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**NICKLAUS AVENUE, MACHYNYS, LLANELLI
ARCHAEOLOGICAL DESK-BASED ASSESSMENT**



Prepared
by
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for
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CONTENTS	PAGE
Summary	1
Introduction	2
The study area	3
The archaeological resource	7
Potential impacts of the proposed development	9
Recommendations	10
Sources	11
Figure 1: Location plan	3
Figure 2: Location of palaeoenvironmental sample	6

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SUMMARY

Proposals by Machynys Homes for a new residential development and associated flood attenuation works at Machynys, Llanelli, required an archaeological desk-based assessment to form part of an Environmental Impact Assessment (EIA) of the proposed development. Powell Dobson Architects, acting on behalf of Machynys Homes, commissioned Cambria Archaeology Field Services to carry out the archaeological component of the EIA in January 2007.

Machynys lies on the northern shore of the Loughor Estuary in an area of reclaimed coastal wetlands. Reclamation of the area was piecemeal, starting in the medieval period and completed in 1808-09 when the Great Embankment was constructed. The proposed development site lies within an area enclosed by the Great Embankment and was until that time saltmarsh.

Palaeoenvironmental sampling carried out in 2000 has revealed much about the development history of this part of the Llanelli Marshes. It revealed how fluctuations in the overall rate of post-glacial sea level rise led to significantly drier periods in the Neolithic and Bronze Age periods, before once again rising sea level created the saltmarshes that are typical of the region today.

Despite the rapid industrialisation of the area and the expansion of the town in the 19th century the proposed development site was never developed.

Recent large-scale remodelling of the Llanelli coastline has had a significant impact on the proposed development site, with much of the area affected by the construction of the golf course. Very little survives of the earlier landscapes and no further archaeological works are considered necessary within the area of the residential development. Flood attenuation works along the rear of the Great Embankment, including the insertion of a new outfall to the Loughor may require a watching brief.

A programme of sampling may be desirable to assess the current condition of the buried deposits across the site.

1.INTRODUCTION

Project proposals and commission

Machynys Homes are developing proposals for a new residential development, with associated flood attenuation works at Machynys, Llanelli. Machynys lies on the northern shore of the Loughor Estuary in an area of reclaimed coastal wetlands. The potential of the archaeological resource and the likely impacts of the proposed development upon that resource are a material consideration in the determination of any planning application. Therefore, this archaeological desk-based assessment was required to form part of an Environmental Impact Assessment (EIA) of the proposed development. The scheme architects, Powell Dobson Architects, acting on behalf of Machynys Homes, commissioned Cambria Archaeology Field Services to carry out the archaeological component of the EIA in January 2007.

Scope of the project

This assessment was designed to provide enough information to identify the potential archaeological resource within the proposed development area and the likely impacts of the proposed development on that resource. Recommendations for further work or mitigation measures have been given where appropriate.

The assessment was a non-intrusive process and consisted of the examination of a wide variety of source material held at a number of local, regional and national repositories.

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.

Abbreviations used in this report

All sites recorded on the county Historic Environment Record (HER) 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 cartographic and documentary evidence and published sources will be given in brackets throughout the text, with full details listed in the sources section at the rear of the report.

2. THE STUDY AREA

The proposed development site occupies c.26ha (64.5 acres) of reclaimed salt marsh on the southern edge of Llanelli at NGR SS51899863 (Fig 1). The site is bounded on its north side by the new Morfa – Berwig Link Road and on its southern side by Machynys Golf Course (Fig 2). The site also includes a linear strip along the back of part of the Great Embankment, which will lead to a new outfall to the Loughor (Fig. 2). The site is currently semi-cleared open ground with rough grass cover, crossed by several watercourses and drains.

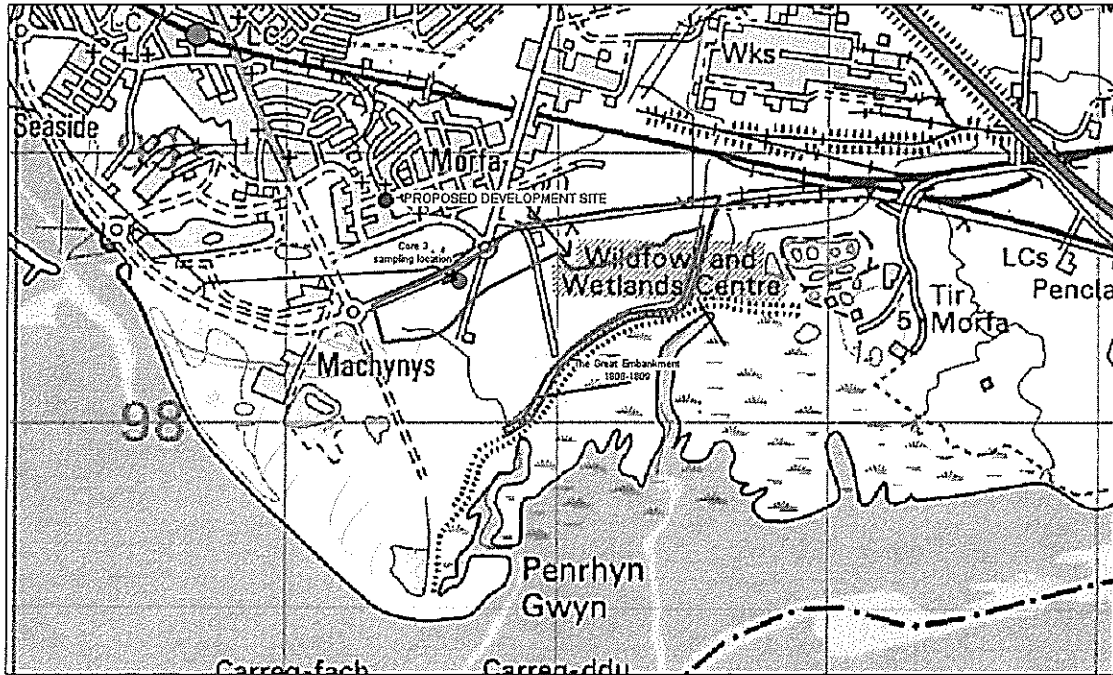


Figure 1: Location of proposed development site. Reproduced from Landranger® 1:50000 scale by permission of Ordnance Survey® on behalf of The Controller of Her Majesty's Stationery Office. © Crown copyright 1999. All rights reserved. Licence number AL 100020930.

Wetland landscapes

The importance of wetlands as areas of high archaeological potential has been recognised since the mid-19th century. Since that time, work in wetland areas – coastal or otherwise – has produced a number of important archaeological finds, sites and even entire landscapes preserved within the unique wetland conditions.

There is little doubt that the principal archaeological importance of wetlands is the survival of forms of evidence not normally recoverable from dry sites, namely organic materials such as wood, plant remains, leather and textiles. Furthermore, the matrix within which this material is found also has archaeological potential as it can contain palaeoenvironmental evidence, including pollen, plant and insect remains, which can provide information about past landscapes and climates. This provides a wider study base for the investigation of wetland sites than is possible on comparative dry land sites, giving a more integrated and fuller understanding of past activity.

Previous work carried out on the coastal wetlands around Llanelli has outlined their development history and highlighted their archaeological potential (James 1993; James and Morgan 1994; Page 1997; Page 1999; Page 2000; Lillie *et al* 2000; Lillie *et al* 2003; Page 2006a, 2006b).

Development within wetland landscapes

New building involves a range of processes that have immediate and very obvious archaeological implications. The main processes are:

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

To these can be added the further implications of construction in a wetland environment, which include:

1. Changes to the drainage pattern in the development site affecting the local water table, which can lead to the drying out of waterlogged deposits across a wide area
2. The introduction of oxygen into an anaerobic environment leading to the loss of organic material
3. Pollution and chemical changes affecting buried waterlogged deposits
4. Compression of the underlying deposits

The massive changes to the drainage patterns of the Machynys area effected through construction of the golf course and proposed as part of this development could have significant implications for the buried deposits across the site.

Landscape development within the study area

The coastal wetlands of Llanelli are a dynamic and constantly changing environment that have been shaped by natural processes, such as rising sea levels and the changing course of the River Loughor, and human actions, which have included the reclamation of large areas of former saltmarsh. The proposed Nicklaus Avenue site lies within such an area of reclaimed saltmarsh. Mapping and aerial photography clearly show the pattern of former tidal creeks and watercourses fossilised in the irregular field boundaries in this area, which survived until the large-scale remodelling of the landscape associated with the construction of the golf course.

Traces of much earlier landscapes are present on the foreshore in the intertidal zone c.2.5km to the east of the study area, where remnants of a submerged forest are often visible at low tide. A radiocarbon date of 4190 ± 80 BP (Swan-238) was obtained from a sample of peat from the submerged forest (Page 1997, 8), which calibrates out at 2 sigma level (95% confidence) to 2921-2475 cal BC. This suggests that during the Neolithic period the north bank of the Loughor estuary was well wooded, with the woodland in some places probably extending close to the water line.

However, results from palaeoenvironmental sampling at Machynys, including samples taken from within the development boundary (Fig. 2), did not identify a submerged forest deposit in this area (Lillie *et al* 2000; Lillie *et al* 2003). The lack of a similar submerged forest at Machynys may be explained if there were different environmental regimes on either side of the Dafen river, which used to flow into the Loughor on the east side of Machynys prior to its canalisation in the early 19th century.

On the other hand, as noted by Lillie *et al* (2003, 56) the Machynys samples did identify 'two phases of positive sea-level tendency... during which saltmarsh/saline reedswamp persisted' either side of an episode of major negative sea-level trend. This resulted in the terrestrialisation of the saltmarsh and eventually led to the development of raised bog conditions at this location during the Neolithic and Bronze Age periods (Lillie *et al* 2003, 56).

The presence of the submerged forest deposit and the development of the peat at Machynys show that the slowing in the rate of sea level rise during the Neolithic and Bronze Age periods led to an expansion of dry land and near dry land conditions that would have increased the availability of resources across the estuary. Subsequent sea level rise submerged this land and led to the creation of the extensive saltmarsh deposits that are still present on either side of the Loughor, which are thought to be the second largest area of saltmarsh in Britain, containing over 2000 hectares (Smith and Yonnow 1995, 38; Burd 1989, 151).

Estuaries are amongst the most fertile and productive ecosystems in the world (Davidson 1991, 2) and the wide range of resources available within a fairly small area has always made them attractive to people. Early exploitation would have been by hunter-gatherer-fishers taking advantage of the seasonally available resources such as new plant growth, shellfish, fish and wild fowl and probably dates to as early as the Mesolithic period, c.7000 years ago. Later, as farming became widely established the coastal marshes provided rich grazing lands between tides, as well as still affording a rich variety of wild foods. However, without some form of intervention access to the wetlands was at best seasonal, sometimes impossible, but frequently uncontrollable. Therefore, sea walls were constructed and the enclosed land drained to provide a permanent and productive landscape (Page 1997, 1).

Reclamation of the saltmarshes in this area began in the medieval period with sea banks erected at Maes ar Dafen, a short distance to the north, to control the tidal reach of the Afon Dafen. Embankment in the Machynys region may also have medieval origins, but it was the later post-medieval and early modern periods that saw the main episodes of embankment. An estate map of Machynys produced in 1761 (CRO ref, Stepney Mapbook) shows that the pre-golf course layout of fields had been established by the mid-18th century. The map also showed that the Machynys peninsula had been enclosed on its south and east sides, with two separate phases of embankment. The southern sections of these banks have been incorporated into the modern sea defences. Embankment of the area was finally completed with the construction of the Great Embankment in 1808-09 (Page 1997, 11), which still forms the major component of the sea defences in the area.

The present landscape retains very few elements that show the characteristics of coastal wetlands reclaimed over a long period of time, with irregular fields separated by sinuous watercourses. The sinuous nature of the watercourses are typical of former tidal creeks that have been incorporated into the reclaimed areas to provide the drainage necessary to ensure that the newly enclosed land does not flood. The extent of the remodelling of the Machynys region has isolated a few remaining traces of the earlier landscape within the development site.

There is little doubt that one of the most important factors in the shaping of the Llanelli landscape was the extraction and transportation of coal. Without it, it is unlikely that the town of Llanelli, or many of the other settlements in the area, would have developed to any great extent. By the mid-19th century Llanelli was the third largest South Wales port for the export of coal, behind Swansea and Neath (Morris and Williams 1958, 95). Without coal it is extremely unlikely that

3.THE ARCHAEOLOGICAL RESOURCE

The known archaeological resource

The only known archaeological feature within the proposed development site was the line of the former Llanelli and Llandeilo Railway, which has now been built over by the new Morfa-Berwig Link Road.

The Llanelli and Llandeilo Railway

The Llanelli and Llandeilo Railway was constructed by the Llanelli Rail Railway and Dock Company in 1833 to service the ever expanding New Dock. In 1835 a third Act of Parliament was passed that authorised the financing for the construction of 32km of additional line to Llandeilo to allow anthracite and other minerals to be brought down and exported from New Dock (Craig *et al* 2002, 60). Use of the line decreased with the decline of the coal and metal processing industrial in Llanelli and the line was closed in the early to mid-20th century.

Part of its former line forms the northern boundary of the proposed development site. This section has now been built over by the new Morfa-Berwig Link Road. Prior to the construction of the road the line of the railway survived as a grassed track.

The buried archaeological resource

A programme of hand-augering and percussion borehole sampling was undertaken in 2000 in advance of golf course construction (Lillie *et al* 2000; Lillie *et al* 2003). This included a hand-auger sample (Core 3) from within the proposed development boundary at NGR SN 51639852 (Fig. 2). The main results from the sampling have been summarised above (see Section 2) and this discussion will be based on the results of the two above reports and focus in greater detail the results from sample Core 3.

The core extended from c.2.8m Above Ordnance Datum (AOD) to c.-3.3m OD, a total depth of c.6.1m. The core was stopped by the presence of sandstone at its base. It is not clear whether the sandstone was part of the underlying bedrock, or a stray boulder within the alluvial deposits of the enlarged Loughor Estuary. From the sandstone to a depth of c.-0.8m OD were intercalated peaty deposits and silty clay. These probably reflect periods of regressive, or negative, sea-level tendencies that were part of an overall slowing in the rate of sea-level rise that eventually led to the formation of the main peat layer¹ during the Neolithic and Bronze Age periods. The same sequence of intercalated peaty deposits and silty clay was recorded in all three hand-auger samples indicating that the same processes were taking place across the Machynys area.

Palynological analysis of the main peat unit revealed a sequence of development from fencarr through open grassland communities, with fluctuations in sea-level tendency indicated by occasional evidence for saltmarsh plants and increased wetness by wet meadow species. This was followed by the development of ombrotrophic bog. The presence of ombrotrophic bog, which is entirely fed by rainwater, indicated that at Machynys the bog had become separated from the water table, presumably by a lowering of sea level.

Subsequent sea-level rise saw the return of estuarine conditions, which was indicated by the ostracod and foraminifera evidence and supported by the diatom

¹ In Core 3 this lay between c.-0.8m OD and -0.1m.

analysis that suggested intertidal mudflats (Lillie *et al* 2003, 56). These conditions remained on the site until the land was enclosed and drained in the early 19th century.

The current condition of the below ground deposits is unknown. It is not certain how much affect the massive remodelling of the landscape has had on the buried deposits and the environmental information they contain.

4. POTENTIAL IMPACTS OF THE PROPOSED DEVELOPMENT

The proposed residential development area of the site lies within a landscape that has a long history of use, adaptation and change. However, modern changes have removed nearly all the surface traces of the former landscapes.

Therefore, it is considered that the residential development will have little or no archaeological impact on surface features.

There is no contemporary data on the condition of the buried deposits and the palaeoenvironmental evidence they contain. It is therefore impossible to predict the impact of the development on the buried deposits without more up to date information.

The flood attenuation works along the rear of the Great Embankment will raise the height of the right bank of the Afon Dafen and require a new outfall through the Great Embankment. This will require excavation through the Great Embankment, which will inevitably affect its structure.

5. RECOMMENDATIONS

The massive changes that have occurred within and around the proposed development site precludes the need for further archaeological works with regard to any surface features within the area of the residential development.

The insertion of a new outfall through the Great Embankment may require a watching brief to record any structures or deposits exposed during the course of the works. This will be dependent upon the proposed construction methods and the exact location of the new outfall.

A new programme of sampling could be undertaken to test the current condition of the underlying deposits.

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