

PROPOSED RAGWORM FARM AT PENDINE, CARMARTHENSHIRE

ARCHAEOLOGICAL DESK-BASED ASSESSMENT

Report No. 2002/28

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PROPOSED RAGWORM FARM AT PENDINE, CARMARTHENSHIRE
ARCHAEOLOGICAL DESK-BASED ASSESSMENT

By

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PROPOSED RAGWORM FARM AT PENDINE, CARMARTHENSHIRE

SUMMARY

Proposals to construct a ragworm farm on part of Laugharne Marsh at SN27000843 required an Environmental Impact Assessment. The proposed development site lies within an area listed on the Register of Landscapes of Outstanding Historic Interest in Wales. Laugharne Marsh was reclaimed through a programme of embankment and drainage, initiated by Sir Sackville Crow in the mid-17th century. During his reclamation works Crow constructed at least two embankments, one of which still partially surrounds the proposed development site.

Prior to the construction of Crow's embankment the proposed development area consisted of marsh and salt marsh that was subjected to frequent inundation, especially during the winter months. It was finally drained, and the present layout of fields and drains established during the 19th century. Little Burrows farm, which is the only farm within the proposed development site boundaries, appears to have been established sometime during the early 19th century.

The potential for buried archaeological remains within the site is at present unknown, but all coastal wetland areas have the capacity to contain extensive and important archaeological remains.

Most of the proposed works are above ground and should, therefore, have little impact on the integrity of the historic landscape or on the individual archaeological sites and features it contains. However, the full implications of the scheme will not be known until the final design plans, including construction methods, are produced.

1. INTRODUCTION

1.1 PROJECT PROPOSALS AND COMMISSION

Proposals by Dragon Baits Ltd. to construct a ragworm farm on part of Laugharne Marsh at Pendine, Carmarthenshire, required an Environmental Impact Assessment (EIA) and this report forms part of the that assessment.

1.2 SCOPE OF THE ARCHAEOLOGICAL ASSESSMENT

This assessment reviewed the current state of knowledge on the historic development and past landuse of the study area and its environs in order to provide base-line data against which the potential impacts of the proposed scheme can be properly assessed.

1.3 REPORT OUTLINE

This report describes the physical environment of the study area (Section 2) before summarising the archaeological resource (Section 3) and the likely impact of the proposed scheme on that resource (Section 4). Recommendations based on the results of Sections 3 and 4 are given in Section 5. Detailed supporting data are presented in a series of appendices.

1.4 ABBREVIATIONS USED IN THIS REPORT

All sites recorded on the county Sites and Monuments Record are identified by their Primary Record Number (PRN) and located by their National Grid Reference (NGR). New sites have been assigned a PRN and located by their NGR. References to primary cartographic and documentary evidence and published sources are given in brackets; full details are contained in Appendix Two.

2. THE STUDY AREA

2.1 LOCATION

The proposed development area is located on an area of reclaimed marshland at NGR SN27000843. It covers c.70ha (c.172.5 acres) of pasture land on the West Marsh, which itself forms part of the more extensive Laugharne Marsh. The area is bounded on its northeast side by a M.O.D. magazine and laboratory compound and on the southwest by the Pendine M.O.D. testing range. Its north, northwest and east sides follow the line of a 17th century sea defence and later road. The meandering line of the Witchett Brook marks the southern boundary. The Laugharne Marsh forms part of the Taf and Tywi Estuary, one of 36 landscapes listed in the *Register of Landscapes of Outstanding Historic Interest in Wales* (Cadw 1998, 40-42).

2.2 LANDSCAPE HISTORY

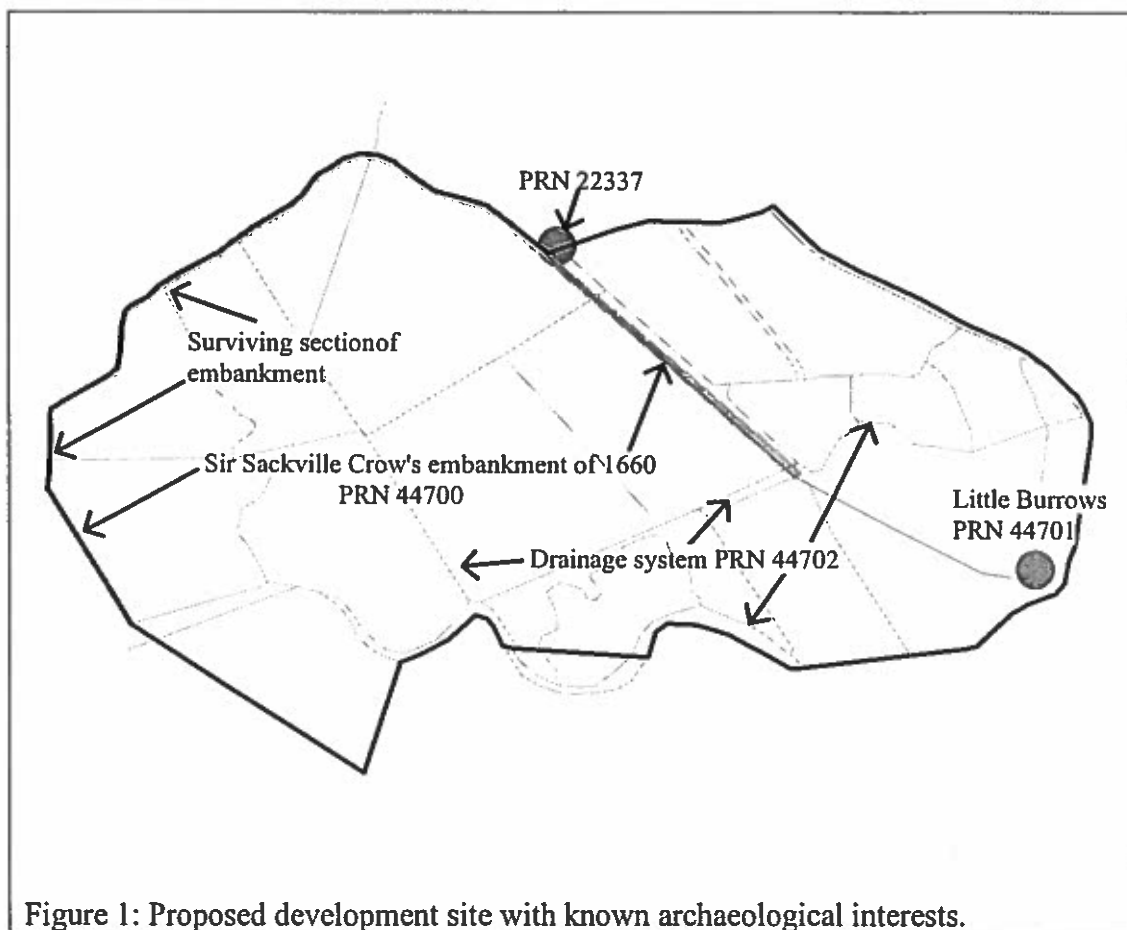
Laugharne Marsh has developed as a consequence of natural and human actions. The natural development of the marsh has been discussed in elsewhere (James 1991) and new research,¹ unfortunately unavailable during this study, is increasing the knowledge of the early development of the area. The new research should be consulted at the earliest opportunity and incorporated into the existing data. The following discussion will focus on the later history and the processes that led to the creation of the landscape of the proposed development site.

Most of the landscape of Laugharne Marsh is the result of post-medieval enclosure and drainage of the coastal marshes for agricultural use. During the medieval period and earlier the area was saltmarsh with patches of rough pasture and by the later 16th century, at least, it was used for large-scale sheep grazing (Murphy and Ludlow 2000). Embankment and drainage began in 1659-1660 when Sir Sackville Crow initiated a scheme to reclaim the marsh, which included the construction of the embankment (PRN 44700) that surrounds much of the proposed development site.

At that time the proposed development area lay outside the sea wall and was a tidal lake fed by the Witchett Brook. It was during the later 18th century or early 19th century that drainage of the site began with the present layout of fields and boundaries established by the late 19th century. On the parish tithe maps for Llansadurnen (1841) and Laugharne (1846) the field names reflect the nature of the area, with all the fields within the proposed development site – that is the area defined by, but outside, the 17th century sea wall - having such names as 'saltmarsh piece', 'part of marsh' or simply 'saltmarsh'. A late 18th century or early 19th century sale catalogue for Brook Farm, which included the proposed development site, has most of the site marked simply as saltmarsh (Fig 2). Neither Little Burrows Farm (PRN 44701) nor the cottage (PRN 22337) is shown on the plan that accompanied the sale catalogue, although both appear on the Llansadurnen tithe map.

¹ Walley S 1996, *Holocene Evolution of a Coastal barrier Complex, Pendine Sands*. Unpublished PhD Thesis, University of Wales Bangor.

The area remained largely unchanged until the establishment of the Ministry of Defence research and testing facility during the 20th century.



3. SUMMARY OF THE ARCHAEOLOGICAL RESOURCE

3.1 DRAINAGE AND EMBANKMENT

The embankment (PRN 44700) that surrounds most of the proposed development site dates from the Sir Sackville Crow's drainage of Laugharne Marsh in 1659-1660.

The bank was built according to Crow's instructions '*six foot high in earth and eighteen foot deep in the sole*' (NLW Llwyngwair 14264). The bank ran for a length of 1.5km. Only a short length of the bank remains at the northwest corner of the proposed development site, the rest, particularly along the west, northeast and east sides, has been used as the lines for modern access roads.

The proposed development site was drained during the 19th century. Some of the drains are shown on the tithe map, but, it was not until the later 19th century that the present layout of fields and drains was established. The drains are straight channels, some with a low parallel hedge. Aerial photographs clearly show how the artificial drainage system (PRN 44702) was imposed on the underlying natural, dendritic pattern of former saltmarsh creeks.

3.2 AGRICULTURE AND CULTIVATION

Prior to the construction of the first sea defences in 1659-1660 the marsh was used as pasture. After it was built, the area inside the sea wall - effectively the area surrounding the proposed development site - was cultivated using ridge and furrow (Murphy and Ludlow 2000). Figure 2² shows the extent of the cultivation during the later 17th and 18th centuries and it clearly shows that most of the proposed development site lay outside the 1660 sea wall. It was only from the later 18th century when a dam and sluice was constructed across the Witchett Brook that the proposed development site became suitable for year round agricultural use.

The only farm within the proposed development site is Little Burrows (PRN 44701) situated in the southeast corner of the site. Little Burrows is an early 19th century farm established on the southern edge of the drained marsh. Today the farm is uninhabited, but the land is still leased as pasture.

A cottage (PRN 22337) formerly stood at SN27280868, just at the point where the site boundary forms a dog-leg around the southern edge of part of the M.O.D. facility to the northeast of the site. The cottage was shown but unnamed on the Llansadurnen tithe map, where it was simply marked as 'cottage and garden'. The cottage seems to have disappeared by the time the Ordnance Survey 1st edition 1:10560 maps were published in 1891 and there are no surviving above ground remains.

² This map was compiled from various sources by Ken Murphy who intends to include it in a forthcoming publication on the historic development and landuse of Laugharne Marsh.

Little Burrows Farm (PRN 44701): description

Little Burrows farmyard complex has two main elements, the original early 19th century house and yard and a group of modern sectional metal-framed sheds to the north. The buildings that surround the original yard are stone built with slate gabled roofs. They include a long range incorporating a cowshed and stables that occupies the north side of the yard and a former double cartshed with flattened arches over the cart openings. This building has been adapted by the partial blocking of the cart openings into stables. The house, which occupies the southwest corner of the yard is currently empty, but in good condition, and may retain many of its original features.

3.3 CHANGING DIRECTIONS: THE LATER LANDUSE HISTORY

The 20th century saw radical and significant changes to the character of the area, with the establishment of the M.O.D. research and testing facility, which occupies large areas of Laugharne Marsh and the Burrows to the southwest, west and northeast of the proposed development site. The use of marginal areas on the coastal fringe for military activity is not unusual in this region, with the Pembrey Air Weapons Range approximately 1km away on the opposite side of Carmarthen Bay. The Pendine establishment now fringes the proposed development site on three sides.

South of the burrows, Pendine Sands was the site of various attempts at national and international speed records. The most famous attempt was by Parry Thomas in his car 'Babs' in 1927. The attempt was unsuccessful and Thomas was killed. Following this, 'Babs' was buried in the dunes, until the 1990s when it was re-excavated and it is now housed in the Babs Museum of Speed, Pendine.

4. POTENTIAL IMPACTS OF THE PROPOSED SCHEME ON THE ARCHAEOLOGICAL RESOURCE

4.1 GENERAL IMPACTS OF DEVELOPMENT IN WETLAND ENVIRONMENTS

Developments in wetland environments have a number of fundamental impacts on the archaeological resource, which in such areas includes the important, but probably more abundant palaeoenvironmental evidence. This often fragile evidence includes organic materials not usually found on archaeological sites outside of the wetlands such as, wood, leather, textiles, pollen and plant remains. Any ground breaking operations, whether in dry or wetland areas, have the potential to uncover new archaeological sites, but whereas, dry land sites can be reasonably easily dealt with - even to the extent of leaving them for future investigation - wetland sites and their fragile evidence begin to deteriorate once the surrounding soil conditions have been changed.

As well as suffering the immediate impacts of direct development, wetlands can be affected by developments some distance away as changes to drainage, may lead to a lowering of the water table and the drying out of the waterlogged deposits over quite a wide area. This can be a consequence of so-called 'improved' drainage that is frequently part of modern development, where water is channelled straight into streams or main drains bypassing many intermediate drains and channels. The upshot of this is that, even though the same volume of water is being drained and channelled, it is more confined and is removed from the area more quickly, with the result that less water soaks into the ground, again leading to a drying out of the surrounding deposits and the loss of valuable archaeological information (Coles 1995, 19).

4.2 THE PROPOSED WORKS

The main element of the proposed works for the ragworm farm is the construction of up to 300 ponds, 10m wide by 75-150m long. The ponds will be constructed above ground using pond lining material fixed to post and timber frames. Each pond will be aerated by pump, and they will have up to c.18cms of substrate in the base. The substrate to be used in the base of the ponds, which could be as much as 40,000 - 80,000 cubic metres, may be won from shallow excavations in the area around Little Burrows (PRN 44701).

The final design plans, including the proposed construction and extraction methodologies are necessary before the archaeological implications can be fully assessed. However, it is likely that the construction of the ponds will require topsoil stripping to provide a level surface, and it may also require the infilling of some sections of the existing drainage system. The provision of between 40,000 and 80,000 cubic metres of substrate for the bases of the ponds from within the proposed development site will have a significant impact on the site.

Access tracks across the site are to be constructed from gravel and will be designed to take 'quad-bike' traffic only. It is not clear at present whether this will require the removal of the topsoil, or whether the gravel can be laid on the existing ground surface. In any event, new crossings over the drains (PRN 44702), or new openings through the existing section of the sea bank (PRN 44700) may be required.

4.3 THE POTENTIAL IMPACTS OF THE PROPOSED WORKS USING SIGNIFICANCE CRITERIA

The following table outlines the potential impacts of the proposed works against set criteria in order to assign each archaeological site to a category, which can be used to determine the level of response necessary to mitigate the effects of the proposals.

The significance criteria³ are:

Severe – Only adverse effects are assigned this level of importance as they represent key factors in the decision-making process. These effects are generally, but not exclusively, associated with sites and features of national importance and resources/features which are unique and which, if lost, cannot be replaced.

Major – These effects are likely to be important considerations at a regional or district scale, but if adverse, are potential concerns to the project, depending upon the relative importance attached to the issue during the decision-making process. Mitigation measures and detailed design work are unlikely to remove all of the effects upon the affected communities or interests.

Moderate – These effects, if adverse, while important at a local scale, are not likely to be key decision making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on a particular resource. They represent issues where effects will be experienced but mitigation measures and detailed design work may ameliorate/enhance some of the consequences upon affected communities or interests. Some residual effects will still arise.

Minor – These effects may be raised as local issues but are unlikely to be of importance in the decision making process. Nevertheless, they are of relevance in the detailed design of the project and consideration of mitigation or compensation measures.

Negligible – No effects, or those which are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

PRN	NGR	Impact significance
22337 - Cottage	SN27220867	Minor
44700 – Sea bank	SN26690819 – SN27570835	Moderate/Minor
44701 – Little Burrows	SN27870821	Minor/Negligible
44702 – Drainage System	Centred on – SN27000843	Moderate/Minor

Table 1: Impact significance of the proposed development.⁴

³ The significance criteria definitions were supplied by Arup.

⁴ The table was compiled without having the full design plans, and some sites may be re-categorised once the final design plans are available.

5. RECOMMENDATIONS

5.1 MANAGEMENT OF THE ARCHAEOLOGICAL RESOURCE IN WETLAND ENVIRONMENTS

Because of the complex nature of the wetland archaeological resource its management is often more difficult than for dry land sites. Therefore, it is important that archaeology is fully integrated into any development proposals at an early stage of the project. Without the final design plans and proposed construction details it is not possible to be unequivocal about the final archaeological response. Therefore, the following mitigation measures are suggestions only at this stage and they should be firmed-up once the final design plans are available.

5.2 GENERAL CONSIDERATIONS

Current access into the proposed development site is good, and the existing entry points to the site should be maintained and incorporated into the final design plans.

Where possible, all boundaries and drains should be retained, to preserve the existing field and drainage pattern, which is characteristic of a reclaimed coastal wetland landscape.

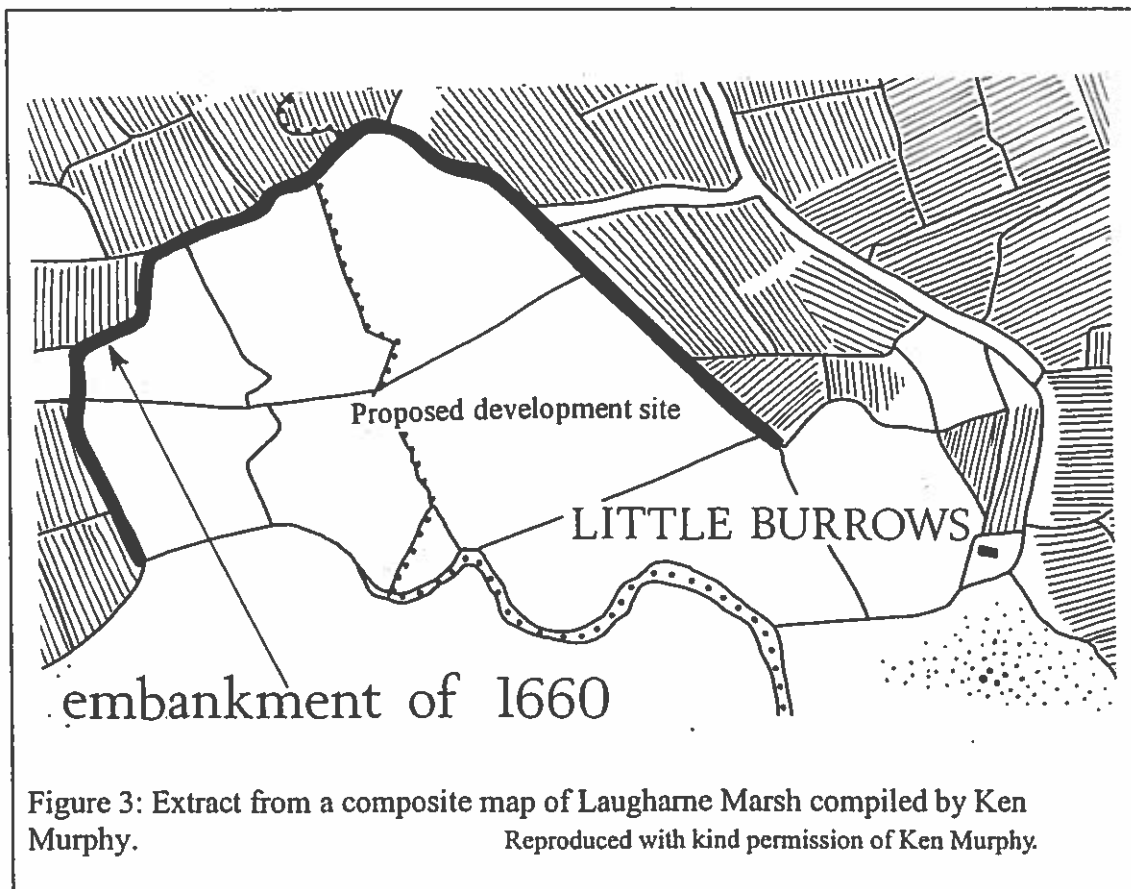
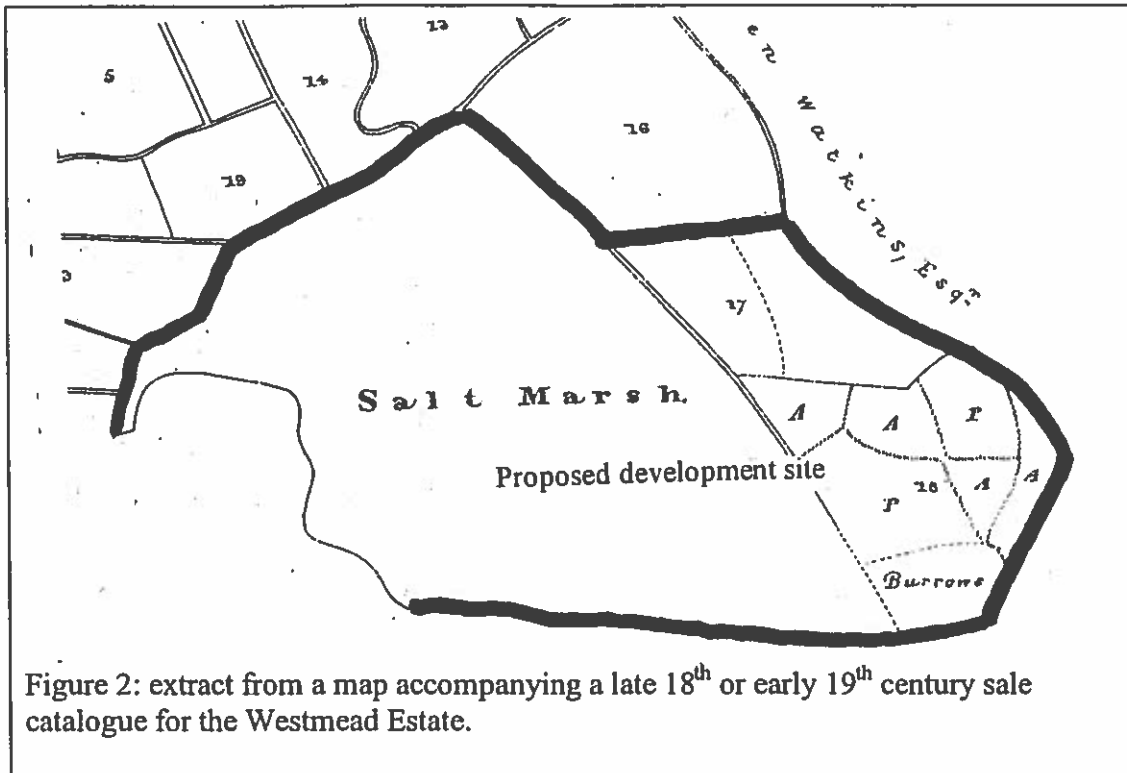
5.3 PRE CONSTRUCTION RECORDING

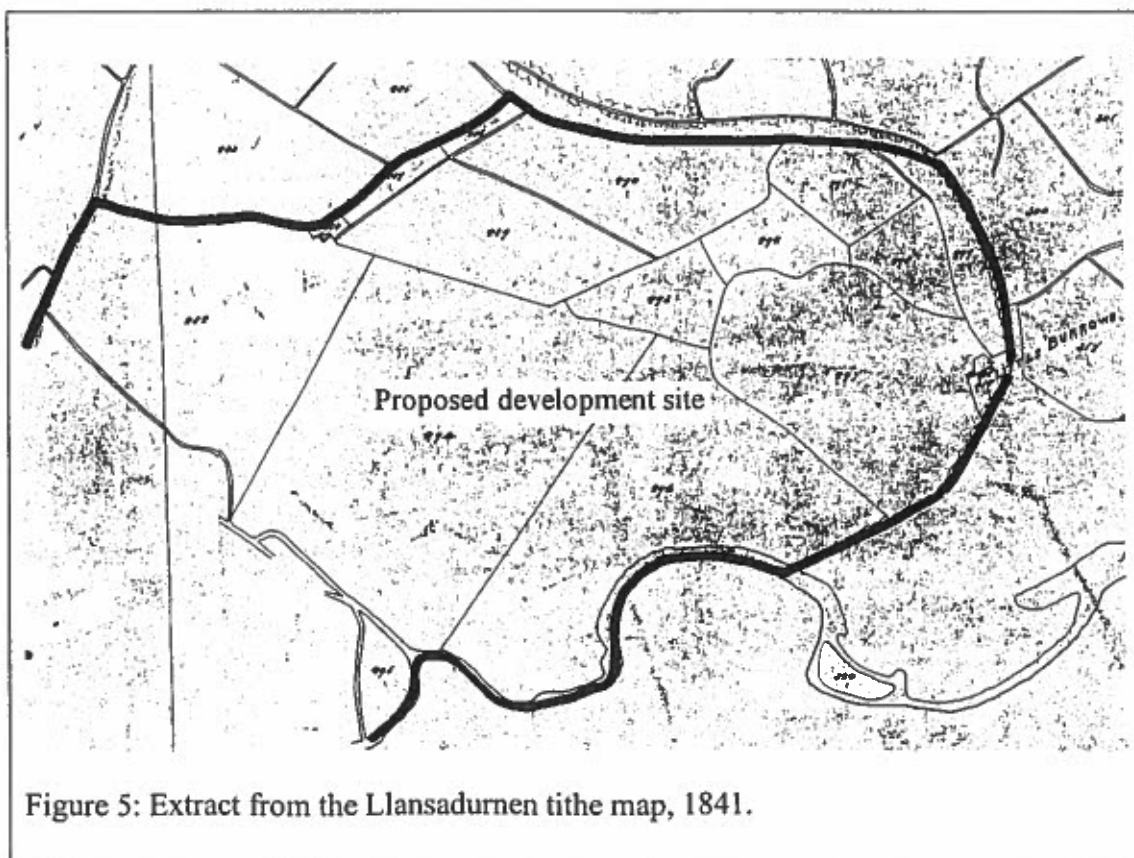
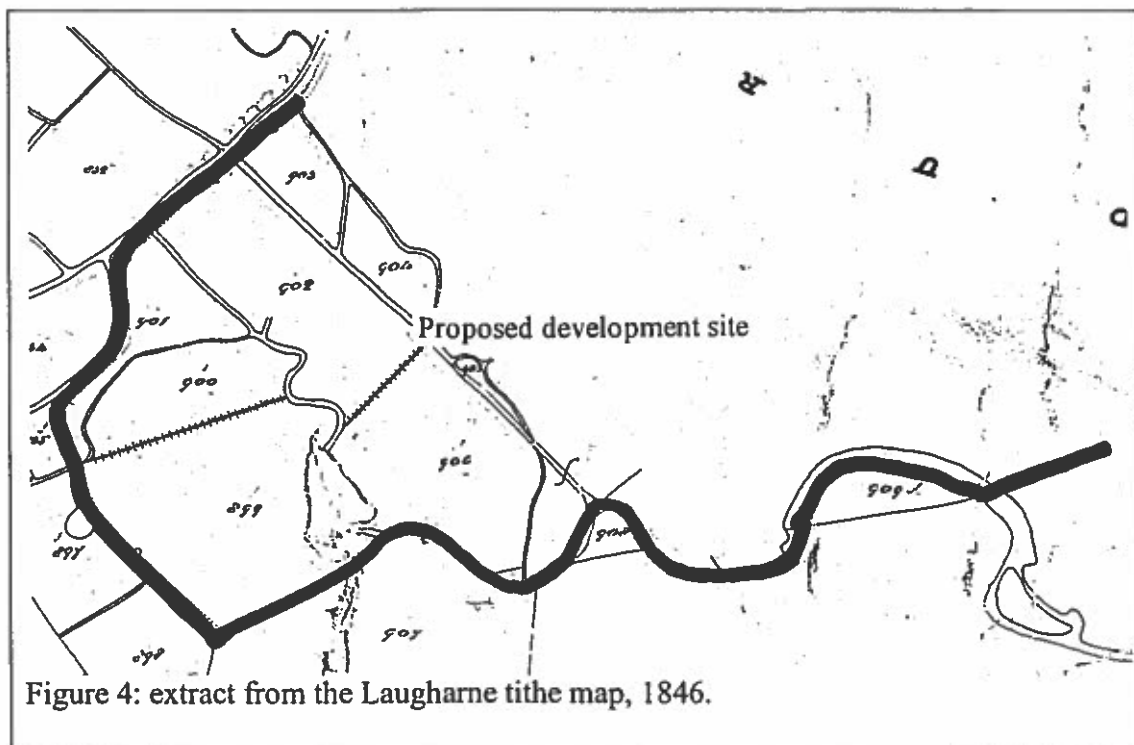
Where identified structures or features are to be affected, pre-construction recording should be carried out, this particularly relates to the buildings at Little Burrows Farm (PRN 44701) and the existing section of the sea bank (PRN 44700).

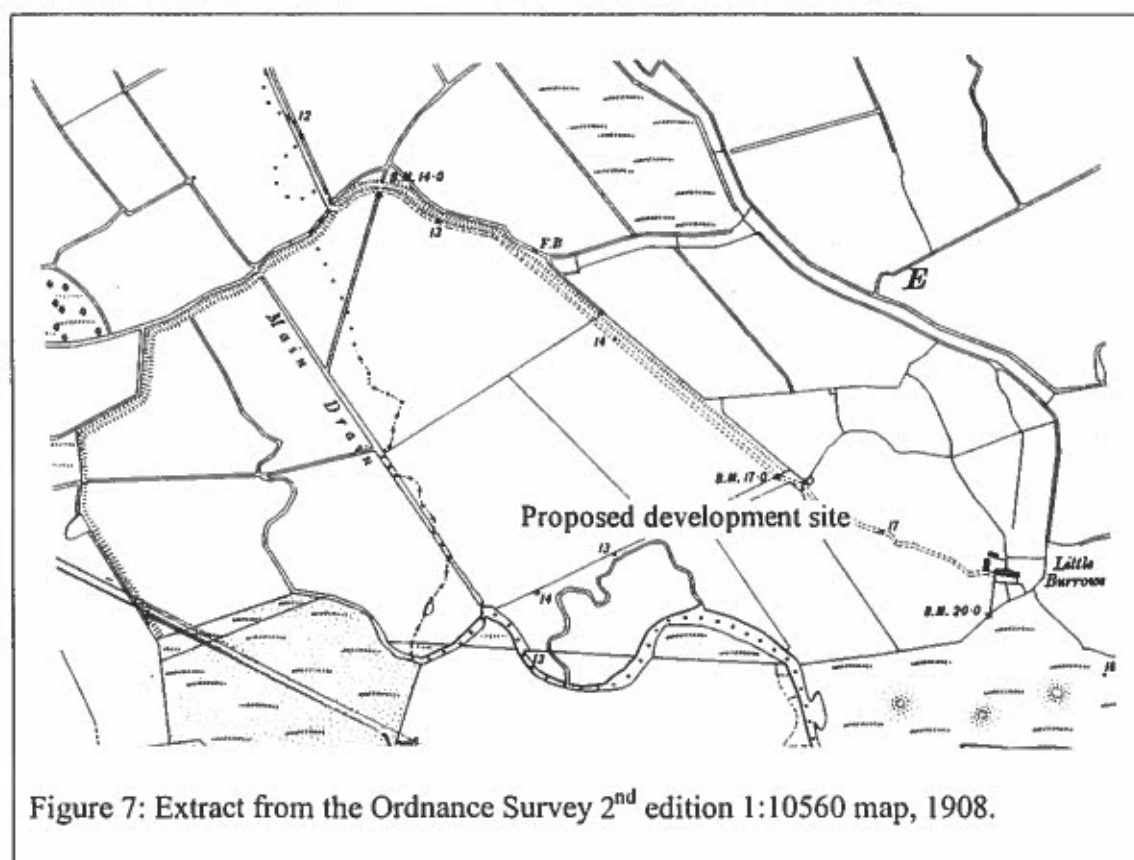
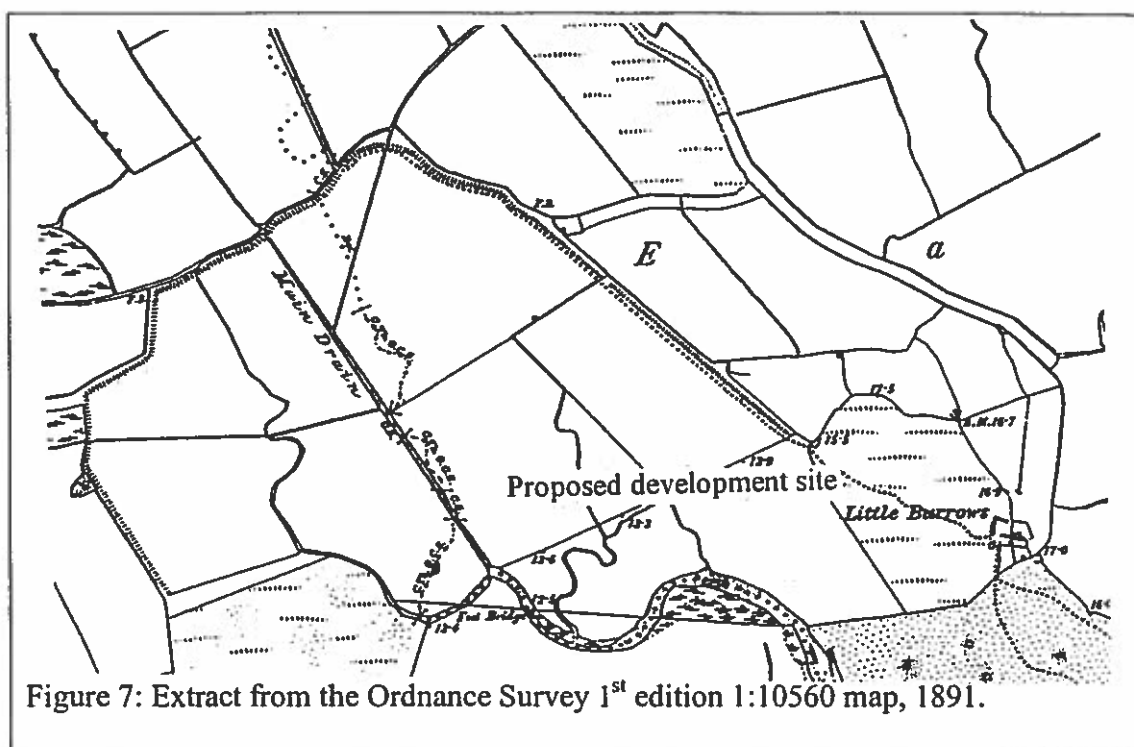
If the buildings at Little Burrows (PRN 44701) are to be affected at any stage of the development, they should be recorded by photographic and descriptive survey, to at least Level 2 as defined in *Recording Historic Buildings: a Descriptive Specification* (1st edition issued by Royal Commission on the Historical Monuments of England 1990).

5.4 WATCHING BRIEF DURING CONSTRUCTION AND EXTRACTION WORKS

All large-scale earth-moving operations, in particular the proposals to extract the substrate for the bases of the ponds from the Little Burrows area of the site, should be monitored for archaeological interests. In the event of archaeological features or deposits being encountered, time should be made available for an archaeologist to record them and to assess their vulnerability to the rest of the proposed works.







APPENDIX ONE: EXTRACT FROM HISTORIC LANDSCAPE CHARACTERISATION REPORT

The following extracts are from a recent historic landscape characterisation project of the Taf and Tywi Estuary, one of 36 landscapes on *Register of Landscapes of Outstanding Historic Interest in Wales* (Cadw 1998, 40-42), undertaken by Cambria Archaeology (Murphy and Ludlow 2000) and grant-aided by Cadw: Welsh Historic Monuments. For more information on this historic landscape characterisation project visit Cambria Archaeology's website at www.acadat.com.

LAUGHARNE AND PENDINE MARSH

GRID REFERENCE: SN 281086

AREA IN HECTARES: 958.00

Historic Background

From the later prehistoric period until Medieval times, this area probably comprised salt marsh and patches of rough pasture on marginally higher ground, interspersed with fresh and brackish-water lagoons. In a borough charter of 1278-82 (Williams n.d.) it is stated that Sir Guy de Brian granted certain privileges and rights to the burgesses of Laugharne 'in the marsh of Talacharn called Menecors'. However, it is clear that Sir Guy kept the greater part of the marsh in his own hands as part of the demesne of the Lordship of Laugharne, as on his death in 1307, 1000 acres of pasture in 'le Marcis' were recorded in an *Inquisition post Mortem* (National Library of Wales 10118E Vol. 1). In 1595, the first record of habitations occurs, when the 'dairies' of Hurst House, East House and Brook House were noted in a survey (Laugharne Corporation). These three dwellings are either on the fringes of the marsh or on islands of higher ground. The term dairy indicates pasture, perhaps on a seasonal basis, as it is likely that the marsh was subjected to flooding and tidal inundation in the winter months. Prior to 1595, Sir John Perrot, Lord of Laugharne, cheated the burgesses of Laugharne out of their share of their marsh, adding it to the demesne established by Guy de Brian. Sir John used the marsh for large-scale sheep farming. However, a small part of the marsh known as 'The Lees' remained in the hands of the burgesses and was later cultivated using an open- or strip-field system (Davies, 1955). The Lees is still owned by Laugharne Corporation, though in character it is indistinguishable from the rest of the marsh. It was not until 1660 when Sir Sackville Crow came into possession of the marsh that a scheme of drainage was initiated with the construction of sea walls (Murphy, forthcoming). Drainage allowed for the establishment of new farms - a process that was complete by the tithe survey of the 1840s - and by the late 18th-century Laugharne Marsh comprised the best farmland in the county. Charles Hassall (1794, 15) described how the land could be made more productive by ridging-up the land by the use of the Dutch Plough. Drainage work continued in the 19th century. A large sea-wall armoured with stone, and a quay, were constructed at the east end of the marsh in 1800-10 by George Watkins of Broadway and connected to Coygan Quarry by a tramway (James 1991, 150), and in c. 1840 a wall across the Witchett Brook was built. Watkins's work seems to have been part of wide-ranging improvements as most of the farms (all part of Broadway estate) were rebuilt in c.1820 in a 'Georgian' style and provided with good ranges of outbuildings. A Ministry of Defence research establishment has been founded across part of the south and southeast portion of this historic landscape character area.

Description and essential historic landscape components

This historic landscape character area consists of flat land some 6km by 1.5km just a few metres above sea level. It is characterised by regularly-shaped fields of pasture. These fields are divided by drainage ditches which are usually accompanied by wire fences, though in the central area of the Marsh, south of Coygan Quarry, low hedges parallel some of the ditches. Towards the eastern end of the Marsh fields become less regular and tend to reflect the dendritic pattern of the pre-drainage salt marsh. Two phases of sea wall separate this area from the salt marsh to the east. Pasture is the dominant land use, mostly improved, but with pockets of unimproved ground. There is limited arable and no old woodland. Towards the western edge the land is becoming neglected and rushes are growing. Ridge and furrow, or rather in this instance ridge and drain, is everywhere apart from between the two phases of sea wall at the eastern edge. This ridge and furrow is a distinct component of the historic landscape. The settlement pattern is of dispersed farms. Farm buildings are generally two-storey and stone built. Farmhouses are in a 'Georgian' style and farms were provided with large

ranges of outbuildings which were usually located formally around a yard. These early 19th-century estate farms lend a distinctive architectural signature to the area. Farms have modern agricultural buildings associated with them. The Ministry of Defence research establishment across part of the southern portion of this historic landscape character area has erased many landscape components. Many new buildings and tracks and have been constructed and the planting of shelter belts and scrubby woodland to shield the establishment from view have further altered the character of part of the area.

All recorded archaeological features relate to the reclamation and land-use described above.

There are some distinctive buildings. Date stones on several of the farms indicate a major period of rebuilding in c. 1820 by the Broadway estate. Hurst House and its farm buildings are both Grade II listed.

This is a very distinct character area with clear boundaries between it and its neighbours.

LAUGHARNE AND PENDINE BURROWS

GRID REFERENCE: SN 280074

AREA IN HECTARES: 730.60

Historic Background

An area of sand dunes fronting Laugharne Marsh, which probably began to form in the second millennium BC in common with other coastal areas of South Wales (Higgins, 1933). The discovery early in the 20th century of shell middens in the dunes, seemingly associated with prehistoric finds, supports an early date for sand incursion (Cantrill, 1909). The dunes lay within the Lordship of Laugharne during the Medieval period, but were clearly of little economic use. The present system of an unbroken chain of dunes from Pendine to the Taf estuary is fairly modern. Terry James (1991, 148-51) has demonstrated that the Witchett Brook opened out through the dunes as late as the 1830s, when a dam and engine house were constructed across it. Since the Second World War a Ministry of Defence research establishment has used the dunes for tests, and many installations have been constructed within them.

Description and essential historic landscape components

This is a very extensive system of sand dunes, running for over 9 km from Pendine in the west to the Taf estuary in the east. It is 1km to 1.5km wide between Laugharne and High Water Mark. Historic landscape components are confined to the modern period and comprise many installations, buildings and tracks associated with the Ministry of Defence research establishment.

Recorded archaeology similarly mainly relates to the Ministry of Defence and to Post-Medieval drainage schemes but there is a possible settlement site, of unknown date (prehistoric?) and several findspots and middens.

Distinctive buildings are confined to the recent Ministry of Defence structures.

This is a distinct landscape area, and effectively separates Pendine beach and foreshore from the area to the north.

APPENDIX TWO: SOURCES

Cartographic sources

- nd. Late 18th or early 19th century sale catalogue and maps of the Westmead Estate.
- nd. Composite map of Laugharne Marsh and Laugharne Burrows compiled by Ken Murphy, to show the embankment and extent of cultivation.
- 1841 Llansadurnen parish tithe map and apportionment.
- 1846 Laugharne parish tithe map and apportionment.
- 1891 Ordnance Survey 1st edition 1:10560 map, sheet Carms.LII.NW.
- 1908 Ordnance Survey 2nd edition 1:10560 map, sheet Carms.LII.NW.

Aerial photographs

- 1946 RAF/106G-UK-1629 frames 3069-3072.
- 1955 Meridian Airmaps frames 37602-37603 (north part of site only).

Unpublished sources

- Murphy K 2000 *Carmarthenshire Historic Landscape Characterisation of four Landscapes on the Register of Landscapes of Outstanding Historic Interests in Wales: Black Mountain and Mynydd Myddfai; Tywi Valley; Dolaucothi; Taf and Tywi Estuary.* Unpublished Cambria Archaeology report for Cadw: Welsh Historic Monuments.
- and Ludlow N

Published sources

- Cadw 1998 *Register of Landscapes of Outstanding Interest in Wales.*
- Coles B 1995 *Wetland Management: a survey for English Heritage.* WARP. Exeter.
- James H (Ed.) 1991 *Sir Gâr: Studies in Carmarthenshire History.* Carmarthenshire Antiquarian Society. Monograph Series, Volume 4. Carmarthen.
- James T 1991 'Where Land Meets Sea'. In H James (Ed.) 1991, p143-166.

APPENDIX THREE: CATALOGUE OF RESEARCH ARCHIVE

The project archive has been indexed and catalogued according to National Monument Record (NMR) categories and contains the following:

- A. Copy of the report.
- B. Notes from site visits.
- D. Site photographs - catalogue, colour slides, B/W contact sheets.
- G. Documentary data, including primary and published sources.
- I. Draft copies of report.
- J. Publication drawings.
- M. Miscellaneous correspondence

There is no material for classes C, E, F, H, K, L and N.

The project archive is currently held by Cambria Archaeology Field Operations, Llandeilo, Carmarthenshire as project number 44698.

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APRIL 2002

This report has been prepared by Nigel Page

Position Project Manager

Signature Date

This report has been checked and approved by Gwilym Hughes on behalf of Cambria
Archaeology, Dyfed Archaeological Trust Ltd.

Position Director

Signature Date.....

As part of our desire to provide a quality service we would welcome any comments you may have
on the content or presentation of this report