

PROPOSED ECO-PARK & RESIDENTIAL DEVELOPMENT, MACHYNYS MOUND, LLANELLI: ARCHAEOLOGICAL DESK-BASED & IMPACT ASSESSMENT UPDATE 2013



Prepared by Dyfed Archaeological Trust
For: Arup / Carmarthenshire County
Council



ymddiriedolaeth archaeolegol
DYFED
archaeological trust

DYFED ARCHAEOLOGICAL TRUST

RHIF YR ADRODDIAD / REPORT NO. 2013/10
RHIF Y DIGWILLIAD / EVENT RECORD NO. 105379

Mai 2013
May 2013

PROPOSED ECO-PARK & RESIDENTIAL DEVELOPMENT, MACHYNYS MOUND, LLANELLI: ARCHAEOLOGICAL DESK-BASED & IMPACT ASSESSMENT UPDATE 2013

Gan / By

Phil Poucher
and James Meek

Paratowyd yr adroddiad yma at ddefnydd y cwsmer yn unig. Ni dderbynnir cyfrifoldeb gan Ymddiriedolaeth Archaeolegol Dyfed Cyf am ei ddefnyddio gan unrhyw berson na phersonau eraill a fydd yn ei ddarllen neu ddibynnu ar y gwybodaeth y mae'n ei gynnwys

The report has been prepared for the specific use of the client. Dyfed Archaeological Trust Limited can accept no responsibility for its use by any other person or persons who may read it or rely on the information it contains.



Ymddiriedolaeth Archaeolegol Dyfed Cyf
Neuadd y Sir, Stryd Caerfyrddin, Llandeilo, Sir
Gaerfyrddin SA19 6AF
Ffon: Ymholiadau Cyffredinol 01558 823121
Adran Rheoli Treftadaeth 01558 823131
Ffacs: 01558 823133
Ebost: info@dyfedarchaeology.org.uk
Gwefan: www.archaeolegdyfed.org.uk

Dyfed Archaeological Trust Limited
The Shire Hall, Carmarthen Street, Llandeilo,
Carmarthenshire SA19 6AF
Tel: General Enquiries 01558 823121
Heritage Management Section 01558 823131
Fax: 01558 823133
Email: info@dyfedarchaeology.org.uk
Website: www.dyfedarchaeology.org.uk

*Cwmni cyfyngedig (1198990) ynghyd ag elusen gofrestredig (504616) yw'r Ymddiriedolaeth.
The Trust is both a Limited Company (No. 1198990) and a Registered Charity (No. 504616)*
CADEIRYDD CHAIRMAN: PROF. B. C. BURNHAM
CYFARWYDDWR DIRECTOR: K MURPHY BA MIFA

**PROPOSED ECO-PARK & RESIDENTIAL DEVELOPMENT,
MACHYNYS MOUND, LLANELLI:
ARCHAEOLOGICAL DESK-BASED & IMPACT ASSESSMENT UPDATE 2013**

CONTENTS	PAGE
SUMMARY	1
1. INTRODUCTION	2
1.1 Project Proposals and Commission	2
1.2 Scope of the project	2
1.3 Abbreviations used in this report	3
1.4 Illustrations	3
1.5 Timeline	3
2. SITE LOCATION AND TOPOGRAPHY	4
3. ARCHAEOLOGICAL AND HISTORICAL BACKGROUND	10
3.1 Designated Sites and Listed Buildings	10
3.2 Known Archaeological Remains	10
3.3 Historical Development	13
3.4 Site Visit	30
3.5 Previous Archaeological Work	34
4. IMPACT ASSESSMENT	36
4.1 Previous Impacts	36
4.2 Potential Impacts from Development	37
5. ASSESSMENT OF ARCHAEOLOGICAL POTENTIAL AND IMPORTANCE	43
6. MITIGATION	45
7. SOURCES	47

FIGURES

Figure 1:	Location map based on the Ordnance Survey	5
Figure 2:	Site location plan for the proposed Eco-Park	6
Figure 3:	Site location plan for the proposed residential development	7
Figure 4:	Detailed map of the proposed Eco-Park layout	8
Figure 5:	Detailed map of the proposed residential development layout	9
Figure 6:	Extract from Saxton's map of 1578	13
Figure 7:	Extract from the <i>Chart</i> by Murdock Mackenzie, 1775	14
Figure 8:	Extract from a chart by William Jones of Loughor, 1757	18
Figure 9:	Details of representations of the house at Machynys 1757 and 1775	23
Figure 10:	Extract from the 1880 OS map overlaid with PRNs	27
Figure 11:	Extract from the 1907 OS map overlaid with PRNs	28
Figure 12:	Extract from the 1916 OS map overlaid with PRNs	29

Figure 13:	Eco-Park development proposal plan overlaid with former buildings shown on 1916 Ordnance Survey Map	41
Figure 14:	Illustrative Masterplan of residential development area showing features from 1916 and 1880 Ordnance Survey maps	42

TABLES

Table 1:	Archaeological and Historical Timeline for Wales	3
Table 2:	Sites recorded in the regional HER and national NMR	11

PHOTOGRAPHS

Photo 1:	Western façade of Machynys Farm c.1970	19
Photo 2:	Eastern facade of Machynys Farm c.1970	20
Photo 3:	Southern facade of Machynys Farm c.1970	21
Photo 4:	Northern facade of Machynys Farm c.1970	22
Photo 5:	Southern façade of Machynys farmhouse taken in the 1960s	24
Photo 6:	Machynys farmhouse and farm buildings from east	26
Photo 7:	General view of garden walls associated with Machynys House	30
Photo 8:	Section of walling associated with the garden walls visible amongst the scrub.	31
Photo 9:	Further section of garden/enclosure wall	31
Photo 10:	One of the highest sections of surviving walling associated with Machynys House	32
Photo 11:	A segment of mortared building wall	32
Photo 12:	General view of Machynys Mound viewed from the Delta Lakes roundabout	33
Photo 13:	General view across the southern end of the site with the golfcourse beyond	33

PROPOSED ECO-PARK & RESIDENTIAL DEVELOPMENT, MACHYNYS MOUND, LLANELLI:

ARCHAEOLOGICAL DESK-BASED & IMPACT ASSESSMENT UPDATE 2013

SUMMARY

An Eco-Park and Residential Development have been proposed on Machynys Mound, Llanelli, Carmarthenshire (SS 5087 9823). Several archaeological studies have been undertaken on Machynys, including a Desk-Based Assessment and partial archaeological evaluation looking at previous development proposals across the current study area. These were undertaken in 2006/7 and it was determined that an updated desk-based assessment should be undertaken specifically examining the potential impact of the current development proposals upon the archaeological resource. Consequently Arup commissioned Dyfed Archaeological Trust – Field Services to undertake the archaeological desk-based and impact assessment in November 2012.

The assessment has identified a total of fifteen recorded sites of archaeological and historic interest within the study area. These sites consist of a potential early-medieval monastic settlement, a medieval and post-medieval house and farmstead with surrounding field system, and late post-medieval and early modern industrial activity and associated settlement.

No designated sites will be affected by the proposed development and it is not considered to have a significant impact on the current archaeological and historic landscape setting.

Of the remaining non-designated sites, seven may be affected by the proposed works, five in the area of the proposed Eco-Park, and two in the area of the proposed residential development. Within the Eco-Park the proposed works have the potential to expose, damage or destroy below-ground remains of late post-medieval/early modern terraced housing (PRNs 34013 & 34014) and an associated Chapel (PRN 34017), as well as an industrial reservoir (PRN 34018). Nothing remains of these sites above ground, and if any remains exist below-ground they would be considered to be of local archaeological significance. As such it is recommended that an archaeological watching brief would be sufficient to record any archaeological features or deposits associated with these sites.

The proposed works also involve outlining the remains of Machynys House (PRN 6995) to create a feature marking out the building footprint and clearing vegetation from and repairing associated upstanding garden walls. There is considered to be high potential for the survival of below-ground archaeological remains of this site, which is considered to be of regional archaeological importance. Therefore it is recommended that an archaeological watching brief be undertaken on any ground-breaking activity in and around this site. It is also suggested that this site would be an ideal candidate for a community archaeological excavation in order to engage the local community in the history and archaeology of their area.

The proposed residential development has the potential to expose, damage or destroy below-ground remains of a 19th century brickworks (PRN 31423), potentially of regional archaeological importance, and an early 20th century tinplate works (PRN 30709), considered to be of local archaeological importance. It is recommended that an archaeological watching brief would be sufficient to record any archaeological features or deposits associated with these sites.

There is the potential for peat deposits containing palaeo-environmental remains to exist that could be exposed by the proposed groundworks. However, in this particular area the palaeo-environmental potential of these deposits is considered to be low due to previous disturbances.

1. INTRODUCTION

1.1 Project Proposals and Commission

1.1.1 An Eco-Park and residential development have been proposed at Machynys Mound, Llanelli, Carmarthenshire (NGR SS 5087 9823, Figure 1). The development proposals include the landscaping and establishment of the Eco-Park on the majority of the development site with residential housing proposed for the eastern edge of the area. Several archaeological studies have been undertaken ahead of proposed developments on Machynys, but an updated study was required, and one that assessed the specific impacts of this proposed development.

1.1.2 Arup commissioned Dyfed Archaeological Trust Field Services (DAT-FS) to undertake an archaeological desk-based and impact assessment update on the proposed development in November 2012. The work was started in February 2013 following meetings with the Carmarthenshire County Council (the developers).

1.1.3 The aim of the assessment is to update and clarify the known archaeological resource in the application area and to predict the effect of the proposed development upon it. In areas where the archaeological resource cannot be determined using current information, it will indicate the requirements for further investigation.

1.2 Scope of the project

1.2.1 The assessment comprised the examination and collation of available sources of information including:

- Information on known archaeological and historic sites recorded on the regional Historic Environment Record¹ (HER), including a search of available cartographic and pictorial sources, published and unpublished works, aerial photographs and any relevant web-based information;
- Relevant information held by the Royal Commission on Ancient and Historic Monuments in Wales (RCAHMW) via the COFLEIN online computer database and information on Conservation Areas or Historic Landscape Areas within or in the vicinity of the site area from information held by Dyfed Archaeological Trust and CCW;
- A search of Cadw's Listed Building records and Schedule of Ancient Monuments for designated buildings and sites of archaeological and historical importance lying on or in close proximity to the site;
- A site visit to determine the presence or absence of visible archaeology or evidence for previous ground disturbance within the proposed development area.

1.2.2 The results of the assessment contained in this report are intended to identify the extent and character of the known and potential archaeological resource, to assess the likely and potential impacts of any development on that resource and, if required, to outline a possible programme of further works to mitigate those impacts. The assessment should be seen only as the first stage of the archaeological process and does not preclude the possibility that further archaeological input may be required prior to, or during, any proposed development.

¹ Held and managed by Dyfed Archaeological Trust, Carmarthen Street, Llandeilo, Carmarthenshire SA19 6AF.

1.3 Abbreviations used in this report

1.3.1 All sites recorded on the regional HER are identified by their Primary Record Number (PRN) and located by their National Grid Reference (NGR). Sites recorded by the Royal Commission on the Ancient and Historic Monuments of Wales (RCAHMW) are identified by their National Primary Record Number (NPRN). Altitude is expressed to Ordnance Datum (OD). Pembrokeshire County Council (PCC). Dyfed Archaeological Trust Field Services (DAT-FS).

1.4 Illustrations

1.4.1 Photographic images and printed map extracts are to be found throughout the report. Note that the printed map extracts are not necessarily reproduced to their original scale and are illustrative only.

1.5 Timeline

1.5.1 The following timeline is used within this report to give date ranges for the various archaeological periods that may be mentioned within the text (Table 1).

Period	Approximate date	
Palaeolithic –	c.450,000 – 10,000 BC	Prehistoric
Mesolithic –	c. 10,000 – 4400 BC	
Neolithic –	c.4400 – 2300 BC	
Bronze Age –	c.2300 – 700 BC	
Iron Age –	c.700 BC – AD 43	
Roman (Romano-British) Period –	AD 43 – c. AD 410	Historic
Post-Roman / Early Medieval Period –	c. AD 410 – AD 1086	
Medieval Period –	1086 – 1536	
Post-Medieval Period ² –	1536 – 1750	
Industrial Period –	1750 – 1899	
Modern –	20th century onwards	

Table 1: Archaeological and Historical Timeline for Wales

² The post-medieval and industrial periods are combined as the post-medieval period on the Regional Historic Environment Record as held by Dyfed Archaeological Trust

2. SITE LOCATION AND TOPOGRAPHY

2.1 Machynys is situated to the south of Llanelli in Carmarthenshire (SS 5087 9823, Figure 1), consisting of a former island surrounded by reclaimed marshland on the northern edge of the Loughor Estuary. Machynys mound itself is the slightly raised area and presumably historically relatively dry land surrounded by an extensive system of coastal wetlands that stretch for some distance along the edge of the Loughor estuary.

2.2 The site itself is now located on the south side of the B4304 Coastal Link Road, adjacent to the roundabout serving the Delta Lakes and Pentre Nicklaus Village. The B4304 bounds the northern edge of the site and Pentre Nicklaus Village is located to the south. Pentre Nicklaus is a relatively new development, as is the Machynys golfcourse that now occupies much of the former reclaimed marshland to the southeast.

2.3 The proposed development site was formerly a site of heavy industry mixed with some settlement and a farmstead. This was largely cleared from the area in the 1960s and 1970s leaving a brown field site with areas of dense scrub and grassland and a few standing remains associated with the former farmstead. The majority of the site is raised to approximately 12m above sea level to a maximum height of 16m.

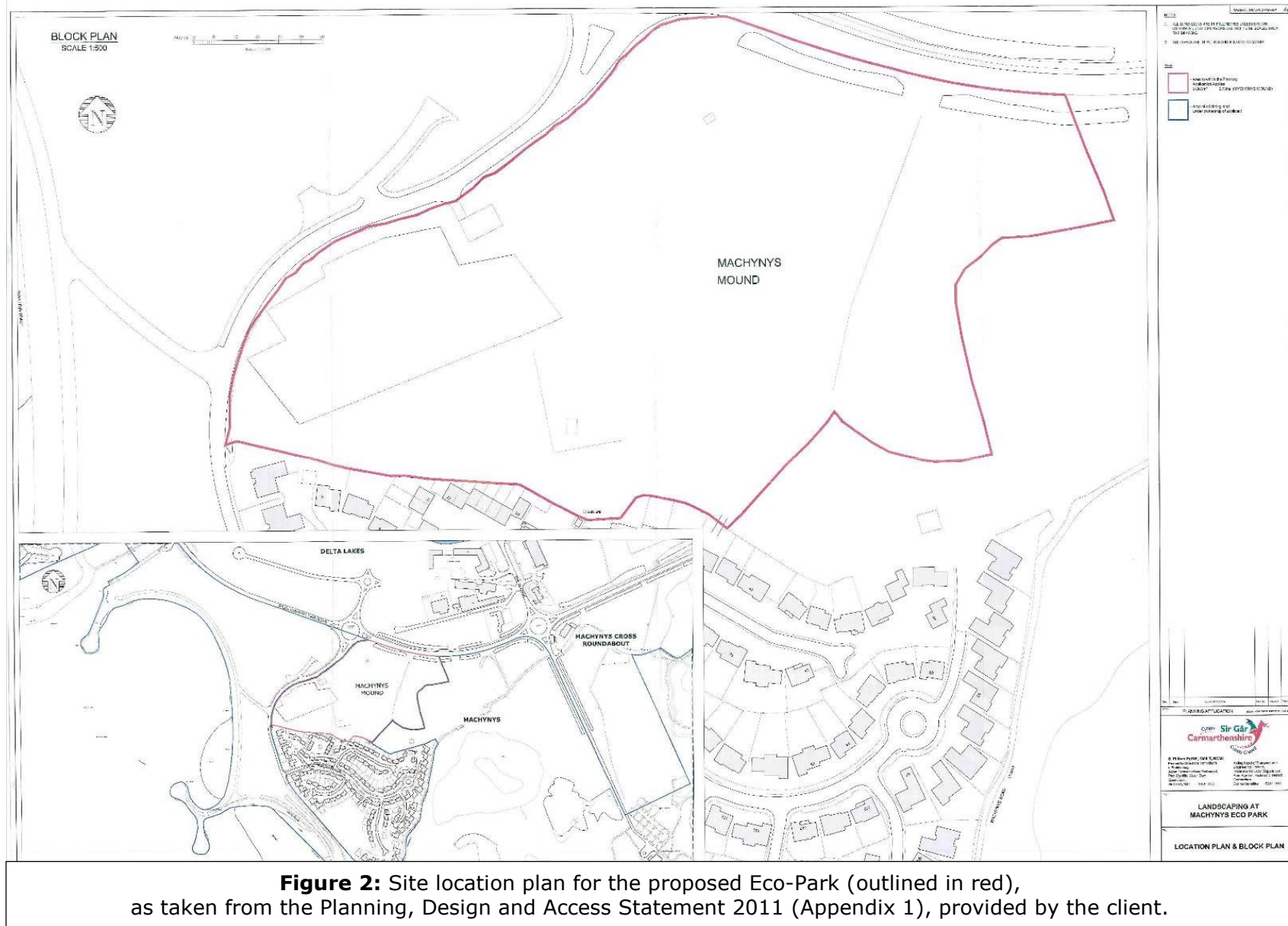
2.4 The underlying geology of the area consists of Pennant Shales, with coal and sandstones of the Upper Carboniferous Period. Machynys was formed as a moraine of glacial till deposited by the retreating ice sheets at the end of the last glaciation, 10000 – 12000 years ago. A thick deposit of peat began to form around this higher ground during the Neolithic and Bronze Age periods, now topped by a thick band of alluvial clays.

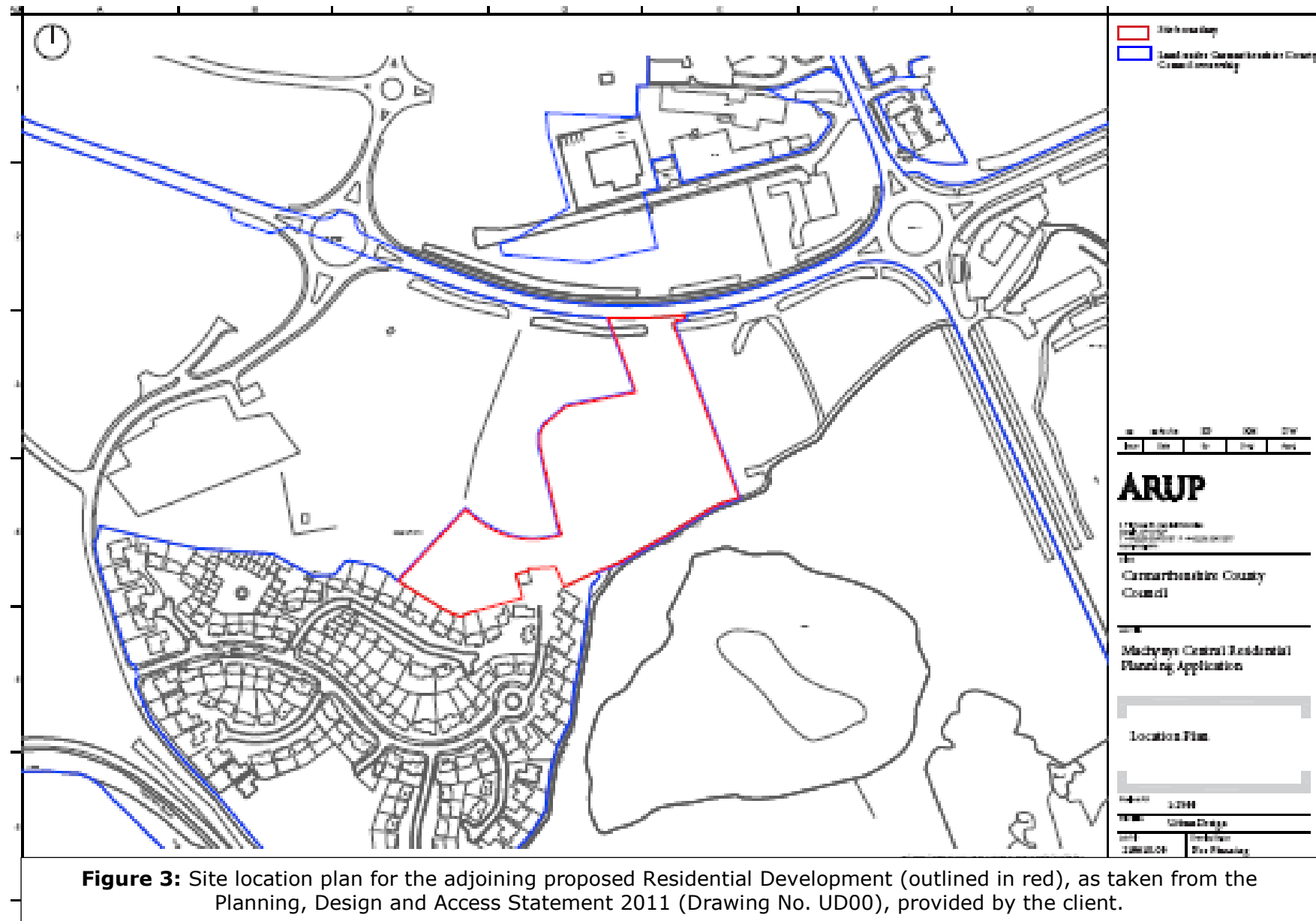
2.5 The proposed development consist of two adjoining areas. The largest, the proposed Eco-Park, comprises an area of 5.73ha (Figure 2), with a smaller area of 2.4ha (Figure 3) on its eastern side for proposed residential development.



Figure 1: Location map (site of Machynys Farm shown as red dot) based on the Ordnance Survey.

Reproduced from the 1987 Ordnance Survey 1:50,000 scale Landranger Map with the permission of The Controller of Her Majesty's Stationery Office, © Crown Copyright Dyfed Archaeological Trust, The Shire Hall, Carmarthen Street, Llandeilo, Carmarthenshire SA19 6AF. Licence No AL51842A





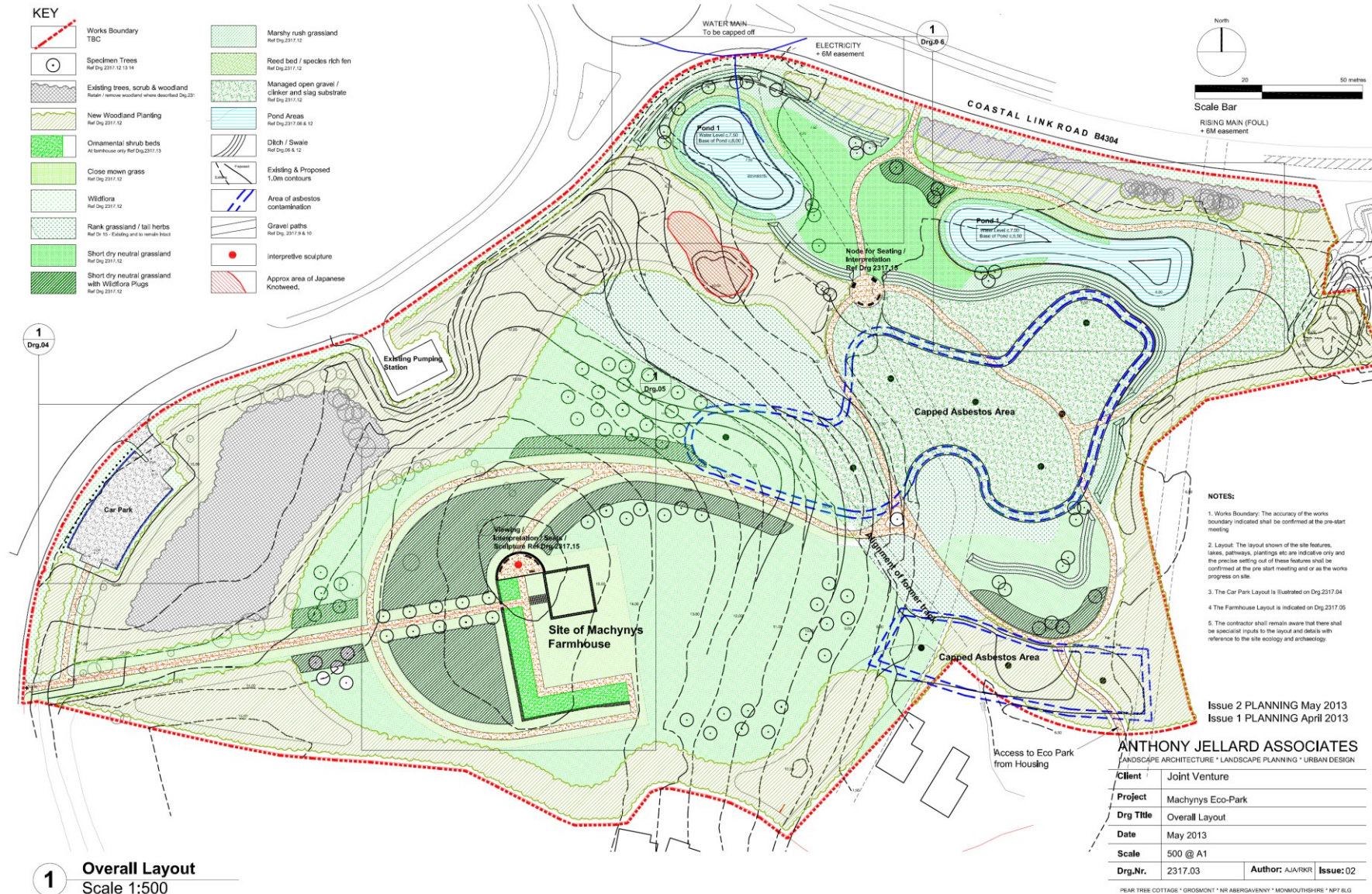


Figure 4: Detailed map of the layout of the proposed Eco-Park, showing proposed landscape profile, planting, pathways, car park and site of Machynys House provided by ARUP on behalf of the client



Figure 5: Detailed map of the Illustrative Masterplan of the proposed Residential development, showing the locations of buildings, play area and possible pumping station. Provided by ARUP

3. ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

3.1 Designated Sites and Listed Buildings

3.1.1 No scheduled ancient monuments (SAMs) or listed building lie within the boundaries of the proposed development site.

3.1.2 The site does not lie within any registered Historic Landscape Character Areas.

3.2 Known Archaeological Remains

3.2.1 A search of the Regional Historic Environment Record database revealed a total of fifteen known archaeological sites that lie within, or potentially within the proposed development boundaries. They range in date from the suggested location of a possible early-medieval monastic settlement to industrial and settlement activity of the late post-medieval and early modern periods. The majority of the sites are connected with this latter stage of development.

3.2.2 The individual sites are listed and briefly described in Table 2. The majority of these late post-medieval and early modern sites have been identified from historic map sources, and their locations, layouts and extents can be seen on Figures 10 - 12.

3.2.3 A search of the same study area was undertaken of the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) National Monument Record (NMR). This search returned four sites, these comprise the Burry Extension Works, Joppa Chapel, Machynys House and the South Wales Steel and Tinplate Works, all of which are also recorded on the HER. The NPRNs of these sites are referenced in the same table (Table 2) as the sites recorded in the HER.

Table 2: Sites recorded in the regional HER (PRN), sites that are also recorded in the NMR are further referenced by their NPRNs.

PRN	Name	Site Type	Period	Grid reference	Brief Description
6995 NPRN 17536	Machynys House; Machynys Farm	Dwelling	Post-Medieval; Medieval	SS 5078 9822	The site of a post-medieval farmhouse. The house is believed to date from the late 16 th or early 17 th century when it may have been a mansion house, but may have earlier, medieval, origins. By the 19 th century it was operating as a farmhouse with associated outbuildings, farm buildings and gardens. Photographs exist of the farmhouse, which may be a later rebuild but incorporating elements of earlier phases. The building was demolished in the later 20 th century.
11756	Machynys	Ecclesiastical Establishment	Early Medieval	SS 510 979	A possible Early Medieval monastic site. Machynys may be the 'terra Machinis' mentioned in a land-grant of c.735, recorded in the 'Llandaff Charters', although there is no direct evidence that an ecclesiastical establishment was founded on the site. Samuel Lewis's 1833 account of the site as a 'monastery' is a misidentification with Caldey Island, Pembrokeshire. Later medieval occupation appears to have been secular, probably occupying the same site as Machynys House, which formerly stood upon a slight knoll within an area of saltmarsh.
25373	Machynys	Dwelling	Post-Medieval; Medieval	SS 5078 9822	A duplicate of PRN 6995
30708 NPRN 40408	South Wales Steel & Tinplate Works; Morewood's	Tinplate Works	Post-Medieval; Modern	SS 5082 9858	An iron and tinplate works, opened in 1872. It became the first integrated steel and tinplate works in 1879. Closed in 1958. It largely lay outside the area of development (to the north), although four steel furnaces were added to the site in the late 1910's/early 1920s which extended into the development area to the west of Machynys House
30709 NPRN 404317	Burry Tinplate Works	Tinplate Works	Post-Medieval; Modern	SS 509 983	A tinplate works opened in 1875. The main buildings lay largely to the north of the development area, although the forge lay within the development area. In 1911 the site was greatly extended southwards, as the Burry Extension Works, across the site of the former brickworks PRN 31423. During WWII it was requisitioned by the Admiralty and also made tank armour. Ceased tinplate work in 1966, and the area of the Extension Works was subdivided and used by various occupiers, including for engineering and storage. Believed to have been demolished in the 1970s.
31423	Machynys	Brickworks	Post-Medieval	SS 5104 9824	A brickworks established in the mid 19 th century, manufacturing building bricks, tiles and pipes using clay from several pits dotted around the works. It lies adjacent to, but was under separate ownership to another Machynys Brickworks PRN 9037 to the northeast. It closed in 1880, the 2 nd edition Ordnance Survey map of 1907 shows the site had been cleared by that point, and was subsequently redeveloped as the Burry Extension Works PRN 30709.

PRN	Name	Site Type	Period	Grid reference	Brief Description
31424	Machynys Mission Room	Mission Hall	Post-Medieval; Modern	SS 5078 9831	Mission room, built at some point between 1880 (the 1 st edition OS map) and 1907 (the 2 nd edition OS map) next door (to the west) of the school (PRN 34016). Still operating as a mission room in 1916, the building appears to have been demolished in the late 1960s/early 1970s.
34013	Brick Row, Machynys	Terrace	Post-Medieval; Modern	SS 5081 9835	Brick Row comprised two terrace rows of six residential buildings in each row, as depicted on the 1 st Edition OS map (1880). By the 2 nd Edition OS map (1907) the northern terraced row was demolished to make way for the expansion of the South Wales Works PRN 30708. The southern row (which extended into the development area) was demolished in the later 20 th century.
34014	Cliff Terrace, Machynys	Terrace	Post-Medieval; Modern	SS 5072 9827	Terraced row comprising six residential houses identified from the 1 st Edition OS map (1880). By the time of the 2 nd edition OS map (1907) the row had been extended by the addition of a Mission Hall (PRN 31424), School (PRN 34016) and Chapel (PRN 34017). The entire row was demolished in the later 20 th century.
34015	Bay View Terrace, Machynys	Terrace	Post-Medieval; Modern	SS 5076 9834	Terraced row comprising twenty residential houses just south of the South Wales Works, built at some point between the 1 st edition OS map (1880) and the 2 nd Edition OS map (1907). This row was demolished in the later 20 th century. Only the easternmost building lay within the bounds of the development area.
34016	Machynys School	School	Post-Medieval; Modern	SS 5078 9828	A school opened on Cliff Terrace, Machynys in 1894. It was bought by the owner of the nearby steelworks in 1916 and converted into offices. Demolished in the later 20 th century.
34017 NPRN 6446	Capel Joppa	Chapel	Post-Medieval; Modern	SS 5083 9830	A Calvinistic Methodist Chapel. It appears to have been built as a Sunday School in 1879. It was apparently closed in 1918 although it is still marked as Capel Joppa on Ordnance Survey maps until WWII. The building was demolished in the late 1960s/early 1970s.
34018	Machynys	Reservoir	Post-Medieval; Modern	SS 5090 9835	A large reservoir, identified from 2 nd Edition OS map (1907), presumably serving the various adjacent steel and tinplate works. An earlier reservoir, seen on the 1 st edition OS map (1880) lies adjacent to the east. They appear to have been filled in the 1960s and 70s.
34021	Machynys	Field System	Post-Medieval	SS 5085 9790	Relict field system depicted on the 1 st and 2 nd Edition OS maps, later obscured mostly due to extensive dumping of industrial waste. Largely concentrated to the south and east of the development area.
34070	Machynys	Clay Pit	Post-Medieval	SS 5088 9836	Clay pits, identified from 1 st Edition OS map (1880), probably serving Machynys Brickworks (PRN 31423). Later erased by construction of reservoir PRN 34018.

3.3 Historical Development

General

3.3.1 The historic landscape is the result of natural processes and human actions interacting and influencing each other since the end of the last glacial maximum, c.10,000 – 12,000 years ago (Rackham 1994, 6). Those interactions and influences are particularly evident in the coastal areas around Llanelli where they have resulted in the construction of sea defences, reclamation of marshes, shifting settlement patterns, shipwrecks, construction of harbours and drowned landscapes (Page 1997, 2).

3.3.2 The following section is largely taken from previous detailed studies of the development of the area (see Page 1999 and DAT 2006) which looks at the whole of Machynys in order to put the history of the proposed development area into its proper historical context.



Figure 6: Extract from Saxton's map of 1578 showing 'Bachhannis Island'.

Natural development: the physical background

3.3.3 Machynys forms the western limit of Llanelli Marsh, an area of largely reclaimed coastal marsh that stretches to the Penclacwydd Wildfowl and Wetland Centre. Llanelli Marsh is part of an extensive system of coastal wetlands that extends 4km up the Loughor Estuary and Burry Inlet as far as Llangennech. This area is backed by a discontinuous crescent of high ground from Pembrey to Bynea that is the remnants of former sea cliffs and raised beach deposits of the last interglacial period (Page 1997, 6; Page 2000, 4; Page 2000, 3). The cliffs are dissected by numerous small river valleys that drain the high ground to the north into the Loughor (James 1993, 8). The accumulation of sediments from these rivers, in particular the Dafen, Lleidi, Lliw and the Loughor itself has led to the

formation of the extensive saltmarshes throughout the Burry Inlet and the lower reaches of the Loughor Estuary. The Burry Inlet and Loughor Estuary has the second largest area of saltmarsh in Britain and the largest estuarine saltmarsh in Wales (Burd 1989, 151; Smith and Yonow 1995, 38).

3.3.4 The present ground surface lies between 3m and 5m above Ordnance datum (OD), with a number of small islands of higher ground at c.8mOD and a high point of 15mOD on the site of Machynys House (Page 2000, 3). These higher points are moraines of glacial till deposited by the retreating ice sheet at the end of the last glaciation, 10,000 – 12,000 years ago. The Machynys moraine is the largest and forms a ridge that formerly extended across the estuary to Penclawdd on the north Gower coast. Traces of its former extent were shown on an 18th century (1775) navigation *Chart of Carmarthen Bay on the South Wales Coast* by Murdock Mackenzie that showed three small gravel islands running south from Machynys (Figure 7).



Figure 7: Extract from the *Chart of Carmarthen Bay on the South Wales Coast* by Murdock Mackenzie, 1775, showing the remnants of the Machynys moraine.

3.3.5 The post-glacial, Holocene, sedimentary record shows an overall trend of sea level rise with periodic slowing or lowering of sea levels indicated by layers of peat. Radiocarbon dates obtained from peat cores taken from just outside the proposed development area show that drier conditions probably began in the early to mid-Neolithic period, c.4500 – 3500BC, with bog and grassland developing during the later Neolithic and the Bronze Age (Lillie *et al* 2003, 46). A radiocarbon date obtained from peat associated with a submerged forest at Morfa

Bacas to the east of Machynys returned a calibrated date of 2941-2475BC (Page 1997, 8), which relates it to the drier period recorded in the Machynys samples. A fairly rapid inundation signalled the onset of sea level rise, which appears to have been part of a widespread episode of rising sea levels that was recorded in other locations along the South Wales coast (Lillie et al 2003, 56).

3.3.6 These post-glacial processes have (and continue to) produced a dynamic and until relatively recently ever-changing environment as the various factors constantly worked and reworked the coastline. This was halted by deliberate human intervention.

Land use: food collection and production

3.3.7 Estuarine wetlands are amongst the most fertile and productive ecosystems in the world (Davidson 1991, 2). Because they are influenced by both fresh and saltwater and constantly re-nourished by water-borne nutrients, carried in the silts from higher up the river, they are particularly rich in natural resources (Page 1997, 1). This mix provides a range of ecozones, each with its own flora and fauna. As the saltmarshes grow and extend to seaward and the salinity decreases at the landward edge the halophytic plants are replaced by a more species-rich flora that in turn attracts more diverse fauna, thereby increasing the available resources.

3.3.8 The richness and variety of resources available in the Llanelli wetlands has attracted people from prehistory onwards. Early use of the wetlands would have been by hunter-gatherer groups taking advantage of the seasonally available resources such as new plant growth, shellfish, fish and wild fowl. A shell midden exposed by erosion of the saltmarsh at Morfa Bacas, a short distance to the east of Machynys, contained cockle and mussel shells and the skull of a roe deer. The midden was sitting on one of the glacial islands of higher ground and was at the base of the saltmarsh and is thought to be prehistoric (Page 1997, 14).

3.3.9 The remains of a large number of fishtraps, dating from the last two or three centuries, have been recorded along the Llanelli coastline (Page 1997, 14), which provide evidence of the continued exploitation of fish.

3.3.10 As agriculture became established the coastal marshes acquired a new range of uses, principally grazing of livestock. Originally, during the Neolithic and early Bronze Age, this would probably have been on a periodic basis and formed part of a round of movement. Whether that movement was annual or not is uncertain, but it is likely that the use of the marshes for grazing was seasonal, with spring and summer favoured. Before agriculture became sedentary and virtually self-sufficient natural resources would still have made up a significant part of the diet, so the visit to the estuary would have been an important event in the lives of the early agriculturists.

3.3.11 As agriculture became more sedentary and farming more intensive the rather unstable nature of the coastal marshes meant that full economic exploitation was difficult. To fully exploit the potential of the marsh human intervention was required to halt the cyclical nature of accretion and erosion and to stabilise the changing patterns of creeks and channels. That intervention took the form of sea defences that allowed the newly enclosed land to be drained and managed.

3.3.12 Reclamation of coastal marshes of Wales has a long history that in some areas dates from the Roman period. In the Llanelli area most of the embankment was carried out in the post-medieval period, although some areas, particularly around Maes-ar-dafen, Trostre and Dafen, a short distance to the

northeast of the proposed development site, may have been embanked during the medieval period (James 1993, 13; Page 1997, 10).

3.3.13 At Machynys embankment had begun by at least the early 18th century. Two banks are shown surrounding the southern edge of Machynys in a set of 1761 maps of the estate of the prominent Stepney family (CRO ref: Stepney map book, 1761).

3.3.14 A survey of the agriculture of Carmarthenshire undertaken in 1794 recorded only piecemeal enclosure of the marshes, with the marshes around Kidwelly and Llangennech the only areas that had been substantially embanked and drained. The survey also expressed surprise that 'no attempt has been made to embank and drain the other marshes' (Hassall 1794, 28). The other marshes included those around Machynys and Llanelli, which – despite some enclosure in the area around what is now the Penclacwydd Wildfowl and Wetlands Centre – were not fully embanked and drained until the construction of the Great Embankment in 1808-09 that ran from Machynys to join with an earlier sea defence bank at Maes-ar-Dafen, which is now beneath the Trostre Steelworks (Page 1997, 11).

3.3.15 Once enclosed the marshes were farmed fairly intensively (see PRN 34021) until the ever-expanding metal industries began to put pressure on the local agricultural economy. By the early to mid-20th century most of the coastal farms had been abandoned and industry was in decline.

Industrial interests

3.3.16 Of all the abundant natural resources available in the Llanelli region coal has had the biggest impact. It was first exploited in the medieval period and by 1585 the 'port of Burry' was the main place of export from the Carmarthenshire coalfield (Symons 1979, 28). The quantities of coal exported at the time were small, although, as Symons (1979, 30) points out, a number of acrimonious disputes in the early 17th century indicate that the potential value of the Llanelli coalfield had been recognised.

3.3.17 The development of the coal industry was slow and dictated by the available technology and the contemporary knowledge about the formation of the coalfields (Page 1997, 16). Sixteenth and 17th century mining was focused on exposed seams in well-drained locations, where any drainage could be achieved through gravity-fed adits or gutters. Export was by boat from small shipping places established along the north bank of the Loughor, with larger facilities developing at Pembrey, Burry Port and eventually Llanelli. By the 18th century the potential of the Llanelli region was attracting large-scale investment from wealthy industrialists drawn to the area by the potential of the area and its location.

3.3.18 Many of these industrialist were involved in the metal processing industries and the Llanelli area met many of the criteria they required. The chief criteria were flat land at low rent, raw materials, fuel, water and an established transport system (Jones 1995, 45-46). As with the coal industry the early metal processing industries were relatively small-scale. In the early 19th century the combined lead, silver and copper industries were employing 550 people between them, but by the mid-1850s one company alone was said to be employing 3,500 miners and raising 700 tons of coal per day for use in its copper works in Llanelli (Bowen 1856, 6).

3.3.19 This rapid expansion turned Llanelli from a village into one of the world's leading iron and tinplate suppliers in a few decades. The period covering the late 19th and early 20th centuries was the boom time for Llanelli. However, by

the middle of the last century most of the industrial works had closed and the former industrial areas of the time, particularly around Machynys have been in fairly constant decline ever since.

Machynys: a monastic settlement?

3.3.20 The origin of the name Machynys is difficult to determine. It has often been claimed that Machynys is the location of a monastic settlement established by the early 6th century Saint Piro, and the name itself derives from *Mynach Ynys*, meaning Monks Island. The origin of the monastery comes from an early account of the life of St Samson, Piro's successor, which stated that Piro established his monastery on an island not far from St Illtyd's monastery.

3.3.21 It is not disputed that Machynys was formerly an island, as can be clearly seen on early maps of the area (Figures 6 & 7), and early 19th century accounts of Machynys House being cut off from the mainland on spring tides (Figure 8). No evidence that Machynys was the site of this early-medieval monastery has yet to come to light. It is perhaps much more likely that this interpretation is incorrect and the (very much) more likely location would be Caldey Island, also known as Ynys Pyr, and on which sits St Illtyd's church.

3.3.22 The early origin of the name Machynys is suggested by an early 8th century grant of a parcel of land called *terra Machinis* (Davies 1979, 112). In the early 14th century land rentals for 'the rent and farms of all the demesne lands, meadows and pastures of Maghenes' (James 1993, 14) shows that the name had survived in constant use for several centuries.

3.3.23 Contrary to this on the 17th century Saxton map amongst others, the island is called *Bachhinnis*, merely suggesting it was known as 'little island'. The fact that the island is shown on these earlier maps may not be an indication of the importance of the site, more that as there were a lack of features on the shore of the estuary, features such as the island would be shown and named to aid navigation.

Early development: Machynys House, Mansion or farm?

3.3.24 A house is thought to have stood on Machynys since at least the late 16th or early 17th century (PRN 6995). It was not shown on Saxton's map of Carmarthenshire produced in 1578 (Figure 6), although others in Llanelli were shown. The Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) have said that Machynys House was built in 1627 (RCAHMW 1817, 120), although Francis Jones has stated that the house was purchased in that year by Walter Vaughan of Llanelli House (Jones 1987, 124). This suggests that Machynys House was built sometime after 1578 and before 1627. Thomas Lloyd described the house as an early double-pile (Photos 1 & 2), a style that was becoming popular in Wales in the late 16th and early 17th centuries, supporting a construction date between 1578 and 1627 (Page 1999, 16).

3.3.25 It is possible that there was an even earlier building on the site as perhaps evidenced by documentary records. There are the known 14th century documentary references to a farm at 'Maghenes' (James 1993, 14) and Jones (1987, 124) relates a story of rafters in the house having AD 1450 carved into them. However, the story as related was anecdotal and the reuse of earlier building materials is not uncommon, so the rafters could have come from anywhere in the Llanelli area.

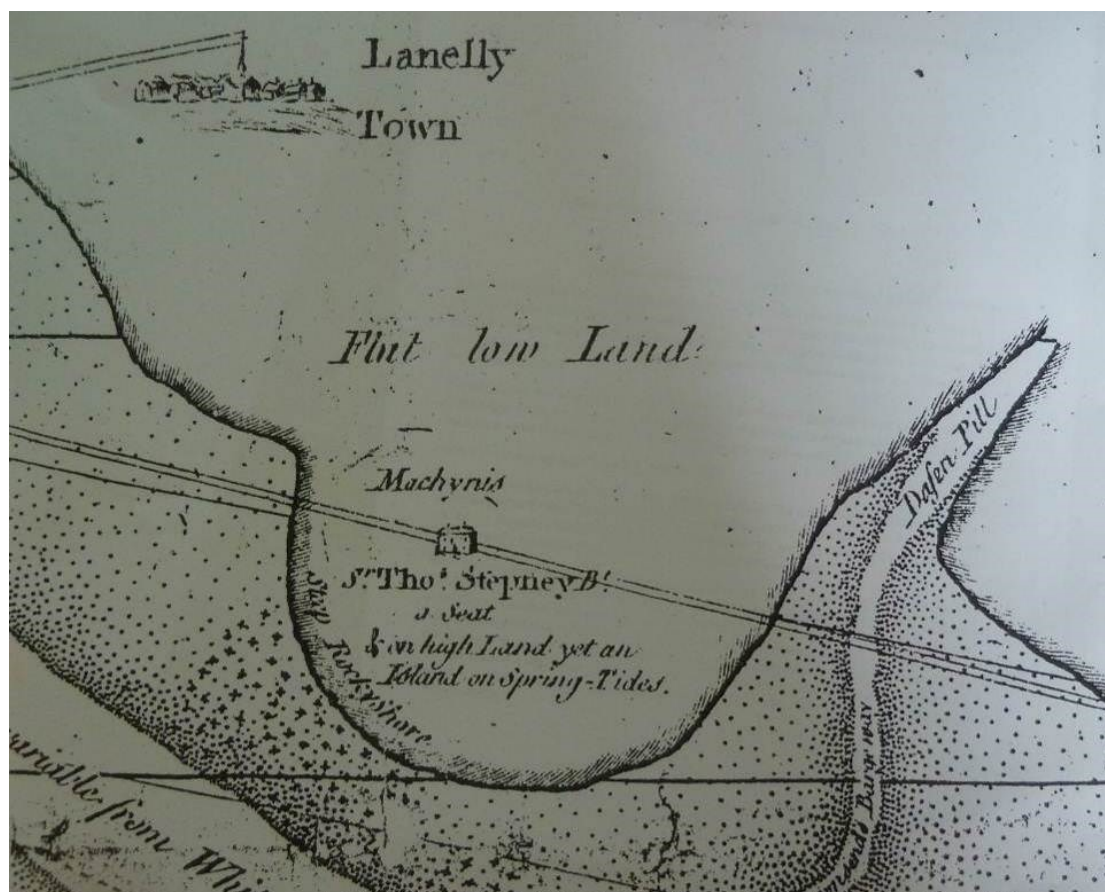


Figure 8: Extract from a chart by William Jones of Loughor, 1757 showing Machynys (Machynis) House, home to the Stepney's.

3.3.26 The presence of a pre-existing medieval dwelling on the site could explain the choice of Machynys, a tidal island in an estuarine saltmarsh, as the location for the seat of Thomas Stepney (Figure 8). An island location would not be seen as the typical location for the construction of a house according to the emerging picturesque philosophy. Furthermore, the fact that by the mid-18th century the house was called Machynys Farm suggests that it was perhaps built in contemporary style to replace or remodel an existing house (Page 1999, 16). The possibility of an earlier, possibly medieval farm on the site has significant implications for the chronology of the flood embankments of Machynys suggesting that the banks could in fact have medieval origins.

3.3.27 The few photos that remain of Machynys Farm show a mix of differing architectural styles and probable dates. A number of these photographs are either held in private collections or available copies are of poor quality. All available photographs have been included for completeness in order to provide as much information as possible about the former structure.

3.3.28 An initial description of the building and its phased development was prepared by Page in the previous desk-based assessment. This has been updated in this report following further information obtained from further photographs available on the internet (not reproduced due to copyright issues) and discussions with Tom Lloyd, Richard Suggett (RCAHMS) and Huw Pritchard (Dyfed Archaeological Trust).

Description of Machynys House from photographs

3.3.29 Four photographs of the main body of Machynys Farm were taken by Francis Jones just before it was demolished in 1970, which are held at the Carmarthenshire Records Office (CRO ref: DX/35/2; originals held by Thomas Lloyd). It can be seen that the basic form of the structure is a double piled building, square in shape (roughly 14m x 14m). The height of the building to the apex of the rooflines can be extrapolated to have been around 9m in height. The house was of masonry construction with a slate roof, it was rendered externally, so the stone-work was obscured. All the openings were square-headed and appeared to date from the 18th or 19th centuries, although their form suggests that some may have been modified from earlier openings. The windows were single casement sashes. There are cellars, which have gained much local notoriety and tradition, which are said to have been arched with a cobbled floor (Roger Jones *pers. comm.*; Hughes 1985, 168). These are discussed later in the house description.

- **West Elevation** (Photo 1): The front (west) elevation contains a single central doorway with pairs of windows to either side only at ground floor level. There is a substantial gap between the tops of the windows and door and the eaves of the roof, perhaps indicating that the frontage was originally single storey but heightened. The eaves of the roof line projects above this facade quite considerably. This could suggest it was formerly a thatched roof but subsequently considerably modified, although this seems unlikely. The doorway and windows appear to have substantial stone surrounds and lintels (as far as can be told from this photograph and others on the internet). The form of this facade is quite unique and of uncertain date.

This was known as the front of the house even though there was no path or road to the front gate and it was approached across a field (Roger Jones *pers. comm.*). A low walled garden was present in front of the house (of similar dimensions to the main house (14m x 14m).



Photo 1: Western façade of Machynys Farm c.1970
(CRO ref: DX/35/2)

- **East Elevation** (Photo 2): The rear of the farmhouse formerly had a large barn abutting the southern half of this facade. The scar of the barn is visible on photograph 2. There appears to be no indication of any access between the barn and the main farmhouse, nor is any evidence for any blocked doorways or windows visible. This could suggest the house was built up against the pre-existing barn or former windows in this elevation would be expected to be visible, but this is not certain. The arrangement of the off-centre rear door and window above offset to the south (avoiding the barn roofline – and located centrally in the facade), may also indicate the barn was an earlier structure. This window is also at a lower level than the first floor windows on the north and south facades (Photos 3 and 4). This could indicate that it provided light to a landing level on a stair, although this cannot be confirmed. A two stage stairwell at the rear of a double-pile property of 17th or 18th century date is fairly standard. A very small opening is also present at the top of the northern end of the elevation providing some light to the first floor level.



Photo 2: Eastern facade of Machynys Farm following demolition of former attached barn c.1970 (CRO ref: DX/35/2)

- **South Elevation** (Photo 3): The southern facade shows the twin gables of the structure, with the roofline of the central attic cross-passage also just visible. The elevation has six windows, a pair equally spaced on each gable at ground level and two symmetrically placed windows at first floor level below the join of the two rooflines. Photo 3 could indicate that the

two halves of the structure are of slightly different construction, as evidenced in the colour of the exterior of the building on either side of the central line. Also suggesting this are the slight differences in the chimneys at each gable. That to the west is of lighter colour, possibly of a similar stone to that used in the lintels for the windows and door on the western facade. The chimney may also be slightly taller than that to the east.

An area of either surviving render or a blocked opening is present in the upper western part of the facade. This is also visible on other photos of the building from earlier dates. This could be associated with a former window. The western ground floor window on the western half of the building would also appear to have been slightly larger than that the others, perhaps indicating a former modified doorway? The projection of the eaves of the roofline is clearly far larger to the west than east.



Photo 3: Southern facade of Machynys Farm c.1970
(CRO ref: DX/35/2)

- **North Elevation** (Photo 4): The northern facade also shows the twin gables of the structure, with the central passage roofline clearly visible. This elevation is partially obscured by a hedges and outbuilding, and is also one of the least photographed views of the building. It appears to show two symmetrically placed windows at first floor level on either side of the central line of the facade. A doorway is present roughly central on the

eastern side of the building, with no other openings visible on the western half (although any such opening could be obscured).

The difference in colours of the two halves of the structure is not visible in this photograph, being covered in render. A slight difference in chimney construction could still be argued. The large projection of the eaves of the roof over the western facade is clearly visible. A brick shed is present on the northern side of the garden wall.



Photo 4: Northern facade of Machynys Farm c.1970
(CRO ref: DX/35/2)

3.3.30 As noted above, the fact that the building was double-pile suggests a date from the late 16th century onwards, but perhaps most likely of 18th or 19th century date (Tom Lloyd / Richard Suggett pers. comm.). there is still a possibility the double-pile was constructed in two phases. The RCAHMS record Machynys as a house dated to 1625 and but heavily altered (record dating from 1917). The 1757 and 1775 maps (Figures 7 & 8) both indicate the presence of a large house on the island. These are both clearly schematic but are reproduced in detail below to demonstrate the cartographers interpretation of the building. That of 1757 shows a two storey building with a central door and windows on both the ground and first floor. The illustration of 1775 may indicate a side on view of the house, with the western facade to the left, with central door and windows to either side (at ground floor?) with a single gabled end to the south and a projecting wing behind. Unfortunately this symbol is used for all houses

over a certain size on the rest of the map so does not provide any useful information.

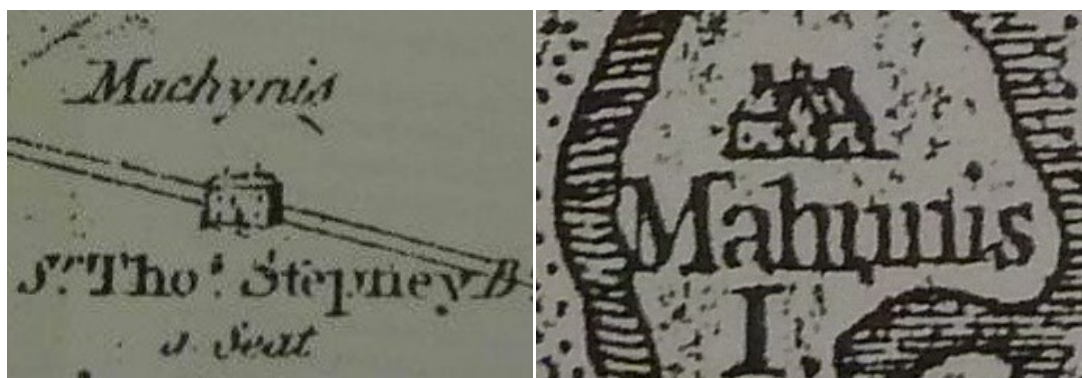


Figure 9: Details of representations of the house at Machynys from 1757 (left) and 1775 (right)

3.3.31 An 18th century painting of the farm (thought to date from 1725) on view in the Parc Howard Gallery, Llanelli, shows the house from the northeast side. The painting shows the north gable wall and the north wall of the west-east block. The gable wall had four windows, two upper and two lower, arranged in a regular and symmetrical pattern, whilst the north wall had a row of four upper windows, but no openings shown in the lower floor; a wall running at 90 degrees from the house may have obscured the ground floor openings from the artist. All the windows were tall square-headed openings and they were similar to those in the photographs of the house just prior to demolition (Photos 1 to 4). Two central chimneys, which may have been hexagonal, that extended through the northeast roof slope indicated the presence of fireplaces in the north wall. The chimneys were flanked by two dormer windows for the attic rooms. Only two upper windows and one lower window were visible on the north wall of the east-west wing, the rest of the wall was obscured by a small stone-built building. The windows were of identical to those in the rest of the house. The painting also showed a range of stone-built outbuildings to the east of the house and three other small buildings to the north and west. These descriptions are somewhat at variance with the structure before demolition and either indicates considerable later alteration had occurred to the house or artistic licence in its depiction.

3.3.32 On a 1761 estate map of the farm (CRO ref: Stepney mapbook 1761) a further range of outbuildings had been added southeast of the house. Both the painting and the estate map show the garden enclosure to the south of the house, the southwest and part of the southeast wall of which were surveyed during this project. In the painting there is a white decorative gate in the southeast wall which leads out to small avenue of poplar-like trees, which in turn leads into an east-west avenue of larger broad-leaved trees. This was supposed to lead to Llanelli House (joining the Stepney family households), but it is not clear if this is just folklore.

3.3.33 From the photographic evidence it is considered that the front (western) half of Machynys Farm was a surviving element from an earlier structure. The layout of the single storey facade with central doorway and pairs of flanking windows do not fit with the grander double-pile house behind. It is possible that the facade forms the remains of 'a medieval or sub-medieval hall house with its original arch-braced roof still in situ, which allowed for only very cramped space above' (Tom Lloyd pers. comm). The southern façade would indicate that there was a first floor to this part of the structure, which may have

had former dormer windows on the western façade, but subsequently removed (Richard Suggett pers. comm.).

3.3.34 The former eastern wing to the building had a steep pitched roofed and single storey walls (Photo 5). This was located on the southern half of the eastern facade (Photo 2 shows where it had been located following demolition). Earlier ordnance survey maps indicate that this wing was around 22m in length. It may have been used as a barn when the structure was used as a farmhouse, but was possibly part of the main building prior to this. The shape of this wing could almost suggest it was cruck framed, although Photo 2, taken after the demolition of the barn, shows no sign of marks left by the cruck blades in the wall (assuming they were positioned in this location), but marks are left by the purlins and cross member. Full cruck-framed buildings are rare in West Wales, due to the lack of availability of the necessary timber sizes. Scarf-cruck buildings are more commonly used, which could form a similar profile to that shown in the photographs.



Photo 5: Southern façade of Machynys farmhouse taken in the 1960s, showing the double-pile construction of the main house with the eastern wing and an ivy-clad external lateral chimney stack (with possible arch visible in ivy)

3.3.35 On the southern side of the eastern wing was a large lateral chimney stack. This is shown as being ivy clad in Photo 5. This chimney stack is too large and of the wrong form to be associated with east wing and may have been a relic of an earlier part of the structure. A possible arch is visible in the ivy which could indicate a former overgrown opening. This is on the south facade of the chimney stack and would indicate that its associated building lay to the south of the east wing but had been demolished by this time. A big lateral chimney generally relates to a high-status hall which may be of medieval origin and thus it is possible this wing of the building is the remnant of an earlier and modified medieval hall (Richard Suggett pers. comm.). The size of the chimney would suggest a substantial building. The reputed stone vaulted cellars with cobbled

floors would potentially tie in better with a chimney stack of this size, as opposed to the single storeyed western facade of the main farmhouse.

3.3.36 Although a previous attempt has been made to develop a phase plan for the house (Page 1999), the accuracy of this is questionable and it is not reproduced within this report. The potential for surviving medieval or late medieval elements to have been present (and visible) within the farmhouse that survived into the 20th century is noted above. These were not commented upon in the previous phasing. It is considered that without undertaking archaeological investigation of the below ground remains of the structure, that it is not possible to prepare a phase plan. It is understood that the buildings were demolished and levelled c.1970, as were the surrounding school buildings and the buildings of Cliff Terrace etc. Evaluation excavations on the site of the school and Cliff Terrace in 2007 by DAT (then Cambria Archaeology) revealed the buried remains of some floor levels and foundations of the former buildings. It is considered that similar would be present on the site of Machynys Farm, which could include evidence for the original layout of the footprint of the buildings. The base of the lateral chimney stack is likely to remain as would any evidence for the former cellars said to have been present at the site (probably backfilled with material derived from the farmhouse). Based on the available photographic and documented information the following broad phases could be inferred (based on suggestions from Richard Suggett RCAHMW):

Phase 1: Rear wing with lateral chimney of possible 16th century date;

Phase 2: Re-fronted in 1627 (RCAHMW information)

Phase 3: Second pile added in 18th or early 19th century and house modernised

Phase 4: Further modifications and alterations occur to the structure throughout the 19th and 210th centuries

Phase 5: Farm demolished in c.1970

Industry at Machynys

3.3.37 Until the industrial expansion of the 19th century Machynys was an agricultural district, but by the end of that century the focus had very definitely switched to industry, with virtually the whole of Machynys covered by factories and housing for the workers they employed.

3.3.38 It has been seen above how the rapid expansion of the coal, metal processing and associated transport industries had increased the number of people living and working in the Llanelli area. The flat lands of Llanelli Marsh around Machynys and the areas around Seaside – to the west of Machynys – were seen as ideal building land for both factories and worker housing and by the end of the 19th century factories and housing extended as far as Machynys House (Figures 10, 11 & 12). The alluvial clays that covered much of Machynys proved ideal material for the production of bricks and by the late 1860s Machynys had become the home to several thriving brickworks, one of which operated within the bounds of the proposed residential development area to the east of Machynys Farm (PRN 31423). By the end of the 19th century the ever-expanding and dominant tinsplate industry, that was to give Llanelli the name Tinopolis, had spread onto Machynys and left its mark within the bounds of the proposed residential development area to the east of Machynys Farm (PRNs 30708, 30709 & 34018).

3.3.39 By the time the Second Edition Ordnance Survey map was published in 1907 (Figure 11) parts of several factories, terraces of worker housing (PRNs 34013, 34014 & 34015), a school (PRN 34016), a chapel (PRN 34017) and a mission room (PRN 31424) were all present within the proposed development boundaries. This housing, school and chapel lay within the

proposed Eco-park boundary close to Machynys Farm (Photo 6), with industrial development across both areas.

3.3.40 During the early years of the 20th century the Machynys landscape was dominated by the massive factories and the associated infrastructure of industry, but by the middle of the century the factories and the people had gone. This area of Machynys was largely cleared in the late 1960s and early 1970s.



Photo 6: Machynys farmhouse (PRN 6995) and farm buildings from the east with Cliff Terrace (PRN 34014), Mission Hall (PRN 31424) and School (PRN 34016) to the right.

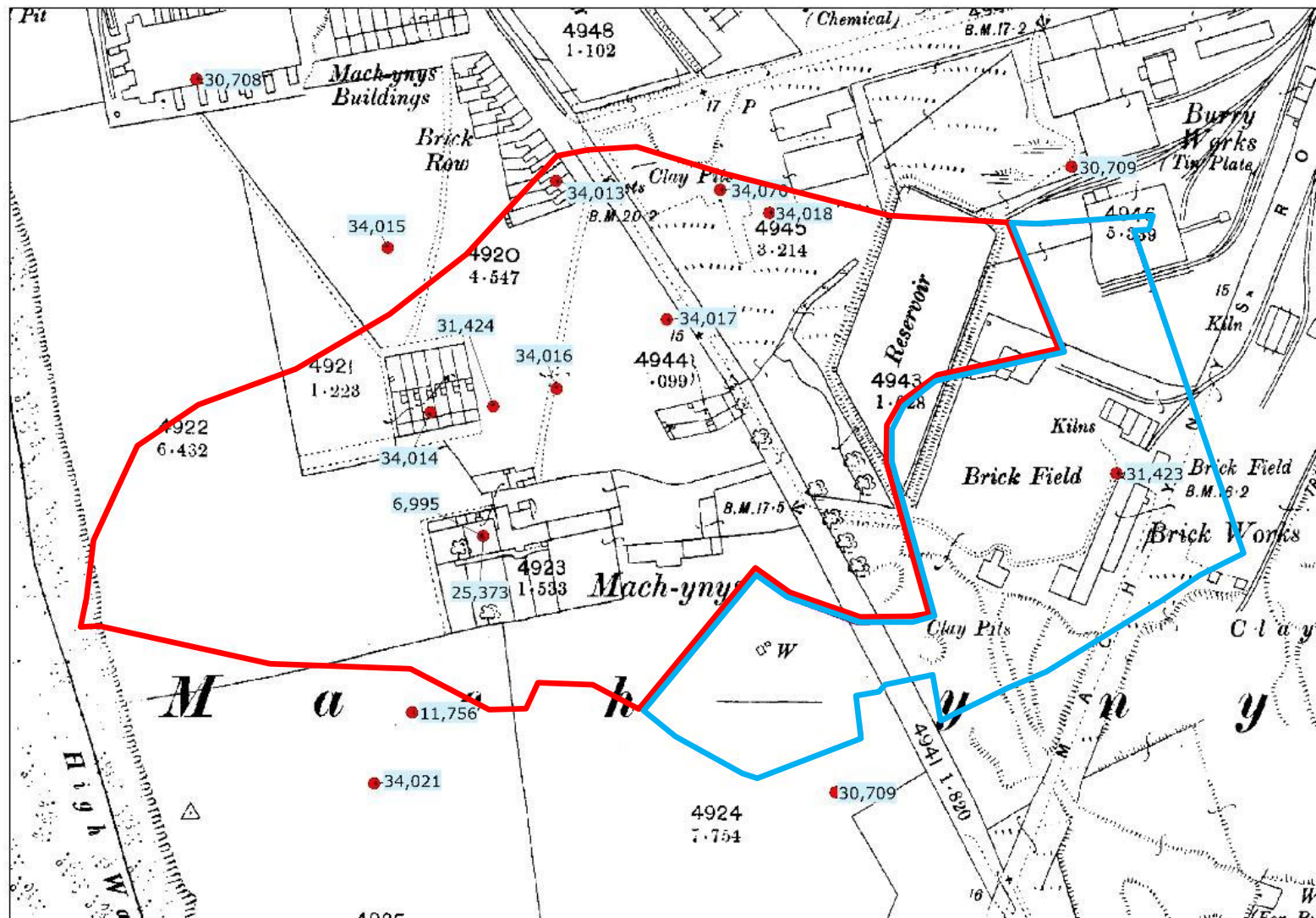


Figure 10: An extract from the 1st edition 1:2500 Ordnance Survey map of 1880, showing the outline of the development area and the HER sites mentioned in the text (labelled by PRN). Red line – Eco-Park; blue line - residential

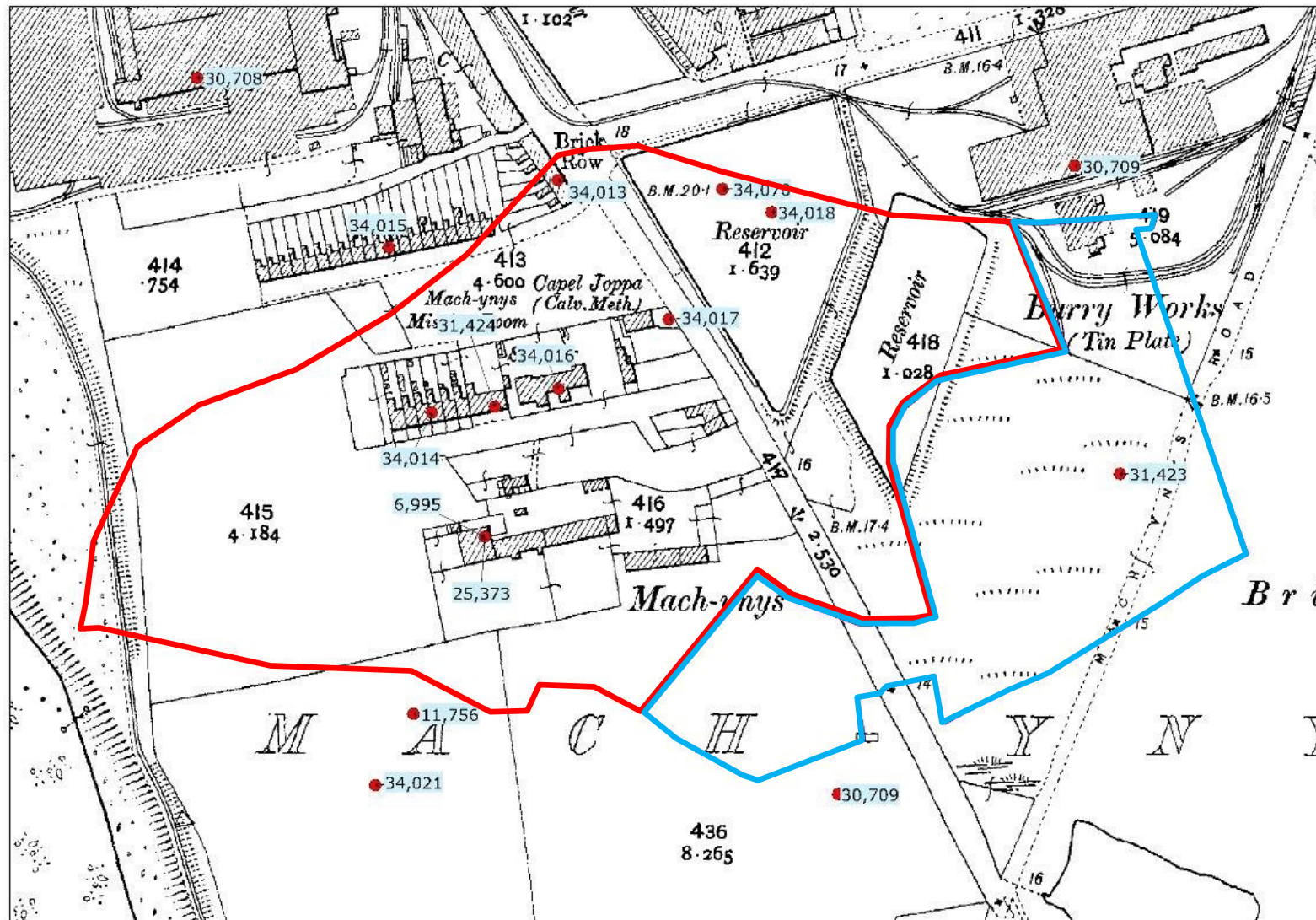


Figure 11: An extract from the 2nd edition 1:2500 Ordnance Survey map of 1907
Red line – Eco-Park; blue line - residential

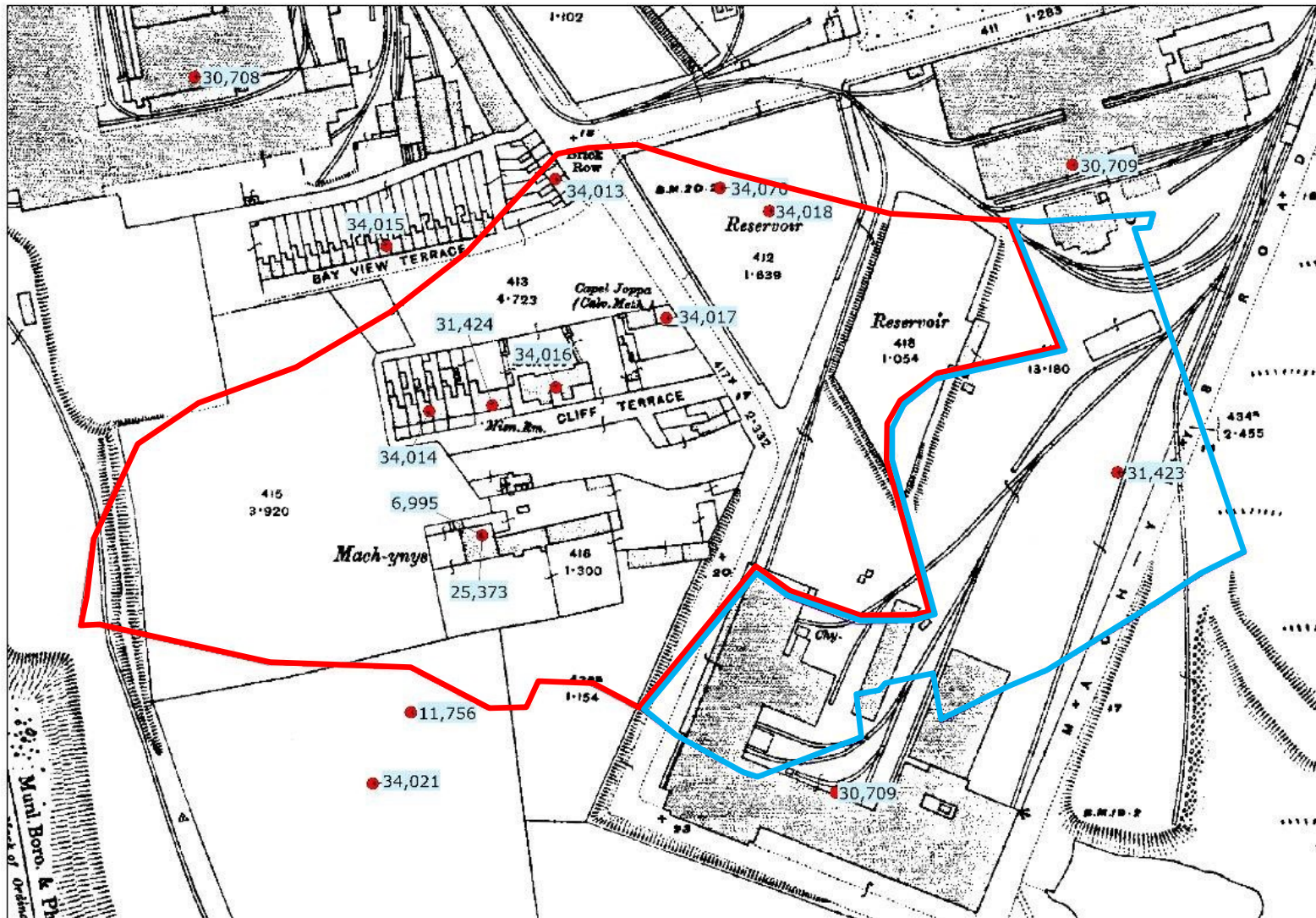


Figure 12: An extract from the 3rd edition 1:2500 Ordnance Survey map of 1916
Red line – Eco-Park; blue line - residential

3.4 Site Visit

3.4.1 A site visit demonstrated the majority of the area had been cleared of all standing remains of the known archaeological sites, with the exception of remains of the garden walls surrounding Machynys house (PRN 6995).

3.4.2 A series of standing stone-built walls ranging from between 0.5m and up to c.2.5m high mark the line of the former gardens (Photos 7, 8, 9, 10 & 11) that would have surrounded the house. The walls appear to be a mix of clay-bedded and mortared walling with differing styles of stone and construction presumably indicating different phases of walling and possibly former structures. No standing remains of the house were visible, although the whole area is covered in dense scrub and this possibility cannot be discounted. Wider views back to the site area from the surrounding land are also included (Photos 12 & 13).



Photo 4: General view showing the lines for the scrub-covered walling around Machynys House (PRN 6995)



Photo 8: Section of walling associated with the garden walls visible amongst the scrub. 2m scale.



Photo 9: Further section of garden/enclosure wall.



Photo 10: One of the highest sections of surviving walling associated with Machynys House (PRN 6995)



Photo 8: A segment of mortared building wall.



Photo 12: General view of Machynys Mound
viewed from the Delta Lakes roundabout



Photo 13: General view across the southern end of the site
with the golfcourse beyond.

This was the former location of the Burry Extension Tinplate Works (PRN 30709)

3.5 Previous Archaeological Work

3.5.1 There have been several archaeological desk-based studies undertaken across Machynys, examining the effect of various proposed developments upon the archaeological resource. In 1993 an archaeological assessment of the local coastal area, including part of Machynys, was undertaken prior to the construction of a Dwr Cymru pipeline (James 1993). In 1997 a Cadw-funded archaeological assessment of the importance of the Llanelli and Loughor Wetlands was undertaken (Page 1997), which included the Machynys area.

3.5.2 The first study to look specifically at Machynys came in 1999 when the Dyfed Archaeological Trust (then known as Cambria Archaeology) undertook an archaeological assessment of the whole of the Machynys area, from the sea to Pil Dafen in the east and Morfa and the New Dafen River to the north. This report looked at the history and development of Machynys, with particular reference to Machynys House and examined the potential impact of the Machynys Golf Course and the Berwick Park – Morfa Link Road. These two studies (Page 1997 & Page 1999) form the core of the historical research into the area incorporated into many of the later reports, including this report. As part of the 1999 study a survey of the standing walls within the Machynys area was undertaken. This demonstrated that a number of the garden and field boundary walls to the west and southwest of Machynys Farm survived, including the square garden in front of the western façade of Machynys Farm. These boundary walls can be seen on aerial photographs of Machynys. The area of the actual farm building structures was covered in dense vegetation, much as it is today and during both that exercise and the present site visit, the potential for low standing remains of the farm buildings cannot be discounted.

3.5.3 In 2005 an archaeological appraisal was undertaken to look more closely at the archaeological potential of the Delta Lakes area (Page 2005), which lies a short distance to the north of this study area. This was followed by a geotechnical investigation of the same area, the results of which were subsequently combined with the archaeological appraisal (Page 2005). It was found that industrial remains associated with the South Wales Steel and Tinplate Works (PRN 30708) survived at depths of over 1m below current ground levels.

3.5.4 In 2006 two archaeological assessments were undertaken ahead of proposed development on adjoining land within Machynys. This comprised Machynys West (Page 2006), an area of land immediately to the northwest of the current study area, and also Machynys East (Page 2006), which incorporated the current study area. In many ways the current report is an updated version of the latter report, looking specifically at the development proposals of the proposed Eco-Park and Residential Development.

3.5.5 Many of the above reports recommended a series of more intrusive archaeological work be undertaken to better understand and record the archaeological resource prior to or during the various proposed developments. Prior to the establishment of Machynys golf course a joint program of archaeological investigation and borehole sampling was undertaken, in order to investigate the palaeoenvironmental and litho-stratigraphic development, as well as the history of enclosure, reclamation and changing land use of the area known as Llanelli Marsh on Machynys (Page et al 2000). A subsequent archaeological watching brief was also undertaken on the major earth moving operations associated with the creation of the golf course (Page 2000). Both works revealed peat deposits containing potentially important palaeoenvironmental data from the Bronze Age and Neolithic periods, at depths of between c.1.5m and 4m below current ground levels, overlaid with thick alluvial deposits.

3.5.6 Archaeological evaluation excavations were also undertaken following the archaeological assessment of the Machynys West (Ramsey 2007) and Machynys

East (DAT 2006) areas. Both evaluations were undertaken in 2006. As part of the Machynys East evaluation four trenches were excavated within the bounds of the current study area. Trench 1 showed that although some rear boundary walls of the terrace of buildings along Brick Row (PRN 34013) survived, the houses themselves appeared to have been demolished to below ground floor levels. Trenches 2 and 3 were located over the buildings of Cliff Terrace (PRN 34014), revealing remains of the houses at a varying depth of between 0.1m and 0.5m below current ground levels, and in some places the remains have been removed to below ground floor levels. Trench 4 was located largely over the remains of the road (Cliff Terrace), but also part of a stone built structure survived below the topsoil, presumably part of Machynys School (PRN 34016). The remaining trench was located beyond the limits of this proposed development area, but demonstrated the general pattern of partially surviving archaeological remains beneath large-scale demolition and clearance deposits.

4. IMPACT ASSESSMENT

4.1 Previous Impacts

4.1.1 The continual industrialisation of much of this area during the 19th and early 20th century is likely to have had a significant impact on many of the archaeological sites mentioned within this study. Initially the establishment of the brickworks (PRN 31423) and their associated clay pits (PRN 34070) over much of the eastern part of this study area (the area of proposed residential development) is likely to have removed earlier enclosure activity, such as the field boundaries (PRN 34021). Similarly the encroachment of the buildings along Brick Row (PRN 34013) and Cliff Terrace (PRN 34014) removed field boundaries to the north of Machynys House (PRN 6995). Further industrialisation, such as the expansion of the Burry Extension Works (PRN 30709) across much of the eastern side of the development area, and the establishment of the reservoirs (PRN 34018) across much of the northern side, would have further compromised previous underlying archaeological remains, including remains of the earlier brickworks (PRN 31423) (see Figures 10, 11 & 12).

4.1.2 The wholesale clearance of the area in the 1960s and 1970s has had a clear detrimental impact on the recorded archaeological remains. This clearance work removed much of the standing remains across the site, and infilled pits and reservoirs. The scale of the demolition work however appears to have been inconsistent across the site. As is clear from the previous evaluation excavations undertaken across some parts of this development area (DAT 2006) the foundations and ground-levels of some buildings of Cliff Terrace (PRN 34014) and Brick Row (PRN 34013) survive under varying depths of topsoil and demolition rubble, whereas other buildings on the same streets appear to have been removed to below ground-level remains. Test-pitting on a nearby former tinplate works to the north (outside the study area) revealed overlying deposits of over 1m in depth before presumed remains of the tinplate works were reached (Page 2005), as to what extent similar depths may be applicable to remains of the former Burry Extension Works (PRN 30709) in the eastern part of the development area is currently unknown. The only site to survive with any standing remains was that of Machynys House (PRN 6995) where the surrounding garden walls still partially survive and the possibility above ground remains of the actual building may survive in dense undergrowth.

4.1.3 Recent redevelopment has been undertaken on adjoining land to the south. The Pentre Nicklaus village borders the southern edge of this proposed development. This has included the establishment of residential housing over part of the site of the Burry Extension Works (PRN 30709), the remainder of the site lies within the bounds of the current proposed development.

4.2 Potential Impacts from Development (Figures 13 & 14)

4.2.1 No Scheduled Ancient Monument or listed buildings will be directly or indirectly affected by the proposed works. In terms of its landscape setting little remains of the industrial landscape above ground and residential development has already become established to the south. The only surviving above-ground remains are those associated with Machynys Farm (PRN 6995). The intention is that these will be consolidated and preserved, therefore the impact on the historic landscape setting is considered to be minimal.

4.2.2 The two parts of this development – the Eco-Park and the Residential Development to the east, will by their nature have varying potential impacts upon the archaeological resource and are therefore discussed separately.

Eco-Park (Figure 13)

4.2.3 As stated in their Planning, Design and Access Statement (Arup 2011) the proposed works for the new Eco-Park at Machynys Mound, Llanelli, comprise a network of footpaths, ponds and landscaping including the outlining of the former Machynys Farm as a focal feature within the proposed park (Figure 4). The design strategy for the park has been described by Anthony Jellard Associates thus:

The overall layout has been considered to provide an enhanced visitor experience, provide a focal point to the Eco-Park and a viewing area to the park and wider environment. The intention is to initially clear the site of vegetation, restore the remaining walls, include the path network, viewing area and sculpture. The footprint of the Farmhouse would follow once the archaeological research has reached a point where a satisfactory layout has been agreed.

4.2.4 Consolidation of the surviving L-shape walls around Machynys Farm is proposed to be carried out. It is understood from Anthony Jellard Associates that that this will be done by first carefully removing ivy and other vegetation from the surface of the walls and subsequent consolidation to be done as follows:

- *Cut ivy stems at base and apply a glyphosate based herbicide*
- *Allow ivy at base and to wall to die back and dry out*
- *Remove ivy carefully by hand and or by burning*
- *Stabilise wall by removal and replacement of stones*
- *Repair or rebuild of stone and brick walls as considered appropriate in consultation with archaeological advisors using material on-site*
- *Stabilisation of the top courses of stone works via removal and replacement of coping / capping stones upon an appropriate mortar bed*

4.2.5 This will result in a beneficial impact to the standing remains, preserving them for the future and allowing further interpretation and recording of the walls as they are exposed from within the vegetation cover. Intermittent archaeological observation of the consolidation works is recommended to assist with interpretation and record the exposed remains and any features within the walls.

4.2.6 It is proposed that the layout of Machynys farmhouse will be marked out within the Eco-Park, though the exact layouts will hopefully be informed by further archaeological investigations. The methodology being put forward is as follows:

- *Confirm and agree a historical layout of the main farmhouse, and possibly outbuildings*

- *Set out the layout on-site marked in granite kerbs laid flat, the layout slightly raised with granite setts (100mm width) flanking on either side to aid maintenance (grass mowing)*
- *Access to the site shall be via a main path from the car park that shall enter the Machynys Farmhouse site at the top of the mound via the existing (restored) brick gate posts. From thence a path shall provide an all-weather route around the interior of the site, and a viewing area. The viewing area shall include the further features – interpretation boards and interpretative sculpture.*
- *Two interpretative boards are proposed:*
 - *Board 1: Shall interpret the historical aspects of the Machynys Farmhouse Site so far as it is known where the incorporation of text and illustrations shall be the outcome of any further research that will take taking place.*
 - *Board 2: This shall interpret the natural history of the site and offer a description of its environmental history, value and restoration.*

4.2.7 The construction of markers representing the former layout of Machynys Farmhouse could cause some impact to surviving remains of the farm. Where surviving walls are revealed in the undergrowth, it is presumed these will be retained. The depth of the granite sets and markers is relatively shallow and it is hoped that although below ground deposits may be exposed, these will not be further damaged by the proposals. It is intended that further investigation of the site area will be undertaken prior to the wall lines being laid out, by way of either a community excavation or basic recording exercise once vegetation clearance has been carried out. The results of these investigations will inform the layout. The results will also inform the information placed on the interpretation boards. Archaeological observation of any groundworks may be necessary depending upon the findings of any subsequent excavation exercises within the former farmhouse area.

4.2.8 Following information supplied by Anthony Jellard Associates it is understood that an Interpretive Sculpture will be erected on the summit of Machynys Mound. The design of this is based on a '*consultation exercise that took place on 19th January 2011 with the The Bwlch y Gwynt & Machynys Lost Communities Group where three design options were presented by Mick Petts (Environmental Artist)*'. The favoured design was for the erection of a chimney styled tower made of brick of around 5m height, with a wind vane on-top. The chimney will represent the former industrial nature of the area, reinforced by the use of copper alloys for the wind vane and plaque on the brick tower.

4.2.9 The construction of the brick tower will require foundations, which could impact on below ground remains. We do not have any evidence for structures being present on this spot from old maps and photographs, but the likelihood of the high point of the former island being used in the past is very high. Construction works should be subject to archaeological monitoring.

4.2.10 The majority of the area around the former farmhouse will be laid to close mown grass where the existing vegetation would be cleared and the soils cultivated to allow grass seeding. An ornamental walled garden is proposed for the area between the restored walls and main pathway which could be informed by further research or investigation of the site area.

4.2.11 It is intended that the surface of the site will be scraped to a depth of approximately 75mm and the clinker/slag is to be reclaimed for re-use. The north-eastern part will be managed to create a biodiversity area. Woodland planting will be established around the periphery of the site.

4.2.12 These landscaping works have the potential to expose, damage and destroy any potential below ground remains. However, the main re-profiling works in the southwest of the site lies in area of few known archaeological remains and the given depth of 75mm is unlikely to expose extensive archaeological remains given that the shallowest archaeological remains uncovered in the 2006 archaeological evaluation was 100mm, and generally tended to be deeper. Intermittent archaeological observation would be recommended during these works, depending on the results of any earlier phases of archaeological investigation.

4.2.13 Other works proposed as part of the Eco-Park included in the Planning, Design and Access Statement (Arup 2011) will include:

- linear ponds;
- a network of footpaths;
- a visitor car park; and
- further planting and landscaping;

4.2.14 The proposed woodland planting around the site may impact on below-ground archaeological remains through root action and potential tree collapse and uprooting. However, the proposed location of the woodland planting is likely to have a relatively minimal impact on known below-ground remains, with the exception of proposed planting over the site of some of the buildings along the former Cliff Terrace (PRN 34014).

4.2.15 The footpaths will be typically 2m wide and tarmac surfaced on a substrate of clinker and slag. Surfaces will be dressed with a corn coloured chipping, and in some places small stones. A footbridge will also be built, of timber construction with timber parapets. Its span will be 6.9m and have a width of 2.0m. The car park area will be macadam surfaced with a gate and a row of bollards set in the verge, all surrounded by woodland planting.

4.2.16 The location and design of these footpaths and the car park is likely to have minimal impact on known buried archaeological remains, with the potential exception of those around the former Machynys Farmhouse (PRN 6995) as discussed above. It is possible any ground-breaking activity in and around the house may expose below-ground remains as the full extent of the complex, given its long history, is unclear.

4.2.17 The depth of the linear ponds is not stated but their given location extends largely along the line of a former road and in places extend over the boundaries of the two former reservoirs (PRN 34018) at the northern end of the site. This is unlikely to have any significant impact on the archaeological resource. However, the line of the pond also encompasses the site of Capel Joppa (PRN 34017) and the terraced buildings on Brick Row (PRN 34013). The archaeological evaluation in 2006 (DAT 2006) suggested the buildings on Brick Row are likely to have been demolished to below ground-floor levels and therefore archaeological remains of this site are likely to be minimal. The extent of the remains of Capel Joppa however is currently unknown. The creation of a pond across this site has the clear potential to expose, damage and destroy any potential below-ground remains.

Residential Development (Figure 14)

4.2.18 According to the Planning, Design and Access statement (Arup 2011) the proposed development in the eastern part of the site will comprise the development of 35 residential properties, a local area for play and associated infrastructure (Figure 5). This will include:

- A total of 35 residential properties, comprising a mix of three to five bed properties, including terraced housing, semi-detached and detached houses;
- Local Area for Play situated on a site easily accessible to Pentre Nicklaus Village and the proposed Eco-Park development;
- New vehicular access off the B4304 road;
- Associated infrastructure including new pumping station; and
- Earthworks and landscaping.

4.2.19 To enable the site to be developed for housing, ground levels will need to be raised by between 0.5m and 2.0m across the site. One other key abnormal is that the site is underlain by highly compressible alluvium with peat layers, therefore foundations will most likely need to be piled.

4.2.14 All of these works have the potential to expose, damage and destroy any potential below ground remains through groundworks associated with the creation of the residential development, potential pumping station, landscaping and terracing works and enabling works, such as installation of contractor's compound, construction of access roads, parking areas, storage areas, borrow pits and associated services.

4.2.15 Piling activity is likely to reach depths that could disturb underlying remains of the Burry Extension Works (PRN 30709) and the brickworks (PRN 31423). The raising general ground levels should largely protect the underlying deposits, and the extent of disturbance from piling would be minimal.

4.2.16 Peat deposits could contain important palaeo-environmental information, although these are known to exist at depths of between c.1.5m and 4m, and combined with the ground level raising any such deposits are very unlikely to be directly affected by the proposed works. It is possible that the development could cause indirect adverse effects to the peat deposits through de-watering.

4.2.17 The area allocated for the potential pumping station, as illustrated in drawing number UD04 should not disturb any known archaeological remains as visible from the historic mapping, although it does lie in close proximity to the location of a former forge associated with the Burry Extension Works (PRN 30709).

Proposed Eco-Park & Residential Development, Machynys Mound, Llanelli:
Archaeological Desk-Based & Impact Assessment Update

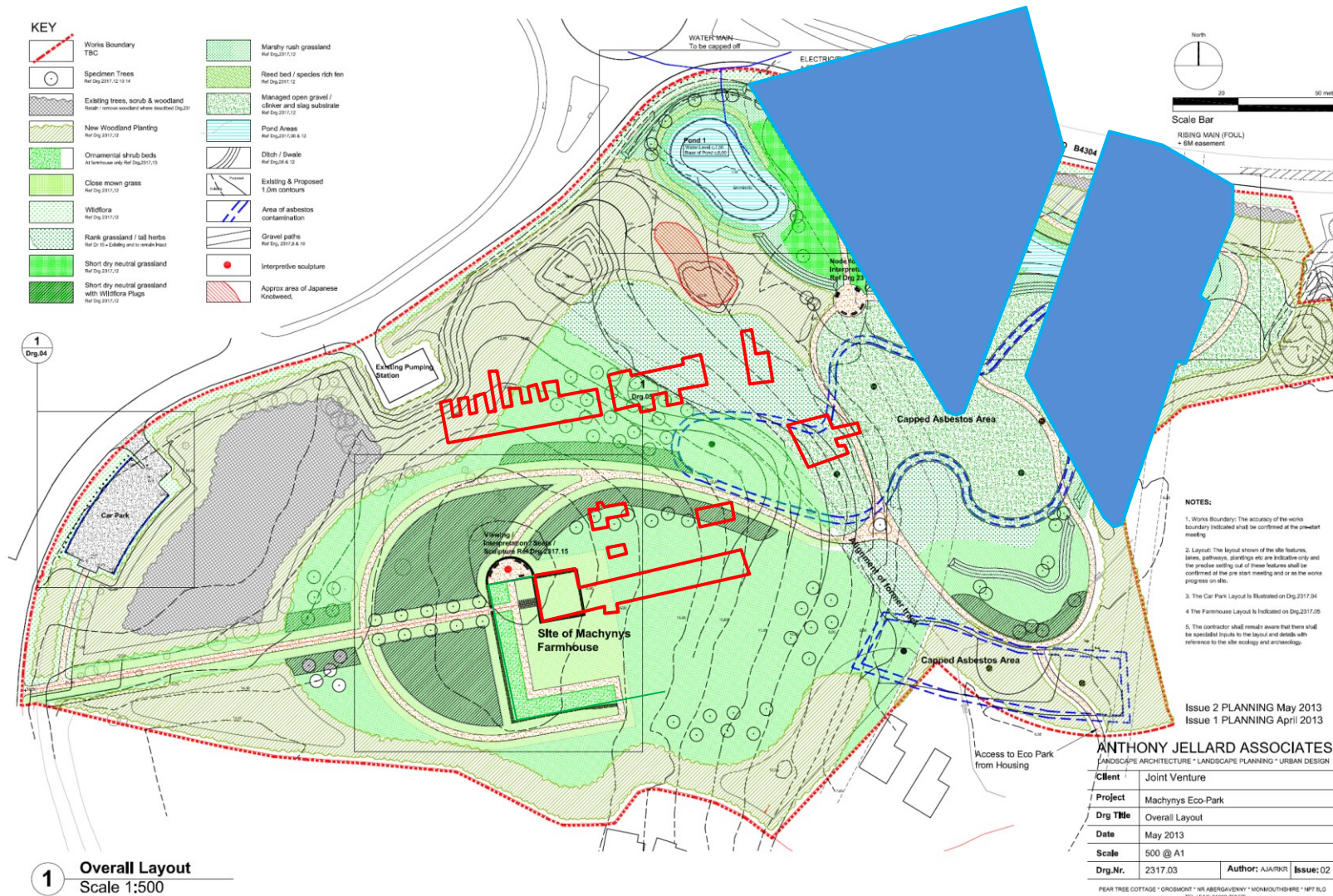
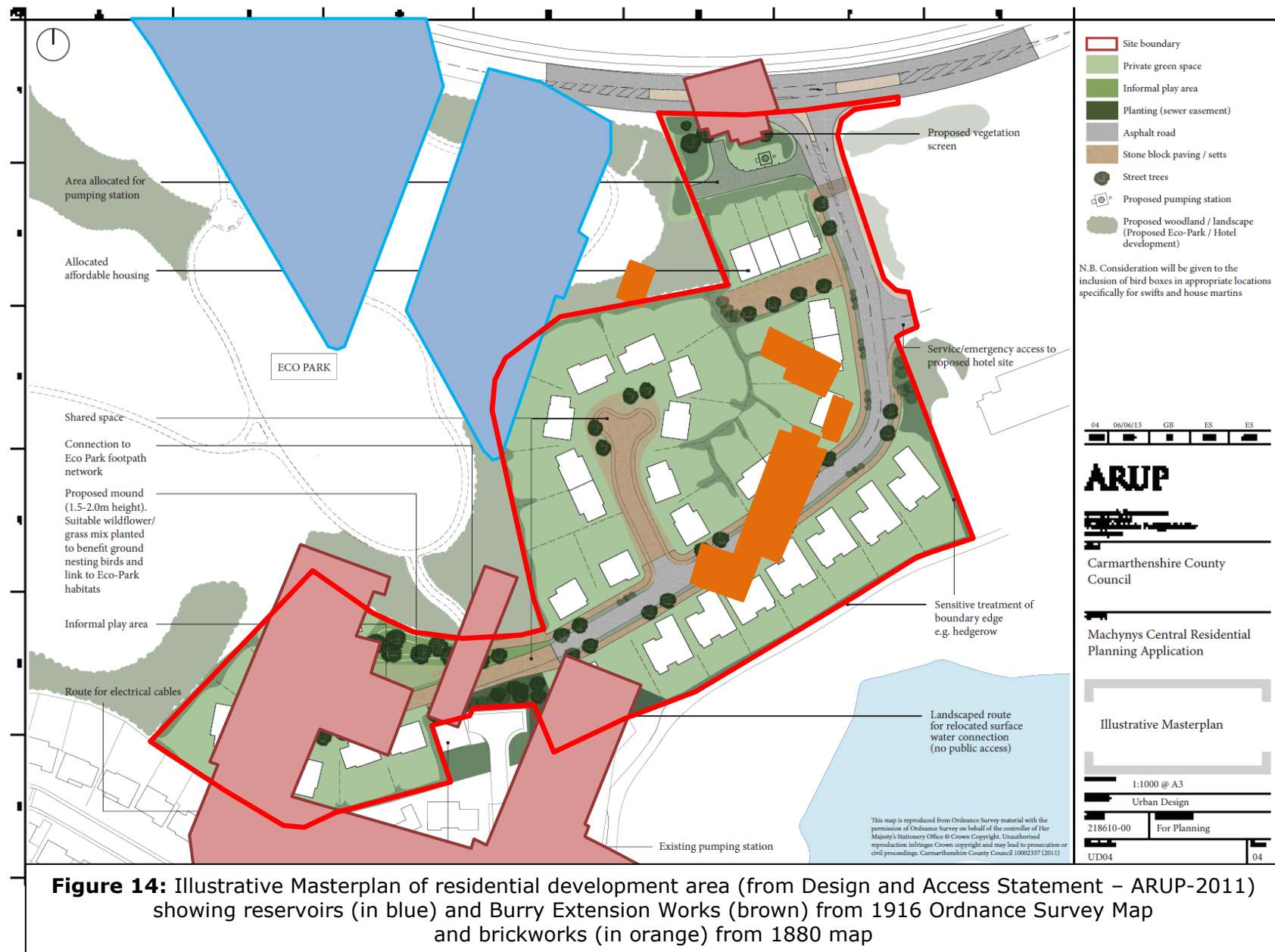


Figure 13: Eco-Park development proposal plan overlaid with former buildings of Cliff Terrace, School, Chapel and Machynys Farm (in red) and reservoirs (in blue) from 1916 Ordnance Survey Map



5. ASSESSMENT OF ARCHAEOLOGICAL POTENTIAL AND IMPORTANCE

5.1 As stated in the previous section it is felt the proposed works within the area designated as the Eco-Park could potentially impact on five sites; namely Machynys House and associated features (PRN 6995), Terraced Housing along the former Cliff Terrace (PRN 34014) and Brick Row (PRN 34013), Capel Joppa (PRN 34017) and the nearby reservoirs (PRN 34018).

5.2 The proposed works within the area of the proposed Residential Development could potentially impact on three further sites; namely the brickworks (PRN 31423), the Burry Extension Tinplate Works (PRN 30709) and underlying peat deposits.

5.3 All these sites are discussed below according to which part of the development they lie within and an assessment of their most likely archaeological importance is also made. Numerous other sites have been identified within the study area, but only those sites discussed below are likely to be impacted on by the proposed development.

Eco-Park

5.4 The layout of Machynys House (PRN 6995) is shown on late 19th and early 20th century mapping (Figures 10 - 12), and surviving upstanding walls mark out some the layout of the surrounding garden enclosures. However, as can be seen in Photo 6 the site would have comprised the house, farm buildings, outbuildings and enclosures, but also as this site appears to have a history stretching back into the medieval period its form and layout could have changed significantly over time. As such, the extent of any below-ground remains is currently unknown and as the site has not been developed upon since the farm was demolished, the potential for below-ground remains is considered to be high. Given the potential age-range of the house and local interest in it then the site is considered to be of regional importance.

5.5 The remains of some of the housing along Brick Row (PRN 34013) has been previously investigated archaeologically (DAT 2006) which came to the conclusion that the potential for significant below-ground remains in this area is considered to be low. Should remains of this site exist below-ground then they would be considered to be of local importance.

5.6 Similarly the remains of some of the housing along Cliff Terrace (PRN 34014) were investigated archaeologically (DAT 2006) which revealed that, although inconsistent, archaeological remains associated with the housing did exist. The same is also likely for Capel Joppa (PRN 34017) which also stood on Cliff Terrace, therefore the potential for below-ground remains is considered to be high. Should remains of this site exist below-ground then they would be considered to be of local importance.

5.7 The extent of any below-ground remains associated with the reservoir (PRN 34018) is currently unknown. Should remains of this site exist below-ground then they would be considered to be of local importance.

Residential Development

5.8 The extent of the brickworks site (PRN 31423) is shown quite clearly on late 19th century mapping (Figure 10). Although the site was cleared and redeveloped as part of the Burry Extension Works the redevelopment on the site of the brickworks themselves was not intense. The site has not been investigated archaeologically and therefore the extent and condition of any below-ground remains is currently unknown. Should remains of this site exist below-ground

then they would be considered potentially to be of regional importance given the lack of archaeological evidence from mid to late 19th century brickworks.

5.9 Similarly the extent of the Burry Extension Works (PRN 30709) at the southern end of the site is shown quite clearly on early 20th century mapping (Figure 12 and 14). All above-ground traces of this site have been removed but the extent of any below-ground remains associated with the tinplate works is currently unknown. Should remains of this site exist below-ground then they would be considered to be of local importance.

5.10 As well as the known sites, wetland areas have enormous archaeological potential to provide forms of evidence not present on dry-land sites. The preservation conditions that exist in wetland sites mean that objects made from organic materials survive, often in exceptional condition, whereas on dry sites they decay and leave no trace in the archaeological record. Wetland areas can also contain unique palaeoenvironmental evidence such as pollen, plant remains, insect remains, molluscs, diatoms and foraminifera, which provide contemporary evidence of past environmental conditions and landscapes.

5.11 Previous work to the east of the proposed development area has shown that there is a good surviving environmental record buried across the Llanelli Marsh. However, the past industrialisation and recent ground-moving operations in the east section of the proposed development area has probably already compromised the environmental record in this area. Such remains may have already dried out and thus the organic matter will have already deteriorated.

6. MITIGATION

6.1 There is not considered to be a significant setting impact on any designated sites or sites of high archaeological significance that would warrant any changes to or prevention of the proposed development on archaeological grounds. Basic mitigation is mentioned above associated with the Eco-Park proposals.

Eco-Park

6.2 Within the Eco-Park there is the potential for some archaeological features and deposits to be exposed, damaged or destroyed during the course of these proposed works, specifically any work around Machynys House (PRN 6995) and the creation of the linear ponds over the site of Capel Joppa (PRN 34017) and on Brick Row terrace (PRN 34013).

6.3 Features associated with Capel Joppa and Brick Row, if present, would be considered to be of local importance and the recording of any exposed archaeological features or deposits could be adequately enabled by the undertaking of an archaeological watching brief on the proposed works.

6.4 Machynys House and associated features is considered to be of more regional importance, therefore any ground-breaking work within this area should also be undertaken under archaeological watching brief conditions, with the aim of recording and preserving (if possible) any archaeological remains should they become apparent.

6.5 Consideration should be given to the siting of any works compound and the passage of machinery and materials through the area to avoid impacting on any recorded archaeological remains in the vicinity of the proposed works.

6.6 Consideration should also be given to the potential of Machynys House as a site of a community-led archaeological excavation. The Eco-Park is clearly designed as a useful community resource and care has been taken in its design to highlight the archaeological and historical importance of Machynys House, which is clearly already of significance to local residents. Little is understood about the full history of this site and its development, but given the clear survival of surface remains and the potential for associated sub-surface remains to date back as far as the medieval period, this site provides an ideal candidate for further archaeological investigation and excavation. Such excavation could be operated as a community-led project, possible even as a long-running, seasonal excavation, designed to engage the local community in the history and archaeology of the local area, with relatively minimal professional input in terms of training and supervision. The majority of the Eco-Park could be established, leaving the area of the former farm for archaeological investigation without compromising the development proposals. The information recorded from these investigations would help in the design of the interpretation panels, providing information which is presently lacking. The results would also inform the final design and layout of the pathway markers for the former house.

Residential

6.7 There is the potential for some archaeological features and deposits to be exposed, damaged or destroyed during the course of these proposed works associated with the Burry Extension Works (PRN 30709) and the brickworks (PRN 31423). These features, if present, would be considered to be of local importance and the recording of any exposed archaeological features or deposits could be

adequately enabled by the undertaking of an archaeological watching brief on any proposed ground-breaking activity in their vicinity.

6.8 If peat deposits are encountered during the works, an assessment would need to be made of their significance and whether any palaeo-environmental sampling and analysis should be carried out.

7. SOURCES

Database

Dyfed Archaeological Trust Historic Environment Record, housed with the Dyfed Archaeological Trust in Shire Hall, Carmarthen Street. Llandeilo SA19 6AF

National Monument Records for Wales, housed with the Royal Commission on the Ancient and Historical Monuments of Wales, Aberystwyth.

Online database <http://www.coflein.gov.uk/>

Cartographic

Bowen E	1729	Map of South Wales
Cary J	1787	Map of South Wales
Jones W	1757	Chart
Ordnance Survey	1880	1 st edition 1;2500 Carmarthenshire Sheet LVIII.11
Ordnance Survey	1907	2 nd edition 1;2500 Carmarthenshire Sheet LVIII.11
Ordnance Survey	1916	3 rd edition 1;2500 Carmarthenshire Sheet LVIII.11
Saxton W	1578	Map of Glamorgan
Simpson C	1931	Wales South Coast: Burry Inlet

Published

Bowen D	1856	<i>The history of Llanelli</i> . Translated by J Griffiths. Privately published.
Burd F	1989	<i>Research and assessment in nature conservation No.17: the saltmarsh assessment of Great Britain; an inventory of British saltmarshes</i> . Peterborough. Nature Conservancy Council.
Craig RS, Protheroe Jones R & Symons MV	2002	<i>The Industrial and Maritime History of Llanelli and Burry Port 1750 to 2000</i> . Carmarthenshire County Council
Davidson N	1991	<i>Estuaries, wildlife and man: a summary of nature conservation and estuaries in Great Britain</i> . Peterborough. Nature Conservancy Council.
Davies W	1979	<i>The Llandaff Charters</i> . Aberystwyth, NLW
Hassall C	1794	<i>General view of the agriculture of the county of Carmarthen with observations on the means of its improvement</i> . London. W Smith.
Jones F	1987	<i>Historic Carmarthenshire homes and their families. Carmarthen</i> . Carmarthen Antiquarian Society and Dyfed County Council.
Jones G	1995	A summary of Llanelli's tinsplate industry. In J Edwards (Ed.) <i>Tinopolis: aspects of Llanelli's tinsplate trade</i> , p44-54. Llanelli. Llanelli Borough Council.
Lillie M, Page N, Kirby J & Griffiths G	2003	'Neolithic-Bronze Age landscape development at Machynys, Llanelli'. <i>Archaeology in Wales</i> vol.43, 45-57.
McKibbin E	1995	'Machynys - a vanished village'. In J Edwards (Ed.) 1995, p124-128.

- Rackham O 1994 *The Illustrated history of the countryside*. London. George Weidenfeld and Nicholson Ltd.
- RCAHMW 1917 *Inventory of the ancient monuments Wales and Monmouthshire*. London. HMSO.
- Rees A 2002 'New Dock, Llanelli: the changing landscape'. In the *Carmarthenshire Antiquary*, vol. XXXVIII.
- Smith J & Yonow N 1995 *The coast of Dyfed and southwest Glamorgan: an environmental assessment*. Pembroke. Field Studies Council.
- Symons M 1979 *Coal\mining in the Llanelli area*. Llanelli. Llanelli Borough Council.

Unpublished

- Arup 2011 *Machynys Central Residential Development, Llanelli: Planning, Design and Access Statement* Carmarthenshire County Council
- Arup 2011 *Machynys Eco-Park, Llanelli: Planning, Design and Access Statement* Carmarthenshire County Council
- DAT (Dyfed Archaeological Trust) 2000 *Machynys Golf Course, Machynys, Llanelli: Archaeological Watching Brief* DAT (formerly Cambria Archaeology) Report PRN 37422
- DAT 2006 *Proposed Development at Machynys West, Llanelli: Archaeological Desk-Based Assessment* DAT (formerly Cambria Archaeology) Report No. 2006/19
- DAT 2006 *Proposed Development at Machynys East, Llanelli: Archaeological Desk-Based Assessment* DAT (formerly Cambria Archaeology) Report No. 2006/44
- DAT 2007 *Proposed Development at Machynys East, Llanelli: Archaeological Field Evaluation* DAT (formerly Cambria Archaeology) Report No. 2006/52
- DAT 2007 *Nicklaus Avenue Machynys, Llanelli: Archaeological Desk-Based Assessment* DAT (formerly Cambria Archaeology) Report No. 2007/6
- James H 1993 *Llanelli Sewage Treatment Works: Archaeological Assessment*. Dyfed Archaeological Trust Report
- James H & Morgan E 1994 *Report on the history of past landuse and embankment of Talyclyn & Llangennech Marshes and vegetation patterns and past landuse on Llanlli Marsh*. Dyfed Archaeological Trust Report
- Page N 1997 *Llanelli and Loughor Wetlands: archaeological assessment*. DAT (formerly Cambria Archaeology) report for Cadw. Project No. 31347.
- Page N 1999 *Land at Machynys, Llanelli: archaeological assessment*. DAT (formerly Cambria Archaeology) Project No. 37418.
- Page N 2000 *Llanelli Marsh, Llanelli, Carmarthenshire: archaeological and palaeoenvironmental investigation*. DAT (formerly Cambria Archaeology) Project No. 41365.
- Page N 2005 *Delta Lakes, Coastal Link Road, Llanelli: archaeological Appraisal*. DAT (formerly Cambria Archaeology) Report No.2005/97.

Ramsey, R 2007 *Proposed Development at Machynys West, Llanelli, Carmarthenshire: Archaeological Evaluation* DAT (formerly Cambria Archaeology) Report No. 2007/77

PROPOSED ECO-PARK & RESIDENTIAL DEVELOPMENT, MACHYNYS MOUND, LLANELLI: ARCHAEOLOGICAL DESK-BASED & IMPACT ASSESSMENT UPDATE 2013

RHIF YR ADRODDIAD / REPORT NO. 2013/10
RHIF Y DIGWILLIAD / EVENT RECORD NO. 105379

Mai 2013

May 2013

Paratowyd yr adroddiad hwn gan / This report has been prepared by

Philip Poucher

Swydd / Position: Archaeologist

Llofnod / Signature



..... Date 16/05/13

Mae'r adroddiad hwn wedi ei gael yn gywir a derbyn sêl bendith

This report has been checked and approved by

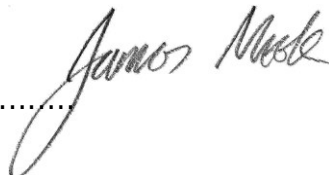
JAMES MEEK

ar ran Ymddiriedolaeth Archaeolegol Dyfed Cyf.

on behalf of Dyfed Archaeological Trust Ltd.

Swydd / Position: Head of Field Services

Llofnod / Signature



... Date 16/05/13

*Yn unol â'n nôd i roddi gwasanaeth o ansawdd uchel, croesawn unrhyw sylwadau
sydd gennych ar gynnwys neu strwythur yr adroddiad hwn*

*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*

