

# **DYNAMIC DUNESCAPES, PEMBREY: ARCHAEOLOGICAL WATCHING BRIEF 2021**



*PRN 105937 Wing Markers Shelter No.1*



Prepared by DAT Archaeological Services  
For: Natural Resources Wales



ymddiriedolaeth archaeolegol  
**DYFED**  
archaeological trust

**DYFED ARCHAEOLOGICAL TRUST**

**REPORT NO. 127944  
EVENT RECORD NO. 2022-01**

December 2021

**DYNAMIC DUNESCAPES, PEMBREY:  
ARCHAEOLOGICAL WATCHING BRIEF 2021**

By

Charlie Enright

*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  
Ty Cornel, Stryd Caerfyrddin, Llandeilo, Sir  
Gaerfyrddin SA19 6AE  
Ffon: Ymholiadau Cyffredinol 01558 823121  
Adran Rheoli Treftadaeth 01558 823131  
Ebost: [info@dyfedarchaeology.org.uk](mailto:info@dyfedarchaeology.org.uk)  
Gwefan: [www.archaeolegdyfed.org.uk](http://www.archaeolegdyfed.org.uk)

*Dyfed Archaeological Trust Limited*  
*The Corner House, Carmarthen Street, Llandeilo,*  
*Carmarthenshire SA19 6AE*  
*Tel: General Enquiries 01558 823121*  
*Heritage Management Section 01558 823131*  
*Email: [info@dyfedarchaeology.org.uk](mailto:info@dyfedarchaeology.org.uk)*  
*Website: [www.dyfedarchaeology.org.uk](http://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 CHAIR: Judith Wainwright MA MSc FIC FRSA CYFARWYDDWR DIRECTOR: K Murphy BA MCIfA**

**DYNAMIC DUNESCAPES, PEMBREY: ARCHAEOLOGICAL WATCHING  
BRIEF 2021**

<b>Client</b>	Natural Resources Wales
---------------	-------------------------

**Event Record No** 127944

<b>Report No</b>	2022-01
------------------	---------

**Project Code** FS21 029

<b>Report Prepared By</b>	Charlie Enright
---------------------------	-----------------

**Fieldwork Undertaken By** Charlie Enright

<b>Illustrated By</b>	Charlie Enright
-----------------------	-----------------

**Report Approved By** Fran Murphy

Rev Number	Description	Undertaken	Approved	Date
_V1	Final draft	CE	FM	08/02/2022



**DYNAMIC DUNESCAPES, PEMBREY: ARCHAEOLOGICAL WATCHING  
BRIEF 2021**

**CONTENTS**

<b>EXECUTIVE SUMMARY/CRYNODEB GWEITHREDOL</b>	<b>1</b>
<b>1 INTRODUCTION</b>	<b>2</b>
1.1 Project Commission	2
1.2 Scope of the Project	2
1.3 Report Outline	2
1.4 Abbreviations	3
1.5 Illustrations	3
1.6 Timeline	4
<b>2 SITE LOCATION AND TOPOGRAPHY</b>	<b>6</b>
<b>3 ARCHAEOLOGICAL AND HISTORICAL BACKGROUND</b>	<b>7</b>
3.1 Historical Background	7
3.2 Recorded Archaeological Sites	7
<b>4 WATCHING BRIEF METHODOLOGY</b>	<b>11</b>
4.1 Fieldwork	11
4.2 Post-fieldwork Reporting and Archiving	11
<b>5 RESULTS</b>	<b>12</b>
5.1 Area 1	12
5.2 Area 2	14
<b>6 CONCLUSIONS</b>	<b>18</b>
<b>7 SOURCES</b>	<b>19</b>
<b>APPENDIX 1: WRITTEN SCHEME OF INVESTIGATION</b>	<b>20</b>

## FIGURES

<b>Figure 1:</b>	Location map showing assessment areas at Pembrey Burrows.	4
<b>Figure 2:</b>	Aerial photograph showing the two areas where sea buckthorn removal is proposed (Google Satelite).	5
<b>Figure 3:</b>	Known archaeological assets within Area 2	10

## TABLES

<b>Table 1:</b>	Archaeological and historical timeline for Wales	3
<b>Table 2:</b>	Known archaeological assets within and in the vicinity of Area 2	9

## PHOTOGRAPHS

<b>Photo 1:</b>	Area 1 prior to clearance.	12
<b>Photo 2:</b>	The mechanical excavator equipped with a tree shear attachment for cutting the buckthorn.	13
<b>Photo 3:</b>	An example of an area following clearance.	13
<b>Photo 4:</b>	The tracked tractor with a mulching attachment used to clear buckthorn in Area 2.	14
<b>Photo 5:</b>	PRN 31415 Main Markers Shelter. View NNW.	15
<b>Photo 6:</b>	PRN 31415 Main Markers Shelter. Southwest facing (seaward) elevation.	15
<b>Photo 7:</b>	PRN 105937 Wing Markers Shelter No.1. southwest facing (seaward) elevation.	16
<b>Photo 8:</b>	PRN 118045 Pill box. Largely obscured from view by vegetation atop the sand dune. Southwest facing (seaward) elevation.	16
<b>Photo 9:</b>	Area 2 looking northwest after buckthorn had been removed.	17

## **PEMBREY BURROWS SEA BUCKTHORN REMOVAL ARCHAEOLOGICAL WATCHING BRIEF**

### **EXECUTIVE SUMMARY**

*DAT Archaeological Services were commissioned by Natural Resources Wales to undertake an archaeological watching brief during the mechanical removal of sea buckthorn in two areas of Pembrey Burrows.*

The archaeological potential of Area 1 was considered low and no evidence of archaeological remains were observed during the watching brief.

Area 2 had a high potential for archaeological remains relating to World War II and contained several known historic assets. The condition of these was recorded during the watching brief, but no previously undiscovered archaeological remains were observed.

### **CRYNODEB GWEITHEREDOL**

*Comisiynwyd Gwasanaethau Archaeolegol YAD gan Cyfoeth Naturiol Cymru i gynnal brîff gwylio archeolegol yn ystod y broses fecanyddol o dynnu helygen y môr mewn dwy ardal yn Nhwyni Pen-bre.*

*Ystyriwyd bod potensial archeolegol yn Ardal 1 yn isel ac ni welwyd unrhyw dystiolaeth o weddillion archeolegol yn ystod y brîff gwylio.*

*Roedd gan Ardal 2 botensial uchel ar gyfer olion archeolegol yn ymwneud â'r Ail Ryfel Byd ac roedd yn cynnwys nifer o asedau hanesyddol hysbys. Cofnodwyd cyflwr y rhain yn ystod y brîff gwylio, ond ni welwyd unrhyw olion archeolegol nas darganfuwyd o'r blaen.*

## **1. INTRODUCTION**

### **1.1 Project Commission**

- 1.1.1 DAT Archaeological Services were commissioned by Natural Resources Wales to provide an archaeological watching brief during the removal of the non-native invasive shrub sea buckthorn (*Hippophae rhamnoides*) at two locations on Pembrey Burrows (Area 1 centred on SS 4088 9952 and Area 2 centred on SN3742 0287) which forms the southwestern fringe of Pembrey Country Park in Carmarthenshire (Figures 1 and 2). These areas have dune grassland habitat; however, this has now become shaded out by sea buckthorn and scrub. Dune grassland habitat should recover if the sea buckthorn and scrub is cleared and arisings are collected and disposed of offsite. Area 1 comprises approximately 1.5 hectares of mature sea buckthorn. Area 2 comprises approximately 12.2ha of mainly low-lying sea buckthorn of less density and with some scattered young growth. This area is slightly larger than the estimate given in the WSI, therefore the maps in this report will differ from those in the WSI as they reflect the actual working area. This work forms part of the HLF funded Dynamic Dunescapes project.
- 1.1.2 Following discussions with the archaeological curators at Dyfed Archaeological Trust's Heritage Management section, it has been recommended that an archaeological watching brief be carried out during the sea buckthorn removal, as the proposed clearance areas are located within archaeologically sensitive areas of the Burrows.

### **1.2 Scope of the Project**

- 1.2.1 A written scheme of investigation (WSI) for a watching brief was prepared by DAT Archaeological Services before the commencement of the works, and was approved by Dyfed Archaeological Trust – Heritage Management (DAT-HM) in their capacity as advisors to the local authority, before the commencement of the works (Appendix I). The project objectives were:
- Provision of a written scheme of investigation to outline the methodology by which DAT Archaeological Services will undertake the watching brief.
  - To monitor groundworks to identify the presence/absence of any archaeological deposits.
  - To establish the character, extent and date range of any archaeological deposits to be affected by the proposed groundworks.
  - To appropriately investigate and record any archaeological deposits to be affected by the groundworks.
  - To produce an archive and report of any results.
- 1.2.2 The overall work was summarised as: *"Archaeological attendance and recording during the mechanical removal of sea buckthorn at Pembrey Burrows, Pembrey, Carmarthenshire. Appropriate investigation and recording of any such remains will be undertaken if revealed. A report and archive of the results of the works will be prepared."*



### 1.3 Report Outline

- 1.3.1 This report describes the location of the development works along with their archaeological background and provides a summary and discussion of the archaeological watching brief and its results.

### 1.4 Abbreviations

- 1.4.1 Sites recorded on the regional Historic Environment Record (HER) are identified by their Primary Record Number (PRN) and located by their National Grid Reference (NGR). Sites recorded on the National Monument Record (NMR) held by the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) are identified by their National Primary Record Number (NPRN). Scheduled Monument (SM). Altitude is expressed to Ordnance Datum (OD). References to cartographic and documentary evidence and published sources will be given in brackets throughout the text, with full details listed in the sources section at the rear of the report.

### 1.5 Illustrations

- 1.5.1 Photographic images are to be found within the report. Printed map extracts are not necessarily reproduced to their original scale.

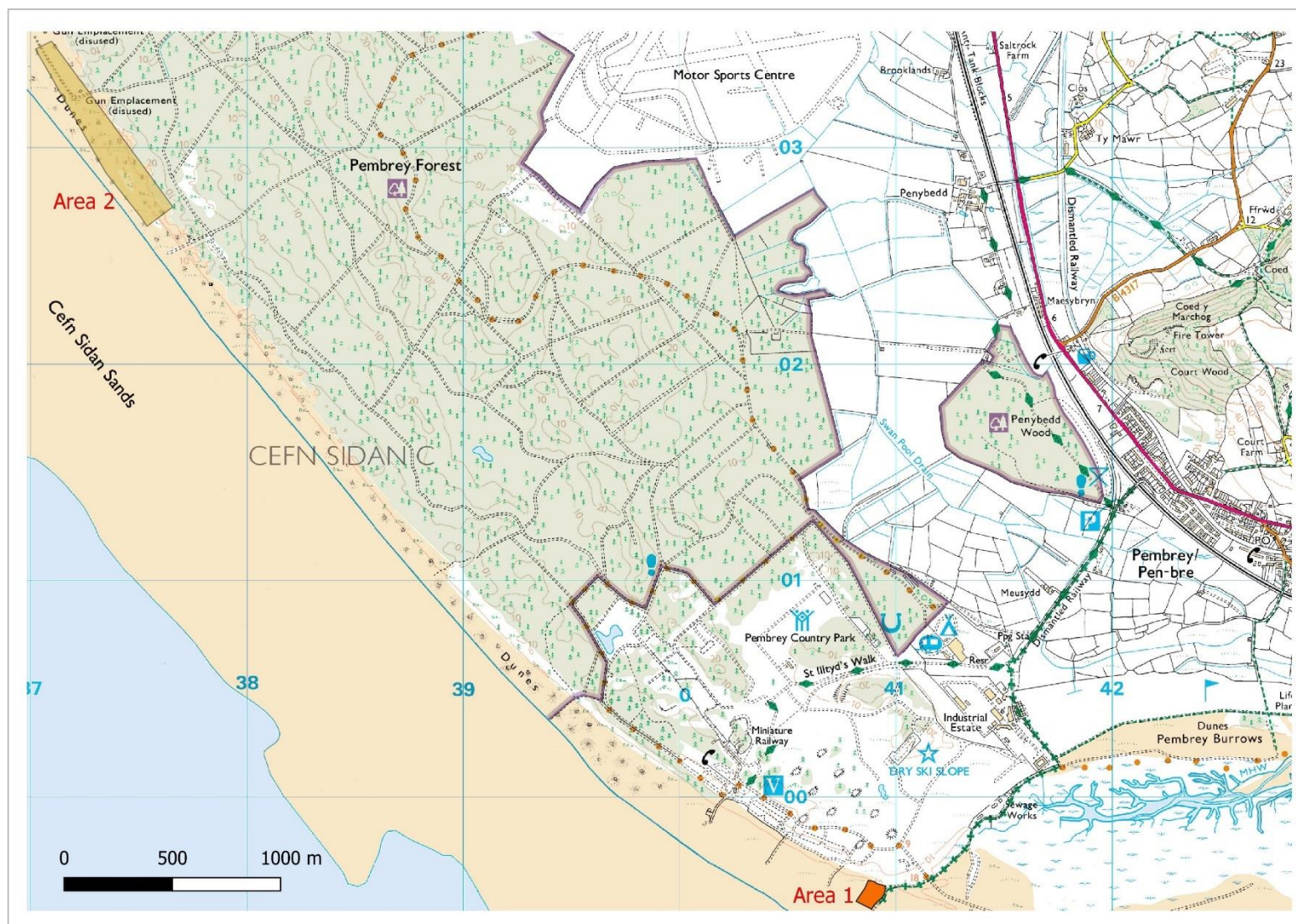
### 1.6 Timeline

- 1.6.1 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:** Archaeological and historical timeline for Wales

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 <sup>1</sup> –	1536 – 1750	
Industrial Period –	1750 – 1899	
modern –	20 <sup>th</sup> century onwards	

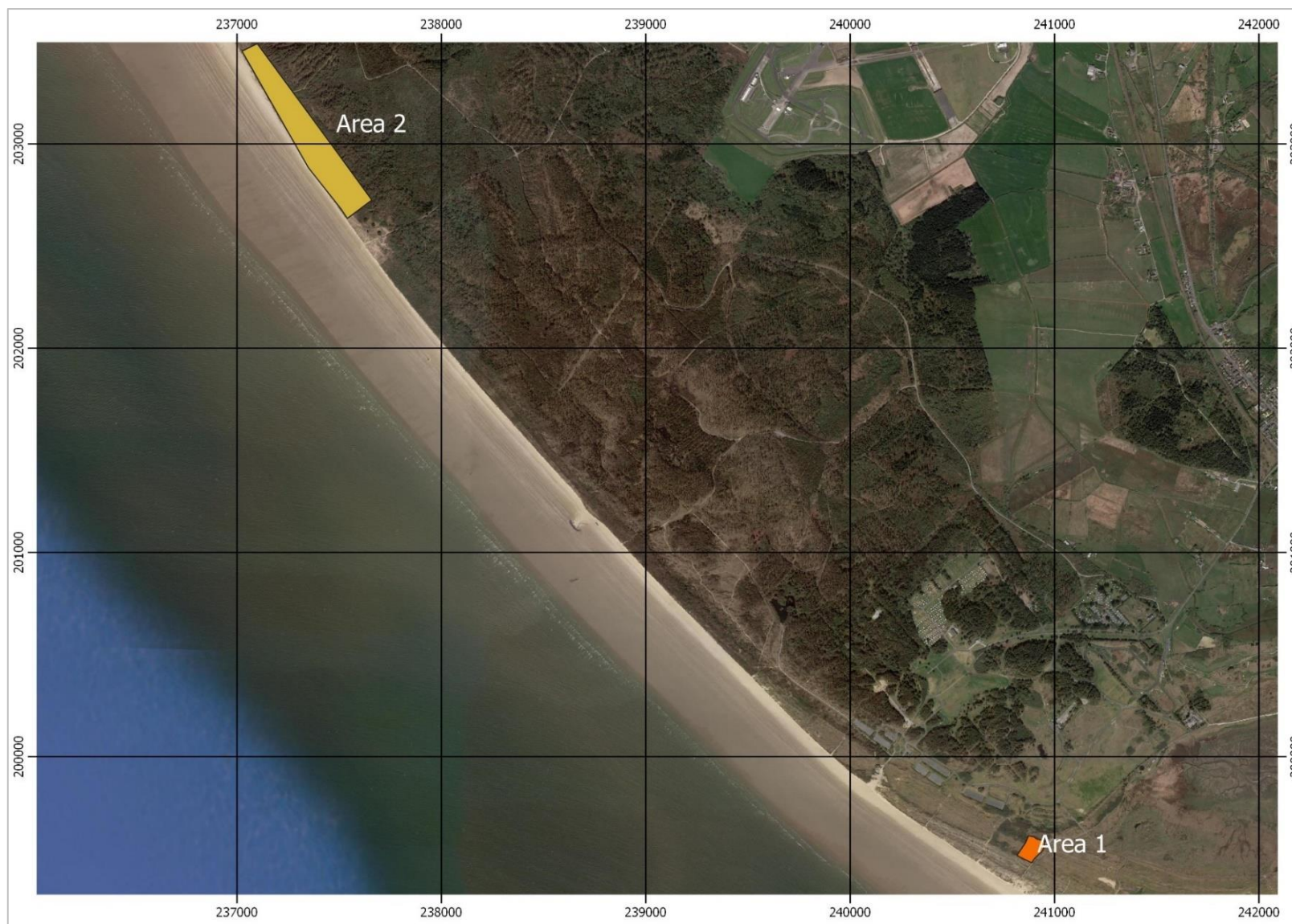
<sup>1</sup> The post-medieval and industrial periods are combined as the post-medieval period on the Regional Historic Environment Record as held by Dyfed Archaeological Trust



**Figure 1:** Location map showing assessment areas at Pembrey Burrows in the Gwendraeth Estuary.

Reproduced from the Ordnance Survey 1:50,000 scale Explorer Map with the permission of The Controller of Her Majesty's Stationary Office, © Crown Copyright Dyfed Archaeological Trust. The Corner House, 6 Carmarthen Street, Llandeilo, Carmarthenshire SA19 6AE. Licence No 100020930





**Figure 2:** Aerial photograph showing the two areas where sea buckthorn removal is proposed (Google Satelite).

## **2. SITE LOCATION AND TOPOGRAPHY**

- 2.1 Pembrey Burrows are located at the southern side of the Gwendraeth Estuary in the eastern part of Carmarthen Bay. The Pembrey Burrows dune system commences in the north at Tywyn Point and extends southwards along the coast before terminating at the town of Burry Port. Pembrey Airfield is located approximately 2km to the east of the Burrows, with Pembrey Forest located immediately adjacent and Pembrey Country Park located at the southern end of the dunes. A swathe of sea buckthorn has colonised the entire dune system running parallel with Cefn Sidan Sands (Figure 2). Natural Resources Wales (NRW) intends to remove the sea buckthorn to enable the regeneration of the dunes to grassland habitat.
- 2.2 Pembrey Forest is owned and managed by NRW and is bordered by the MOD Pembrey Sands Firing Range in the northwest and Pembrey Country Park to the south. The dunes in the latter area are owned by Carmarthenshire County Council.
- 2.3 The northern and southernmost ends of the Pembrey Burrows dune system fall within the Carmarthen Bay Dunes Special Area of Conservation (SAC), and the entire system is encompassed by the Pembrey Coast SSSI (ref 509). In 2014 Pembrey Burrows was subject to a geomorphological appraisal undertaken on behalf of Natural Resources Wales (Pye and Blott 2014). The morphology of the beach at Tywyn Point and the south-eastern end of the Pembrey dunes have been closely monitored since 1998. The monitoring data reveals up to 170m of frontal dune erosion at Tywyn Point, but no net change near the Air Weapons Range control tower, between 1998 and 2013. However, the study also reveals around 40m of dune erosion immediately south of the rock armour at the control tower since 1998. Furthermore, the study notes the vulnerability of the dunes to storm erosion, citing between 5m and 15m of erosion of the dune frontage, and consequent dune cliffing, following the winter storms of 2013/14.
- 2.4 The underlying solid geology of this area is the Bishopstone Mudstone Formation- comprised of mudstone, siltstone and sandstone; sedimentary bedrock formed approximately 313 to 326 million years ago during the Carboniferous period. The superficial geology is one of windblown sand (BGS nd.). The geomorphological assessment undertaken by Pye and Blott (2014), states that the Pembrey Dune system formed over the last 12,000 years during the Late Flandrian (Post-glacial) period. However, the core area of the dune system is less than 500 years old, whilst the major dune-capped barrier spits at either end of the system have developed within the past 130 years.
- 2.5 Following late nineteenth-century efforts to control blowing sand and dune migration, large scale planting of conifers on the dunes was initiated by the Forestry Commission during the middle twentieth century. This planting began in 1929 and continued until 1954. The conifers largely occupy the centre of the dune system, namely Pembrey Forest, whilst the northern and southern ends of the dune system have largely experienced encroachment by scrub, grasses and sea buckthorn. Where active sand

accretion exists, largely at the terminal ends of the dune system, it is possible to find areas of bare sand and mobile dunes (Pye and Blott *ibid.*).

### **3. ARCHAEOLOGICAL AND HISTORICAL BACKGROUND**

#### **3.1 Historical Background**

(After Bell 2016)

- 3.1.1 The area of Pembrey Burrows occupies that part of Pembrey (or 'Towyn') Burrows which is not planted with coniferous forest, i.e., a narrow strip averaging some 150m wide on the seaward side of Pembrey Forest. The Burrows developed at the mouth of the Gwendraeth Fawr over a long period, alongside a series of reclamations around an initial nucleus formed by a tongue of dry land at the foot of Mynydd Penbre. The dune system at The Burrows has developed since at least the 17<sup>th</sup> century but, is not thought to be earlier than the Medieval period. Its seaward development continues, and that part occupied by this area has only developed since 1830. The area was incorporated into the system of Second World War defences around Pembrey Airfield and Ordnance Factory.
- 3.1.2 Work began on the construction of the RAF Pembrey Airfield and Pembrey Sands Air Weapons Range in 1937. The Range opened as the "No. 1 Bombing and Gunnery School" in 1939 before being succeeded in 1941 by the "No.1 Air Gunnery School". Upon the outbreak of the Second World War the Range became integrated into the Carmarthen Stop Line, and several anti-invasion defences were constructed along the coastline and further inland in defence of the airfield. The wartime boundary of the range extended from the north at Tywyn Point to approximately 2.5km south of the present southern border, and accommodated numerous structures and targets along the length of the coast. These included Wing Marker Shelters, Searchlight platforms and the location of the original Bombing Range Control Tower.

#### **3.2 Recorded Archaeological Sites**

- 3.2.1 Pembrey Burrows encompasses an area of archaeologically and historically significant Second World War anti-invasion defences along with later infrastructure relating to an RAF air weapons range located at Tywyn Point. The dune system at Pembrey was densely defended and constituted an integral part of the Carmarthen Stop Line. This stop line was one of a number established throughout the Western Command and comprised coordinated anti-invasion defences stretching between the Ceredigion and Carmarthenshire coastlines. Whilst the archaeological significance of this area has long been acknowledged, the true extent and nature of the archaeology remains somewhat ambiguous and underrepresented in both the regional Historic Environment Record (HER) and the National Monument Record (NMR).
- 3.2.2 Jonathan Berry's unpublished PhD thesis on Second World War anti-invasion defences in south and southwest Wales revealed a significant

number of sites within the Pembrey area, the majority of which were previously unrecorded (Berry 2016). At present the remains highlighted by Berry are not yet recorded on the Dyfed Historic Environment Record nor the National Monument Record (NMR).

- 3.2.3 Consultation of various documentary sources, particularly historic photography, during a 2020 archaeological assessment (Bell, 2020) identified several features of archaeological interest within the Pembrey Burrows area. However, despite some general concordance between these sources there remained significant ambiguity regarding the distribution and nature of the archaeology, particularly regarding the precise locations, and consequently, features were often attributed multiple grid references. Much of the study area was inaccessible owing to the density of the sea buckthorn and therefore areas of archaeological interest could not be verified. Conversely, previously unrecorded archaeological structures were discovered in more accessible areas.
- 3.2.4 Area 2 of the present study was located within an area of medium archaeological potential and contains known archaeological sites of interest. None of the sites within Area 2 has designated status. Details of these sites are presented in Table 2, and their locations mapped in Figure 3. The list of sites is longer than that presented in the WSI because the actual study area was larger than the approximation given in the WSI. Area 1 was situated within an area of less archaeological potential and does not contain any known archaeological sites.

**Table 2:** Known historic assets within and in the vicinity of Area 2 (mapped in Figure 3).

PRN	REF	NAME	TYPE	SUMMARY	EVIDENCE	NGR
31415		Gun emplacement	Gun Emplacement		Rectangular in plan 6.4 x 7.3m with openings facing southwest. One wide rectangular opening in the southwest wall with doorway to side.	SN 3724 0326
105937		Wing Marker Shelter No 1.	Wing marker shelter	A small concrete rectangular plan shelter with a turf-covered concrete roof. Previously incorrectly recorded as a gun emplacement.	A. Pyper site visit.	SN 37380 0298
118045		Pillbox	Pillbox	A pillbox constructed in brick with a shuttered concrete roof. A canted front with wide gun embrasures and small loop-holes in the side and rear walls. Entered from the rear (northeast). Access impossible due to the growth of scrub all over the structure		SN 37138 03408
	Berry 2016	Wing Marker Shelter No 1.		Duplication of PRN 105937	J. Berry site visit	SN 37388 02988
	Berry 2016	Main Markers Shelter		Duplication of PRN 31415	J. Berry site visit	SN 37229 03262



	Berry 2016	Pembrey barbed wire entanglement			J. Berry site visit	SN 37510 02755
	Berry 2016	Military structure		Duplication of PRN 118045	J. Berry site visit	SN 37139 03404



**Figure 3:** Known historic assets within Area 2.



## **4. WATCHING BRIEF METHODOLOGY**

### **4.1 Fieldwork**

- 4.1.1 The watching brief was undertaken following the Chartered Institute of Archaeologists' (CIfA) *Standard and Guidance for an Archaeological Watching Brief* (CIfA 2014).
- 4.1.2 A Written Scheme of Investigation (Appendix I) was prepared by DAT Archaeological Services detailing the proposed archaeological works, and was approved by DAT-HM in their capacity as advisors to the local planning authority.
- 4.1.3 Recording of all archaeological features or deposits conformed to best current professional practice and was carried out following the Recording Manual<sup>2</sup> used by DAT Archaeological Services. A written and photographic record was maintained throughout this watching brief, a summary of which is presented in the Project Archive.
- 4.1.4 An Unexploded Ordnance (UXO) Risk Assessment undertaken by RPS (RPS, 2020), concluded that the risk of UXO at Pembrey Burrows was sufficient to necessitate that the archaeological watching brief was undertaken under the conditions of a UXO watching brief. The risk assessment concluded that the main sources of UXO contamination at Pembrey Burrows are:
- Ordnance associated with the Ministry of Supply Pen-clawdd Experimental Testing and Proofing Area;
  - Ordnance associated with the First World War His Majesty's Explosive Factory/Royal Ordnance Factory, Pembrey and the associated National Filling Factory 18;
  - Ordnance associated with Pembrey Air Weapons Range; and
  - Marine Migrated Ordnance.
- 4.1.5 Cutting of sea buckthorn only took place at ground level with no ground penetration due to UXO risk. In Area 1 large dense stands of buckthorn had to be removed using a mechanical excavator equipped with a tree shear attachment. The shear cuts the plant at ground level leaving the roots and stump remaining. In Area 2 low-lying/medium to smaller stands of buckthorn were mulched using a tracked tractor and mulching attachment.

### **4.2 Post-Fieldwork Reporting and Archiving**

- 4.2.1 All data recovered during the fieldwork were collated into a site archive structured following specifications in *Archaeological Archives: a guide to best practice in creation, compilation, transfer and curation* (Brown 2011), and procedures recommended by the National Monuments Record, Aberystwyth.

---

<sup>2</sup> DAT Archaeological Services have adopted the Recording Manual developed by English Heritage Centre for Archaeology. A copy will be available on-site for inspection if required.

- 4.2.2 The results of the fieldwork have been assessed in local, regional and wider contexts. The report includes a desk-based research element to ensure that the site is placed within its wider archaeological context.

## **5. RESULTS**

### **5.1 Area 1**

- 5.1.1 The density of sea buckthorn in area 1 prevented a walkover survey of the site before the mechanical excavators moved in (See Photo 1).
- 5.1.2 The buckthorn was cleared using a mechanical excavator equipped with a tree shear attachment (See Photo 2). The plants were cut at ground level leaving the roots and stumps remaining, the arisings were removed from the area to the nearby fisherman's car park for chipping.
- 5.1.3 As areas were cleared of buckthorn it was possible to carry out a walkover survey. Although some detritus was left behind (Photo 3) any upstanding archaeological remains should have been visible.
- 5.1.4 No archaeological remains were observed in Area 1.



**Photo 1:** Area 1 prior to clearance.





**Photo 2:** The mechanical excavator is equipped with a tree shear attachment for cutting the buckthorn.



**Photo 3:** An example of an area following clearance.



## 5.2 Area 2

- 5.2.1 In Area 2 the sea buckthorn consisted of low-lying medium to small stands and was mulched in-situ using a tracked tractor with a mulching attachment (Photo 4).
- 5.2.2 During the watching brief in Area 2 PRNs 31415, 105937 and 110845 were all recorded. PRN 31414 was also seen but it was located just beyond the most northern edge of the mulching area on MOD property. The barbed wire entanglement noted by Berry (2016) was not seen. The location of each historic asset is shown in Figure 3. Photos 5 - 8 show the condition of each asset at the time of the watching brief. PRNs 31415 and 105937 were largely clear of buckthorn and other vegetation growth. They are exposed to the elements but appear to be in a good and stable condition. PRN 118045 is located on top of a dune and is largely obscured from view by vegetation and the build-up of sand around it. The entrance is partially buried and the pillbox is filling with sand inside, but it is uncertain to what depth.
- 5.3.3 Photo 9 shows area 2 looking northwest after the buckthorn had been cleared.



**Photo 4:** The tracked tractor with a mulching attachment used to clear buckthorn in Area 2.



**Photo 5:** PRN 31415 Main Markers Shelter. View NNW.



**Photo 6:** PRN 31415 Main Markers Shelter. Southwest facing (seaward) elevation.





**Photo 7:** PRN 105937 Wing Markers Shelter No.1. Southwest facing (seaward) elevation.



**Photo 8:** PRN 118045 Pillbox. Largely obscured from view by vegetation atop of the dune. Southwest facing (seaward) elevation.





**Photo 9:** Area 2 looking northwest after buckthorn had been removed.

## **6. CONCLUSIONS**

- 6.1 The watching brief has monitored the removal of sea buckthorn in two areas of Pembrey Dunes totalling an area of approximately 13.7ha.
- 6.2 Area 1, with a low potential for archaeological remains and previously inaccessible before the watching brief, had no archaeological remains identified within it.
- 6.3 In Area 2 archaeological remains associated with World War II were identified. Each of these had been previously identified and recorded in the regional HER (PRNs 31415, 5728764 and 118045). No previously undiscovered archaeological remains were identified during the watching brief.
- 6.4 Overall, the removal of sea buckthorn does not appear to have had an impact on the historic assets and all those observed appear currently to be in a good and stable condition. However, they are exposed to the elements and over time their condition will likely deteriorate.



## 7. SOURCES

### Published

BGS nd. British Geological Survey [online] available at  
<<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>> Accessed February 2021

CIfA, 2014. *Standard and Guidance for an Archaeological Watching Brief*, Chartered Institute for Archaeologists.

Pye, K. and Blott, S. J. 2014. *Pembrey Burrows – a geomorphological appraisal and options for dune rejuvenation*. NRW Evidence Report No.42., Bangor Natural Resources Wales.

### Unpublished

Bell, M. 2020. *Pembrey Burrows Dune Grassland Restoration: Historic Environment Desk-based Assessment*. Dyfed Archaeological Trust report no. 2020/30

Bell, M. 2020. Pembrey Burrows Sea Buckthorn Removal, Carmarthenshire: Archaeological Watching Brief SN 38260 01859. Dyfed Archaeological Trust report no. 2021/18

Berry, J. 2016: *Second World War anti-invasion defences in south and south-west wales: A comparative case study area based approach*. Unpublished PhD thesis

Pyper, A. and Page, M. 2014. *Twentieth century military sites: Airfields – dispersed sites and defences Final report: A threat-related assessment 2013-2014* Dyfed Archaeological Trust report no. 2012/70

RPS, 2020. *UXO Mitigation Report (Stage 3) Dynamic Dunescapes – Pembrey Burrows*. RPS Explosive Engineering Services

### Cartographic

1953 National Grid series Ordnance Survey Map, Carmarthenshire, 1:10,560

### Database

Dyfed Archaeological Trust Historic Environment Record, housed with Dyfed Archaeological Trust in The Corner House, Llandeilo, Carmarthenshire, SA19 6AE

RCAHMW Coflein Database: -<http://www.coflein.gov.uk/>

Cof Cymru - National Historic Assets of Wales:  
<http://cadw.gov.wales/historicenvironment/recordsv1/cof-cymru/?lang=en>

Historic Wales: - <http://historicwales.gov.uk>

## APPENDIX I

### **DYNAMIC DUNESCAPES, PEMBREY, ARCHAEOLOGICAL WATCHING BRIEF 2021 WRITTEN SCHEME OF INVESTIGATION**

#### **1 INTRODUCTION**

- 1.1 This Written Scheme of Investigation (WSI or specification) has been prepared by DAT Archaeological Services (the contracting arm of Dyfed Archaeological Trust) to provide a methodology for an archaeological watching brief during the removal of the non-native invasive shrub sea buckthorn (*Hippophae rhamnoides*) within two areas at Pembrey Burrows centred on Area 1) SS4088 9952 and Area 2) SN3742 0287 (Figure 1) which forms the southwestern fringe of Pembrey Country Park in Carmarthenshire. This WSI has been commissioned by Natural Resources Wales.
- 1.2 These areas have dune grassland habitat; however, this has now become shaded out by sea buckthorn and scrub. Dune grassland habitat should recover if the sea buckthorn and scrub is cleared and arisings are collected and disposed of offsite. Area 1 comprises approximately 1.5 hectares of mature sea buckthorn. Area 2 comprises approximately 8ha of mainly low-lying sea buckthorn of less density and with some scattered young growth.
- 1.3 Pembrey Burrows are located at the southern side of the Gwendraeth Estuary in the eastern part of Carmarthen Bay. The Pembrey Burrows dune system commences in the north at Tywyn Point and extends southwards along the coast before terminating at the town of Burry Port. Pembrey Airfield is located around 2km to the east of the Burrows with Pembrey Forest located immediately adjacent and Pembrey Country Park located at the southern end of the dunes. A swathe of sea buckthorn has colonised the entire dune system running parallel with Cefn Sidan Sands. NRW intends to remove the sea buckthorn to enable a regeneration of the dunes to a grassland habitat. This work forms part of the HLF funded Dynamic Dunescapes project.
- 1.4 Pembrey forest is owned and managed by Natural Resources Wales and is bordered by the MOD Pembrey Sands Firing Range in the northwest and the Country Park at its southern end. The sand dunes at this end fall within the ownership of Carmarthenshire County Council.
- 1.5 Pembrey Burrows encompasses an area of archaeological and historically significant Second World War anti-invasion defences along with later infrastructure relating to the Air Weapons Range located at the northern most extent of the burrows at Tywyn Point. The archaeological significance of the area was highlighted in an unpublished PhD thesis undertaken by Jonathon Berry, Senior Inspector at Cadw in 2016<sup>3</sup> and in subsequent archaeological assessments undertaken by Dyfed Archaeological Trust in 2016<sup>4</sup> and specifically of the Burrows in 2020<sup>5</sup>, and demonstrated that the dune system at Pembrey were densely defended and constituted an integral part of the Carmarthen Stop Line. This stop line was one of a number established throughout the Western Command and comprised co-ordinated

---

<sup>3</sup> Berry, J. 2016: Second World War anti-invasion defences in south and south-west Wales: A comparative case study area based approach.

<sup>4</sup> Bell, M. 2016: Pembrey Sands Air Weapons Range: Archaeological Survey in Advance of Sea Buckthorn Removal. Dyfed Archaeological Trust

<sup>5</sup> Bell, M. 2020: Pembrey Burrows: Archaeological Survey in Advance of Sea Buckthorn Removal. Dyfed Archaeological Trust

anti-invasion defences stretching between the Ceredigion and Carmarthenshire coastlines.

- 1.6 Cutting in Area 1 will only be at ground level with no ground penetration due to UXO risk. The clearance will be undertaken under the conditions of an Unexploded Ordnance (UXO) watching brief following the findings of a detailed UXO Risk Assessment undertaken by RSP. The assessment concluded that the main sources of UXO contamination at Pembrey Burrows are:
- Ordnance associated with the Ministry of Supply Pen-clawdd Experimental Testing and Proofing Area,
  - Ordnance associated with the First World War His Majesty's Explosive Factory/Royal Ordnance Factory Pembrey and the associated National Filling Factory 18.
  - Ordnance associated with Pembrey Air Weapons Range,
  - Marine Migrated Ordnance.
- 1.7 The UXO risk mitigation strategy is detailed in the "UXO Mitigation Report (Stage 3) Dynamic Dunescapes – Pembrey Burrows<sup>6</sup>" prepared by RPS for NRW.
- 1.8 Following discussions with the archaeological curators at Dyfed Archaeological Trust's Heritage Management section, it has been recommended that an archaeological watching brief is carried out during the sea buckthorn removal, as the proposed clearance areas are located with archaeologically sensitive areas of the Burrows.
- 1.9 The following written scheme of investigation outlines the methodology through which DAT Archaeological Services will undertake an archaeological watching brief, in accordance with the conditions of the UXO mitigation constraints, during the removal of the sea buckthorn which may potentially expose, damage or destroy archaeological remains. Should any significant archaeological features be revealed, then a programme of further mitigation can be formulated and potentially implemented prior to any further clearance.
- 1.10 This written scheme of investigation (WSI) has been prepared in accordance with the Chartered Institute for Archaeologists (CIfA) Standard and Guidance for Archaeological Watching Briefs (CIfA 2014). A copy will be sent to the archaeological curator for their approval.
- 1.11 DAT Archaeological Services has considerable experience of this type of project and always operates to best professional practice. DAT Archaeological Services is the contractual arm of Dyfed Archaeological Trust that has its own Health and Safety Policy, and all works are covered by appropriate Employer's Liability and Public Liability Insurances. Copies of all are available on request.
- 1.12 **Dyfed Archaeological Trust is a CIfA Registered Organisation and all permanent staff are CSCS registered.**

---

<sup>6</sup> RPS, 2020. UXO Mitigation Report (Stage 3) Dynamic Dunescapes – Pembrey Burrows. Report Number EES1135 R-10-02. RPS Explosives Engineering Services

## **2 HISTORICAL BACKGROUND**

(After Bell 2016)

- 2.1 The area of Pembrey Burrows occupies that part of Pembrey (or 'Towyn') Burrows which is not planted with coniferous forest, ie. a narrow strip averaging some 150 m wide on the seaward side of Pembrey Forest. The Burrows developed at the mouth of the River Gwendraeth Fawr over a long period, alongside a series of reclamations around an initial nucleus formed by a tongue of dry land at the foot of Mynydd Penbre. The Burrows have developed since the 17th century at least but, are not thought to be earlier than the Medieval period. Their seaward development continues, and that part occupied by this area has only developed since 1830. The area was incorporated into the system of Second World War defences around Pembrey Airfield and Ordnance Factory.
- 2.2 Work began on the construction of the RAF Pembrey Airfield and Pembrey Sands Air Weapons Range in 1937. The Range opened as the "No. 1 Bombing and Gunnery School" in 1939 before being succeeded in 1941 by the "No.1 Air Gunnery School". During the outbreak of the Second World War the Range became integrated into the Carmarthen Stop Line and a number of anti-invasion defenses were constructed along the coastline and further inland in defence of the airfield. The wartime boundary of the range extended from the north at Tywyn Point to approximately 2.5km south of the present southern border and accommodated numerous structures and targets along the length of the coast. These included Wing Marker Shelters, Searchlight platforms and the location of the Original Bombing Range Control Tower.

## **3 SEA BUCKTHORN REMOVAL AND UXO WATCHING BRIEF**

- 3.1 The removal of the sea buckthorn will be undertaken by A J Butler Contracting (AJB) and the UXO watching brief is being conducted by RPS Explosives Engineering Services.
- 3.2 AJB have prepared a method statement for the sea buckthorn clearance (09/09/2021). That states:
  - These areas have dune grassland habitat; however, this has now become shaded out by sea buckthorn and scrub. Dune grassland habitat should recover if the sea buckthorn and scrub is cleared, and arisings are collected and disposed of offsite.
  - The scrub in Area 1 consists mainly of mature sea buckthorn. There is approximately 1.5 hectares of scrub to be cleared. Area 2 mainly consists of low-lying sea buckthorn of less density and with some scattered young growth.
  - The ground conditions consist of undulating sand dunes and sometimes steep gradients and drops, particularly near the beach.
  - The following method of clearance has been outlined by the clearance contractors AJB:
    - **AREA 1** - Larger dense stands must be removed using a mechanical excavator equipped with a tree shear attachment, the shear will cut the plant at ground level leaving the roots and stump remaining. The arisings will be removed with a telehandler and grab to the old fisherman's car park

for processing. The material will be chipped directly into a walking floor lorry and removed from site and delivered to western Bioenergy in Margam. A matt of arisings must be avoided as this will impede new dune grassland growth and add unwanted nutrients to the habitat.

- Due to this area being very close to public rights of way and public eye in general, it is proposed that a circa 10metre swath of scrub is left next to the car park which will act as a natural screen. A single point of entry from the car park will be used to access the work area. The excavators will work towards the sea in a narrow strip (circa 10 metres). Once at the far end of the work area they will work backwards in small blocks using the scrub as a natural screen/barrier with heras fencing/banksman bolstering security at the car park end of the site.
  - **AREA 2** - Low-lying/medium to smaller stands should be mulched using our tracked tractor and mulching attachment and remote-controlled mower (for steeper or reduced access situations). On smaller scrub we will endeavour to use our heavy-duty mower collector which would be more efficient. The arisings are to be raked into piles with an excavator, transported with a tracked dumper or telehandler and placed in a chosen sacrificial area or buried as agreed with NRW representatives.
- 3.3 The UXO contractor RPS has stated that all persons involved in the project should attend a toolbox talk prior to the commencement of any works and that they ought to be aware of the emergency procedures in the event of encountering a suspected item of UXO.
- 3.4 RPS recommends that an UXO consultant is present during any excavation work, to act as a UXO banksman. The UXO consultant will conduct an enhanced visual inspection, with a magnetometer, prior to each removal and confirm the identity of any suspicious objects noted during the clearance. The UXO consultant will maintain a visual overwatch of the clearance as detailed in Figure 2, for the duration of the work.

#### **4. RECORDED ARCHAEOLOGICAL SITES**

- 4.1 Pembrey Burrows encompasses an area of archaeological and historically significant Second World War anti-invasion defences along with later infrastructure relating to the RAF air weapons range located at the northern most extent of the burrows at Tywyn Point. The dune system at Pembrey was densely defended and constituted an integral part of the Carmarthen Stop Line. This stop line was one of a number established throughout the Western Command and comprised co-ordinated anti-invasion defences stretching between the Ceredigion and Carmarthenshire coastlines. Whilst the archaeological significance of this area has long been acknowledged, the true extent and nature of the archaeology remains somewhat ambiguous and underrepresented in the regional Historic Environment Record (HER) held at Dyfed Archaeological Trust, and the RCAHMW National Monument Record.
- 4.2 Jonathan Berry's (Cadw Senior Inspector) 2016 unpublished thesis on the study of Second World War anti-invasion defences in south and southwest Wales revealed a significant number of sites within the Pembrey area, the majority of which were previously unrecorded sites. At present the remains highlighted by Berry are not yet recorded on the Dyfed Historic

Environment Record or the Royal Commission on the Ancient and Historical Monuments of Wales (RCAHMW) National Monument Record (NMR).

- 4.3 Consultation of various documentary sources, particularly historic photography, during the 2020 archaeological assessment (Bell, 2020) identified several features of archaeological interest within the Pembrey Burrows area. However, despite some general concordance between these sources there remained significant ambiguity regarding the distribution and nature of the archaeology, particularly regarding the precise locations and consequently features were often attributed with multiple grid references. Much of the study area was inaccessible owing to the density of the sea buckthorn and therefore areas of archaeological interest could not be verified. Conversely, previously unrecorded archaeological structures were discovered in more accessible areas.
- 4.4 Area 2 is located within an area of medium archaeological potential and contains known archaeological sites of interest. None of the sites within Area 2 have designated status. These sites are presented in Table 1 and shown in Figure 4. Area 1 is situated within an area of less archaeological potential and does not contain any known archaeological sites.

**Table 1:** Known archaeological assets within and in the vicinity of the Area 2 (shown in Figure 3).

PRN	REF	NAME	TYPE	SUMMARY	EVIDENCE	NGR
105937		Wing Marker Shelter No 1.	Wing marker shelter	A small concrete rectangular plan shelter with a turf covered concrete roof. Previously incorrectly recorded as a gun emplacement.	A Pyper site visit.	SN 37380 0298
	J Berry 2016	Wing Marker Shelter No 1.		Duplication of PRN 105937	J Berry site visit	
	J Berry 2016	Pembrey barbed wire entanglement			J Berry site visit	SN 37510 02755

## 5 WATCHING BRIEF

- 5.1 The definition of archaeological watching brief, taken from the Chartered Institute for Archaeologists Standards and Guidance: for Archaeological Watching Briefs (CIfA S&G: AWB 2014) is a formal programme of observation and investigation conducted during any operation carried out for

non-archaeological reasons. This will be within a specified area or site on land, inter-tidal zone or underwater, where there is a possibility that archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report and ordered archive.

- 5.2 The purpose of a watching brief, as laid down in the CIfA S&G AWB is:  
*to allow, within the resources available, the preservation by record of archaeological deposits, the presence and nature of which could not be established (or established with sufficient accuracy) in advance of development or other potentially disruptive works;*  
*to provide an opportunity, if needed, for the watching archaeologist to signal to all interested parties, before the destruction of the material in question, that an archaeological find has been made for which the resources allocated to the watching brief itself are not sufficient to support treatment.*
- 5.1 This document provides a scheme of works for:

***Archaeological attendance and recording during the mechanical removal of sea buckthorn at Pembrey Burrows, Pembrey, Carmarthenshire.***

## **6 PROJECT OBJECTIVES**

- 6.1 Provision of a written scheme of investigation to outline the methodology by which DAT Archaeological Services will undertake the archaeological watching brief.
- 6.2 To monitor groundworks in order to identify the presence/absence of any archaeological deposits.
- 6.3 To establish the character, extent and date range for any archaeological deposits to be affected by the proposed groundworks.
- 6.4 To appropriately investigate and record any archaeological deposits to be affected by the groundworks.
- 6.5 To produce an archive and report of any results.

## **7 ARCHAEOLOGICAL WATCHING BRIEF METHODOLOGY**

- 7.1 The watching brief will entail an archaeologist being present during all stages of the sea buckthorn removal where there is a potential for archaeological remains to be exposed, damaged or destroyed.
- 7.2 It is essential that coordination between the site contractors and archaeologist is established at the outset to avoid any potential disturbance to the monument without an archaeologist being present, or unnecessary visits to the site when works are being carried out that do not require the presence of an archaeologist.
- 7.3 Adequate time must be made available to the visiting archaeologist to ensure that appropriate recording can be undertaken of any archaeological features or deposits exposed during ground works.
- 7.4 Recording of all archaeological features or deposits will conform to best current professional practice. Significant archaeological features or

deposits will be drawn at a suitable scale (no less than 1:20) and photographed in an appropriate format.

- 7.5 All archaeologically significant finds (if found) will be retained and, where possible, related to the contexts from which they derived. All finds, except those deemed to be Treasure, will remain the property of the landowner.
- 7.6 Under the 1996 Treasure Act, "treasure" can be summarised as:
- Any object other than a coin containing at least 10% gold or silver and at least 300 years old;
  - Any prehistoric assemblage of base metal;
  - Coins found together which contain 10% gold or silver (but no single coins) and groups of at least 10 coins of other metals, provided they are at least 300 years old;
  - Any object found associated with treasure except unworked natural objects; and
  - Any object which would have been Treasure Trove before the 1996 Act but not covered above.
- 7.7 In the event that unforeseen archaeological discoveries are made during the development, or that archaeological remains of high significance are exposed, the appointed Archaeological Contractor shall have the power to halt any ground works and shall inform the site agent/project manager and prepare a written statement with plan detailing the archaeological evidence. Following assessment of the archaeological remains and consultation the archaeological curator at Dyfed Archaeological Trust's Heritage Management section, the appointed Archaeological Contractor shall, if required, implement on behalf of the Client a contingency scheme for salvage excavation of affected archaeological features.
- 7.8 In the very unlikely event that human remains are encountered, the District Coroner's Office and the Police will be notified immediately. All human remains will, where possible, be left *in situ*. If preservation *in situ* is not possible all statutory permissions will be obtained in writing before removal begins.

## **8 POST-FIELDWORK REPORTING AND ARCHIVING**

- 8.1 An archive will be prepared if it meets the requirements of the Dyfed Archaeological Trust archive retention policy (2018). If it does, then data recovered during the evaluation will be collated into a site archive structured in accordance with the specifications in Archaeological Archives: a guide to best practice in creation, compilation, transfer and curation (Brown 2011), and the procedures recommended by the National Monuments Record, Aberystwyth. The National Standards for Wales for Collecting and Depositing Archaeological Archives produced by the Federation of Museums and Art Galleries of Wales will also be adhered to. Digital archives will be collated using the Royal Commission on the Ancient and Historical Monuments of Wales systems (2015) and deposited with the RCAHMS. The Guidance for the Submission of Data to the Welsh Historic Environment Records (HERs) shall be followed.
- 8.2 The results of the fieldwork will be assessed in local, regional and wider contexts.
- 8.3 The results will be used to inform subsequent design considerations of the proposed development so that they can aim to avoid impacts upon any



archaeological remains or that further archaeological mitigation can be implemented before such remains are disturbed.

- 8.4 The project archive, including all significant artefacts and ecofacts (excepting those which may be deemed to be Treasure) will be deposited with an appropriate body following agreement with the landowner (if retained and containing more than just digital information).
- 8.5 DAT Archaeological Services will arrange for the deposition of finds, and ascertain the costs of storage and deposition, with an approved body before the project commences and inform DAT-HM of the arrangement which has been made.
- 8.6 A summary of the project results, excluding any confidential information, may be prepared for wider dissemination (e.g. Archaeology in Wales and special interest and period-specific journals).
- 8.7 The report will be prepared to follow the Standard and Guidance for Archaeological Watching Briefs (CIfA S&G: AWB 2014).
- 8.8 Digital copies of the report will be provided to the client, as well as the regional HER and DAT-HM.
- 8.9 Appropriate specialists to be used by DAT Archaeological Services include:
  - **Industrial Archaeology** –Jennifer Protheroe-Jones, Principal Curator – Industry, National Waterfront Museum, Swansea
  - **Post-medieval / medieval pottery** – Dee Brennan (local independent specialist)
  - **Prehistoric Pottery** – Dr Alex Gibson (formerly of University of Bradford / now Independent pottery specialist)
  - **Prehistoric Flint** – Dr Andrew David (formerly of English Heritage, now independent lithics specialist)
  - **Radiocarbon dating** - Beta Analytic
  - **Animal Bones** – Worcester Archaeology
  - **Fish bones** – Jennifer Browning (University of Leicester Archaeological Services)
  - **Environmental / Pollen analysis** – Worcester Archaeology

## 9 STAFF

- 9.1 The project will be managed by Fran Murphy, Head of DAT Archaeological Services.
- 9.2 The on-site works will be undertaken by experienced archaeologists, from DAT Archaeological Services.

## 10 QUALITY ASSURANCE

- 10.1 DAT Archaeological Services has considerable experience of undertaking all categories of archaeological fieldwork and always operates to best professional practice; adhering to CIfA guidelines where appropriate. The Trust is a Registered Organisation with CIfA and all staff abide by their code of conduct and adhere to their relevant standards and guidance.
- 10.2 DAT Archaeological Services operate robust internal monitoring procedures that ensure that the standard of each project is maintained from commencement to completion.

## 11 MONITORING

- 11.1 The watching brief may require monitoring by the archaeological curator at Dyfed Archaeological Trust's Heritage Management, section who should be told of the commencement of the works. The fieldwork may also need to be monitored by the Head of DAT Archaeological Services.
- 11.2 All parties should be provided with free access to the site at any time during the watching brief works.

## 12 HEALTH AND SAFETY

- 12.1 All permanent DAT Archaeological Services staff are CSCS<sup>7</sup> registered.
- 12.2 DAT Archaeological Services will carry out a health and safety risk assessment to ensure that all potential risks are minimised. The Watching Brief will be undertaken in accordance with the safety constraints of the UXO mitigation strategy.
- 12.3 All known health and safety risk and the presence of any services etc must be made known to the attending archaeologist at the start of any ground works by the client/site contractor.
- 12.4 All relevant health and safety regulations must be followed, including compliance with Welsh Government guidelines on working practices during the current Covid-19 Pandemic, and guidance issued by CIfA.
- 12.5 CIfA advise that Registered Organisations should ensure they are familiar with the latest *Site Operating Procedures*, published by the Construction Leadership Council (Version 4, updated 18<sup>th</sup> May 2020) and the latest *Covid-19 Working Advice Ver.1.1*, published by Prospect (5<sup>th</sup> May 2020), which addresses potential issues relating to archaeological site work. These procedures will be attached to the project risk assessment. If the site cannot operate in line with this guidance then the project archaeologist will not be allowed to attend.
- 12.6 The project risk assessment details the precautions put in place to reduce the spread of Covid-19 Coronavirus during fieldwork.
- 12.7 All site inductions, H&S procedures and site rules of the site contractor will be made known to DAT Archaeological Services staff prior to them commencing work on-site. The attending archaeologist will also attend a toolbox talk with the UXO and removal contractors.
- 12.8 Safety helmets, high visibility vests and boots are to be used by all site personnel as necessary. The site contractors will make all archaeological staff aware of any other PPE<sup>8</sup> that may be required and provide them. Archaeological staff must not enter any area where there is a considered to be a health and safety risk that has not or is not being appropriately mitigated against.
- 12.9 DAT Archaeological Services staff must ensure that their presence on site is communicated to all relevant site staff, especially machine operators.
- 12.10 **Working with machinery:** all staff must ensure that their presence on site is communicated to all relevant site contractor staff, especially the machine operator. The archaeologist observing the excavation of trenches by machine will establish a safe working procedure with the machine

---

<sup>7</sup> Construction Skills Certification Scheme (Health and Safety Tested)

<sup>8</sup> Personal Protection Equipment

operator at the start of work. This will include explaining the purpose of the works itself and the method by which the trenches shall be machined. This will include ensuring that the machine driver is aware that topsoil is stripped carefully to avoid disturbing archaeology. This will also include discussing the methodology for safe working, ensuring that no machining is done without an archaeologist being present.

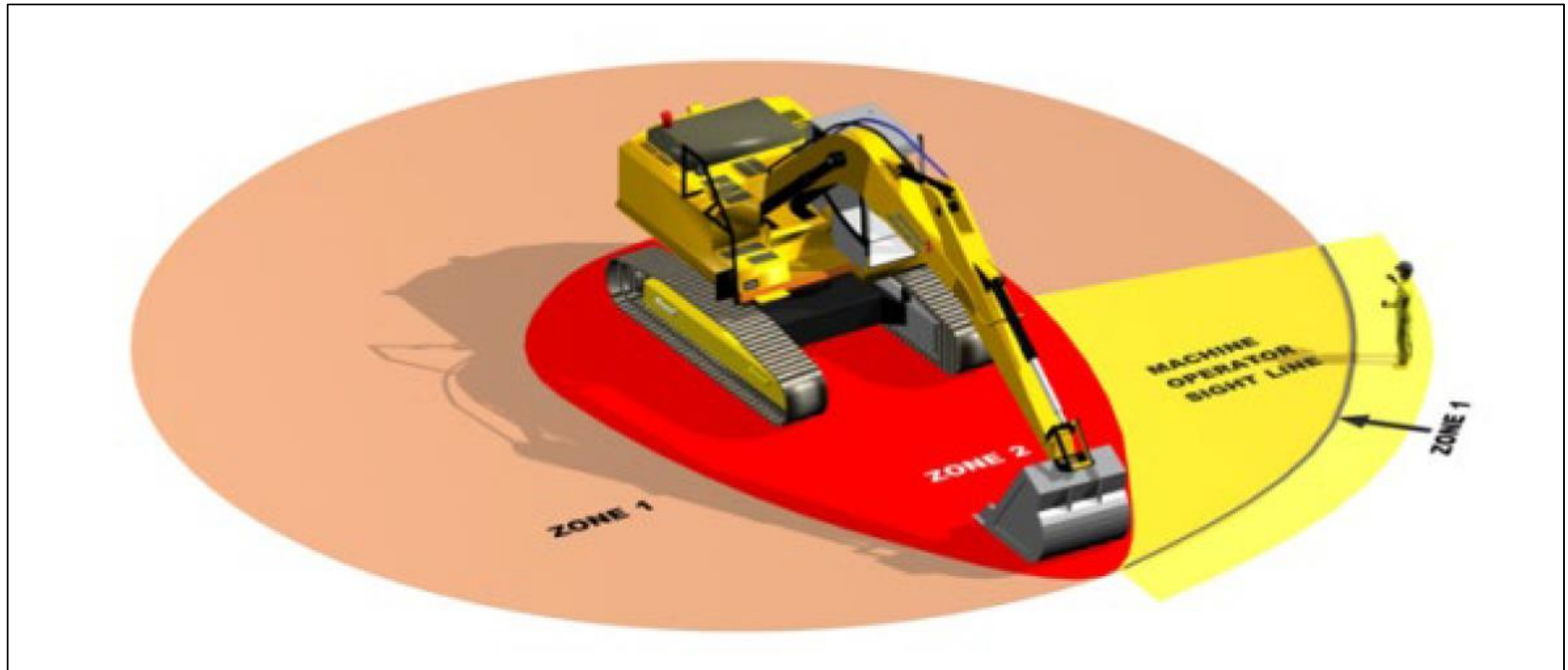
### **13 ARBITRATION**

- 13.1 Any dispute or disagreement arising out of a contract in relation to this work shall be referred for a decision to the Chartered Institute of Archaeologist's arbitration scheme.



**Figure 1:** Location map showing the two areas where it is proposed to remove sea buckthorn that has colonised the dune system (outlined in red)

Reproduced from the Ordnance Survey 1:25,000 scale Landranger Map with the permission of The Controller of Her Majesty's Stationery Office, © Crown Copyright Dyfed Archaeological Trust. The Corner House, 6 Carmarthen Street, Llandeilo, Carmarthenshire SA19 6AE. Licence No 100020930



**Figure 2:** Hazard Zones when conducting UXO banksman duties.





**Figure 3:** Known archaeological assets within Area 2.