

YCCART 2023/Y10
West lime kiln, Prestow Wood, Wrington

Written Scheme of Investigation for
archaeological trial evaluation



West kiln, Prestow Wood, spring 2023

North Somerset HER: MNS1126

NGR: ST 4745963131

July 2023

Project: Uncovering Prestow Wood's industrial past (Wrington PC)

WSI prepared by: Vince Russett MA (Oxon), 7 Amberey Road, Weston-super-Mare BS23 3QJ
vrussett@gmail.com

Page	Contents
3	Site location Land use and geology
4	Introduction
6	Evaluation procedure
10	Research aims and objectives
11	Methodology
15	Appendix 1: Lime and lime burning Appendix 2: Initial field report on limekilns at Prestow Wood, Wroughton (attached .pdf)

Site location



Fig 1: West kiln, NE of Wrington village

The west kiln lies at ST 4745963131, in the extreme SW corner of Prestow Wood, off Wrington Hill, and north of Branches Cross, in the parish of Wrington in North Somerset.

Land use and geology

The kiln lies at the lower edge of the exposure on Broadfield Down of the Oxwich series (Carboniferous limestones), the source of the quarried stone, and that used in the kiln. Immediately below the site, the Mercia Mudstone skirting the southern edge of the Down is exposed.

The site is presented as a permissive open area , with a permissive footpath between Wrington Hill and Old Hill, by the owners, the Wrington Parish Council. Please be advised that the area is not Public Access land.

Introduction

Yatton Congresbury Cleeve and Claverham Archaeological Research Team (hereafter YCCCART) has been requested by Mr Tony Harden, on behalf of the Uncovering Prestow Wood's industrial past Project to carry out an archaeological evaluation at Prestow West kiln (hereafter 'the site') off Wrington Hill, Wrington (ST 4745963131).

The site, formerly a limekiln operating with locally derived limestone from an adjacent quarry lay, until intervention by the Project, under thick woody undergrowth and trees of the nearby Prestow Wood. This growth was underway by the 1946 RAF air photographs of the area (Fig 2 below), but the process would obviously have been accentuated by the cessation of rabbit grazing due to myxomatosis (a lethal infection) in the late 1950s and after.

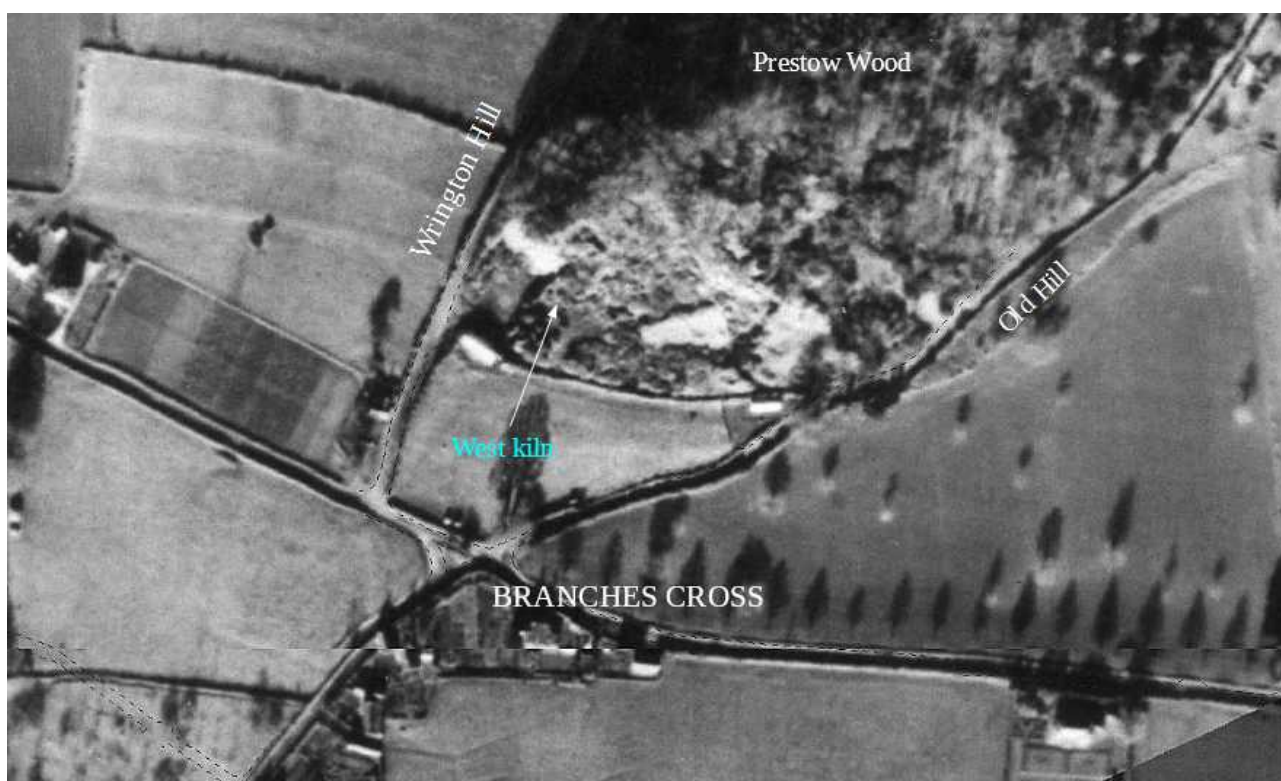


Fig 2: The west kiln site in 1946

West limekiln, Prestow Wood, Wrington

West limekiln, the restoration of which these trial evaluations are intended to inform, is a relatively well-preserved example of its type, the local lime burning structure for (mainly) local consumption. The survival of limekilns in the contemporary landscape is largely the result of chance, the structures having no practical use after their abandonment some time in the first half of the 20th century (or earlier, in the case of field kilns), and their supplanting by industrial-scale production and transport.

The kiln itself appears to date from the middle of the 19th century, subsequent to the 1840 Tithe Map of Wrington. It is described on OS plans as 'Limekiln' in 1885 and 1903, but is not even planned on the OS map of Epoch 5 (c1970).

In the Avon county SMR it was described in 1982 by David Pollard (Avon SMR4028) as 'General preservation is good despite being covered & surrounded by under growth. [It is a] single draw kiln, with gothic arch & draw hole'.

The exterior of the kiln is of skilled construction (see for example, the careful selection of the canted stones of the edges of the arch in cover illustration), but the sides and face have clearly not been particularly well tied in, leading to a possible source for future collapse if not attended to.

The North Somerset HER (NSHER MNS 1126) does not add substantially to this summary, little relevant research having been carried out on local limekilns in the intervening years.

A large, but now heavily overgrown, quarry served the kiln: whether it was in conjunction or in competition with, the other surviving Prestow Wood kiln (NSHER MNS1125; ST 4761363131) is not at present known. The quarry serving this kiln is known to be of geological importance: this matter is dealt with elsewhere in the Project.

As usual with local industrial structures of this type, documentary and cartographic references are poor.

Kelly's Directories for Wrington do list a 'Limeburner' for the late 19th and early 20th centuries, but his address is given as Redhill, where other limekilns exist, so may not be relevant. Any local recorded connection to the construction and operation of the kiln will obviously be of immense importance for the Project.

Evaluation Procedure

This document is a Written Scheme of Investigation (WSI) for an archaeological trial evaluation prepared for consultation between YCCCART and the North Somerset Council Senior Archaeologist. It has been prepared in accordance with the relevant Standards and Guidance of the Chartered Institute for Archaeologists (CIfA 2014). All work will be reported in line with the guidelines introduced in Management of Research Projects in the Historic Environment (MoRPHE Historic England 2015). It will be submitted to all parties for approval prior to commencement of the works contained.

All work will be carried out in accordance with this WSI, managed overall by Vince Russett. The archaeological background to this project is contained in the paragraphs above, Appendix 1 below, and in the appropriate section of the YCCCART web site (<http://www.ycccart.co.uk/>).

All earthmoving and any demolition works will be carried out by members of YCCCART, supervised by Vince Russett, to record in detail any archaeological sites, structures and deposits revealed during the course of such works.

All hand excavation will be carefully undertaken and will follow the stratigraphy of any encountered archaeological layers, features and/or deposits.

All structures and all zones of specialised activity (e.g. funerary, ceremonial, industrial, agricultural processing) will be fully excavated and all relationships recorded.

Ditches and gullies will have all relationships defined, investigated and recorded. All termini will be excavated. A sufficient length of each feature will be excavated to determine its character over its entire course, and the possibility of recuts of parts, not just the whole, of features will be considered. This will be achieved by a minimum 25% sample of each feature.

All pits will initially be half-sectioned and fully recorded. Pits may subsequently be fully excavated to facilitate 100% collection of artefact assemblages.

Post and stake holes not clearly forming part of a structure (see above) will be half-sectioned ensuring that all relationships are investigated. Where deemed necessary, by artefact content, a number may demand full excavation.

For other types of feature such as hollows, quarry pits etc., an attempt will be made to ascertain any and all relationships with/to other features. Further investigation will be a matter of on-site judgement, but will seek to establish as a minimum the extent, date and function of each feature.

A single context recording system will be undertaken automatically within any hand excavation area.

Should any human burials or remains be encountered the Archaeological Advisor and the Coroner's Office will immediately be informed and excavation will cease until the relevant Ministry of Justice licence has been obtained.

The provisions of the Treasure Act of 1996 (amended 2003) will be observed. Should finds of precious metals such as gold and silver or other finds as defined under the Act be made, they will be reported to the local Coroner and then deposited with the Coroner's local Archaeological Advisor. Should the removal of such objects be unable to be made during the same working day, suitable and appropriate security arrangement will be made to deposit them with the local Coroner's Office.

The North Somerset Senior Archaeologist will be informed at the earliest opportunity of any unexpected archaeological features or deposits worthy of preservation. They will of course be free and welcome to visit the site at any time during the work in order to view the fieldwork whilst it is in progress.

All exposed features will be recorded according to current professional standards using the standard context record sheets and masonry sheets used by YCCCART employing a single context recording system.

All structural and other relationships will be recorded and a structural matrix created.

A full photographic record will be made of all significant archaeological features comprising digital photography (Sony DSC HX60V 21Mp). All photographs will include a scale and (if necessary) a north arrow. All photographs will be fully indexed and cross-referenced on YCCCART context sheets and photographic registers.

Where necessary, detailed structure or elevation and/or section drawings will be hand-drawn at 1:10 on plastic draughting film (Permatrace).

While it is not anticipated, if deposits suitable for environmental sampling are encountered, YCCCART will seek further appropriate advice.

Upon completion of the fieldwork, the site archive will be assembled in accordance with the guidelines set out in Management of Research Projects in the Historic Environment (Historic England 2015). The site archive will contain all the data collected during the excavation including records, finds and environmental samples.

A post-excavation assessment report including plans, digital photographs and drawings for the excavations will be prepared within six weeks of completion of the site work, subject to the production of any necessary specialist reports. It will include a record of all materials recovered and all written, drawn and photographic records relating directly to the investigations undertaken. It will be quantified, ordered, indexed and internally consistent. It will also contain a site summary and brief written observations on the artefactual and environmental data.

The report will be in line with guidelines set out in Management of Research Projects in the Historic Environment (Historic England 2015).

An Online Access to the Index of Archaeological Investigations (OASIS) form will be completed at <http://ads.ahds.ac.uk/project/oasis/> following the completion of the work and included as an appendix.

A draft copy of the report will be sent to the North Somerset Council Senior Archaeologist in the first instance for their comments and approval. Once the report has been accepted further copies and one electronic copy in PDF format will be sent to North Somerset Council and the client as appropriate.

It has been agreed with the client that once accepted by the North Somerset Senior Archaeologist, a report will also be published on the YCCCART web site (<http://ycccart.co.uk>).

Health and Safety

A Risk Assessment will be produced and agreed with the client prior to the commencement of the work. All relevant main contractor health and safety regulations will be adhered to.

Insurance

YCCCART is insured against claims for:

public and products liability to the value of £2,000,000 any one event for all claims in the aggregate during any one period of insurance;

employers' liability to the value of £10,000,000 any one event inclusive of costs;

A copy of the relevant Certificate of Employers Liability Insurance will be available on site.

Monitoring

The North Somerset Senior Archaeologist will be kept aware of dates and progress of the works, to enable monitoring of such to take place.

References

British Geological Survey 2023 Geoindex, accessed online:
<http://www.bgs.ac.uk/GeoIndex/>

CIfA, 2014a *Standard and Guidance for the collection, documentation, conservation and research of archaeological materials*

CIfA, 2014b *Standard and Guidance for archaeological field evaluation (revised)*.
Chartered Institute for Archaeologists

CIfA, 2014c *Code of Conduct (revised)*. Chartered Institute for Archaeologists

English Heritage, 2011 (2nd Ed.) *Environmental Archaeology: A guide to the theory and practice of methods, from sampling and recovery to post-excavation*

Historic England, 2015, *Management of Research Projects in the Historic Environment (MoRPHE)*

Historic England 2015 *Archaeometallurgy: Guidelines for Best Practice*

Museums and Galleries Commission, 1994 *Standards in the Museum Care of Archaeological Collections*

Neale, F. 1969 *Wrington Village Records* Bristol University

UKIC 1990. *Guidelines for the Preparation of Excavation Archives for Long-term Storage*

Webster, C 2007 *The Archaeology of South-West England; South West Archaeological Resource Assessment and Research Agenda*

Research aims and objectives

The broad aims of the trial evaluations are:

To make a full record of the limekiln, including its attached structures, by photographic and other records as necessary, and establish comparison with earlier published cartographic and other records;

To excavate 2 3x1m evaluations on targeted areas of the kiln structures (see below for detail) and to record any archaeological sites structures or deposits revealed during the works, where it is not possible to preserve *in situ*, although the latter will be the favoured outcome

The project will be informed by the South-West Archaeological Research Framework (SWARF; Webster 2007) especially

Research Aim 4: **Encourage wide involvement in archaeological research and present modern accounts of the past to the public**

Research Aim 7: **Increase and develop the recording of the built environment... (and) greater understanding of different kinds of structures and earlier active use of space**

Research Aim 45: **Broaden our understanding of postmedieval to modern technology and production** [and to extend such understanding more widely]

Methodology

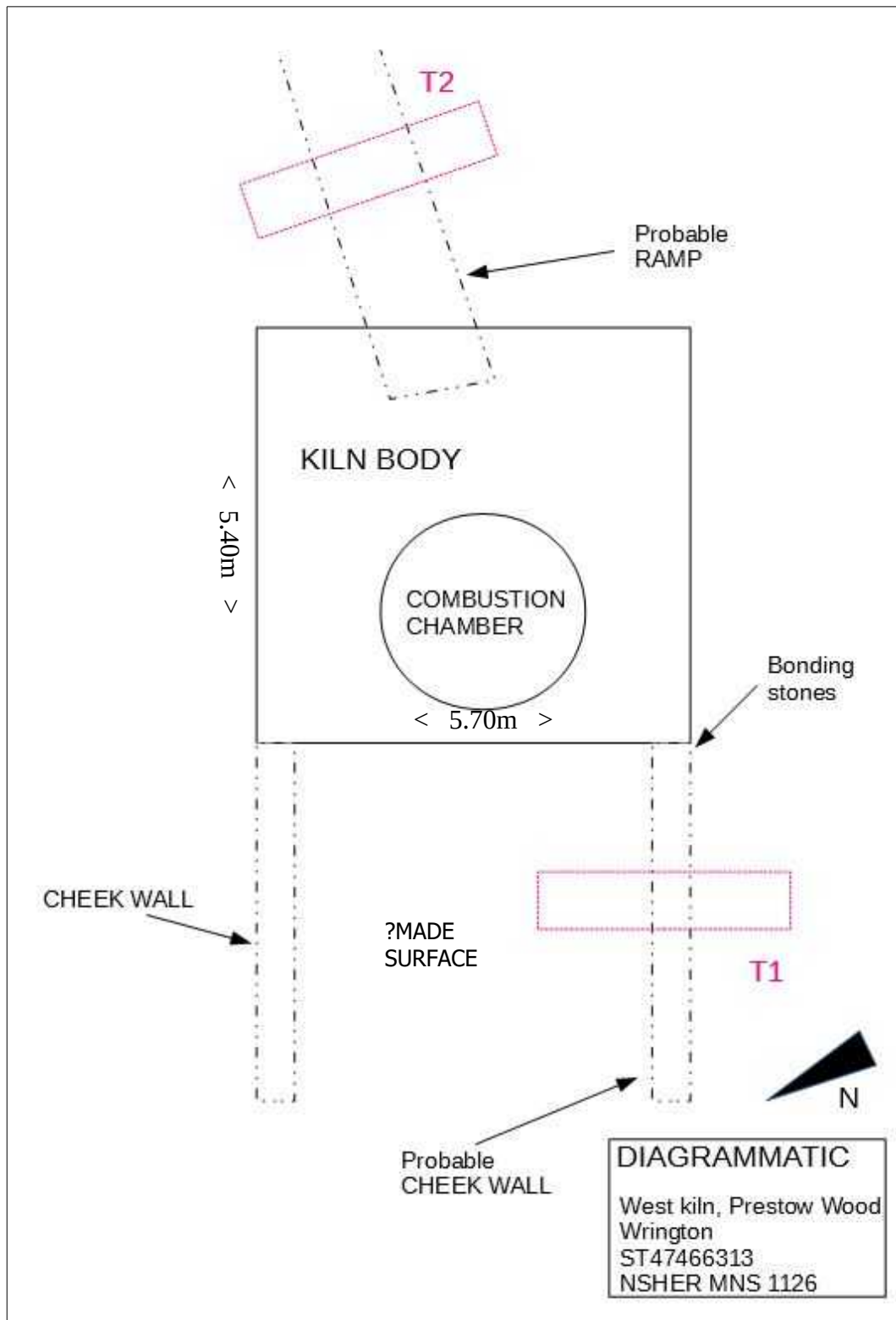


Fig 4: Proposed evaluation trenches at West Kiln

While the body and combustion chamber of the kiln are the most obvious survivals of the structure, partial elements of other structures probably survive. These are

1) The cheek walls before the kiln

2) The ramp to the combustion chamber of the kiln, from the higher ground to its north. Both, and the reasons and proposals for evaluation, are discussed below.

Cheek walls

These structures project from the front of the kiln, to form a working area before the kiln mouth. They take the form of coursed walls similar to the structure of the main kiln.



Fig 5: Limekiln at Uphill quarry (ST31515839) showing cheek walls surviving in front of the kiln face

Cheek walls (the space between is sometimes even roofed over) provide a working and storage space in front of the kiln.

Fresh lime (CaO) generates an extreme exothermic reaction on contact with water (see Appendix 1), meaning that eyes of anyone working the kiln are particularly vulnerable.

Cheek walls serve the dual purpose of stilling the air around the kiln mouth, to prevent windblown dust, and even a dry temporary storage area (if roofed) for lime in barrels or jute sacks.

They clearly once existed at West kiln, as the keying stones attest:



Fig 6: South side of West kiln, showing key stones for cheek wall projecting from the body of the kiln (arrowed)

From the existence of these stones, it is obvious that, although built later than the body of the kiln, these structures were intended to be built from the start.

Trench 1, a 3m x 1m intervention over the visible line of the south cheek wall, is intended to establish the exact line, the nature and if possible, the date, of any surviving cheek wall foundation.

In addition, some slight deepening of the northern end of the trench can establish the presence or absence of a made floor before the kiln (as at Uphill), or whether the rock surface sufficed.

Ramp

In hand-made and operated structures such as these, charging the kiln would be by alternative loads of broken limestones, and fuel (probably coal by this date) tipped into a fired load inside the combustion chamber. This would be most effectively achieved with the use of wheelbarrows (their construction and use is documented at Saunders Hill on Mendip in the late 18th century).

To load the chamber from wheelbarrows, an even flat approach surface would be needed, and to address this, a ramp was often made.



Fig 7: The ramp behind limekiln Somerset HER 10373 (ST47305543)

One of the best preserved is shown in Fig 7, belonging to a field kiln at Charterhouse in Priddy.

Evidence that a similar ramp once existed can be seen at West kiln as a bump in the local path between two trees: it is slightly better preserved around the trees, but clearly this area is obviously not available for evaluation.



Fig 8: Linear earthwork of core of probable surviving ramp at West kiln

Trench 2 would sample this earthwork to establish whether it is indeed the remains of a charging ramp, and the structure and potentially, date, of such.

Appendix 1: Lime and limeburning (from YCCART 2019/Y12)

Mendip grey Carboniferous Limestone makes good, pure lime, for which it is still in demand by the modern steel industry, where used as a flux. Limestones are composed of calcium carbonate (CaCO_3), which on heating (in this case, with coal), breaks down into lime and carbon dioxide:



The limestone and coal are added to the kiln in layers, and as the stone lumps break down in the hopper of the kiln, the lime can be extracted from below. It takes a skilled limeburner to prevent blockages. The lime is used for three principal purposes at the date of operation of the Saunders Hill limekiln.

1. As the basis for mortar, a mixture of lime, sand and / or gravel and other neutral agents and water. The lime, when wetted, gradually begins to re-absorb CO_2 from the atmosphere, and eventually hardens back into something resembling a limestone, holding the stones around it firmly together
2. For 'liming' fields, a process designed to 'sweeten' the acid Mendip soils. Thin soils like those of Mendip are acidified by rain, naturally slightly acid, due to the presence of carbonic acid (H_2CO_3) formed by CO_2 combining with atmospheric water. This dissolves out the CaCO_3 they naturally contain by converting it to soluble calcium bicarbonate ($\text{Ca}(\text{HCO}_3)_2$), and the quality of the soil for arable falls. Liming the soil puts this back (by converting the carbonic acid to CaCO_3 again), and also allows soils to hold plant micronutrients more successfully
3. For whitewash / limewash. This simple paint, annually used to whiten houses, barns and other stone buildings, is made by dropping lumps of lime into water, converting it into calcium hydroxide: ($\text{CaO} + \text{H}_2\text{O} = \text{Ca}(\text{OH})_2$). When this is painted on a wall as a white slurry, it gradually hardens by absorbing CO_2 and changing back to CaCO_3 . The reaction of lime and water is profoundly exothermic (gives off a great deal of heat) and the water usually boils during the making of limewash.

The CO_2 given off from limekilns normally disperses into the atmosphere, but as it cools, it becomes much denser than air, and tends to pool in any hollow, where its tasteless odourless presence can suffocate living things, and there are known instances of tramps bedding down by still-warm limekilns and being asphyxiated in the night. In the hollow in which the Saunders Hill limekiln sat, it may have been quite dangerous to work on still, cool nights.

Lime is also extremely caustic, and due to the exothermic nature of its reaction with water, will burn watery parts of human bodies like eyes and mucous membranes severely. This makes it a dangerous material to use, so it is often 'cured' before spreading on fields by letting it sit around in the rain for months, converting it to the much less dangerous, but just as effective slaked lime ($\text{Ca}(\text{OH})_2$).

Appendix 2: Initial field report on limekilns at Prestow Wood, Wroughton

.pdf file attached.