BULFORD ROAD IMPROVEMENTS, JOHNSTON TO TIERS CROSS, PEMBROKESHIRE: ARCHAEOLOGICAL WATCHING BRIEF AND CONTROLLED STRIP FINAL REPORT

(NGR SM 9292 1006 to SM 9062 1071)





Prepared by Dyfed Archaeological Trust For: Griffiths (Contractors) Ltd and Ramboll UK Ltd





DYFED ARCHAEOLOGICAL TRUST

RHIF YR ADRODDIAD / REPORT NO. 2015/46 RHIF Y PROSIECT / PROJECT RECORD NO. 107301

> Gorfennaf 2015 July 2015



BULFORD ROAD IMPROVEMENTS, JOHNSTON TO TIERS CROSS, PEMBROKESHIRE: ARCHAEOLOGICAL WATCHING BRIEF AND CONTROLLED STRIP FINAL REPORT

Gan / By

James Meek, Charles Enright & Duncan Schlee

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: <u>info@dyfedarchaeology.orq.uk</u> 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: Professor B Burnham. CYFARWYDDWR DIRECTOR: K Murphy BA MIFA

BULFORD ROAD IMPROVEMENTS, JOHNSTON TO TIERS CROSS, PEMBROKESHIRE: ARCHAEOLOGICAL WATCHING BRIEF AND CONTROLLED STRIP FINAL REPORT

	SUM	MARY	1
1	INTR	ODUCTION	2
	1.1	Project Commission	2
	1.2	Scope of Project	2
	1.3	Report Outline	3
	1.4	Abbreviations	3
	1.5	Illustrations	3
	1.6	Timeline	3
2	THE	SITE	7
	2.1	Location	7
	2.2	Archaeological and Historical Background	7
3	METH	IODOLOGY	8
	3.1	Geophysical Survey	12
	3.1	Watching Brief Methodology	12
	3.3	Post Fieldwork and Report Writing	13
4	RESU	JLTS	14
	4.1	Introduction	14
	4.2	Area 1	14
	4.3	Area 3	18
	4.3	Area 3	16
	4.4	Area 2	19
	4.5	Area 4 - Western Burnt Mound	29
	4.6	Area 4 – Eastern Burnt Mound	37
	4.7	Paleo-environmental sampling and radiocarbon dating	42
5	DISC	CUSSIONS AND CONCLUSIONS	43
	5.1	Cultivation marks, field boundaries and modern features	43
	5.2	Burnt mounds	43
	5.3	Environmental Remains and Radiocarbon dating	46
	5.4	Conclusions	47
	BIBL	IOGRAPHY	49

APPENDIX 1: AN ASSESSMENT OF THE ARCHAEOBOTANICAL REMAINS FROM THE BULFORD ROAD IMPROVEMENTS EXCAVATION, JOHNSTON TO TIERS CROSS, PEMBROKESHIRE (University of Wales Trinity St David) 50					
APPENDIX 2	RADIOCARBON DATE RESULTS (Scottish Universities Environmental Research Centre)	54			
FIGURES					
Figure 1:	Site location map based on the Ordnance Survey	5			
Figure 2:	Outline of work areas for Bulford Road Improvements with archaeological investigation Areas 1 to 4 highlighted	6			
Figure 3:	Location of HER entries within a 500m buffer zone around the road improvements corridor	11			
Figure 4:	Area 1 showing geophysical survey anomalies / area of ridge and furrow	15			
Figure 5:	Area 3, geophysical survey anomalies and probable service trenches	17			
Figure 6:	Area 2, geophysical survey anomalies, controlled strip area and additional controlled strip labelled A	18			
Figure 7:	Area 2 detail showing machine stripped area and excavated sections through ditches	22			
Figure 8:	Sections excavated through field boundary ditches in Area 2	23			
Figures 9a a	nd 9b: Extract of 1847 Tithe Map of Steynton showing field boundaries north of Bulford Farm	24			
Figures 10a	and 10b: First edition Ordnance Survey map showing field boundaries north of Bulford Farm	25			
Figure 11	Area 4 showing former stream course and the two burnt mounds identified within the road line	27			
Figure 12:	Full layout plan of Western Burnt Mound	31			
Figure 13:	Plan of excavated trough of Burnt Mound	32			
Figure 14:	Sections through Burnt Mound cut [009] and adjacent posthole cut [007]	33			
Figure 15:	The Eastern Burnt Mound showing its extent within the topsoil stripped area of the road line	40			
Figure 16:	Sections A and B showing the height of material associated with the burnt mound above	41			
TABLES					
Table 1:	Archaeological and Historical Timeline for Wales	4			
Table 2:	Summary of HER data within a 500m buffer zone around the road improvement scheme	10			
Table 3:	Context descriptions (Area 2)	26			
Table 4:	Context descriptions (Western burnt mound)	36			
Table 5:	Context descriptions (Eastern Burnt Mound)	39			

PHOTOGRAPHS

Photo 1:	Area 1 of enhanced archaeological potential. Representation of exposed ridge and furrow aligned northeast to southwest	16
Photo 2:	Former hedgebank and flanking ditches exposed in Area 2	19
Photo 3:	Former hedgebank and flanking ditches exposed in Area 2	20
Photo 4:	Plough marks within Area 2 (205)	21
Photo 5:	Possible posthole located in Area 2	21
Photo 6:	Western Burnt mound after cleaning with features marked	29
Photo 7:	Excavation of the southern end of the trough feature	29
Photo 8:	Southeastern section through trough showing slight undercutting on eastern side	30
Photo 9:	South eastern quadrant of probable trough after excavation showing high level of burnt material	30
Photo 10:	Excavation of northern section through trough	34
Photo 11:	Northern section through trough with part of a possible water channel [024] visible on the right hand side	34
Photo 12:	View south along trough following excavation of sections	35
Photo 13:	Eastern burnt mound which appeared to have been heavily disturbed	37
Photo 14:	South facing section along edge of machine stripped area for road line	38
Photo 15:	View north across excavated sondage with section along edge of excavated area visible to rear	39

BULFORD ROAD IMPROVEMENTS, JOHNSTON TO TIERS CROSS, PEMBROKESHIRE: ARCHAEOLOGICAL WATCHING BRIEF AND CONTROLLED STRIP FINAL REPORT

SUMMARY

DAT Archaeological Services were commissioned by Griffiths (Contractors) Ltd through their archaeological consultants Ramboll UK Limited, to undertake an archaeological watching brief and controlled strip during the early construction phase of the proposed Bulford Road Improvements between Johnston to Tiers Cross.

The site had been subject to a previous archaeological desk-based assessment by Ramboll and a geophysical survey by ArchaeoPhysica Ltd. Although a trial trench evaluation was recommended by the archaeological consultants prior to the start of the groundworks for the new road line, time pressures were such that this was not possible and so the archaeological watching brief was implemented instead following discussions with the archaeological advisors to the planning authority.

The geophysical survey was carried out along accessible off line routes of the proposed road improvement scheme and three areas of potential archaeological significance were identified. These were mostly in the form of ditches, likely to represent former land divisions (field boundaries). The areas of interest lay at the western end of the scheme near Tiers Cross (Area 1); an area to the north of Bulford Farm (Area 2); and an area at the eastern end of the scheme near the existing A4078 and A477 road junction (Area 3). An additional area of interest had been identified by Ramboll in the centre of the route where a stream course runs along which Burnt Mounds of Bronze Age date have been previously identified, although not within the road line.

The works have demonstrated that a number of the features identified on the geophysical survey are actually service pipes, many of which were already being diverted by Dwr Cymru in advance of the road line construction.

Area 1 contained two water pipes and further features indicative of ridge and furrow agricultural practices. Area 2 was targeted due to the presence of a possible sub-rectangular enclosure suggestive of an Iron Age defended enclosure. These could almost all be seen to follow former field boundaries on earlier maps and excavation demonstrated that they are probably the remains of former hedgebanks of medieval or post-medieval date. Area 3 revealed little of archaeological interest. The geophysical anomalies appeared to represent service trenches and possible differences in the geology.

Area 4 contained two burnt mound sites. These lay to the east and west of the former stream course. The Western Burnt Mound comprised a large horse-shoe shaped area of heat affected stones and charcoal surrounding an oval trough on its western side. The trough was of 3m length. The entire mound was visible within the working area of the road line and was subject to sample excavation and recording, prior to the remainder of the feature being covered with geotextile membrane and the ground raised above it for the new road. The Eastern Burnt Mound was less well preserved within the road line, but much of it may well lie preserved beyond the edge of the working area for the new road. No significant environmental remains were recovered from the trough of the western Burnt Mound, which is typical for such sites. Charcoal identification indicated the trough was lined with oak planking and that fuel used to heat the stones was gathered from oak woodland. Radiocarbon dates place the burnt mound within the latter part of the Early Bronze Age or start of the Middle Bronze Age.

1 INTRODUCTION

1.1 Project Commission

- 1.1.1 DAT Archaeological Services were commissioned by Griffiths (Contractors) Ltd through their archaeological consultants Ramboll UK Limited, to undertake an archaeological watching brief and controlled strip during the early construction phase of the proposed Bulford Road Improvements between Johnston to Tiers Cross (See Figure 1).
- 1.1.2 The Bulford Road Improvement scheme consists of a c.2.5km improvement to *Bulford Road*, a tertiary road which connects the village of Tiers Cross to the A4076 at Johnston and lies c.5.5km north of Milford Haven, Pembrokeshire. Construction is being undertaken by Griffiths, hereafter referred to as the Principal Contractor. It consists of three main elements:
 - an off-line bypass to the south of Tiers Cross;
 - widening of the central section of the existing Bulford Road; and
 - an off-line bypass south of Bulford Close to link to the A4076 just to the south of its junction with the A477.
- 1.1.3 The proposed route consists of a 7.3m-wide carriageway with 3.5m verges. New roundabout junctions are proposed at each end of the realigned road. Parts of the realigned sections of road will be in cutting and part will be on embankment. At Johnston, the eastern bypass section of Bulford Road, the A4076 and the A477 will link into a new roundabout. The western bypass, C3006 Merlin's Bridge to Hubberston road and a minor road to Walwyn's Castle will link into a new roundabout at Tiers Cross.
- 1.1.4 The Scheme includes a shared cycleway and footpath to the northern side of the carriageway from the junction with the A4076 in the east to a point where it would divert onto the bypassed section of Bulford Road to the east of Tiers Cross. The new shared use route will link with the National Cycle Network." (Ramboll 2014)

1.2 Scope of Project

- 1.2.1 A written scheme of investigation (WSI) for a watching brief and controlled strip was prepared by DAT Archaeological Services prior to commencement of works. This was produced in response to a draft brief prepared by Ramboll UK Limited. The WSI outlined methodologies for:
 - Provision of a written scheme of investigation to outline the methodology by which the watching brief should be undertaken.
 - To identify the presence/absence of any archaeological deposits.
 - To establish the character, extent and date range for any archaeological deposits to be affected by the proposed ground works.
 - To appropriately investigate and record any archaeological deposits to be affected by the ground works.
 - To produce an archive and report of any results.
- 1.2.2 The proposed scheme of work was summarised in the WSI as: Archaeological attendance and recording during topsoil strip of the proposed route of the Bulford Road Improvements, Pembrokeshire. Areas of a controlled topsoil strip will be undertaken in areas where potential archaeological remains have

been identified by geophysical survey. Further mitigation is likely to need to be implemented where significant remains are identified, the scope of which will be determined in future WSI documents. The proposed works may expose, damage or destroy any underlying archaeological remains, if present within the area. A report shall be prepared on the results of the watching brief and controlled strip and any further mitigation which is required to be implemented at the site, and an archive created of all finds, records, photographs and plans created by this mitigation strategy.

1.3 Report Outline

- 1.3.1 In October 2014 an Assessment and Summary Report was prepared by DAT Archaeological Services on the initial findings of the works which summarised the results and proposed future archaeological research on the results.
- 1.3.2 In total four areas of potential archaeological activity were identified along the route of the road (Figure 2), two of which (Areas 1 and 3) identified modern services trenches. Area 2 revealed a series of former field boundaries possibly indicating a post-medieval paddock. Area 4 identified the remains of two Bronze Age burnt mounds.
- 1.3.3 This report includes the summary results of the archaeological investigations in Areas 1 and 3, and provides more detail and analysis of the archaeological results for Areas 2 and 4.

1.4 Abbreviations

- 1.4.1 Sites recorded on the Regional Historic Environment Record¹ (HER) are identified by their Primary Record Number (PRN) and located by their National Grid Reference (NGR).
- 1.4.2 Cut numbers for archaeological features are identified in square brackets, eg. [207]; fills of features and layers are identified in round brackets, eg. (110).

1.5 Illustrations

- 1.5.1 Printed map extracts are not necessarily produced to their original scale.
- 1.5.2 Site plans are shown with Ordnance Survey 6 figure national grid points (eastings and northings) which can be used to scale the drawings.
- 1.5.3 Section drawings are shown with the height of the recorded string line in m above Ordnance Datum (aOD). The Ordnance Survey 6 figure national grid points (eastings and northings) for each of the section points illustrated are shown on the section drawings.
- 1.5.4 The survey information showing the excavation areas in Areas 2 & 4 was supplied by Griffiths (Contractors) Ltd. Grid references and heights aOD are based on this survey information.

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

1.6 Timeline

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

Period	Approximate date	
Palaeolithic –	<i>c</i> .450,000 – 10,000 BC	
Mesolithic –	<i>c</i> . 10,000 – 4400 BC	Pre
Neolithic –	<i>c</i> .4400 – 2300 BC	hist
Bronze Age –	<i>c</i> .2300 – 700 BC	öri
Iron Age –	<i>c</i> .700 BC – AD 43	0
Roman (Romano-British) Period –	AD 43 - <i>c.</i> AD 410	
Post-Roman / Early Medieval Period –	<i>c</i> . AD 410 – AD 1086	
Medieval Period –	1086 - 1536	Hist
Post-Medieval Period ² –	1536 - 1750	öri
Industrial Period –	1750 - 1899	n
Modern –	20 th 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



Figure 1: Site location map based on the Ordnance Survey.

Reproduced from the Ordnance Survey Explorer 1:50,000 scale Landranger Map with the permission of The Controller of Her Majesty's Stationery Office, © Crown Copyright Dyfed Archaeological Trust Ltd., The Shire Hall, Carmarthen Street, Llandeilo, Carmarthenshire SA19 6AF. Licence No 100020930





6

2 THE SITE

2.1 Location

- 2.1.1 The route of the new road runs roughly from the A4076 and A477 junction on Milford Road (NGR SM 9292 1006) to a point on the road to the southwest of Tiers Cross (NGR SM 9062 1071) (Figures 1 and 2).
- 2.2 The proposed route is situated at the base of a gently sloping valley which rises up to 100m to the north and south of the road.
- 2.3 Through the centre of the route runs the course of an unnamed stream. It starts at a spring at Tiers Cross to the west. This stream course then runs roughly southeast for around 5km where it joins up with Westfield Pill past Neyland and then into Milford Haven.

2.2 Archaeological and Historical Background

- 2.2.1 A search of the regional Historic Environment Record (HER) held by Dyfed Archaeological Trust was undertaken for a buffer zone of 500m around the road improvement corridor which identified 34 known sites (Table 2; Figure 3).
- 2.2.2 Several burnt mound features have been recorded in the area (Primary Record Numbers (PRNs) 3345, 3346, 3347, 3348 and 3351). Burnt mounds are typically represented by mounds of discarded heated affected stone. Previous excavations on various burnt mounds indicate that they were generally used throughout the Bronze Age period. All of the burnt mounds lie close to the stream course which runs from Tiers Cross. These are discussed in more detail in the conclusions section of this report. The Jubilee Cottage Burnt Mound (PRN 3348) is also designated as a scheduled ancient monument (PE476).
- 2.2.3 Two Roman findspots are recorded within the search area. The first is from an area to the south of Johnston (PRN 11836) possibly within the eastern end of the road improvement corridor. The second findspot is of uncertain location, but attributed to have come from the area to the southwest of Tiers Cross (PRN 11845).
- 2.2.4 Medieval sites within the search area include the general medieval settlement of Johnston (PRN 10898). The settlement was presumably established around the focus of St Peter's Church (PRN 3352; also a Grade II* Listed Building). Johnston Grange lies to the east of the church and is a medieval building (PRN 12494). Early documents record the Ancellislade fulling mill which is thought to lie on the eastern side of the area south of Johnston, within close proximity to the stream course which runs through the road line (PRN 11762). Place name evidence records a North and South Castle within the search area (PRN 7940), located to the northeast of Tiers Cross located to the north of the western end of the road improvement corridor. The significance of the name is uncertain as no recorded castles have been recorded within this location.
- 2.2.5 To the north of the road improvement corridor, roughly half way along its length lies the site of 'Bolton Beacon' a possible medieval or post-medieval grand house (PRN 5814). Whether the building started as some form of signalling beacon before being replaced by the large house is uncertain.
- 2.2.6 To the northeast of Johnston lies an area of Glebe Land which is either of the medieval or earlier post-medieval periods (PRN 13222). Glebe land would have belonged to the church and used to support the parish priest.
- 2.2.7 Bulford Farm is recorded on the HER as possibly being first established in the medieval period (PRN 29539). Bulford Farm lies directly to the south of the road improvement corridor towards its eastern end. It should be noted that it is likely

that the majority of farms within the area may have had at least medieval origins, the sites of the farms chosen due to their

- 2.2.7 All other sites recorded within the 500m search area on the HER are of postmedieval date and includes two quarries (PRNs 17808 to the southwest of Tiers Cross & 17815 north of the centre of the road improvement corridor). Another industrial building is that of the former Sunny Hill Mineral Water Works which is located southeast of the centre of the road line (PRN 29538). A blacksmith's workshop is recorded in Johnston (PRN 24400). Quarrying
- 2.2.8 The majority of the other sites recorded of post-medieval date are of buildings recorded on earlier maps (mostly 19th century) including Johnston Hall (PRN 17814), The Manse, Tiers Cross (PRN 24402), Jubilee Cottage (PRN 29542), Sunnyhill Cottage (PRN 29544), Bulford Cottage (PRN 29546), Lower Bulford Cottage (PRN 29545), ferny Castle Cottage (PRN 29540) and Upper Harmeston Cottage (PRN 60484). Four further unnamed dwellings are also recorded (PRNs 19859, 29541, 29543 & 29547). Many of these sites lie on or adjacent to Bulford road but will be unaffected by the road improvement scheme. Only one of these buildings is listed, Upper Harmeston Cottage (Grade II Listed, PRN 60484).
- 2.2.9 The last sites recorded include a 19th century chapel site in Tiers Cross (PRN 17817) and two milestones, one at the western end of the scheme on the road through Tiers Cross (PRN 108271) and the other to the east on the A4076 through Johnston (PRN 108276).

PRN	Site Name	Summary Description	Period	Grid Reference
3345	Ferny Castle Cottage Burnt Mound	An oval mound, adjacent to a stream, measuring $11m \times 9.5m \times 0.5m$. It consists of dark soil and burnt stone mixed with a lighter soil component. No coal or pottery was noted and it was not thought to be a midden as suggested by the OS.	Prehistoric	SM 9102 1065
3346	Ferny Castle Cottage Burnt Mound	First identified in 1995, but subsequently not found.	Prehistoric	SM 9118 1066
3347	Sunny Hill Burnt Mound	A thin spread of stones, some of which are burnt, but with no charcoal present. There are other unburnt scatters of stone in the area.	Prehistoric	SM 9190 1042
3348	Jubilee Cottage Burnt Mound	An elongated mound, adjacent to a stream, measuring $12-15m \times 4.3m \times 0.5m$. It consisted of very dark matrix with burnt stone. SAM PE476	Prehistoric	SM 9218 1024
3351	Johnston Church; Bwlford Burnt Mound	First identified in 1995, but subsequently not found.	Prehistoric	SM 9243 1028
3352	Johnston Parish Church; St Peter's	Medieval parish church, comprising chancel with choir-recesses, nave, N and S transepts and west tower. Not listed in the Taxatio of 1291 but mentioned in a mid 13th century grant. Small, square churchyard. Grade II* Listed Building	Post-Medieval, Medieval	SM 93212 10406
5814	Bolton Beacon	Site of a medieval beacon, now within the compound of the Bolton High level reservoir. The site was identified on the Steynton tithe map as 'the beaconing' and also on the 1st edition Ordnance Survey map with a small building.	Post-Medieval, Medieval	SM 91769 11076
7940	North Castle; South Castle	Place-name of unknown significance.	Unknown	SM 910 110
10898	Johnston Settlement	Medieval settlement at Johnston	Medieval	SM 93 10
11762	Ancellislade Fulling Mill	Medieval fulling mill	Medieval	SM 91 11
11836	Johnston Findspot	Roman findspot, no further information	Roman	SM 93 10
11845	Haylett Findspot	Approximate Findspot, thought to be in the South Pembrokeshire area	Roman	SM 90 10
12494	Johnston Grange	Dwelling	Medieval	SM 934 103
13222	Glebe Land	Glebe Land record	Post-Medieval, Medieval	SM 931 105
17808	Quarry	Quarry	Post-Medieval	SM 90031 10220
17814	Johnston Hall	Dwelling	Post-Medieval	SM 9334 1026
17815	Unnamed Quarry	Quarry	Post-Medieval	SM 9152 1074
17817	Congregational Church	Chapel	Post-Medieval	SM 9064 1080
19859	Unnamed dwelling	Record of unspecified dwelling in Johnston mentioned in Arch. Cam. in 1864.	Post-Medieval	SM 93 10
24400	Smithy	Blacksmiths Workshop	Post-Medieval	SM 9315 1043
24402	The Manse	Dwelling	Post-Medieval	SM 9065 1080
29538	Sunny Hill Mineral Water Works	Not marked as anything but furze on 1st ed 1887 OS map. Two buildings are shown on 2nd ed as part of a mineral waterworks one of which was still shown on the 1976 Ed the other may have been split into two.	Post-Medieval	SM 91956 10305
29539	Bullford; Bullforde; Bulford Farmstead	Documented farmstead. Current condition not known.	Post-Medieval, Medieval	SM 9233 1040
29540	Ferny Castle;	Cottage shown on 1773 Picton Castle estate map.	Post-Medieval	SM 91039 10684

	Ferney Castle Cottage			
29541	Unnamed building	Probable building shown on the 1st ed OS map.	Post-Medieval	SM 9242 1038
29542	Jubilee Cottage	Cottage shown on 1908 OS map.	Post-Medieval	SM 9218 1043
29543	Unnamed building	Building shown on 1842 tithe map.	Post-Medieval	SM 9210 1045
29544	Sunnyhill Cottage	Cottage shown on parish tithe map.	Post-Medieval	SM 9204 1049
29545	Bullford Cottage;	Originally called Bulford Cottage but now Bulford Cottage lies to the north west PRN 29546	Post-Medieval	SM 9165 1053
	Lower Bulford	and this one is known as Lower Bulford Cottage.		
	Cottage			
29546	Bullford Cottage	Now known as Bulford Cottage although earlier this name was given to PRN 29545. Lower	Post-Medieval	SM 91460 10647
		Bulford.		
29547	Unnamed dwelling	Dwelling shown on 1887 OS map.	Post-Medieval	SM 91167 10707
60484	Upper Harmeston	Grade II listed cottage	Post-Medieval	SM 92872 09960
	Cottage			
108271	Milestone	A milestone on the Haverfordwest to Hakin turnpike road. Appears on Ordnance Survey 1st	Post-Medieval	SM 90295 10383
		edition 1876 labelled "Hakin 4 1/2". Also on Ordnance Survey 2nd edition 1908 labelled "Old		
		M.S".		
108276	Milestone	A milestone on the Haverfordwest to Milford haven turnpike road. Appears on Ordnance	Post-Medieval	SM 92970 10192
		Survey 1st edition 1893 labelled "Haverfordwest 3" and "Millford 2. 1515 Yds". Also on		
		Ordnance Survey 2nd edition 1908 labelled "Haverfordwest 3" and Milford Haven 2 miles'		

Table 2: Summary of HER data within a 500m buffer zone around the road improvement scheme



Figure 3: Location of HER entries within a 500m buffer zone (blue line) around the road improvements corridor (red line)

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

3 METHOLODOGY

3.1 Geophysical survey

3.1.1 Following a geophysical survey undertaken by ArchaeoPhysica Ltd along accessible off line routes of the proposed road improvement scheme, three areas of potential archaeological significance were identified (ArchaeoPhysica Ltd 2014; Figure 2 Areas 1, 2 and 3).

Area 1

3.1.1 Area 1 was located at the Tiers Cross end of the improvement scheme and was identified as an area of enhanced archaeological potential because two linear anomalies observed in the geophysical data did not correspond with known field boundaries.

Area 2

3.1.2 Area 2 was located on the north of the existing road between Tiers Cross and Johnston, directly opposite Bulford Farm, where a series of former field boundaries and a possible curving enclosure (anomalies 13 and 15). were identified on the geophysical survey.

Area 3

3.1.3 Area 3 was an area of enhanced archaeological potential located at the Johnston end of the road improvement scheme, due to a linear anomaly (22).

Area 4 (Figure 2)

- 3.1.4 An additional area of interest had been identified by Ramboll in the centre of the area where a stream course runs due to the proximity of a number of known Bronze Age burnt mound sites. Unfortunately it was not possible to undertake geophysical survey of this area.
- 3.1.5 A walkover survey of the area (which had already been extensively disturbed by the construction of a base for a culvert to divert the course of a stream to run beneath the new road), confirmed the presence of archaeological features in this area.

3.2 Fieldwork Methodology

- 3.2.1 Each of the identified areas of archaeological potential were monitored by a watching brief during groundworks. Identified features of significance were subject to further archaeological assessment including controlled topsoil strip, followed by cleaning, sample excavation and recording of the features.
- 3.2.2 Visits to the site during the groundwork programme were undertaken from the 4th of July until the 21st of July, 2014 at the request of the client / site contractors.
- 3.2.3 A former stream course which crossed the proposed road line had already been diverted into a newly excavated culvert prior to the commencement of the archaeological watching brief.
- 3.2.4 Controlled stripping of topsoil observed by the attending archaeologists was undertaken using a 360 excavator with a toothless bucket. Where archaeological features were identified the area was cordoned off to prevent vehicles moving across until the archaeology had been cleaned by hand and recorded to an appropriate level.

- 3.2.5 Excavation and recording of all archaeological features or deposits conformed to best current professional practice and was carried out in accordance with the Recording Manual³ used by DAT Archaeological Services. However, due to time pressures on site, it was not possible to fully define, excavate and record all the archaeological features identified.
- 3.2.5 Bulk soil samples for palaeo-environmental analysis and radiocarbon dating were taken from appropriate samples during the excavations.

3.3 Post-Fieldwork Reporting and Archiving

- 3.3.1 A Summary and Assessment Report on the results of the watching brief was prepared in October 2014.
- 3.3.2 This report presents the results of a desk-top-survey, watching brief, excavation and analysis of palaeo-environmental samples undertaken as part of the archaeological mitigation for the road scheme. Radiocarbon dating samples have also been sent for dating, but at this time we are still awaiting the results. The results of the fieldwork have been assessed in local, regional and wider contexts.
- 3.3.3 All data recovered during the fieldwork will be collated into a site archive structured in accordance with specifications in *Archaeological Archives: a guide to best practice in creation, compilation, transfer and curation* (Brown 2007), and the procedures recommended by the National Monuments Record, Aberystwyth.

³ Dyfed Archaeological Trust Field 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 RESULTS

4.1 Introduction

- 4.1.1 The results from the watching brief are laid out as follows:
 - Area 1 and Area 3: These two areas at the western and eastern ends of the road scheme revealed no significant archaeological remains, the results identified on the geophysical survey corresponding with modern services, agricultural marks, former field boundaries and natural features. The results included in this report are the same as those included in the Summary and Assessment Report. These two areas are dealt with first.
 - **Area 3**: This area towards the eastern end of the road scheme contained the remains of 18th century or later field boundaries which were initially interpreted as a possible enclosure of Iron Age or Roman date.
 - **Area 4**: This area was located on either side of the former stream course through the road line. The remains of two Bronze Age burnt mounds were identified in this location.
- 4.1.2 Where archaeologically investigated features were initially identified in the geophysical survey, the geophysical survey reference numbers included in the text for the geiophysical survey report (ArchaeoPhysica Ltd 2014) and figures are prefixed with GSNo.

4.2 Area 1 (Figure 2 & 4)

- 4.2.1 At the time of this survey access to the most westerly section of the road improvement scheme was restricted due to groundworks being undertaken by Dwr Cymru in advance of the road improvement scheme. However, inspection of their trench excavation identified a cement/asbestos pipe approximately 0.25m in diameter on, the same northwest-southeast orientation as anomaly GSNo.1 as identified by the geophysical survey. A second pipe corresponding with the other axis of anomaly GSNo.1 was identified by Dwr Cymru workmen.
- 4.2.2 A controlled strip and cleaning of the adjacent area to the east of GSNo.1 revealed evidence of ploughing in the form of ridge and furrow on a northeast to southwest alignment (Photo 1). The ridges consisted of sandy clay with frequent stone inclusions and were approximately 3m wide. The furrows contain clay silt and are approximately 2m wide. These features are presumed to correspond with geophysical anomalies GSNo.4 and GSNo.3. Anomaly GSNo.2 probably represents a former field boundary.
- 4.2.3 No further features or artefacts were discovered within this area.



Figure 4: Area 1 showing geophysical survey anomalies / area of ridge and furrow

15



Photo 1: Area 1 of enhanced archaeological potential. Representation of exposed ridge and furrow aligned northeast to southwest.

4.3 Area 3 (Figures 2 & 5)

- 4.3.1 A trial trench (10m x 4m) was cut across linear feature GSNo.22. An outcrop of bedrock on the same alignment as the geophysical survey anomaly was identified as the cause of the anomaly.
- 4.3.2 The other linear geophysical survey anomalies (shown as black on Figure 6; anomalies GSNo.24 and GSNo.25) were Dwr Cymru service pipes. These anomalies were not further investigated and were being diverted during the works.
- 4.3.3 Linear geophysical anomaly GSNo.21 could not be identified within the topsoil stripped area. Although it does not correspond with any boundaries shown on the Tithe or early OS maps, the feature is most likely to have been a former field boundary. No other features corresponding with anomalies suggested by the geophysical survey were identified within the area.



Figure 5: Area 3, geophysical survey anomalies (pink) and probable service trenches (black)



Figure 6: Area 2, geophysical survey anomalies (pink), controlled strip area (red dash dot line) and additional controlled strip labelled A (red box)

- **4.4** Area 2 (Figures 2 & 6)
- 4.4.1 Descriptions of contexts recorded in the area can be found in Table 3.
- 4.4.2 The linear geophysical anomaly GSNo.12 (in the west of Area 2) was identified a large modern Dwr Cymru service trench. This was not investigated further.
- 4.4.3 Directly opposite Bulford Farm the geophysical survey identified a possible sub-rectangular ditched enclosure of potential prehistoric origin (anomalies GSNo.13 and GSNo.15) (Figure 6). Archaeological investigation confirmed these anomalies to be pairs of ditches ([201] & [303] and [207] and [209]/[211]) flanking an area of flat level ground. Sections were excavated through these features which demonstrated they were approximately 1.5m wide and approximately 0.10 0.15m in depth (Photos 2 & 3; Figures 7 & 8). The area between the ditches was approximately 2m wide.



- **Photo 2:** Former hedgebank and flanking ditches exposed in Area 2 (GSNo. 14), viewing northwest along northwest to southeast aligned double ditches, showing excavated sections. (Left: [207], Right [209]/[211]).
- 4.4.4 The roughly northwest-southeast oriented ditches (anomaly GSNo.14) clearly correspond with field boundaries shown on the 1847 Steynton Tithe Map (Figures 9a & 9b) and the first edition Ordnance Survey maps (Figures 10a & 10b). The anomaly on the southeastern side of the area (anomaly GSNo.15) corresponds with a modern field entranceway, which runs over another former field boundary. The north to south aligned stretch forming the western side of the possible enclosure (anomaly GSNo.13) is not shown on the early OS maps nor is it shown on the 1847 Tithe map of the area.



- **Photo 3:** Former hedgebank and flanking ditches exposed in Area 2 (GSNo.13), viewing north along north to south aligned double ditches, showing excavated sections. (Left: [201], Right: [203]).
- 4.4.5 Fragments of post-medieval pottery and clay pipe from the fills of these ditches suggest they are boundaries created in the post-medieval period and are unlikely to have had earlier origins.
- 4.4.6 A large number of similar linear features (205) running parallel with the north-south aligned ditches and spaced 1.70m apart were visible to the east (Photo 4). On investigation it was apparent that these were cultivation marks, possibly the result of steam ploughing in the early 19th century. The cultivation marks are visible in the upper fills of the north-south aligned field boundary ditches (202) and (204), indicating this boundary was removed, prior to the survey for the tithe and OS maps, but before the fields were ploughed. It is possible that the field boundary was removed to create a larger field that was suitable for steam ploughing.
- 4.4.7 An additional area corresponding with a former field boundary visible on the geophysical results (Figure 6 – labelled A) was also subject to archaeological investigation. A clearly defined (possible) posthole or small pit (213) (Photo 5) approximately 0.50m in diameter and a clearly defined field boundary were identified. These were investigated and considered to be of low archaeological significance.



Photo 4: Plough marks within Area 2 (205).



Photo 5: Possible posthole located in Area 2.



Figure 7: Area 2 detail showing machine stripped area and excavated sections through ditches

Ditches [207] & [209]/[211] correspond with field boundaries shown on the 1847 Tithe map and the first edition Ordnance Survey map; ditches [201] and [203] had been infilled and removed by 1847



Figure 8: Sections excavated through field boundary ditches in Area 2



Figures 9a and 9b: Extract of 1847 Tithe Map of Steynton showing field boundaries north of Bulford Farm, and approximate position of former field boundary line (green)

Field 540 is called Little Meadow and used as a meadow at the time of the Tithe Apportionment



Figures 10a and 10b: First edition Ordnance Survey map showing field boundaries north of Bulford Farm, including former field boundary line (dotted red)

A small kink in the northern field boundary corresponds with the line of the north to south boundary (dotted red) which had been removed by 1847

25

Context Number	Name	Description
201	Linear cut	A long linear that curves around to east at north end. It has a north/south alignment. It has a sharp break of slope that leading down to a gently sloping smooth side that blends in to a shallow concave base with a discernible break in slope between the base and sides. Approximately 1.34m wide and 0.35m deep.
202	Fill of [201]	Friable mid brown clay silt with small angular stone inclusions.
203	Linear cut	Linear feature which respects [201]. Sharp break of slope leading to gently sloping sides. With gentle break of slope to flat base. Approximately 0.93m wide and 0.19m deep.
204	Fill of [203]	Friable mid brown clay with occasional small angular stone inclusions.
205	Linear cut	A Linear feature aligned north/south, approximately 1.0m wide and 0.15m deep.
206	Fill of [205]	Friable mid brown clay silt, with occasional small angular stones, Rare flecks of charcoal and burnt limestone fragments.
207	Linear cut	Long linear feature with east/southeast – west/northwest alignment. Approximately 0.90m wide and 0.16m deep. It has a discernible break of slope with gradual sloping sides leading to a flat base.
208	Fill of [207]	Friable mid brown clay silt with very few inclusions except occasional small angular stone fragments.
209	Linear cut	Linear cut running parallel with [207]. Approximately 1.25m wide and 0.19m deep. It has a fairly steep edge on the south side with a much more gradual slope on its north side and a shallow concave base. The north side and base have been badly affected by root action.
210	Fill of [209]	Friable mid brown clay silt with occasional angular stones.
211	Root bowl	Amorphous shape
212	Fill of [211]	mid brown orange compact silt/clay with occasional small stones.
213	Post hole cut	

 Table 3: Context Descriptions (Area 2).



Figure 11 Area 4 showing former stream course and the two burnt mounds identified within the road line The plan also shows the extent of groundworks for the road (red line) and excavation area cleared around the Western burnt mound (green)

4.5 Area 4 – Western Burnt Mound (Figures 2, 11, 12, 13 & 14)

- 4.5.1 Descriptions of contexts recorded in the area of the Western Burnt Mound can be found in Table 4.
- 4.5.2 Area 4 was located in the centre of the new road line in an area where geophysical survey had not been undertaken. Unfortunately the area had been subject to a topsoil strip and groundworks to construct a culvert prior to archaeological attendance at the site.
- 4.5.3 An initial walkover of the area indicated two potential burnt mounds on the northern side of the road line area. Further controlled stripping under archaeological guidance allowed the extent of the features to be defined prior to their sample excavation.
- 4.5.4 The burnt mounds were characterised by large concentrations of burnt material (charcoal and heat affected stones) and several other features.
- 4.5.5 The Western Burnt Mound consisted of a trough [009], a posthole [007] to the west, and a probable (unexcavated) pit [026] to the east. The encompassing spread of burnt material (002) included a high percentage of heat affected stones fractured into irregular shapes and flecks of charcoal. The burnt mound had been truncated by post-medieval land drains and presumably agricultural activity over the years. It is not known if the mound survived as an earthwork as the area had been stripped and levelled prior to archaeologists attending the site.
- 4.5.6 The area of burnt material 002 had a well-defined, roughly horse-shoe shape, with an east facing opening (Photo 6; Figures 11 & 12). The feature occupied an area of approximately 181 sq m. The burnt mound material (002) survived to a maximum depth of approximately 0.06m, suggesting that the mound had been heavily eroded by ploughing.
- 4.5.7 Beneath the burnt mound deposit (002) was a buried soil layer (003), overlying natural subsoil (004). No archaeological material was recovered from layer (003), it only being exposed in a small area, the majority being left in-situ beneath mound material (002).
- 4.5.8 The trough [009] was located on the eastern side of the burnt material (002), adjacent to its east facing opening. The roughly oval shaped northsouth aligned trough had rounded ends and measured approximately 3.30m in length and approximately 1.40m at its widest point. It was 0.50m deep, with steeply sloping or undercutting sides, with a flat, smooth base. The trough was cut into natural clay which may have been sufficient to ensure it could hold water. It was excavated in three sections along its length. The eastern side had been undercut by approximately 0.10m and the western side was nearly vertical (Photos 7 & 8). At the north end of the trough a number of charred wood fragments were discovered. These are likely to be the charred remains of a wooden lining to the trough.
- 4.5.9 The trough [009] contained three fills (Figure 14, Sections 1 & 2). The lowest (012) was a compact clay/silt that contained a high percentage of burnt material that included heat affected stones and charcoal, this layer is probably the by-product of the last use of the trough. The middle layer (011) consisted of almost entirely burnt material and was rich in charcoal and is probably deliberate backfilling of the trough using burnt material from the surrounding mound. The upper layer (010) comprised burnt material with a black/grey silt with frequent stone inclusions (Photo 9).



Photo 6: Western Burnt mound after cleaning with features marked. The horseshoe shape mound is visible in the background, the probable trough in the centre of the picture and a possible pit in the foreground (2m scale).



Photo 7: Excavation of the southern end of the trough feature



Photo 8: Southeastern section through trough showing slight undercutting on eastern side.



Photo 9: South eastern quadrant of probable trough after excavation showing high level of burnt material (south end of Section 1, Figure 14)



Figure 12: Full layout plan of Western Burnt Mound



Figure 13: Plan of excavated trough of Burnt Mound



Figure 14: Sections through Burnt Mound cut [009] and adjacent posthole cut [007]

33

DAT Report no. 2015/46



Photo 10: Excavation of northern section through trough, viewing southeast



Photo 11: Northern section through trough with part of a possible water channel [024] visible on the right hand side

- 4.5.10 At the northern end of the trough (nearest the current location of the stream) (Photos 10 & 11), excavation revealed an east-west oriented linear feature (024). The dimensions of this feature are uncertain but it is thought to have been contemporary with the trough, and was interpreted by the excavators as a 'gulley-like' channel (Photo 11; Figure 13). The channel is thought to have diverted fresh water from the stream to the northern end of the trough, and then continued eastwards to re-join the stream, forming a leat.
- 4.5.11 To the west of the trough, a small sub-circular feature [007] approximately 0.30m in diameter, was thought likely to be a posthole (Figures 12 & 13). The fill of the posthole (008) consisted of light brown silt with a depth of approximately 0.09m (Figure 14, Section 3). The western edge of the posthole contained a number of larger stones that may have been used as packing to provide support to a timber post inserted into the posthole. The function of the posthole is not known.
- 4.5.12 A third cut feature [026] was located approximately 0.40m to the east of the trough (Figures 12 & 13). This feature was roughly circular in plan with a diameter of approximately 0.70m. Due to time constraints the feature was not excavated so its depth and possible function were not ascertained. The unexcavated fill (025) contained burnt mound material. Feature 214 has been interpreted as a possible pit.



Photo 12: View south along trough following excavation of sections

Context Number	Name	Description
001	Topsoil	
002	Burnt material	Black gritty burnt material including moderate heat affected stone inclusions. Forms horse shoe shape of burnt mound. Approx. 0.02 – 0.03m deep.
003	Buried underlying topsoil	A light brown silt containing moderate stone inclusions. Approx. 0.08m deep.
004	Buried subsoil	A pale orange clay, the original subsoil underlying the burnt mound. Approx. 0.12m deep.
005	Modern land drain cut	A drain cut approximately 0.38m wide and 0.23m deep. In profile the drain is box shape and cut (002), (003), and (004).
006	Fill of [005]	A light brown silt fill of the land drain [005].
007	Post hole cut	A circular post hole including stone packing. The post hole is approximately 0.03m in diameter and 0.09m deep. In profile the post hole is bowl-shaped.
008	Fill of [007]	A light brown silt film containing frequent small stone inclusions.
009	Trough cut	An oval shaped cut 3.5m in length and 1.5m wide. In profile the trough had steep v-shaped sides (almost vertical) and a flat bottom. It was approximately 0.65m deep.
010	Upper fill of trough	A blackish grey silt containing at least 60% burnt material, frequent stone, irregular shaped stones. Approx. 0.26m deep.
011	Middle fill of trough	A black silt containing 90% burnt material (mostly charcoal), frequent irregular shaped stones and irregular shaped heat affected stone. Approx 0.32m deep.
012	Lower fill from base of trough	Grey/black grit, frequent irregular shaped stone and burnt material.
013	Spread	Mid brown coloured clay silt containing a high percentage of angular stone, many heat shattered stone and/or reddened including occasional flecks of charcoal.
014	Spread	A dark grey silt containing 50% heat shattered stone and frequent flecks of charcoal.
024	Leat cut	A linear feature not fully excavated in length or width. It appears that it is cut by [009].
213	Fill of 214	
214	Cut containing 213	probable pit, unexcavated.

Table 4: Context Descriptions (Western Burnt Mound).

4.6 Area 4 – Eastern Burnt Mound (Figures 2, 11, 15 & 16)

- 4.6.1 Descriptions of contexts recorded in the area of the Eastern Burnt Mound trench can be found in Table 5.
- 4.6.2 The Eastern Burnt Mound was located to the east of the former stream course (Photo 13). This area of burnt material (020) was approximately 90 sq m in size, but evidently projecting underneath the edge of the stripped area for the road line. The exposed surface had been stripped prior to an archaeologist being in attendance and had wheel ruts from heavy machinery across its surface. This made it difficult to fully define its shape, orientation and extents. The burnt material was also in-dispersed with lenses of light brown sands and silts (Photo 13). A machine was brought in and under archaeological control the area was stripped using a toothless ditching bucket to better define its extents, and this was planned to demonstrate an approximation of its layout (Figure 11 & 15)
- 4.6.3 This burnt mound was located in an area of waterlogged ground either as a result of its proximity to the former stream course, or perhaps as a result of a channel cut to divert water from the stream to the location of the burnt mound (as appears to be the case for the Western Burnt Mound).



Photo 13: Eastern burnt mound which appeared to have been heavily disturbed

4.6.4 The northern edge of the machine stripped area for the road line was cleaned up and it was evident that the burnt mound material survived for as much as 0.55m above the stripped surface (Photo 14; Figure 16, Sections A & B). The depth of material could be seen to survive as a visible mound in the field to the north beyond the extent of the groundworks for the Bulford Road improvements. The approximate outline

of the burnt mound earthwork, beyond the edges of the machine stripped area, are shown on Figures 11 and 15. It is possible that the height of the ground in this area was exacerbated by the presence of a former hedgebank field boundary.



Photo 14: South facing section along edge of machine stripped area for road line, showing the burnt mound material at the base of the section and

- 4.6.5 An exploratory sondage was excavated through the burnt material (020) which demonstrated that it was still present at a depth of approximately 0.30m below the stripped ground surface. This suggests that not only does a significant depth of burnt material survive on the eastern side of the stream course, but that it also has probably been subject to less disturbance from agricultural activity than that to the west. The fact it survived below the depth of the machine stripped area would indicate that an accumulation of soils (colluvium / hill wash) had built up around the base of the mound, or even that a terrace had been cut into the hillslope for the burnt mound.
- 4.6.6 No features commonly associated with burnt mounds were discovered within the road corridor, such as a trough, postholes or leat, but if present, they may well survive in the adjacent field to the north.
- 4.6.7 No archaeological finds were discovered except for a single animal bone. This is likely to be a metacarpal belonging to a sheep or goat. The bone was found in the section through the burnt mound but its context could not be determined due to the road works disturbing the section. Bone normally deteriorates in the acid soils of this area, so it is probable that the bone is modern.



Photo 15: View north across excavated sondage with section along edge of excavated area visible to rear

Context Number	Name	Description
015	Burnt layer	A grey grit material containing frequent irregular shaped stones.
016	Burnt material	A black silt containing burnt stone fragments. Probable burnt remains of burnt mound.
017	Subsoil (heat affected)	an orange/red clay/silt containing heat affected stones. The soils is underlying an area of burning. Heat affected stones appear to have perforated this layer. There is evidence of iron panning.
018	Topsoil (underlying hedgerow spoil)	A light brown clay loam.
019	Subsoil (hedge)	A grey clay/silt containing moderate small stones. Some comingling of burnt material and heat affected stone at western end.
020	Burnt material	A black layer containing frequent inclusions of charcoal. Almost pure charcoal at eastern end.

Table 5: Context descriptions (Eastern Burnt Mound).



Figure 15: The Eastern Burnt Mound showing its extent within the topsoil stripped area of the road line (hatched area) and an approximation of a mound within the adjacent non-stripped area which could represent the extent of the burnt mound.

40



Figure 16: Sections A and B showing the height of material associated with the burnt mound above the machine stripped level of the road corridor

4.7 Paleo-environmental sampling and radiocarbon dating

- 4.7.1 Environmental samples were taken from the excavated trough of the Western Burnt Mound as this was a discrete feature with secure contexts free from disturbance from the initial groundworks. Samples from this feature were considered to have the most potential for radiocarbon dating and environmental information. The remains of the eastern burnt mound were considered to have low potential and it is known that the remains of the feature will survive beyond the edge of the road improvements area.
- 4.7.2 One 10 litre bulk soil sample was taken from each of the three fills of the trough [009], from the two sections excavated at its southern end. These were processed for the recovery of wood charcoal and charred plant macrofossils (seeds), in order to obtain information on the wood species used as fuel, and any other evidence that might characterise the local environment during the Bronze Age or evidence of agricultural crops. The following Environmental samples were taken:
 - Context 010 Sample 101 *c*.10 litres (southeast section)
 - Context 011 Sample 102 *c*.10 litres (southeast section)
 - Context 012 Sample 103 c.0.5 litres, (southeast section)
 - Context 012 Sample 104 *c*.5 litres (southeast section)
 - Context 010 Sample 105 c.5 litres (central-west section)
 - Context 011 Sample 106 c.5 litres (central-west section)
 - Context 012 Sample 107 c.5 litres (central-west section)
- 4.7.3 It was decided that two radiocarbon samples would be taken from the Western Burnt Mound, from the lowest fills of the bottom fills of the two excavated sections (Sample 104 and Sample 107).
- 4.7.4 The environmental samples have been processed and assessed by the University of Wales Trinity St David (UoWTSD) and the radiocarbon dating undertaken by Scottish Universities Environmental Research Centre (SUERC).

5 **DISCUSSION AND CONCLUSIONS**

5.1 Cultivation marks, field boundaries and modern features

- 5.1.1 Four areas were investigated during the watching brief. Areas 1, 2 and 3 all contained evidence of former field boundaries (probably originating from the medieval to post-medieval periods) and remnants of ridge and furrow cultivation marks. Ridge-and-furrow farming originated in the medieval period, but is less common in west Wales than it is east Wales and England. The Bulford Road ridge-and-furrow is more likely to be the result of steam ploughing most probably dating from the early 19th century.
- 5.1.2 Other features identified by the geophysical survey were proven to be modern service pipes or variations in the natural geology of the area. Many of the modern services corresponded with water and sewer pipes that were being diverted prior to the road way by Dwr Cymru.
- 5.1.3 The field boundary ditches in Area 2, probably represent small paddocks associated with Bulford Farm. Other similar small paddock-like enclosures lie on either side of Bulford Road at its western end near Tiers Cross, perhaps suggesting they are a characteristic feature of land use in this area. Other examples may have been removed when larger fields were created to facilitate the use of steam ploughs, as seems to be the case in Area 2.
- 5.1.4 Small quantities of post-medieval pottery were found within the backfill of the field boundary ditches excavated in Area 2. No other significant archaeological features or finds were recovered from the area.
- 5.1.5 The field boundaries themselves are of low archaeological importance, but are an interesting record of land management changing through the post-medieval period from a system more associated with smaller fields changing over time to an agricultural landscape of larger fields, as agricultural regimes and practices have developed.

5.2 Burnt mounds

- 5.2.1 The remains of two burnt mounds in Area 4 are the most archaeologically significant features. The Eastern Burnt Mound was only partially exposed by the development, with the majority of the feature surviving beyond the edges of the construction area. The Western Burnt Mound was entirely exposed during the aroundworks. It is not known how much depth of burnt material was removed by the topsoil strip as it had occurred prior to archaeologist attending the site.
- 5.2.2 Burnt mounds were first identified in the late nineteenth centuries by Cantrill and Jones during the Geological Survey in South Wales (Cantrill and Jones 1906 & 1911). They also occur throughout Wales, in northern Scotland, western Ireland, the North of England, the Midlands and in the New Forest areas.
- 5.2.3 The vast majority of burnt mounds for which reliable dating evidence is available date to the Middle to Late Bronze Age, although some dating evidence suggests activities resulting in the formation of burnt mounds continue into the early medieval period. Late Neolithic burnt mounds have also been recorded, such as that at Watermead Park in Leicestershire (Ripper & Beamish 2011)
- Burnt mounds are found throughout the Dyfed area, but their known distribution 5.2.4 pattern is largely a result of survey bias corresponding to the original survey area investigated by Cantrill and Jones. Since this work, several other sites have been recorded in other areas of Dyfed (Maynard 1993 and Davies 1997) and most recently during the construction of the Milford Haven to Brecon Gas Pipeline which recorded a further 39 burnt mounds (Hart et al 2015).

- 5.2.5 There are currently roughly 370 burnt mound sites recorded on the Regional Historic Environment record within Dyfed, although several of these are no longer considered to be burnt mounds, and a number of new burnt mounds have also been identified, but the records have not yet been updated. Approximately 10 new burnt mound sites (some with multiple burnt mounds) were excavated on the route of the Milford Haven to Brecon pipeline within the Dyfed region (Hart et al 2015). Full or partial excavation of 14 burnt mounds at 9 sites has been undertaken by Dyfed Archaeological Trust since 1977, not including the two here.
- 5.2.6 In attempts to produce a typology of burnt mounds, a variety of forms have been described and proposed, however, in west Wales at least, only three basic shapes are generally recognised: oval/circular mound with adjacent trough; crescentric mound almost entirely encircling the trough; and kidney / horse-shoe shaped where the trough lies within the open side of the mound. Most known examples are circular, although there is a recognised concentration of kidney-shaped burnt mounds in Carmarthenshire and east Ceredigion (Manning 1989).
- 5.2.7 Burnt mound deposits are typically accumulations of small stones of fairly uniform size. The stones are usually heat reddened and shattered, and are contained in a matrix of blackened, charcoal rich soil (James 1986). Where they survive as extant landscape features they are usually low in height in relation to their diameter, varying in size from a few meters to over 30m. They are often found with associated troughs, usually oval features which would have held water.
- 5.2.8 It is not known whether the two burnt mounds revealed at Bulford Road were visible as surface landscape features prior to the area being subject to a topsoil strip. It seems likely that the Eastern Burnt Mound was, as an earthwork is still roughly visible in the area to the north of the road line, although this may be partially the remains of a former hedgebank. Neither burnt mound had been identified prior to these works, although at five others had been recorded on the same stream course during survey work in 1995. Potentially the Eastern Burnt Mound was not previously identified due to the feature being obscured by the former boundary. The Jubilee Cottage Burnt Mound to the southeast recorded in 1995 was of such quality that it was designated as a scheduled ancient monument (PE476). The form and extent of the two burnt mounds at Bulford Road is thus uncertain due to the area being stripped prior to archaeological observation. Both burnt mounds seem likely to have been kidney / horse-shoe shaped.
- 5.2.9 Burnt mounds are almost all found alongside water courses, so the location of these two mounds is not unusual. It is also common to find a network of multiple burnt mounds along a section of flowing water, possibly indicating a shift in activity from one site to another over a period of time. Further burnt mounds are known on this stream course to the east and west of the two recorded during these works, as mentioned above.
- 5.2.10 Because it was not possible to fully investigate both burnt mounds, it remains possible that the two concentrations of burnt mound material at Bulford Road are actually part of a single burnt mound complex straddling the former stream, rather than two distinct sites. A similar example of a burnt mound complex 'straddling' a watercourse was excavated at Robeston Wathen in Pembrokeshire (Schlee 2009).

Burnt mound processes

5.2.11 Since their initial identification there has been much speculation as to what processes or activities led to the formation of burnt mounds. While the most widely accepted theory is that they are prehistoric cooking sites, the burnt mounds being formed from stones that had been heated in a bonfire before being

placed in the trough to boil water. The stones would shatter when submerged in the water due to the rapid changes in temperature. Once shattered, the stones were too small for reuse so would be removed from the trough after they had cooled and thrown in an area adjacent to the trough. Over time the accumulation of stone forms the mound of heat affected stones. Burnt mounds can have more than one trough suggesting longevity of use.

- 5.2.12 one of the most widely accepted theories for the purpose of burnt mounds is for ritual feasting or other periodic events. Other suggestions include metal ore processing, sweat lodges or saunas, fulling, felt making, brewing, producing steam to bend wood etc. It may be that burnt mounds as a group are the result of a variety of different activities that apparently share the need for hot water or steam, and also lack a need of complex material equipment, artifacts and structures.
- 5.2.13 Although few artifacts are ever found in association with burnt mounds, there are often other features such as occasional hearths, pits, post-holes or far more rarely leats or channels. Leats may have been used to divert water from a stream course to the troughs, and could presumably be controlled to turn the water off and on. Postholes could suggest covering structures were present over the trough. Pits could be the remains of smaller troughs, or scoops associated with an area used as a fire pit for heating the stones, and hearths again remnants of the fires used for stone heating.

The Bulford Road Burnt Mounds

- 5.2.14 The Eastern Burnt Mound at Bulford Road has the remains of a possible channel or leat, which may have diverted water from the stream course to the northwest into the trough, and then with a channel continuing to the southeast leading back into the stream course. The feature demonstrates the link between burnt mounds and water management, but it is unfortunate that it was not possible to fully characterize this feature during the watching brief. The possible leat system is of particular interest as this is a rare characteristic found associated with burnt mounds.
- 5.2.15 The trough appears to be associated with a posthole on one side and a small pit on the other. The excavations were not, however, able to clarify exactly what processes these features signify or any direct stratigraphic relationship between the features (they may all be of different dates).
- 5.2.16 Most examples of excavated burnt mounds in the UK have shown that their associated troughs are on average 1.5m in length; however the example associated with the Eastern Burnt Mound is just over 3.0m in length. The work undertaken on the Milford Haven to Brecon pipeline identified that the majority of oval troughs identified measured between 2.7m 3.2m in length (Hart et al 2015, p139), such as that close by at Scurtle, Pembrokeshire (*ibid*, p144). The closest burnt mound excavated on the pipeline to Bulford road was at Steynton, where a large crescentric mound surrounded a trough of almost 5m length (*ibid*, p138). The size of the trough may indicate a specific function. It has been suggested that they may have been used for semi-industrial purposes, such as the steaming or softening of withies for use in fencing or basket making etc, and a trough of 3m length may be more useful for such activities, enabling larger lengths of material to be processed.
- 5.2.17 Relatively large pieces of charcoal wood against the side of the trough may be evidence that the trough had a wooden lining. Analysis of this charcoal by UoWTSD also indicates that the wood had a flattened side, suggesting it is the remains of planking and thus a lining for the trough. Evidence that troughs had

wooden linings has been found in association with burnt mounds elsewhere (Ripper & Beamish 2011; Hart et al 2015).

- 5.2.18 At other excavated burnt mound sites in Dyfed, it has been noted that no buried soil was evident beneath the burnt mound material. This absence has generally been attributed to the effects of trampling, ware, and possibly the effects of scorching associated with burnt mound activity, preventing the growth of groundcover.
- 5.2.18 At Bulford Road it is interesting to note the possible buried soil beneath burnt mound deposit 002, the heat affected subsoil beneath burnt mound deposit 017, but the apparent absence of a buried soil beneath burnt mound deposit 020. This variation in the stratigraphic sequence between the different deposits of burnt mound material may suggest zones of different activity around the trough prior to the deposition of the burnt mound material. The small areas of identified buried soil at the Bulford Road site could not be investigated further within the constraints of the excavation, although the remains of the feature survive beneath the new road line.
- 5.2.19 The absence of an identified trough associated with the eastern Burnt Mound is not untypical for burnt mound sites, although in this case there is a very good likelihood it lies outside of the excavated area.
- 5.2.20 The apparent height of burnt material that was visible in the recorded section on the northern edge of the machine stripped area suggests that a significant amount of stratified material associated with the mound may survive within the field to the north of the road line. This may have survived as a field boundary had been later placed on top of the feature, such that ploughing was never undertaken across this feature. It is possible that the presence of a visible mound in the landscape was utilised as an existing feature to define the field boundary in the first place.

5.3 Environmental Remains and Radiocarbon dating

- 5.3.1 The results of the environmental analysis undertaken by UoWTSD (full report in Appendix 1) from the samples taken from the Western Burnt Mound at Bulford Road are quite typical for such features, in that plant macro fossils other than wood charcoal were scarce. The only plant macro-fossils identified were a cleavers seed from sample 107 context (012) (lowest fill of the central-west section of the trough) and a tree bud. Such material is thought likely to have originated from the gathering of firewood for the fire for heating the stones.
- 5.3.2 The charcoal recovered from the samples suggests that the firewood used was mainly oak and hazel, with some birch, alder and blackthorn present as well. Such species would be typically found in surrounding woodland.
- 5.3.3 No indications of grain processing or processes such as brewing⁴ were found from the trough of the Western Burnt Mound. If such activity had been undertaken it is more than likely that some wastage or spillage of material would have been present at the site and have shown up in the environmental material. The majority of burnt mounds have a similar lack of such evidence. It is most unlikely that at Bulford road the Western Burnt Mound was associated with brewing or any other form of grain processing.
- 5.3.4 Bone does not survive well in the acid soils of the Dyfed region and so its absence cannot be used to demonstrate such material was not present at the site. On the

⁴ Experimental archaeology has demonstrated that burnt mounds can be used in the production of beer, partly for using the boiling water to sterile containers and equipment but also to make the mash needed for the brewing process.

other hand burnt bone will usually survive. If burnt mounds were used as feasting sites with the troughs used to boil large joints of meat (as has been successfully tested numerous times through experimental archaeology), assuming the feasting occurred next to the burnt mound it is likely that waste would have been dropped into the bonfire and thus burnt bone would be present. There is again a distinct lack of any such remains from the majority of burnt mounds across the UK. It has been suggested that such sites may have been used purely for the cooking of the meat, with the feasting then undertaken away from the burnt mound and so the consumption of meat and subsequent waste lies elsewhere.

- 5.3.5 The two radiocarbon samples came from the lower fill of the burnt mound, and both were identified as Corylus avellana L. (Hazel) a good material for dating. The full information on the dates is included in Appendix 2, but the resulting dates with the highest probability are summarised below:
 - Sample 107 context (012): 1666 1507 calBC (ref SUERC-61650 (GU38471)) (93.5% probability)
 - Sample 104, context (012): 1611 1446 calBC (ref SUERC-61651 (GU38472)) (95.4% probability)
- 5.3.6 These dates place the Western Burnt Mound within the latter part of the early Bronze Age or start of the middle Bronze Age. These dates are very similar a number of the burnt mounds excavated on the Milford Haven to Brecon Gas Pipeline within Pembrokeshire, including those at Upper Neeston (Site 511) and Steynton (Site 512), the two closest burnt mounds to those at Bulford road (Hart et al 2015, p146).

5.4 Conclusions

- 5.4.1 The burnt mound sites recorded during the construction of the Bulford Road improvements scheme have produced similar information as recorded at other burnt mound sites in the region.
- 5.4.2 The function of these features is still very much open to debate, with the most favoured being cooking sites or saunas. As noted above, the troughs can be successfully used for boiling large joints of meat, but the lack of any associated waste within the burnt mounds either indicates they left no waste, or the food was consumed elsewhere. The lack of contemporary settlement evidence around burnt mound sites does not support such a theory, unless specific feasting areas were used away from settlements. As noted by Hart et al (2015, p151) the transportation of cooked meat from such a site to the feasting area risks accidents with the meat being dropped or going cold by the time it reaches the feasting site and also deprives the attendees from enjoying the smells of the meat cooking.
- 5.4.3 The sauna theory is based on ethnographic examples of covered tents within which heated stones are doused with water to create a steam room. In the case at Bulford Road, as with most of the burnt mound sites excavated, there is no evidence for any structure covering the troughs. It is still possible that the troughs were used for cleansing the body, perhaps the water heated for washing or bathing. As Hart notes, such uses would leave no material remains in the archaeological record (2015, p151). Perhaps the features are more mundane rather than ritualistic or associated with feasting. The use of them as cleansing sites or a regularly used site for ablutions may be a tradition specific to the mid to late Bronze Age.

- 5.4.3 As discussed above the use of the troughs for processing grain or brewing certainly seems most unlikely in the case for the Western Burnt Mound at Bulford Road.
- 5.4.4 The theory that they could have been used as industrial processing sites is also one which would might little in the way of artefacts. A heated pool of boiling water could be used for submerging wood and timber for bending or twisting into required shapes (as commonly used by wheelwrights or in boat building in the medieval and post-medieval periods).
- 5.4.5 The two investigated burnt mounds at Bulford Road lie close to five known other burnt mounds along the same stream course within the proximity of the road improvement scheme works. With at least seven burnt mounds within an approximate 1.6km length would suggest that such features are actually a very common feature of the Bronze Age. The number may indicate that burnt mounds are replaced over a certain period of time (as the period of burnt mound use covers at least a 1000 year period). Perhaps burnt mounds were used for a wide range of functions and activities, a mix of all of the possible theories. Or could it be that where a number of sites are located in close proximity that they all had individual functions. The dates of the Western Burnt Mound place it within the latter part of the Early Bronze Age or start of the Middle Bronze Age.
- 5.4.6 As is the case with all of the theories, by the Iron Age the use of burnt mounds seems to stop. Whatever they were used for is no longer required after around 700BC, whether traditions or beliefs change or the same functions are carried out, but using different methodologies is unknown.
- 5.4.7 As with many burnt mound sites, it is generally the obvious features which are subject to excavation, often due to time constraints or the location of the features in relation to development. Perhaps the wider vicinity of the mounds should be looked at in more detail to try and identify settlement sites, or specifically look for the remains of the bonfires or hearths for heating the stones. Hart et al suggest that more emphasis should be placed on the recording of the mounds themselves and the process and chronology of their formation, identifying individual layers associated with the troughs being emptied (2015, p153). They also note that by removing the entire burnt mound material it would be possible to identify any underlying features, such as earlier troughs subsequently covered by the mound (*ibid*). It is still the case that burnt mounds remain little understood, which rather contradicts the fact that they are some of the most common features of the mid to late Bronze Age period within the Dyfed region, with new examples being identified on a regular basis.
- 5.4.8 The majority of the Eastern Burnt Mound lies beyond the edges of the excavated area for the road line and remains preserved. Through discussions with Griffiths (Contractors) Ltd, following sample excavation of the trough and planning of the mound itself, the Western Burnt Mound was covered with geotextile membrane followed by layers of sand to protect the feature below ground, with the road line in this area being constructed on an embankment at the edge of the proposed road line. The majority of the feature will thus remain relatively intact beneath this embankment material for the road.

BIBLIOGRAPHY

- ArchaeoPhysica Ltd, 2014, Johnston To Tiers Cross, Pembrokeshire: Geophysical Survey Report, Project Code JTP141
- Ramboll, 2014; Johnston to Tiers Cross: Bulford Road Improvement: Archaeology Design, document reference 61031832\CHA\R01, dated June 2014
- Cantrill, T.C, and Jones O.T, 1906, 'The Discovery of prehistoric Hearths in South Wales', *Archaeologia Cambrensis* 6th Series, Vol. **VI**, p17-34.
- Cantrill, T.C, and Jones O.T, 1911, 'Prehistoric Cooking Places in South Wales', *Archaeologia Cambrensis* 6th Series, Vol. **XI**, part 3, p203.
- Davies, J. F, 1997, 'Some recent archaeological discoveries in the Aberystwyth district' *Ceredigion*, Vol XIII.
- James, H. 1986. Excavations of Burnt Mounds at Carne, Nr. Fishguard, 1979 and 1981. Bulletin of the Board of Celtic Studies 33, 245-365.
- Manning A. and Crane P., 1989, 'The Burnt Mounds of Dyfed: The 1997-8 Archaeological Assessment Survey', Cambria unpublished report PRN35377.
- Maynard, D, 1993, 'Burnt mounds in the St. Dogmaels area of north Pembrokeshire', *Archaeology in Wales* No. 33, p 41-43.
- Ripper, S, & Beamish, M, 2011, 'Bogs, Bodies and burnt Mounds: Visits to the Soar Wetlands in the Neolith and Bronze Age' in The Proceedings of the Prehistoric Society, Vol 78, pp173-206
- Schlee, D. E, 2009, Excavations on the A40 Bypass at Robeston Wathen, Pembrokeshire, 2009. DAT Report no. 2010/4
- Hart, J, Rackham, J, Griffiths, S & Challinor, D, 2015, 'Burnt mounds along the Milford Haven to Brecon gas pipeline, 2006-07', Archaeologia Cambrensis, Vol 163, pp173-172

APPENDIX 1: AN ASSESSMENT OF THE ARCHAEOBOTANICAL REMAINS FROM THE BULFORD ROAD IMPROVEMENTS EXCAVATION, JOHNSTON TO TIERS CROSS, PEMBROKESHIRE

C. J. Griffiths – University of Wales Trinity St David

Introduction

Five samples were received for assessment from the Bulford Road Improvements, Johnston to Tiers Cross, Pembrokeshire for assessment of archaeobotanical remains, charcoal identification and the identification and preparation of charcoal for radiaometric dating.

Methods

The four bulk samples and one wood/charred wood sample were sieved in the laboratory using a simple wash over technique, the flots were sieved through 2mm, 1mm, 500 μ m and 250 μ m sieves, the residues were sieved on to 2mm and 250 μ m sieves. The samples were air dried. The residues were dry sieved through 2mm - 250 μ m sieves once dried. The flots and residues were examined using a Wild M5 stereoscopic microscope, the plant remains from the bulk samples were noted using a scale of abundance. All non-cereal nomenclature follows Stace (1995).

Charcoal for radiometric dating was chosen using low magnification with preference given to diffuse porous species where possible, the charcoal for identification was chosen randomly from the samples. The charcoal was fractured to produce clean sections in three dimensions (transverse, transverse longitudinal and radial longitudinal). A Leica DMR microscope with incident light source was used to examine the charcoal. Wood identification manuals (Schoch *et al* 2004, Schweingruber 1978) were consulted for identification purposes. Nomenclature follows Stace (1995). Identifications are presented in Table 2.

Results

Sample 101, context 010, the upper fill of trough in SW quadrant. The sample contained numerous stones in a silty clay matrix, the only environmental remains were numerous fragments of wood charcoal.

The charcoal from this sample comprised of *Quercus* spp. (oak), *Corylus avellana* L. (hazel), *Alnus glutinosa* (L.) Gaertner (alder) and *Prunus spinosa* L. (blackthorn).

Sample 102, context 011, the mid fill of trough in SW quadrant. The sample comprised a silty clay matrix with large stones present, the only environmental remains were numerous wood charcoal fragment.

The charcoal from sample 102 comprised *Quercus* spp. (oak), *Corylus avellana* L. (hazel), and a *Betula* sp. (birch)

Sample 104, context 012, the primary fill of trough in SW quadrant, a wet sample of grey silty clay with large stones present. Identifiable environmental evidence comprised wood charcoal fragments.

The charcoal from this sample comprised of almost equal quantities of *Quercus* spp. (oak) and *Corylus avellana* L. (hazel), two fragments of Corylus avellana L. (hazel) were chosen from this sample for radiometric dating.

Sample 107, context 012, the primary fill of trough in central quadrant, grey clay with large stones present. The environmental evidence from this sample comprised a *Galium aparine* L. (Cleavers) seed and a charred tree bud. Large quantities of wood charcoal were also present.

The charcoal comprised of equal quantities of *Quercus* spp. (oak) and *Corylus avellana* L. (hazel), two fragments of *Corylus avellana* L. (hazel) were chosen from this sample for radiometric dating.

Sample 110, wood/charred wood sample found in north quadrant of trough, possibly the trough lining. The sample although considered to potentially contain non-charred wood, it did in fact contain fragments of wood charcoal and no other environmental remains.

As this was a sample specifically for charcoal identification twenty charcoal fragments were identified, nineteen of which were *Quercus* spp. (oak) and one was *Corylus avellana* L. (hazel).

Discussion

The results from the burnt mound are consistent with other burnt mounds in that plant macro fossils other than wood charcoal were scarce. The presence of the cleavers (*Galium aparine* L.) seed from sample 107 context 012 would most likely have been due to it being accidentally introduced to the site, cleavers or goosegrass plants are found in hedgerows, woodland margins and waste places, the seeds are covered with hooked bristles which adhere to fur and clothing, therefore it was probably amongst wood brought to the site for fuel.

The charcoal from the samples indicate that oak and hazel were the main species of wood being utilised at the site, with birch, alder and blackthorn also present in the later contexts.

The sample potentially from the trough lining produced nineteen fragments of oak charcoal, with one fragment of hazel, which may indicate that the trough did have an oak lining as the oak charcoal from this sample was of a smoother nature than that of the other samples.

The two samples from the primary fill of the trough (samples 107 and 103/104) from context 012, had almost equal quantities of oak and hazel present in each sample. The mid fill of the trough sample 102 context 011 produced oak and hazel, but also had one fragment of birch, whilst the upper fill produced both alder and blackthorn as well as oak and hazel.

The species from all the charcoal analysed indicates that wood for fuel was probably being sourced from local oak/hazel woodland, the later samples included birch and blackthorn possibly because oak and hazel were becoming scarcer although they are still the dominant species in the samples and alder, possibly from a wetter alder carr.

Conclusion

As with most burnt mounds the only environmental evidence was from the charcoal which indicates that the wood for the lining of the trough was probably oak and that wood for fuel was most likely from a local deciduous oak/hazel woodland and the one charred seed it is recommended that no further work needs to be done on the samples.

Bibliography

Schoch, W., Heller, I., Schweingruber, F.H., Kienast, F., 2004. Wood Anatomy of Central European Species. Online version: www.woodanatomy.ch

Schweingruber, F.H., 1978. Microscopic Wood Anatomy. Birmensdorf: Swiss Federal Insitute of Forest, Snow and Landscape Research.

Stace, C., 1995. New Flora of the British Isles. Cambridge, Cambridge University Press.

Sample	101	102	104	107	110	Total
Context	010	011	012	012		
Volume/Litres	5	8	2	5	0.25	
Galium aparine L. (Cleavers)	-	-	-	1		
Tree bud	-	-	-	1		
Wood charcoal fragments	+++++	+++++	+++++	+++++	+++++	

Table 1 Plant Macro fossils for Bulford Road Improvements

Table 2 Charcoal identification for Bulford Road Improvements

Sample	101	102	104	107	110	Total
Context	010	011	012	012		
Quercus spp. Oak	5	4	4	5	19	37
<i>Betula spp.</i> Birch	-	1	-	-	-	1
Corylus avellana L. Hazel	3	5	6	5	1	20
Alnus glutinosus (L.) Gaertner Alder	1	-	-	-	-	1
Prunus spinosa L. Black thorn	1	-	-	-	-	1
Total	10	10	10	10	20	60

APPENDIX 2: RADIOCARBON DATE RESULTS (Scottish Universities Environmental Research Centre)





Rankine Avenue, Scottish Enterprise Technology Park, East Kilbride, Glasgow G75 0QF, Scotland, UK Director: Professor R M Eliam Tel: +44 (0)1355 223332 Fax: +44 (0)1355 229898 www.glasgow.ac.uk/suerc

RADIOCARBON DATING CERTIFICATE

12 August 2015

nmes Meek yfed Archaeological Trust he Shire Hall armarthen Street landeilo
yfed Archaeological Trust he Shire Hall armarthen Street landeilo
he Shire Hall armarthen Street landeilo
armarthen Street landeilo
landeilo
A19 6AF
ulford Road, Pembrokeshire
ontext 012
AMPLE 107
harcoal : Corylus avellana L. (Hazel)
24.4 %

Radiocarbon Age BP 3313 ± 34

N.B. The above ¹⁴C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error.

The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal4).

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email <u>Gordon Cook@glasgow.ac.uk</u> or telephone 01355 270136 direct line.

Conventional age and calibration age ranges calculated by :- 🤅 Duchay Date :- 12/08/2015

Checked and signed off by :- P. Nayant

Date :- 12/08/2015











RADIOCARBON DATING CERTIFICATE 12 August 2015

Laboratory Code	SUERC-61651 (GU38472)	
Submitter	James Meek	
	Dyfed Archaeological Trust	
	The Shire Hall	
	Carmarthen Street	
	Llandeilo	
	SA19 6AF	
Site Reference	Bulford Road, Pembrokeshire	
Context Reference	context 012	
Sample Reference	SAMPLE 104	
Material	Charcoal : Corylus avellana L. (Hazel)	
$\delta^{\rm 13}C$ relative to VPDB	-27.4 ‰	
Radiocarbon Age BP	3244 ± 34	

The above ¹⁴C age is quoted in conventional years BP (before 1950 AD). The error, which is expressed at the one sigma level of confidence, includes components from the counting statistics on the sample, modern reference standard and blank and the random machine error. N.B.

The calibrated age ranges are determined from the University of Oxford Radiocarbon Accelerator Unit calibration program (OxCal4).

Samples with a SUERC coding are measured at the Scottish Universities Environmental Research Centre AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to the Radiocarbon Laboratory should also quote the GU coding given in parentheses after the SUERC code. The contact details for the laboratory are email <u>Gordon Cook@glasgow.ac.uk</u> or telephone 01355 270136 direct line.

Conventional age and calibration age ranges calculated by :- 🗧 Durbay

Date :- 12/08/2015

Checked and signed off by :- P. Nayout

Date :- 12/08/2015







BULFORD ROAD IMPROVEMENTS, JOHNSTON TO TIERS CROSS, PEMBROKESHIRE: ARCHAEOLOGICAL WATCHING BRIEF AND CONTROLLED STRIP FINAL REPORT

RHIF YR ADRODDIAD / REPORT NUMBER. 2015/46 RHIF YR DIGWYLLIAD / EVENT RECORD NUMBER 107301

Gorfennaf 2015 July 2015

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

Charles Enright

Swydd / Position: Archaeologist

Llofnod / Signature

Y

.. Dyddiad / Date 20/10/14

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 DAT Archaeological Services

Hanos N.

Llofnod / Signature

Dyddiad / Date 20/10/14

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

