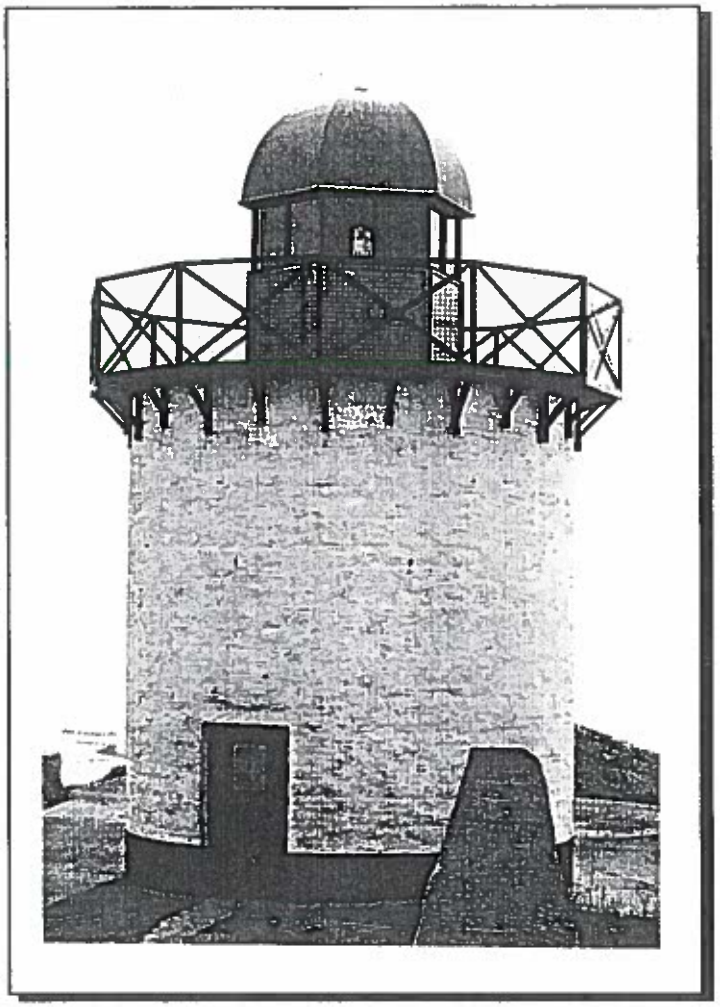

report prepared by

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for

CADW

Welsh Historic Monuments

Front Cover: The lighthouse at Burry Port Harbour. Photo K de Witt.

ARCHAEOLEG CAMBRIA ARCHAEOLOGY

LLANELLI AND LOUGHOR WETLANDS

an archaeological assessment
of
the northern shore of the Burry Inlet
and
the lower reaches of the Loughor Estuary

report prepared for
CADW: Welsh Historic Monuments

One cannot examine the neighbourhood of Llanelli without immediately realising that nature had spread its underground treasures there, and man, through his inventiveness and effort had turned this to his advantage. The whole of the surrounding country has been enriched with valuable wealth, and whichever way we look, we see large works and high chimneystacks spouting smoke in thick columns to the clouds. On the flat land near the sea one can see one of the largest copper works in Wales, and not far from it the lead and silver works. In the same neighbourhood is seen the tall masts of the ships like a forest of trees at their various moorings, and some of these coming from every nation in Europe. The powerful trains, overflowing with the valuable wealth of the neighbourhood, and the big ships carrying away thousands of tons of it to other countries. Wander a little way into the countryside and one can see inumerable coal pits along with a host of other works; in a word, the place is full of life.

(Taken from the history of Llanelli by David Bowen, 1856. English translation by Ivor Griffiths)

by
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LLANELLI AND LOUGHOR WETLANDS ARCHAEOLOGICAL ASSESSMENT

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LLANELLI AND LOUGHOR WETLANDS ARCHAEOLOGICAL ASSESSMENT

The coastal wetlands of the Burry Inlet and Loughor Estuary are a dynamic and ever changing environment. Since the end of the last Ice Age, rising sea-levals and the River Loughor have been constantly reworking the landscape. That natural landscaping is now revealing evidence of past landforms, and of a long history of human activity in the area. A Roman fort and medieval castle established on the same site at Loughor show the strategic importance of the the Burry Inlet and River Loughor. Later, the emphasis changed from military to commercial. Increased exploitation of the Llanelli coalfield attracted metal processing industries to the region, which meant that Llanelli rapidly developed into one of the most important industrial and shipping centres in the country. The landscape around Llanelli and Loughor has been shaped by its industrial past, both its development and its decline. There is an important surviving legacy of the past that could be used to enhance proposals for the region's future.

INTRODUCTION

Of the coastal littoral it is the estuaries that have been most affected by human actions. Besides having an abundance of natural resources estuaries were, and are, important as gateways to the sea and to the interior, via the rivers. Many of Britain's major and numerous smaller ports, harbours and landing places are situated in the relative shelter of estuaries. The richness and diversity of the flora and fauna of estuarine wetlands attracted people from the earliest of times. Because estuaries are influenced by fresh and salt water and constantly renourished by water-borne nutrients they are particularly rich in natural resources. This mix provides a wide range of ecozones, each with its own plant and animal communities, making estuaries amongst the most fertile and productive ecosystems in the world (Davidson 1991, 2).

The chief factor in determining the zones and available resources is salinity. As salinity decreases further from the sea the halophytic plants give way to a more species-rich flora which attracts a more diversified fauna, thereby increasing the available resources. Early human exploitation of the wetlands would have been by hunter-gatherer groups taking advantage of seasonally available resources such as new plant growth, shellfish and returning fish and wildfowl. Later as the method of subsistence changed from hunting and gathering to farming, the wetlands provided good grazing land, between tides, as well as the usual range of wild foods. Without intervention, access to the wetlands would have remained periodic and uncontrollable, so sea walls were constructed and the enclosed land drained to provide a stable, controlled and productive landscape for agriculture and more importantly, for permanent settlement.

As well as the usual resources, the wetlands of the Burry Inlet and Loughor Estuary had one resource that more than anything shaped the character of the region: coal. From the medieval period onwards the coal industry and the metal processing industries it spawned were the major factors in the economic and social development of the region, as well as in the formation of the present landscape. Just as industrial development has left its mark on the landscape so has industrial decline. Former industrial sites are now abandoned, derelict and in many cases removed altogether. The industrial decline of the region has led to a shift towards more leisure-orientated uses of the landscape with large-scale and radical re-development plans for the coastal wetlands around Llanelli. Even though the present landscape is dominated by remains of the recent industrial past there are surviving

elements of earlier landscapes dating back to at least the Neolithic period.

A LANDSCAPE VIEW

The present landscape is the result of natural and human actions interacting and influencing each other since the end of the last Ice Age (Rackham 1994, 6). Those interactions and influences are particularly evident in coastal areas where the constant battle between natural and human forces has resulted in sea defences, drained marshes, abandoned settlements, shipwrecks, silted-up harbours and drowned former landscapes. The development of Llanelli and the other urban centres in the area was linked to the availability of natural resources - in this case coal - and ready access to the sea, so their location within, and their impact on the landscape was in some ways inevitable. Furthermore, the positions of individual archaeological sites within the landscape are no accident. Often the location of one site influenced the positioning of another. For example, the central operations of coal mining - the extraction, transportation and export - had specific site types which formed part of a system precisely located within the landscape. The following example concentrates on those central operations, but does not consider the cultural, or social factors of site location like land ownership, licensing or cultural taboo.

The system of coal movement and its position in the landscape

The extraction of the coal, is obviously dictated by the location of the coal seams, thereby fixing the position of the coal pits in the landscape. Once extracted, the coal has to be transported from the pit and exported in bulk either by rail or sea. Bulk export in the Llanelli area was by sea from shipping places on the Loughor; the location of the shipping places was influenced by factors such as the need for deep water berths, sand bars and sediment movement. That meant the locations of the shipping places were to a certain extent, also environmentally fixed, although the river bottoms and sand bars could be dredged. Transporting the coal from the pit to the shipping places was achieved by a network of canals, tramways and railways, the routes and locations of which were dictated by the positions of the pits and shipping places.

Each individual element had its own prescribed position in the system of coal mining and in the landscape. When the "knock-on" effects of the coal industry like, new housing, expanding settlements, new roads and railways, the loss of agricultural land etc., are considered it becomes apparent how complex a place the historic landscape is. Whilst coal was the biggest factor in the development of the historic landscape, all human actions, processes and industries had their own sites and systems which have left their mark on the landscape. Therefore, to study individual sites in isolation, essentially disassociating them from the landscape, is to lose some understanding of the past.

This study uses a wide range of sources - documentary, cartographic, topographical, geotechnical, ecological, palaeoenvironmental, archaeological, geographical and geological - to show how a particular part of the historic landscape evolved, how it worked, how it fitted into the wider picture of South Wales and how it is being adapted and modified for use in the latter part of the 20th century.

IMPORTANCE OF WETLAND LANDSCAPES

The importance of wetlands was, prior to the Ramsar Convention of 1971, largely unrecognised and undervalued. Similarly the full potential of wetlands as archaeological landscapes has only been realised from the early 1970s. Since that time archaeological and nature conservation interests in wetlands have developed side by side with, until recently, little contact between them. This is a pity because whilst archaeologists have a great deal to learn from nature conservation bodies about wetland management, it has to be emphasised that there are almost no areas of purely "natural" wetlands. All wetlands, and therefore their ecosystems, have been influenced by human actions, and those influences need to be considered in any discussion of wetland habitat management. It seems clear that the wetland conservation lobby as a whole could be strengthened by integrating archaeological and nature concerns into a single wetland agenda (Cox *et al* 1996, vii-viii; Page 1996, 31). However, any integration must be on an equal footing as there will be times when nature and archaeological conservation priorities conflict.

ARCHAEOLOGY IN THE WETLAND LANDSCAPE

Given that all landscapes have been more or less influenced by human actions and so have an archaeological aspect, what makes wetland landscapes of special interest to archaeologists?

Wetlands provide a unique opportunity to study a wide range of relationships between past human activity (archaeological evidence) and the landscape (palaeoenvironmental evidence). The preservation qualities that exist in wetlands mean that objects made from organic materials survive, often in exceptional condition, whereas on dryland sites they decay leaving no trace in the archaeological record. Equally important, but more widespread, is the palaeoenvironmental evidence preserved in wetland conditions such as, pollen, plant remains, molluscs, diatoms, foraminfera and insect remains, all of which provide contemporary evidence of past environmental conditions and landscapes. In wetland archaeology there is an important association between the archaeological and the palaeoenvironmental evidence. Not only are some objects both archaeological and environmental evidence (a wooden bowl, for example, is both archaeological - the bowl - and environmental - the wood) but the matrix surrounding the objects contains contemporary environmental evidence (Coles 1995, 1). This combination of the archaeological and palaeoenvironmental evidence means that a multi-discipline approach can be adopted for the study of wetland sites allowing a more complete interpretation of past activity than is generally possible for dry sites.

The extraordinary range of 'finds' from wetlands has meant that most wetland archaeological studies have concentrated on the buried sites. This is understandable, because the buried archaeological resource is sensitive to even very slight changes in ground conditions. However, the situation is changing as there is a groqing recognition that the study of the surviving landscape of reclaimed wetlands can be equally rewarding (see for example Rippon 1996).

PROJECT COMMISSION

This is the second Cadw grant-aided assessment of the coastal wetlands of southeast Dyfed, now Carmarthenshire, undertaken by Archaeoleg Cambria Archaeology (formerly Dyfed Archaeological Trust). The first assessment, of the Kidwelly and Pembrey Marshes, (Page 1996) demonstrated the archaeological potential of the wetlands by adding almost 100 new sites to the county Sites and Monuments Record (SMR), recommending some sites for statutory protection and identifying sites needing further archaeological recording. Following the success of the original assessment Archaeoleg Cambria Archaeology submitted proposals for a similar project concentrating on the area to the east of the original project. This assessment area was chosen for several reasons: the landscape has been established for a long time; it has been heavily industrialised; it has major urban centres; it is facing a variety of development pressures, including the Llanelli Millenium Coastal Park. It also provides a good contrast to the undeveloped fairly modern landscape of the 1995/6 project. Cadw accepted the proposals and the assessment was carried out during winter 1996/97.

The current assessment is part of series of major assessment projects carried out by Archaeoleg Cambria Archaeology in southeast Dyfed. Previous reports concentrated on the historic utilisation of the mineral resources - limestone, gritstone, silica, coal - (Murphy and Sambrook 1994; Sambrook 1995) and the on-going threat of continued extraction (Sambrook and James 1995). The 1995/5 wetlands assessment project (Page 1996) focussed on the area between St. Ishmael's, just north of Kidwelly, and Pembrey. All of those projects were grant-aided by Cadw. Reports on the historic landuses of the reclaimed marshes at Llanelli and Llangennech have been prepared for the Countryside Council For Wales (James 1993; James and Morgan 1994). Development led projects, on behalf of Dwr Cymru, were undertaken in advance, and during construction of the Pen-y-Bryn Sewage Treatment Works (James 1993; Ludlow 1995)

PROJECT OBJECTIVES

The assessment had a range of objectives:

- To determine, where possible, the development and condition of the historic landscape.
- To identify, record and evaluate the individual sites, features and deposits within the historic landscape.
- To identify the range and causes of pressures on the historic landscape.
- To make recommendations for the protection of individual sites, features or complexes of sites and features.
- To make recommendations on developing overall archaeological protection and management strategies.
- To produce a report summarising the above.

- To enhance the county Sites and Monuments Record (SMR).

MANAGING THE ARCHAEOLOGICAL RESOURCE

The overall objective of the assessment was to provide reliable baseline information for use in the formulation of a management and protection strategy for the archaeological resource within a context of coastal zone development. To be effective archaeological management plans have to be integrated into the wider initiatives for coastal and estuarine protection such as shoreline and estuary management plans. Therefore, it is important to establish and increase liaison with agencies such as the Environment Agency, Countryside Council for Wales, coastal development authorities and the National Coasts and Estuaries Advisory Group.

PROJECT METHODOLOGIES

To achieve the stated objectives the project was divided into 3 sections:

1. Documentary searches.
2. Fieldwork.
3. Analysis and reporting.

It is worth detailing here the methodologies employed, and the problems and limitations encountered throughout the project. The methods employed were largely those developed during the 1995/6 assessment.

DOCUMENTARY AND CARTOGRAPHIC SEARCHES

Documentary and cartographic searches were carried out to provide further information on known sites and to identify new sites. The searches were divided into two phases, one carried out prior to the fieldwork and the other carried out during the fieldwork.

Prior to the fieldwork the searches concentrated on the county Sites and Monuments Record (SMR), the National Monuments Record (NMR), air photographs (coverage held by DAT and the Central Register of Air Photographs for Wales, Cardiff, were consulted) and historic maps contained in the SMR. All sites, known and new, were plotted onto working base maps for use in the field and during the reporting.

Carrying out fieldwork and documentary research elements at the same time had a number of advantages. It was flexible inasmuch as it meant that documentary work could be undertaken during unsuitable tides and the worst of the weather without affecting the overall project timings. The fieldwork and documentary searches frequently turned up information that led to new areas of investigation in the other element, and it allowed the information to be continually assessed and its value appraised.

FIELDWORK

The fieldwork formed the bulk of the project and consisted of a series of field visits to assess the condition and vulnerability of known sites and to identify new sites, features and deposits, and to identify areas where they may occur. All new sites, features and deposits were recorded onto computerised SMR site record forms. Selected sites, features and deposits were photographed in colour slide and monochrome (35mm format). Site notes were kept during field visits and all sites, features and deposits were plotted onto the working base maps which were annotated during the site visits.

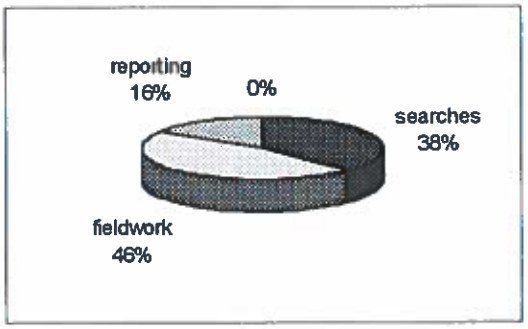


Figure 1: Breakdown of the project timings

LIMITATIONS, CONSTRAINTS AND PROBLEMS

All non-intrusive assessments have an in-built bias towards the later historic period with its wealth of documentary and cartographic evidence. This bias is particularly evident in wetland assessments where mobile sediment can quickly cover and obscure early sites, features and entire landscapes making them invisible to the usual methods of archaeological prospection. As a fairly rapid assessment the overall project constraints meant that the documentary searches could not be exhaustive and the recording of sites during the field visits was not very detailed. The usual problems of accessibility and sediment movement in the intertidal zone were encountered. Areas of saltmarsh were crossed by numerous channels and ditches making systematic examination difficult. The potential

hazards of the assessment area meant that for safety reasons two people were required for field visits. None of the above proved insurmountable and a more than sufficient assessment was made of the available data to analyse and interpret the development of the historic landscape; evaluate the individual sites, features and deposits and how they fitted into that landscape; identify the nature and immediacy of the pressures on the archaeological resource; highlight areas which would benefit from further investigation.

ACKNOWLEDGEMENTS

The Trust is indebted to Cadw for grant-aiding this project and to Rick Turner, Inspector of Ancients Monuments, for his continued support of the programme of wetland assessment. Thanks go to the many individuals and institutions who assisted during the course of the project, including the staff at the Central Register of Air Photography for Wales, Cardiff; staff at local and national record offices and libraries; and at the county engineers department, Carmarthenshire County Council for making available the borehole data. Most of the farmers and landowners we met during the course of the fieldwork were happy to pass on information and expressed an interest in the project. Thanks also go to Martin Locock of the Glamorgan-Gwent Archaeological Trust for identifying the skull recovered from the shell midden. I would like to thank Belinda Allen for her tireless and patient assistance throughout the project, especially when compiling the hundreds of new site records; Jenny Hall, regional SMR Officer tabulated the results for Appendix One. As usual other Trust staff were generous with their time and knowledge, and Ken Murphy, Sue Scott and Heather James of the Trust all read and commented on early drafts of this report. Any errors must, however, remain the responsibility of the author.

THE ASSESSMENT AREA

The assessment area covers a large area of low-lying land on the northern coast of the Burry Inlet (Fig. 1). For the purposes of this assessment the boundaries are defined by Pembrey Harbour and the M4 motorway at the west and east ends respectively, the 10m contour line along the north side and mean low water mark on the south side. Much of the assessment area has been designated a Site of Special Scientific Interest (SSSI) and the waters and intertidal zone of the Burry Inlet are recognised as a Special Protection Area under the EC Directive on Conservation and as a wetland of international importance as defined by the Ramsar Convention of 1971.

THE GEOLOGICAL BACKGROUND

Much work has been carried out on the geological and geomorphological formation of the Llanelli area, most notably by D Q Bowen (1980). This report uses the published material as well as unpublished borehole data held by Carmarthenshire County Council. The assessment area is bounded to the north by a discontinuous crescent of high ground, the remnants of sea cliffs and raised beaches of the last interglacial which are traceable from Pembrey to Bynea. The former cliffs, composed of rocks of the Carboniferous period, are dissected by small river valleys draining the higher ground to the north into the Loughor and the Burry Inlet (James 1993b, 8).

The Llanelli area was completely covered during the last (Devensian) glaciation; the ice-sheets spread from the north and northeast to the south and southwest. A coastal slope leading south from the former cliff-line and the coastal plain are mantled by the glacial and periglacial deposits of the last glaciation (Bowen 1980, 134). Of the borehole data examined only one area reached bedrock which was at *c.*-1.5m OD. As the ice sheet retreated *c.*10,000 years ago a number of glacial moraines, including an end-moraine stretching from Machynys south to Penclawdd on the north Gower coast, were deposited along the low-lying ground at the base of the former sea cliffs. These survive today as islands of higher ground in the alluvial plain. These islands were the focus for agriculture from the medieval period and there is every likelihood that they were also favoured during earlier times.

POST-GLACIAL DEPOSITION AND SEA-LEVEL RISE

The Holocene sedimentary sequence shows an overall trend of sea level rise. In general terms, the sequence was one of thick deposits of alluvium intercalated with peat beds. Whilst the exact make up (i.e. whether the deposits were laid down under marine or freshwater influences) of the sequence is not known at present, it is clear that the peat deposits represent less wet conditions. Whether those conditions were caused by periodic slowing or regression of sea level rise or by the rate of sedimentation being more rapid than the rate of sea-level rise is not clear. No previous work on sea-level rise was found for the survey area, but work in other areas suggests a rise of *c.*25m since 9000 BP radiocarbon years (Heyworth and Kidson 1982, 110), with a rise of 2.5-3.7m since the Roman period (Toft 1992, 251: Waddelove and Waddelove 1990), although detailed work on late-Holocene sea-level rise on the Gwent Levels has shown a rise of 1.6m-1.7m since the Roman period (Allen and Rae 1988, 225).

A generally accepted picture of sea-level rise has a mid-Holocene slowing in the rate of rise, leading to an advancing shoreline, dating to around 6,000BP for the Severn Estuary (Scaife R and Long A 1995, 81; Canti *et al* 1996, 62-63). Analysis of the deposits within the assessment area would reveal any local effects of this slowing. The problems of assessing the rate of sea-level rise in the area do not appear to be complicated by any significant isostatic movement since the last glaciation. A line running from the north Yorkshire coast through Wales is the approximate axis for isostatic rise and fall in Britain. North of the line the land is rising as a response to the removal of the weight of the ice sheet whilst to the south the land is sinking (Heyworth 1978, 281; Scourse 1992, 13-14), both as a result of the rise in the north and tectonic shift.

Peat deposits

In places, such as Bynea and Burry Port the peat only appears in one or two boreholes suggesting localised pockets of growth. At Burry Port peat deposits up to 3.35m (11 ft) thick have been recorded (Archer 1968, 164), but the borehole data examined only revealed a small localised area nowhere near that thick (max. thickness 0.60m). From approximately Pwll eastwards the peat appears to occur in a wide undulating band lying between 2m and -5m OD, and fell into two categories, true peat and clayey peat/peaty clay;

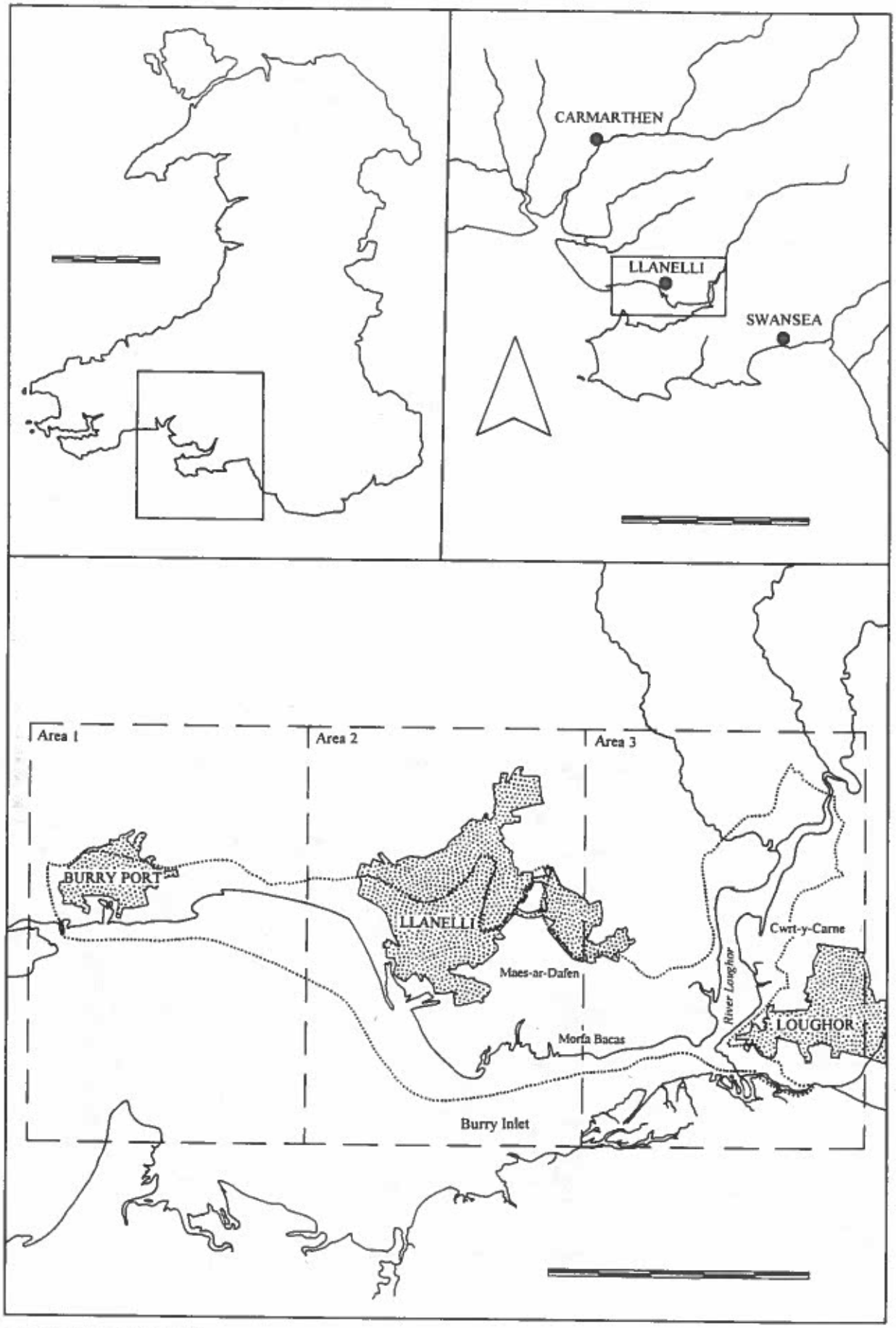


Figure 2: Location plan

the relative quantities of clay and peat varied in he mixed deposit. In all but one of the borehole logs examined the true peat overlay the clay/peat deposit. The exception was from a borehole at Machynys where a sequence of true peat - clay/peat - true peat was recorded suggesting an episode of wetter conditions between two drier periods. This is perhaps evidence of a breach, or topping, of the Machynys end-moraine resulting in the formation of a lagoon behind it.

A sample of peat recovered from a submerged forest (PRN 31317; NGR SS 5430 9769) discovered during this assessment at Morfa Bacas returned a radiocarbon date of 4190±80 BP (SWAN-238). Other exposures of submerged forest were discovered in the intertidal zone to the west of Llanelli (PRN 31318; NGR SS 4800 0000) and in the saltmarsh on the west bank of the river Loughor at Llangennech (PRN 31275; NGR SN 5622 0086 and PRN 31238; NGR SN 5655 0124). Dates are not available for these yet (plate 1).

The exposed forests and associated peat beds provide an opportunity to examine and analyse the development of the prehistoric landscape, and to provide dated indicators of sea-level rise in the eastern part of Carmarthen Bay. Furthermore, the results from any analysis of the Llanelli and Loughor peats could be used in conjunction with the results of work carried out on the submerged peats of Pembrokeshire and Carmarthenshire (Lewis 1992) to provide data on sea level rise over the last 5,000 years for the whole of southwest Wales.

Superficial or drift deposits

The meltwaters at the end of the last glaciation carved out an enlarged channel for the Loughor, roughly delimited by the 8m contour line, but Holocene aggradation has infilled that earlier channel to form the low-lying alluvial plains on either side.

Plate 1: exposed tree stumps in the intertidal zone at Morfa Bacas, Llanelli. Photo DAT.

Fluvial deposits across the assessment area have been, and are still being, deposited and modified by the rivers Loughor, Lliw, Lliedi, Dafen, Morlais and their tributaries. River movement across the alluvial plains means that sediment accretion and erosion is cyclical. Extensive saltmarsh growth took place on the northern bank of the Burry Inlet as the river Loughor followed a more southerly course close to the Gower coast in the past.

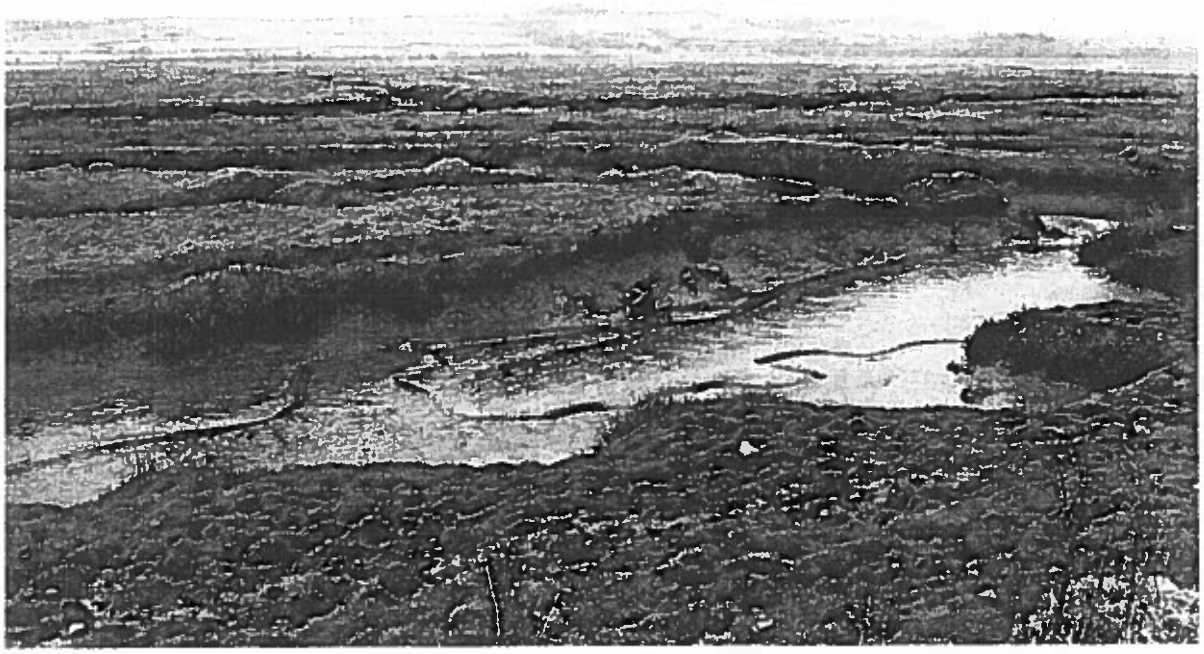


Plate 2: Extensive saltmarsh development in the Loughor Estuary. Photo DAT.

The Loughor Estuary and Burry Inlet has the most esturaine saltmarsh in Wales, over 2,000 hectares, and it is the second largest area of saltmarsh in Britain (Smith and Yonow 1995, 38; Burd 1989, 151). However, since 1830 the Loughor has meandered further north and has started to erode the saltmarshes along the northern coastline (James 1993b, 9). That erosion is uncovering and eroding earlier landscapes and in places the glacial gravel making up the 'islands' is visible.

NATURAL DRAINAGE

Prior to land reclamation, the assessment area was drained by the numerous pills and creeks that fed into the rivers Dulais, Lliedi, Dafen, Morlais, Mwrwg and ultimately the Loughor. This natural drainage was characteristically dendritic in nature. Much of the pattern of palaeochannels and creeks is still visible on air photographs, and some palaeochannels are traceable on the ground. The air photographs clearly show how the reclaimed landscape has been superimposed on the natural landscape.

EMBANKMENT, DRAINAGE AND MANAGEMENT OF THE LLANELLI and LOUGHOR WETLANDS

SALTMARSHES: NATURAL DEVELOPMENT AND ARTIFICIAL MANAGEMENT

Saltmarsh development is dependent on certain conditions which allow a net accumulation of sediment such as a fairly open location, some shelter from wave action and a gently sloping aspect. Although saltmarsh development begins below the Mean High Water Mark of Neap Tides with colonisation of the mud by algae, it is only when the sediment is free from inundation for several days during neap tides that true saltmarsh development takes place. Those few tide free days allow seedlings to germinate and halophytic plants to colonise the mud. Once the plants are

established more sediment is trapped, raising the level of the saltmarsh. As the saltmarsh grows to seaward the tidal influence is decreased at the landward edge allowing a wider variety of plants to survive and more complex communities to develop (Burd 1989, 7).

The unprotected marshes would have had a range of uses, but they were principally used for food collection and following the adoption of agriculture, for grazing. Whilst providing good free grazing, the unprotected marshes were unstable inasmuch as they could be eroded and the network of channels and creeks meant that no systematic exploitation could take place. To make the saltmarsh stable and fully exploitable it was necessary to construct sea defences and to drain the newly enclosed land.

SEQUENCE AND PROCESSES OF EMBANKMENT AND DRAINAGE

Land reclamation depends on a set sequence of actions:

- Construction of a sea defence along the coastline and the along the major rivers crossing the area.
- Minor rivers and watercourses modified and incorporated into a rudimentary system of drains.
- Creation of an artificial drainage system.

THE HISTORY OF SEA DEFENCES IN THE ASSESSMENT AREA

The sea defences in the assessment area are made up of four principal types, three of which were purpose built. These are earth banks, stone walls, concrete and steel walls. With the fourth type, railway embankments, sea defence was a secondary consideration. In most, if not all cases, the earthen defences have been replaced by stone or concrete and steel walls.

The earliest discovered reference to sea defences in the assessment area comes from an assessment of the Duchy of Lancaster Lordships in Wales (1609) when one William Davie, late deceased, enclosed the commons called Brine Bach (Rees 1953). This suggests 16th century or earlier enclosure of parts of the marshes. Even though there are at present no known medieval references to embanking in the area, it is almost certain that there was some form of sea defence around the medieval grange at Cwrt y Carnau (PRN 5853; NGR SN 5733 0046) on the east bank of the Loughor. Cwrt y Carnau, a grange of Neath Abbey, was mentioned in a charter of 1208, but may well have been established before the end of the 12th century[1]. The remains of the grange chapel, St. Michael's (PRN 5854; SAM Gm200; NGR SN 5718 0044), is located on the saltmarsh close to the present Cwrt y Carne farmhouse. This suggests that at the time the area was either enclosed, or above the level of spring tides. The Cistercians are known for having enclosed and drained other areas of low-lying coastal plain, for example, Margam held lands at the mouths of the rivers Afan and Ely and Tintern had lands on the Caldicot Level (Cowley 1977, 56; Rippon 1996, 79). Therefore, the argument for medieval enclosure and drainage at Cwrt y Carnau seems a strong one.

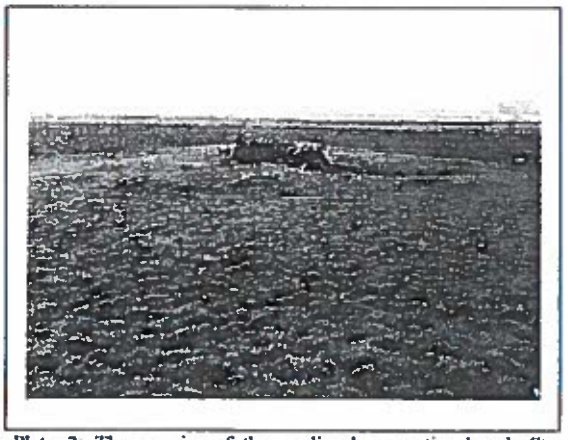


Plate 3: The remains of the medieval monastic chapel, St. Michael's.

Enclosure of the Llanelli Marshes

This brief discussion centres on the major, identifiable historic land units, so does not mention all episodes of embankment. For a detailed overview of embankment within the assessment area see James (1993) and James and Morgan (1994).

Maes-ar-Dafen

Another area of possible medieval enclosure has been suggested by James (1993b, 13) as being around the former site of Maes-ar-Dafen, now the site of the Trostre Steelworks. The 'maes' element of the names Maes-ar-Dafen Fawr and Maes-ar-Dafen Fach (PRN 21430; NGR SS 5270 9970) when taken together with the irregular field shapes and the bulwark or sea defence that defined their southern boundary suggests

[1] The chapel is a Scheduled Ancient Monument. Information from Glamorgan county SMR, held by Glamorgan-Gwent Archaeological Trust, Swansea.

reclaimed land. To the north of the two farms were fields called Ca' Cefen that on a map of 1751 (*A Description of Lands Near or About Berwick Chapel in Llanelly Parish, Carmarthenshire* by William Jones) were still divided into the common strips or shares typical of a medieval open field.

Furthermore, an area of surviving fields on the east banks of the old and new Dafen River are angular in shape and bounded by a bank whose irregular course also suggests early enclosure. Also shown on the 1751 plan was another block of fields, belonging to Trawstre (Trostre) that appear to have their origins in a medieval open field system. The southern boundaries of the Trostre and Maes-ar-Dafen lands were defined by either end of an embankment (the Maesardafen Sea Bank) that cut across the valley of the Dafen River. It is unclear when the Maesardafen Sea Bank was constructed, but it appears to have joined two banks of probable medieval date.

The area of medieval enclosure around Maes-ar-Dafen fach has been totally lost during the construction of Parc Trostre, and by current land-fill on the site.

Machynys

Machynys is shown as an island on early maps of the area and it remained an island until the later 18th century (James 1993b, 14). On Emmanuel Bowen's *Map of South Wales* (1740) and a later chart by Murdock Mackenzie (1775) Machynys is clearly shown as an island. Care should be taken when using the Mackenzie chart as it does not appear to show saltmarsh or any other kind of boggy ground, so it is not possible to tell if the channel between Machynys and the mainland had started to infill by 1775. What this chart does show however is the southerly course of the Loughor along the north Gower coast and three gravel islands running south from Machynys in the channel. These are remnants of the Machynys end moraine. By the time of Denham's *Chart of the Burry or Llanelly Inlet* (1830), Machynys was joined to the mainland and was embanked on its southeastern side. The embankment of Machynys had started much earlier. A mid 18th century estate map shows two areas of embankment and reclamation on the southern end of the island (Stepney Mapbook, 1761). The final stages in the embanking of Machynys were the construction in 1808-9 of the 'Great Embankment' from Machynys to the Maesardafen Sea Bank.

The sea defences of the area between the Penclacwydd Wildfowl and Wetlands Centre and Yspytty were, in common with the rest of the area, erected piecemeal and of varying dates. Although large-scale enclosure appears to have started during the 18th century, it was not until the 19th century enclosure acts that an integrated approach to embankment was adopted and the Llanelli marshes were reclaimed in quantity (James 1993b, 27).

Enclosure of Llangennech Marsh

The enclosure of Llangennech Marsh was later than that of Llanelli Marsh. When Charles Hassall wrote about the agriculture of Carmarthenshire in 1794 there was little or no enclosure on Llangennech Marsh. The fact that Hassall never mentioned the marshes around Llanelli suggests either that they were not of a significant size, or more likely they were already largely enclosed. Most of the embankment at Llangennech dates from the 19th century. The process of enclosure of Llangennech Marsh closely mirrors that at Llanelli with early settlement and enclosure focused on the raised glacial islands of Vinney, Bryn-y-Gwair and Perth-y-wrach.

There are a few interesting points arising from previous study of this area (James and Morgan 1994) which identified seven phases of embankment. A track that today leads from Llangennech Station past Vinney to an old fording point across the Loughor at one time continued past the medieval grange at Cwrt y Carne on the opposite side of the river. Although its origins are unclear, it is likely to be of medieval or possibly earlier date. Because it crossed waterlogged ground, there may have been some attempts at providing a dry, or drier route in the form of wooden trackways. This would particularly be the case if the route was well used. Therefore, there may be some surviving sections preserved in the waterlogged conditions of the marsh. Even though the area has been heavily disturbed by the construction of a concrete road and the insertion of various water pipes leading to and from the sewage treatment works on the former site of Vinney Farm, the possibility of surviving remains must be considered.

A bank that ran along the south side of the Afon Morlais, around the seaward edge of Perth-y-wrach and on to Bryn-y-Gwair, enclosing the north part of Llangennech Marsh, was

considered by James and Morgan (1993, 7) to be a "levee-type bank" designed to allow inundation at high tide to create improved saltmarsh. This bank replaces an earlier, aborted attempt to enclose this area of marsh. The system of controlled, or in this case semi-controlled flooding of an area to encourage sediment deposition is a recognised method of raising the level of the land surface and providing light fertile soils (see for example Lillie and Weir 1997, 191-218). Sampling and analysis of the sediments inside this bank will show whether the system was successful. The construction of the Llandeilo and Llanelli Railway in 1834 cut right across the marsh, effectively embanking everything behind it.

DRAINAGE

The drainage of the assessment area was, and is, a combination of natural and artificial drains. Drainage can be divided into three categories: a) natural drainage; b) enhanced natural drainage; c) artificial drainage.

a) Natural drainage channels are typically serpentine and dendritic in character giving the landscape an irregular appearance. Natural drainage allows only episodic access to the wetlands.
b) Enhanced natural drainage channels are modified in some way, i.e. recutting or minor re-routing, but still retain natural characteristics. Enhancing some drains would have stabilised some areas of marsh and may have allowed more frequent and better controlled access to the wetlands.
c) Artificial drainage channels are usually straight and uniform resulting in a regular, rectilinear land pattern. It would have fully stabilised the enclosed marsh allowing constant access and use of the land. This type of drainage can be divided into soft drainage, open drains, or hard drainage, buried ceramic or plastic field drains. More farmers now lay hard drainage because, once laid, they are relatively labour free, and by replacing the open drains they allow for larger, more productive fields.

All three types of drainage are present in the assessment area. Inside the sea defences the drainage is a mixture of artificial and enhanced natural drainage, whilst outside the sea walls the saltmarsh and mud flats are drained by natural pills and creeks. These are particularly evident in the intertidal zone at Morfa Bacas, where a palaeochannel (PRN 31239; NGR SS 5473 9794), that cuts the alluvial deposits is filled with blue (esturine?) clay and sealed by the later saltmarsh. The palaeochannel continues northwards, running under the reclaimed land. The blue clay fill contained pieces of waterlogged worked wood indicating human activity. Just how far the wood had been moved down the palaeochannel is impossible to tell, but it was in good condition, so it may not have travelled far. The archaeological potential of palaeochannels has been amply demonstrated on the Severn Levels where major sites have been found in close association with former tidal creeks and pills (Allen and Rippon 1995, 41-50). It appears that this may also be the case with the Morfa Bacas area.

In areas of reclaimation soft drainage is still the predominant form, although, areas of tile-drainage around Llangennech are visible on aerial photographs. There are many areas of enhanced natural drainage. These are particularly evident where creeks and channels are crossed by linear barriers such as sea-walls and railway embankments. Enhanced natural drainage is particularly evident on the southern tip of Machynys and on Llangennech Marsh where drains around the glacial islands have been modified and redirected. The lower reaches of the rivers Dafen and Lliedi have been drastically modified or re-routed completely for industrial purposes. Both were redirected to help the water management of the expanding docks area of the town. The Dafen used to flow out of the Dafen Pill at modern Penclacwydd, but it was re-routed to flow out through the Copperworks Dock area and the Lliedi originally flowed into the Loughor in the Sandy Gate area, but was redirected through the Carmarthenshire Dock.

WATER MANAGEMENT

Once the land was enclosed and drained, it was necessary to control and manage the movement of water. That was achieved by the construction of weirs and sluices in the which could be opened and closed to control the movement of water through the channels.. The remains of many of those sluices and weirs are visible in the drainage channels, particularly on Llangennech Marsh, and on the opposite side of the Loughor. Where channels passed through linear barriers the flow of water was controlled by sluice gates, some of these are still in place and functioning. Responsibility for the maintenance of the drainage channels outside the sea walls lies with the Environment Agency and inside the defences with the landowners.

Plate 4: drain clearance at Penrhyngwyn, January 1997. Note the amount of material removed compared to the uncleared bank Photo. DAT.

THE ARCHAEOLOGY OF THE ASSESSMENT AREA

A total of 531 individual sites were recorded during the assessment. There was great variation in the types and dates of the sites, ranging from prehistoric woodland to WWII defences. A gazetteer of sites is given in Appendix One. As an assessment project the following discussion is, of necessity, only a brief summary of the cultural development of the area, and as such should be regarded as the starting point for further, more detailed study.

FOOD COLLECTION

Evidence of food collection was confined to the intertidal zone where a shell midden (PRN 31237: NGR SS 5487 9793) of unknown date and large number of fishtraps were recorded. The midden consisted of mussel and cockle shells and contained a skull of a roe deer that was lifted before it was lost to erosion. Although not securely dated, the position of the midden just above the glacial gravel, suggests an early (?prehistoric) date. The condition of the midden will be monitored as it is in an area of active erosion, and should any other bone become visible it will be lifted with a view to radiocarbon dating.

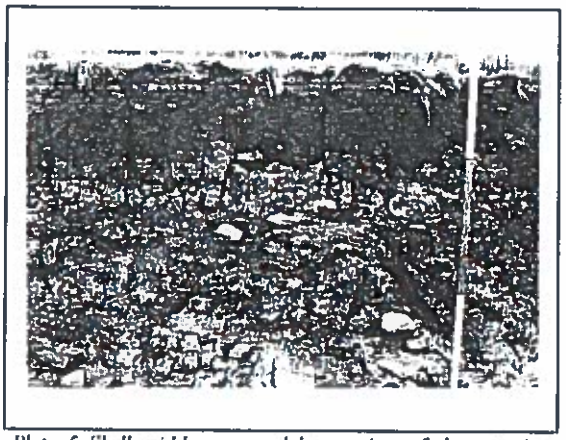


Plate 5 Shell midden exposed by erosion of the covering saltmarsh.

A large number of uprights were recorded in the intertidal zone. The uprights formed many identifiable linear arrangements forming structures. There were also many individual uprights that at present cannot be linked to any of the structures. There is little doubt that the structures were the remains of fishtraps, or parts of fish weirs. Other uses for the uprights included mooring posts and markers for crossing points of the channels and creeks.

There were too many fishtraps in the assessment area to discuss them all at length. The most complete trap (PRN 31235; NGR SS 5630 9766), *c.*70m long, was located in the Afon Lliw at its confluence with the Loughor. It comprised wooden uprights positioned in two curved rows forming arms either side of a square collecting point. The biggest concentration of fishtraps was centred on the submerged forest at Morfa Bacas (PRN 31317; NGR SS 5419 9771); over 200 uprights were recorded on the peat exposures there. Within the Morfa Bacas group there were many identifiable lines of uprights on two main orientations. Those closest to land were parallel to the shoreline whilst the ones close to the channel were at 90 degrees to it. Samples taken from two of the lines have returned radiocarbon dates of 290±60BP (Swan-239) and 140±60BP (Swan-240). In places, wooden uprights had been replaced by metal bars and tubes, showing a continuity of use until very recent times. It appears that the northward movement of the main channel of the Loughor has removed any earlier structures.

Other groups of fishtraps were recorded in the Sandy Gate - Pwll area and Penrhyngwyn Point, on the southern end of Machynys, where one modern trap, aligned at 90 degrees to the main channel, consisted of two parallel rows of uprights which curved to form a spiral at the northern end. Some of the other modern traps were of much more basic design whereby a net was simply held by piles of stones at either end. There are reports of long (up to 40ft - *c.*12m) fishtraps being uncovered in the Llanelli Beach area (Morgan 1991, 59), but nothing like that was visible during the assessment.

FOOD PRODUCTION

In the past, agriculture was the primary reason for enclosing and draining low-lying land and coastal marshes. That was the case within the assessment area, where there were a number of episodes of enclosure culminating in a 19th century Enclosure Act. The sea defences and drains have already been mentioned above and are not included in the following discussion. Managed marshland provides excellent agricultural land suitable for both arable and pastoral farming, even during the driest weather the grass stays green and lush because of the inherent wetness of the ground. Unprotected saltmarsh also provides excellent grazing land, and the farmers on the east bank of the Loughor use it for grazing cattle and sheep. Horses graze

the saltmarsh on the west bank of the Loughor at Llangennech.

The monastic grange at Cwrt y Carnau (PRN 5853; NGR SN 5733 0046) is the earliest known agricultural settlement in the assessment area. There was no evidence of Roman agriculture, despite the presence of the fort at Loughor (PRN 7690; NGR SS 5635 9800). However, there is evidence from elsewhere in Britain - Northampton and Solway, for example - to suggest an intensification of native agriculture following Roman settlement (Greene 1986, 127). It seems that this intensification was a response by the local farmers to the new economic opportunities offered by the troops stationed in the fort rather than under military direction (Rivet 1958, 101; Greene 1986, 127). Palynological analysis of the sediments in the Loughor Estuary may reveal changes in the local agriculture following the arrival of the Romans.

Cwrt y Carnau was established sometime during the late 12th or early 13th century. It was leased by the crown in 1537 and later bought by the Pryce family (for a discussion on the grange see, for example, Spurgeon and Thomas 1975, 58-59; Williams 1990) The present farm, Cwrt y Carne (PRN 31333; NGR SN 57320049) is thought to occupy the original 'cwrt' site, but, aerial photography (OS 69 267, frames 43-44) revealed a number of substantial rectangular marks (PRN 31549; NGR SN 5724 0060; PRN 31550; NGR SN 5723 0090; PRN 31551; NGR SN 5721 0049; PRN 31552; NGR SN 5721 0040; PRN 31553; NGR SN 5726 0041) in the saltmarsh just to the north of the chapel site which may have been part of the medieval grange. However, they could also be associated with the 19th century limekiln (PRN 31334; NGR SN 5718 0045) present on the site, or even simply stock enclosures. No large structures were shown in this area on any of the cartographic evidence examined.

In the Llanelli area a significant number of the post-medieval farms occupied the raised glacial island in the coastal plain, for example Machynys (PRN 6995; NGR SS 5078 9822), Machynys, Tir Morfa (PRN 21403; NGR SS 5330 9860), Pen y Bryn (PRN 29589; NGR SS 5410 9820), Techon Fawr (PRN 21401; NGR SS 5395 9920), Maes-ar-Dafen Fach (PRN 21430; NGR SS 5270 9970), Maes-ar-Dafen Fawr, Tir Teneu (PRN 31674; NGR SS 5849 9798), Tir Kit Rees (PRN 31671; NGR SN 5368 9806), Dyffryn, Pen Ceiliogwydd (PRN 21402; NGR SS 5385 9867), Penclacwydd Isaf (PRN 31678; NGR SS 5306 9835), Bryn Carnarfon (PRN 21408; NGR SS 5460 9830) and Berwick (PRN 21410; NGR SS 5480 9880). Few, if any of these are still working farms.. The others have suffered a variety of fates, some have been demolished, some are abandoned, one is now a museum and one has become a wildfowl and wetlands centre.

Pen y Bryn was demolished to make way for a new Sewage Treatment Works (Ludlow 1995). There are no above ground traces of Tir Teneu; Maes-ar-Dafen Fawr formerly stood on the site of the Trostre Steel works. Machynys, Tir Morfa, Tir Kit Rees, Pen Ceiliogwydd have all been abandoned and are in varying states of dereliction. Machynys House has long been abandoned and now only a few walls survive; Tir Kit Rees is overgrown, but a few low stone walls are visible whilst both Tir Morfa and Pen Ceilogwydd survive in reasonably good condition. The latter two are earmarked for refurbishment as part of extension plans for the wildfowl and wetland centre at Penclacwydd Isaf. Maes-ar-Dafen Fach now lies within the grounds of the Trostre Steelworks and has been turned into a museum and functions hall.

Plate 6: Tir Morfa Fawr. One of the last Llanelli Marsh farms.

Even though the earliest documentary reference to agricultural settlement in the area comes from the 16th century, it is possible that many of these sites had earlier origins, with the remains of earlier buildings buried or incorporated into the post-medieval farm buildings.

The situation is different on the east bank of the Loughor where the farms in the assessment area are, with one exception, Maes-y-Brawd (PRN 31326; NGR 5780 0138), still working farms.

INDUSTRY

The industrialisation of the region began in the medieval period when coal was mined by local landholders and shipped from the Burry Inlet.

COAL MINING

The medieval monastic grange at Cwrt y Carnau had a mine on the eastern edge of the property, now under modern Gorseinon (Williams 1984, 239-40; 1990, 55) and by 1585 the 'Port of Burry' was the main place of export for Carmarthenshire coal (Symons 1979, 28; Sambrook and James 1995, 7). The quantities of coal exported at the time remained small, although as Symons (1979, 30) points out, a number of disputes, some quite acrimonious, during the early years of the 17th century hint at the recognised potential of the Llanelli coalfield. The coal industry continued to develop throughout the Llanelli area during the 17th and 18th centuries, despite a small depression in the later 17th century (Symons 1979, 39). By the mid-19th century Llanelli was the third largest South Wales port for the export of coal behind Neath and Swansea (Morris and Williams 1958, 95).

The early development of the coal industry was dictated by the available technology and the state of contemporary knowledge about the geological formation of the coalfields. During the 16th and 17th centuries, mining concentrated on exposed seams in well-drained locations close to the river. Techniques of prospection were insufficiently developed to to exploit areas covered by thick drift deposits; drainage was by gravity - drainage-adit or gutter - running excess water off to the lower ground. Prior to the developoment of the tramroad and canal systems coal was moved from the pits to the shipping places by cart and pack animal. This meant that mining was centred around those areas of higher ground near the shore or tidal pills (Symons 1979, 13-14). By the middle of the 18th century, the Llanelli coalfield was attracting outside investors with deep mining experience, and this influx introduced new technology.

The advent of steam, or horse powered engines meant that water could be pumped from the pits, allowing deeper coal seams to be exploited. At the same time as technical advancement was changing the way coal was mined advances in transport technology meant that more efficient methods of moving the coal to the export places were being developed. These included tramways, consisting of wooden rails on stone sleepers (Sambrook and James 1995, 24) and towards the end of the 18th century, canals. The new technology meant that far greater quantities of coal were being mined and exported than before, much of it was destined for the expanding metal processing industries around Llanelli. From the early- to mid-17th century the close association between the coal and metal processing industries had been a major impetus in the development of the coal industry. So when the influence of the Llanelli smelteries decreased during the latter half of the 19th century the coal industry declined as well.

METAL PROCESSING INDUSTRIES

The late 18th century saw an influx of wealthy industrialist from outside the area keen to exploit the ideal situation of Llanelli for metal processing. It had many of the requirements for its establishment and continued expansion namely, flat land at a low rent, room for expansion of the individual works, raw materials, fuel, water and good transport (Jones 1995, 45-46). The first metal working industry was established by Alexander Raby during the late 18th century (Sambrook and James 1995, 15) with the construction of a furnace at Cwmddyche, northwest of Llanelli. This remained the only furnace until the beginning of the 19th century; the early years of the 18th century also saw the opening of the first copperworks at Llanelli (Bowen 1856, 6). By the early- to mid-19th century the lead, silver and copper works employed 550 men in the Llanelli region, but by the 1850s one company alone was employing 3,500 miners in their collieries raising 700 tons of coal per day, mostly to supply their copper works at Llanelli (Bowen 1856, 6). Those rather astonishing figures show the incredible expansion in the industry of the region during 19th century.

During the latter part of the 19th century tinplate began to replace the iron foundries. The need to import more ore, from places such as Spain, Cuba and Cornwall made Llanelli a favoured location for the new steelworks of the late-19th century (Bowen 1856, 6; Sambrook and James 1995, 16). Tinplate became the dominant product of Llanelli, and tinplate manufacture still continues at the Trostre Steelworks today. Ironically it was the construction of the Trostre works, and the Velindre works at Swansea that finished off the smaller local tinplating industries. By the 1950s the metal processing indistries, that once clustered around the

Machynys - Sandy area were being demolished and the sites cleared (Jones 1995, 49; Williams 1995, 18-19); some companies were still operating until the early 1970s, when they too closed (Hughes 1985, 273).

OTHER INDUSTRIES

As well as the metal works the assessment area has seen a wide range of other industies come and go. These included a tannery in Llanelli docks that opened in 1960 and closed, following a fire in the early 1970s (Hughes 1985, 270); the South Wales Pottery, opened in 1840 (Bowen 1856, 7); brickworks at Bynea (Sambrook and James 1995, 19) and Machynys; and glassworks at Loughor.

TRANSPORT

Underpinning the entire industrial framework was an intricate transport infrastructure, consisting of tracks, roads, tramways, railways, canals and rivers, that was developed and modified according to requirements. Some elements of the transport system clearly predate the industrial expansion of the 17th-19th centuries, but with the amount of redevelopment of the landscape it is often difficult to trace those earlier routes. However, the major routeway in the region was, at least until the arrival of the railway in the mid-19th century, the river Loughor.

WATER TRANSPORT

River transport

The Loughor was used to supply the Roman fort and later medieval castle at Loughor and it provided access to overseas markets for the post-medieval coal and metal industries. The fort at Loughor was sited to command the strategic point at the confluence of the Lliw and Loughor and the lowest fording point of the Loughor. Established in AD75 and abandoned *c.*AD120-130, the fort was part of the Roman advance into southwest Wales. It appears to have regained some of its importance during the 3rd century, possibly as a naval base. Although linked to both Neath and Carmarthen by roads, it is likely that much of the fort's supplies would have been brought by boat to a landing place near the fort. As yet there has been no evidence recovered for the site of the Roman quay at Loughor, but there are clues as to where it may have been. If one accepts that sea-level was somewhere between 1.6m-3m lower, that the Loughor flowed further south than today and that the fort was sited at the lowest fording point across the Loughor, then the quay was probably in the area to the south of the fort. An 18th century dock (PRN W1376; NGR SS 5631 9783) was recorded to the south of the town, in the area of the later railway station, but it is likely that the Roman quay would have been further to the south and west reflecting the lower sea levels. However until some evidence is recovered, its location will remain unknown.

During the medieval period the Loughor continued to be an important supply route, particularly for the medieval castle at Loughor (PRN 31587; NGR SS 5642 9798) and the monastic grange at Cwrt y Carnau. The castle was established in the 12th century by Henry de Beaumont, Earl of Warwick, on the site of the Roman fort and the surviving castle tower, which dates from the 13th century, covers the northeast corner of the fort's defences. There was also a castle, Old Castle (PRN 694; NGR SN 5004 0036), in the Sandy area of Llanelli. It has been suggested that it had a pre-Norman foundation (RCAHMW, 1917, 119; Jones 1987, 104). By the 14th century the old castle had been replaced by a fortified residence, New Castle (Jones 1987, 104). The name Old Castle was kept alive by the 18th century Old Castle Works. The position of the castle suggests that it would have been supplied by boat, using the Loughor and a short stretch of the Afon Lliedi. An 18th century coal shipping place called Bank-y-Llong was located on the Lliedi a short distance from the castle (Symons 1979, 272) which may have reused a traditional landing place.

Loughor Castle was sited for exactly the same reasons as the Roman fort, that is to protect the strategically important confluence of the rivers and the fording place on the Loughor. As with the fort, the bulk of the castle supplies would have been transported by boat. The location of any quay or landing place associated with the castle is unknown, but it may have been on, or close to, the site of the later 18th century dock (PRN w1376), although it is possible that the castle supplies were landed at Llanelli. Llanelli figures prominently in the port-books from the 16th and 17th centuries (Williams 1978, 64), so it is reasonable to assume that it was developed enough as a shipping place in the medieval period to have acted as the landing point for the castle supplies.

Plate 7: North dock at Lanelli.

The grange at Cwrt y Carnau would also have relied on river transport to move goods to and from the abbey at Neath; it is known that Neath Abbey had its own boats (Williams 1990, 29). A landing place for the grange may have been an informal affair with few, if any, permanent structures or simply a flat stretch of mud in a creek.

A report of 1566 listed five ports, creeks or landing places in the region where foreign trade vessels could load and unload. They were Carmarthen, Laugharne, Gwendraeth Fychan, Burry and Marros; Burry was designated a creek (Williams 1978, 62-63). It is interesting to note that Llanelli was not mentioned in the 1566 report or in a slightly earlier (1562) report because it already had an established reputation as a shipping place. The earlier report does not mention the creek of Burry either. A 1757 plan of '*Directions for ships to come in safe into Burry and to the Several Places of Safety to be within the same*' by William Jones showed shipping places at Dafen Pill, Spitty, Pencoed and Loughor. What it did not show was any structures associated with these places, nor did it show any dock or shipping place in the area of the Llanelli Docks (Symons 1979, 242-243; plate 36). This suggests that until the end of the 18th century ships landed on the flat mud exposed at each low tide to be loaded or unloaded by cart, or they were berthed in deep water anchorage's in the main channel and serviced by barges, keels and other small craft.

Symons (1979, 263) has suggested traditional (i.e. pre-1790s) shipping locations in tidal pills and creeks at Barnaby Pill, Pwll, the Afon Dulais, the Afon Lliedi, Llanelli Flats, Penrhyngwyn, Dafen Pill, Pill y Cefen, Spytty, Pencoed and Llangennech. The earliest is believed to have been Spytty Bank (Hughes and Reynolds 1988, 26).

Most of these were never developed in any way, but at Llangennech a quay (PRN 4486; NGR SN 6520 0080) was constructed by 1807. This seems to have replaced earlier shipping places just upstream at Llangennech Pill and on the southern edge of Llangennech Marsh. The shipping place at Llangennech Pill, which could have early-17th century origins (Symons 1979, 174), may be represented by a double row of wooden posts (PRN 31306; NGR SN 5623 00898) that are visible running from the eroding edge of the saltmarsh to low water mark, just downstream of the mouth of Llangennech Pill. Perhaps dendrochronology could be used to provide an age range for the structure. Llangennech Quay itself is now completely silted up, although erosion at its outer edge is beginning to uncover the curving stone entrance walls..

The 1790s saw the first dock constructed at Llanelli by local colliery owners, Roderick and partners, this was quickly followed by others over the next ten years as the local industrialists sought to exploit the established coal and metal industries. The late-18th century was a dynamic period in the industrialisation of Llanelli with much speculation. For instance, Alexander

Raby, an English industrialist with interests in Worcestershire, Staffordshire, London and South Wales, constructed a quay in 1799 which by 1802 had been taken over by the Carmarthenshire Railway Company (in which Raby was a prime mover) and became the Carmarthenshire Dock. Carmarthenshire Dock (PRN 4654; NGR SN 4997 9950) west quay is now a Listed Building (grade II).

By the time John Wedge produced his *Chart of Burry Bar and Harbour* in 1806-7 the facilities at Llanelli were substantial enough to be shown as a dock; other landing places, but no structures, were shown at Llangennech and just to the north of Loughor. A vivid description of the loading and unloading of vessels at Llanelli in the late 18th century was supplied by Bowen writing in 1856 (p10):

"*There was not a single dock to load or unload ships; but in fine weather some small ships would take a load of limestone to the Sandy lime kilns and take on a load of Lady Mansell's coal by the Bont Haiarn. When they could not venture out, it was conveyed down near the Flatts in horsehair sacks on the backs of horses and mules. Small ships would come to the Flatts on the spring tide with ore for the furnace works, and the carts of local farmers would carry it away from the beach. If they did not unload quickly enough before the tide ebbed, the ore was thrown on to the beach, and before it could be carried away, the sands would cover half of it, and the sea would also carry away some of it. There are tons of ore mixed with the sand near the Flatts to this day. Coal was brought down to the beach in sacks on the backs of mules. Then a man would carry the sack on his back and another man would open the mouth of the sack and the coal would be tipped into the ship's hold. It took a long time to a ship in this difficult manner*".

During the 19th century harbours were constructed at Pembrey and Burry Port. The first was Pembrey Harbour, which opened in 1819, but was replaced by Burry Port Harbour (PRN 5345; NGR SN 4452 0030) in 1832 (Nicholson 1991, 123-129). Both these installations had trouble with silting, and it was that as much as the growth of Llanelli that forced both harbours into decline. Today, Pembrey Harbour is saltmarsh and Burry Port is open to small vessels, mainly pleasure craft, only. When the docks at Llanelli finally closed for good in the 1950s it brought to an end a long history of shipping in the Burry Inlet and Loughor Estuary.

Canals

The canals that were constructed to move coal from local pits to the shipping places were amongst the first in Wales. Early (late-18th century) canals in the assessment area were tidal (Symons 1979, 178; Sambrook and James 1995, 21), and were probably adapted from existing creeks and pills rather than being purpose built. There were many known canals in, or having part of their length in the assessment area, the major canals were:

1. The Yspytty Canal, 1776-1770 (PRN 4669; NGR SS 5570 9815).
2. The Llangennech Canal, *c.*1790 (PRN 31276; NGR SN 5614 0133 - SN 5616 0079).
3. The Baccas Canal, *c.*1795 (PRN 31241; NGR SS 5447 9793).
4. The Wern Canal, *c.*1795 (PRN 8703; NGR SN 5082 0015).
5. Lliedi Coal canal, (PRN 4485; NGR SN 5012 0015).
6. Dafen Canal, (PRN 4663; NGR SS 50 95).
7. Hopkin's Canal, (PRN 4670; NGR SS 50 95 - SS 55 95).
8. Pembrey Canal, (PRN 5347; NGR SN 40 00).
9. Kidwelly and Llanelli Canal, (PRN 8822; NGR SN 4276 0530).
10. Tal-y-clun Canal, (PRN 31292; NGR SN 5775 0220 - SN 5771 0287).
11. Bowser's Eastern Canals (PRN 30667; NGR SN 44 00 - SN 44 01).
12. Cwmmawr Canal Basin, (PRN 30702; NGR SN 531 126).

The canal system was developed by the colliery owners to ship coal from the local pits to the landing places on the Loughor. An interesting and important survival from the age of canals are the remains of four metal coal barges that have now been built into the harbour wall at Burry Port. It is believed that they operated on the Kidwelly and Pembrey Canal (Nicholson 1991, 121)

LAND ROUTES

Roads

The Roman fort at Loughor was linked by road to the forts at Neath and Carmarthen. This is known from *Iter XII* of the Antonine Itinerary. What is not known, however, is the route of the road between Loughor and Carmarthen. It is possible to identify the probable positions of the gates to the fort by overlaying the projected

outline of the fort on a modern plan of Loughor. This shows that the sites of the northeast, northwest and southwest gates, and therefore the roads, are marked by Castle Street, the old line of the ford/bridge across the Loughor and Station road respectively. It seems likely that the road to the northwest, across the ford, was the Carmarthen road. The probable road-line from the fort is fossilised by the present Spytty Road, Heol y Bwlch, Cwmfelin Road and Tanygraig Road. This line, which leads from the historic fording/bridging point of the Loughor into the northeast suburbs of modern Llanelli, was also an important route throughout the medieval period. It became known as Heol Fawr (James 1993b, 12). A small group of Roman coins recovered from Bynea (A G Marvell, *pers. Comm.*) may be evidence of a road, but with a known Roman fort in the vicinity not too much should be made of stray finds.

James (1991, 72-73) has postulated a route for the Loughor to Carmarthen road which takes it from the ford, along what was to become Heol Fawr through modern Trimsaran to Spudder's Bridge, before swinging northeast towards Carmarthen. Some support for this route comes from Gerald of Wales, whose journey through Wales in 1188 took him across the river Loughor and the Gwendraeth streams to Kidwelly Castle (Thorpe 1978, 34 and 136). A route along. Or close to this line is also marked on Rees' map of *South Wales and the Borders in the Fourteenth Century* (1932). Another possible route for the road was hinted at by Lloyd (1939, 341) in his *History of Carmarthenshire* when he showed on a plan of the industrial centre of Llanelli *c.*1840 an 'old road' marked as Roman running north from the town, possibly towards the Five Roads - Pontyates area.

Information on major post-Roman roads is sketchy at best. Work by James and Morgan (1993, 27-32) has identified a number of tracks of probable medieval date in the Llanelli Marsh area and the probable medieval track running from Llangennech past the grange at Cwrt y Carnau has already been mentioned (see above). There are occasional references, like Gerald of Wales' that hint at pre-industrial routes. Some of those references come from unlikely sources such as a 16th century cargo inventory of one William Johnes, a merchant from Llandilo, who on 9 November 1586, imported 5t. iron, 100st. cheese, 200lbs soap, 1cwt. small raisins from Bristol to the landing place at Burry. A cargo of that size presupposes an adequate road system from the Burry Inlet to Llandeilo (Williams 1978, 65), especially as the docks at Carmarthen were considerably nearer.

It can be assumed, however, that the coal industry was the major force behind the establishment of many of the roads in this area. Reliable roads to and from the pits, landing places and docks would have been vital to support the increasing industrialisation of the region, particularly around Llanelli. Modern road development is being geared towards the changing nature of Llanelli, with a new road from Loughor, the A484, and a new ring road around the southern edge of the town. The ring road has been designed to keep traffic away from the town and to encourage traffic into the areas around Machynys that have been earmarked for development.

Rail transport

As with all the other elements of the transport system the early development of rail transport, which in this instance includes tramroads, tramways and railways, was linked to the movement of coal. The latter half of the 18th century saw a number of tramroads constructed to link the local collieries to the coast and the burgeoning metal processing industries around Llanelli. At the beginning of the 19th century the attention of the leading industrialists was beginning to focus on coalfields inland. Those coalfields, namely the Amman Valley, also needed linking by tramroad to the export facilities in the Burry Inlet. The earliest of those inland lines was the Carmarthenshire Railway (PRN 30865; NGR SN 4980 0040 - SN 5600 1310). Construction started in 1802-3, and by 1805 it linked the Carmarthenshire Dock (formerly Alexander Raby's quay) with Gorslas to the north (Sambrook and James 1995, 25). The number of tramroads, and railways increased along with the rise in numbers of industrial developments. A total of 25 tramways and railways were constructed within the assessment area between the late 18th century and the mid 19th century. A full discussion on the complexity of the development of the rail transport system around the docks at Llanelli and the Burry Port Harbour area is beyond an assessment project such as this, but it is a subject that would repay careful study.

INDUSTRIAL DECLINE

The decline of Llanelli as an industrial town has been almost total. A few metal processing factories remain, the biggest being the British Steel plant at Troste, although, even that is beginning to be run down. Concomitant with the industrial declione has been the decline in agriculture on the Llanelli Marsh (see above), which has essentially left an entire region derelict and abandoned.

This has led to a change in landuse, with a more leisure orientated approach to development. One of the biggest elements of the proposed Coastal Park is the leisure aspect, of providing green spaces. Once constructed, the park will complete a process of change that started during the decline in the metal and coal indistries of the latter half of the 19th century.

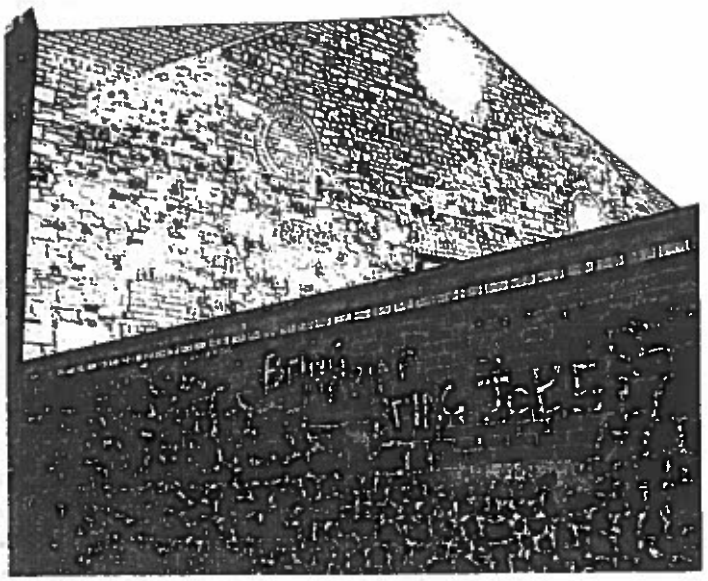


Plate 8: 19th century works building at Burry Port. The gable wall retains the evidence of many changes.

THE ARCHAEOLOGICAL RESOURCE: PRESSURES AND POSSIBILITIES

It has become clear over the last few years that there is a growing awareness of the importance of archaeological interests in wetland and coastal management fora. This is particularly welcome with regard to wetland archaeology which, because of its unique nature is vulnerable to damage by a wide range of processes and actions. Preservation on wetland sites is dependent on the maintenance of certain conditions, once those conditions are altered deterioration of archaeological material can be rapid and total. Unlike dry sites which are, essentially, only physically affected by erosion and direct action on the site itself, wetland sites can be affected by developments some way from them. For example, it is well known that changes in drainage can lower the water table across a wide area, leading to the drying out of waterlogged soils. That drying then affects the condition and survival of any archaeological material contained within the soils.

There is a paradox in wetland archaeology that the discovery of a site inevitably leads to deterioration, because it is the act of discovery itself that leads to a change in the preservation conditions of the site. This means that effective site assessment and management mechanisms have to be developed and in place to ensure an adequate level of protection for as much of the site as possible, as quickly as possible. Whereas, on a dry site (one without buried organic deposits) the reverse is probably true, once discovered a dry site can be protected and managed effectively and relatively easily. The great advantage of assessing and formulating an appropriate protection policy for dry sites is time. Unless the site is actively being damaged, demolished, or falling down the site can be assessed, and effective and sustainable management strategies developed over time to ensure that the final strategy is the right one. Once the strategy is in place monitoring is required to ensure its effectiveness. Monitoring a protected dry site is simple because it, or its position, is visible and any changes are immediately obvious, whereas, protected wetland sites are buried making any changes invisible.

EFFECTIVE MANAGEMENT OF THE ARCHAEOLOGICAL RESOURCE OF THE LLANELLI AND LOUGHOR WETLANDS

As wetlands across the country come under increasing pressure from developers, the number of wetland archaeological sites affected will increase. It is no coincidence that the increasing number of significant and spectacular sites and finds in the Severn Estuary come from a time of increased development on the Severn Levels. This assessment of the Llanelli and Loughor wetlands has shown that they also have the potential to contain significant surviving buried archaeology. It has also shown that they are under severe development pressure. Almost the entire area of reclaimed land from Pembrey to Loughor is to be re-landscaped into the Llanelli Millenium Coastal Park. Other pressures include coastal erosion, which is particularly serious in the Morfa Bacas area; erosion of the saltmarsh around the monastic grange at Cwrt y Carne farm on the east bank of the Loughor; and bait digging, the two worst affected areas are the Pwll - Llanelli Beach area west of Llanelli and south of Loughor Bridge.

Even though archaeology is now a material consideration in developments requiring planning permission, it is a fact that many potentially damaging operations in wetland areas do not fall within the Town and Country Planning legislation (Page 1996, 31). Even though current planning control extends to the low water mark it is fair to say that outside the sea walls they have a limited value (Nayling 1996, 1). For the most part, destructive processes outside the sea walls are natural such as erosion and sea-level rise. This is the case in the assessment area where severe erosion is taking place in the Morfa Bacas area, although this area has also been affected by the construction of a new sewage outfall pipe from the Pen-y-Bryn Sewage Treatment Works.

The following section outlines general management considerations as well as detailing suggestions for further archaeological investigations. However, at this stage these are only suggestions and are intended to promote discussions between the relevant bodies.

PRESSURES

To ensure an appropriate level of response to the pressures facing the archaeological resource it is first necessary to define those pressures. Within

the assessment area they can be broken into four groups:

Environmental pressures
Water management operations
Land management operations
Development proposals

It is felt appropriate at this stage to outline the general pressures and possibilities facing the assessment area, as well as detailing some specific cases.

Environmental pressures

The environmental pressures have been briefly mentioned above. They comprise erosion, principally in the Morfa Bacas area and in a few places on either bank of the Loughor upstream of the bridge. The two most serious sections are at Morfa Bacas and Cwrt y Carne. At Morfa Bacas, the saltmarsh is eroding by cracking into blocks which were eventually falling; once fallen they erode and degrade back to silt which is then deposited around as mobile sediment. However, this is offering no protection to the submerged forest exposure (PRN 31317). The other most seriously affected area is at Cwrt y Carne where St. Michael's chapel (PRN 5854) is sinking as the saltmarsh erodes, and even though it sits on a slight mound it is now frequently covered at high tide. At Llangennech, erosion is affecting the site of Llangennech Quay (PRN 4486), the remains of a wooden shipping place (PRN 31306) and the exposed area of submerged forest (PRN 31238 and 31275). At Pwll to the west Llanelli the other submerged forest (PRN 31318) exposure is also suffering erion.

Water management operations

Even though nearly all of the active sea defences in the assessment area are modern, perhaps the oldest is the mid-19th century railway embankment crossing Llangennech Marsh, in places they preserve the lines of earlier walls and banks. Therefore, any maintenance or renewal of sections of the defences may impact on the surviving remnants of the earlier features. Outside the sea walls responsibility for the clearing of the major drainage channels is with the Environment Agency. At the time of the survey, clearance had taken place on Llangennech Marsh; worked wood and animal bones were noted in the spoil from one of the cleaned drains. Clearance by mechanical excavator was in progress at Penrhyngwyn, on the southern tip of Machynys, to stop water backing up and flooding the area behind the sea wall (plate 4).

Land management operations

For most of the assessment area future land management operations will be linked to the development of the Llanelli Millenium Coastal Park. Only north of Loughor Bridge is land management still an agricultural consideration. The wetlands are only a part of the farms in this area, and the farmers spoken to were not concerned about the rate of erosion of the marshes.

Development proposals

The proposed Llanelli Millenium Coastal Park will affect the entire coastline from Pembrey to Loughor. Not only will it involve physically re-landscaping the area, but the ancillary works will also have significant archaeological implications. The proposals include extending the facilities at Penclacwydd Wildfowl and Wetland Centre by the creation of a new wetland habitat between the Sewage Treatment Works at Pen-y-Bryn and the abandoned farmstead at Tir Morfa (PRN 21403). The proposals also include the provision of new housing, industrial units and new public access areas, beaches, walks, etc., all of which will have a direct and indirect impact on the archaeological resource. Although the specific details of the proposals are not available yet it is possible to make general comments about the likely level of impact of the scheme.

New building and associated infrastructure works

New building is to take place at a number of selected sites, including the docks area of Llanelli and Burry Port Harbour (PRN 5345), as part of the Coastal Park development. Any new building work has a range of actions that have obvious and immediate archaeological implications:

1. Site clearance.
2. Demolition of derelict buildings.
3. Excavation for foundations and service trenches.
4. Heavy machinery moving across the site.
5. Construction of new roads.
6. Landscaping.

To those can be added the further archaeological implications of built development in a wetland environment:

1. Changes to the drainage pattern in the development area leading to a lowered water table and a drying out of the soils over a wider area.
2. Changes in the condition of the ground water.
3. Pollution affecting buried waterlogged deposits.
4. Compression of the underlying deposits.

Therefore, any built development within the assessment area will have a significant archaeological implications.

Landscaping works

Most, if not all of the reclaimed land from Pembrey to Loughor will be landscaped in some way during construction of the park. This may range from scrub clearance and new planting, through the demolition of buildings to the complete remodelling of some sections of the site. The potential landscaping works are a great threat to the historic landscape. Phase I of the Coastal Park works will be the creation of a new wetland habitat at Penclacwydd. Its creation will mean the destruction of one of the last surviving sections of the pre-industrial landscape in the assessment area. Not only is the area sensitive for its surface features, but discoveries in the intertidal zone have shown that there are known archaeological features buried beneathe thick covering of alluvium.

All landscaping works can be damaging, and as with built development there are a range of implications for the archaeological resource:

1. The removal of scrub, trees and shrubs can damage any surviving above ground features. Equally, the root systems may have become entangled in buried features and deposits which would be damaged by the ripping out of the roots.
2. The demolition of standing buildings.
3. The clearance of surface features during landscaping.
4. Changes in the drainage of the area leading to a drying out of the surrounding soils.
5. The planting of new trees and other plants whose roots can have a damaging effect on the buried deposits. It is known that reeds have very probing roots, and tree and shrub root systems can alter the drainage over quite a wide area. Roots can also introduce oxygen into the anaerobic environment necessary for preservation of organic materials (Van de Noort *et al* 1995, 342).
6. Other ground breaking operations such as trenching, topsoil stripping, etc., will have an immediate effect on both above and below ground deposits, as well as the longer term impact of the drying out of the surrounding soils and the introduction of oxygen. This will encourage bacterial and fungal growth on waterlogged organic material, leading ultimately to its decay.

It is clear then that the proposed landscaping for the Coastal Park will impact on the archaeological resource of the Llanelli wetlands.

A stroll in the park: the 'knock-on' effects of the Coastal Park development

One of the major aims of the park is to attract people and business into the Llanelli area, and more specifically to the coastal zone. Public access areas, paths, beaches, etc, will be required, as will toilets and other facilities. All of these will need some construction work which will affect the archaeological resource. A further consideration is the likely increase in access to the intertidal zone and the fragile archaeological resource it contains.

MANAGEMENT, PROTECTION AND POSSIBLE UTILISATION OF THE ARCHAEOLOGICAL RESOURCE

Given the level of pressures facing the archaeological resource across the whole assessment area it is important to devise a sustainable programme of archaeological management. Inherent to that programme should be the understanding that in this case the major developments proposed for the area will take place. Therefore, it is incumbent on archaeologists to formulate strategies to operate within this local framework of coastal zone development. Each element of the Coastal Park will be subject to the usual planning regulations and should, therefore, be picked up during the development control process. However, this is a piecemeal approach to the problem. What is needed is a coordinated and structured response to the particular problems of an area of wetlands under pressure.

Dissemination of the project results

One of the primary objectives of the project was to raise the awareness of all the agencies, institutions and individuals with an interest in the region of the importance of the archaeology. This assessment has generated a lot of

information regarding the nature and importance of the archaeology of the Llanelli and Loughor wetlands. It is important that this information is circulated to those with an interest in the wetlands. This report, and the non-technical summary report of the project results are intended as the starting point for this dissemination and will be widely distributed. Following on from the reports it is hoped to arrange some kind of forum to present the results of the project and to initiate discussions about the future management of the archaeology. This could be achieved through a series of informal talks, or by a more formal presentation of the results, possibly at the Cambria Archaeology offices.. On the other hand, archaeolgists have to become more active in established fora such as the Buryy Inlet and Loughor Estuary Symposium. If this approach is to be effective it would need to be initiated as soon as possible so any archaeological interests can be considered in the proposals for the Coastal Park.

The potential of archaeology to entertain and educate

This assessment has shown that there are an extrordinary range of archaeological sites, features and deposits present throughout the study area reflecting the long and changing history of the region. Therefore, with the on-going development of Llanelli it is a good time to consider how the evidence of the past can be used in the future.

Recognition

Before the archaeological resource can be used in any way it must be identified and its full significance recognised. In order to accomplish that, a programme of further archaeological investigation should be instigated to investigate the character and potential of those sites not fully understood and under pressure. More information is required about the extent and character of the buried archaeological deposits before a satisfactory protection strategy can be devised to protect them. Archaeological test-pitting and palaeoenvironmental sampling could provide the information necessary to make informed decisions regarding the future protection of the buried resource.

Sites not suitable for preservation due to their current condition, those under severe erosion threat and those to be removed during development works should be fully investigated and recorded before they are lost. This particularly applies to the areas of submerged forests at Llanelli (PRNs 31317 and 31318) and Llangennech (PRN 31238 and 31275); St Michael's Chapel (PRN 5854) at Cwrt y Carne; the wooden shipping place at Llangennech (PRN 31306); the palaeochannel (PRN 31239) and shell midden site (PRN 31237) at Morfa Bacas. With such large-scale development plans in place, and the ever-present threat of erosion there will inevitably be some loss, but by recognising the potential of the archaeological resource, and how it can fit into future proposals those losses could be minimised.

Enhancment and interpretation

An important strand of the re-development plans of the region is leisure, the Coastal Park will attract visitors to the area. Incorporation of the cultural heritage aspect of Llanelli's past into the park, perhaps through the provision of interpretative leaflets and display panels, would increase visitor enjoyment. This also provides a context for the physical preservation of cultural features, allowing the interpretation of the area to be illustrated by physical surviving features. Well interpreted *in situ* features also provide a valuable educational resource, which along with the facilities at Penclacwydd Wildfowl and Wetlands Centre gives the Llanelli area a wonderful opportunity to educate and inform about the cultural and natural history of the region. This would be a positive way in which archaeological and nature interests could be used to show how the cultural and natural heritage of the Llanelli wetlands are inextricably linked.

APPENDIX ONE: GAZETTEER OF SITES AND DISTRIBUTION MAPS

A total of 531 sites were recorded during the survey from a variety of sources (see Appendix Two). The sites are listed below in numerical (PRN) order and shown on the distribution maps. The categories in the following table are those used in the regional SMR.

For mapping purposes the assessment area was split into three, Pembrey - Llanlli Beach, Llanelli Beach - Loughor Bridge and Loughor Bridge - M4 motoway. The maps have been divided into known sites of prehistoric Roman and medieval dates, known sites of post-medieval and modern date (Area 2 has been further divived into known industrial sites), new prehistoric, Roman and medieval sites and new post-medieval and modern sites. In this case new sites means to the Dyfed SMR, some sites may have a PRN from the Glamorgan SMR. Symbols used on the maps are:

- ✱ prehistoric
- ▲ Roman
- ■ medieval
- ● post-medieval/modern
- ◆ unknown

271	SN494001	unknown	post med	none		4
694	SN50040036	motte	mediaeval	earthwork	d	
1651	SN4500	chapel	mediaeval	documents!		
2075	SS50909979	finds	bronze age?	finds!		3
4485	SN50120015	canal	post med	o.struct	u	4
4486	SN56200080	quay	post med	o.struct	c	8
4603	SM83042674	unknown	unknown	place-name!		
4652	SS49809960	dock	post med	o.struct	u	5
4653	SS49959983	power station	post med	building	e	5
4654	SS49979950	dock	post med	o.struct	u	5
4656	SS51109807	windmill	post med	building	e	5
4657	SS54909850	coalmine	post med	o.struct	d	8
4659	SS54219899	coalmine	post med	o.struct	d	8
4660	SN73152000;S	trackway	post med	earthwork	b	
4662	SS51109850	foundry	post med	building	r	5
4663	SS5095	canal	post med	o.struct	u	
4664	SS50009857	harbour light	post med	building	b	5
4665	SS50039974	bridge	post med	building	a	5
4666	SS50059937	smelting works	post med	building	u	5
4667	SS50509900	dock	post med	o.struct	d	5
4669	SS55709815	canal	post med	o.struct	b	8
4670	SS5095;SS559	canal	post med	o.struct	d	
4671	SS55249905	brickworks	post med	building	u	8
4673	SS51259855	chemical works	post med	building	e	5
4709	SN56160140	tinplate works	post med	building	e	8
4716	SN56180127	saw mill	post med	building	u	8
4855	SN61941530	mill	post med	building	b	
4952	SS50409951	foundry	post med	building	r	5
5338	SN44800064	foundry	post med	building	u	1
5339	SN44900035	smelting works	post med	building	r	1
5340	SN44560050	floating dock	post med	o.struct	u	1
5341	SN44400054	floating dock	post med	o.struct	u	1
5342	SN44650028	lifeboat house	post med	building	u	1

5343	SN44520043	customs house	post med	building	u	1
5345	SN44520030	harbour	post med	o.struct	u	1
5347	SN4000	canal	post med	o.struct	c	
5349	SN4000;SN450	railway	post med	o.struct	u	
5853	SN573005	grange	mediaeval	documents!		7
5854	SN57190042	chapel	mediaeval	building	d	7
6758	SN57900317	dwelling	post med	building	r	8
6995	SS50809822	dwelling	post med	building	r	5
7273	SS50529973	church	mediaeval?;post	building	r	3
7274	SS50879979	church	mediaeval?;post	building	r	3
7275	SS5099	church	mediaeval?;post	building	r	3
7690	SS56409800	fort	roman	documents!		7
7744	SS51009865	scouring basin	post med	o.struct	r	5
8424	SS55629878	coalmine	post med	o.struct	e	8
8425	SS51109875	shipyard	post med	o.struct	e	5
8426	SS54699830	coalmine	post med	o.struct	e	8
8428	SN44450003	lighthouse	post med	building	a	1
8444	SS51319860	turntable	post med	o.struct	e	5
8445	SS50809940	railway signal	post med	building	a	4
8446	SS50659945	bridge	post med	building	a	4
8447	SS559980;SS5	railway bridge	post med	building	a	8
8449	SS49959947	slipway	post med	building	b	5
8639	SM95171553	municipal	post med	documents!		
8658	SN49920002	coalmine	post med	earthwork	e	4
8659	SN45890114	coalmine	post med	earthwork	e	1
8660	SN46830126	coalmine	post med	earthwork	e	1
8661	SN499008	coalmine	post med	earthwork	d	3
8662	SN48590085	bridge	post med	building	e	3
8664	SN459011	tramway	post med	o.struct	c	1
8668	SN43750030	reservoir	post med	earthwork	e	1
8669	SN43680025	flood gates	post med	o.struct	e	1
8671	SN44650076	railway station	post med	building	e	1
8672	SN44510065	engine house	post med	building	e	1
8674	SN44620069	dwelling	post med	building	a	
8675	SN44010073	bridge	post med	building	b	1
8694	SN51120038	tramway	post med	o.struct	e	4
8703	SN50820015	canal	post med	o.struct	e	4
8707	SN56400120	railway station	post med	building	d	8
8759	SS43709990	lighthouse	post med	building	e	1
8760	SS49999974	engine house	post med	building	c	5
8761	SS49899944	railway signal	post med	building	b	5
8762	SS49849904	loading stage	post med	o.struct	d	5
8763	SS49879943	bridge	post med	o.struct	c	5
8764	SS51109875	dock	post med	o.struct	e	5
8765	SS51319860	office	post med	building	b	5
8767	SS55839932;S	coalmine	post med	o.struct	e	8
8768	SS50859867	wharf	post med	o.struct	c	5
8769	SS56109830	tinplate works	post med	building	u	8
8770	SS51319860	depot	post med	documents!		5
8771	SS56289808	ferry	post med	o.struct	u	8
8812	SS52009962	coalmine	post med	documents!		4
8813	SS53509818	coalmine	post med	documents!		4
8814	SS50109930	dock	post med	documents!		5
8815	SS53909942	coalmine	post med	documents!		8

8816	SS50609968	iron works	post med	documents!		4
8817	SS50659980	iron works	post med	documents!		4
8818	SS50759990	iron works	post med	documents!		4
8820	SS51609945	coalmine	post med	documents!		4
8822	SN42760530	canal	post med	earthwork	c	
8829	SN40530012	tramway	post med	o.struct	c	
8833	SN44950162	tramway	post med	o.struct	c	1
8854	SS50469931	weighbridge	post med	building	r	5
8861	SS50909885	iron works	post med	building	d	5
8864	SR97159480	hillfort	roman	finds!		
8926	SN56100060	tinplate works	post med	building	e	8
8937	SS54829913;S	coalmine	post med	o.struct	d	8
8938	SS51709875	tinplate works	post med	building	d	4
8939	SS51799875	brickworks	post med	building	e	4
8940	SS52109880	brickworks	post med	building	e	4
8942	SN44850050	lead &silver wks	post med	building	e	
8971	SS49899940	shipwreck	post med	o.struct	d	5
9037	SS51209830	brickworks	post med	building	e	5
9043	SN44160040	tinplate works	post med	building	d	1
9434	SN47700090	brickworks	post med	building	e	1
9436	SN49800038	chemical works	post med	building	e	4
9437	SN46000117	brickworks	post med	building	e	1
9668	SS50899971	tucking mill	post med	building	e	
9711	SN43630234;S	tramway	post med	earthwork	d	4
9746	SN49900020	iron & tinplate	post med	building	r	4
9896	SN5702	canal	post med	earthwork	c	
10422	SN4500	celtic dedication	dark age?	documents!		
11125	SS54389938	standing stone?	bronze age	place-name!		7
11382	SS54809890	unknown	unknown	place-name!		8
11756	SS512978	monastery?	dark age?;med	documents!		3
12670	SN4501	water mill	mediaeval	documents!		
12863	SS55209900	longhouse	mediaeval;post	building	r	7
14394	SS4899;SS499	fish trap	unknown	o.struct	u	4
15962	SS5598	factory	post med	building	u	8
15963	SS558982	factory	post med	building	u	8
16152	SS50089970	chapel	post med	building	u	4
16153	SS50509987	church	post med	building	u	4
16154	SS50759963	chapel	post med	building	u	4
16155	SS50819952	chapel	post med	building	u	4
16156	SS50859929	chapel	post med	building	u	4
16157	SS50899909	church	post med	building	u	4
16158	SS50979900	chapel	post med	building	u	4
16159	SS50399937	chapel	post med	building	u	4
16160	SS50469933	chapel	post med	building	u	4
16200	SS51249889	chapel	post med	building	u	4
16201	SS51349882	church	post med	building	u	4
16202	SS51429885	school	post med	building	u	4
16203	SS51479877	chapel	post med	building	u	4
16204	SS51459895	chapel	post med	building	u	4
16210	SS54469945	chapel	post med	building	a	8
16211	SS54979905	school	post med	building	u	8
16264	SN47380106	chapel	post med	building	u	1
16268	SN48540068	brickworks	post med	building	u	4
20368	SN453018	coalmine	post med	o.struct	u	

20380	SN44890067	church	post med	building	u	
21401	SS53959920	farmhouse	post med	building	r	8
21402	SS53859867	farmhouse	post med	building	b	8
21403	SS53309860	farmhouse	post med	building	b	4
21404	SS53709950	dwelling	post med	building	r	8
21406	SS5553709940	cottage	post med	building	r	8
21407	SS53709950	smithy?	post med	place-name!		8
21408	SS54609830	farmhouse	post med	building	b	8
21409	SS54859828	hendre?	post med	place-name!		8
21410	SS54809880	dwelling	post med	building	r	8
21411	SS55009880	smithy?	post med	place-name!		8
21413	SS55209870	dwelling	post med	building	r	8
21415	SS55159900	cottage	post med	building	b	8
21416	SS55029910	dwelling	post med	building	b	8
21417	SS55409920	dwelling	post med	building	c	8
21430	SS52709970	dwelling	post med	building	r	4
21432	SS52909970	dwelling	post med	building	c	4
23290	SN4000	school	post med	documents!		
23419	SN56159815	bridge	post med	documents!		8
23877	SN43700030	reservoir	post med	documents!		1
23878	SN44810040	lead & silver	post med	documents!		1
23879	SN44800055	smelting works	post med	documents!		1
23880	SN44040048	cottage	post med	documents!		1
23896	SN47440092	coalmine	post med	documents!		1
23905	SN48650084	lodge	post med	documents!		4
23910	SN49240076	lodge	post med	documents!		4
23911	SN49350077	cottage	post med	documents!		4
23912	SN49430074	dwelling	post med	documents!		4
23913	SN49680054	brickworks	post med	documents!		4
23914	SN49950051	brass works	post med	documents!		4
23915	SN49920040	bridge	post med	documents!		4
24334	SN56000100	quarry	post med	documents!		8
24419	SN4400;SN450	field system-	post med	topog;earthwo	u	
24438	SS5098	ship channel	post med	earthwork	b	5
24439	SS509986;SS5	scouring	post med	earthwork	b	5
24440	SS505988	factory	post med	building	u	5
24564	SS50989937	goods shed	post med	building	b	4
25068	SN56690178	dwelling	post med	building	u	8
25623	SN5601;SN550	park	post med	topog;earthwo	u	
29529	SN44620077	footbridge	post med	o.struct	a	
29589	SS541982	farm	post med	building	d	8
29590	SS54109820	project record				8
30663	SS509989	lead smelting	post med	documents	u	5
30665	SS560983	smelting works	post med	documents	e	8
30666	SS506991	smelting works	post med	documents	e	5
30667	SN4400;SN440	canal	post med	documents	e	1
30702	SN531126	canal	post med	earthwork	d	
30704	SS505993	iron foundry	post med	documents	u	4
30708	SS50829858	tinplate works	post med	documents	u	5
30709	SS509983	tinplate works	post med	documents	u	5
30710	SS51309860	tinplate works	post med	documents	u	5
30713	SS503990	tinplate works	post med	documents	u	5
30714	SS500993	tinplate works	post med	documents	u	5
30715	SS530995	tinplate works	post med	building	a	4

30718	SS507991	brickworks	post med	documents	u	5
30724	SS505989	brickworks	post med	documents	u	5
30731	SS547995;560	tramroad	post med	documents	u	8
30734	SS549984;SS5	tramroad	post med	documents	u	8
30736	SS500999;SS5	tramroad	post med	documents	d	5
30738	SN475009;SN4	tramroad	post med	documents	u	5
30739	SN561007;SS5	tramroad	post med	documents	u	8
30741	SN503005	tramroad	post med	documents	d	4
30865	SN498004;SN5	railway	post med	earthwork	u	5
30866	SS5398;SS549	railway	post med	earthwork	a	8
31235	SS56249760;S	fish trap	mediaeval?;post	o.struct	c	9
31236	SS54449798;S	sea defense	mediaeval?;post	earthwork	b	9
31237	SS54879793	midden	prehistoric?	o.struct	c	9
31238	SN56550124	submerged forest	prehistoric?;med	landform	b	9
31239	SS54739794	palaeochannel	prehistoric?	landform	u	9
31240	SS54629792	drainage channel	post med	o.struct!		10
31241	SS54479793;S	canal	post med	o.struct	b	10
31242	SS54589792	drainage channel	prehistoric?;	o.struct	u	9
31243	SS54499781;S	peat shelf	mesolithic?;iro	landform	b	9
31244	SS54369775	fish trap	mediaeval?;post	o.struct	c	9
31245	SS54299769;S	peat shelf	mesolithic?;iro	landform	b	9
31246	SS54199770	peat shelf	mesolithic?;iro	landform	b	9
31247	SS54229769	fish trap	unknown	o.struct	c	9
31248	SS54239771	fish trap	unknown	o.struct	c	9
31249	SS54229772	fish trap	unknown	o.struct	c	9
31250	SS54439774	fish trap	unknown	o.struct	c	9
31251	SS54249772	fish trap	unknown	o.struct	c	9
31252	SS54359773	fish trap	unknown	o.struct	c	9
31253	SS54349773	fish trap	unknown	o.struct	c	9
31254	SS54339772	fish trap	unknown	o.struct	c	9
31255	SS54319771	fish trap	unknown	o.struct	c	9
31256	SS54329772	fish trap	unknown	o.struct	c	9
31257	SS54299770	fish trap	unknown	o.struct	c	9
31258	SS54229766	fish trap	unknown	o.struct	c	9
31259	SS54269773	fish trap	unknown	o.struct	c	9
31260	SS51249654	shipwreck	unknown	o.struct	u	
31261	SS50009858;S	sea defense	post med?;moder	o.struct	u	6
31262	SS49949863	groyne	post med	o.struct	u	6
31263	SN56560127	fence	post med?	o.struct	c	10
31264	SN56610128	unknown	post med?	o.struct	d	10
31265	SN56370097	quay	post med	o.struct	c	10
31266	SN56440117	sluice	post med?	o.struct	c	10
31267	SN56460114	sluice	post med?	o.struct	c	10
31268	SN56680121	sluice	post med?	o.struct	d	10
31269	SN56930113	sluice	post med?	o.struct	d	10
31270	SN56920107	unknown	post med?	o.struct	u	10
31271	SN56900105	sea defense	post med?	o.struct	c	10
31272	SN56590113;S	sea defense	modern?	o.struct	c	10
31273	SN56560103;S	sea defense	modern?	o.struct	b	10
31274	SN56720106	farmstead	post med	o.struct	v	10
31275	SN56220086	submerged forest	prehistoric?	landform	c	9
31276	SN56140133;S	canal	post med	o.struct	u	10
31277	SN56440118;S	sea defense	post med?	o.struct	c	10
31278	SN56590116	footbridge	post med	documents	u	10

31279	SN56940102	ford	post med	documents	u	10
31280	SN56340123	lime kiln	post med	documents	d	10
31281	SN56390122	saw mill	post med	documents	d	10
31282	SN56520121	unknown	post med?	o.struct	d	10
31283	SN56550101	ford	post med?	documents	d	10
31284	SN56460112	ford	post med?	documents	u	10
31285	SN56450117	ford	post med?	documents	u	10
31286	SN56880114;S	sea defense	post med?	o.struct	c	10
31287	SN56840108;S	sea defense	post med?	o.struct	c	10
31288	SN56930104;S	sea defense	post med?	documents	u	10
31289	SN56860136;S	sea defense	post med?	documents	u	10
31290	SN56970179;S	sea defense	post med?	documents	u	10
31291	SN57030181;S	sea defense	post med?	documents	u	10
31292	SN57750220;S	canal	post med	o.struct	c	10
31293	SN57820224	lime kiln	post med	o.struct	d	10
31294	SN57980233	lime kiln	post med	o.struct	b	10
31295	SN57990238	dwelling	post med	building	d	10
31296	SN58160345;S	sea defense	post med?	o.struct	u	
31297	SN58220293;S	sea defense	post med?	o.struct	u	10
31298	SN58080266;S	sea defense	post med?	o.struct	u	10
31299	SN57560226;S	sea defense	post med?	o.struct	u	10
31300	SN57610202;S	sea defense	post med?	o.struct	u	10
31301	SN57630206;S	sea defense	post med	o.struct	u	10
31302	SN57630205;S	sea defense	post med?	o.struct	u	10
31303	SN58100247;S	sea defense	post med	o.struct	u	10
31304	SN56920212;S	sea defense	post med	o.struct	u	10
31305	SN57040211;S	sea defense	post med	o.struct	u	10
31306	SN56230089	quay	post med	o.struct	d	10
31307	SN57200238	lime kiln	post med	o.struct	d	10
31308	SN56510096	quay	post med	documents	u	10
31309	SN56260130;S	drainage channel	post med	documents	u	10
31310	SN56230133;S	ford	post med;mediae	documents	u	10
31311	SN56280152	dwelling	post med	building	u	10
31312	SN57730313	level	post med	o.struct	u	10
31313	SN57110202;S	railway	post med	o.struct	a	10
31314	SN57260241;S	tramway	post med	o.struct	u	10
31315	SN57760310;S	tramway	post med	o.struct	u	10
31316	SN57220233;S	tramway	post med	o.struct	u	
31317	SS54199771;S	peat shelf	neolithic	landform	b	9
31318	SN48000064;S	submerged forest	neolithic?	landform	c	6
31319	SN57380252;S	sidings	post med	o.struct	u	10
31320	SN58310250	pillbox	post med	building	b	10
31321	SN58520231	farm	mediaeval?;post	building	v	9
31322	SN58530222;S	lime kiln	post med	o.struct	v	10
31323	SN58460218	building	post med?;moder	building	d	10
31324	SN58480220;S	building	modern?	building	d	10
31325	SN58120142	farm	mediaeval?;post	building	b	9
31326	SN57800138	farmstead	mediaeval?;post	building	d	9
31327	SN57940154;S	sea defense	unknown	o.struct	c	9
31328	SN57830144	sluice	post med	o.struct	c	10
31329	SN57840145	sluice	post med	o.struct	c	10
31330	SN57950103	well	post med	o.struct	u	10
31331	SN58130107	well	post med	o.struct	u	10
31332	SN57900140	enclosure?	unknown	o.struct	u	9

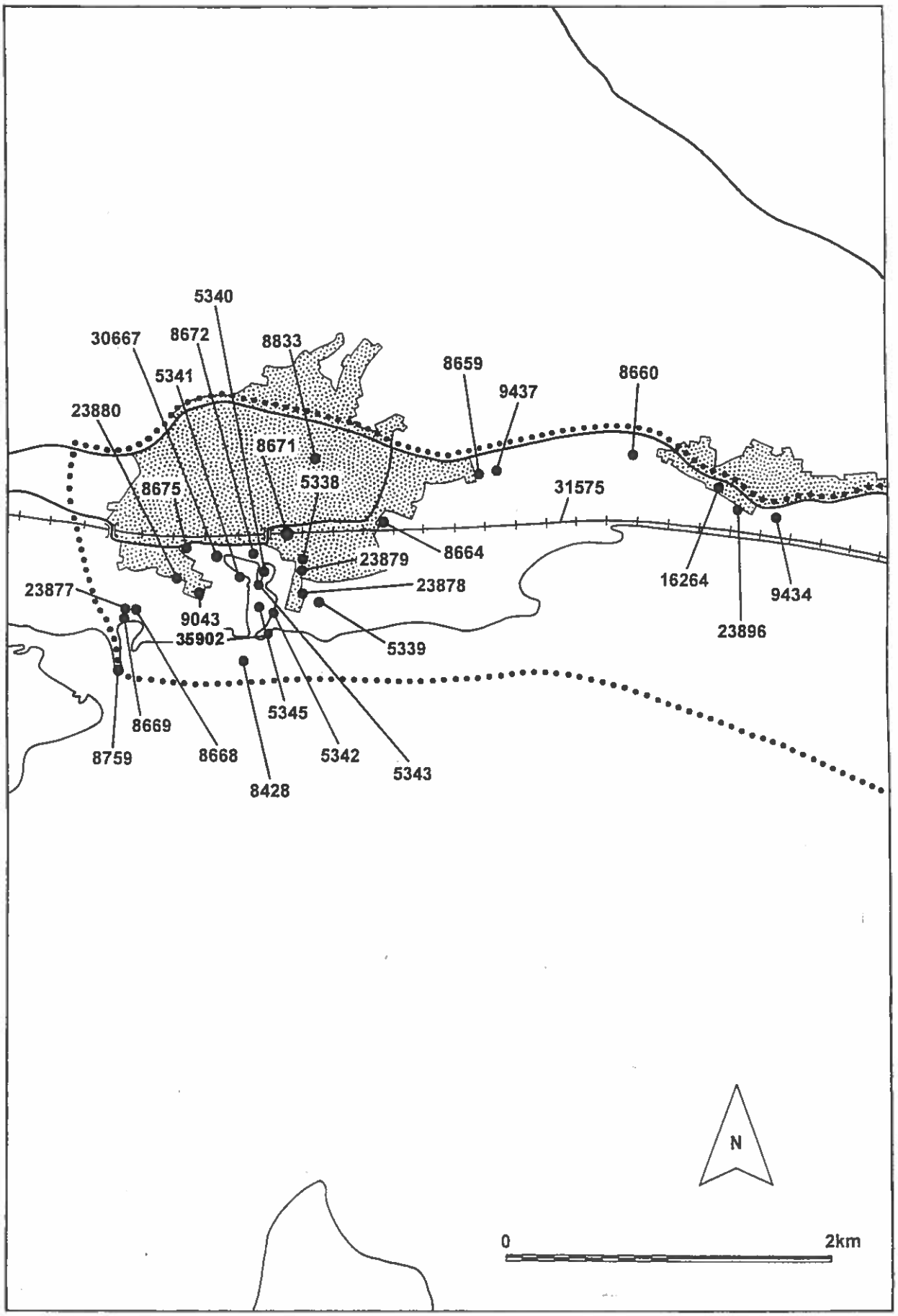
31333	SN57320049	farm	mediaeval?;post	building	b	9
31334	SN57180045	lime kiln	post med	o.struct	c	10
31346	SS50259876;S	dock	post med	o.struct	u	
31417	SS52600000;S	river	post med	o.struct	u	6
31418	SS51629868	building	post med	building	u	6
31419	SS51179827	mill	post med	building	d	6
31420	SS51059798;S	brickworks	post med	documents	u	6
31421	SS51239871	building	post med	building	u	6
31422	SS50509823;S	groyne	modern?	o.struct	u	
31423	SS51049824	brickworks	post med	building	u	
31424	SS50789831	mission room	post med?;moder	building	u	
31425	SS50499857	lime kiln	post med	o.struct	u	6
31426	SS51079885	iron foundry	post med	building	d	6
31427	SS51959830	reservoir	post med	o.struct	u	
31549	SN57240060	building?	unknown	cropmark	d	9
31550	SN57230060	building?	unknown	cropmark	d	9
31551	SN57210049	building?	unknown	cropmark	d	9
31552	SN57210040	building?;grange	unknown	cropmark	d	9
31553	SN57260041	enclosure?	unknown	cropmark	d	9
31554	SN57140041	sea defense	modern?	o.struct	c	10
31555	SS53929775	lime kiln	post med	o.struct	d	10
31556	SN56620040;S	sea defense	post med;modern	o.struct	c	10
31557	SN56570029;S	sea defense	mediaeval?;post	documents	u	9
31558	SN57180045;S	sea defense	mediaeval?;post	o.struct	d	9
31559	SN58310251	viaduct	post med	o.struct	a	10
31560	SN57560022	lime kiln	post med	o.struct	c	10
31561	SN57870188	earthwork	unknown;moder	earthwork	d	10
31562	SN57880195	mast	modern	o.struct	c	10
31563	SN57830166	earthwork	unknown	earthwork	c	10
31564	SN56190075	landing stage	post med?;moder	o.struct	d	10
31565	SN57290040;S	sea defense	modern	o.struct	b	10
31566	SN5802	ferry	mediaeval	documents	u	9
31567	SN5802	bridge	mediaeval?;post	documents	u	9
31568	SN57340043	building?	mediaeval?;post	excav feature!		9
31569	SN573004	building?	mediaeval?	excav feature!		9
31570	SN57180044	charging ramp	post med?	o.struct	u	10
31571	SN58450300	church	mediaeval?;post	building	u	
31572	SS56399808	lime kiln	post med	o.struct	u	10
31573	SS56479808	cist	roman	excav feature!		9
31574	SS56239793;S	tramway	post med	o.struct	d	10
31575	SS57009770;S	railway	post med	o.struct	a	1
31576	SS56689958	groyne	post med?	o.struct	u	10
31577	SS56319783	dock	post med	documents	u	10
31578	SS56689836	dock;quay	post med	documents	u	10
31579	SS5698	fair	post med?;moder	documents	u	9
31580	SS56519810	assembly point	post med?	documents	u	9
31581	SS56259800	finds	roman	finds	u	9
31582	SS56579777;S	cremation	roman	excav feature!		9
31583	SS56149821;S	bridge	post med	o.struct	d	10
31584	SS56159795	finds	roman	finds!		9
31585	SS56159800	bath house	roman	building	c	9
31586	SS56559779	church	mediaeval?;post	building	u	9
31587	SS56429798	castle	mediaeval	building	u	9
31588	SS56339809;S	ford	roman?	o.struct	u	9

31589	SS57539816	altar	roman	o.struct	u	9
31590	SS56439805	building	mediaeval?;post	building	u	9
31591	SN56900023	ridge &vurrow?	mediaeval?;post	earthwork	u	9
31592	SS56429785;S	trackway	unknown	cropmark!		10
31593	SS56999920;S	trackway	unknown	earthwork	u	10
31594	SS56489780;S	tank obstacle	modern	o.struct	b	10
31595	SS56679755	drainage system?	unknown	o.struct	u	10
31596	SS56399814	slipway	post med?;moder	o.struct	u	10
31597	SS56479821	slipway	post med?;moder	o.struct	u	10
31598	SS56689833	iron foundry	post med	building	u	10
31599	SS56739831	works	post med	building	u	10
31600	SS56919839	works	post med	building	u	10
31601	SS57089896;S	sea defense	unknown	o.struct	u	10
31602	SS55809800	sea defense	unknown	o.struct	u	10
31603	SS55979857	farm	post med	building	u	10
31604	SS56769837	lime kiln	post med	o.struct	u	10
31605	SS55809892	earthwork	unknown	earthwork	u	9
31606	SS55909825	reservoir	post med	o.struct	u	10
31607	SS55829936;S	sea defense	post med	o.struct	u	10
31608	SS55879934	pillbox?	modern	building	u	10
31609	SS55489919;S	bank	unknown	o.struct	u	9
31610	SS56049862;S	quay?	unknown	o.struct	u	9
31611	SS56109957	farm	post med	building	u	9
31612	SS55789931;S	bank	post med	o.struct	u	10
31613	SS55489919	lime kiln	post med	o.struct	u	10
31614	SS55859916	sluice	post med	o.struct	u	10
31615	SS55619831	school	post med	building	u	10
31616	SS55579905;S	tramway	post med	o.struct	u	10
31617	SS55619903	coalmine	post med	building	u	10
31618	SS55579887;S	sea defense	post med	o.struct	u	10
31619	SS55919834	drainage system?	post med	o.struct	u	10
31620	SN56000032	building?;field	post med?;moder	cropmark	u	10
31621	SS56099853	building	modern?;post me	cropmark	u	10
31622	SS55859841	works	modern	building	u	10
31623	SS55819864	sidings	modern	o.struct	u	10
31624	SS56079786;S	pipeline	modern	o.struct	a	10
31625	SS56589780	sea defense	post med?;media	o.struct	u	10
31626	SS56159776	ford	mediaeval?;post	o.struct	u	9
31627	SS55559891	spoil tip	post med	earthwork	u	10
31628	SS55149813;S	canal?	unknown	o.struct	u	9
31629	SS55769910;S	bank	post med?;moder	o.struct	u	10
31630	SS55099892	building	post med	building	u	10
31631	SS54849901;S	tramway	post med	o.struct	u	10
31632	SS55109850;S	tramway	post med	o.struct	u	10
31633	SS55149891	lime kiln	post med	o.struct	u	10
31634	SS54799892	coal pit	post med	o.struct	u	10
31635	SS54819891	shaft	post med	o.struct	u	10
31636	SS54819889	spoil tip	post med	earthwork	u	10
31637	SS54169902;S	tramway	post med	o.struct	u	10
31638	SS54189849	spoil tip	post med	earthwork	u	10
31639	SS54159855	spoil tip	post med	earthwork	u	10
31640	SS54109860	spoil tip	post med	earthwork	u	10
31641	SS54129847;S	trackway	post med	documents	u	10
31642	SS54389834	shaft	post med	o.struct	u	10

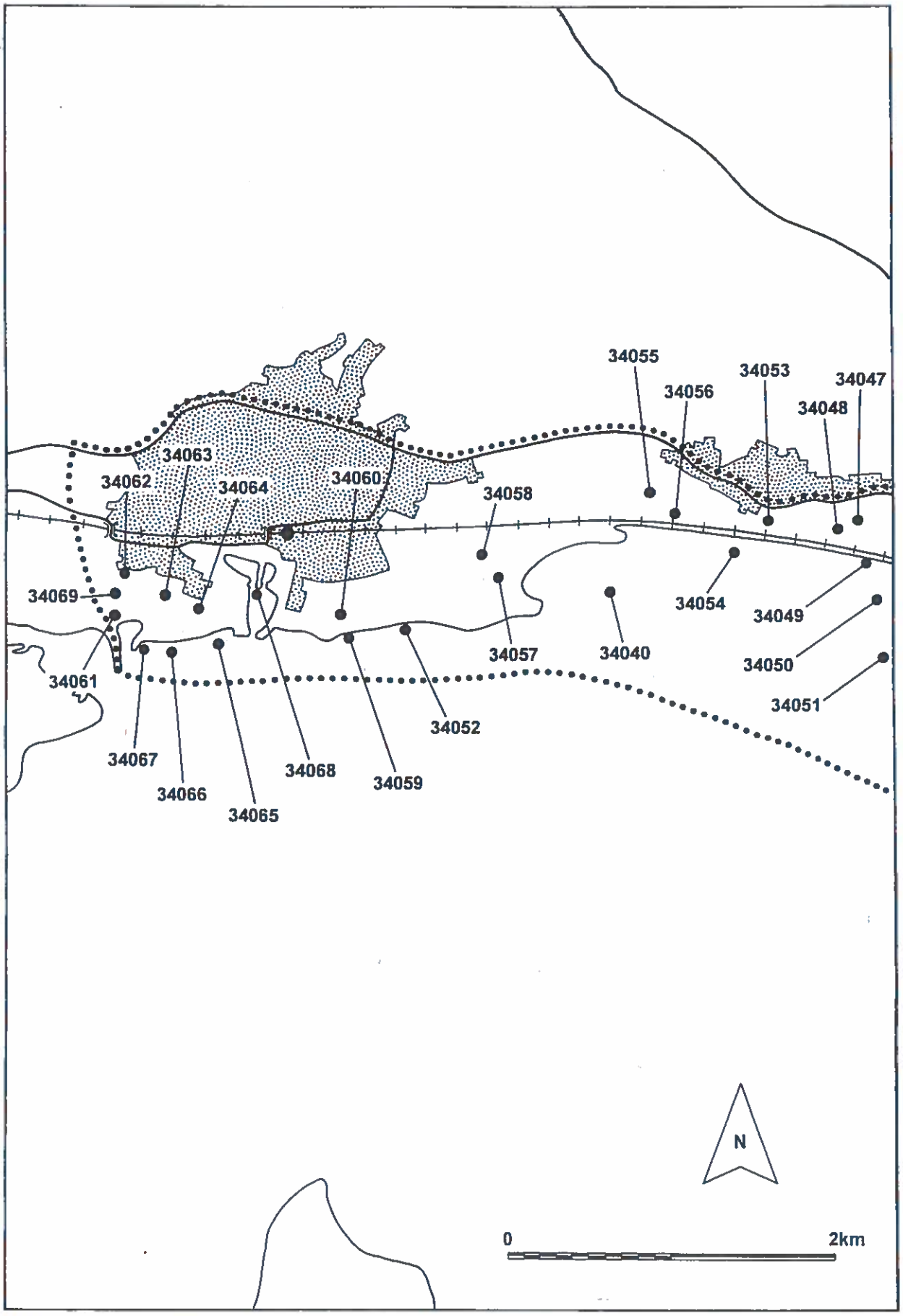
31643	SS54699826	coal pit	post med	o.struct	u	10
31644	SS54679825	shaft	post med	o.struct	u	10
31645	SS54809834	pond	post med	o.struct	u	10
31646	SS54619853	shaft	post med	o.struct	u	10
31647	SS54649848	building	post med	building	u	10
31648	SS54619849	building	post med	building	u	10
31649	SS54599844	building	post med	building	u	10
31650	SS54859863;S	bank	post med	earthwork	u	10
31651	SS54599877	spoil tip	post med	earthwork	u	10
31652	SS54479881;S	bank	post med	earthwork	u	10
31653	SS54299870	building	post med	building	u	10
31654	SS54159873	coal pit	post med	o.struct	u	10
31655	SS54249896;S	trackway	post med	documents	u	10
31656	SS54229885	spoil tip	post med	earthwork	u	10
31657	SS54139885	spoil tip	post med	earthwork	u	10
31658	SS54029872;S	bank	post med	earthwork	u	10
31659	SS54599873;S	bank	post med	earthwork	u	10
31660	SS53709902;S	trackway	post med	o.struct	u	10
31661	SS53339887;S	trackway	post med	o.struct	u	6
31662	SS53779891	building	modern	building	d	10
31663	SS53839894	building	post med	building	d	10
31664	SS54069901;S	bank	post med	earthwork	u	10
31665	SS53649897	building	post med	building	d	6
31666	SS53259915;S	bank	post med	earthwork	u	6
31667	SS54329909	farm	post med	building	d	10
31668	SS54359902;S	terrace	post med	landform	u	10
31669	SS54329906	tramway	post med	o.struct	c	10
31670	SS53539850;S	bank	unknown	earthwork	u	6
31671	SS53689806	farm	mediaeval?;post	building	c	10
31672	SS53559792;S	sea defense	mediaeval?;post	earthwork	c	10
31673	SS54389802	farm	mediaeval?;post	building	d	
31674	SS54899798	farm	post med	building	d	10
31675	SS54749791;S	drainage system	post med	documents	d	10
31676	SS53359862	drainage system	post med	documents	u	6
31677	SS53239855	farm	post med	building	b	6
31678	SS53069835	farm	post med	building	u	6
31679	SS53009820	drainage system	unknown	documents	u	6
31680	SS53029836;S	trackway	post med	documents	u	6
31681	SS52589898;S	sea defense	post med	o.struct	c	6
31682	SS53549824;S	drainage system	unknown	o.struct	u	6
31683	SS52899848;S	sea defense	unknown	o.struct	u	6
31684	SS52499847;S	sea defense	post med?;moder	o.struct	u	6
31685	SS52639879;S	sea defense	post med?;moder	o.struct	u	6
31686	SS51689833	hospital	post med?;moder	building	u	6
31687	SS51689788;S	bank	unknown	o.struct	u	6
31688	SS51389814;S	bank	post med?	o.struct	u	6
31689	SS51729749	rifle butt	post med	o.struct	c	6
31690	SS51729742	building-military	post med	building	d	6
31691	SS51629737	rifle butt	post med	o.struct	c	6
31692	SS51659741	mantelet	post med	o.struct	u	6
31693	SS51689746	mantelet	post med	o.struct	u	6
31694	SS51439733	building-military	post med?;moder	building	u	6
31695	SS51239750;S	building-military	post med?;moder	building	u	6
31696	SS51389804	dwelling	post med?;moder	building	u	6

31697	SS51899798	shaft	post med?;moder	o.struct	u	6
31698	SS51479916;S	trackway	post med	documents	d	6
31699	SS51179768	coal pit	post med	o.struct	u	6
34010	SS50309857	breakwater	post med	o.struct	u	6
34011	SS50339858;S	terrace	unknown	landform	u	6
34012	SS50739843	terrace	post med	building	u	6
34013	SS50819835	terrace	post med	building	u	6
34014	SS50729827	terrace	post med;modern	building	u	6
34015	SS50769834	terrace	post med?;moder	building	u	6
34016	SS50789828	school	post med?;moder	building	u	6
34017	SS50839830	chapel	post med?;moder	building	u	6
34018	SS50909835	reservoir	post med?;moder	o.struct	u	6
34019	SS50819845	reservoir	post med	o.struct	u	6
34020	SS50959776	building	post med?;moder	building	u	6
34021	SS50859790;	field system	post med	topog	u	6
34022	SS51409780	lake	modern	earthwork	u	6
34023	SS51419754	lake	modern	earthwork	u	6
34024	SS50469806	lime kiln	post med	o.struct	u	6
34025	SS50469852	sand pit	post med	earthwork	u	6
34026	SS51219869	works	post med	building	u	6
34027	SS50759863	coalyard	post med	o.struct	u	6
34028	SS50839853	terrace	post med	building	u	6
34029	SS51049897	saw mill	post med	building	u	6
34030	SS51389907	works	post med	building	u	6
34031	SS50359922	scouring basin	post med	o.struct	u	6
34032	SS50349877	building	post med	building	u	6
34033	SS50599898	coalyard	post med	o.struct	u	6
34034	SS50149892	wreck	post med?;moder	o.struct	u	6
34035	SS50249889	building	post med	building	u	6
34036	SS50259884	building	post med	building	u	6
34037	SS50219903;S	dock	post med	o.struct	u	6
34038	SS50149859;S	harbour	post med	o.struct	u	6
34039	SS49869944;S	scouring	post med	o.struct	u	6
34040	SN46730045	fish trap	unknown	o.struct	u	2
34041	SS49829900	building	post med	building	u	6
34042	SS498699	landing stage	post med	o.struct	c	6
34043	SS49879935	terrace	unknown	documents	u	6
34044	SS49809989	reservoir	post med?;moder	o.struct	d	6
34045	SS49629940;S	groyne	post med?;moder	o.struct	d	6
34046	SS49390004	wreck	unknown	documents	d	6
34047	SN47750084;S	drainage channel	unknown	documents	d	2
34048	SN48110089;S	drainage channel	unknown	documents	d	2
34049	SN48150060	groyne	post med?;moder	o.struct	c	2
34050	SN48350051	fish trap	unknown	o.struct	c	2
34051	SS49179985	fish trap	unknown	o.struct	c	2
34052	SS50259922	works	post med	building	u	2
34053	SN47450092;S	bank	unknown	o.struct	u	2
34054	SN47300075	navigation	unknown	natural		2
34055	SN46240103;S	drainage system	unknown	earthwork	u	2
34056	SN46700090;S	lagoon	unknown	landform	u	2
34057	SN46240076;S	tramway	post med?;moder	earthwork	u	2
34058	SN46070074;S	reservoir	post med?;moder	earthwork	u	2
34059	SN45040014;S	groyne	post med?;moder	o.struct	u	2
34060	SN45100030	power station	post med?;moder	building	d	2

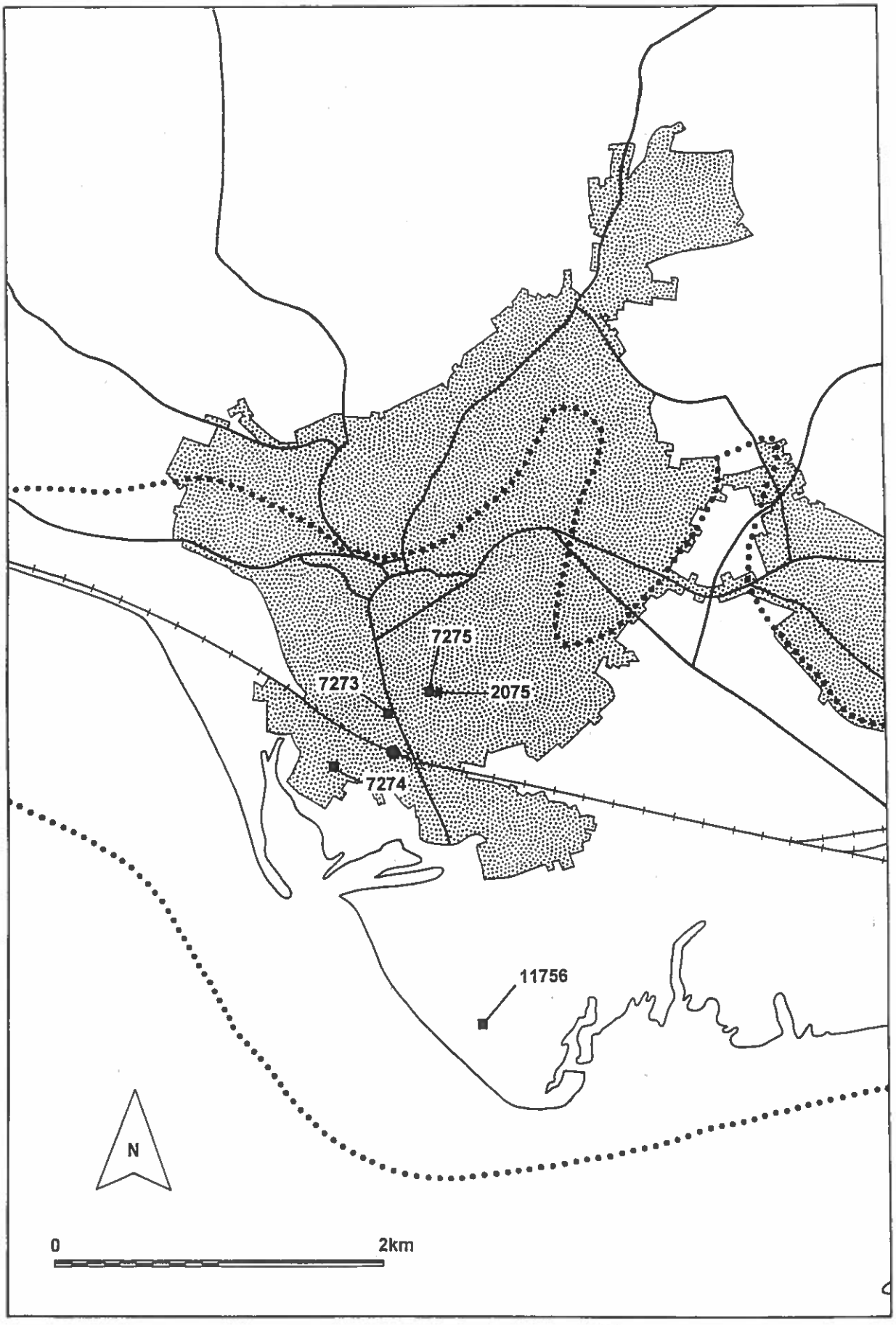
34061	SN43520029;S	building	modern	building	d	2
34062	SN43670051	quarry	unknown	earthwork	b	2
34063	SN43930044;S	building	post med?	building	d	2
34064	SN44000031;S	building	post med?	building	d	2
34065	SN44200007	fish weir	unknown	o.struct	c	2
34066	SS51799618;S	shipwreck	post med?;moder	o.struct	c	2
34067	SN43830007	groyne	unknown	o.struct	c	2
34068	SN44500041	sluice	post med?;moder	o.struct	c	2
34069	SN43660044	bridge	post med?;moder	o.struct	b	2
34070	SS50889836	clay pit	post med	earthwork	u	
34071	SS50829843	works	post med	building	u	
34072	SS55739839	terrace	post med	building	c	
35902 SAMCM268	SN44570014	coal barges	Post med	shipwrecks	c	1



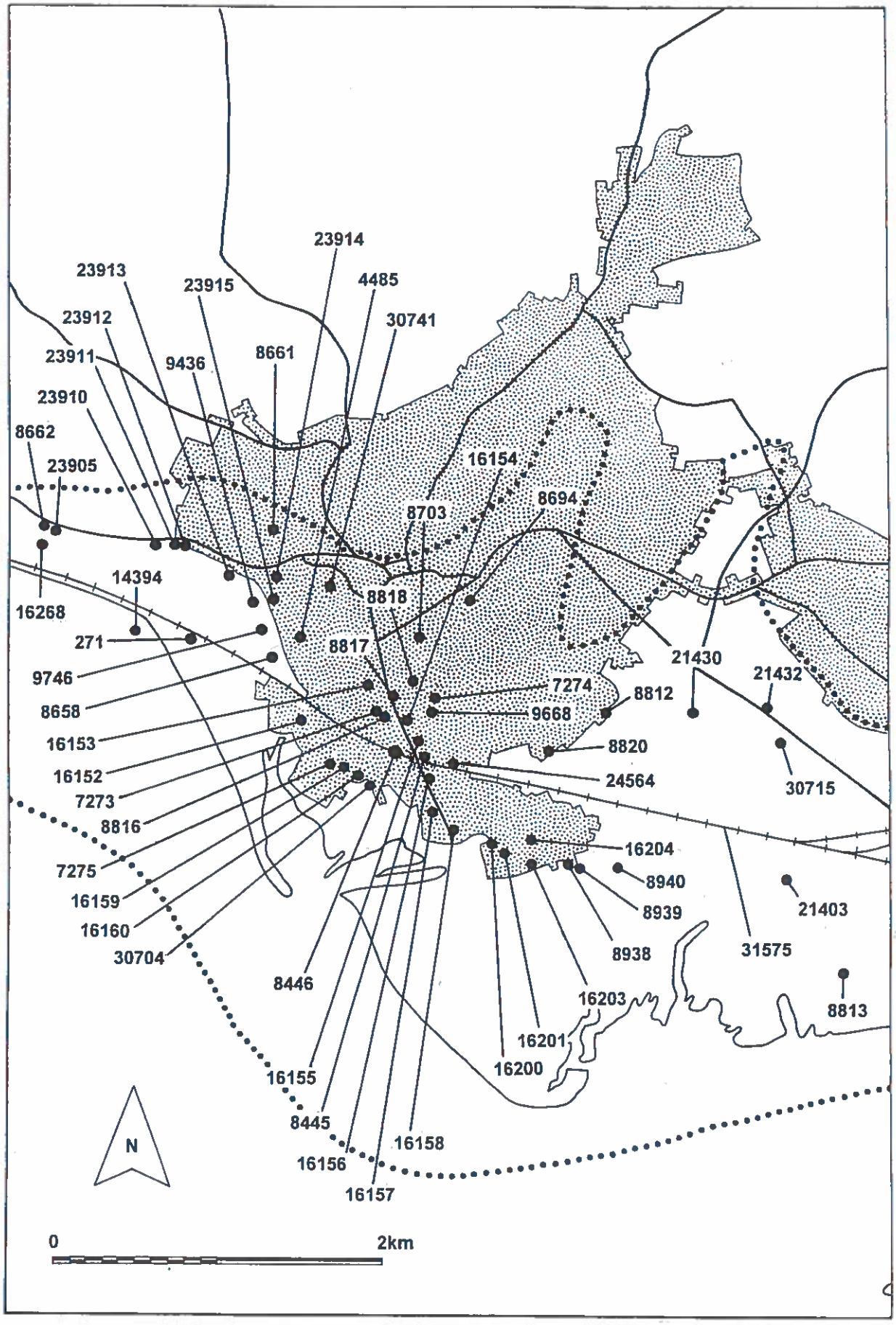
MAP1 : Area 1, known post-medieval and modern sites.



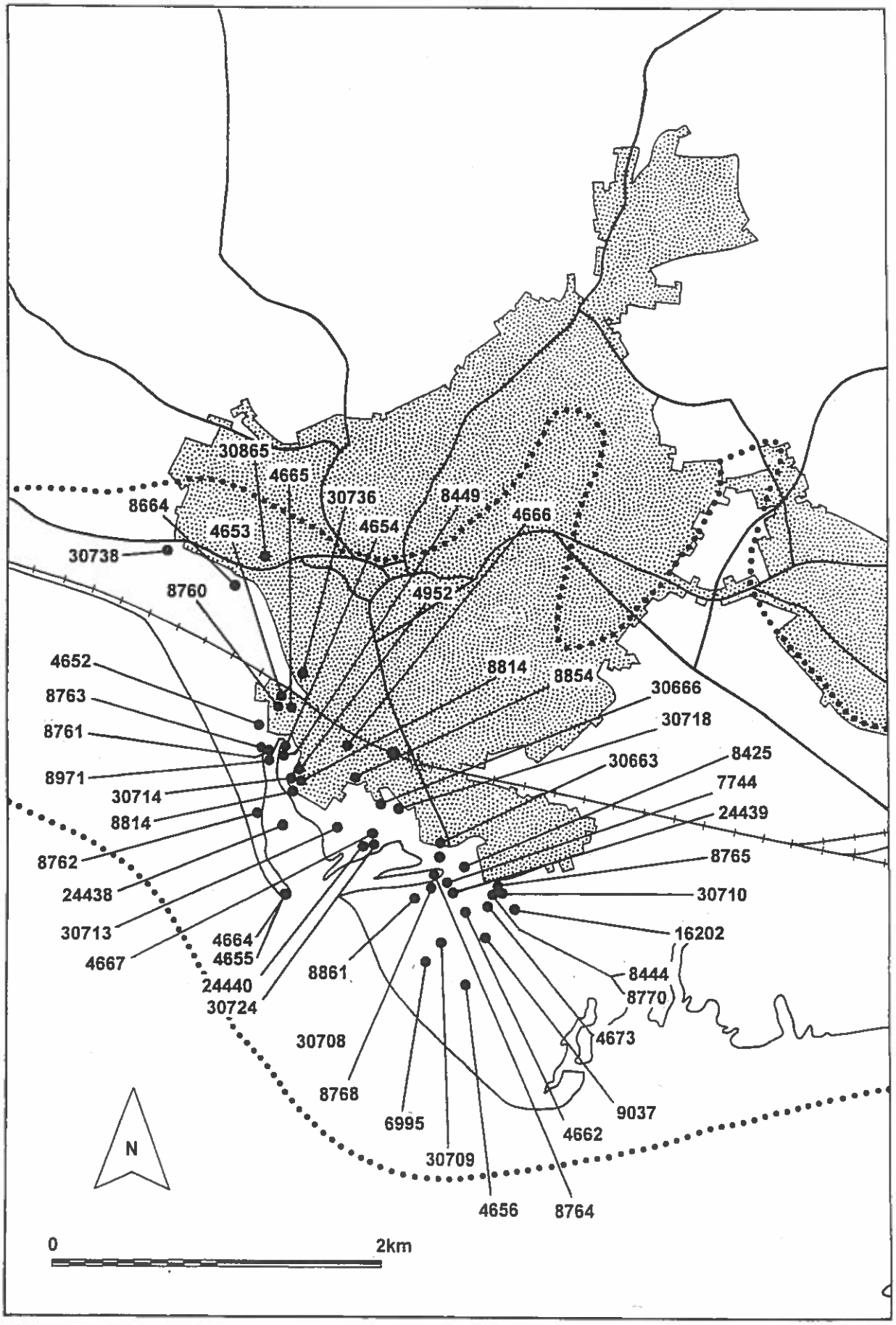
MAP 2: Area 1, new post-medieval and modern sites.



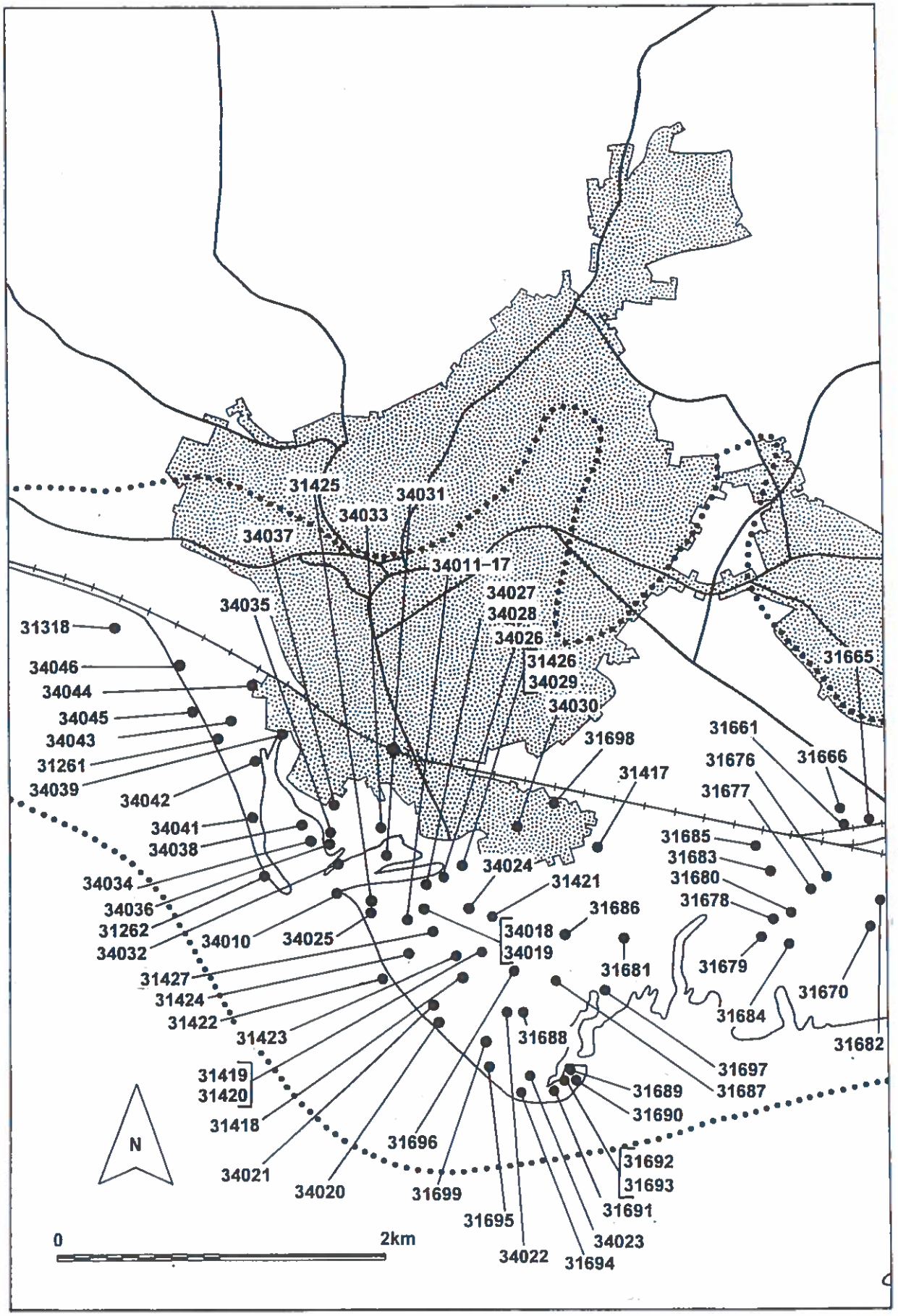
MAP 3: Area 2, known prehistoric, Roman and medieval sites.



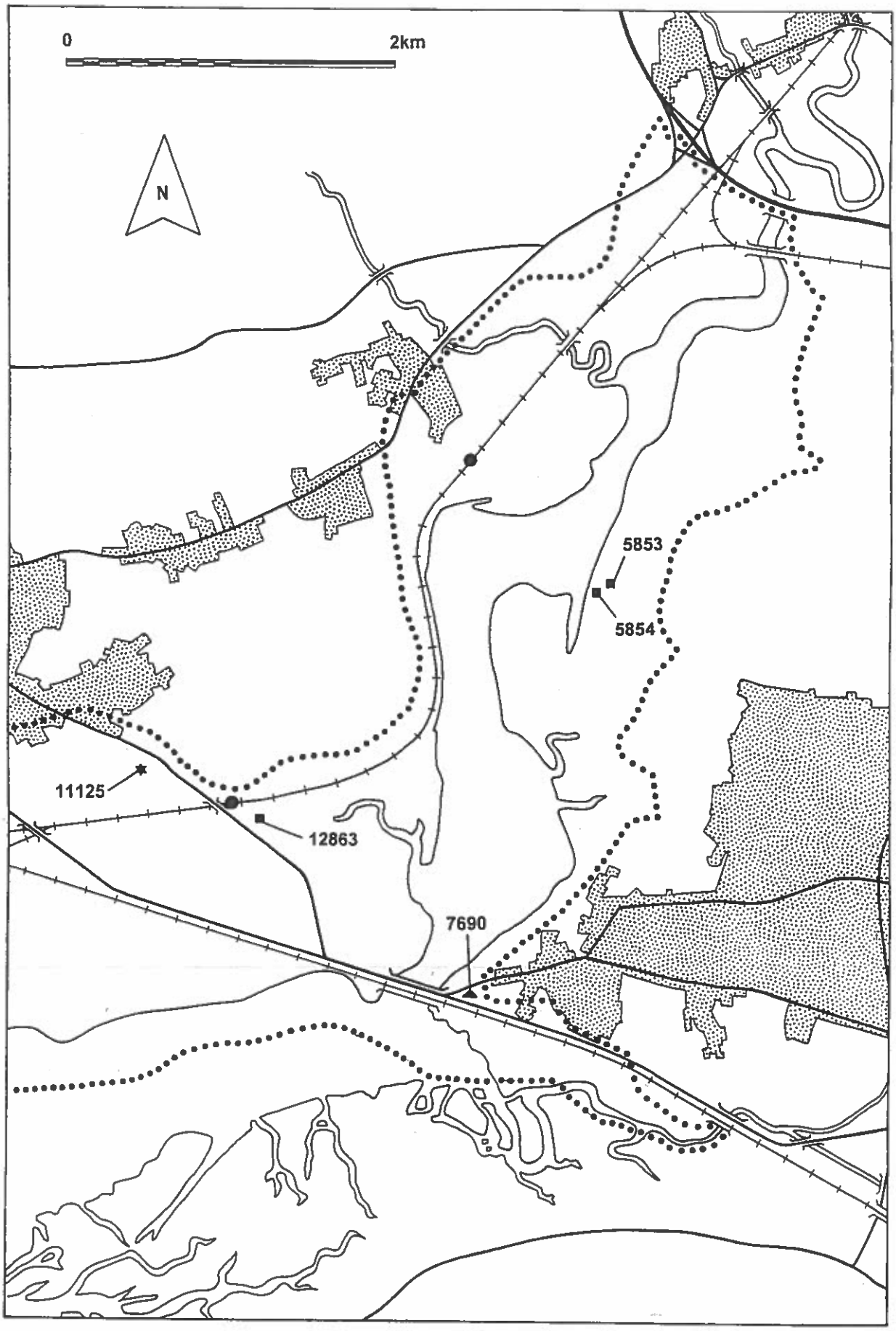
MAP 4: Area 2, known post-medieval and modern sites.



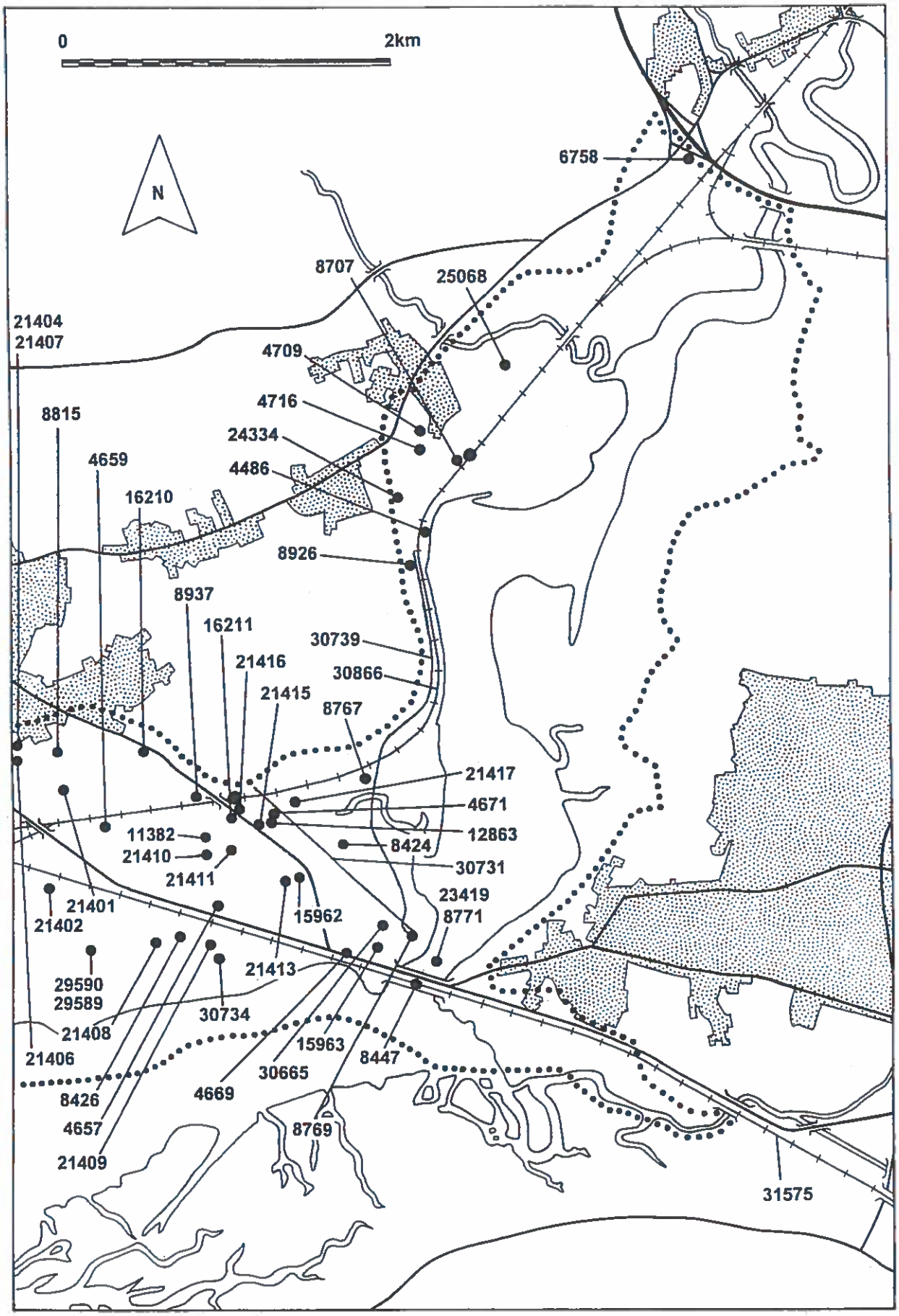
MAP 5: Area 2, known industrial sites.



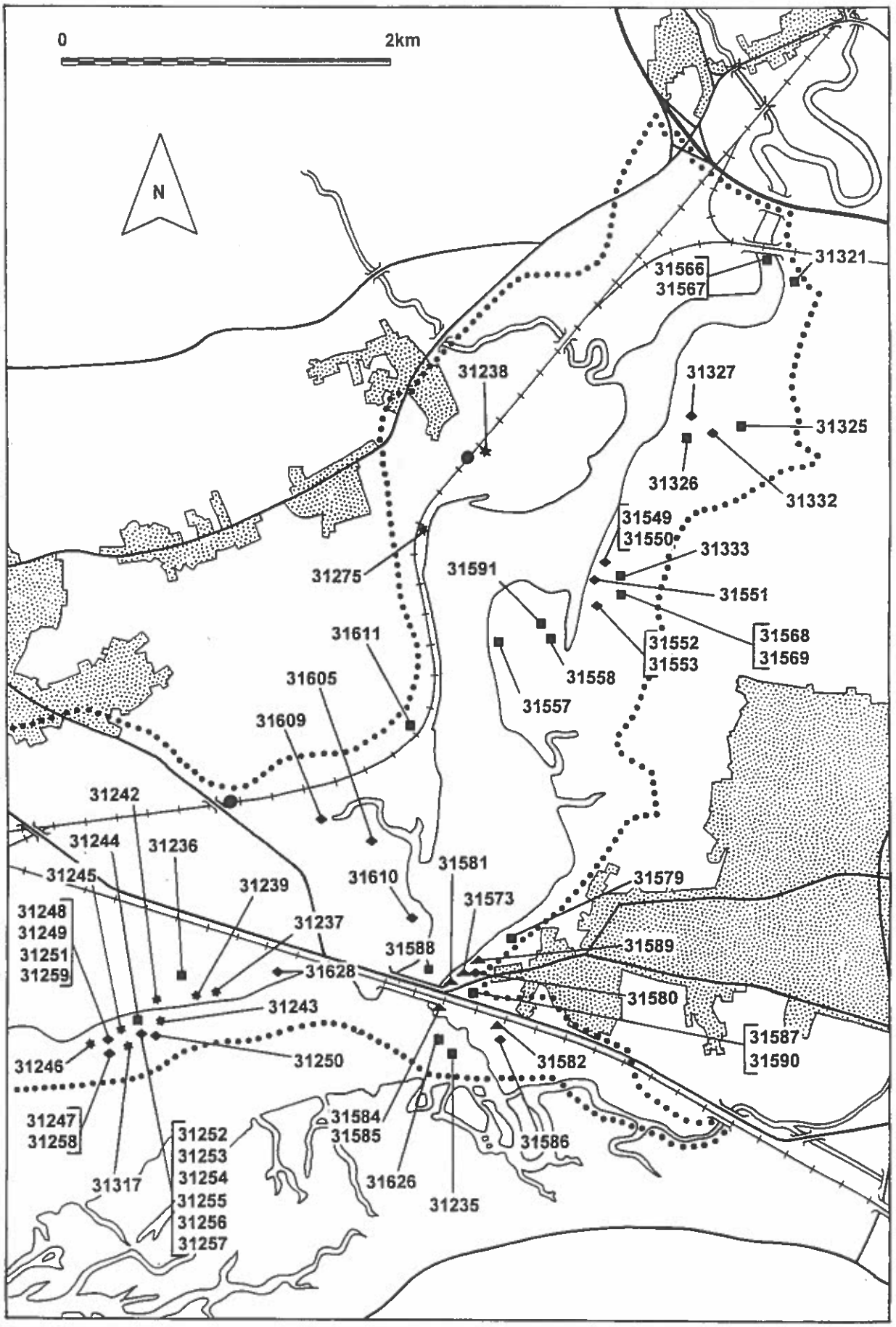
MAP 6: Area 2, new post-medieval and modern sites.



MAP 7: Area 3, known prehistoric, Roman and medieval sites.



MAP 8: Area 3, known post-medieval and modern sites.



MAP 9: Area 3, new prehistoric, Roman and medieval sites.

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