Cotswold Archaeology

South Wales Gas Pipeline Project
Sites 26.02, 26.03 and 26.04
Land South of Dolau Farm
Manordeilo and Salem
Carmarthenshire

Archaeological Excavation

for

Rhead Group

on behalf of

National Grid

CA Project: 9150
CA Report: 13279
Event: DAT108882

January 2014

South Wales Gas Pipeline Project
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Archaeological Excavation

CA Project: 9150
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CONTENTS

LIST OF ILLUSTRATIONS

GLOSSARY

CA – Cotswold Archaeology

CAP – Cambrian Archaeological Projects

CPAT – Clwyd Powys Archaeological Trust

DAT – Dyfed Archaeological Trust

GGAT - Glamorgan Gwent Archaeological Trust

FTP – Felindre to Brecon gas pipeline

HER – Historic Environment Record

MHA – Milford Haven to Aberdulais gas pipeline

NAL – Network Archaeology Ltd

NLMJV – Nacap Land & Marine Joint Venture

UPD – Updated Project Design

SUMMARY

Project Name:	South Wales Gas Pipeline Project
Location:	Sites 26.02, 26.03 and 26.04, Land South of Dolau Farm, Manordeilo and Salem, Carmarthenshire
NGR:	Site 26.02: SN 6489 2501; Site 26.03: SN 6517 2512; Site 26.04: SN 6527 2528
Type:	Excavation
Date:	8 June–18 July 2007
Location of Archive:	To be deposited with RCAHMW (original paper archive) and Carmarthenshire Museum (digital copy of paper archive; accession number CAASG 2008.0282)
Site Code:	MHA06

An archaeological excavation was undertaken by Cambrian Archaeological Projects during groundworks associated with construction of gas pipelines (part of the South Wales high pressure gas pipeline scheme) between Milford Haven and Aberdulais, and Felindre and Brecon, which were conducted between 2005 and 2007.

Three burnt mounds were recorded along a 500m-long stretch of the southern bank of a tributary of the River Towy. Charcoal from the burnt mounds at Sites 26.03 and 26.04, some 200m apart, returned radiocarbon dates of 1380–1050 cal. BC and 1530–1400 cal. BC, dates within the Middle Bronze Age. These mounds were located in fields immediately east of an undated burnt mound found at pipeline Site 26.01 and together reveal a notable density of burnt mound activity along a single stream bank.

Hearths and pits suggestive of settlement were found within Site 26.04. These represent a western extension of an early prehistoric settlement found to the immediate east at Site 26.05 where pits, postholes and tree-throw hollows were dated to the Early Neolithic, Late Neolithic or Early Bronze Age and Middle Neolithic periods. Radiocarbon dating of charcoal from one hearth at Site 26.04 gave an Early Bronze Age date range of 2020–1770 cal. BC and it is possible that some of the burnt mound activity was directly contemporary with occupation within the settlement, although this cannot be stated for certain.

Several ditches were also found. All were undated and only one corresponded with a field boundary depicted on historic Ordnance Survey mapping.

1. INTRODUCTION

1.1 NACAP Land and Marine Joint Venture (NLMJV), on behalf of National Grid, commissioned RSK Environment (part of the RSK Group) to manage the archaeological works (non-invasive surveys, desk based assessment, evaluation, watching brief, and open area excavation) on a 216km-long section of pipeline from Milford Haven (Pembrokeshire) to Brecon (in Powys). The high pressure gas pipeline (part of the 316km-long pipeline route from Milford Haven to Tirley in Gloucestershire) was required to reinforce the gas transmission network. The archaeological work performed in advance of this pipeline was undertaken in a number of sections by a number of archaeological companies. The westernmost section of 122km, from Milford Haven to Aberdulais, was investigated by CA (then Cotswold Archaeological Trust) during 2005–2007 with some additional excavation work carried out by CAP. The section of 89km, from Felindre to Brecon was investigated by CA during 2006–2007 and CAP during 2007. Assessment reports on the works were completed in January 2012 (NLM 2012a, 2012b) and the current reporting stage was commissioned in February 2013.

1.2 In June and July 2007 CAP carried out archaeological excavations at Sites 26.02, 26.03 and 26.04, Land South of Dolau Farm, Manordeilo and Salem, Carmarthenshire (centred on NGRs: Site 26.02: SN 6489 2501; Site 26.03: SN 6517 2512; Site 26.04: SN 6527 2528; Fig. 1). The objective of the excavations was to record all archaeological remains exposed on the sites during the pipeline construction.

1.3 The excavations were carried out in accordance with professional codes, standards and guidance documents (EH 1991; IfA 1999a, 1999b, 2001a, 2001b, 2001c and IfA Wales 2008). The methodologies were laid out in an *Archaeological Framework Document* (RSK 2007) and associated *Written Statements of Investigation* (WSIs) and *Method Statements*.

The sites

1.4 The sites are located within three adjacent fields on the southern bank of a small tributary of the River Towy, close to the confluence of the Rivers Towy and Dulais (Fig. 1). They lie at 40m–45m AOD on land that falls away gently towards the tributary which currently flows within 20m–60m of the sites.

1.5 The underlying solid geology of the area is mapped as the Nantmel Mudstones Formation of the Ordovician Period overlain by superficial deposits of Quaternary Till (BGS 2013).

Archaeological background

1.6 No archaeological remains were identified within the sites during the preliminary *Archaeology and Heritage Survey* (CA 2006). Within the wider vicinity, an Iron Age defended enclosure has been identified 1.2km north-west of the site (PRN 849). Other heritage assets in the vicinity comprise medieval, post-medieval and modern buildings and a medieval chapel is recorded by the HER as having existed 50m north-west of the site (PRN 12741). A possible historic bank following the river has also been identified, which may be of medieval or post-medieval date (CA 2006, ref. ID 1622).

1.7 During the pipeline construction works, a number of burnt mounds were found within 4km of the site at pipeline Sites 26.01, 26.06, 28.08 and 28.14. The closest of these was at Site 26.01, located within the field immediately west of Site 26.02. At Site 26.05, located within the field immediately east of the sites, further remains were found including residual Mesolithic flints and the remains of an Early Neolithic settlement. Site 26.05 also contained Late Neolithic or Early Bronze Age and Middle Bronze Age features, although the nature of the activity represented by these was not clear.

1.8 Sites 26.02–26.04 were initially investigated as part of the geophysical survey undertaken along the pipeline route (BCC 2006). Areas of possible archaeological activity were identified within all three sites and these were investigated during a subsequent evaluation undertaken by CA during 2006–7 (CA 2009; Fig. 2). The results of the evaluation undertaken within these fields are contained within this report but, in summary, comprised undated ditches within Sites 26.02 and 26.03 whilst Site 26.04 contained significant remains including a burnt mound, pits, hearths and further undated ditches.

Archaeological objectives

1.9 The objectives of the archaeological works were:-

- to monitor groundworks, and to identify, investigate and record all significant buried archaeological deposits revealed on the site during the course of the development groundworks; and
- at the conclusion of the project, to produce an integrated archive for the project work and a report setting out the results of the project and the archaeological conclusions that can be drawn from the recorded data.

Methodology

1.10 The fieldwork followed the methodology set out within the *WSI* (NLM 2006). An archaeologist was present during intrusive groundworks comprising stripping of the pipeline easement to the natural substrate (Fig. 1).

1.11 Due to confusion regarding the field numbering at the time of excavation, contexts from all three sites were assigned the prefix 263 or 2603, resulting in contexts from sites 26.02 and 26.03 having duplicate context numbers. To avoid confusion in this report, context numbers have been prefixed by the correct site number (e.g. context 2603001 becomes 26.02/2603001 from Site 26.02 or 26.03/2603001 from Site 26.03). In the appendix tables and on the illustrations, the contexts retain their original numbers.

1.12 The post-excavation analysis and reporting was undertaken following the production of the UPD (GA 2012) and included re-examination of the original site records. Environmental evidence was taken from the assessment reports (NLM 2012b) except where the UPD recommended further work, in which case the updated reports were used. The archaeological background to the site was assessed using the following resources:-

- the *Archaeology and Heritage Survey* which was undertaken in advance of the pipeline construction and which examined a 1km-wide corridor centred on the pipeline centre line, including the then existing HER record (CA 2006);
- Dyfed Archaeological Trust HER data (received July 2014); and
- other online resources, such as Google Earth and Ordnance Survey maps available at http://www.old-maps.co.uk/index.html.

All monuments thus identified that were relevant to the site were taken into account when considering the results of the fieldwork.

1.13 The archive and artefacts from the excavation are currently held by CA at their offices in Kemble. Subject to the agreement of the legal landowner the artefacts will be deposited with Carmarthenshire Museum under accession number CAASG 2008.0282, along with a digital copy of the paper archive. The original paper archive will be deposited with the RCAHMW.

2. RESULTS (FIGS 2–5)

2.1 This section provides an overview of the evaluation and excavation results; detailed summaries of the recorded contexts, environmental samples (palaeoenvironmental evidence) and radiocarbon dating are to be found in Appendices A, B and C. Full, original versions of the specialist reports are contained within the archive.

Site 26.02

Evaluation (trenches 26.02.T1 and 26.02.T2; Fig. 2)

2.2 Trench 2 contained no archaeological features. In trench 1, the natural substrate was cut by north/south aligned ditch 26/2/1/04, which was 1.7m wide and 0.35m deep with an irregular profile. It contained two natural infills and was undated. The ditch lay to the east of the area subsequently excavated and was not exposed during the excavation but corresponds with a linear anomaly recorded during the geophysical survey.

Excavation (Fig. 3)

2.3 The natural geological substrate was directly overlain by a burnt mound. Although only partially exposed within the site, this was at least 11m wide and 0.2m high and consisted of layer 26.02/2603003 which was made up of burnt stones and charcoal within a dark silt matrix. Charcoal from this deposit was poorly preserved but comprised the remains of fuelwood.

2.4 Pit 26.02/2603008 was located immediately south-west of the burnt mound. It was circular in plan with steep sides and a flat base and was 0.3m in diameter and 0.1m deep. Its fill (26.02/2603006) comprised burnt stones within a dark silty matrix and contained no finds.

Site 26.03

Evaluation (trench 26.03.T1; Fig. 2)

2.5 The natural substrate was cut by east/west aligned ditch 26/3/1/04, which was 0.65m wide and 0.1m deep and corresponded to a linear anomaly recorded during the geophysical survey. It had a single stony fill which contained no dating evidence. This ditch lay to the west of the area subsequently excavated as Site 26.03 and was not further exposed.

Excavation (Fig. 4)

2.6 The natural substrate was overlain by a burnt mound and cut by a ditch. Burnt mound 26.03/2603003 was not fully exposed within the site but was at least 6m wide and 0.25m thick. It comprised burnt stones and charcoal in a dark silt matrix. The charcoal represented the remains of fuelwood and a fragment of alder charcoal from this material returned a Middle Bronze Age radiocarbon date range of 1380–1050 cal. BC (SUERC-56041).

2.7 The burnt mound was cut by two tree-throw pits and a ditch. Ditch 26.03/2603006 was east/west aligned and consisted of a fairly steep-sided cut 0.7m wide and 0.3m deep with a concave base. It was filled with material derived from the burnt mound, although it is unclear whether this was a deliberate backfill or an inwash of the surrounding material.

Site 26.04

Evaluation trench 26.04.T1 (Fig. 2)

2.8 Trench 1 contained a hearth and a pit. Circular hearth 26/4/1/04 was 1.05m wide and 0.2m deep with a flat base, although it was not fully exposed within the trench. It had been edged with cobble-sized stones, although only part of this edging survived. Within the cut, a charcoal-rich lower fill (26/4/1/08) was overlain by a backfill (26/4/1/05) which had been capped with grey clay (26/4/1/10). Charcoal from the lower fill of the hearth which dates to the use of the feature gave an Early Bronze Age radiocarbon date of 2020–1770 cal. BC (Beta Analytic-222403).

2.9 Pit 26/4/1/06 was 2.5m west of the hearth. It was oval in plan with steep sides and a rounded base and was 1.1m long, 0.7m wide and 0.2m deep. It contained a single silty clay fill which included a few charcoal flecks and was undated.

Evaluation trench 26.04.T2 (Fig. 2)

2.10 Trench 2 contained two parallel north/south aligned ditches, 26/4/2/04 and 26/4/2/06. The ditches were 0.65m–1.5m wide and 0.1m–0.25m deep with silty fills. Neither ditch contained finds and the ditches are on a more north/south alignment compared to a series of faint linear anomalies visible on the geophysical survey plot which are on a more northeast/southwest orientation.

Evaluation trench 26.04.T3 (Fig. 2)

2.11 Four discrete features (features 26/4/3/04, 26/4/3/06, 26/4/3/08 and 26/4/3/10) were identified within a single cluster, three of which were intercutting. Of the intercutting features, 26/4/3/04 was the largest and earliest and comprised a circular cut 1.2m wide and 0.15m deep. The surrounding substrate had been scorched suggesting that this was the cut for a hearth. It contained a single clay silt fill which included clusters of charcoal and burnt sandstones. The three remaining features were smaller (up to 0.25m wide and 0.2m deep) and contained clay silt fills with lenses of charcoal along their bases. These were probably further hearths. All were undated.

Evaluation trench 26.04.T4 (Fig. 2)

2.12 No archaeological features or deposits were present.

Evaluation trench 26.04.T5 (Fig. 2)

2.13 Trench 5 revealed deposit 26/4/5/04, comprising burnt stones within a charcoal-rich silty matrix. Charcoal from this material gave an Early Bronze Age radiocarbon date of 1530–1400 cal. BC (Beta-222402) and this deposit correlates with a burnt mound recorded in the subsequent excavation.

Excavation (Fig. 5)

2.14 The excavation was targeted on the area around trench 5, to investigate the burnt mound deposit and its surroundings. None of the features within trenches 1–4 were re-exposed during the excavation although this most probably reflects the depth of the overlying subsoil and colluvial deposits across these trenches which were deeper than the depth of the topsoil strip undertaken during the construction works. The yellow clay geological substrate was cut by two palaeochannels, a trough and two postholes and was overlain by a burnt mound. The burnt mound correlates with the deposit identified in trench 5.

2.15 Feature 26.04/2631010 was oval to sub-rectangular in plan with steep sides and a flat base and was 1.7m long, 1.2m wide and 0.35m deep. Given its location and morphology, this feature was probably a water trough associated with the overlying burnt mound. It contained four grey silty/sandy clay fills (26.04/2631009, 26.04/2631014, 26.04/2631015 and 26.04/2631018) and included fragments of wood (these were not recovered from site) as well as burnt stones. Monolith samples taken through the trough revealed no evidence for an *in situ* wood lining, although it is possible that the wood fragments noted in the site records may have been remnants of a former lining.

2.16 Postholes 26.04/2631013 and 26.04/2631024 were recorded near the trough. Both were circular in plan with steep sides and flat bases and were up to 0.3m wide and 0.1m deep. They were filled with material comparable to that from the burnt mound.

2.17 The trough and posthole 26.04/2631024 were sealed by the burnt mound. This survived as four small irregular patches of dark silty clay containing abundant burnt stone and charcoal (layers 26.04/2631002, 26.04/2631003, 26.04/2631004 and 26.04/2631005). Collectively, these extended across an area 10m long and 5m wide. Samples from the mound (26.04/2631005 and 26.04/2631004) yielded fuelwood charcoal, of which a sample was radiocarbon dated to 1530–1400 cal. BC (Beta-222402).

2.18 Palaeochannel 26.04/2631025 truncated the north-western edge of the trough. The channel contained blue-grey silty clay fills, the composition of which was indicative of flowing water (Appendix B).

Discussion

2.19 Taken with the results from Site 26.01 to the immediate west and Site 26.05 to the immediate east, the remains at Sites 26.02–04 have clearly exposed elements of a rich prehistoric landscape.

Settlement

2.20 The hearths and pits identified during the evaluation within Site 26.04 suggest that the settlement found at Site 26.05 extended westwards. Unfortunately, the depth of the topsoil stripping during the construction works was not sufficient to fully define the limits or nature of this western extent of the settlement but it is likely that further parts of the settlement survive in the immediate vicinity. The radiocarbon date from

the hearth found during the evaluation at Site 26.04 (2020–1770 cal. BC) falls between the radiocarbon date ranges obtained from the settlement at Site 26.05 (4040–3800 cal. BC; 3930–3690 cal. BC; 3770–3640 cal. BC; 3780–3640 cal. BC; 1390–1130 cal. BC; 1370–1120 cal. BC) but accords with the overall dating from that site, which includes Late Neolithic/Early Bronze Age pottery and which suggests that the site was in use, probably episodically, from the Early Neolithic through to the Middle Bronze Age periods. In light of this, it is worthy of note that the burnt mounds at Sites 26.03 and 26.04 both returned Middle Bronze Age radiocarbon date ranges (1380–1050 cal. BC and 1530–1400 cal. BC respectively) which fall within the overall duration of use of this settlement. Although it is not known whether specific phases of the mounds and settlement were directly contemporary, these results provide a rare example of a settlement site potentially associated with burnt mounds.

Burnt Mounds

2.21 If the undated mound at Site 26.01 is included, then this part of the pipeline route has revealed four burnt mounds along a 600m-long stretch of a small stream bank. All were located on the southern side of this stream, although it should be noted that the northern bank lay outside the area investigated. This apparent density of burnt mound activity is paralleled at another section of the pipeline route, reported on as Site 506, where the route ran alongside a stream rather than crossing it at right angles and where the remains of at least seven and up to ten burnt mounds and troughs without burnt mounds were exposed along a 300m-long strip along the northern bank of the stream (CA 2013). Such results suggest that burnt mounds may be more common within the landscape than has been appreciated and that where mounds have been found in apparent isolation from other mounds, this may simply reflect the limits of the excavations.

2.22 While samples of fuelwood charcoal the from the burnt mounds at Sites 26.03 and 26.04 both returned radiocarbon date ranges in the Middle Bronze Age, the mound at Site 26.02, as with that at Site 26.01, was undated. Therefore it is not possible to fully estimate the duration of activity on the site, beyond observing that the presence of multiple mounds potentially indicates use over a prolonged period. This prolonged duration could potentially mirror that of the settlement uncovered at Site 26.04/26.05; although the current dating evidence from the mounds reported on here is not sufficient to understand the relative chronologies of these sites in detail, those at Site 506 which were subject to a more intensive programme of radiocarbon

dating were shown to have been used for a period of up to 1570 years from the Late Neolithic through to the Middle Bronze Age (CA 2013). The volume of burnt stone on the site was relatively small and this might suggest that at least some of the mounds may have formed from a single event. However, a note of caution should be added that the level of truncation to the mound deposits is not known and they may have originally been more extensive than was recorded on site.

2.23 Evidence for the functions of the mounds was not forthcoming, although it can be observed that food remains were almost entirely absent and it is possible that the mound locations were used as saunas or washing places. The stones appear to have been locally sourced (perhaps from stream beds and/or tree-throw hollows in the immediate vicinity).

Undated ditches

2.24 Undated ditches were found within evaluation trenches at Sites 26.02, 26.04 and 26.03 and during the excavation within Site 26.03. Some of these correspond to linear anomalies recorded during the geophysical survey. The ditch exposed within evaluation trench 26.03.T1 corresponds to a field boundary depicted on the 1st Edition 1:2500 Ordnance Survey (OS) map of 1885–7 and last depicted on an OS map of 1964. None of the remaining ditches are depicted on the OS mapping and their dates are unknown.

3. PROJECT TEAM

Fieldwork was undertaken by Cambrian Archaeological Projects. This report was written by Luke Brannlund and Christopher Leonard with comments by Jonathan Hart and illustrations prepared by Daniel Bashford. The archive has been compiled by Jonathan Hart and prepared for deposition by Hazel O'Neill. The fieldwork was managed for CAP by Kevin Blockley and the post-excavation work was managed for CA by Karen Walker.

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APPENDIX A: CONTEXT DESCRIPTIONS

Site 26.02

Trench 1

Context No.	Fill of	Interpretation	Description	L (m)	W (m)	D (m)
26/2/1/01		Topsoil	Mid brown silt	30.0	2.0	0.3
26/2/1/02		Subsoil	Dark brown silty clay	30.0	2.0	0.3
26/2/1/03		Natural	Mid yellow-brown clay and gravel	30.0	2.0	
26/2/1/04		Ditch	N/S aligned with moderately steep sides and flat base	>2.0	1.7	0.35
26/2/1/05	26/2/1/04	Ditch fill	Mid grey silty clay with common charcoal flecks		1.7	
26/2/1/06	26/2/1/04	Ditch fill	Mid brown clay silt			

Trench 2

Context No.	Fill of	Interpretation	Description	L (m)	W (m)	D (m)
26/2/2/01		Topsoil	Light brown silt	30.0	2.0	0.3
26/2/2/02		Subsoil	Mid orange-brown sandy silt	30.0	2.0	0.1
26/2/2/03		Natural	Mid brown-orange silt	30.0	2.0	

Excavation

Context No.	Fill of	Interpretation	Description	L (m)	W (m)	D (m)
2603001		Topsoil	Light grey-brown silty clay			0.4
2603002		Subsoil	Dark brown-black silt			0.35
2603003		Burnt mound	Dark grey-black silty clay with frequent burnt stones and charcoal		11.0+	0.2
2603004		Burnt mound	= 2603003 (not distinguished on section dwg)			
2603005		Natural	Yellow clay			
2603006	2603008	Pit fill	Dark black-grey silt with occasional charcoal and burnt stones	0.3	0.3	0.1
2603007		Burnt mound	= 2603003			
2603008		Pit	Circular in plan with moderately steep sides and flat base	0.3	0.3	0.1

Site 26.03

Trench 1

Context No.	Fill of	Interpretation	Description	L (m)	W (m)	D (m)
26/3/1/01		Topsoil	Dark grey-brown clay silt	30.0	2.0	0.2
26/3/1/02		Subsoil	Mid brown clay silt	30.0	2.0	0.2
26/3/1/03		Natural	Yellow silt and cobbles	30.0	2.0	
26/3/1/04		Ditch	E/W aligned. Moderately steep sides and flat base		0.65	0.1
26/3/1/05	26/3/1/04	Ditch fill	Mid grey-brown sandy silt with occasional small stones		0.65	0.1

Excavation

Context No.	Fill of	Interpretation	Description	L (m)	W (m)	D (m)
2603000		Topsoil	Mid red-brown silty clay			0.2
2603001		Subsoil	Mid brown clay silt			0.25
2603002		Natural	Yellow and grey clay			
2603003		Burnt mound	Dark brown silt with frequent burnt stones and charcoal		6.0+	0.1
2603004	2603006	Ditch fill	Upper fill: mid grey-brown clay silt with frequent burnt stones and charcoal		0.7	0.05
2603005	2603006	Ditch fill	3rd fill: mid orange-brown clay silt with common burnt stones and charcoal		0.5	0.3
2603006		Ditch	E/W aligned with moderately steep sides and concave base		>0.7	0.3
2603007	2603006	Ditch fill	2nd fill: dark brown-black clay silt with frequent charcoal and common burnt stones		0.5	0.1
2603008	2603006	Ditch fill	Lower fill: mid orange-brown silty clay		0.7	0.1
2603009		Burnt mound	Dark brown-black clay silt with frequent charcoal and occasional burnt stones		0.35	0.15
2603010		Burnt mound	Dark grey-brown silty clay with frequent burnt stones and common charcoal		0.5	0.1
2603011		Burnt mound	Black-brown silty clay with frequent burnt stones and charcoal		0.9	0.15
2603012		Burnt mound	Mid yellow-brown silty clay with frequent small burnt stones and charcoal		1.8	0.1
2603013		Burnt mound	Mid brown-grey silty clay with frequent charcoal and common burnt stones		1.0	0.13
2603014		Burnt mound	= 2603009		2.1	0.15
2603015		Burnt mound	= 2603010		0.85	0.1
2603016		Wood	Piece of wood below burnt mound (not retained)	>1.0	0.3	0.1
2603017			Context not used			
2603018		Burnt mound	=2603003		1.0	0.35
2603019		Ditch fill	= 2603005		1.1	0.2
2603020		Burnt mound	=2603009		0.9	0.3
2603021		Subsoil	= 2603001			0.15

Site 26.04

Trench 1

Context No.	Fill of	Interpretation	Description	L (m)	W (m)	D (m)
26/4/1/01		Topsoil	Light grey-brown silt	30.0	2.0	0.15
26/4/1/02		Subsoil	Mid yellow-brown silt	30.0	2.0	0.25
26/4/1/03		Natural	Yellow-brown sandy silt	30.0	2.0	
26/4/1/04		Hearth	Circular in plan with moderately steep sides and flat base	>1.1	>0.8	0.25
26/4/1/05	26/4/1/04	Hearth fill	2nd fill: orange-brown silty clay with occasional small stones	>1.1	>0.8	0.15
26/4/1/06		Pit	Oval in plan with moderately steep sides and concave base	1.1	0.7	0.2
26/4/1/07	26/4/1/06	Pit fill	Mid green-grey silty clay with rare charcoal flecks	1.1	0.7	0.2
26/4/1/08	26/4/1/04	Hearth fill	Lower fill: black-brown silt with frequent charcoal and common small stones	>1.1	>0.8	0.1
26/4/1/09	26/4/1/04	Hearth lining	Heat-affected blue-grey stones			
26/4/1/10	26/4/1/04	Hearth fill	Upper fill: mid grey clay	0.65	0.15	0.05

Trench 2

Context No.	Fill of	Interpretation	Description	L (m)	W (m)	D (m)
26/4/2/01		Topsoil	Mid grey-brown silty clay	30.0	2.0	0.15
26/4/2/02		Subsoil	Mid brown silty clay	30.0	2.0	0.15
26/4/2/03		Natural	Mid red-brown sandy silt	30.0	2.0	
26/4/2/04		Ditch	N/S aligned with U-shaped profile		0.65	0.1
26/4/2/05	26/4/2/04	Ditch fill	Mid brown silty sand with occasional stones		0.65	0.1
26/4/2/06		Ditch	N/S aligned with moderately steep sides and flat base		1.5	0.25
26/4/2/07	26/4/2/06	Ditch fill	Mid brown-grey sandy silt with frequent small stones and occasional charcoal flecks		1.5	0.25

Trench 3

Context No.	Fill of	Interpretation	Description	L (m)	W (m)	D (m)
26/4/3/01		Topsoil	Mid brown silt	30.0	2.0	0.3
26/4/3/02		Subsoil	Mid yellow-brown silty clay	30.0	2.0	0.3
26/4/3/03		Natural	Mottled grey-brown clay	30.0	2.0	
26/4/3/04		Hearth	Sub-circular in plan with gently sloping sides and flat base. Scorching to surrounding substrate		1.2	0.15
26/4/3/05	26/4/3/04	Hearth fill	Mid yellow-brown clay silt with clusters of burnt sandstones and charcoal		1.2	0.15
26/4/3/06		Hearth	Sub-circular in plan with gently sloping sides and flat base. Scorching to surrounding substrate		0.25	0.1
26/4/3/07	26/4/3/06	Hearth fill	Mid yellow-brown clay silt with charcoal along base		0.25	0.1
26/4/3/08		Hearth	Sub-circular in plan with gently sloping sides and flat base. Scorching to surrounding substrate		0.2	0.1
26/4/3/09	26/4/3/08	Hearth fill	Mid yellow-brown clay silt with charcoal along base		0.2	0.1
26/4/3/10		Hearth	Sub-circular in plan with gently sloping sides and flat base. Scorching to surrounding substrate		>0.15	>0.1
26/4/3/11	26/4/3/09	Hearth fill	Mid yellow-brown clay silt with charcoal along base		>0.15	>0.1

Trench 4

Context No.	Fill of	Interpretation	Description	L (m)	W (m)	D (m)
26/4/4/01		Topsoil	Light grey-brown silty sand	30.0	2.0	0.25
26/4/4/02		Subsoil	Mid grey-brown silty clay	30.0	2.0	0.15
26/4/4/03		Natural	Mid brown-grey silty clay	30.0	2.0	

Trench 5

Context No.	Fill of	Interpretation	Description	L (m)	W (m)	D (m)
26/4/5/01		Topsoil	Mid brown silty clay	30.0	2.0	0.15
26/4/5/02		Colluvium	Mid yellow-brown clay	30.0	2.0	0.4
26/4/5/03		Natural	Yellow-grey clay	30.0	2.0	
26/4/5/04		Burnt mound	Black-grey silt with frequent burnt stones and charcoal	2.3	1.2	

Excavation

Context No.	Fill of	Interpretation	Description	L (m)	W (m)	D (m)
2631000		Topsoil				
2631001		Natural	Yellow clay			
2631002		Burnt mound	Dark grey silty clay with frequent burnt stones and charcoal	2.2	2.2	0.15
2631003		Burnt mound	Dark grey silty clay with frequent burnt stones and charcoal		0.7	0.1
2631004		Burnt mound	Dark grey silty clay with frequent burnt stones and charcoal		0.9	0.15
2631005		Burnt mound	Dark grey silty clay with frequent burnt stones and charcoal	2.75	2.75	0.1
2631006		Burnt mound	Dark grey-black sand with frequent charcoal and burnt stones		1.15	0.1
2631007		Palaeochannel fill	Dark grey-black silty clay with frequent burnt stones and charcoal		1.4	0.1
2631008		Palaeochannel fill	Blue-grey silty clay			0.1
2631009	2631010	Trough fill	Upper fill: light grey-yellow silty clay with frequent charcoal		0.5	0.1
2631010		Trough	Sub-circular in plan with steep sides and flat base	1.7	1.2	0.35
2631011		Burnt mound	Dark black-grey sand with frequent stones and charcoal		1.5	0.1
2631012	2631013	Posthole fill	Light blue-grey silty clay with common small stones		0.3	0.1
2631013		Posthole	Circular in plan with steep sides and flat base		0.3	0.1
2631014	2631010	Trough fill	2nd fill: mid blue-grey clay with frequent stones		1.1	0.2
2631015	2631010	Trough fill	Lower fill: dark grey-black sandy clay with frequent charcoal and occasional burnt stones		1.5	0.15
2631016	2631025	Palaeochannel fill	Upper fill: dark blue-grey silty clay		1.2	0.35
2631017	2631025	Palaeochannel fill	Lower fill: mid blue-yellow silty clay		0.45	0.25
2631018	2631010	Trough fill	3rd fill: light yellow-grey silty clay with occasional charcoal		0.6	0.4
2631019		Natural	Discoloured natural beneath pit 2631010			0.1
2631020	2631026	Palaeochannel fill	Mid green-grey silty clay		2.4	0.45
2631021	2631027	Palaeochannel fill	Lower fill: light blue-grey clay sand		3.5	0.3
2631022	2631027	Palaeochannel fill	Upper fill: dark blue-grey sandy silt		4	0.7
2631023	2631024	Posthole fill	Dark grey-black silty sand with frequent charcoal and occasional small stones		0.1	0.1
2631024		Posthole	Circular in plan with steep sides and tapered base		0.1	0.1
2631025		Palaeochannel	NE/SW aligned with irregular sides and base		1.4	0.35
2631026		Palaeochannel	NE/SW aligned with irregular sides and base		2.5	0.5
2631027		Palaeochannel	NE/SW aligned with irregular sides and base		4.5	0.5

APPENDIX B: THE PALAEOENVIRONMENTAL EVIDENCE BY JAMES RACKHAM

Site 26.02

Bone

No bone was recovered from this site.

Environmental Soil samples

A total of five environmental samples were taken from the burnt mound (Table 1). Three of these were taken from a series of 5cm spits through the centre of the mound, one from the mound as a bulk sample and one from a pit (Table 1). The samples were processed in the manner described in the assessment report (Carruthers 2008). The residues of all the samples were located and refloated to produce a second flot. However there was some confusion with the sample numbers (see *Methodology*, above). Several of the original sample tags show that the context numbers were changed on site and there may have been errors at some stage during the processing and assessment. We believe we have sorted these out but the charcoal analysis has been restricted to the samples where we are confident of their origin. The processing sheets for CAP do not record any finds from the samples but upon refloating the residues were checked by the EAC team, sorted for finds, burnt stone and checked for a magnetic component and none of the latter was found (Table 2). The volume of the second flot is noted in Table 2 and these flots were scanned for identifiable charred plant remains.

The secondary processing produced an abundance of burnt stone in the burnt mound deposits and pit fill. In the column of three samples the burnt stone component was 54, 43.5 and 37% by weight of the total sample. No magnetic component was recovered from any of the samples. Apart from charcoal no other environmental finds were recovered from the samples. Charcoal concentrations were not high with a range of 8-3mls of charcoal per kilogramme of deposit and no charcoal samples were assessed from this site (Schmidl 2009) but the assemblages from burnt mound samples 2603001 and 2603002 have been selected for study as examples of this burnt mound.

Table 1. Bulk environmental samples from Site 26.02

sample no	context no	feature	description	Wt kg.	Vol. l.*
2603001	BM3-2603003	0-5cm	Burnt mound deposits	19.5	30
2603002	BM3-2603003	5-10m	Burnt mound deposits	10	20
2603003	BM3-2603003	10-15cm	Burnt mound deposits	18.5	30
2603004	2603004		Burnt mound deposits	2	2.5
2603005	2603006	2603008	pit fill	10.5	8

* - volume recorded on site – not accurate

Table 2. Data for the environmental samples from Site 26.02

Sample no	Context no	pro-cessed wt kg	1st Vol ml	2nd vol	residue wt g	burnt stone wt g	magnetic
2603001	BM3	19.5	100	none	11353	10522	-
2603002	BM3	10	100	none	4804	4348	-
2603003	BM3	18.5	100	5	7480	6852	-
2603004	2603004	2	20	0.1	552	491	-
2603005	2603006	10.5	41	1	1456	303	-

Charcoal *(Dana Challinor)*

The largest samples (2603002 and 2603003) from burnt mound deposit 2603003 were selected for charcoal analysis. Standard methodological procedures were followed, although only the >4mm fractions were identified. In common with other adjacent sites (Sites 26.01, 26.03 and 26.04), the preservation of charcoal was very poor and it was considered that there was no merit in attempting to identify material of <4mm in size. The charcoal was heavily mineralised, with strong orange deposits in the vessels. Additionally, the material was soft and crumbly making fracturing without destruction difficult. Four taxa were identified; *Quercus* sp. (oak), *Alnus glutinosa* (alder), *Corylus avellana* (hazel) and *Populus/Salix* (poplar or willow). The undifferentiated category of *Alnus/Corylus* in both samples may well include both species and any apparent contrast is not reliable. No heartwood was recorded, but this may have been due to lack of recognition in poor material. However a number of strong roundwood fragments of oak were recorded, in addition to some bark. The use of oak, alder and hazel in burnt mound assemblages is well-attested at other sites along the pipeline. The alder and poplar or willow would have grown along the stream side, and the poor preservation reflects deposition in waterlain (or seasonally wet) sediments.

Table 3: Charcoal from burnt mound feature at Site 26.02

	Sample number	2603002	2603003
Quercus sp.	oak	10 (r)	13 (r)
Alnus glutinosa Gaertn.	alder		7
Corylus avellana L.	hazel	1	
Alnus/Corylus	alder/hazel	9	6
Populus/Salix	poplar/willow	2	1
Indeterminate	bark	2	
Indeterminate		6	3
Total		**30**	**30**

s=sapwood; h=heartwood; r=roundwood; (brackets denotes presence in some fragments only)

Discussion

The results from the samples are typical of the burnt mounds along the pipeline route with high concentrations of burnt mudstone, and a lack of debris that could reflect occupation or food consumption. The charcoal concentrations are small but no significance can be attached to this since rainfall and weathering can have a major impact on the charcoal concentrations.

The site lies on Devensian diamicton, over mudstones which form the major component of the burnt mound stone debris. The mound is approximately 30.5 square metres in extent and with an average thickness of 0.088m and an approximate density of burnt stone of 0.635kg per litre in the samples the quantity of stone represented within

the total planned area is at a crude estimate about 1.7 tonnes. The planned area does not record the whole mound but unfortunately we have no data that allows us to accurately predict the size of the mound which could be twice the size of the exposed area. A guess of perhaps 3 tonnes of burnt stone might be a good general indication of the size of the whole mound. This places the site at the lower end of the medium sized mounds (2-10 tonnes) along the pipeline route. The site lies at 46m OD approximately 7m south west of a modern stream or field ditch. This field boundary is located over a former stream whose course is marked by a field boundary on the 1st edition OS map (Fig. 2), and flowed in the bottom of a small valley. Whether this was the course of the Bronze Age stream, or not, the course contemporary with the mound must have been close by. The stone used at the site is likely to be from the stream bed and tree throws in the local woodland.

The site is undated, so it is difficult to tie it in to the landscape suggested by the local pollen sequences studied within the project. The pollen sequence at 28.23 (Langdon and Scaife 2014) a few miles to the north of the mound covers much of the 1st millennium BC and shows a wooded landscape of oak and hazel woodland, with alder in wetter areas and along the stream and river banks in the late Bronze Age with a phase of major clearance in the early Iron Age. Arable and grasslands are present in the late Bronze Age but the pasture expands appreciably after the clearance phase, although there is no obvious increase in arable lands. Oak dominates the two charcoal assemblages studied, with hazel and alder, and a little willow/poplar, all consistent with the pollen evidence. We cannot speculate whether the slopes of the valley were wooded or already cleared, but alder and willow must have been growing on the banks of the stream, and the prevalence of oak suggests a nearby woodland.

Site 26.03

Animal Bone

No animal bones were recovered from this site.

Environmental soil samples

A series of five 5cm spit samples were taken from a 'test pit' through burnt mound 2603003 (Table 4). The precise location of the test pit is not known but the location normally chosen is the highest central point of the mound. In addition to the bulk soil samples a piece of wood was lifted in a block of soil from beneath the burnt mound deposits. The samples were processed in the manner described in the assessment report (Carruthers 2008). The residues of all the samples were located and refloated to produce a 2nd flot. However there was some confusion with the sample numbers (see *Methodology*, above). Several of the original sample tags show that the context numbers were changed on site and there may have been errors at some stage during the processing and assessment. We believe we have sorted these out but the charcoal analysis has been restricted to the samples where we are confident of their origin. The processing sheets for CAP do not record any finds from the samples but upon refloating the residues were checked by the EAC team, sorted for finds, burnt stone and checked for a magnetic component although none of the latter was found (Table 5). The volume of the second flot is noted in Table 2 and these flots were scanned for identifiable charred plant remains.

The secondary processing produced an abundance of burnt stone in the spits through the burnt mound deposits. In the column of five samples the burnt stone component was 47, 18, 49, 25 and 3.5% by weight of the total sample. The small stone content in the basal spit clearly indicates that this sample incorporates the underlying surface upon which the burnt mound was dumped. The fall in burnt stone and total residue weight between spits 1 and 3, might indicate a time gap in the build-up of the mound, or perhaps alluvial or colluvial inwash that added

fine sediment to the make up of the mound. It is at least suggestive of at least two periods of stone dumping. No magnetic component was recovered from any of the samples. As with the other mounds in this area no environmental evidence other than charcoal was recovered from the deposits. The highest charcoal concentration is in the basal spit, which with the lowest stone content perhaps indicates this part of the deposit was rapidly sealed. Charcoal concentrations lie within the range 2 to 55ml per kilogramme of sample. No charcoal samples were assessed from this site (Schmidl 2009) but the assemblages from burnt mound samples 2603003 and 2603005 have been selected for study as examples of this burnt mound.

There is a problem with the wood sample, 2603006, from context 2603016. A single piece of wood labelled <2633013> context 2633016 has been found. This context is Site 26.03, and the only wood sample from this site was sample 2633017 from beneath context 2631014 (sample 2633013 was a spit sample from burnt mound 2631002). It is a hard eroded piece of oak heartwood with a visible curvature indicating a central piece of branch or trunkwood of some 16cm diameter. The surviving fragment is 32cm long with a maximum diameter of 4cm and seventeen rings showing a period of strong growth followed by nine years of slow growth, and then strong growth again. There is no surviving evidence for working.

Table 4 Bulk environmental samples and wood from Site 26.03
* - volume recorded on site – not accurate

sample no	feature	description	Wt kg.	Vol. l.*	Date
2603001	0-5cm	Burnt mound deposit	10	15	MBA/LBA?
2603002	5-10cm	Burnt mound deposit	7	15	MBA/LBA?
2603003	10-15cm	Burnt mound deposit	8.5	15	MBA/LBA?
2603004	15-20cm	Burnt mound deposit	9	15	MBA/LBA?
2603005	20-25cm	Burnt mound deposit	9	15	1380-1050 cal BC
2603006	2603017	wood			MBA/LBA?

Table 5 Data for the environmental samples from Site 26.03

Sample	Context	pro-wt kg	1st flot Vol ml	2nd flot vol	residue wt g	burnt clay	burnt stone
2603001	BM4	10	107	165	4882	6	4673
2603002	BM4	7	300	-	1349		1247
2603003	BM4	8.5	300	-	4437		4150
2603004	BM4	9	20	1	2369		2274
2603005	BM4	9	500	2	365		311

Charcoal *(Dana Challinor)*

Two samples from the mound were submitted for charcoal analysis. Thirty fragments were examined from each sample, using standard procedures. Although there was abundant material, the condition of the charcoal was extremely poor; heavily mineralised, with strong iron staining to the cell structure. In some instances it seemed that it was only the mineralisation products holding the structure together and the charcoal crumbled on attempts at fracturing. Three taxa were positively identified; *Quercus* sp. (oak) and *Alnus glutinosa* (alder) and Maloideae (hawthorn group) (Table 6). Some moderate ring curvature was recorded in the alder fragments, but condition was generally too poor to allow examination of maturity.

Table 6 Charcoal from burnt mound feature at site 26.03

	Feature type	burnt mound	Burnt mound
	Feature number	BM4	BM4
	Context number	BM4	BM4
	Sample number	2603005	2603003
Quercus sp.	oak	16	6
Alnus glutinosa Gaertn.	alder	3 (r)	8 (r)
Alnus/Corylus	alder/hazel	5	10
Maloideae	Hawthorn group		1
Indeterminate		6	5
Total		30	30

r=roundwood; (brackets denotes presence in some fragments only)

Given the poor preservation of the charcoal, assumptions on taxonomic composition must be considered tentative. Of the alder/hazel group only alder was confidently identified, but it is possible that hazel was also represented in the undifferentiated category and/or that other taxa were present. Oak appeared to form a larger component of the fuelwood used in sample 2603005, than in 2603003, which produced more alder (plus and/or hazel). The use of alder in burnt mound features is not uncommon, probably because the tree prefers habitats near rivers and streams, which are often associated with these deposits of burnt stone material. The mineralised condition of the charcoal may also be associated with wet soil conditions (occurring post-deposition), as this can produce iron staining, and repeated wetting and drying causes mechanical damage to the anatomical structure.

Discussion

Once again these samples have produced assemblages typical of the burnt mounds along the pipeline route. The deposits are dominated by burnt sandstone and mudstone cobbles, but also angular sandstone and mudstone, with variable quantities of charcoal. There is a complete lack of any evidence for occupation or food consumption on the site. The absence of a magnetic fraction in the residue would suggest that the stone was burnt beyond the mound. The charcoal concentrations are low to medium and seem as likely to reflect the degree of protection the deposit had after deposition as any other factor.

As with the mound at Site 26.02 this mound lies on Devensian diamicton, over mudstones, these mudstones and also sandstones comprising the bulk of the mound. The planned mound is approximately 28.5 square metres in area and has an approximate average thickness of 0.05m, indicating (on the basis of the burnt stone quantities in the column of samples) a total weight of approximately 0.58 tonnes of burnt stone. Unfortunately the whole mound was not exposed but even if we assume that only half of the mound was exposed this would still represent a small burnt mound with little more than a tonne of burnt stone in the mound. The presence of two tree throw pits at the south end of the mound may also indicate why this location was selected. Tree throws may have been some of the only locations from which stone could be extracted easily without serious digging, and they also suggest trees or woodland in the immediate vicinity that would afford a fuel source, although it has not been established archaeologically that the tree throws are contemporary with the mound.

Oak and alder have been positively identified from the charcoal assemblage, with some alder roundwood, and form the major taxa, but hawthorn group is also present and possibly hazel. The alder would have been available from the streamside near the site and the frequency of oak also suggests local woodland. The nearest pollen sequence studied within the project, a few miles north at Site 28.23 (Langdon and Scaife 2014), post dates the mound but shows an oak and hazel woodland dominating the landscape with alder growing in wetter areas and some pasture and arable activity in the late Bronze Age. The major clearance episode in the landscape is dated to the early Iron Age suggesting that in the mid-late Bronze Age when the mound was being created woodland was the dominant landscape type in the area, and the mound could have lain within woodland or on its periphery.

Site 26.04

Animal Bone

No animal bones were recovered from this site.

Environmental soil samples

Each of the burnt mound layers, except 2631003, were sampled with a short column of samples in 5cm spits; three from layer 2631002, two from layer 2631005, and two series of four and three spits from layer 2631004 (Table 7). Samples were also taken from the trough fills, the palaeochannel and two postholes (Table 7), while a piece of wood was lifted from the trough (sample 2633017). In addition to the bulk samples three monolith samples were taken through the trough and palaeochannel fills. The samples from the main excavation were processed in the manner described in the assessment report (Carruthers 2008), and those from the evaluation are described in Giorgi and Martin (2009). The residues of all the samples, except those from the evaluation trenches, were located and refloated to produce a second flot. The processing sheets for CAP do not record any finds from the samples but upon refloating the residues were checked by the EAC team, sorted for finds, burnt stone and checked for a magnetic component and none of the latter was found except in sample 2633017 (Table 8). The volume of the second flot is noted in Table 8 and these flots were scanned for identifiable charred plant remains.

The results of sorting the burnt mound sample residues produced quantities of burnt stone in all the residues located. The only other finds were a little burnt clay in one sample, and a very small magnetic fraction in one. The lower two samples of the southern series from BM deposit 2631004 have a reducing stone content, the basal sample with very little indeed (Table 9), and this is also true for the basal samples of BM 2631005 and BM 2631002, suggesting these represent deposits into which the mounds were trampled. The proportion of burnt stone in each of the column series is given in Table 9. The basal sample of the northern series from BM 2631004

was incomplete so the proportion could not be calculated, but the stone density was greatest in this part of the mound.

The flots are dominated by charcoal, and only one sample, context 2631008, produced any identifiable charred plant remains, a single fragment of hazel nutshell (Table 8). The charcoal concentrations vary significantly through the deposits with a minimum of 3.5ml/kg of sample in the basal deposit of the southern column of BM 2631004 (clearly reflecting the stone density and supporting the inference that this is largely the underlying deposit) to 167ml/kg in the second spit of this column. With four samples producing concentrations of greater than 100ml/kg these deposits are relatively rich in charcoal, although this may have no significance beyond the degree of weathering and protection the deposits received.

The charcoal from three contexts were assessed (Schmidl *et al* 2009), the upper, secondary and lower fills of trough 2631010, but none from the mounds. These produced abundant alder/hazel and oak roundwood and stemwood, with oak only recorded in the top fill, alder/hazel only in the secondary fill and both species in the lower fill, but since the samples were not specifically quantified or randomly selected these differences may not be important. Samples from the burnt mound deposits in 2631004 and 2631005 have been selected for detailed study as examples from these burnt mounds, along with the charcoal assemblage from the dated hearth fill, context 26.04.T1.08.

The samples from evaluation trenches 1 and 3 represent settlement. Samples were recovered from evaluation trenches 1, 3 and 5, the contexts from trench 1, 26.04.T1.05 and 08 being described as hearth fills, that from trench 3 as a pit, and the sample from trench 5 a burnt mound. The first and second flots from the hearth fills (05 and 08) are both dominated by burnt and concreted sediment, with a small amount of charcoal from which oak and hazel roundwood was identified by Rowena Gale for potential radiocarbon dating. Sample 006 also produced a significant amount of fired and partially concreted earth. The lower fill of the hearth was appreciably richer in charcoal with oak and hazel roundwood also identified. Neither sample produced any identifiable charred plant remains other than charcoal. The sample from pit 26.04.T3.04 is dominated by oak charcoal, but a single small fragment of charred hazel nutshell was also recovered and a few grammes of fired and concreted earth. The sample details for 26.04.T5.04 are missing but charcoal from this sample was looked at by Rowena Gale for potential radiocarbon samples, and she identified Maloideae and oak in the assemblage. No other plant macrofossils were recorded. In the assessment Schmidl *et al* (2009) identified only oak and alder/hazel in the three samples they studied. Despite the single hazel nutshell fragment none of the samples from the evaluation trenches allow any specific interpretation. Like many undated and dated samples along the pipeline of prehistoric or possible prehistoric age charcoal was the only material recovered and this shows the presence of oak, hazel and Maloideae (hawthorn group) in the area.

Table 7 Bulk environmental samples from Site 26.04

sample no	context no	feature	description	Wt kg.	Vol. l.*
006	26.04.T1.05	26.04.T1.04	2nd Hearth fill	10	10
007	26.04.T1.08	26.04.T1.04	Lower hearth fill	10	10
008	26.04.T3.05	26.04.T3.04	Pit fill	20	15
	26.04.T5.04		Burnt mound	nd	nd
2633001	2631007	0-5cm	Burnt mound deposit	9	15
2633002	2631005	0-5cm	Burnt mound deposit	23	20
2633003	2631007	5-10cm	Burnt mound deposit	15	30
2633004	2631005	0-5cm	Burnt mound deposit	8	15
2633005	2631004	0-5cm	Burnt mound deposit	16	30
2633006	2631002	0-5cm	Burnt mound deposit	10	15
2633007	2631007	10-15cm	Burnt mound deposit	6	15
2633008	2631004	5-10cm	Burnt mound deposit	12	15
2633009	2631004	5-10cm	Burnt mound deposit	12	nd
2633010	2631008	15-20cm	Burnt mound deposit	20	30
2633011	2631004	10-15cm	Burnt mound deposit	12	22
2633012	2631002	10-15cm	Burnt mound deposit	10	15
2633013	2631009	2631010	Upper trough fill	10	15
2633014	2631009	2631010	Trough fill beneath 013	5	5
2633015	2631012	2631013	Posthole fill-east quadrant	2	1.5
2633016	2631012	2631013	Posthole fill-west quadrant	3	1
2633017			Wood, beneath 2631014		
3633018		Monolith	trough fill and palaeochannel		
2633019	2631016	2631025	Palaeochannel fill	not proc.?	0.5
2633020		Monolith	Trough fills and burnt mound		
2633021		monolith	Palaeochannel fills		
2633022	2631014	2631010	2nd trough fill	10	15
2633023	2631015	2631010	Lower trough fill	10	15
2633024	2631023	2631024	Posthole fill	1	1

* - volume recorded on site – not accurate

Table 8 Data for the environmental samples from Site 26.04

Sample	Context	Pro-Cessed wt kg	1st Flot Vol ml	2nd Flot Vol	Residue wt g	burnt clay	burnt stone g.	magnetic	comments
006	26.04.T1.05	10	7.5	20		150g		C	3ml ch'coal
007	26.04.T1.08	10	140	125				D	180ml ch'coal
008	26.04.T3.05	20	55	9		5g		A	105ml ch'coal
	26.04.T5.04	nd	nd						
2633001	2631007	9	1000	#	3821		3540	-	0-5cm
2633003	2631007	15	2500	3	5872		5545	-	5-10cm
2633007	2631007	6	2500	1	1013		939	-	10-15cm
2633010	2631008	20	70	3	332		17	-	15-20cm; HNSx1
2633002	2631005	23	1528	3	9690		8265	-	0-5cm
2633004	2631005	8	400	2	420		273	-	5-10cm
2633005	2631004	16	429	1	11769	168g	11167	-	0-5cm
2633008	2631004	12	530	3	7243		6868	-	5-10cm
2633011	2631004	12	800	2	5378		1059+	-	15-20cm
2633006	2631002	10	1200	1	4899		4556	-	0-5cm
2633009	2631004	12	1172	3	3187		2914	-	5-10cm
2633012	2631002	10	100	0	96		88	-	10-15cm
2633013	2631009	10	160	-	456		nd	-	
2633014	2631009	5	350	-	295		292	-	
2633015	2631012	2	50	1	618		527	-	
2633016	2631012	3	175	2	251		213	-	
2633017	2631014/15				1694		1604	0.4	
2633022	2631014	10	200	none	7720		7700	-	
2633023	2631015	10	1500	none	3351		2857	-	
2633024	2631023	1	40	1	138		106	-	

samples 2603001 and 2633001 mixed in error; HNS-hazel nutshell; + - not all the residue was located.

Table 9 Burnt stone content in the series of column samples from Site 26.04

sample no.	context no.	depth in column	wt kg.	burnt stone wt. g	Burnt stone proportion by weight of unwashed sample
2633001	2631007	0-5cm	9	3540	39%
2633003	2631007	5-10cm	15	5545	37%
2633007	2631007	10-15cm	6	939	16%
2633010	2631008	15-20cm	20	17	<1%
2633002	2631005	0-5cm	23	8265	36%
2633004	2631005	5-10cm	8	273	3.4%
2633005	2631004	0-5cm	16	11167	70%
2633008	2631004	5-10cm	12	6868	57%
2633011	2631004	15-20cm	12	1059+	-
2633006	2631002	0-5cm	10	4556	46%
2633009	2631004	5-10cm	12	2914	24%
2633012	2631002	10-15cm	10	88	<1%

+ proportion of residue only located

Monoliths samples

Three monoliths were collected, two from the trough and the third from the palaeochannel. The location of the monoliths was not indicated on the plans and sections but the section drawings on the sample sheets allow us to place them fairly precisely. The monoliths are illustrated within the site archive.

Monolith 2633018

The lower part of this sequence (34.5-48) appears to be the natural underlying the cut for trough 2631010. There is a sharp boundary above, but no evidence for a lining of any sort. The lower fill of the trough comprises a mixed charcoal and sandy silt deposit. Above this is a small dump of quite large charcoal lumps and firecracked river pebbles presumably derived from the adjacent burnt mound. A heavily mottled clayey silt above suggests that this deposit formed in standing water in the trough, perhaps reflecting natural episodes of flooding and infilling of the trough. There is an absence of any structure in the deposit between 10 and 22cm, and a similar sediment has infilled the voids between the charcoal and stones in the horizon below. The top of the sequence is a slightly sandy clayey silt showing some structure and soil development. The sequence suggests a fluctuating water table, a possible inwash component in the upper sediments but no evidence of organic survival, and a low likelihood of any pollen survival.

Monolith 2633020

The second monolith from the trough shows a probable base to the feature at 32cm, with the basal fill dominated by heated and fractured river pebbles and mudstone, and charcoal with waterlain silts and clays. The upper silty clays continue to include some stone and charcoal flecks indicating the continued inwash of material from the burnt mound after the trough has gone out of use. The upper sediments have undergone some soil development, the upper parts of which have not been recovered in the monolith. There is no organic preservation in the sediments and pollen survival is likely to be very poor.

Monolith 2633021

The final monolith from this site was taken from the fills of palaeochannel 2631016. The upper fills of the feature are part of a developed soil, the upper parts of which have not been sampled in the column. The sharp oblique boundary at the base of this horizon (at 13-16cm) suggests the base of this soil, and has the appearance one might expect for the base of a ploughsoil, although it is similar to the upper deposit in Monolith 2633018.

The lower mottled deposits reflect water movement through the soil and deposition of iron salts. The basal layer (31-37cm) includes sub-rounded stones and a little sand suggesting the base of the channel feature. The whole of this deposit post-dates the burnt mound. There is no organic survival in these sediments and there is little likelihood of pollen survival so no further work was carried out on any of these monoliths.

Charcoal *(Dana Challinor)*

The charcoal from three contexts were assessed (Schmidl et al 2009), the upper, secondary and lower fills of trough 2631010, but none from the mounds. These produced abundant alder/hazel and oak roundwood and stemwood, with oak only recorded in the top fill, alder/hazel only in the secondary fill and both species in the lower fill, but since the samples were not specifically quantified or randomly selected these differences may not be important. Two samples were selected for charcoal analysis from the burnt mound, and analysed following standard procedures. These were samples 2633002 from layer 2631005 and 2633003 from layer 2631004. Both samples produced abundant charcoal, with some very large (>20mm) fragments, but the material was heavily mineralised and/or vitrified, which inhibited analysis. Four taxa were positively identified; *Quercus* sp. (oak),

Alnus glutinosa (alder), *Corylus avellana* (hazel) and Maloideae (hawthorn group). Some oak heartwood was identified in sample 2633003, with occasional oak roundwood fragments in both samples. Both the hazel and the alder exhibited strong ring curvature, consistent with the use of small diameter (measurements of 12-16mm radius) branchwood or young stem wood, though surviving pith and bark was rare. Ring counts showed several stems of 14-16 years. Sample 2633003 contained some fragments of oak (and indeterminate) with strong vitrification.

The charcoal assemblage accords with the assessment results from the trough, showing the use of oak, hazel and alder in the burnt mound activities. Clearly some mature wood was used; shown not just by the use of oak heartwood, but the age of the hazel stems (16 years+), which is more mature than traditional coppicing cycles (5-7 years). The apparent absence of hazel from spit 2 of mound 2631004 (sample 2633003) is noteworthy, but is probably not of great significance, or at least impossible to ascribe any on the basis of such a small dataset. It is possible that it represents a second burning episode, or it may just be accounted for by uneven deposition, since the charcoal was probably not burnt *in situ*. In any case, the use of oak, alder and hazel is replicated at other burnt mound sites along the pipeline.

Table 10 Charcoal from at Site 26.04

	Feature number	BM5	BM5
	Context number	2631005	2631007
	Sample number	2633002	2633003
Quercus sp.	oak	10 (r)	24 (hr)
Alnus glutinosa Gaertn.	alder	2r	2r
Corylus avellana L.	hazel	13r	
Alnus/Corylus	alder/hazel	3	
Maloideae	hawthorn group	1	
Indeterminate		1	4
Total		**30**	**30**

s=sapwood; h=heartwood; r=roundwood; (brackets denotes presence in some fragments only)

Discussion

All the samples are characteristic of the assemblages from other burnt mounds along the pipeline. The deposits are dominated by burnt stone, with appreciable quantities of charcoal in many of the samples. The lower parts of the mound have been trampled into the underlying soil. The absence of a magnetic fraction in the samples suggests that little burning was actually undertaken on site in those areas from which the samples were collected. The only evidence for food remains on the site is a single fragment of charred hazel nutshell.

A broad idea of the scale of the mound can be calculated. Individually the planned area of BM 2631005 is approximately 5.25sq. metres in extent, BM 2631004 is 8.2 sq. m., BM 2631003 is 1.6 sq. m. and BM 2631002 is 3.45sq. m., a total of 18.5 square metres, with a total volume based upon the section drawings and recorded depth of the deposits, and trough 2631010, of 1.25 cubic metres. This represents an approximate burnt stone weight in all deposits of 0.49 tonnes, which would probably rise to about 0.55 tonnes if we take into account the deposits removed by the palaeochannels. The deposits were spread fairly thinly and much material may have been lost through truncation, but this still appears to be a fairly small example, and considering the number of individual mounds at the site each is likely to have had a fairly short period of build-up, for example mound 2631005 is estimated to have contained just 83kg of burnt stone, about six ten litre tubs of stone, and mound 2631003 just 23kg (although these deposits were not actually sampled and this figure is based on the burnt stone density in the other deposits). This latter mound could well derive from a single stone heating event.

The burnt stone debris is comprised of mudstone and sandstone cobbles with angular mudstone. The site lies on Devensian diamicton, which overlies Nantmel mudstone, and the stone is likely to derive from material brought down by the stream, tree throws and potentially material cleared from local cultivated land. The quantities are not great and might have been generated by just one or two tree throws, although clay underlies the site and stone may not have been abundant in tree throws in this area. The palaeochannel recorded during the excavations cuts the mound and is therefore a later channel feature, although at only 1.2m wide at the stripped level it may not have been a former channel of the main stream. The excavated palaeochannels in Sites 26.01 and 26.03 lack pebbles or cobbles and do not cut down to the underlying mudstone and it is therefore perhaps unlikely that the stream bed could have supplied much of the stone for the sites.

With a radiocarbon date suggesting a middle Bronze Age date for the mound this predates the pollen sequence at site 28.23 (Langdon and Scaife 2014) which starts some time in the late Bronze Age, but we can assume that the wooded character of the landscape indicated by this diagram for the late Bronze Age was present earlier. There is clear evidence for arable and pastures in the landscape but the major woodland clearance does not commence until the early Iron Age. The charcoal assemblages from the mound show a dominance of oak, and also hazel, with a smaller occurrence of alder and hawthorn group. This is consistent the oak and hazel woodland indicated buy the pollen evidence and would suggest local woodland was available to the site.

Conclusions

There is a complete absence of any food remains in any secure burnt mound deposits from any of these sites although a few charred hazel nutshells have been found in features possibly associated with the mounds. This is typical of many of the mounds and if food debris is largely incidental at burnt mounds then its complete absence from the few samples taken at the small mounds is not a surprise since these must represent sites with a relatively short lifetime and perhaps less likely to accrue food debris than those larger mounds in use for perhaps much longer periods.

The mounds primarily exploit oak wood, much of it roundwood, as a fuel, with alder and hazel in similar frequencies, with occasional hawthorn group and poplar/willow. This fuel selection seems likely to be largely whatever was available, rather than any specific selection and the limited pollen evidence we have for the area would indicate a predominantly oak and hazel woodland with alder along the stream and river banks in areas of wetland. The variations between the sites, largely between hazel and oak, may merely reflect proximity to the stream bank with alder used more frequently when available in the immediate vicinity of the mound. It is quite possible that many if not all of these sites lay in woodland that had not been cleared from the stream banks and valley floors.

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APPENDIX C: THE RADIOCARBON DATING BY SEREN GRIFFITHS

For the analysis, radiocarbon measurements were produced on short-life, single entity charred plant remains. Samples with the 'Beta-' laboratory code were pretreated as detailed here http://www.radiocarbon.com/. Samples with the 'SUERC-' laboratory code were pretreated using an acid-base-acid process. Samples were combusted and graphitized and then dated by Accelerator Mass Spectrometry (AMS). The results are conventional radiocarbon ages, quoted according to the international standard set at the Trondheim Convention. The results have been calibrated using IntCal13, and OxCal v4.2. The date ranges have been calculated using the maximum intercept method, and have the endpoints rounded outward to 10 years.

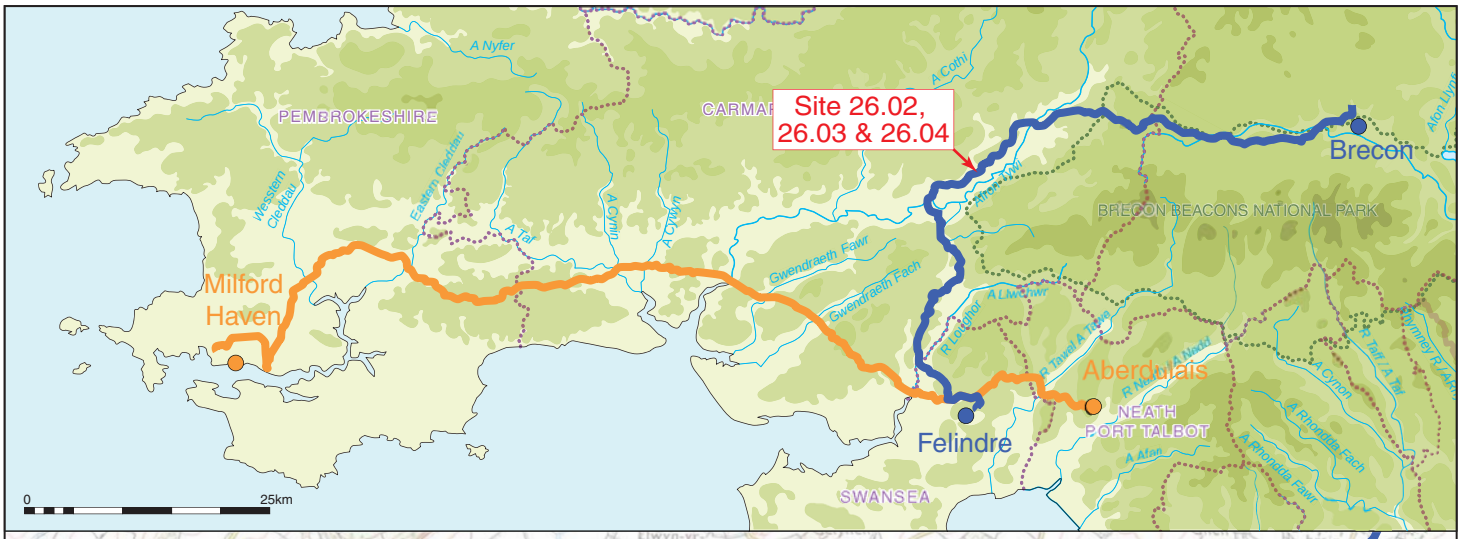
Site 26.03

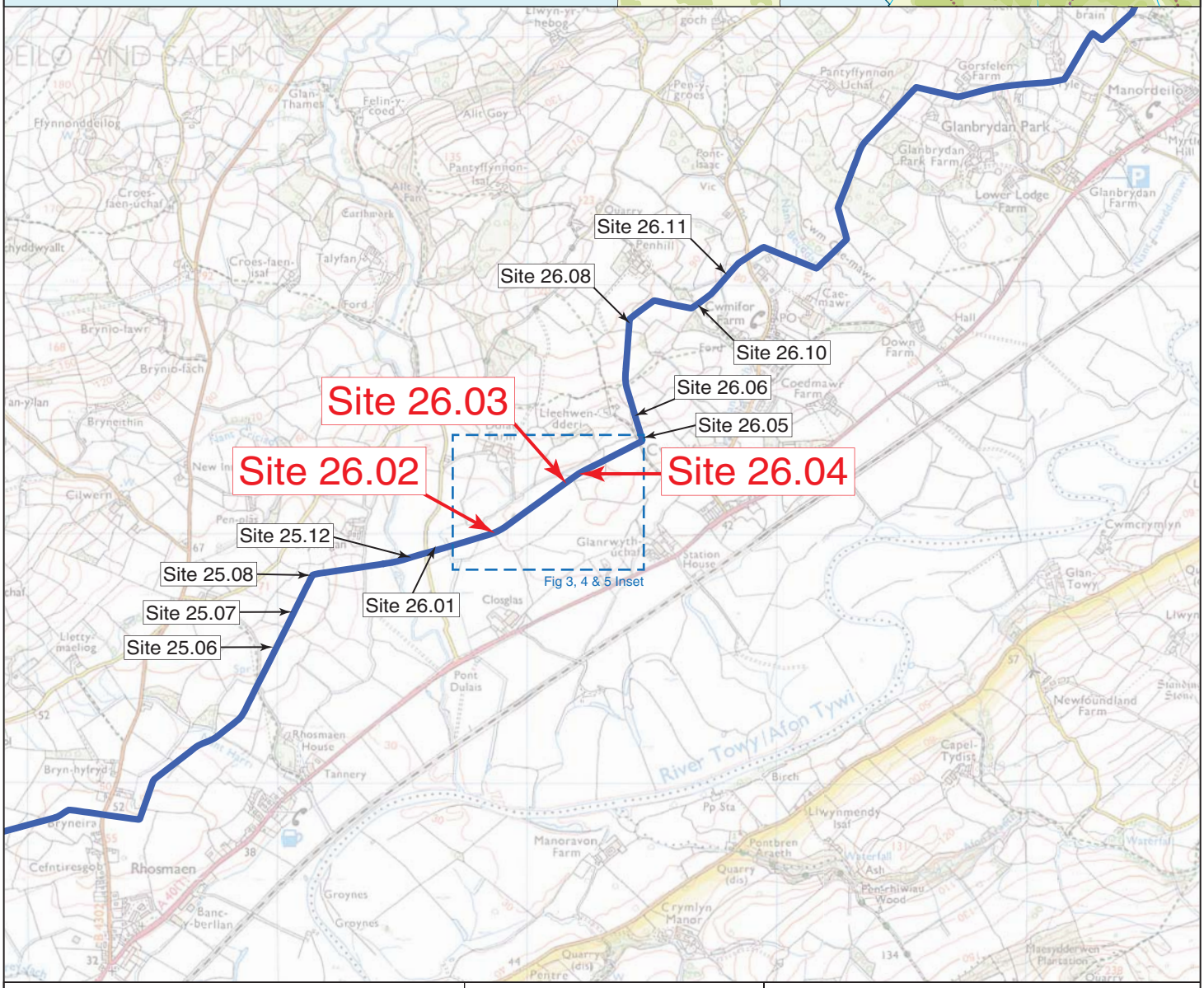
Context	Feature	Sampled material	Laboratory ref.	Measured age	δ13C	Calibrated date (95%)
2603003	Burnt mound	*Alnus* sp. charcoal	SUERC-56041	2985 +/-40	-25.2	1380–1050 cal BC

Evaluation Site 26.04

Trench No.	Context	Feature	Laboratory ref	Measured age	δ13C	Calibrated date (95%)
1	26/4/1/08	Hearth 26/4/1/04	Beta-222403	3580 +/- 40	-	2020–1770 cal BC
5	26/4/5/04	Burnt mound	Beta-222402	3240 +/- 40	-	1530–1400 cal BC

Dating undertaken by Beta Analytic, Miami and Scottish Universities Environmental Research Centre





Milford Haven to Aberdulais pipeline

Felindre to Brecon pipeline

0-75m contour

75m contour

200m contour

400m contour

600m contour

N

0 1km

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PROJECT TITLE

South Wales Pipeline. Sites 26.02, 26.03 & 26.04, Land South of Dolau Farm, Manordeilo and Salem, Carmarthenshire

FIGURE TITLE

Site location plan

PROJECT NO.	9150	DATE	10-10-2013	FIGURE NO.
DRAWN BY	DJB	REVISION	00	1
APPROVED BY	PJM	SCALE@A4	1:25,000	

pipeline centreline

2005-6 evaluation trench

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PROJECT TITLE

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FIGURE TITLE

Sites 26.02-26.04: plan showing locations of evaluation trenches and areas of excavation

PROJECT NO.	**9150**	*DATE*	**20-10-2015**	*FIGURE NO.*
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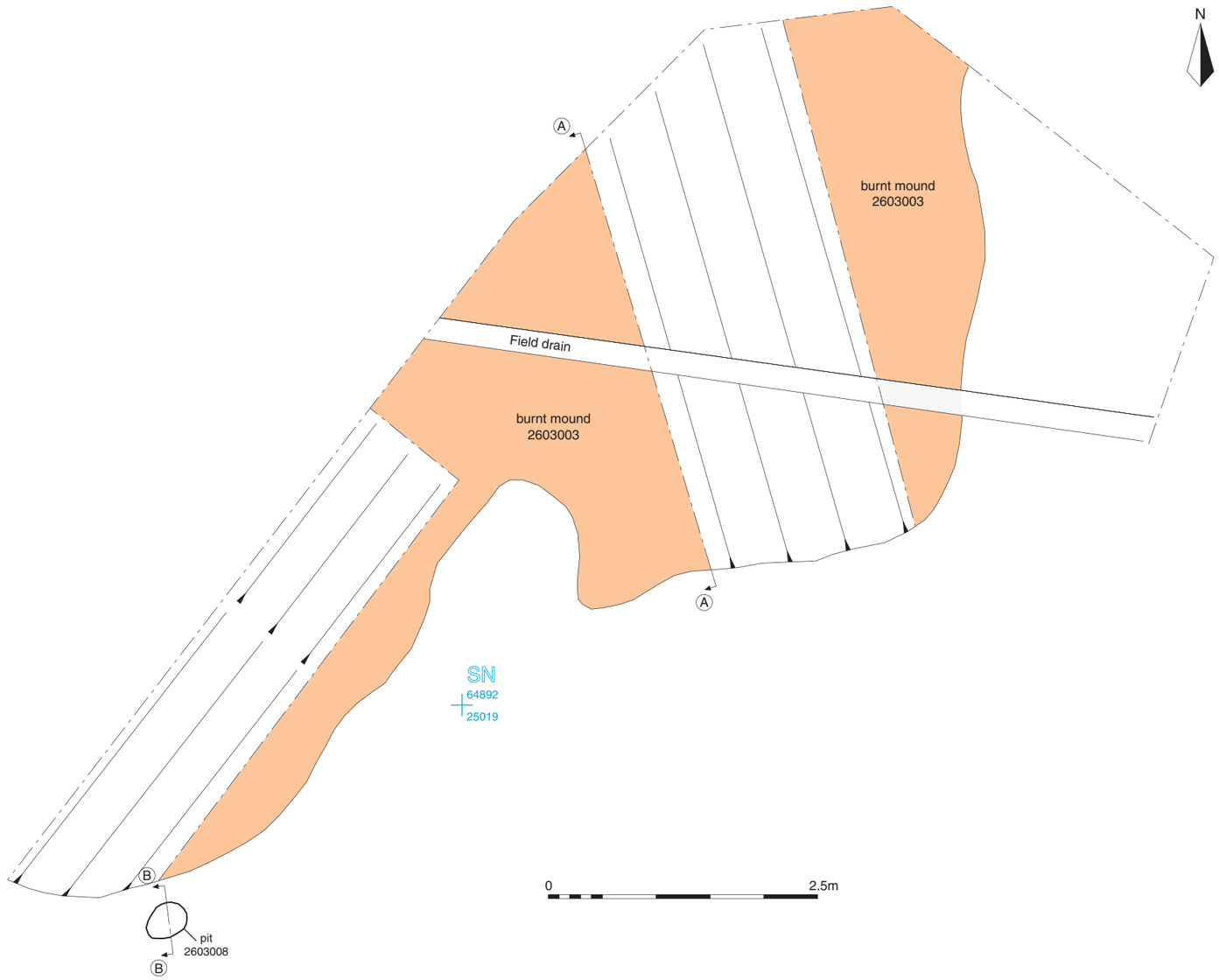
APPROVED BY	**LM**	*SCALE@A3*	**1:2000**	



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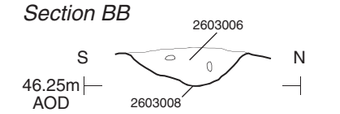

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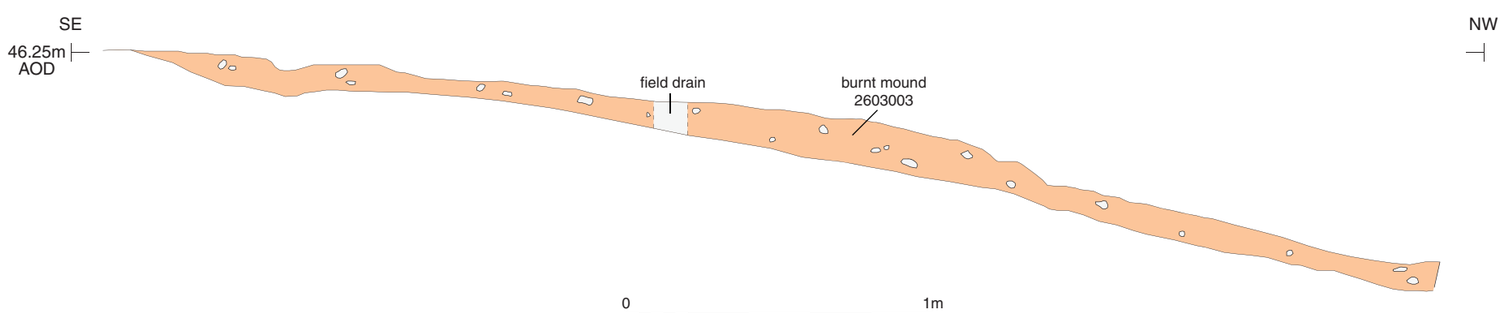

pipeline centreline

2005-6 evaluation trench

burnt mound

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FIGURE TITLE

Site 26.02 plan and sections

PROJECT NO.	**9150**	*DATE*	**06-12-2013**	*FIGURE NO.*
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APPROVED BY	**LM**	*SCALE@A3*	**1:50 1:20 1:10**	

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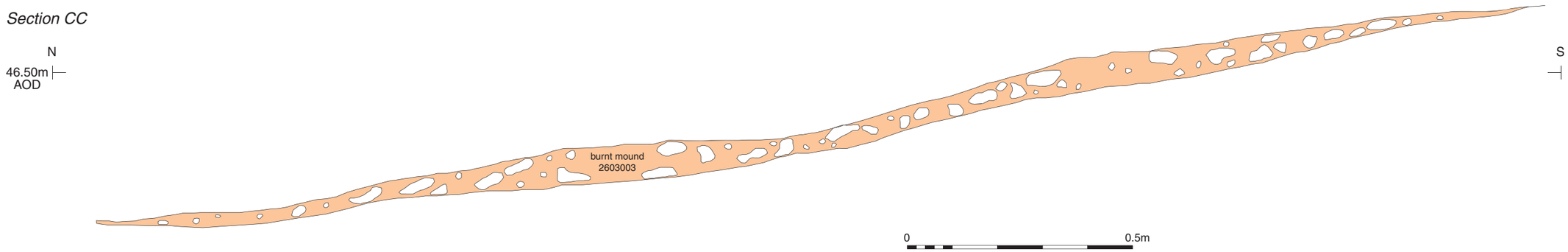

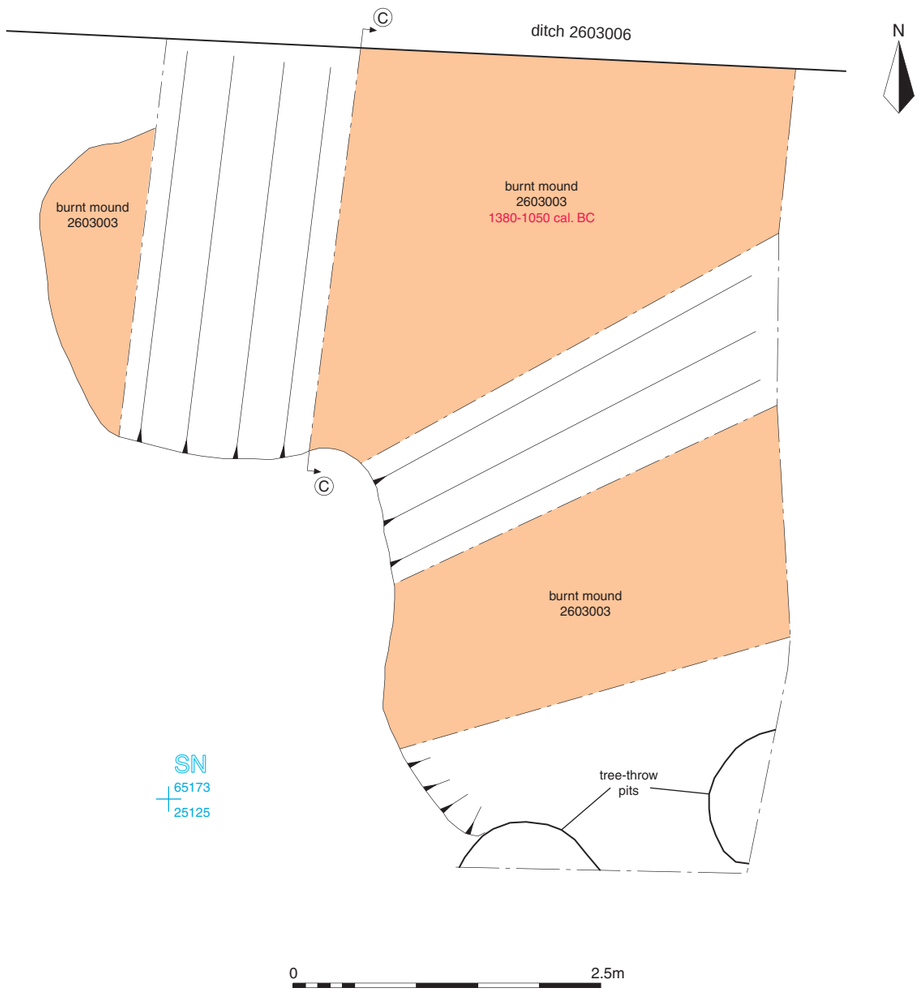

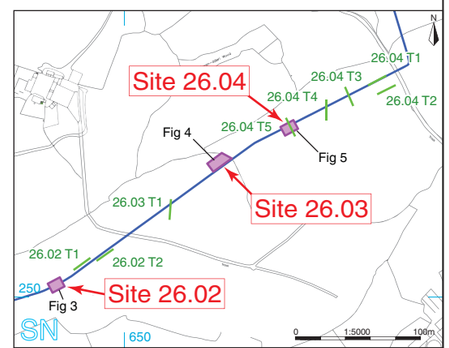

pipeline centreline

2005-6 evaluation trench

burnt mound

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South Wales Pipeline. Sites 26.02, 26.03 & 26.04, Land South of Dolau Farm, Manordeilo and Salem, Carmarthenshire

FIGURE TITLE

Site 26.03 plan and section

PROJECT NO.	**9150**	*DATE*	**13-12-2013**	*FIGURE NO.*
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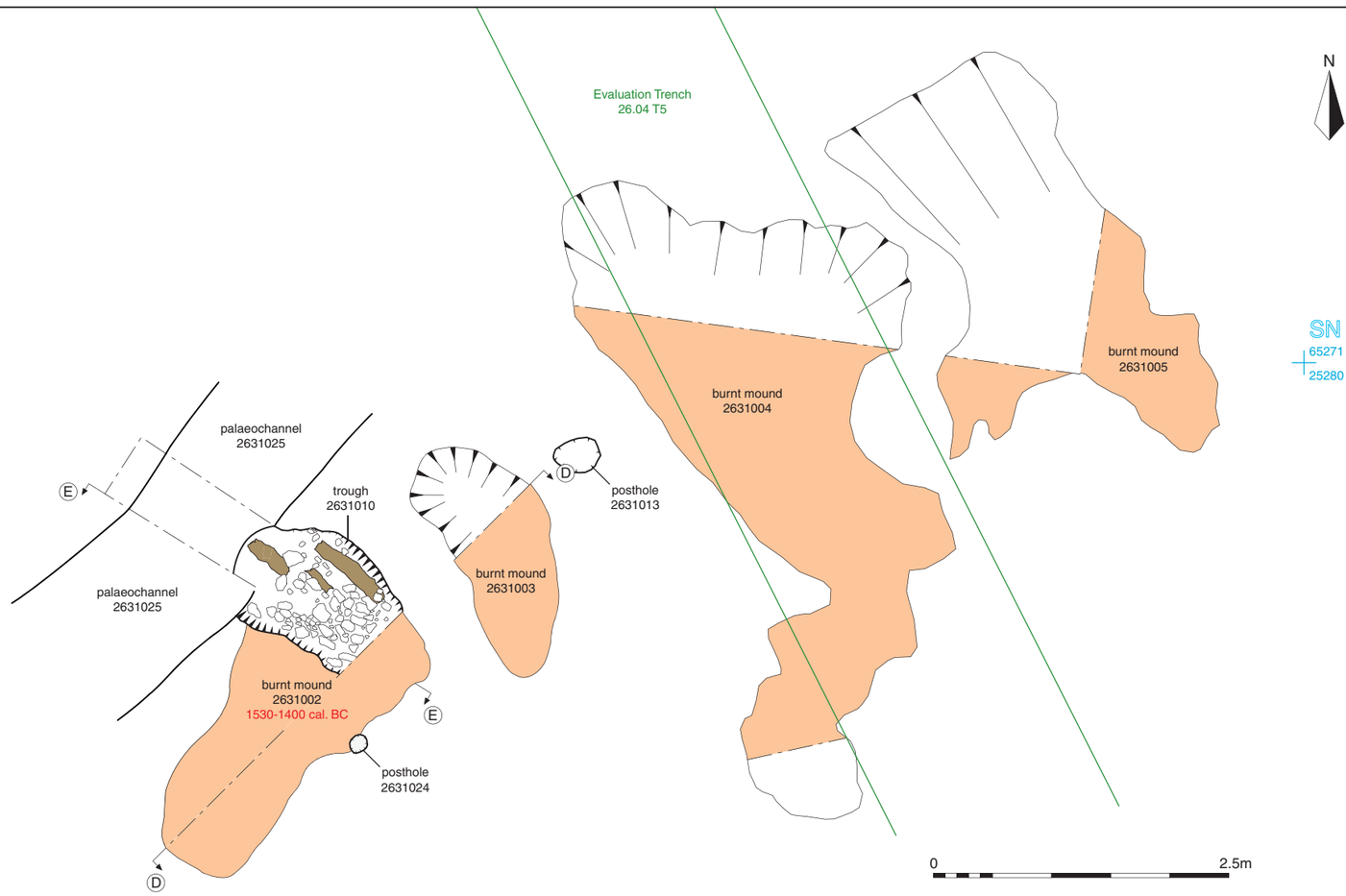

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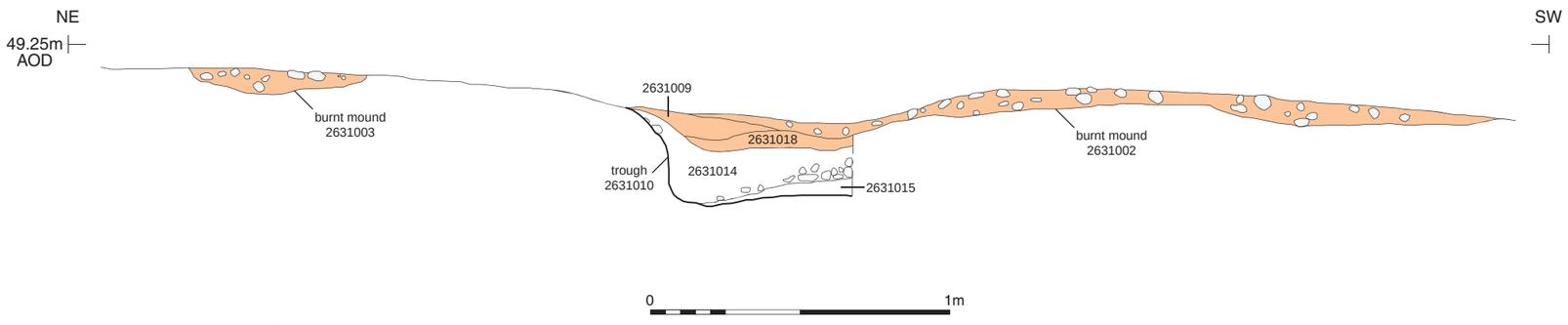

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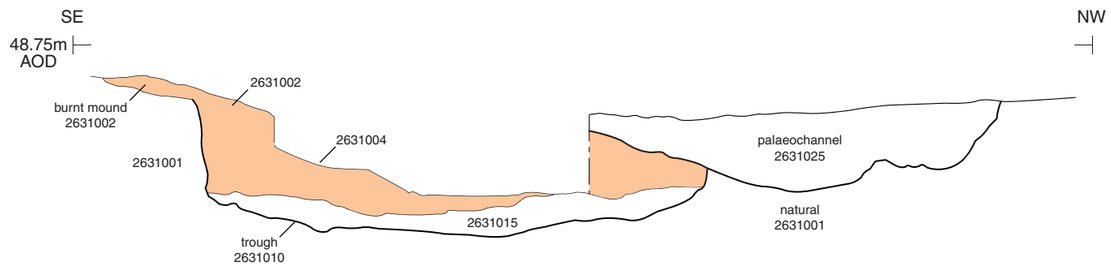

pipeline centreline

2005-6 evaluation trench

burnt mound

trough

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FIGURE TITLE

Site 26.04 plan and section

PROJECT NO.	**9150**	*DATE*	**17-12-2013**	*FIGURE NO.*
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