

**South Wales Gas Pipeline Project
Site 13.01
Land North of Ammanford
Llandybie
Carmarthenshire**

Archaeological Excavation



for
Rhead Group
on behalf of
National Grid

CA Project: 9150
CA Report: 13265
Event: DAT108801

November 2013

South Wales Gas Pipeline Project Site 13.01

Archaeological Excavation

CA Project: 9150
CA Report: 13265
Event: DAT102846

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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:	Site 13.01, Land North of Ammanford, Llandybie, Carmarthenshire
NGR:	SN 6246 1387
Type:	Excavation
Date:	13 March–30 May 2006
Location of Archive:	To be deposited with RCAHMW (original paper archive) and Carmarthenshire Museum (material archive and digital copy of paper archive; accession number CAASG 2008.0282)
Site Code:	FTP06

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.

A few residual Mesolithic/Early Neolithic flints were present. Two burnt mounds were found within 50m of one another, one dated by radiocarbon to the Middle Bronze Age, the other to the Late Bronze Age. One of the mounds was associated with troughs and a possible structure and, although the functions of the mounds were not apparent, the presence of two mounds over such a short distance has implications for the density of such features in the wider landscape. Bayesian analysis of the radiocarbon dates from the mounds suggests that the first dated activity began *1290–1120 cal. BC* with the last dated event estimated to have occurred in *990–830 cal. BC*. The duration of activity represented by these results is estimated as occurring over a period of *170–420 years*. Although these results cannot determine whether or not the site was used intermittently or continuously, the former seems more likely and in either case, they demonstrate the continuation of a tradition over generations.

A medieval enclosure (*1300–1610 cal. AD*) was also present. This was comprised of short ditches creating a segmented circuit enclosing an area 14m in diameter, the ditches of which were filled with material rich in charcoal derived from fuelwood. Whilst the enclosure's function is not known for certain, it perhaps surrounded a charcoal clamp of which no further trace remained.

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 From March to May 2006 CAP carried out an archaeological excavation at Site 13.01, Land North of Ammanford, Llandybie, Carmarthenshire (centred on NGR: SN 6246 1387; Fig. 1). The objective of the excavation was to record all archaeological remains exposed during the pipeline construction.
- 1.3 The excavation was carried out in accordance with professional codes, standards and guidance documents (EH 1991; IfA 1999a, 1999b, 2001a, 2001b 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 site**
- 1.4 The site is situated within a field north-east of the confluence between the Rivers Lash and Marlas and lies within 150m east of the modern course of a tributary of these, although this tributary may have been diverted during construction of the A483 and the railway which run between the site and the tributary (Fig. 1). It lies at approximately 50m AOD on a west-facing slope that falls away towards the rivers. The underlying solid geology of the area is mapped as the South Wales Lower Coal

Measures Formation (Mudstone, Siltstone and Sandstone) of the Carboniferous Period, overlain by superficial Quaternary Till (BGS 2013).

Archaeological background

- 1.5 No archaeological remains were identified within the site during the preliminary *Archaeology and Heritage Survey* (CA 2006). Remains recorded by the Dyfed Archaeological Trust Historic Environment Record (DAT HER) within the wider vicinity include barrows 450m east of the site (PRNs 830 and 814) and three burnt mounds within 300m to the north-east of the site (PRNs 838, 839 and 9740). The site lies between two settlements with medieval origins, Llandybie to the north (PRN 49269), and Ammanford to the south (PRN 831). Post-medieval agricultural features were found during the pipeline construction works at Site 13.03 to the north-east of Site 13.01.

Archaeological objectives

- 1.6 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

- 1.7 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).
- 1.8 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. Finds, environmental and radiocarbon-dating 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 2005);
- 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.

- 1.9 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 2–7)

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

- 2.2 The natural geological substrate, comprising pale sandy silt and clay, was cut by pits, postholes and ditches and was overlain by two burnt mounds. A field boundary wall was also recorded. Undated tree-throw pits (not illustrated) were also present.

Middle Bronze Age

- 2.3 Alluvial deposit 131089 was preserved beneath burnt mound 131087 and contained a Neolithic flint flake and a piece of flint flake shatter. The overlying mound, 131087, was broadly oval in plan and consisted of a single homogenous layer of charcoal-rich silt with burnt stones which was 12m–15m in diameter and 0.2m–0.4m thick (Figs 3 and 6; Fig. 5, section AA). Four struck flints were recovered from the mound, of which only one was closely dateable, a flake from a Mesolithic blade core. Several post-medieval and modern finds also came from the mound and these indicate a degree of intrusion into the mound material. Samples taken from the

mound yielded fragments of charred oak and hazel fuelwood, along with a single unidentifiable charred cereal grain and six charred fragments of hazelnut shell. Hazel wood charcoal from the mound was radiocarbon dated to 1370–1110 cal. BC (SUERC-55502; 95% probability).

Late Bronze Age

- 2.4 A second burnt mound was discovered 50m north-west of burnt mound 131087. Here, the earliest features comprised two sub-rectangular features cut into the clay substrate. Both of these cuts were sealed by the mound and at least one was probably an associated trough. This feature, trough 131063, was located centrally beneath the mound and was a sub-rectangular cut 6.5m long, 3m wide and 0.2m deep with steep sides and a flat base (Figs 4 and 7; Fig. 5, sections BB and CC). It contained two silt fills which collectively yielded eight struck flint flakes, two dateable to the Mesolithic or Early Neolithic periods. The second cut beneath the mound, ditch/trough 131055, was a long, narrow cut 0.3m wide and 0.2m deep. It contained two stony fills and was possibly a short ditch feeding water to trough 131063 rather than a trough in its own right.
- 2.5 The trough and ditch/trough were sealed by burnt mound 131017. This was a layer of burnt stones and charcoal which formed an irregular, broadly oval mound up to 13m wide and 0.2m high. Samples from this material yielded mainly oak fuelwood charcoal including a fragment radiocarbon dated to 980–820 cal. BC (SUERC-55498; 95% probability), a date range within the Late Bronze Age.
- 2.6 The uppermost surviving surface of burnt mound 131017 had been cut by feature, 131074, which was flanked by two postholes, 131076 and 131078. Together, these probably represent the remains of another trough. Trough 131074 was sub-rectangular in plan with steep sides and a flat base. It was 3.2m long, 1.1m wide and 0.35m deep and was lined with blue-grey clay 131075. It was filled with silty clay and clay deposits which included frequent unburnt stones and gravel. Postholes 131076 and 131078 were located either side of the trough's western end and probably supported an associated structure. Charcoal fragments from posthole 131078 were radiocarbon dated to 1280–1110 and 1060–900 cal. BC (SUERC-55497 and -55496; 95% probability), dates within the Middle and Late Bronze Ages respectively, with the earlier material probably being residual. The charcoal from the postholes was more varied than that from the mound, with birch and cherry/blackthorn present in addition to oak and alder/hazel.

Medieval

- 2.7 A segmented ring ditch was found immediately west of burnt mound 131017 (Fig. 4). It comprised a series of short ditches creating a segmented circuit enclosing an area 14m in diameter. The ditches themselves were 0.75m–1.55m wide and 0.05m–0.3m deep with steep sides and flattish bases (Fig. 5, section DD). They were filled with charcoal-rich grey-black silty clays and samples from these deposits yielded bracken and wood charcoal, the latter dominated by oak with lesser amounts of ash, birch, alder and hazel. At least some of this wood came from managed sources, and the charcoal was dominated by roundwood, with coppiced elements certainly present. Five samples from the ditch segments were submitted for radiocarbon dating and these returned dates within the range 1300–1610 cal. AD (Appendix D).

Post-medieval

- 2.8 The collapsed remains of a field boundary wall (131085) ran north-east/south-west across burnt mound 131087. A north-west/south-east aligned ditch (131039) truncated the medieval enclosure and respects the alignment of the existing field boundaries. Neither of these features is depicted on the 1st Edition (1876–78) or later Ordnance Survey mapping of the area.

Discussion

- 2.9 The discovery of two burnt mounds within 50m of one another reveals the likely density of such features within the landscape alongside water courses. The closest water source is a small stream issuing from a spring which flows 15m east of the mounds, although the modern water courses may have been altered during the laying out of communications and field boundaries (see Appendix C for a discussion of the local hydrology). Nevertheless, it seems reasonable to suspect that more mounds may await discovery near to the site but beyond the pipeline easement.
- 2.10 Mound 131017 overlay a trough which was unlined but presumably the clay substrate was sufficient to retain water. The provision of a clay lining within the trough which was cut through the mound reflects the fact that it was cut through porous mound material. The postholes associated with this later trough presumably held an associated structure, although what this might have been is not known. Troughs were not found at mound 131087 and at neither mound were hearths discovered, but these absences may simply reflect the fact that neither feature was fully excavated.

- 2.11 In common with most burnt mounds, little ecofactual or artefactual material was present, with most of the former relating to fuelwood. The small amounts of foodstuffs may have been incidental inclusions and there is no direct evidence of the functions of these mounds. What the site does provide, along with an indication of the likely density of mounds within the landscape, is an indication of the duration over which the activities associated with them occurred. Bayesian analysis of the radiocarbon dates from the mounds suggests that the first dated activity began *1290–1120 cal. BC* (95% probable; or *1270–1160 cal. BC* 68% probable) with the last dated event estimated to have occurred in *990–830 cal. BC* (95% probable; or *970–850 cal. BC* 68% probable). The duration of activity represented by these results is estimated as occurring over a period of *170–420 years* (95% probable; or *240–370 years* 68% probable). Although these results cannot determine whether or not the site was used intermittently or continuously, the former seems more likely and in either case, they demonstrate the continuation of a tradition over generations.
- 2.12 The function of the medieval enclosure is unclear. No structural remains were found and no charred grains were present, with the palaeoenvironmental remains being largely composed of fuelwood, with the bracken perhaps representing kindling. The presence of burnt stones and heat-affected sediments suggests that at least some of this material was debris from something like a hearth or bonfire (Appendix C). Although the possibility that the enclosure surrounded a building constructed in a form which has left no trace cannot be ruled out, the absence of domestic waste suggests that the enclosure most likely had an agricultural or industrial function. Use as a corral seems unlikely, given the fairly ephemeral nature of the ditches but it is possible that the segmented ditch acted as a fire break surrounding a charcoal-burning clamp. No charcoal-burning platform was present, but this could have been entirely truncated and it may be that the charcoal-rich ditch fills are all that remains of the activities that occurred here during the medieval period. Bayesian analysis of the radiocarbon dating results suggests that activity associated with the enclosure can be estimated to have begun in *1300–1440 cal. AD* (95.4% probable; *1380–1430 cal. AD* 68.2% probable) and ended in *1410–1530 cal. AD* (95.4% probable; *1420–1470 cal. AD* 68.2% probable) with an estimated duration of *100–120 years* (95.4% probable; or *0–50 years* 68.2% probable).

3. PROJECT TEAM

Fieldwork was undertaken by Cambrian Archaeological Projects. This report was written by Daniel Sausins and Jonathan Hart with illustrations prepared by Daniel Bashford and Anne Leaver. 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 was managed for CA by Karen Walker.



4. REFERENCES

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APPENDIX A: CONTEXT DESCRIPTIONS

Context	Fill of	Type	Description	L (m)	W (m)	Depth (m)	Spot date
131001		Tree-throw pit	Oval, irregular sides and base	1.2	0.7	0.15	
131002	131001	Tree-throw pit fill	Light brown clay sand	1.2	0.7	0.15	Mod
131003		Tree-throw pit	Sub-rounded, moderate sides, concave base	1.5	1.0	0.7	
131004	131003	Tree-throw pit fill	Light brown sandy clay	1.5	1.0	0.7	
131005		Tree-throw pit	Oval, moderate sides, irregular base	1.2	0.7	0.3	
131006	131005	Tree-throw pit fill	Mid brown sandy clay	1.2	0.7	0.3	
131007		Tree-throw pit	Oval, irregular sides and base	1.9	0.8	0.3	
131008	131007	Tree-throw pit fill	Mid orange-brown silty clay	1.9	0.8	0.3	
131009		Tree-throw pit	Oval, irregular sides and base	1.8	1.4	0.35	
131010	131009	Tree-throw pit fill	Mid brown silty clay	1.8	1.4	0.35	
131011		Topsoil	Mid grey-brown silt clay			0.2	
131012		Subsoil	Mid brown silty sand			0.2	Neo
131013		Natural	Light orange-brown sandy silt				
131014		Tree-throw pit	Not excavated				
131015		Tree-throw pit	Not excavated				
131016		Tree-throw pit	Not excavated				
131017		Burnt mound	Generic number: 3 slots across same burnt mound				
131018		Curvilinear ditch	Generic number: 6 slots across same ditch				
131019		Stone	A single unstratified stone				
131020		Ditch	NE/SW aligned, shallow sides, concave base. Terminus of 131018		0.75	0.3	
131021		Ditch terminus	Rounded corners, moderate sides, flat base. Terminus of 131018		0.95	0.1	
131022	131020	Ditch fill	Orange-brown sandy clay		0.95	0.1	
131023-30			Context not used				
131031	131021	Ditch fill	Grey-black silt clay		0.95	0.1	cal. AD 1320–1440
131032			Context not used				
131033		Ditch	NW/SW aligned, shallow sides, uneven base. Part of 131018		1.55	0.05	
131034	131033	Ditch fill	Dark grey-black silty clay		1.55	0.05	cal. AD 1320–1440
131035		Geological feature	Ovoid in plan. Irregular sides and base.	1.30	0.85	0.3	

131036	131037	Ditch fill	Dark grey-black silty clay, charcoal rich		1.25	0.25	cal. AD 1420– 1490
131037		Ditch	NW/SW aligned, shallow sides, uneven base. Part of 131018		1.25	0.25	
131038	131039	Ditch fill	Mid brown silty clay		1.5	0.2	Meso/ E Neo
131039		Ditch	NW/SE aligned, steep sides, flat base.		1.5	0.2	
131040		Natural	Dark red-brown iron panning		0.5		
131041		Ditch	NW/SE aligned, moderate sides, flat base. Part of 131039		1.0	0.25	
131042	131041	Ditch fill	Mid-light orange-brown silty clay		1.0	0.25	
131043		Burnt Mound	Compact orange-yellow clay silt with angular stones		1.0	0.4	
131044		Burnt Mound	Angular stone in a loose brown-grey silty clay matrix. Part of 131017		1.0	0.4	980– 820 cal. BC
131045		Ditch	E/W aligned, shallow sides, slightly concaved base. Part of 131018		0.75	0.05	
131046	131045	Ditch fill	Dark grey-black silty clay, charcoal rich		0.75	0.05	cal. AD 1300– 1430
131047		Ditch	Moderate sides, gentle break to flat base. Part of 131018		0.85	0.1	
131048	131047	Ditch fill	Grey-black silty clay		0.85	0.1	
131049			Context not used				
131050			Context not used				
131051			Context not used				
131052	131035	Natural	Mid brown silty clay	1.3	0.85	0.3	
131053	131055	Ditch fill	Upper fill. Various sized angular stones and burnt stone in a mid grey silt clay matrix		0.3	0.15	
131054	131055	Ditch fill	Lower fill. Light grey silt clay with occasional sub-angular stone		0.3	0.05	
131055		Ditch	N/S aligned, steep sides, flat base		0.3	0.2	
131056		Ditch terminus	NE/SW aligned, gentle sides, slightly concaved base. Part of 131018		1.05	0.1	
131057	131056	Ditch fill	Lower fill. Dark grey-black silty clay with charcoal		1.05	0.1	cal. AD 1420– 1610
131058	131056	Ditch fill	Upper fill. Mid brown-orange silty clay		0.15	0.05	
131059		Burnt mound	Small-medium sub-angular stones in a mid grey-brown silty clay matrix with charcoal. Part of 131017	0.65	1.5	0.1	
131060		Ditch terminus	N/S aligned, gentle sides, flat base. Part of 131055		1.3	0.1	
131061	131060	Ditch fill	Small-medium sub-angular stone in a light grey clay matrix		1.3	0.1	
131062		?Buried soil beneath mound 131017	Sub-angular stone in a mid brown-yellow silty clay matrix.				
131063		Pit	Sub-rectangular, moderate sides, flat base	6.5	3.0	0.2	
131064		Pit	= 131063				
131065	131063	Pit fill	Light brown-grey silt clay mottled with orange brown iron pan	3.3	1.4	0.2	

131066	131072	Pit fill	Light brown grey silty clay	3.0	1.0	0.5	
131067	131072	Pit fill	Upper fill. Light grey silty clay	2.0		0.2	
131068	131072	Pit fill	Lower fill. Mottled red-brown and light grey clay silt	2.0		0.25	Meso/ E Neo
131069	131072	Pit fill	=131068		0.5	0.2	
131070	131072	Pit fill	=131067		0.8	0.1	
131071	131064	Pit fill	Mid brown-grey silt clay	0.75	0.1	0.35	
131072		Pit	=131063	3.0	1.0	0.6	
131073			Context not used				
131074		Pit	Rectangular in plan, steep sides, flat base	3.2	1.1	0.35	
131075	131074	Clay pit lining	Very compact light blue-grey clay with charcoal	1.4	0.6	0.15	
131076		Posthole	Circular, vertical sides, flat base		0.3	0.25	
131077	131076	Posthole fill	Dark brown silty clay		0.3	0.25	
131078		Posthole	Circular, vertical sides, flat base		0.4	0.2	
131079	131078	Posthole fill	Dark brown silty clay		0.4	0.2	1060– 900 cal. BC; 1280– 1110 cal. BC
131080			Context not used				
131081			Context not used				
131082	131074	Pit fill	=131075	1.1		0.16	
131083	131074	Pit fill	Mid dark brown silty clay	0.75	0.75	0.1	
131084	131074	Pit fill	Brown-grey clay with charcoal	2.1	1.1	0.2	
131085		Boundary wall	NE/SW aligned, sub-rounded stones and cobbles of various sizes, dry stone		2.5	0.3	
131086		Buried subsoil	Subsoil preserved beneath wall 131085. Light-brown silty clay		2.5	0.3	
131087		Burnt mound	Upper layer: angular stone in a dark brown silty matrix			0.3	Meso
131088		Burnt mound	=131087			0.5	1370– 1110 cal. BC
131089		Buried subsoil	Orange-brown sandy clay preserved under burnt mound 131087				
131090		Burnt mound	Firm grey clay with small stone within mound material	0.5	0.3	0.25	
131091			Context not used				
131092		Burnt mound	Burnt stone in a brown silt matrix				
131093		Scorched clay	Heat affected clay			0.05	Neo
131094		Natural	Grey silt clay			0.5	
131095		Natural	Orange-grey clay			0.25	
131096		Natural	Grey clay			0.15	
131097		Burnt mound	=131090			0.20	

APPENDIX B: FINDS**Pottery** (Courtney 2008)

Context	Fabric	Sherds	Weight (g)	Form	Decoration	Date
131002	DEWW	4	20	FW	BT-chinois and dendritic Retailer mark (c. 1860–1915): F.PRIMAVESI & (SON) CARDIFF SW(ANSEA)& NEWPORT	MOD
131087	LGRE	2	16	IG-sh & AOG-sh HW		PMED
131087	FPOT	4	40	Flower pots		PMED
131087	NDGT	7	109			PMED
131087	SPOR	1	5	FW	Painted red & green foliage	MOD
131087	IDYW	1	3	?		MOD
131087	PEAW	13	37	Dishes; cup; HW	Blue edged Painted floral BT-chinois	MOD
131087	DEWW	13	70	Dishes	BT-chinois border (2 join); floral painted	MOD

*Fabric- DEWW Developed White Wares; FPOT Flower Pots; IDYW Industrial Yellow Ware; LGRE Lead Glazed Red Earthenware; NDGT North Devon Gravel Tempered; PEAU Pearl ware; SPOR Semi-Porcelainous wares
Form- AOG All Over Glaze; FW Flat ware; HW Hollow ware; IG Internally Glazed*

Clay pipe (Major 2008)

Context	Description	Date
131087	One stem Bowl fragment. Relief moulded leaves on the front seam. There are moulded vertical lines around the rim, with a band of cross-hatching below, and narrow flutes on the bottom of the bowl. Narrow flutes are common in the mid 19th century	C19 Mid C19

Lithics (Pannett 2009)

Context	Fill of	Interpretation	Material	Classification	Date
131012		Subsoil	Fresh flint	Rough discoidal core	Neolithic
131038	131039	Ditch fill	Fresh flint	Blade	Mesolithic/ Early Neolithic
131057	131056/ 131018	Ditch fill	Fresh flint	Flake medial fragment	
131068	131072/ 131063	Pit fill	Fresh flint	Flake	
131068	131072/ 131063	Pit fill	Fresh flint	Flake- from blade core?	Mesolithic/ Early Neolithic
131068	131072/ 131063	Pit fill	Fresh flint	Flake	
131068	131072/ 131063	Pit fill	Fresh flint	Flake	
131068	131072/ 131063	Pit fill	Fresh flint	Flake microdebitage	
131068	131072/ 131063	Pit fill	Fresh flint	Blade microdebitage	Mesolithic/ Early Neolithic
131068	131072/ 131063	Pit fill	Fresh flint	Flake microdebitage	
131068	131072/ 131063	Pit fill	Fresh flint	Flake microdebitage	
131087		Burnt mound	Burnt flint	Flake shatter	
131087		Burnt mound	Fresh flint	Core trimming flake from blade core	Mesolithic
131087		Burnt mound	Burnt flint	Flake	
131087		Burnt mound	Fresh flint	Flake	
131093		Burnt mound	Fresh flint	Core trimming flake	Neolithic
131093		Burnt mound	Fresh flint	Flake shatter	

Metalwork (Leahy 2008)

Context	Description	Identification	Condition	Date
131087	Cu alloy ring; dia. 30.4mm	Purpose unknown, possibly to fix rugs to wooden floors	Good	C19–20
131087	Lump of non-magnetic mineral	Unknown	Eroding	
131087	Fragment of round sectioned Fe ring; dia. 90mm	Unknown	Corroded	
131087	Fe nail; length 44.3mm, shaft dia. 9.1mm, head dia. 9.2mm	Nail	Corroded	
131087	Fe nail; asymmetrical head; length 43.4mm, shaft dia. 9.1mm, head 12 x 6mm	Nail	Corroded	
131087	Lump of iron concretion 43.4 x 18.6 x 8.3mm	Unknown	Corroded	
131087	Lump of iron concretion 43.8 x 15.6 x 10.6mm	Unknown	Corroded	
131087	Lump of iron concretion 39.4 x 5.4 x 5.4mm	Unknown	Corroded	
131087	Lump of iron concretion 30.3 x 11.4 x 9.2mm	Unknown	Corroded	
131087	Lump of iron concretion 28 x 7.2 x 7.2mm	Unknown	Corroded	

APPENDIX C: THE PALAEOENVIRONMENTAL EVIDENCE BY JAMES RACKHAM

A total of 39 samples were taken, including two monoliths (Table 1). The samples came from the two burnt mounds (131017 and 131087), a pit (131074) and two postholes (131076, 131078) from beneath mound 131087. Near burnt mound 131017 a medieval enclosure ditch was also sampled. One of a group of undated tree-throws was also sampled, but this feature and natural hollow 131035 have not been geo-referenced and are not marked on plan. The two burnt mounds were sampled in spits in accordance with the outline strategy for these sites, but data detailing the vertical order of these spits was lost prior to post-excavation analysis, although they are assumed to go in numerical order. The samples were processed in the manner described in the assessment report (Carruthers 2008), with the additional refloating of the dried sample residues whose flot volume (2nd flot) is indicated in Table 2. The second flots were then sorted for charred macrofossils and the residue for other finds. The processing sheets for these samples do not include any record of finds and all the finds noted in Table 2 were recovered during the sorting of the residues at the time they were refloated.

The burnt mound deposits are typically dominated by burnt stone, with a small magnetic fraction in occasional samples. Struck flint flakes were recovered from the residue of one of the samples from pit fill 131068. In burnt mound 131017 the top spit comprised 79% burnt stone, but in the lower spits, samples 1313017 and 1313018, this had fallen to 15 and then 9.7%, the latter presumably representing material trampled into the underlying soil. In contrast in the spits through burnt mound 131087 the burnt stone component ranged from 41-56% of the sampled deposit, although the very large bulk sample (1313039 – Table 2) from this same layer (131088) was 70% burnt stone. Four of the burnt mound samples produced identifiable charred plant remains. Single grains of oats and an unidentified cereal were recovered and two samples produced a total of six fragments of charred hazel nutshell. The charcoal assemblages were generally smaller than those from the medieval ditch and poorer preserved. Two were assessed (Schmidl *et al* 2009), but only one produced identifiable material and this only alder/hazel and ash/oak fragments because of the poor preservation. Four of the larger samples were selected for detailed study to make a contribution to the broader study of burnt mounds and the overall charcoal analysis project for the whole pipeline.

The medieval enclosure ditch produced a little burnt clay, burnt stone in some samples, and a relatively large magnetic fraction in five of the samples, including heat affected sediment concretions. These samples suggest the deposition of hearth debris into the ditch. Small fragments of pottery and possible pottery was recovered from two of the medieval samples, although these were recovered after the pottery had been reported on (Table 2). The charred plant remains in both the medieval and the burnt mound deposits were few and far between. Most of the samples lacked any identifiable charred plant macrofossils but five from the medieval ditch and four from the burnt mound deposits produced a few identifiable fragments (Table 3). The medieval ditch lacked any evidence for charred cereal remains, but produced just a few finds of hazel nutshell, thistle seed, bracken pinnule, acorn cup, leaf fragment and sand tubers. This does not reflect a domestic type assemblage and it is unlikely, given the medieval date and the quantity of soil processed (over 440 kilogrammes) to produce such a diminutive collection of charred plant remains, that this feature could relate to settlement. On the other hand the charcoal component in some of the ditch sections is large, and this must surely relate to the function of the feature. The assessment (Schmidl *et al* 2009) noted both stemwood and roundwood of oak, with numerous pieces of alder and/or hazel in the ditch fills. Five of the charcoal assemblages have been studied (see below).

Table 1 Bulk environmental samples from Site 13.01

sample no	context no	feature	description	processed wt kg	vol l* taken
1313000	131022	131020	Ditch fill	3	15
1313001	131022	131020	Ditch fill	3	15
1313002	131022	131020	Ditch fill		15
1313003	131031	131021	Ditch fill	45	90
1313004	131032	131030	Pit fill	49	225
1313005	131036	131037	Ditch fill	4	7.5
1313006	131034	131033	Ditch fill	48	90
1313007	131052	131035	Natural hollow	158.5	105
1313008	131048	131047	Ditch fill	77	150
1313009	131046	131045	Ditch fill	39	75
1313010	131057	131056	Ditch fill	16	nd
1313011	131058	131056	Ditch fill	0.45	nd
1313012	131044	131017	Burnt mound	18.5	15
1313013	131067	131017	Burnt mound	8	15
1313014	131066	131017/63	Burnt mound	10	15
1313015	131068	131017/63	Burnt mound	9	15
1313016	131065	131063	Pit fill-charcoal rich		Small bag
1313017	131044	131017	Burnt mound	13	nd
1313018	131044	131017	Burnt mound	9	nd
1313019	131017 E		Monolith	-	-
1313020	131017 W		Monolith	-	-
1313021	131079	131078	Posthole fill	11	30
1313022	131077	131076	Posthole fill	14	30
1313023	131075	131074	nd		15
1313024	131084	131074	Pit fill	10	15
1313025	131082	131074	Pit fill	6.5	15
1313026	131083	131074	Pit fill	17.5	15
1313027	131088	131087	Burnt mound	15	nd
1313028	131088	131087	Burnt mound	13.5	nd
1313029	131088	131087	Burnt mound	14	nd
1313030	131088	131087	Burnt mound	15	nd
1313031	131088	131087	Burnt mound	14	nd
1313032	131088	131087	Burnt mound	10	nd
1313033	131088	131087	Burnt mound	10	nd
1313034a	131088	131087	Burnt mound	10	nd
1313034b	131090		Burnt mound	11	nd
1313035	131090		Burnt mound	10	nd
1313036	131090		Burnt mound	10	nd
1313037	131088	131087	Burnt mound	90	nd
1313038	131088	131087	Burnt mound	98	nd
1313039	131088	131087	Burnt mound	127	nd

nd – no data; * volume recorded on site – not accurate.

Table 2 Data for the environmental samples from Site 13.1

sample no	context no	processed wt kg	1 st flot vol ml	2 nd flot vol	residue wt g	pottery	burnt clay	burnt stone g.	flint	magnetic	burnt bone	comments
Medieval ring ditch and associated features												
1313000	131022	3	90	nd	13					2.2		
1313001	131022	3	150	nd	25					1.4		
1313003	131031	45	>6000	nd	668		2.6g	+++		76.1		
1313004	131032	49	20	nd	9559			+		0		
1313005	131036	4	200	nd	96					9.2		
1313006	131034	48	>4000	nd	3295	1?	5.9g	799		99.2		
1313007	131052	158.5	10	nd	14928+			1146		0		HNSx2
1313008	131048	77	c.10 litres	nd	1481	2	+	122		102.2		
1313009	131046	39	>5000	nd	1071		13.2+	2		53		
1313010	131057	16	1000	nd	627		++	+	<1g	52		
1313011	131058	0.45	15	<1	19		4.6	+		0		
Burnt mound deposits and associated pits												
1313012	131044	18.5	500	2	14400		0.4	14565		2		
1313013	131007	8	15	1	nd			14		0		spit 1
1313014	131066	10	1700	1	566			33		0		
1313015	131068	9	150	1	1374				1g	0		
1313017	131044	13	1400	17	5269			2002		0		spit 2
1313018	131044	9	500	5	2000			874		0		spit 3; <i>Avena</i> sp. x15
1313021	131079	11	400	1	3404			2733		0		
1313022	131077	14	200	2	1238			134		0		
1313024	131084	10	20	<1	463					0		
1313025	131082	6.5	200	1	427			10.2		0		
1313026	131083	17.5	41	3	12000			11678		0.4		
1313027	131088	15	80	3	8000			6229		1.4		Spit 1
1313028	131088	13.5	80	2	7400			6824		1		Spit
1313029	131088	14	70	2	7500			6895		0.6		Spit
1313030	131088	15	70	2	7500			7659		0.1		Spit
1313031	131088	14	70	1	7500			7227		1.2		Spit
1313032	131088	10	500	1	5800			5411		0.2		Spit
1313033	131088	10	500	3	6000			5647		0.1		Spit
1313034a	131088	10	500	4	5400			5664		1.4		Spit
1313034b	131090	11	20	<1	1369			1282		0.1		
1313035	131090	10	10	<1	697			625		0.1		
1313036	131090	10	5	<1	1067			981		0.1		
1313037	131088	90	116	5	39800			36948		1.9		
1313038	131088	98	709	20	41051			28090		17.2		
1313039	131088	127	3175	32	91600			88640		1.8		

nd- no data

Table 3 Identified charred plant remains from the medieval ditch and the burnt mound – Site 13.01

Sample	3003	3005	3006	3009	3010	3013	3028	3034B	3035
Context	031	036	034	046	057	007	088	090	090
Feature	131021	131037	131033	131045	131056	131017	131087	131087	131087
	ditch fill	ditch fill	ditch fill	ditch fill	ditch fill	burnt mound	burnt mound	burnt mound	burnt mound
Date	Med	Med	Med	Med	Med	LBA?	MBA?	MBA?	MBA?
wt. processed soil wt kg	48	4	48	39	10	8	13.5	11	10
FLOT 1 vol. ml.	>6000	200	>4000	>5000	1000	15	80	20	10
2 nd flot									
Cereals									
<i>Avena</i> sp.						1			
Cereal indet grain							1		
Other plants									
<i>Cirsium/Carduus</i> sp.			1						
<i>Corylus avellana</i> nutshell		1	+					5	1
Bracken pinnule	+			+	+				
Poaceae		1							
Leaf fragment		1							
Acorn cup			+						
Tubers			+						
Charcoal	5	4	5	5	5	2	2	1	1

Charcoal (*Dana Challinor*)

Nine samples were studied for charcoal, comprising two deposits from the burnt mounds, (131017 and 131087), two from postholes associated with the burnt mounds (131076 and 131078) and five from the medieval enclosure ditch 131018. Standard procedures for identification were followed, although some alterations in methodology were adopted for the medieval ditch samples. Since these were effectively from one feature, the identification of 20 fragments/per deposit was considered an adequate sample; additionally, all of the fragments examined were taken from the >4mm (and many from the >8mm) fraction, in order to record roundwood data. The charcoal from the Bronze Age and medieval samples was quite different in condition and character and the results are presented separately below.

Burnt mounds and associated features

The charcoal was quite poor in preservation, with degraded structure, heavy sediment infusion and small fragment size. Six taxa were positively identified; *Quercus* sp. (oak), *Betula* sp. (birch), *Alnus glutinosa* (alder), *Corylus avellana* (hazel), *Prunus* sp. (cherry/blackthorn) and *Fraxinus excelsior* (ash). Occasional (incomplete) roundwood fragments were noted and two oak fragments exhibited tyloses, but the condition was generally too poor for reliable determination of maturity. The burnt mound assemblages were fairly typical for features of this type along the pipeline: oak with hazel, a few fragments of alder and sometimes other taxa. The posthole samples are more mixed, less oak-dominated and with two additional taxa, birch (a coloniser) and cherry or blackthorn, which are also light-demanding. The greater diversity may reflect a different or additional activity occurring, or it may be simply that the material is re-deposited from the burnt mound burnings and represents more episodes of usage.

Table 4: Charcoal from burnt mounds and associated postholes at Site 13.01

Feature type		burnt mound	burnt mound	posthole	
Feature number		131017	131087	131076	131078
Context number		131044	131088	131077	131079
Sample number		1313017	1313039	1313022	1313021
<i>Quercus</i> sp.	oak	23 (r)	20 (sr)	6 (h)	8 (h)
<i>Betula</i> sp.	birch			3	2
<i>Alnus glutinosa</i> Gaertn.	alder	2			2r
<i>Corylus avellana</i> L.	hazel	2r	7 (r)	3	
<i>Alnus/Corylus</i>	alder/hazel		1		1
Betulaceae	birch family			3	2
<i>Prunus</i> sp.	cherry type				2r
<i>Fraxinus excelsior</i> L.	ash		1		1
Indeterminate		3	1	5	2

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

Medieval enclosure ditch

The charcoal from these samples was much better preserved; hugely abundant with large fragments (up to 40mm in length). The assemblages were comparable in taxonomic composition and character. Five taxa were positively identified; *Quercus* sp. (oak), *Alnus glutinosa* (alder), *Corylus avellana* (hazel), *Populus/Salix* (poplar/willow) and Maloideae (hawthorn group) (Table 5). A significant component of the assemblages derived from roundwood and, although these were not always complete with pith and bark, they were large enough to merit growth ring analysis (Table 6). Some large fragments of oak heartwood were also recorded, with no ring curvature and ages of >28 years. Some pieces exhibited wider, early rings and narrow late rings, consistent with patterns produced by coppicing.

Table 5: Charcoal from the medieval circular ditch at Site 13.01

Feature type		circular ditch				
Feature number		131021	131045	131047	131056	131033
Context number		131031	131046	131048	131057	131034
Sample number		1313003	1313009	1313008	1313010	1313006
<i>Quercus</i> sp.	oak	17 (hsr)	9 (hsr)	17 (hr)	14 (sr)	10r
<i>Alnus glutinosa</i> Gaertn.	alder	2 (r)	8r		4r	4r
<i>Corylus avellana</i> L.	hazel			3r	1r	4r
<i>Alnus/Corylus</i>	alder/hazel				1	
<i>Populus/Salix</i>	poplar/willow	1r	2r			
Maloideae	hawthorn group		1r			2r

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

Of additional interest was the presence of cut surfaces recorded in several fragments from samples 1313003 and 1313009 (Fig. A). These appeared to be diagonal cuts made across the transverse sections, presumably when the wood was being cut for use. The quantity and quality of the material in the circular ditch raises the issue of provenance. Certainly, the preservation suggests that the wood had been lightly charred – either the deposits representing the larger pieces from the outer edges of a fire, or a dump of charcoal fuel (i.e. wood charred for use as charcoal fuel, but not burned a second time). The taxonomic range and the character of the charcoal is appropriate for the cutting of faggots or cordwood, along with the use of some more mature and larger wood.

Figure A: Charcoal fragments with cut surfaces from sample 1313003

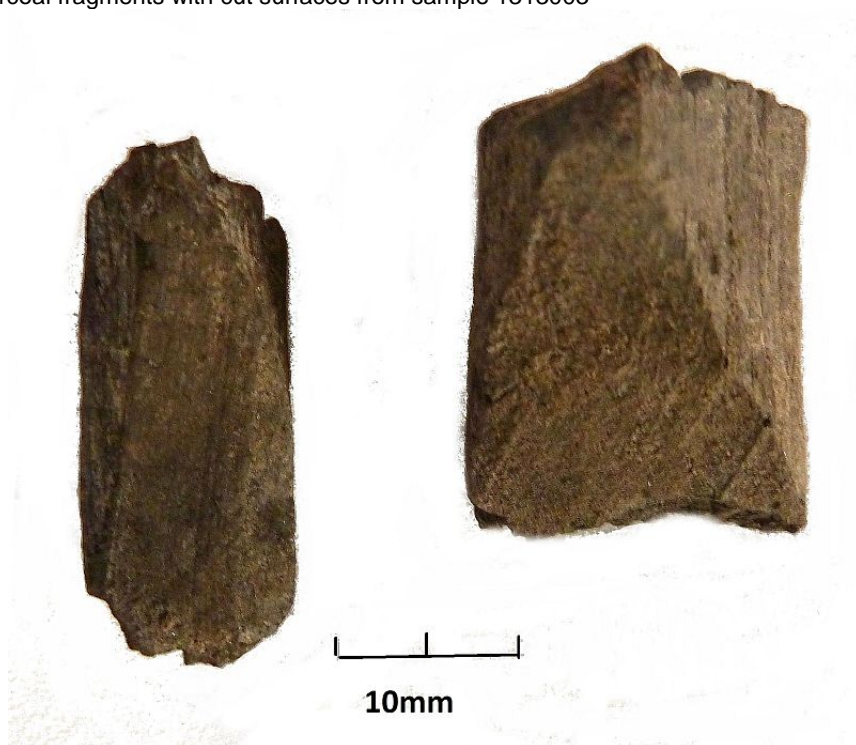


Table 6: Roundwood data for the medieval samples from Site 13.01

Sample no.	Taxa	Tyloses	Pith	Bark	Radius (mm)	Ring count	ARW
1313003	<i>Quercus</i>	N	N	N	13	17	0.76
1313003	<i>Quercus</i>	N	Y	Y	8	18	0.44
1313003	<i>Quercus</i>	N	Y	Y	5.5	16	0.34
1313003	<i>Quercus</i>	N	N	N	5	13	0.38
1313003	<i>Quercus</i>	N	Y	Y	10	13	0.77
1313003	<i>Quercus</i>	Y	N	N	26	28	0.93
1313003	<i>Quercus</i>	N	N	N	11	30	0.37
1313003	<i>Quercus</i>	N	Y	Y	11	21	0.52
1313003	<i>Quercus</i>	N	Y	Y	18	15	1.20
Sample no.	Taxa	Tyloses	Pith	Bark	Radius (mm)	Ring count	ARW
1313003	<i>Quercus</i>	N	Y	Y	9.5	8	1.19
1313003	<i>Alnus glutinosa</i>	N	Y	Y	4	14	0.29
1313003	<i>Quercus</i>	N	Y	Y	2	5	0.40
1313006	<i>Quercus</i>	N	Y	N	12	18	0.67
1313006	<i>Alnus glutinosa</i>	N	Y	Y	9.5	11	0.86
1313006	<i>Quercus</i>	N	Y	Y	7	12	0.58
1313006	<i>Quercus</i>	N	Y	Y	6.5	10	0.65
1313006	<i>Alnus glutinosa</i>	N	N	N	14	15	0.93
1313006	<i>Corylus avellana</i>	N	Y	Y	9	18	0.50
1313006	Maloideae	N	N	N	17	21	0.81
1313006	<i>Quercus</i>	N	N	Y	10	15	0.67
1313006	<i>Quercus</i>	N	N	N	12	14	0.86
1313006	<i>Quercus</i>	N	Y	Y	7.5	14	0.54
1313006	<i>Quercus</i>	N	N	N	6	14	0.43
1313006	<i>Corylus avellana</i>	N	N	N	6	15	0.40
1313006	<i>Alnus glutinosa</i>	N	Y	Y	8.5	7	1.21
1313006	<i>Quercus</i>	N	Y	Y	5	7	0.71
1313006	<i>Alnus glutinosa</i>	N	Y	Y	15.5	7	2.21
1313008	<i>Corylus avellana</i>	N	N	Y	20	14	1.43
1313008	<i>Quercus</i>	N	Y	Y	12	16	0.75
1313008	<i>Quercus</i>	N	N	N	6	14	0.43
1313008	<i>Quercus</i>	N	Y	Y	7	16	0.44
1313008	<i>Quercus</i>	N	N	N	20	18	1.11
1313008	<i>Quercus</i>	N	Y	Y	6.5	9	0.72
1313008	<i>Quercus</i>	N	Y	Y	4	10	0.40
1313008	<i>Quercus</i>	N	Y	Y	6	10	0.60
1313008	<i>Quercus</i>	N	N	N	12	11	1.09
1313009	<i>Alnus glutinosa</i>	N	Y	Y	12.5	15	0.83
1313009	<i>Alnus glutinosa</i>	N	Y	Y	7.5	8	0.94
1313009	<i>Quercus</i>	N	Y	Y	9	12	0.75
1313009	<i>Alnus glutinosa</i>	N	N	Y	18	15	1.20
1313009	<i>Quercus</i>	N	Y	Y	9	15	0.60
1313009	Maloideae	N	Y	Y	5.5	14	0.39
1313009	<i>Alnus glutinosa</i>	N	Y	Y	15	24	0.63
1313009	<i>Quercus</i>	N	Y	Y	14	19	0.74
1313009	<i>Populus/Salix</i>	N	Y	N	14.5	9	1.61
1313009	<i>Quercus</i>	N	Y	Y	8.5	19	0.45
1313009	<i>Alnus glutinosa</i>	N	Y	Y	10.5	14	0.75
1313009	<i>Quercus</i>	N	Y	Y	8	19	0.42

1313009	<i>Quercus</i>	N	Y	Y	5.5	12	0.46
1313009	<i>Alnus glutinosa</i>	N	Y	Y	5.5	10	0.55
1313009	<i>Populus/Salix</i>	N	Y	Y	4.5	7	0.64
1313010	<i>Quercus</i>	N	Y	Y	10.5	16	0.66
1313010	<i>Alnus glutinosa</i>	N	N	Y	9	6	1.50
1313010	<i>Quercus</i>	N	Y	N	9	7	1.29
1313010	<i>Corylus avellana</i>	N	N	Y	22	12	1.83
1313010	<i>Alnus glutinosa</i>	N	N	Y	12	20	0.60

Monolith samples

Burnt mound 131017

Two short monoliths were collected from deposits in burnt mound 131017. Their precise location and relationship to each other was not recorded so they cannot be related directly to the context data. These monoliths were in the poorest condition (they had not been wrapped in clingfilm) and one had dried out to some extent. The samples were briefly described but not considered suitable for further study. The failure to record which way up the monoliths were and the lack of any useful features in the deposits, combined with an absence of palaeoenvironmental evidence determined that no further work was undertaken on these monoliths.

Monolith 3019

This monolith was in poor condition and partially dried out. It was not possible to clean properly and there was no indication as to which was the top or bottom of the monolith. The deposits show some structure indicating that they had been subject to soil processes, but no discernible stratigraphy was noted in the monolith. This appears to be an undifferentiated fill that has been subject to soil development, presumably as it filled.

Monolith 3020

This monolith was in better condition but again no top or bottom was marked. The deposits are very similar to those in 3019, but have a band of small black mineral concretions in the upper half, probably reflecting water table movements.

Discussion

The site lies on the lower slopes above the eastern side of the River Marlais just below the 50m contour. There is a small stream that 'issues' just over 100m north-west of the site passing approximately 25m from the burnt mounds, which then 'sinks'. This at present is the nearest source of water for the burnt mounds, although it may not have been flowing in the Bronze Age. The more reliable sources are a small stream 170m to the south-east, and the River Marlais 130m to the south-west. Two of the pollen studies undertaken during the pipeline project lie just 3km north and 7km south of the site. Both contain deposit sequences that include the middle and late Bronze Age. The sequence to the north (RDX14R) shows an oak and hazel dominated woodland with some ash, elm and lime, and alder along the rivers and in wetland areas. Expanding grasses and the appearance of ribwort plantain indicates an opening up of the landscape with pastures. Occasional large Poaceae pollen grains may indicate the presence of cereals. The period appears to be represented by decreasing oak and hazel woodland accompanied by a slight increase in grasses and birch, the latter likely to be local to the site. To the south at RDX05 (op cit.) the Middle–Late Bronze Age is similarly characterised by an oak and hazel woodland, but with a marked local birch woodland and a less significant alder input. The Late Bronze Age sees a rapid fall in the birch input and a complimentary increase in grasses indicating an expansion of the pastoral landscape. Traces of cereal pollen first appear at this level indicating the local cultivation of cereals. It is quite possible that the burnt

mounds at Site 13.01 lay in woodland –oak dominates the charcoal assemblage with some hazel. The presence of birch and ash charcoal fits the local woodland picture, while the small alder component indicates that trees were growing nearby possibly by the small stream. The posthole in burnt mound 1 adjacent to pit 131074 has a more diverse charcoal assemblage (Table 4) with additionally cherry type, and the birch, ash and cherry in this assemblage might indicate collection from a slightly more open woodland.

The charred plant assemblage from the burnt mound mirrors many of the other mounds along the pipeline route, indicating little domestic or food refuse entering the deposits. What little was recovered might suggest domestic occupation nearby or occasional consumption on or near the mound site. Burnt mound 131017 occupies an area of approximately 59.5 square metres, and has an average depth along its section of 11.5cm which indicates a total surviving volume of 6.84m³. With an average of 603g/litre of burnt stone (original sample volume estimated on the basis of recorded weight of unprocessed sample at 1.4kg/litre, but the sample size is small) this represents a total weight of 4.12 tonnes of burnt stone in the surviving mound, a small to medium sized mound. The planned area of Mound 131087 is approximately 142 square metres in extent and with an average thickness of 14.7cm this represents a total volume of 20.9m³. Extrapolating from the average weight of burnt stone in the sample spits this equates to a total weight of 14.8 tonnes of burnt stone in the surviving mound, making this an appreciably bigger mound than Mound 131017 and one of the larger mounds in the medium sized group. The burnt stone comprised largely large sandstone cobbles, with a little limestone, and these could have been taken from the Devensian till (<http://mapapps.bgs.ac.uk/geologyofbritain/home.html>) that covers the area after being exposed by ploughing, or otherwise collected from the bed of the River Marlais 130m to the south west. Close observation of the cobbles might allow their interpretation as glacial erratics or waterborne cobbles, both can be worn into smooth cobble shapes.

The location of these two mounds, particularly the larger one which presumably represents an appreciable period of use, suggest that the small stream that issues to the north west of the site was probably in existence in the Bronze Age, otherwise one must envisage the water that was used at the site being carried from the river or the stream at least 130m away.

The function of the circular segmented medieval ditch is clearly a problem. The distinct absence of cultural and food debris at this period would argue strongly against the site having any domestic character. It is almost inconceivable that 440 litres of soil would produce so little cultural and food debris if it was associated with an occupation site. The bracken pinnules in three of the ditch samples suggest that it was growing locally, and with slowly permeable seasonally wet acid clayey soils across the site (<http://www.landis.org.uk/soilscapes/>) and surrounding fields this would be typical on the slopes and any woodland margins. The one element that is abundant is the charcoal, although a relatively small quantity of burnt stone and occasional large magnetic fraction suggests the mineral debris from hearths or bonfires. The charcoal assemblage is dominated by oak, including heartwood and roundwood, with some hazel, alder, poplar/willow and hawthorn group. A significant proportion of this assemblage is roundwood with an average ring count of 14 for the oak and 13 for the alder, but a range from 5 to 30 rings for the oak and a concentration around 14-16 rings. This does not imply an 'organised' coppice system (ie a regular cycle), although some of the fragments show the characteristic fast growth followed by slow growth that is associated with coppicing. It is suggested above that the charcoal is consistent with the cutting of faggots or cordwood, the characteristic material harvested for fuel from managed woodlands. This suggests that the charcoal might derive from a 'crop' and is not the casual collection of a mixed bag of material for fires. Unfortunately this does not take us much closer as to the function of the site but it might suggest an

industrial use, an association with the harvesting of timber from local woodlands, or the burning of material from a wood store or stack; but for what purpose remains obscure.

APPENDIX D: 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.

Enclosure 131018

Five radiocarbon results were produced as part of the first round of assessment on plant macrofossils from the ditch fills of enclosure 131018. Beta-257719 was produced on a demonstrably short-lived macrofossil, while Beta-25715–18 were produced on material that probably had limited inbuilt offsets. The measurements that exist are statistically consistent ($T'=8.3$; $T'5\%=9.5$; $df=4$; Ward and Wilson 1978), and may be of the same actual age. All results have been modelled as if they are accurate measurements for the age of associated activity without significant inbuilt offsets. Activity associated with the enclosure is estimated to have begun in cal. AD 1300–1440 (95.4% probable; cal. AD 1380–1430 68.2%). An estimate for the end of this activity is cal. AD 1410–1530 (95.4% probable; cal AD 1420–1470). The activity represented by these samples could have gone on for 100–120 years (95.4% probable; or 0–50 years 68.2% probable).

Burnt mounds

Four radiocarbon dates were produced from the two burnt mounds. Two statistically inconsistent measurements (SUERC-55496 and -55497) were produced on charcoal from posthole 131078 associated with burnt mound 131017, and one (SUERC-55498) from a deposit within this burnt mound. SUERC-55502 was produced on a deposit within burnt mound 131087. The four results could indicate that the site was the focus of at least two phases of activity, with earlier activity represented by SUERC-55497 and SUERC-55502, and then later activity by SUERC-55496 and -55498. Insufficient radiocarbon dating results exist to determine whether activity at the site was punctuated or more continuous. The first dated event associated with the burnt mounds is estimated as 1290–1120 cal. BC (95% probable; or 1270–1160 cal. BC 68% probable). The last dated event associated with the burnt mounds at the site is estimated as 990–830 cal. BC (95% probable; or 970–960 cal. BC 5% or 940–850 cal BC 63% probable). The duration of activity represented by these results is estimated as occurring over 170–420 years (95% probable; or 240–370 years 68% probable).

Context	Feature	Dated material	Laboratory Ref	Measured age	δ13C	Calibrated date
131031	Ditch 131021	<i>Quercus</i> sp. charcoal	Beta-257715	530 +/-40		cal. AD 1320–1440
131034	Ditch 131033	Acorn cup	Beta-257719	520 +/-40		cal. AD 1320–1440
131036	Ditch 131037	<i>Quercus</i> sp. charcoal	Beta-257717	440 +/-40		cal. AD 1420–1490
131046	Ditch 131045	<i>Quercus</i> sp. charcoal	Beta-257716	560 +/-40		cal. AD 1300–1430
131044	Burnt mound 131017	<i>Alnus glutinosa</i> charcoal	SUERC-55498 (GU35190)	2754 +/-30	-26.7	980–820 cal. BC
131057	Ditch 131056	<i>Quercus</i> sp. charcoal	Beta-257718	430 +/-40		cal. AD 1420–1610
131079	Posthole 131078	<i>Alnus glutinosa</i> charcoal	SUERC-55496 (GU35188)	2832 +/-30	-27.2	1060–900 cal. BC
131079	Posthole 131078	<i>Fraxinus</i> sp. charcoal	SUERC-55497 (GU35189)	2974 +/-30	-25.5	1280–1110 cal. BC
131088	Burnt mound 131087	<i>Corylus</i> sp. charcoal	SUERC-55502 (GU35191)	2986 +/-30	-26.6	1370–1110 cal. BC

Fig. 8 A Bayesian model for the later results from site 13.01. Each distribution represents the relative probability that an event occurred at a particular time. For each distribution two ranges have been plotted. The range in outline represents the calibrated radiocarbon result, the solid distribution represents the posterior density estimate (or Bayesian statistical model output). The large square brackets and CQL2 OxCal keywords define the model exactly.

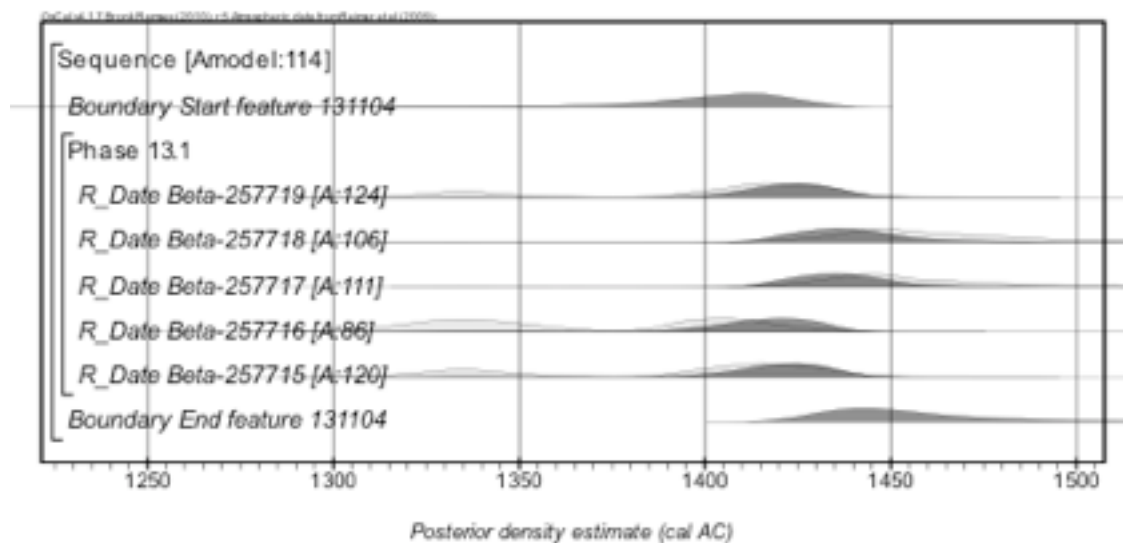
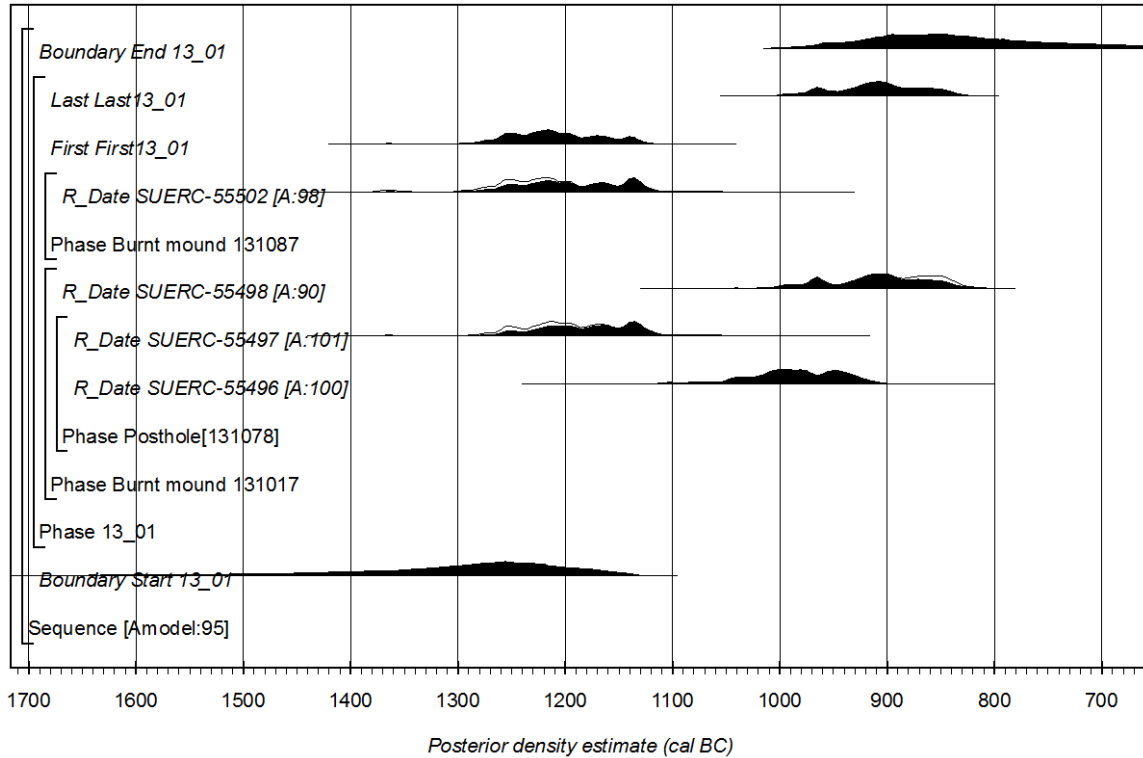
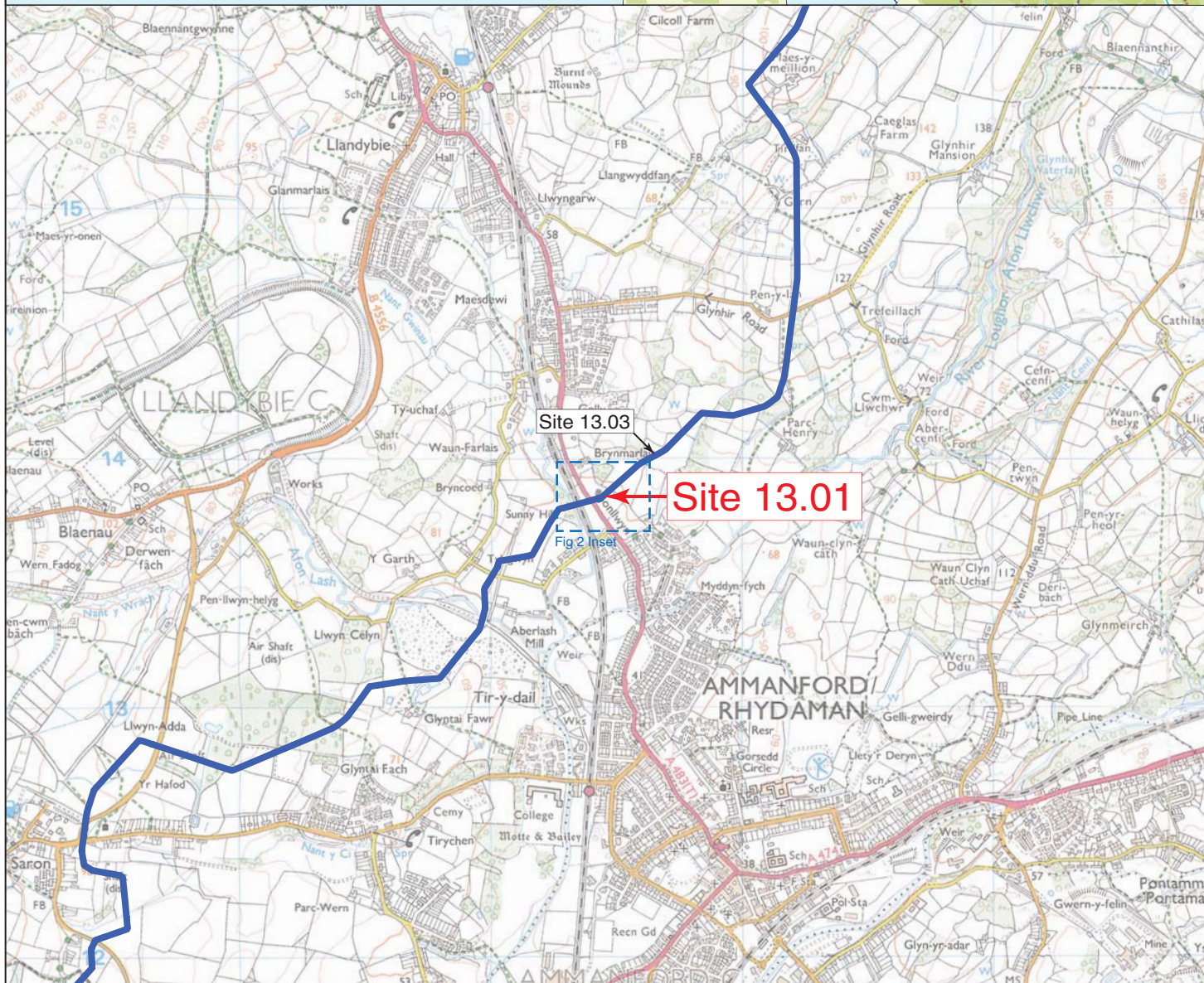


Fig. 9 A Bayesian model for the earlier results from site 13.01. Each distribution represents the relative probability that an event occurred at a particular time. For each distribution two ranges have been plotted. The range in outline represents the calibrated radiocarbon result, the solid distribution represents the posterior density estimate (or Bayesian statistical model output). The large square brackets and CQL2 OxCal keywords define the model exactly.





- Milford Haven to Aberdulais pipeline
- Felindre to Brecon pipeline
- 0-75m contour
- 75m contour
- 200m contour
- 400m contour
- 600m contour



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South Wales Pipeline. Site 13.01, Land North of Ammanford, Llandybie, Carmarthenshire

FIGURE TITLE

Site location plan

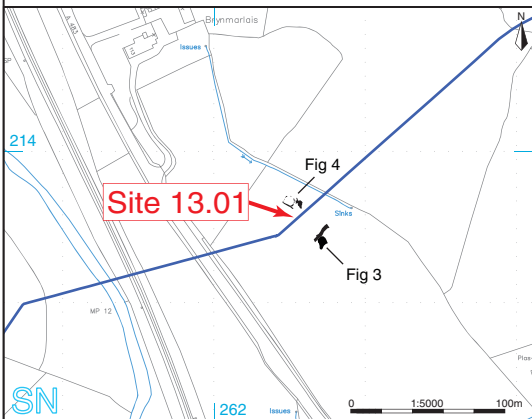
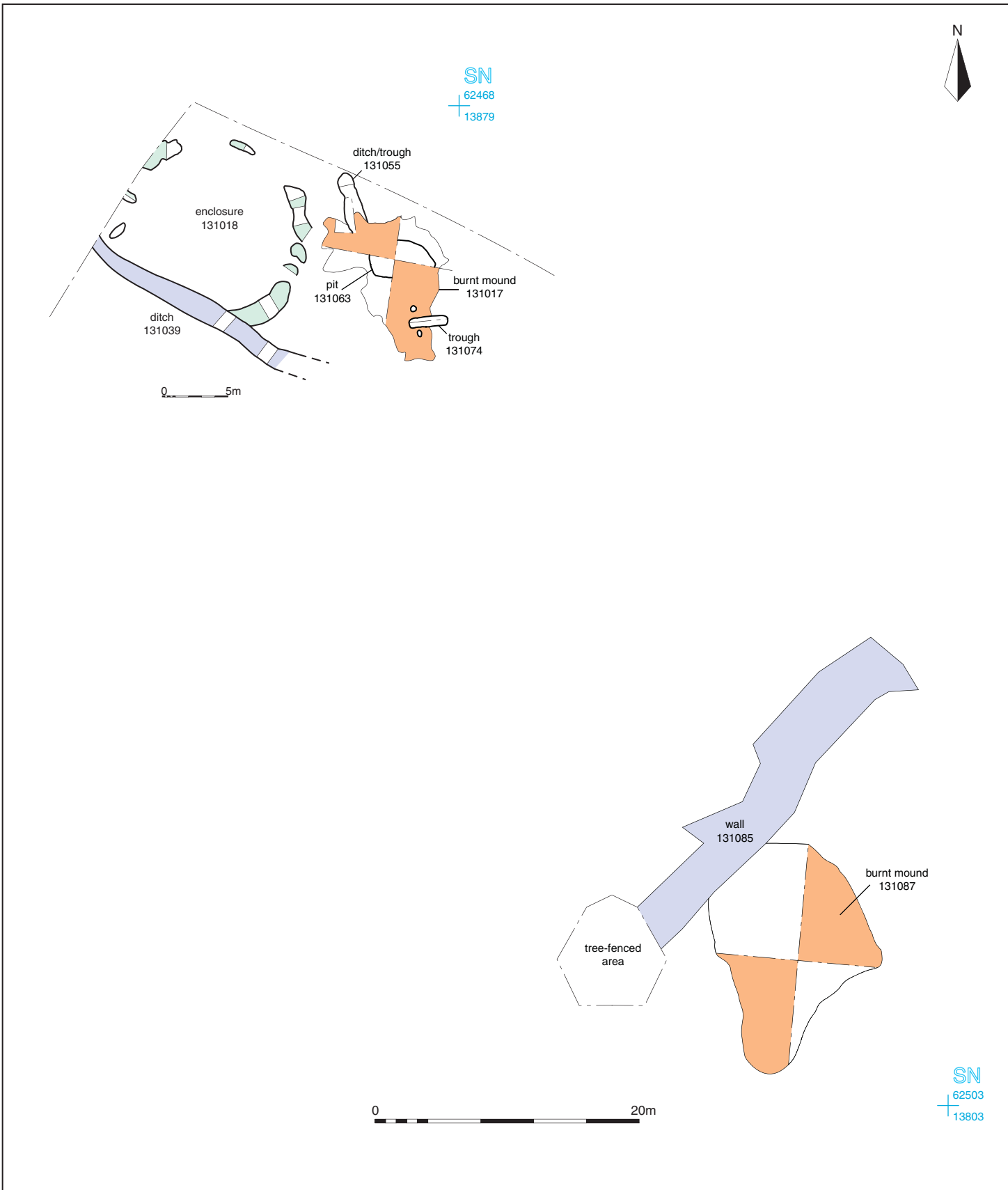
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 APPROVED BY LM
 DATE 28-08-2013
 REVISION 00
 SCALE@A4 1:25,000

FIGURE NO.

1



- pipeline centreline
- burnt mound
- medieval
- post-medieval

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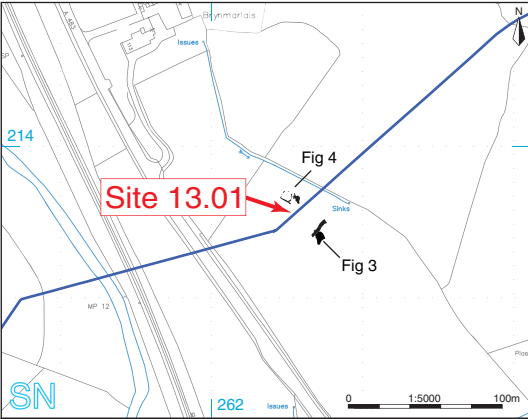
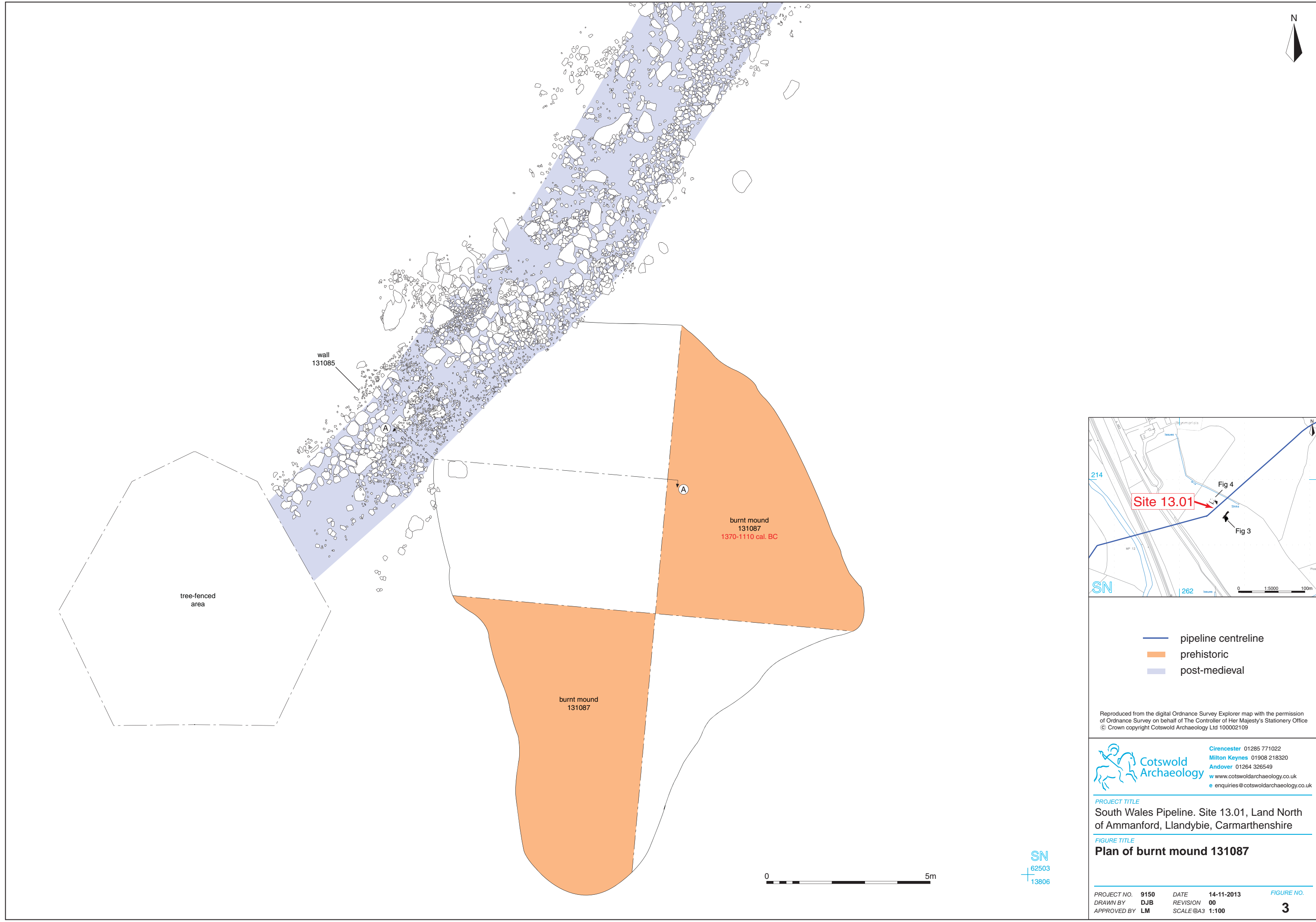
FIGURE TITLE

Phased site location plan

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FIGURE NO.

2



- pipeline centreline
- prehistoric
- post-medieval

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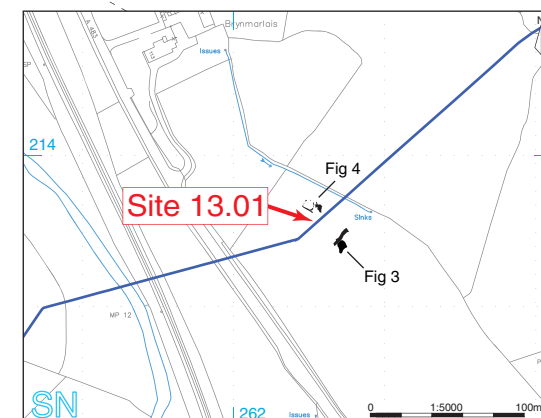
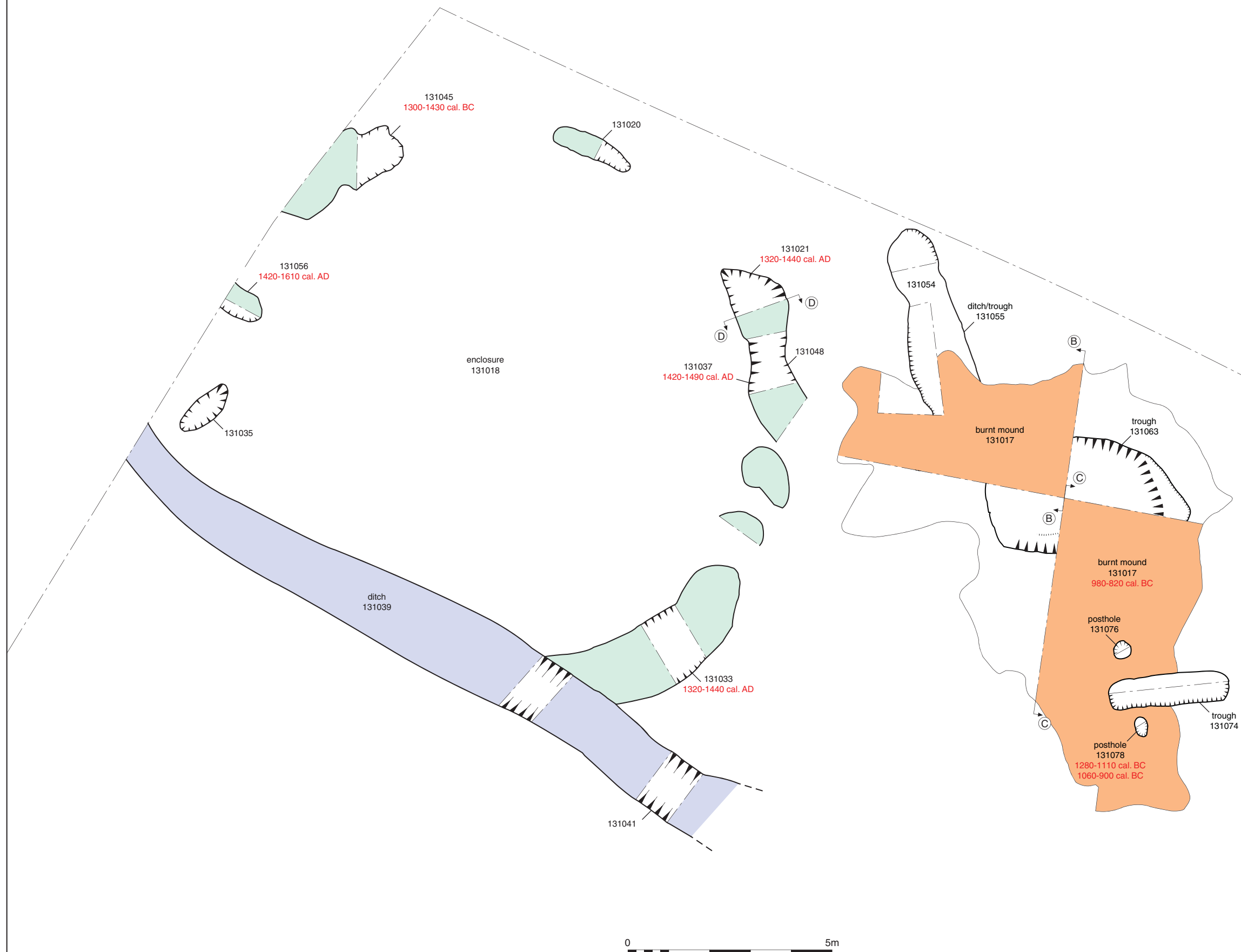
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FIGURE TITLE
 Plan of burnt mound 131087



SN
62468
+
13879



- pipeline centreline
- burnt mound
- medieval
- post-medieval

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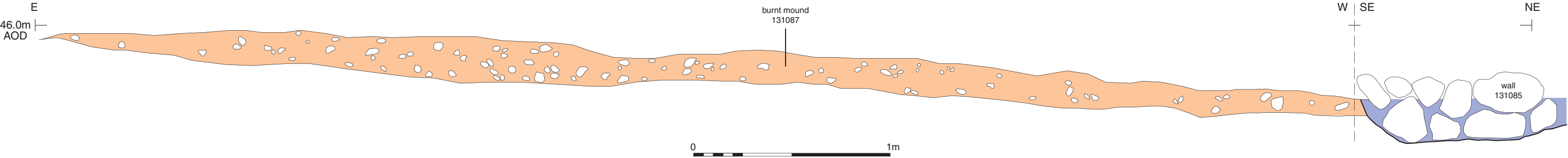
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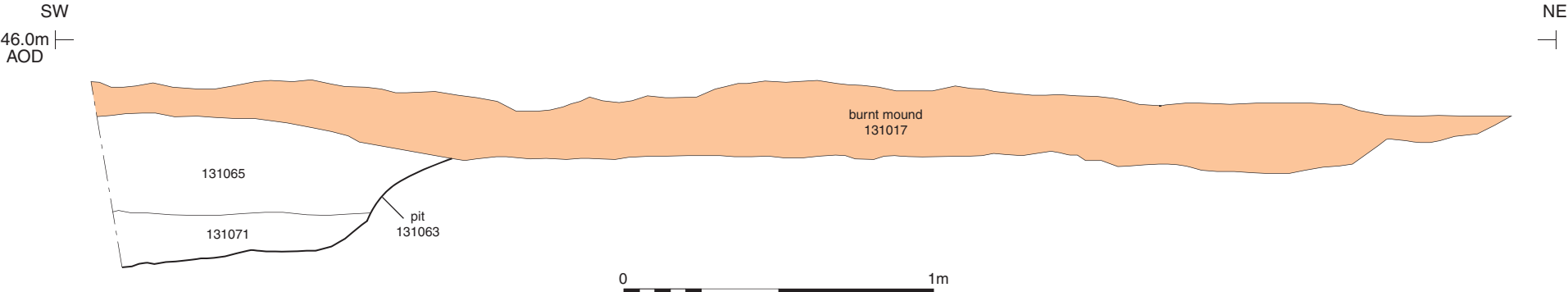
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Plan of burnt mound 131017 and enclosure 131018

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APPROVED BY	LM	SCALE@A3	1:100	

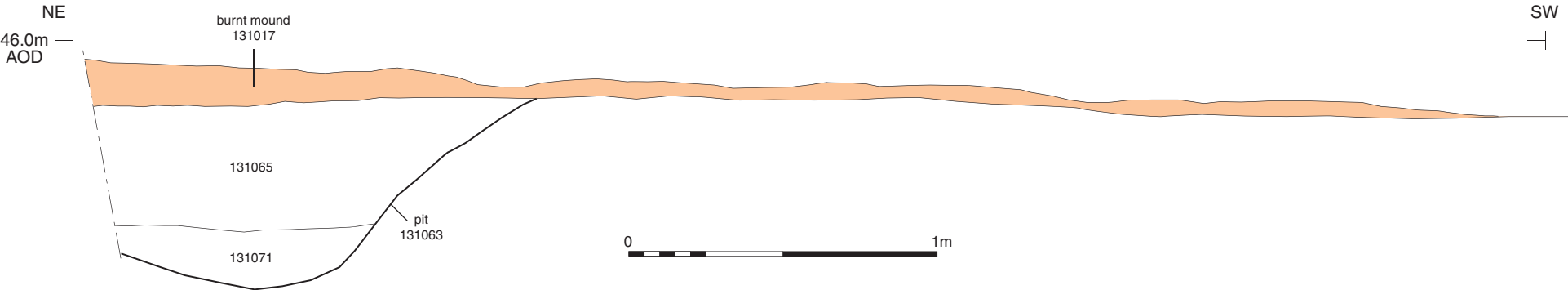
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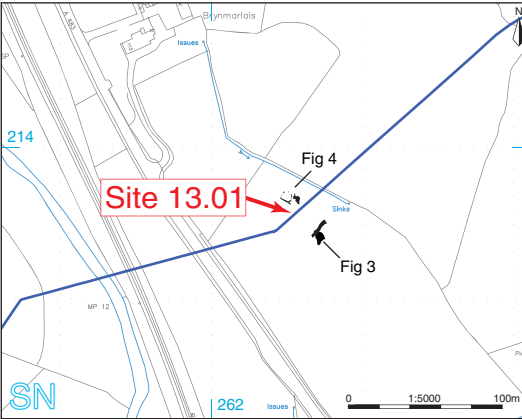
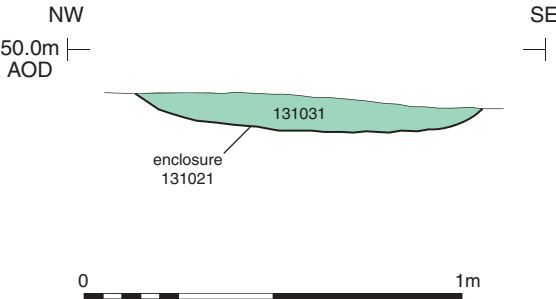
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Section CC



Section DD



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FIGURE TITLE
Sections through burnt mounds and enclosure

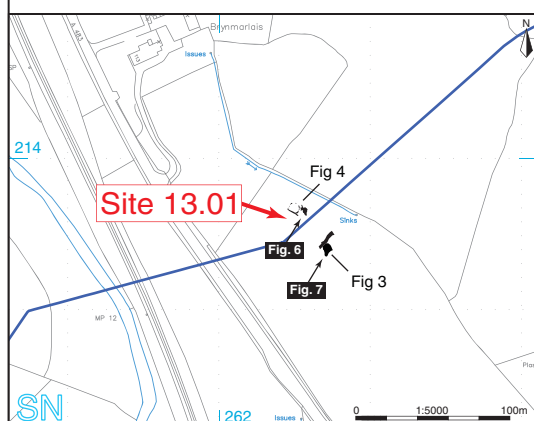
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APPROVED BY	LM	SCALE@A3	1:20	



Burnt mound 131087, looking north-east



Burnt mound 131017, looking north-east



— pipeline centreline
 — photograph locator

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FIGURE TITLE

Photographs

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FIGURE NO.
6 & 7