



Pascoe's Shaft Pumping and Winding
Engine Houses, South Wheal Frances,
Piece, Cornwall
Historic Building Record

Cornwall Archaeological Unit

Report No: 2022R022



Pascoe's Shaft Pumping and Winding Engine Houses, South Wheal Frances, Piece, Cornwall

Historic Building Record

Client	Cormac Solutions Ltd
Report Number	2022R022
Date	December 2022
Status	Final
Report author	Antony Angove
Checked by	Jo Sturgess
Approved by	Andy Jones
Project number	147180
Data location	\\CAU\Archive\Sites\E\Engine House Project 2021-2024 147
Historic England / ADS OASIS online reference	cornwall2-510700
Planning reference	PA21/11635 and PA21/11755

The project's documentary, digital, photographic and drawn archive is maintained by Cornwall Archaeological Unit.

Cornwall Archaeological Unit

Cornwall Council

Pydar House, Pydar Street, Truro, Cornwall, TR1 1XU

Tel: (01872) 323603

Email: enquiries@cau.org.uk Web: www.cau.org.uk

Acknowledgements

This study was commissioned by Mark Ward on behalf of Cormac Solutions Ltd and carried out by Cornwall Archaeological Unit, Cornwall Council.

The fieldwork was undertaken by Antony Angove and Jo Sturgess.

The Project Manager was Jo Sturgess.

The views and recommendations expressed in this report are those of Cornwall Archaeological Unit and are presented in good faith on the basis of professional judgement and on information currently available.

Freedom of Information Act

As Cornwall Council is a public authority it is subject to the terms of the Freedom of Information Act 2000, which came into effect from 1st January 2005.



Cornwall Archaeological Unit is a Registered Organisation with the
Chartered Institute for Archaeologists

Cover illustration - Pascoe's pumping engine house following remedial works.

© **Cornwall Council 2022**

No part of this document may be reproduced, stored in a retrieval system, or transmitted in any form or by any means without the prior permission of the publisher.

Contents

1	Summary	1
2	Introduction	3
2.1	Project background	3
2.2	Aims	3
2.3	Methods	3
2.3.1	Desk-based assessment	4
2.3.2	Fieldwork	4
2.3.3	Post-fieldwork	4
3	Location and setting	4
4	Designations	5
5	Site history	5
6	Historic development of the buildings	7
6.1	Winding Engine House	7
6.2	Pumping Engine House	8
7	Building description – Winding house	9
7.1	General description, functions and layout	9
7.2	Exterior	9
7.2.1	North-east elevation	9
7.2.2	North-west elevation	10
7.2.3	South-east elevation	10
7.2.4	South-west elevation	11
7.3	Interior: winding engine house	11
7.4	Interior: boiler house	12
8	Building description – Pumping house	13
8.1	General description, functions and layout	13
8.2	Exterior	13
8.2.1	North-east elevation	13
8.2.2	North-west elevation	14
8.2.3	South-east elevation	14
8.2.4	South-west elevation	14
8.3	Interior	15
9	Remedial works – Winding house	15
9.1	Repair 1	15
9.2	Repair 2	16
9.3	Repair 3	16
9.4	Repair 4	16
9.5	Repair 5	16
9.6	Repair 6	16
9.7	Repair 7	16

9.8	Repair 8	16
9.9	Repair 9	16
9.10	Repair 10	16
9.11	Repair 11	16
9.12	Repair 12	17
9.13	Repair 13	17
9.14	Repair 14	17
9.15	Repair 15	17
9.16	Repair 16	17
9.17	Repair 17	17
10	Remedial works – Pumping house	17
10.1	Repair 18	17
10.2	Repair 19	17
10.3	Repair 20	18
10.4	Repair 21	18
10.5	Repair 22	18
10.6	Repair 23	18
10.7	Repair 24	18
10.8	Repair 25	18
10.9	Repair 26	18
10.10	Repair 27	18
10.11	Repair 28	18
11	References	18
11.1	Primary sources	18
11.2	Publications	19
11.3	Websites	19
12	Winding engine house site photographs	23
13	Pumping engine house site photographs	54
14	Appendix 1: Photographic archive	80
15	Appendix 2: Written Scheme of Investigation	89

List of Figures

- Fig 1 Location map.
- Fig 2 Site extent.
- Fig 3 Tithe Map, c1840.
- Fig 4 First Edition of the Ordnance Survey 25 Inch Map, c1880.
- Fig 5 Second Edition of the Ordnance Survey 25 Inch Map, c1907.
- Fig 6 RAF aerial photograph taken in 1946 showing the roofless buildings.
- Fig 7 2016 aerial photograph.
- Fig 8 Pascoe's winding engine house c1880 photograph (Trounson and Bullen 1999).
- Fig 9 Pascoe's winding engine house c1910 photograph (Trounson and Bullen 1999).
- Fig 10 North-east elevation before remedial works.
- Fig 11 North-east elevation before remedial works.
- Fig 12 North-east elevation of loadings and flywheel slot before remedial works.
- Fig 13 View of flywheel slot in loadings before remedial works.
- Fig 14 North-east elevation following vegetation clearance and repair work to the boiler house window opening.
- Fig 15 North-east elevation following vegetation clearance.
- Fig 16 North-east elevation following vegetation clearance and repair work to the arch over the boiler house window opening.
- Fig 17 Interior north-east bob wall.
- Fig 18 Interior looking north-east into condenser pit before remedial works.
- Fig 19 Top of bob wall before remedial works.
- Fig 20 Top of bob wall following lime mortal capping.
- Fig 21 North-west elevation of engine house before remedial works.
- Fig 22 North-west elevation of remains of boiler house wall before remedial works.
- Fig 23 North-west elevation of engine house: arch leading to cataract pit following repair work.
- Fig 24 Interior north-west wall before remedial works.
- Fig 25 Interior north-west cataract pit wall following reconstruction of brick arch.
- Fig 26 Interior north-west wall following small patch repair around edges of incised plaster.
- Fig 27 North-west wall of condenser pit.
- Fig 28 South-east elevation of engine house before remedial works.
- Fig 29 South-east elevation of engine house following patch repairs and some ivy clearance.
- Fig 30 South-east elevation following patch repairs.
- Fig 31 South-east elevation following patch repairs.
- Fig 32 South-east elevation following patch repairs.
- Fig 33 South-east elevation following patch repairs to chimney stack.
- Fig 34 South-east elevation of the boiler house before remedial works.

- Fig 35 South-east elevation of the boiler house following patch repairs and some ivy clearance.
- Fig 36 South-east elevation of the loadings following patch repairs and some ivy clearance.
- Fig 37 South-east elevation of the loadings: repaired arch of the condenser pit opening.
- Fig 38 Interior south-east wall before remedial works.
- Fig 39 Interior south-east wall following patch repairs.
- Fig 40 Interior south-east wall following patch repairs.
- Fig 41 Interior south-east wall of the condenser pit before remedial works.
- Fig 42 Interior south-east wall of the condenser pit showing repaired arch over opening.
- Fig 43 South-east wall of the boiler house following lime mortar capping.
- Fig 44 South-east wall of the boiler house following lime mortar capping.
- Fig 45 South-east wall of the boiler house following lime mortar capping.
- Fig 46 South-east wall of the boiler house following patch repair to window sill.
- Fig 47 Interior south-east wall of the boiler house following patch repair.
- Fig 48 Interior south-east wall of the boiler house following patch repair.
- Fig 49 Interior south-east wall of the boiler house following patch repairs.
- Fig 50 South-west elevation of the engine house before remedial works.
- Fig 51 South-west elevation of the engine house following ivy clearance, patch repairs and capping of gable ends.
- Fig 52 Interior south-west engine house wall before remedial works.
- Fig 53 Interior south-west engine house wall following patch repairs and gable end capping.
- Fig 54 South-west engine house wall following gable end capping.
- Fig 55 South-west gable end wall of engine house following patch repair.
- Fig 56 Interior south-west engine house wall following patch repairs.
- Fig 57 Interior south-west engine house wall following patch repair to arch.
- Fig 58 Interior south-west wall following small patch repair to incised plaster.
- Fig 59 Interior south-west wall of boiler house before remedial works.
- Fig 60 Interior south-west wall of boiler house following patch repairs.
- Fig 61 Interior south-west wall of boiler house following repairs to gable end.
- Fig 62 South-west external boiler house gable end following capping.
- Fig 63 Repairs to the arch of the boiler flue opening at the base of the chimney stack.
- Fig 64 Interior south-west wall of boiler house following patch repairs to wall and arch.
- Fig 65 Interior south-west wall of boiler house following patch repairs.
- Fig 66 Interior south-west wall of engine house before remedial works.
- Fig 67 Interior south-west wall of engine house following small patch repairs to incised plaster.
- Fig 68 Interior cylinder bed before remedial works showing exposed vertical bolt tunnel for the cylinder.

- Fig 69 Interior cylinder bed following remedial works.
- Fig 70 Top of Cylinder bed before repair works showing bolt tunnels.
- Fig 71 North-east elevation before remedial works.
- Fig 72 North-east elevation following the installation of a new lintel and repairs to window arches and jambs.
- Fig 73 Interior north-east wall before remedial works.
- Fig 74 Interior north-east wall from the cataract pit before remedial works.
- Fig 75 Interior north-east wall joist sockets and lintel before remedial works.
- Fig 76 Interior north-east wall, joist sockets and lintel following remedial works.
- Fig 77 Interior north-east wall following remedial works.
- Fig 78 Interior north-east wall, repairs to main girder slot sill.
- Fig 79 Exterior north-east elevation, repairs to main girder slot sill.
- Fig 80 Exterior north-east elevation, repairs to window arch.
- Fig 81 North-west elevation, bob wall.
- Fig 82 Interior north-west bob wall.
- Fig 83 Interior north-west bob wall.
- Fig 84 South-east elevation before remedial works.
- Fig 85 South-east elevation following repairs to cylinder arch, small patch repairs and capping of the top of the gable.
- Fig 86 South-east elevation following reconstruction of the lower course of cylinder arch.
- Fig 87 Interior south-east wall and cylinder arch before remedial works.
- Fig 88 Interior south-east cylinder arch following repairs.
- Fig 89 Interior south-east gable end before remedial works.
- Fig 90 Interior south-east gable wall following patch repair and capping.
- Fig 91 Interior south-east gable wall following capping.
- Fig 92 Interior south-east gable wall following replacement of lintel above spring beam slots.
- Fig 93 Interior south-east gable wall following replacement of lintel above spring beam slots.
- Fig 94 Interior south-east gable wall following small patch repair to window sill.
- Fig 95 Interior south-east gable wall following small patch repair to window sill.
- Fig 96 South-east wall of cataract pit (cylinder bed).
- Fig 97 South-west elevation before remedial works.
- Fig 98 South-west elevation following remedial works.
- Fig 99 Small patch repair to chimney stack.
- Fig 100 Interior south-west wall before remedial works.
- Fig 101 Interior south-west wall, replacement sill of main girder slot opening.
- Fig 102 Interior south-west wall, repair to joist socket.
- Fig 103 Interior south-west wall, reconstruction of arch.

- Fig 104 Interior south-west wall, small patch repair to window sill.
Fig 105 Interior south-west wall, small patch repair to window sill.
Fig 106 South-west elevation, view of arch reconstruction.
Fig 107 South-west elevation, replacement sill of main girder slot.
Fig 108 Steps leading in to cataract pit inserted in the 1990s.
Fig 109 Cylinder bed with 1990s metal safety railings.
Fig 110 Winding engine house plan.
Fig 111 Winding engine north-east elevation.
Fig 112 Winding engine north-west elevation.
Fig 113 Winding engine south-east elevation.
Fig 114 Winding engine south-west elevation.
Fig 115 Pumping engine house plan.
Fig 116 Pumping engine house north-east elevation.
Fig 117 Pumping engine house north-west elevation.
Fig 118 Pumping engine house south-east elevation.
Fig 119 Pumping engine house south-west elevation.

Abbreviations

CAU	Cornwall Archaeological Unit
CIfA	Chartered Institute for Archaeologists
HE	Historic England
HER	Cornwall and the Isles of Scilly Historic Environment Record
NGR	National Grid Reference
OD	Ordnance Datum – height above mean sea level at Newlyn
OS	Ordnance Survey

1 Summary

Cornwall Archaeological Unit was commissioned by Cormac Solutions Ltd to carry out a historic building record prior to and following the repair of Grade II Listed winding and pumping engine houses at Pascoe's Shaft, South Wheal Frances mine near Piece, Carnkie. The buildings are located at NGR SW 67814 39357 and SW 67758 39296 within the South Wheal Frances complex.

Conditional Listed Building Consent for the repair of the Grade II Listed Buildings (LBC Application Numbers PA21/11635 and PA21/11755) has now been granted. Condition 3 of the Listed Building Consent required a programme of archaeological work to be undertaken which comprised a historic building record to be made of the building both before and after the completion of the repair works. The historic building record (equivalent to a Historic England level 2/3 building survey) has been undertaken as a mitigation measure for the impacts of the repair works on the Listed Building.

The buildings are associated with Pascoe's Shaft at South Wheal Frances. The winding engine house was constructed in 1878 and the pumping engine house in 1888 during a period of redevelopment. The construction of the winding engine house allowed hoisting directly from Pascoe's Shaft. This had previously been achieved using a winder shared with Marriott's shaft. Since 1872 Pascoe's Shaft had been drained by the use of flat rods leading from a pumping engine at Marriot's shaft. However, the inadequate performance caused by the use of flat rods led to the construction of the existing pumping engine house in 1888 directly over Pascoe's Shaft.

Pascoe's Shaft Pumping and Winding Engine Houses, South Wheal Frances, Piece, Historic Building Record

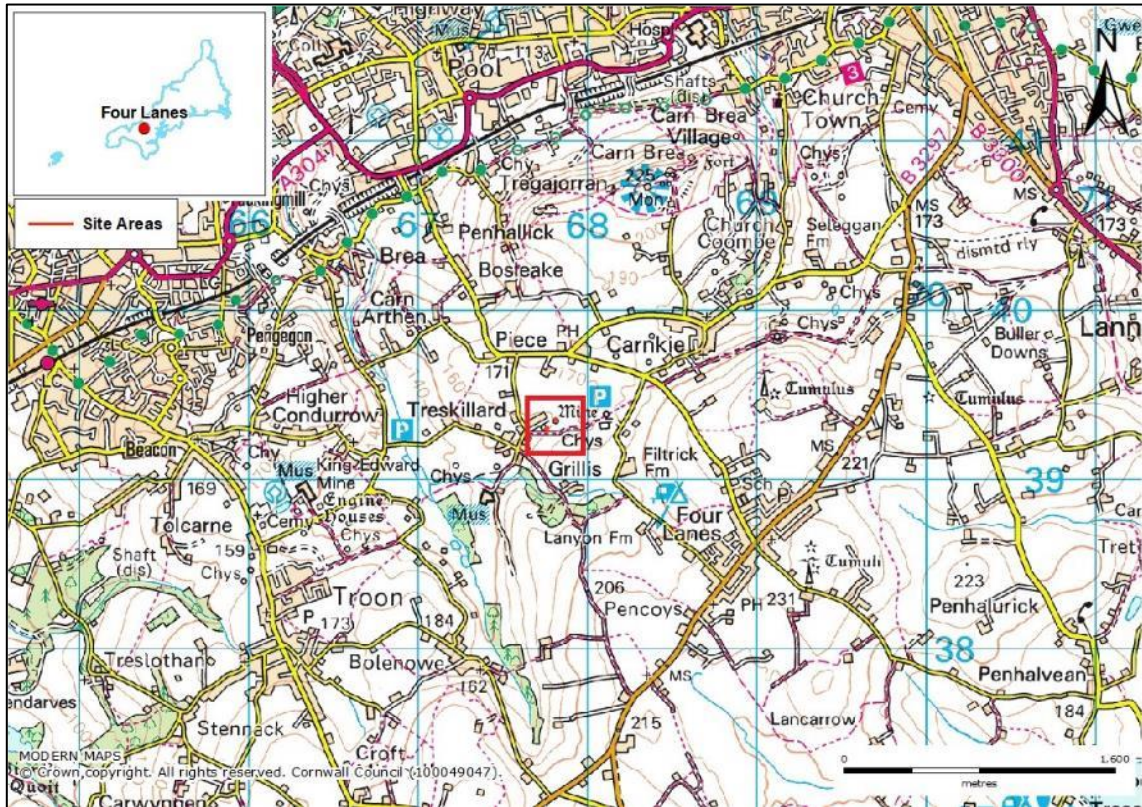


Fig 1 Location map.



Fig 2 Site extent.

2 Introduction

2.1 Project background

The winding and pumping engine houses are part of South Wheal Frances mine. The engine houses were constructed during a period of expansion, with the increased sinking of Pascoe's Shaft up until the mid-1890s. The site of South Wheal Frances mine is now owned by Cornwall Council and having undergone a phase of major landscaping in the 1990s, it is in use as a public amenity space for people to freely explore the redundant mine buildings.

The pumping and winding engine houses at Pascoe's Shaft have been included within a wider heritage programme to repair and stabilise a number of mine buildings and structures owned by Cornwall Council.

As part of the Listed Building Consents for the remedial works, application numbers PA21/11635 (for the pumping engine house) and PA21/11755 (for the winding engine house) a Condition was attached to each for historic building recording.

Condition 3 for both PA21/11635 and PA21/11755 is as follows:

A) The conservation works shall proceed in accordance with the Written Scheme of Investigation (WSI) prepared by Cornwall Archaeological Unit (dated 18/11/2021) that has been approved by Historic Environment Planning (Archaeology) and submitted to the Planning Authority in support of this planning application.

B) No conservation works shall take place other than in accordance with the Written Scheme of Investigation approved under condition(A).

C) The historic building recording condition will normally only be discharged when all elements of the WSI including on site works, analysis, report, and archive work has been completed.

REASON: In accordance with the provisions of NPPF (2021) Chapter 16, paragraph 205 and Cornwall Local Plan policy 24.

Cornwall Archaeological Unit were commissioned to undertake the historic building record by Mark Ward (Cormac Solutions Ltd) on behalf of Donald Martin (Countryside Team, Cornwall Council). The requirements for the historic building records, which are equivalent to a Historic England level 2/3 building survey, were determined by Peter Dudley, Senior Development Officer (Historic Environment Planning, Cornwall Council) and are outlined in the Written Scheme of Investigation (WSI) prepared by CAU (Appendix 2).

2.2 Aims

The principal aim of the study was to create a detailed record of the building prior to alterations and also to create a record after the completion of the remedial works.

The objectives were to:

- Produce an accurate record of the building along with its fabric, fixtures and fittings (Level 2 or 3 as appropriate and as defined by Historic England 2016).
- Create a phased historic development for the building.
- Produce a record of the completed repairs.

2.3 Methods

All recording work was undertaken according to Chartered Institute for Archaeologists (CIfA) (CIfA 2020) and Historic England (2016) guidance.

2.3.1 Desk-based assessment

During the desk-based assessment historical databases and archives were consulted in order to obtain information about the history of the site and the structures and features that were likely to survive. The main sources consulted were as follows:

- Cornwall HER, as accessible via the Heritage Gateway.
- Images of England online Listed Buildings database.
- Early maps and photographs (see Section 11.1).
- Published histories (see Section 11.3).
- Websites (see Section 11.3).

2.3.2 Fieldwork

A historic building record (equivalent to a Historic England level 2/3 survey) was undertaken prior to the repair works.

- Measured drawings were supplied by the client. Measured detail was added to these along with annotations to provide details of both historic development and fabric.
- Colour photographs of all exterior elevations and interior room spaces along with architectural details were taken with a digital camera (at a resolution of 10 million pixels or higher). These along with the post-works photographs form the photographic archive. Photographs included a metric scale bar, except where Health and Safety considerations made this impractical. Particular focus was given to the areas of alterations/repairs.
- Descriptions of the exteriors and interiors were made in note form and by annotation of the plan to record their fabric and construction, phased development through time and architectural details. Particular attention was given to recording the areas of alterations/repairs.

A record was also made of the building following the completion of the repair works. This included a photographic record of the areas which had undergone repairs along with descriptions of materials, methods and styles used.

2.3.3 Post-fieldwork

All site materials were prepared for long term storage. This included:

- Finalisation of measured drawings.
- Archiving of drawings, photographs, paperwork and digital files.
- Filing of digital colour photographs including limited image editing (eg, composition, lighting) where appropriate and depositing with the Archaeology Data Service (ADS)
- Creation of an archive report.
- Completion of the Historic England OASIS record (online access to archaeological investigations).
- Preparation of CAU archive.

A catalogue of the photographs taken as part of the project is given in Appendix 1.

3 Location and setting

South Wheal Frances is a disused tin and copper mine located along the Great Flat Lode to the south of Piece and east of Treskillard (Figs 1 and 7). It lies within the Camborne and Redruth mining district of the World Heritage Site for Cornish mining. The two engine houses associated with Pascoe's Shaft are located to the west of the other mine

buildings associated with Marriott's Shaft at NGR SW 67814 39357 and SW 67758 39296 (Figs 1 and 2).

The two buildings are adjacent to each other and lie at the bottom of a north facing slope within a shallow valley to the south of Carn Brea. They are built in a similar architectural style, which varies from the design of pumping and winding houses located to east at Marriot's Shaft.

At the time of the initial survey the winding engine house, associated boiler house and loadings had areas of dense ivy covering them, and although many of the interior surfaces were grassed, brambles and saplings had become established in some of the room spaces and around the external walls. In comparison, the pumping engine house was largely clear of clear vegetation, with small areas of grass and moss covering the internal walls cylinder bed, and cataract pit.

Geologically the underlying bedrock at South Wheal Frances comprises Carboniferous course-grained granite and Devonian Mylor slate formation (bgs.ac.uk).

4 Designations

The Pumping and Winding engine houses at Pascoe's Shaft, South Wheal Frances, are Grade II Listed Buildings (List Entry Numbers: 1328181 and 1142598). The Listing descriptions are as follows:

GV II Pump engine house to former tin mine, now derelict. 1888, for South Frances mine. Uncoursed granite rubble with bob wall of large, dressed granite blocks, window arches of polychrome brick, brick upper stage to chimney; now roofless. Rectangular plan on north-south axis, with bob wall to north, chimney attached at south-west corner. Three stages, with mostly round-headed openings, including an unusually large driver's window in the bob wall, a large cylinder door in the rear wall, and unusual tall lancet windows (3 in the rear wall, 6 and 3 in the east and west sides). Tapered cylindrical chimney with brick cornices to both stages. History: built to replace former pumping system by flat-rod connections from Marriott's shaft; contained 80-inch cylinder powered by 4 (subsequently 6) Cornish boilers. Reference: Palmer & Neaverson op.cit. Forms group with winding engine house, its functional partner to west.

GV II Winding engine house (or "whim") to former tin mine, now derelict. 1878, for South Frances Mine. Uncoursed granite rubble with quoins, bob wall of large, dressed granite blocks, window arches of yellow brick, brick upper stage to chimney; now roofless. Rectangular plan on north-east/south-west axis, with bob wall to north-east, winder loadings in front of this, chimney attached at south-west corner and remains of boiler house attached to south side. Three stages, with round-headed openings, including driver's window in bob wall, and raised doorway in rear wall. Tapered cylindrical chimney with moulded brick cornices to both stages. Prominent loadings in front of bob wall. Large boiler house on parallel axis mostly dilapidated, but north-east gable wall survives intact. History: built in period of expansion after driving from Pascoe's shaft encountered the Great Flat Lode in 1876; contained 36-inch cylinder. Reference: Palmer and Neaverson, op.cit.

The buildings are located within the Camborne and Redruth mining district of the World Heritage Site for Cornish Mining and within an Area of Great Landscape Value.

5 Site history

Pascoe's Shaft forms part of South Wheal Frances mine lying between Treskillard and Piece. Originally worked for copper, the mine probably dates from the 18th century, although it is first documented in 1823/4 reaching a peak of production in 1858 (Morrison 1983).

The Tithe map for the parish of Illogan c1840 (Fig 3) shows no buildings or shafts at the site of the present Pascoe's shaft complex. The accompanying Tithe Apportionment states that the land was located over two plots, which were part of Nancekuke tenement and was owned by Lady Frances Basset of Tehidy and John Molesworth St Aubyn at that date. The mine was clearly named after Lady Frances Basset who was responsible for granting the lease.

By 1856 seven shafts had been sunk at South Wheal Frances (Graces Guide 1856) including Pascoe's Shaft, which was progressively sunk deeper until the end of the 19th century reaching a final depth of 340 fathoms (439 metres).

Before the construction of the existing engine houses at Pascoe's Shaft, this shaft together with Marriott's Shaft shared a winding engine from 1857. This engine house was located 1000m south west of Pascoe's Shaft but no longer survives.

The existing winding engine house was constructed at Pascoe's shaft in 1878. It is not shown on The First Edition OS map surveyed in 1877 (Fig 4) indicating that it must have been constructed soon after. The material raised by this new winding engine appears to have been trammed to Marriott's shaft to the east for processing. In 1888 a new engine house was constructed immediately to the south east of the shaft. The c1907 OS map (Fig 5) shows the site with both winding and pumping engine houses and associated boiler houses completed. It also shows spoil dumps surrounding Pascoe's shaft and what appear to be settling tanks immediately west of the winding engine house.

The site is shown in photographs taken in c1890 and c1910 (Figs 8 and 9), illustrating both engine houses during operation and with associated fittings. These include shear legs attached to the pumping engine house directly situated over Pascoe's shaft, which were likely to have been removed when work ceased at South Wheal Frances in the early 20th century.

By the 1870s copper lodes had been exhausted here, but the discovery of tin (part of the Great Flat lode) enabled mining to continue. The engine houses seen at Pascoe's Shaft today date to a late period of redevelopment and investment in South Wheal Frances. In 1890 South Wheal Frances was amalgamated with West Wheal Basset for financial reasons, and then became 'South Frances United' but the decline in tin prices in 1893-94 forced another amalgamation of companies with Wheal Basset in 1896.

The outbreak of war in 1914 coincided with a disastrous year for the mine and a loss of £14,145 was reported. Labour was also a problem because men were leaving to fight in the war and this resulted in a drop in output, so losses continued, compounded also by serious damage sustained by the pumping engine at Pascoe's shaft (Palmer and Neaverson 1987, 38). During the war the decline continued with losses continuing to accumulate and eventually the creditors stepped in and pumping on the mine stopped for good on the 21st of December 1918.

The following timeline is taken from Smith (1992) but is based on the dates given in Palmer and Neaverson (1987). It lists the major events in the history of South Wheal Frances mine:

1824 South Wheal Frances at work.

1825 Mine closed and surface plant sold.

1834 South Frances reopened.

1846 First dividend paid (on copper ore).

1847 75 inch pumping engine erected on Marriott's shaft.

1857 24 inch winder erected to draw from Marriott's and Pascoe's. One of the first applications of wire rope in Cornwall.

1864 Dividends ceased; copper production in decline.

1876 Great Flat Lode cut from Pascoe's Shaft.

1877 Copper production ceased; output all black tin.

1878 36 inch winder erected at Pascoe's shaft.

1882 New 80 inch cylinder fitted to Marriott's pumping engine.

1886 Great Flat lode cut in Marriott's Shaft.

1888 80 inch pumping engine erected on Pascoe's shaft.

1892 South Wheel Frances and West Basset amalgamated to form South Frances United. All stamping and dressing operations transferred to West Basset Stamps, Carnkie via (northern) tramway system.

1895 Marriott's pumping engine house destroyed by fire.

1896 South Frances United amalgamated with Wheel Basset to form Basset Mines Ltd. Marriott's shaft redeveloped and re-equipped with all new plant.

1899 New plant at Marriott's in operation.

1906 New Compressor house built at Marriott's. Three additional boilers installed.

1908 New (southern) tramway laid from Marriott's to Basset Stamps. New Miner's Dry and Change-house erected.

1914 Heavy losses due to low grade ore and high operating costs.

1918 Basset Mines closed, and pumping stopped.

Following the closure of the mine at South Wheel Frances the buildings were stripped of all plant and valuable materials that could be used to repay debit. An RAF aerial photograph taken in 1946 (Fig 6) shows nearly all the buildings as roofless shells with only their stone walls standing.

Subsequent activity at South Wheel Francis following the closure of the mine was focused on extracting minerals from the extensive mine dumps and from the tailings on the sites of the former dressing floors. Mine spoil was taken from the site between 1932 and 1939 for use as hardcore elsewhere (Sharpe 1992).

In c1990 landscaping works were undertaken by Kerrier District Council at the site including shaft capping and removal of spoil heaps in order to convert the mine site as a publicly accessible amenity space.

In 1997 Listed Building Consent (W2/PA97/H0013) was granted for fixing of name plates to Pascoe's pumping and winding engine houses.

6 Historic development of the buildings

6.1 Winding Engine House

Phase 1: 1878

The winding engine house was constructed in 1878 during a period of expansion and was fitted with a 36" cylinder engine. This allowed hoisting directly from Pascoe's shaft, which had previously been undertaken by a winder shared with Marriott's shaft. The stone walls and ground floor surfaces of the engine house survive which includes the positioning of cylinder bed and cataract pit. The rear wall of the boiler house has now collapsed or been removed; however, the remaining stone walls survive with attached chimney stack. The surviving loadings aligned with the shaft show the positions of the condenser housing and crank pit, together with a whim cage slot.

Phase 2: Early 20th century

During this period, alterations appear to have been undertaken to the boiler house roof. This is indicated by the scar of a former pitched roof with associated sockets for roof timbers on the south-east elevation of the winding house (see Fig 29). This pitched roof cuts across the upper floor window of the winding house, indicating that it was clearly a later alteration. Photographs taken in c1890 and c1910 (Figs 8 and 9) show a simple gable roof over the boiler house. However, the pitched roof scar on the external south-east elevation of the winding house wall suggests that the roof was altered after the photographs were taken in to create an 'L' shaped roof.

Phase 3: 1908-1918

Following the closure of the mine, the interior fixtures and fittings in the building were stripped out, this included the roofs, upper floors, windows, doors and engine cylinder, machinery and boilers.

Phase 4: c1990

The Mineral Tramways Project was undertaken during the early 1990s (Sharpe 1992). This included reporting on works to reclaim areas of the derelict mining landscape around South Wheal Frances for use as public amenity space, with the creation of footpaths, bridleways and relandscaping around Pascoe's engine houses. As part of this work a condition survey of mine buildings within the project area was undertaken, which supported conservation works carried out on Pascoe's pumping and winding engine houses. The extent of these repair/consolidation works on the winding engine house are not clear. In 1997 Listed Building Consent (W2/PA97/H0013) was granted for fixing name plates to Pascoe's pumping and winding engine houses and two interpretation boards and a plaque at Marriott's Shaft.

Phase 5: 2021-2022

The present scheme of work was granted Listed Building Consent (PA21/11755) for the repair and restabilising of the winding engine house. This included the replacement of rotten lintels, repairing defective masonry and vegetation clearance. The repaired areas are show in Figures 111-114.

6.2 Pumping Engine House**Phase 1: 1888**

The pumping engine house was constructed in 1888 and was fitted at that time with an 80" cylinder engine. Previously (since 1872) Pascoe's Shaft had been drained by the use of flat rods leading from a pumping engine at Marriot's shaft. However, this had provided inadequate performance with the flat roads breaking and increasing water entering and flooding Pascoe's Shaft from West Frances and West Basset mines. The stone walls, ground floor surfaces and attached chimney stack of the pumping engine house survive. However, unlike the adjacent winding engine house, there are no visible standing remains of the boiler house.

Phase 2: 1888-1907

Following the closure of the mine, the interior fixtures and fittings in the building were stripped out, this included the roofs, upper floors, windows, doors and engine cylinder, machinery and boilers. It seems likely that the boiler house was also demolished at this time since the RAF photograph taken in 1946 (Fig 6) shows that it had been demolished by that date.

Phase 3: c1990

The Mineral Tramways Project was undertaken during the early 1990's (Sharpe 1992). This included reporting on works to reclaim areas of the derelict mining landscape around South Wheal Frances for use as public amenity space, with the creation of footpaths, bridleways and the capping of Pascoe's Shaft. As part of this work, a

condition survey of mine buildings within the project area was undertaken, which supported conservation works carried out on Pascoe's pumping and winding engine houses. The extent of these repair/consolidation works on the pumping engine house are not clear although they included the replacement of some timber lintels. In 1997 Listed Building Consent (W2/PA97/H0013) was granted for fixing of name plates to Pascoe's pumping and winding engine houses and two interpretation boards and a plaque at Marriott's Shaft.

Phase 4: 2021-2022

The present scheme of work was granted planning permission PA21/11635 for the repair and restabilising of the engine house. This included the replacement of rotten lintels, repairing defective masonry and vegetation clearance. The repaired areas are shown in Figures 115–119.

7 Building description – Winding house

7.1 General description, functions and layout

(See Figs 111–115).

The winding house along with its adjoining boiler house are now roofless shells with just the stone walls still standing. The building which was constructed in 1878 was designed to hoist ore extracted from Pascoe's shaft. The engine house is aligned north-east to south-west with its loadings constructed in line with the shaft to the north-east.

The majority of the walls of both the engine house and boiler house are constructed from randomly coursed granite rubble with dressed granite quoins and jambs and brick-built round arched openings. However, the bob wall of the engine house is constructed completely from large, dressed granite blocks. All the walls are bonded with a reddish coloured lime mortar mixed with slimes (mine waste).

The openings have round brick arches constructed from several courses of brick voussoirs. The window openings are splayed internally.

A number of joist sockets and other sockets survive. No trace of spring beam sockets could be seen internally or externally. Remnants of internal plaster surviving on all floors of the engine house have incised ashlar decoration. The chimney stack is built into the south rear corner of the engine house. Large parts of the boiler house survive, which is uncommon as they were often removed when mining operations ceased.

The loadings preserve the positions of the condenser housing and crank pit, together with the whim cage slot. The historic photographs (Figs 8 and 9) shows that the flywheel was located in the existing slot.

Inside the engine house the cylinder bed is preserved; however, a large amount of stone has been displaced to the south-east. Three cylinder bed bolt tunnels remain visible, which would have secured the 30" cylinder to the bed-stone.

7.2 Exterior

7.2.1 North-east elevation

(Figs 10–16 and 111).

The north-east elevation comprises three main parts: the bob wall, the loadings and the boiler house gable end. The bob wall and loadings are constructed from large, dressed, coursed granite blocks, whilst the boiler house is constructed from randomly coursed granite rubble.

The bob wall contains a plug door opening, which has a round arch comprising five courses of brick voussoirs. At the top of the bob wall there are two adjacent wing walls that remain *in situ* on either side.

Projecting from, and adjoining, the north-east elevation of the bob wall are the granite-built loadings, which would have housed the flywheel and winding drum.

The boiler house gable end is largely overgrown with ivy, but it contains a centrally set round arched door opening with two courses of brick voussoirs. However, at the time of the initial survey several bricks forming the arch were missing.

7.2.2 North-west elevation

(Figs 21–23 and 112).

The north-west elevation comprises three parts: the engine house, the loadings and the boiler house.

The north-west elevation of the engine house is constructed from randomly coursed granite rubble with large, dressed granite quoins and jambs. It is bonded with a reddish lime mortar containing slimes.

The wall has two window openings, one at the first and the other at second floor level, both of which have round arches comprising four courses of brick voussoirs.

Just to the south-west of the arch of the second floor window opening is the main girder slot. This is now blocked with brickwork, but the opening also has an arch comprising three courses of brick voussoirs.

An arched opening at the base of the wall, lighting the cataract pit has now lost its brick voussoirs.

To the north-east of the engine house the adjoining loadings are constructed from randomly coursed granite rubble.

To the south-west of the engine house a low, short section of the north-west elevation of the boiler house survives (Fig 22). Within the randomly coursed granite rubble masonry there is a low arched opening with two courses of brick voussoirs at ground level, presumably for pipework.

7.2.3 South-east elevation

(Figs 28–37 and 113).

The south-east elevation comprises three parts: the engine house, the loadings and the boiler house.

The south-east elevation of the engine house is constructed from randomly coursed granite rubble with dressed granite quoins and jambs and is bonded with a reddish lime mortar containing slimes. The chimney stack has been built into the south-west corner and is also constructed of randomly coursed granite rubble with brick-built upper part with moulded brick drip course and top.

The engine house wall has four arched openings, which all have different functions, and vary in size. The boiler house door opening adjacent to the boiler house gable end has an arch comprising four courses of brick voussoirs.

Below and to the south-west of this is the steam pipe opening allowing steam to be transferred from the boiler house to the engine house. This opening has an arch which comprises three courses of brick voussoirs.

The highest opening is the main girder slot which, unlike that in the north-west elevation, has not been blocked. It has an arch comprising three courses of brick voussoirs. Below this and to the north-east is a window opening with an arch containing three courses of brick voussoirs. The lower half of this opening has been blocked with brickwork when an alteration was made to the boiler house roof, presumably in the early 20th century.

Cutting across the blocked part of the window opening are the remains of cement flashing for a former pitched roof added to the boiler house at a later date. Inserted sockets for a ridge timber and purlins are also visible.

The lower wall of the engine house is partially overgrown with ivy and some of the masonry has been displaced.

The south-east elevation of the loadings is constructed from randomly coursed granite blocks and contains a brick arched opening to the cistern pit with three courses of brick voussoirs.

The south-eastern elevation of the boiler house largely survives although the wall is fragmented at the south-west end and is densely covered in ivy. There is a wide arch comprising three courses of brick voussoirs at the north-east end of the elevation and the remains of a window opening towards the south-west end which is now missing its arch.

7.2.4 South-west elevation

(Figs 50 and 51 and 114).

Only the southwest elevation of the engine house remains intact. The south-west elevation of the boiler house has collapsed and no longer survives.

There are two openings in the south-western elevation of the engine house. The lower of the two is the cylinder door opening. This is a wide opening, designed to allow installation of the cylinder and has a round arch comprising five courses of brick voussoirs. The upper floor window opening is narrower in comparison and its round arch contains three courses of brick voussoirs.

The chimney stack which is built into the south-eastern end of the elevation, is constructed predominately of granite rubble besides the upper section which is constructed from brickwork with moulded drip course and capping. Much of the chimney stack is obscured by dense ivy growth, which has also grown onto the wall of the engine house. At the base of the stack there is an opening for the flue from the boiler which has an arch with two courses of brick voussoirs that have partially collapsed.

The boiler house elevation has collapsed but overgrown rubble remains visible.

7.3 Interior: winding engine house

North-east wall

(Figs 17–20).

The north-east bob wall is constructed from large, coursed granite blocks, which commence from the base of the plinth up to the base of the plug door arch, with randomly coursed large granite rubble with smaller stones used as snecking continuing up to the top of the wall. There are two rectangular joist sockets in the bob wall on either side of the plug door arch, which itself, consists of five courses of brick voussoirs. There are three modern replacement timber bridging lintels dividing the lower condenser pit and the plug door. The adjoining walls inside the condenser pit consist of large granite stone blocks which have been displaced in sections.

North-west wall

(Figs 24–27).

The wall is constructed from randomly coursed granite rubble and patches of the original lime plaster with incised ashlar decoration still remain *in situ* in places.

The wall contains two arched window openings, each with three courses of brick voussoirs. The main girder slot towards the top of the wall is now blocked with brickwork but has a brick arch of two courses of voussoirs.

At the base of the wall in the cataract pit, the arched cataract pit light had lost its brick voussoirs at the time of the survey. Above this opening there are three large joist sockets and two smaller sockets presumably associated with the former floor over the cataract pit.

South-east wall

(Figs 38–49).

The wall is constructed from randomly coursed granite rubble and patches of the original lime plaster with incised ashlar decoration still remain *in situ* in places.

Towards the top of the wall there is an arched window opening with two courses of brick voussoirs. To the south-west of this is the small arched main girder slot.

Below the window opening is the boiler house door opening which once gave access from the floor over the cataract pit through to the boiler house. This has an arch with three courses of brick voussoirs which are partly covered by incised plaster.

To the south-west of the threshold of the boiler house door is the steam pipe opening located at cylinder bed level which formerly held the steam pipe to power the engine. The opening is arched and has three courses of brick voussoirs. There is a joist socket below the boiler house door for the former floor over the cataract pit and directly to the south-west of it, another joist socket which has been blocked with brickwork.

South-west wall

(Figs 52–58).

This is the rear gable wall of the engine house. It is constructed from granite rubble and retains areas of the original incised ashlar plaster. The wall contains two openings. The higher of the two is an arched window opening with three courses of brick voussoirs. The lower of the two is the cylinder door and its arch has five courses of brick voussoirs, which are partly covered by incised ashlar plaster.

Floors

(Fig 70).

Inside the winding engine house there were originally several floor levels: the floor of the cataract pit, a floor at cylinder bed level and two further floor levels above this.

The upper floors of the engine house were removed when the mine closed, leaving two floor levels at the base of the structure; the lower cataract pit and condenser pit floor level and the higher cylinder bed level (although the suspended half of this over the cataract pit has been removed). The cylinder bed-stone remains *in situ* and is constructed from large granite blocks, although there is some displaced stone and earth and damage on the south-east side. Three bolt tunnels remain visible which secured the 30" cylinder. The lower cataract pit and condenser pit floor level now has an earth covering with a granite threshold separating the cataract and condenser pits.

7.4 Interior: boiler house

North-east wall

(Figs 43–51 and 59–65).

The boiler house north-east gable end wall is constructed from granite rubble and contains a large arched opening with three courses of brick voussoirs. Directly below its south-east jamb there is a very small arched opening (presumably for pipework) with two courses of brick voussoirs. Sockets for roof timbers are visible in the upper part of the wall.

North-west wall

This is described above in section 7.2.3 (south-east elevation).

South-east wall

(Figs 43–49).

The south-east wall of the boiler house largely survives although the wall is fragmented at the south-west end. There is a wide arched opening comprising three courses of brick voussoirs at the north-east end of the wall and the remains of a window opening towards the south-west end which is now missing its arch.

South-west wall

(Figs 59–61).

The south-west elevation of the boiler house has collapsed and no longer survives.

Floor

(Fig 59).

The floor inside the boiler house is not visible and is now covered with earth. It is unclear whether the original floor surface survives below.

8 Building description – Pumping house

8.1 General description, functions and layout

The building is now a roofless shell with the majority of interior fittings removed and only the stone walls still standing. The former adjoining boiler house to the south-west was removed before 1946 as evidenced by the RAF aerial photograph of this date (Fig 6).

The engine house, built in 1888, was designed to pump water solely from Pascoe's Shaft, which had been subject to increased flooding from neighbouring mines at that time. It replaced an earlier distant pumping engine which had served both Pascoe's and Marriott's Shafts. Pascoe's Shaft itself lies immediately outside the north-west front of the engine house. However, it is no longer visible, having been capped and landscaped over as part of the c1990 works.

The walls of the engine house are constructed predominately from granite with dressed granite quoins and jambs and brick arched openings, which are bonded with lime mortar. The bob wall is constructed from coursed, dressed granite blocks whilst the wing walls and rear wall contain both coursed granite blocks, which tend to be lower down in the walls, and smaller randomly coursed granite rubble higher up.

The window openings are distinctively tall and narrow with brick arches. These are unusual compared to other engine house window openings in the area and are provided on all floors.

There is a wide arched cylinder door in the rear (south-east) elevation, which enabled the installation of an 80" cylinder. The cylinder bed-stone is preserved, and the positioning of the bolt hole tunnels are visible, which secured the cylinder to the bed-stone.

The positioning of the cataract pit remains. However, the adjoining condenser pit positioning has been removed during works undertaken in c1990 when the shaft was capped. There are now granite steps providing access through the plug door which were inserted as part of the c1990 works.

Outside the rear (south-east) elevation there is a concrete structure (possibly a machine base) adjacent to the cylinder doorway. However, its original function is not understood.

8.2 Exterior

8.2.1 North-east elevation

(Figs 71 and 72 and 116).

The north-east elevation of the pumping engine house is constructed from randomly coursed granite and killas rubble with occasional brick, in the upper part of the elevation and large dressed granite blocks and rubble lower down the wall. The protruding plinth at the base of the wall is mainly constructed from large granite blocks.

There are six tall, narrow window openings over three floors, which have round arches comprising three courses of brick voussoirs (some of which appear to be china clay bricks), with the exception of the top floor window arch which has two courses of brick voussoirs. Some of the window openings have patches of brickwork used in their jambs, which appears to be part of the original construction rather than later repairs.

Just below and to the south-east of the top window opening there is a large main girder slot which has a segmental arch with three brick courses and a timber sill.

Four metal tie rods with circular pattress plates to strengthen the building remain *in situ*, with one towards the rear wall and three adjacent to the bob wall.

8.2.2 North-west elevation

(Figs 81 and 117).

The north-west elevation is the front, bob wall and lie immediately in front of the capped shaft.

The Bob wall and protruding plinth are constructed from large, dressed granite blocks.

There is a large plug door opening, with a round arch comprising five courses of what appear to be china clay brick voussoirs.

The condenser housing and adjoining balance bob plinth have been removed from in front of the plug door, as part of the shaft capping and landscaping work undertaken in the 1990's (Sharpe 1992). The granite steps built against the plinth and leading down into the cataract pit were inserted as part of the 1990s work.

8.2.3 South-east elevation

(Figs 84–86 and 118).

The south-east elevation is the rear gable end of the building and includes the adjoining chimney stack.

There is a large, wide cylinder door at ground floor level to allowed for the installation of the 80" cylinder. This has an arch of brick voussoirs, originally four courses, but at the time of the survey only two courses remained intact with part of a third course.

The chimney stack is constructed predominately of randomly coursed granite blocks of varying sizes, with a brick-built top with moulded drip course and capping. At approximately the same level as the top of the cylinder door arch there is a small socket in the east side of the stack, presumably to support a timber.

There are three long, narrow window openings in the engine house wall on the second and third floors with round arches containing two and three courses on brick voussoirs.

Below the top window opening there are two spring beam slots with brick jambs and granite lintels. The north-eastern slot has been blocked with brickwork.

A concrete base (possibly a machine base) lies outside and just to the east of the cylinder door. Its date and original purpose is uncertain.

8.2.4 South-west elevation

(Figs 97–99 and 119).

The south-west elevation is constructed from randomly coursed granite and killas rubble, with large, coursed dressed granite blocks adjacent to the bob wall and forming the plinth at the base of the wall. The lower half of this elevation was originally an internal wall face inside the boiler house.

At floor level over the cataract pit there is a boiler house door which once led into a porch attached to the north-west elevation of the boiler house as shown on the c1907 OS map (Fig 5). Cement flashing associated with the porch roof remains *in situ* above the door opening. The opening itself has a round brick arch with four courses of brick voussoirs and dressed granite jambs.

At the base of the engine house wall adjacent to the stack is a small, square opening for the steam pipe to feed from the boiler house into the engine house.

Two metal tie rods with circular pattress plates are fixed in the quoin adjacent to the bob wall. These have been used to tie the side walls firmly into the bob wall.

The second and third floor together contain three tall, narrow window openings, with round arches containing two and three courses of brick voussoirs and dressed granite jambs.

To the south-east of the window openings there is a large main girder slot which has a segmental arch with three courses of brick voussoirs and brick and granite jambs.

An arched opening with one course of brick voussoirs below the second floor windows is possibly for a steampipe.

To the south-east of this remains of cement flashing on the wall and continuing across the stack shows the position of the former boiler house roof.

8.3 Interior

North-east wall

(Figs 72–79).

There are joist sockets at first and second floors level and six tall, narrow round arched window openings with brick voussoirs. The main girder opening just below second floor level has a segmental brick arch and a timber sill that had rotted at the time of the survey.

North-west wall

(Figs 81 and 82).

In the north-west, bob wall there two joist sockets at the top of the plinth which formerly supported the floor over the cataract pit, and two joist sockets within the reveals of the plug door at the same height. There are also drill holes in the coping stones at the top of the bob wall for supports for the bob platform.

South-east wall

(Figs 86–95).

In the south-east wall (the rear gable end) at second floor level there are four sockets for two central spring beams and two outer upper floor joists. There are three tall, narrow round arched window openings with brick voussoirs at the first and second floor level. The arch of the cylinder door had missing courses of brick voussoirs at the time of the initial survey (there were originally four).

South-west wall

(Figs 99–106).

To the north-west, the boiler house door, leading out from the former floor over the cataract pit, has a round arch with four courses of brick voussoirs and is missing part of the lower course. There are joist sockets for former floors at first and second floor level. The main girder opening has a modern (c1990) replacement timber lintel and at the time of the survey there was a gorse bush growing on top of the wall. Within the cataract pit, there are two floor joist sockets in the south-west wall.

Floor

(Figs 108–109).

The upper floors of the engine house were removed when the mine closed, leaving two floor levels at the base of the structure; the lower cataract pit level and the higher cylinder bed level (although the suspended floor over the cataract pit has been removed). The condenser pit which once lay just outside the plug door, has been removed and the area leading out from the door now contains granite steps inserted as part of the c1990 work. The cylinder bed-stone is constructed from large granite blocks and six bolt tunnels remain visible, which would have secured an 80" cylinder.

9 Remedial works – Winding house

(See Figs 110–114 for drawings showing locations of repair works).

Some of the reclaimed historic bricks used for the repair works were St Day bricks which came from the interior walls taken down at Redruth Brewery during its conversion to create Kresen Kernow. Others were sourced from out of County including Yorkshire (Gary Beazley, pers. comm.).

9.1 Repair 1

The ivy was partially cleared from the walls of the engine house along with its associated loadings and boiler house. This included the clearance of vegetation surrounding the base of the buildings to provide access.

(see Figs 11 and 14 for before and after repairs).

9.2 Repair 2

The collapsing arch of the window opening in the north-east gable end of the boiler house was rebuilt using lime mortar.

(see Figs 10, 16, 59 and 60 for before and after repairs).

9.3 Repair 3

The north-east bob wall was cleared of ivy and the top of the wall was capped using lime mortar.

(see Figs 10, 19 and 20 for before and after repairs).

9.4 Repair 4

The centre of plug door arch in the north-east bob wall was stitched and faced with lime mortar to repair cracking.

(see Figs 10, 11 and 14 for before and after repairs).

9.5 Repair 5

The arch over the opening into the cataract pit in the north-west wall was rebuilt using four courses of reclaimed bricks on the exterior and three on the interior. The new brickwork was bonded with lime mortar.

(see Figs 21, 23, 24 and 25 for before and after repairs).

9.6 Repair 6

The edges of the original incised plaster on all the internal walls of the engine house were patch repaired with lime mortar to prevent further loss.

(see Figs 24, 26, 38, 39 and 58 for before and after repairs).

9.7 Repair 7

The vegetation covering the chimney and south-east wall of the engine house was trimmed back, with patch repairs undertaken to fill voids in the masonry using stone rubble and lime mortar.

(see Figs 28, 29 and 30–33 for before and after repairs).

9.8 Repair 8

The vegetation covering the south-east wall of the boiler house was trimmed back and patch repairs were undertaken using lime mortar.

(see Figs 34 and 35 for before and after repairs).

9.9 Repair 9

The loadings were cleared of vegetation and patch repaired using lime mortar. The arch of the opening to the condenser pit was reconstructed in three courses of reclaimed brick bonded with lime mortar.

(see Figs 36 and 37 for repairs).

9.10 Repair 10

The top of the south-east wall of the boiler house was capped, and an exposed sill was patched repaired using lime mortar.

(see Figs 43–47 for after repairs).

9.11 Repair 11

A section of the south-east wall of the boiler house was reconstructed using matching stone bonded with lime mortar.

(see Figs 34 and 48–49 for after repairs).

9.12 Repair 12

The vegetation covering the south-west wall of the engine house and chimney stack was removed and patch repairs were undertaken using lime mortar.

(see Figs 50, 51, 56, 57 and 58 for before and after repairs).

9.13 Repair 13

The top of the engine house gable wall contained loose stonework. This was capped using matching stone bedded in lime mortar, and a damaged area at eaves level to the north-west rebuilt.

(see Figs 52–55 for before and after repairs).

9.14 Repair 14

The arch of the flue opening at the base of the chimney stack was repaired and the brickwork bonded with lime mortar.

(see Fig 63 for after repairs).

9.15 Repair 15

The top of the boiler house gable end wall was capped using matching stone bonded with lime mortar.

(see Figs 59–62 for before and after repairs).

Missing masonry on the internal face of the boiler house gable end wall was patch repaired using matching stone bonded with lime mortar

(see Figs 59, 60, 64 and 65 for before and after repairs).

9.16 Repair 16

On the interior of the south-west wall of the engine house repairs were undertaken around edges of surviving plaster using lime mortar and to the upper floor window arch.

(see Figs 56, 57, 66 and 67 for before and after repairs).

9.17 Repair 17

The cylinder bed was partially reconstructed using matching stone bonded with lime mortar.

(see Figs 68–70 for before and after repairs).

10 Remedial works – Pumping house

(See Figs 115–119 for drawings showing locations of repair works).

Some of the reclaimed historic bricks used for the repair works were St Day bricks which came from the interior walls taken down at Redruth Brewery during its conversion to create Kresen Kernow. Others were sourced from out of County including Yorkshire (Gary Beazley, pers. comm.).

10.1 Repair 18

In the north-east wall the timber sill of the main girder opening was rotten. This was removed and replaced using Douglas Fir.

(see Figs 71–72 and 78–79 for before and after repairs).

10.2 Repair 19

In the north-east wall repairs were undertaken to some window arches and jambs where brick and stonework were damaged.

(see Figs 71–74 and 80 for before and after repairs).

10.3 Repair 20

Internally a rotten lintel above floor joist sockets at the cataract pit end of the north-east wall was replaced with a new Douglas Fir lintel. Lost masonry around the joist sockets was replaced with brick and stone bonded with lime mortar.

(see Figs 73–77 for before and after repairs).

10.4 Repair 21

In the south-east wall the arch of the cylinder door was reconstructed with closely matching reclaimed bricks bonded with lime mortar.

(see Figs 84–88 for before and after repairs).

10.5 Repair 22

In the south-east wall the top of the gable was capped with lime mortar and matching stones.

(see Figs 89, 90 and 91 for before and after repairs).

10.6 Repair 23

Internally, an area of missing masonry at the top of the north-east end of the south-east gable wall was rebuilt using matching stonework bonded with lime mortar.

(see Figs 89 and 90 for after repairs).

10.7 Repair 24

In the south-east wall the rotten timber lintels over the spring beam slots were replaced with new Douglas Fir lintels secured with lime mortar.

(see Figs 92 and 93 for after repairs).

10.8 Repair 25

Two sills in the south-east wall were patch repaired with lime mortar.

(see Figs 94 and 95 for after repairs).

10.9 Repair 26

In the south-west wall the rotten timber sill of the main girder opening was replaced with a new Douglas Fir sill.

(see Figs 97, 98, 100 and 101 for before and after repairs).

10.10 Repair 27

In the south-west wall the possible steam pipe opening next to the boiler house door had lost one brick jamb and part of its arch. This has been reconstructed using reclaimed bricks bonded with lime mortar.

(see Figs 97 and 98 for after repairs).

10.11 Repair 28

Close to the base of the chimney stack an area of missing masonry was replaced using matching stone and lime mortar.

(see Figs 97 and 98 for after repairs).

11 References

11.1 Primary sources

Bullen Photographic Archive: Photograph taken 1880-1910.

Ordnance Survey, c1880 (surveyed in 1877). 25 Inch Map First Edition (licensed digital copy at CAU)

Ordnance Survey, c1907. 25 Inch Map Second Edition (licensed digital copy at CAU)

Pascoe's Shaft Pumping and Winding Engine Houses, South Wheal Frances, Piece, Historic Building Record

Ordnance Survey, MasterMap Topography

Tithe Map and Apportionment, c1840. Parish of Illogan (licensed digital copy at CRO)

11.2 Publications

CAU, 1992. *Marriott's Shaft, Basset Mines, Carnkie. Results of an Archaeological Watching Brief during Shaft Capping Operations*. Cornwall Council: Truro.

CIfA, 2014. Standard and guidance for the archaeological investigation and recording of standing buildings or structures, CIfA, Reading.

Cormac Solutions Ltd, 2021. *Pascoe's Shaft inspection report*.

Historic England, 2016. *Understanding Historic Buildings: A guide to good recording practice*. Historic England, Swindon.

Morrison, TA, 1983. *Cornwall's Central Mines: The Southern District, 1810-1895*.

Palmer, M and Neaverson, P, 1987. *The Basset Mines: Their History and Industrial Archaeology*. Northern Mine Research Society

Sharpe, A, 1992. *Marriott's Shaft - Basset Mines, Carnkie - Results of an Archaeological Watching Brief during Shaft Capping operation* CAU report.

Smith, J, 1992. South Wheal Frances Archaeological Assessment. Cornwall Council: Truro.

Trounson, JH and Bullen, JL and, 1999. *Mining in Cornwall: The Central District Vol 1*. Stroud.

11.3 Websites

<http://www.heritagegateway.org.uk/gateway/> Online database of Sites and Monuments Records, and Listed Buildings

www.mapapps.bgs.ac.uk British Geological Map Viewer

www.gracesguide.co.uk/1856_Mines_in_Devon_and_Cornwall

Pascoe's Shaft Pumping and Winding Engine Houses, South Wheal Frances, Piece, Historic Building Record

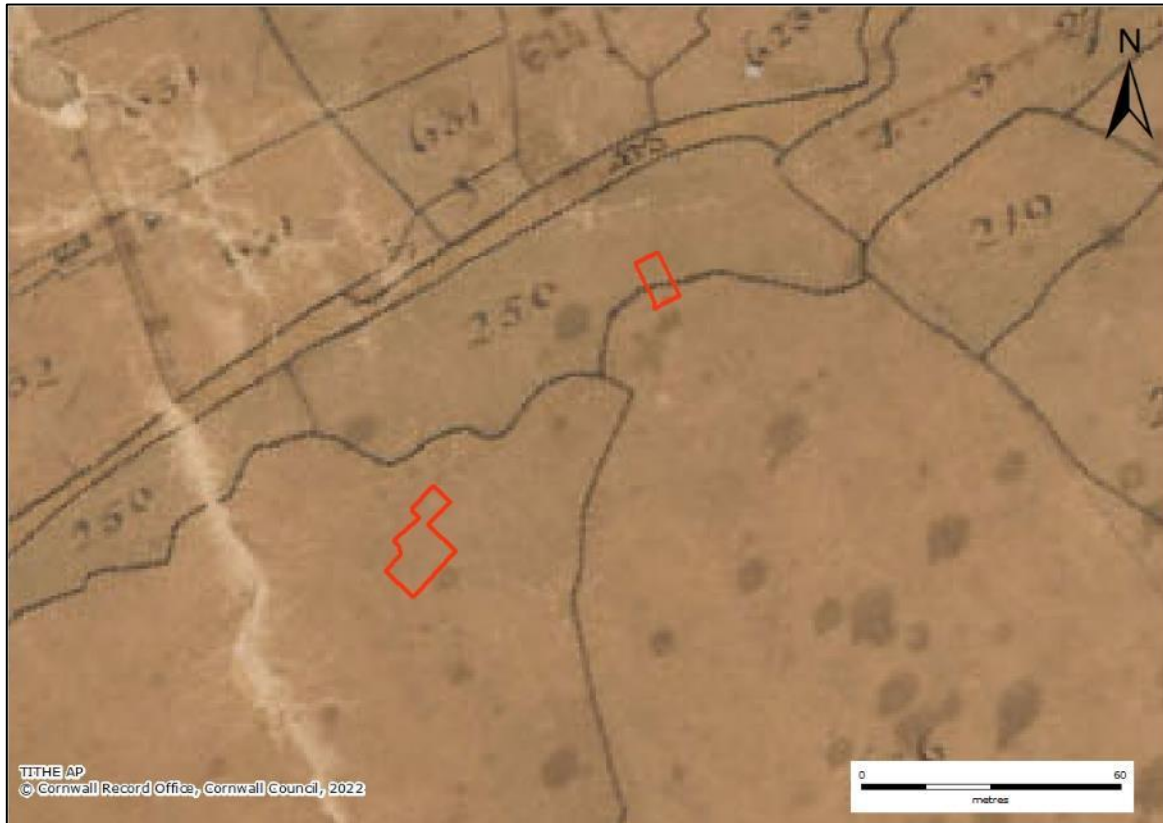


Fig 3 Tithe Map, c1840.

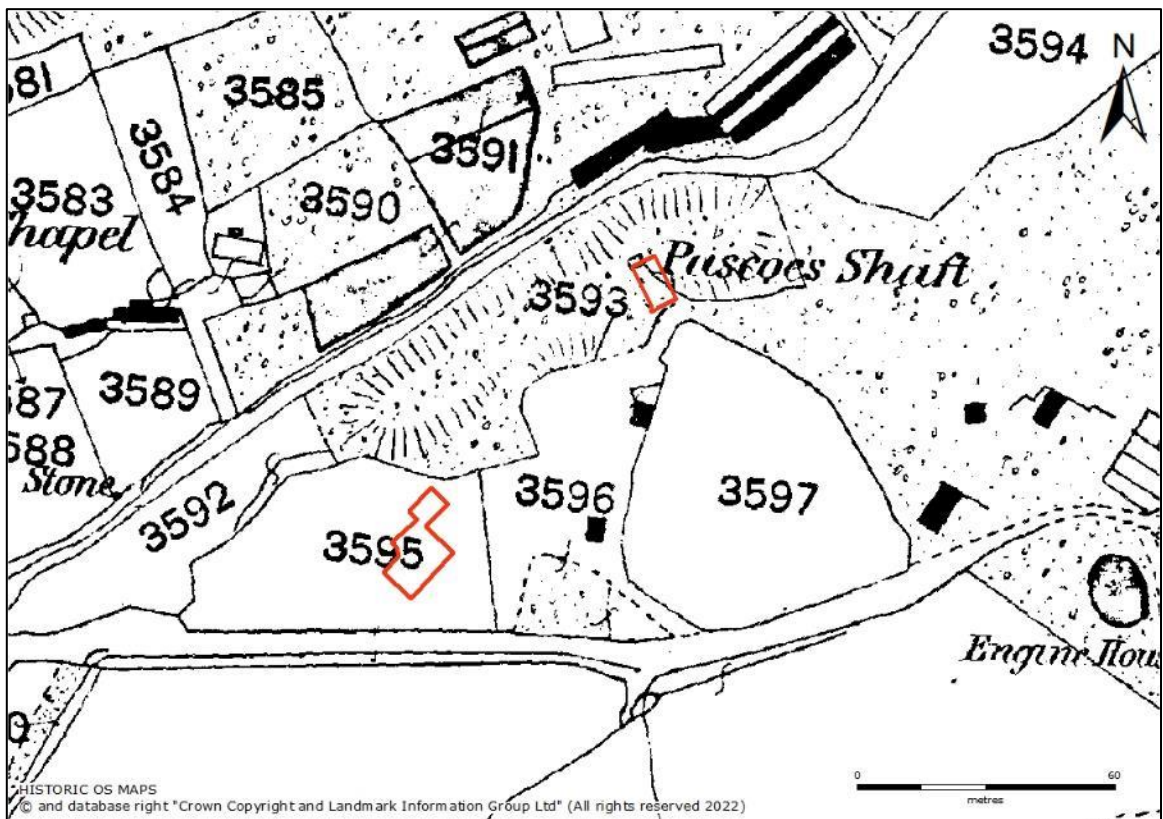


Fig 4 First Edition of the Ordnance Survey 25 Inch Map, c1880.

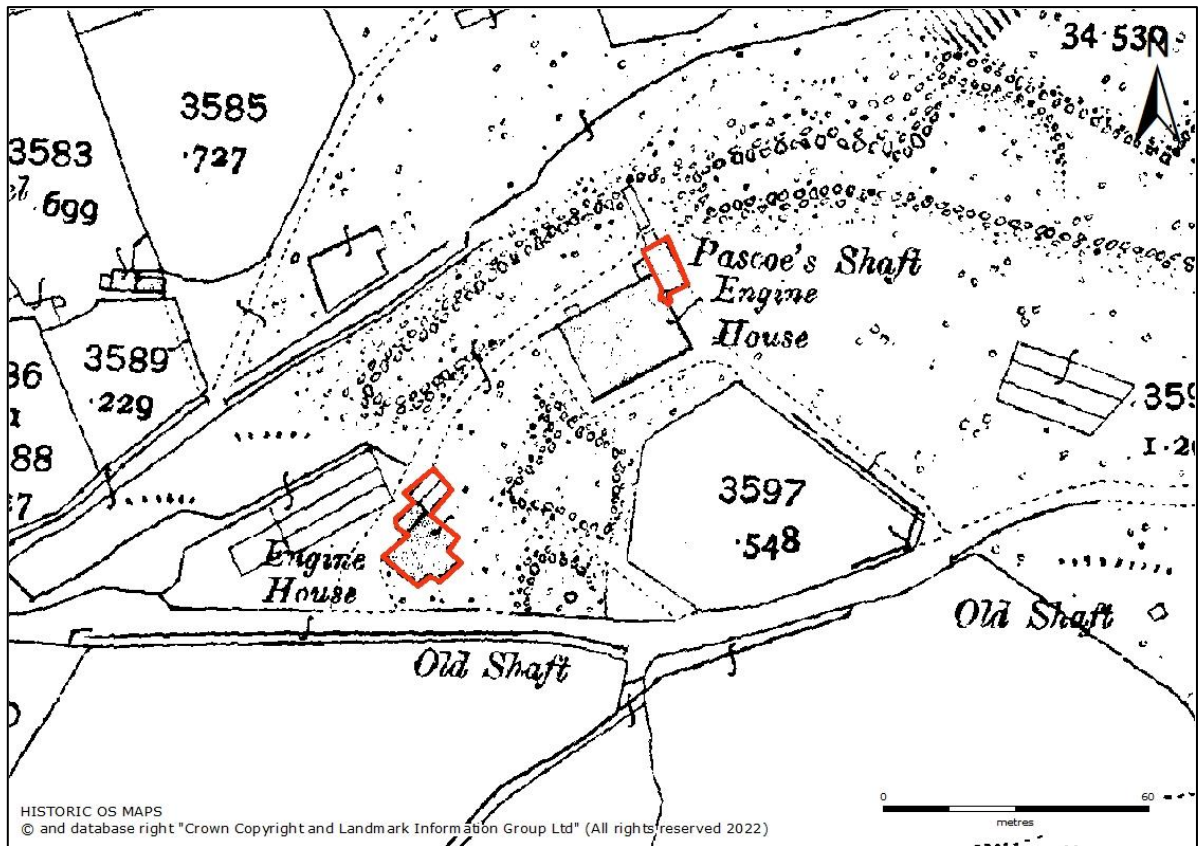


Fig 5 Second Edition of the Ordnance Survey 25 Inch Map, c1907.



Fig 6 RAF aerial photograph taken in 1946 showing the roofless buildings.

Pascoe's Shaft Pumping and Winding Engine Houses, South Wheal Frances, Piece, Historic Building Record



Fig 7 2016 aerial photograph.



Fig 8 Pascoe's winding engine house c1880 photograph (Trounson and Bullen 1999).



Fig 9 Pascoe's winding engine house c1910 photograph (Trounson and Bullen 1999).

12 Winding engine house site photographs



Fig 10 North-east elevation before remedial works.



Fig 11 North-east elevation before remedial works.



Fig 12 North-east elevation of loadings and flywheel slot before remedial works.



Fig 13 View of flywheel slot in loadings before remedial works.



Fig 14 North-east elevation following vegetation clearance and repair work to the boiler house window opening.



Fig 15 North-east elevation following vegetation clearance.



Fig 16 North-east elevation following vegetation clearance and repair work to the arch over the boiler house window opening.

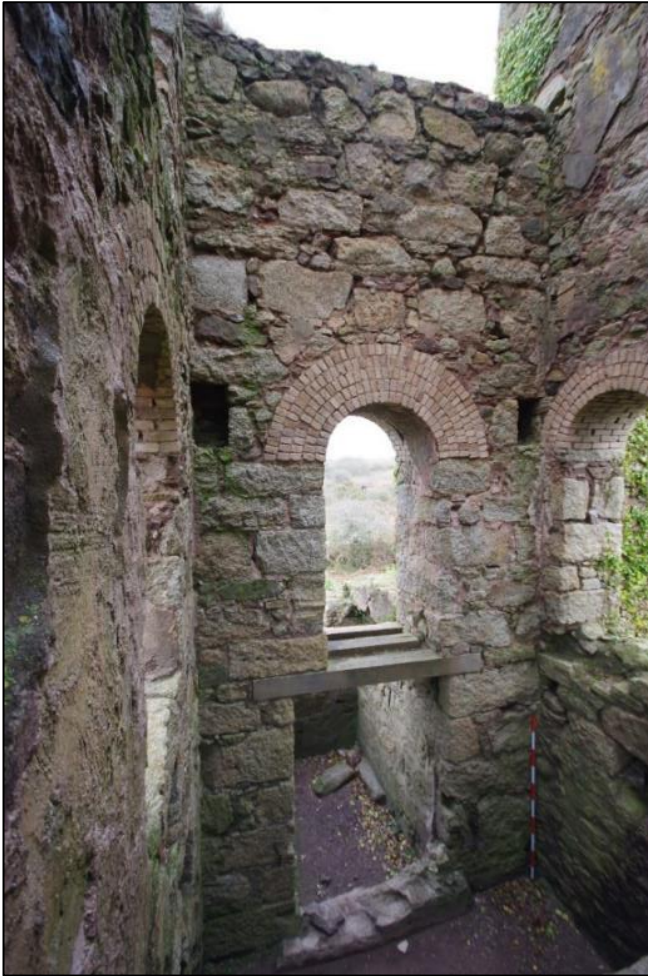


Fig 17 Interior north-east bob wall.



Fig 18 Interior looking north-east into condenser pit before remedial works.



Fig 19 Top of bob wall before remedial works.



Fig 20 Top of bob wall following lime mortar capping.

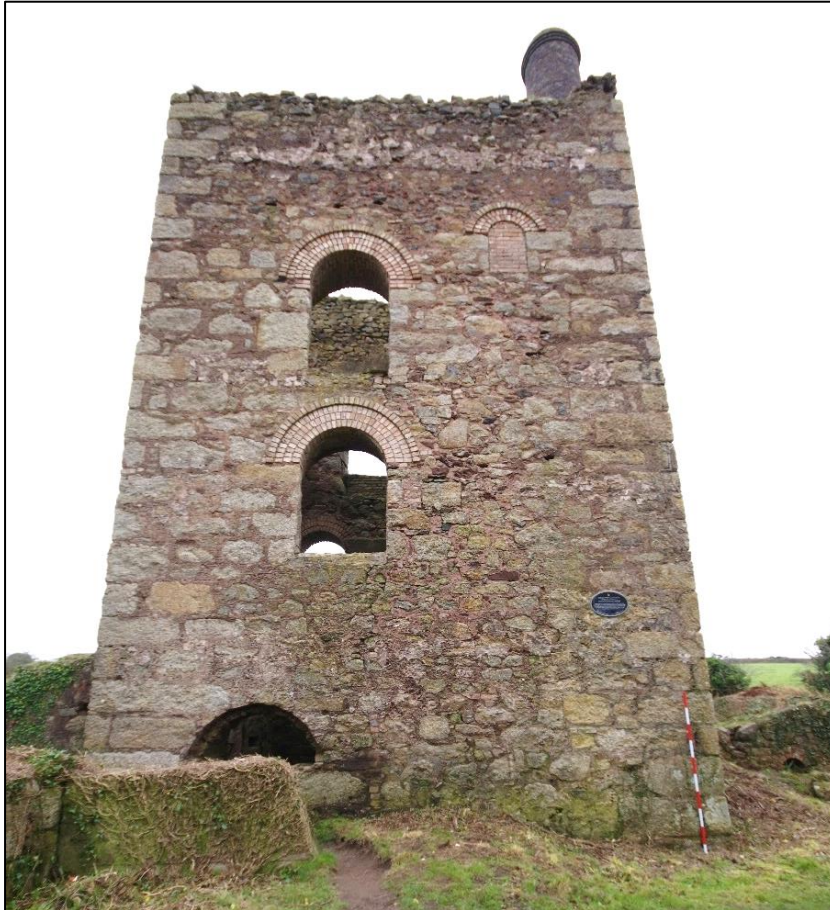


Fig 21 North-west elevation of engine house before remedial works.



Fig 22 North-west elevation of remains of boiler house wall before remedial works.



Fig 23 North-west elevation of engine house: arch leading to cataract pit following repair work.



Fig 24 Interior north-west wall before remedial works.



Fig 25 Interior north-west cataract pit wall following reconstruction of brick arch.



Fig 26 Interior north-west wall following small patch repair around edges of incised plaster.



Fig 27 North-west wall of condenser pit.



Fig 28 South-east elevation of engine house before remedial works.



Fig 29 South-east elevation of engine house following patch repairs and some ivy clearance.



Fig 30 South-east elevation following patch repairs.



Fig 31 South-east elevation following patch repairs.



Fig 32 South-east elevation following patch repairs.



Fig 33 South-east elevation following patch repairs to chimney stack.



Fig 34 South-east elevation of the boiler house before remedial works.



Fig 35 South-east elevation of the boiler house following patch repairs and some ivy clearance.



Fig 36 South-east elevation of the loadings following patch repairs and some ivy clearance.



Fig 37 South-east elevation of the loadings: repaired arch of the condenser pit opening.



Fig 38 Interior south-east wall before remedial works.



Fig 39 Interior south-east wall following patch repairs.



Fig 40 Interior south-east wall following patch repairs.



Fig 41 Interior south-east wall of the condenser pit before remedial works.



Fig 42 Interior south-east wall of the condenser pit showing repaired arch over opening.



Fig 43 South-east wall of the boiler house following lime mortar capping.



Fig 44 South-east wall of the boiler house following lime mortar capping.



Fig 45 South-east wall of the boiler house following lime mortar capping.



Fig 46 South-east wall of the boiler house following patch repair to window sill.



Fig 47 Interior south-east wall of the boiler house following patch repair.



Fig 48 Interior south-east wall of the boiler house following patch repair.



Fig 49 Interior south-east wall of the boiler house following patch repairs.



Fig 50 South-west elevation of the engine house before remedial works.



Fig 51 South-west elevation of the engine house following ivy clearance, patch repairs and capping of gable ends.



Fig 52 Interior south-west engine house wall before remedial works.



Fig 53 Interior south-west engine house wall following patch repairs and gable end capping.



Fig 54 South-west engine house wall following gable end capping.



Fig 55 South-west gable end wall of engine house following patch repair.



Fig 56 Interior south-west engine house wall following patch repairs.



Fig 57 Interior south-west engine house wall following patch repair to arch.



Fig 58 Interior south-west wall following small patch repair to incised plaster.



Fig 59 Interior south-west wall of boiler house before remedial works.



Fig 60 Interior south-west wall of boiler house following patch repairs.



Fig 61 Interior south-west wall of boiler house following repairs to gable end.

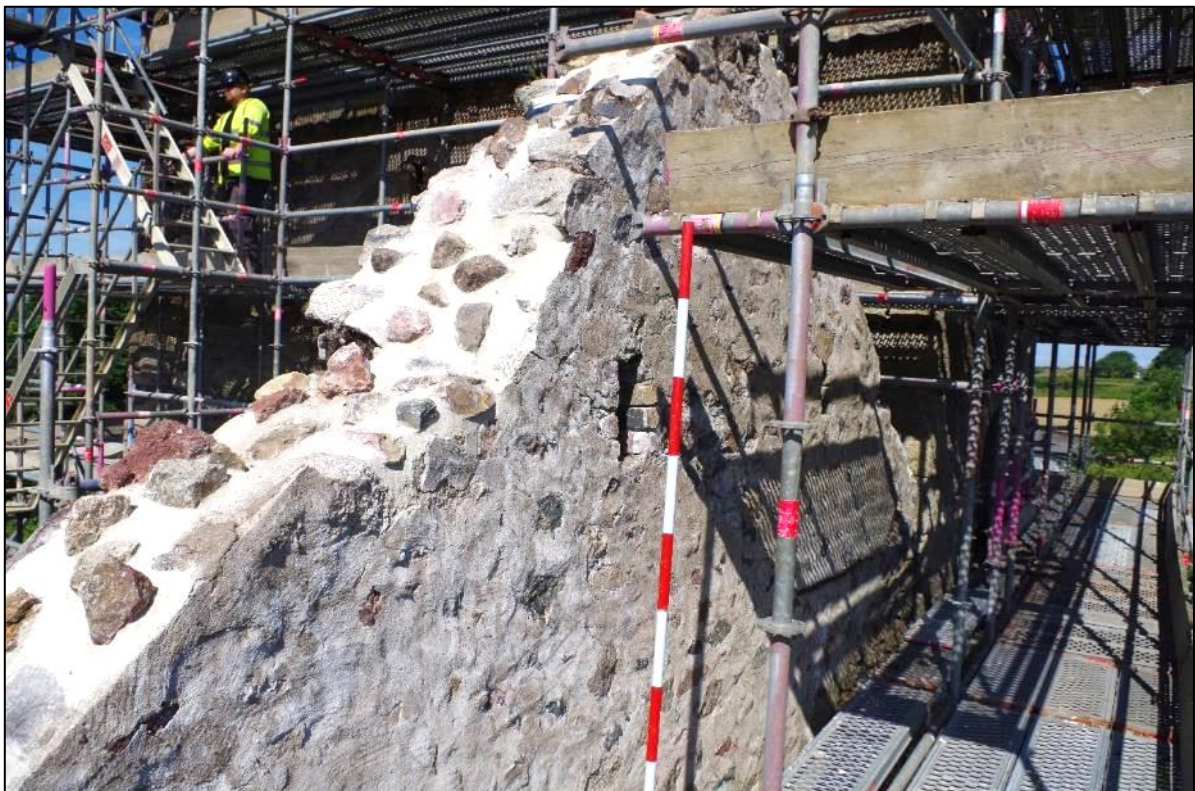


Fig 62 South-west external boiler house gable end following capping.



Fig 63 Repairs to the arch of the boiler flue opening at the base of the chimney stack.



Fig 64 Interior south-west wall of boiler house following patch repairs to wall and arch.



Fig 65 Interior south-west wall of boiler house following patch repairs.



Fig 66 Interior south-west wall of engine house before remedial works.



Fig 67 Interior south-west wall of engine house following small patch repairs to incised plaster.

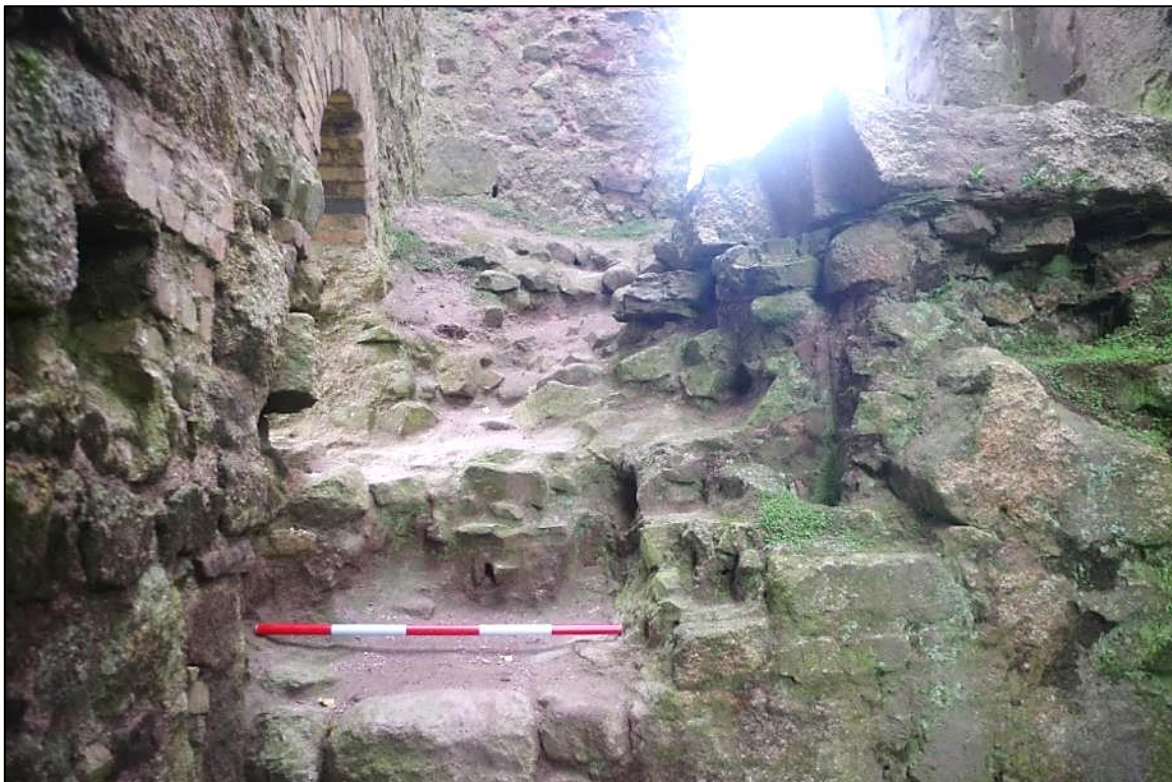


Fig 68 Interior cylinder bed before remedial works showing exposed vertical bolt tunnel for the cylinder.



Fig 69 Interior cylinder bed following remedial works.



Fig 70 Top of Cylinder bed before repair works showing bolt tunnels.

13 Pumping engine house site photographs



Fig 71 North-east elevation before remedial works.



Fig 72 North-east elevation following the installation of a new lintel and repairs to window arches and jambs.



Fig 73 Interior north-east wall before remedial works.



Fig 74 Interior north-east wall from the cataract pit before remedial works.



Fig 75 Interior north-east wall jost sockets and lintel before remedial works.



Fig 76 Interior north-east wall, jost sockets and lintel following remedial works.



Fig 77 Interior north-east wall following remedial works.



Fig 78 Interior north-east wall, repairs to main girder slot sill.



Fig 79 Exterior north-east elevation, repairs to main girder slot sill.



Fig 80 Exterior north-east elevation, repairs to window arch.



Fig 81 North-west elevation, bob wall.



Fig 82 Interior north-west bob wall.



Fig 83 Interior north-west bob wall.

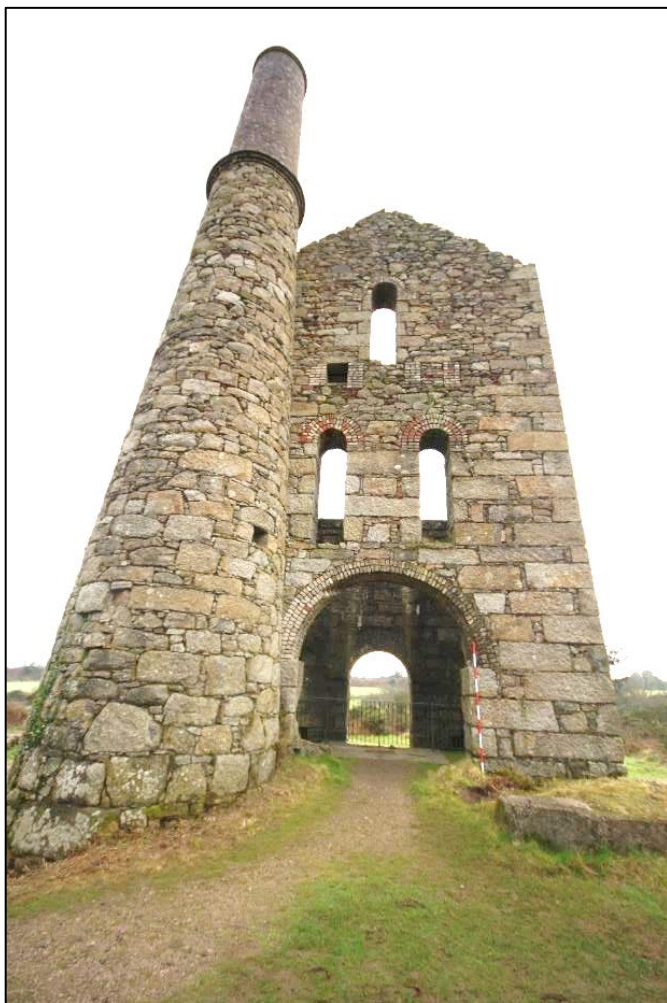


Fig 84 South-east elevation before remedial works.



Fig 85 South-east elevation following repairs to cylinder arch, small patch repairs and capping of the top of the gable.



Fig 86 South-east elevation following reconstruction of the lower course of cylinder arch.



Fig 87 Interior south-east wall and cylinder arch before remedial works.



Fig 88 Interior south-east cylinder arch following repairs.



Fig 89 Interior south-east gable end before remedial works.



Fig 90 Interior south-east gable wall following patch repair and capping.



Fig 91 Interior south-east gable wall following capping.



Fig 92 Interior south-east gable wall following replacement of lintel above spring beam slots.



Fig 93 Interior south-east gable wall following replacement of lintel above spring beam slots.



Fig 94 Interior south-east gable wall following small patch repair to window sill.



Fig 95 Interior south-east gable wall following small patch repair to window sill.



Fig 96 South-east wall of cataract pit (cylinder bed).

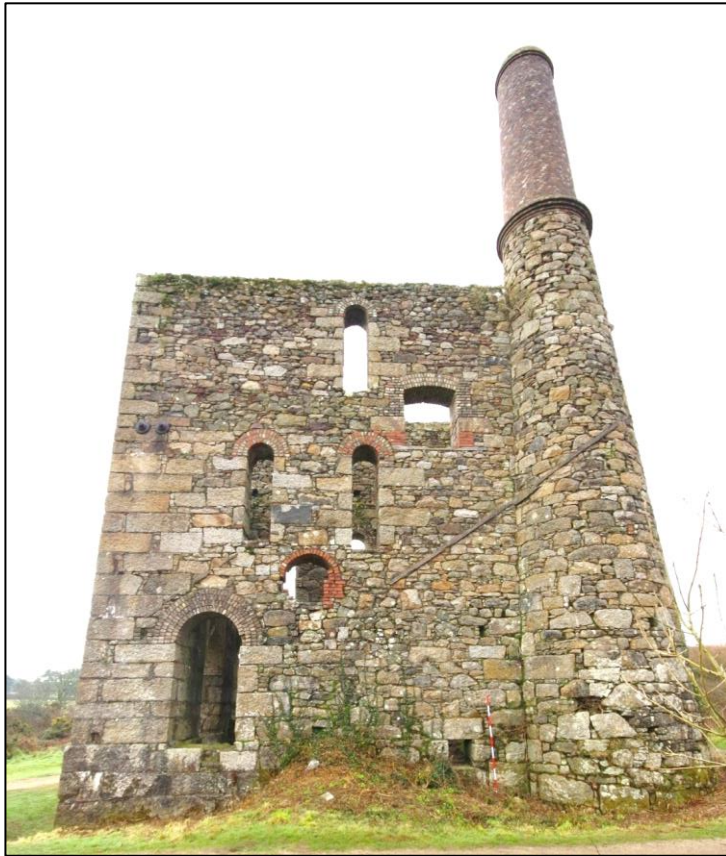


Fig 97 South-west elevation before remedial works.



Fig 98 South-west elevation following remedial works.



Fig 99 Small patch repair to chimney stack.



Fig 100 Interior south-west wall before remedial works.



Fig 101 Interior south-west wall, replacement sill of main girder slot opening.



Fig 102 Interior south-west wall, repair to joist socket.



Fig 103 Interior south-west wall, reconstruction of arch.



Fig 104 Interior south-west wall, small patch repair to window sill.



Fig 105 Interior south-west wall, small patch repair to window sill.



Fig 106 South-west elevation, view of arch reconstruction.



Fig 107 South-west elevation, replacement sill of main girder slot.



Fig 108 Steps leading in to cataract pit inserted in the 1990s.



Fig 109 Cylinder bed with 1990s metal safety railings.

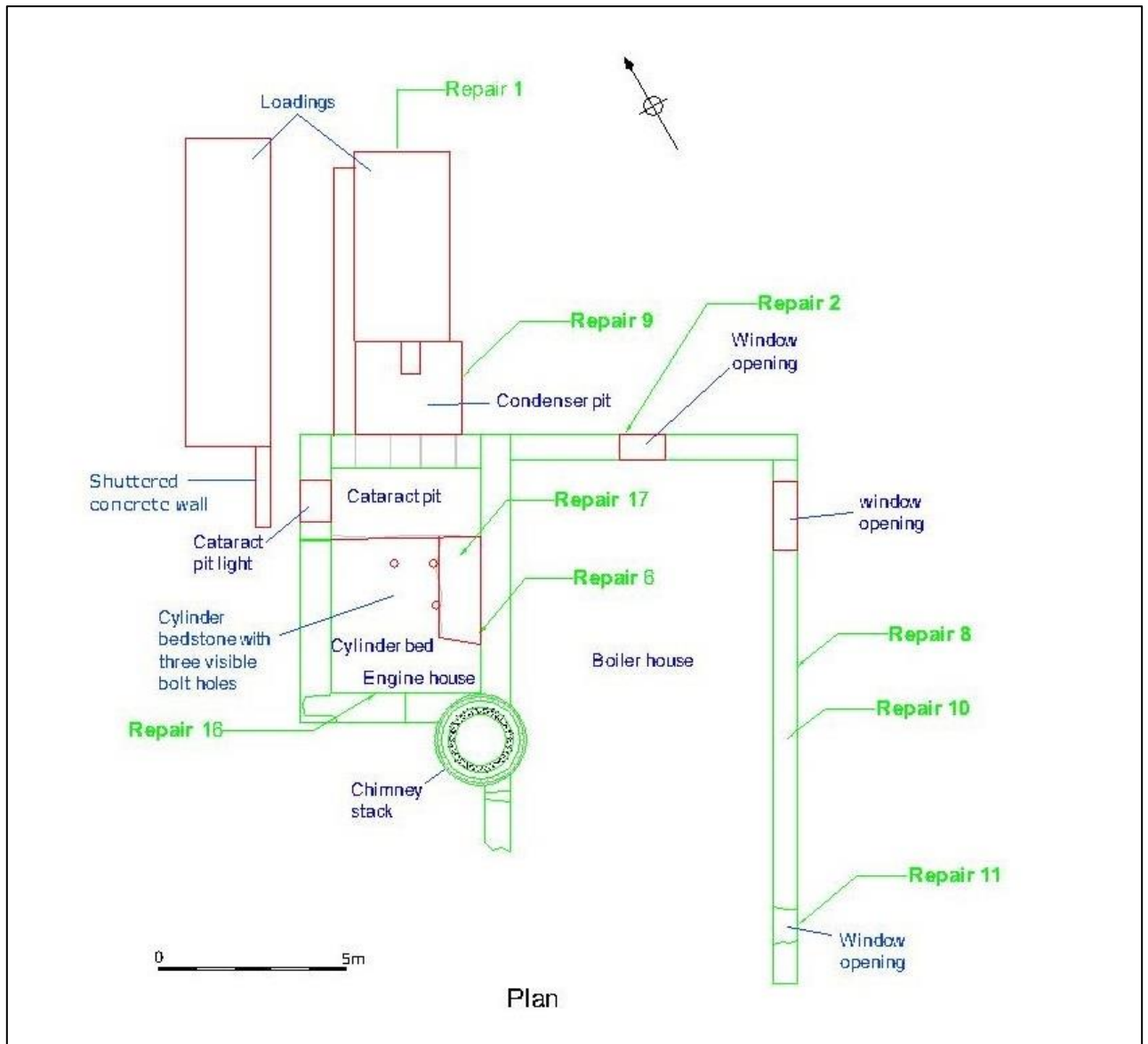


Fig 110 Winding engine house plan.

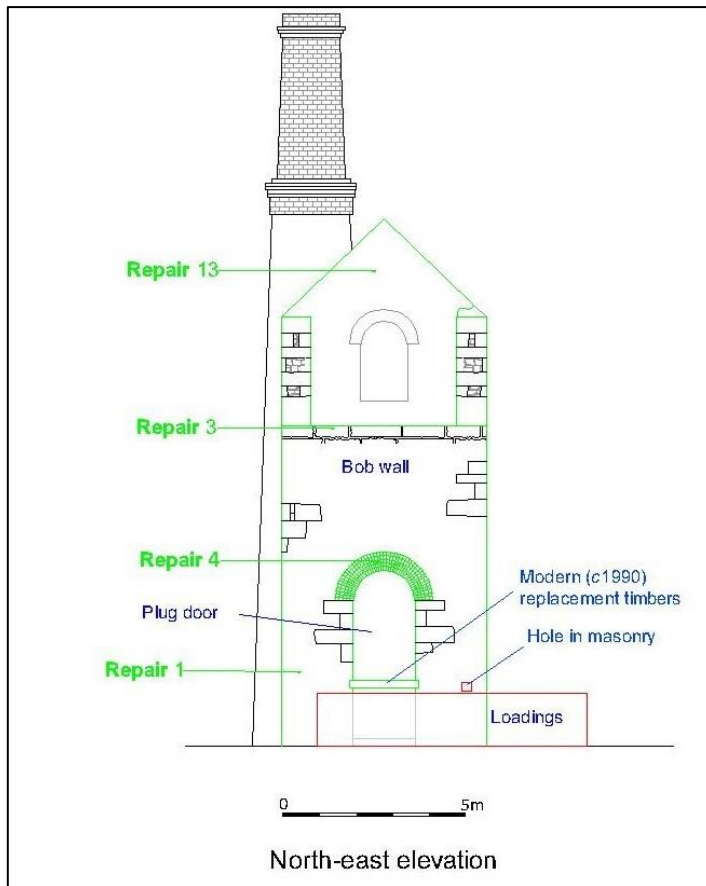


Fig 111 Winding engine north-east elevation.

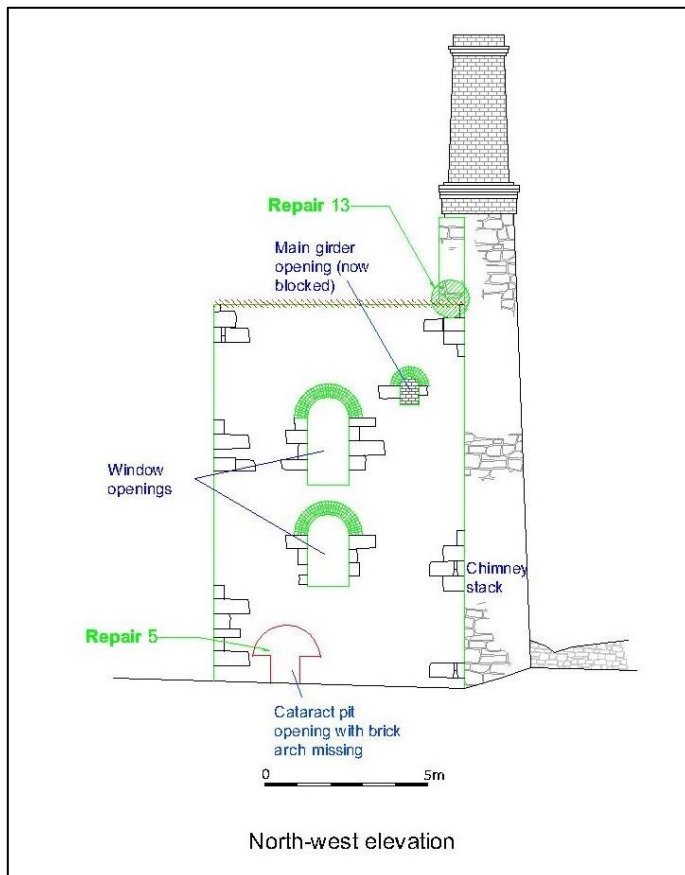


Fig 112 Winding engine north-west elevation.

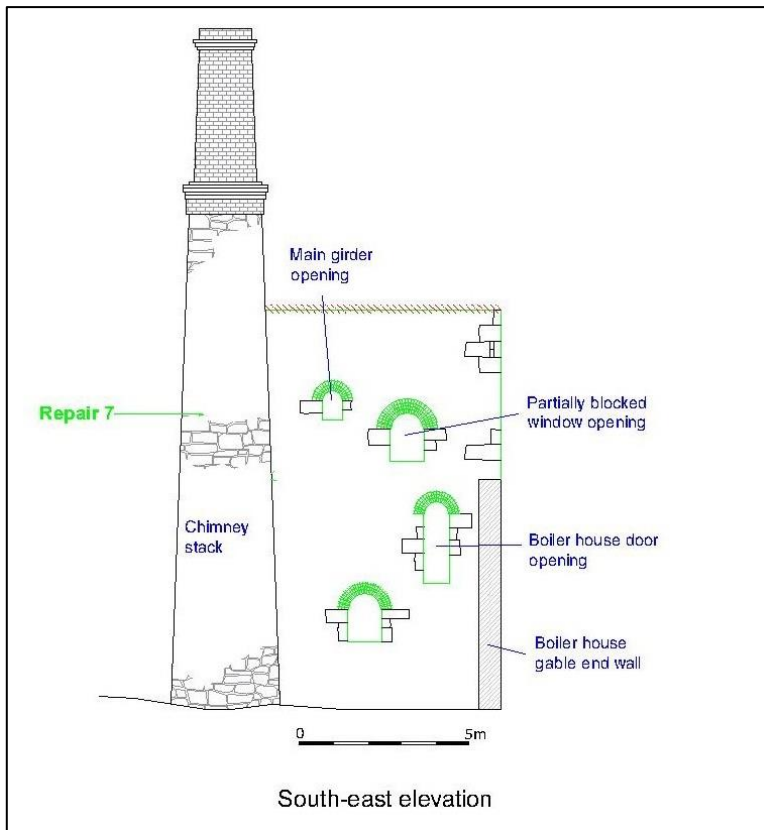


Fig 113 Winding engine south-east elevation.

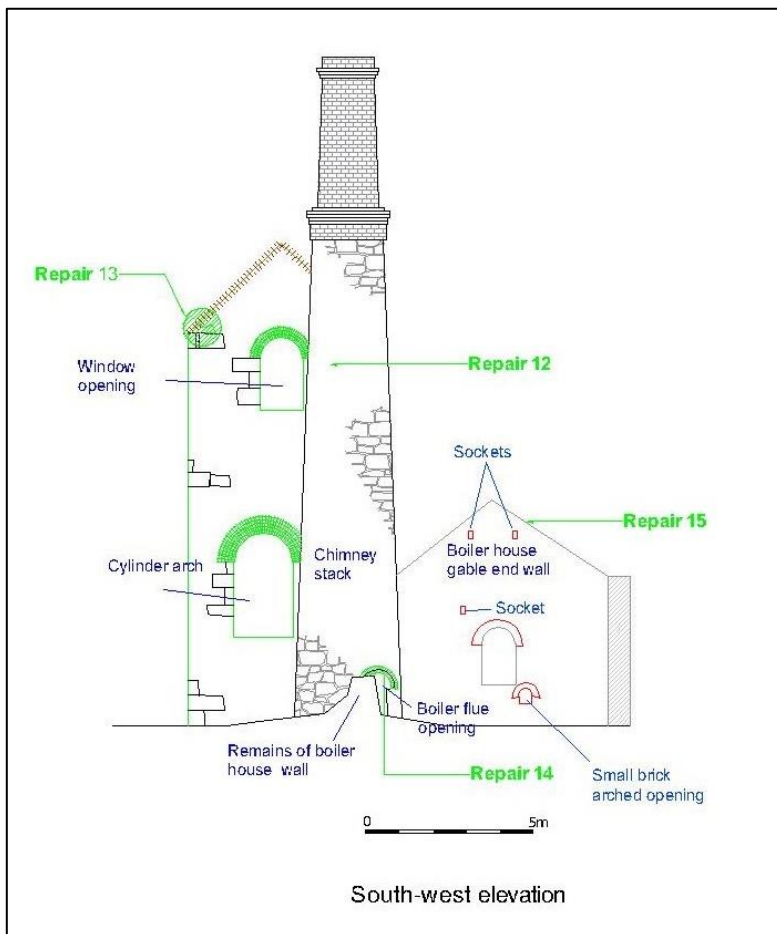


Fig 114 Winding engine south-west elevation.

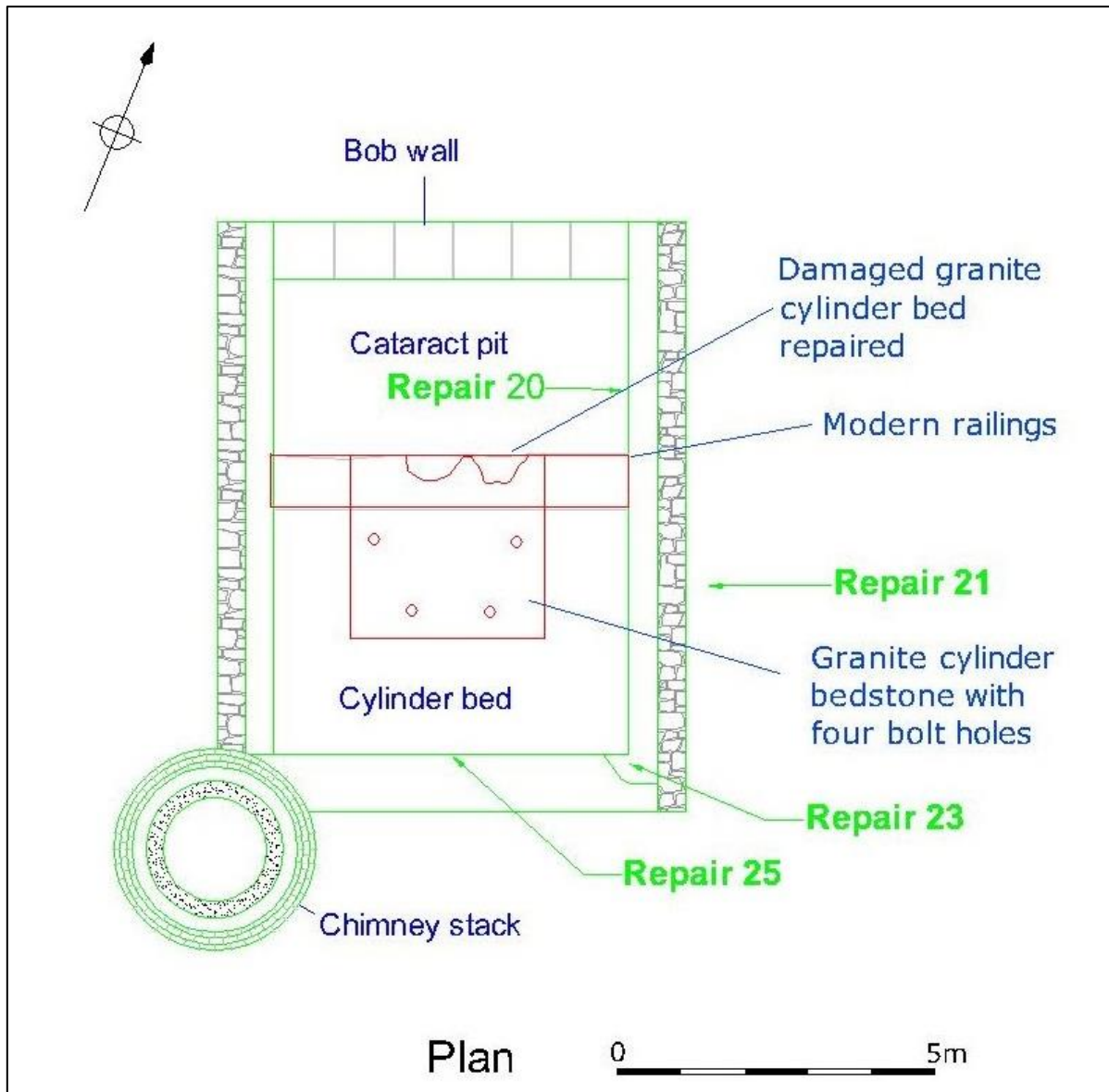


Fig 115 Pumping engine house plan.

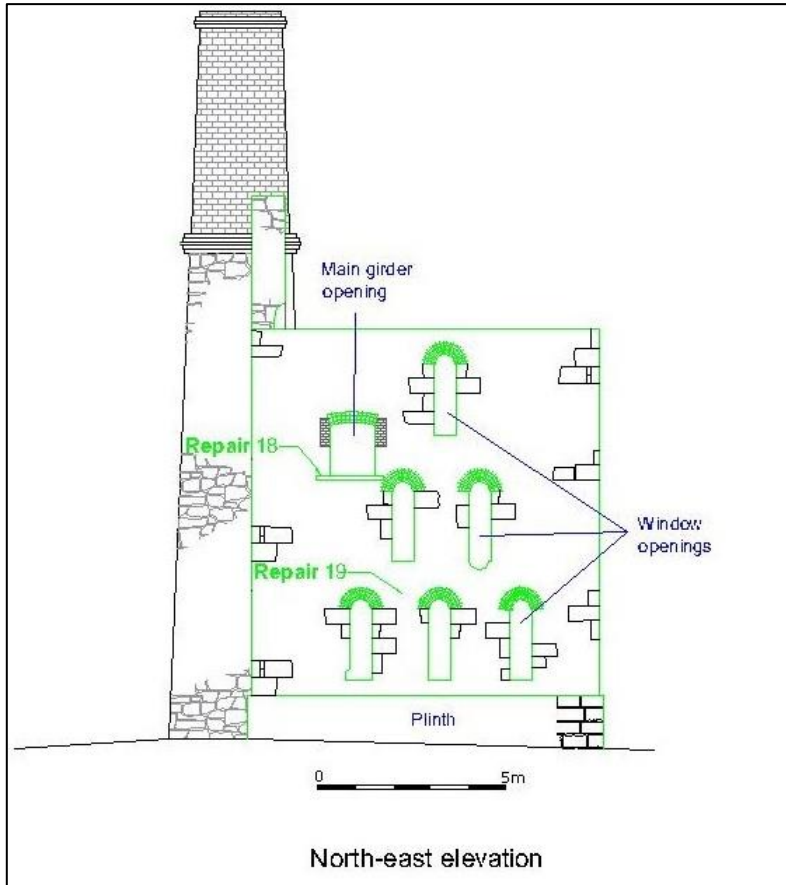


Fig 116 Pumping engine house north-east elevation.

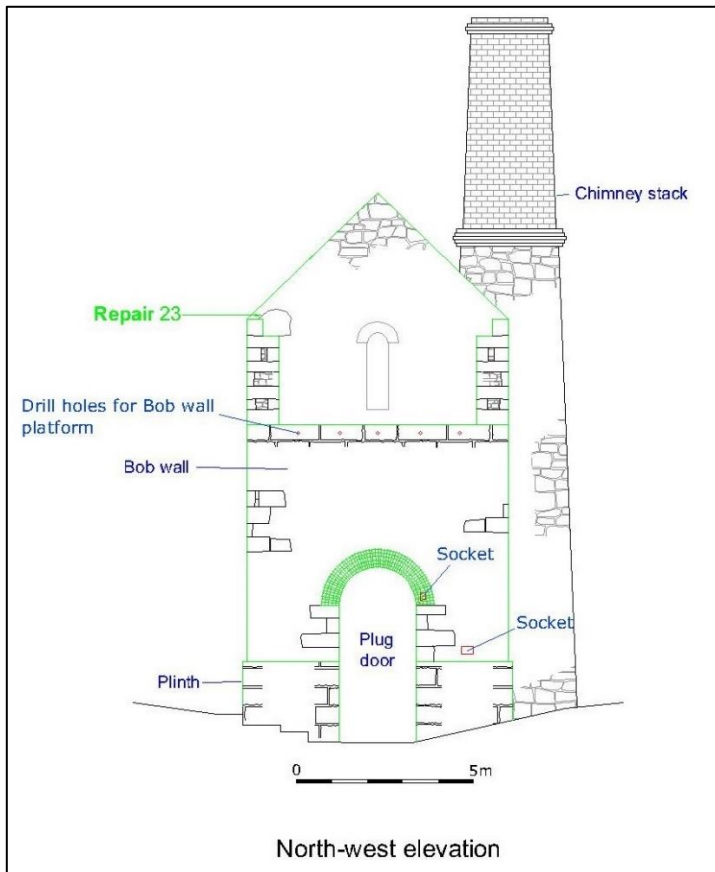


Fig 117 Pumping engine house north-west elevation.

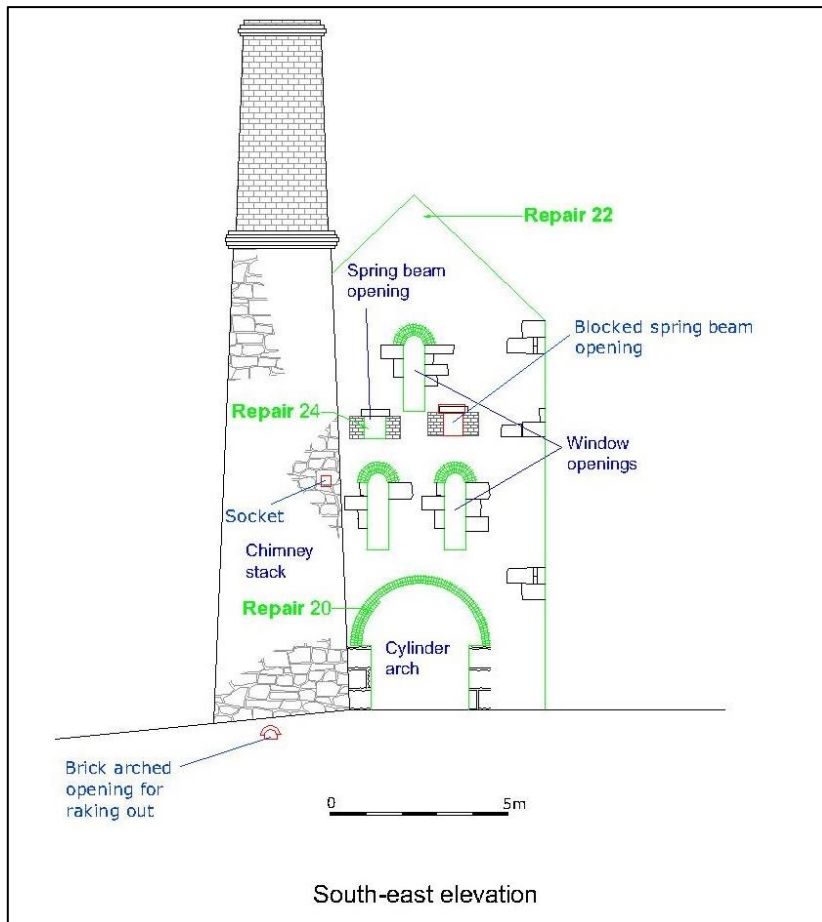


Fig 118 Pumping engine house south-east elevation.

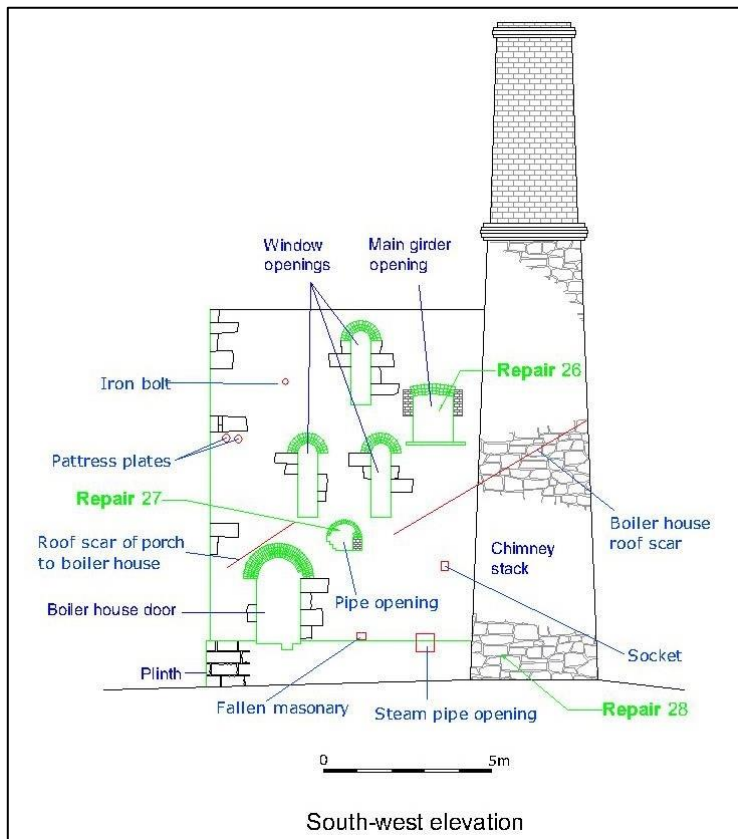


Fig 119 Pumping engine house south-west elevation.

14 Appendix 1: Photographic archive

(Held by the Archaeology Data Service - ADS)

A 1m scale was used in all photographs wherever possible.

Filename	Figure No in Report	Caption	Subject Keyword 1	Copyright Holder Organisation	Creation Date (dd/mm/yyyy)
1.JPG	10	North-east elevation before remedial works.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
2.JPG	11	North-east elevation before remedial works.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
3.JPG	12	North-east elevation of loadings and wheel pit before remedial works.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
4.JPG	13	View of wheel pit in loadings before remedial works.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
5.JPG	14	North-east elevation following vegetation clearance and repair work to the boiler house arch.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
6.JPG	15	North-east elevation following vegetation clearance.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
7.JPG	16	North-east elevation following vegetation clearance and repair work to the boiler house arch.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
8.JPG	17	Interior north-east wall.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
9.JPG	18	Interior looking north-east into condenser pit before remedial works.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
10.JPG	19	Top of bob wall before remedial works.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22

Pascoe's Shaft Pumping and Winding Engine Houses, South Wheal Frances, Piece, Historic Building Record

11.JPG	20	Top of bob wall following lime mortal capping.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
12.JPG	21	North-west elevation of engine house before remedial works.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
13.JPG	22	Fig 22 North-west elevation of remains of boiler house wall before remedial works.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
14.JPG	23	North-west elevation of engine house: arch leading to cataract pit following repair work.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
15.JPG	24	Interior north-west wall before remedial works.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
16.JPG	25	Fig 25 Interior north-west cataract pit wall following reconstruction of brick arch.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
17.JPG	26	Interior north-west wall following small patch repair around edges of incised plaster.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
18.JPG	27	North-west wall of condenser pit.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
19.JPG	28	South-east elevation of engine house before remedial works.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
20.JPG	29	South-east elevation of engine house following patch repairs and some ivy clearance.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
21.JPG	30	South-east elevation following patch repairs.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
22.JPG	31	South-east elevation following patch repairs.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22

Pascoe's Shaft Pumping and Winding Engine Houses, South Wheal Frances, Piece, Historic Building Record

				Council	22
23.JPG	32	South-east elevation following patch repairs.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
24.JPG	33	South-east elevation following patch repairs to chimney stack.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
25.JPG	34	South-east elevation of the boiler house before remedial works.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
26.JPG	35	South-east elevation of the boiler house following patch repairs and some ivy clearance.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
27.JPG	36	Fig 36 South-east elevation of the loadings following patch repairs and some ivy clearance.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
28.JPG	37	South-east elevation of the loadings: repaired arch of the condenser pit opening.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
29.JPG	38	Interior south-east wall before remedial works.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
30.JPG	39	Interior south-east wall following patch repairs.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
31.JPG	40	Interior south-east wall following patch repairs.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
32.JPG	41	Interior south-east wall of the condenser pit before remedial works.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
33.JPG	42	Interior south-east wall of the condenser pit showing repaired arch over opening.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
34.JPG	43	South-east wall of the boiler house following lime mortar capping.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22

Pascoe's Shaft Pumping and Winding Engine Houses, South Wheal Frances, Piece, Historic Building Record

35.JPG	44	South-east wall of the boiler house following lime mortar capping.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
36.JPG	45	South-east wall of the boiler house following lime mortar capping.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
37.JPG	46	South-east wall of the boiler house following patch repair to window sill.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
38.JPG	47	Interior south-east wall of the boiler house following patch repair.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
39.JPG	48	Interior south-east wall of the boiler house following patch repair.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
40.JPG	49	Interior south-east wall of the boiler house following patch repairs.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
41.JPG	50	South-west elevation of the engine house before remedial works.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
42.JPG	51	South-west elevation of the engine house following ivy clearance, patch repairs and capping of gable ends.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
43.JPG	52	Interior south-west engine house wall before remedial works.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
44.JPG	53	Interior south-west engine house wall following patch repairs and gable end capping.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
45.JPG	54	South-west engine house wall following gable end capping.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
46.JPG	55	South-west gable end wall of engine house following patch repair.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22

Pascoe's Shaft Pumping and Winding Engine Houses, South Wheal Frances, Piece, Historic Building Record

47.JPG	56	Interior south-west engine house wall following patch repairs.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
48.JPG	57	Interior south-west engine house wall following patch repair to arch.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
49.JPG	58	Interior south-west wall following small patch repair to incised plaster.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
50.JPG	59	Interior south-west wall of boiler house before remedial works.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
51.JPG	60	Interior south-west wall of boiler house following patch repairs.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
52.JPG	61	Interior south-west wall of boiler house following repairs to gable end.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
53.JPG	62	South-west external boiler house gable end following capping.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
54.JPG	63	Repairs to the arch of the boiler flue opening at the base of the chimney stack.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
55.JPG	64	Interior south-west wall of boiler house following patch repairs to wall and arch.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
56.JPG	65	Interior south-west wall of boiler house following patch repairs.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
57.JPG	66	Interior south-west wall of engine house before remedial works.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
58.JPG	67	Interior south-west wall of engine house following small patch repairs to incised plaster.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22

Pascoe's Shaft Pumping and Winding Engine Houses, South Wheal Frances, Piece, Historic Building Record

59.JPG	68	Interior cylinder bed before remedial works showing exposed vertical bolt tunnel for the cylinder.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
60.JPG	69	Interior cylinder bed following remedial works.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
61.JPG	70	Top of Cylinder bed showing bolt tunnels.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
62.JPG	71	North-east elevation before remedial works.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
63.JPG	72	North-east elevation following the installation of a new lintel and repairs to window arches and jambs.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
64.JPG	73	Interior north-east wall before remedial works.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
65.JPG	74	Interior north-east wall from the cataract pit before remedial works.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
66.JPG	75	Interior north-east wall joist sockets and lintel before remedial works.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
67.JPG	76	Interior north-east wall, joist sockets and lintel following remedial works.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
68.JPG	77	Interior north-east wall following remedial works.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
69.JPG	78	Interior north-east wall, repairs to main girder slot sill.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
70.JPG	79	Exterior north-east elevation, repairs to main girder slot sill.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22

Pascoe's Shaft Pumping and Winding Engine Houses, South Wheal Frances, Piece, Historic Building Record

71.JPG	80	Exterior north-east elevation, repairs to window arch.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
72.JPG	81	North-west elevation, bob wall.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
73.JPG	82	Interior north-west bob wall.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
74.JPG	83	Interior north-west bob wall.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
75.JPG	84	South-east elevation before remedial works.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
76.JPG	85	South-east elevation following repairs to cylinder arch, small patch repairs and capping of the top of the gable.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
77.JPG	86	South-east elevation following reconstruction of the lower course of cylinder arch.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
78.JPG	87	Interior south-east wall and cylinder arch before remedial works.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
79.JPG	88	Interior south-east cylinder arch following repairs.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
80.JPG	89	Interior south-east gable end before remedial works.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
81.JPG	90	Interior south-east gable wall following patch repair and capping.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
82.JPG	91	Interior south-east gable wall following capping.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22

Pascoe's Shaft Pumping and Winding Engine Houses, South Wheal Frances, Piece, Historic Building Record

83.JPG	92	Interior south-east gable wall following replacement of lintel above spring beam slots.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
84.JPG	93	Interior south-east gable wall following replacement of lintel above spring beam slots.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
85.JPG	94	Interior south-east gable wall following small patch repair to window sill.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
86.JPG	95	Interior south-east gable wall following small patch repair to window sill.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
87.JPG	96	South-east wall of cataract pit (cylinder bed).	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
88.JPG	97	South-west elevation before remedial works.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
89.JPG	98	South-west elevation following remedial works.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
90.JPG	99	Small patch repair to chimney stack.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
91.JPG	100	Interior south-west wall before remedial works.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
92.JPG	101	Interior south-west wall, replacement sill of main girder slot opening.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
93.JPG	102	Interior south-west wall, repair to joist socket.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
94.JPG	103	Interior south-west wall, reconstruction of arch.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22

Pascoe's Shaft Pumping and Winding Engine Houses, South Wheal Frances, Piece, Historic Building Record

95.JPG	104	Interior south-west wall, small patch repair to window sill.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
96.JPG	105	Interior south-west wall, small patch repair to window sill.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
97.JPG	106	South-west elevation, view of arch reconstruction.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
98.JPG	107	South-west elevation, replacement sill of main girder slot.	Exterior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
99.JPG	108	Steps leading in to cataract pit inserted in the 1990s.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22
100.JPG	109	Cylinder bed with 1990s metal safety railings.	Interior	Cornwall Archaeological Unit, Cornwall Council	02/01/22 - 04/07/22

15 Appendix 2: Written Scheme of Investigation

Pumping and Winding Engine Houses at Pascoe's Shaft, South Wheal Frances, Written Scheme of Investigation for historic building recording

Client: Cormac Solutions Ltd
Client Contact: Mark Ward
Planning ref: PA21/01867/PREAPP

Project background and site history

The winding and pumping engine houses at Pascoe's shaft are part of South Wheal Frances mine. They are located to the south east of Pool and Camborne, immediately north east of Treskillard, and approximately 350m south of Piece. The pumping engine house is located at NGR: SW 67755 39299 and the winding engine house at NGR: SW 67812 39357 (Figs 1 and 2). Both engine houses are late 19th century Grade II Listed Buildings (Pumping house: List Entry Number: 1328181 and winding house: List Entry Number: 1142598). They also lie within the Camborne and Redruth Mining District of the World Heritage Site for Cornwall and West Devon mining and within an Area of Great Landscape Value (AGLV).

Listed Building Consent is now being sort by Cornwall Council for repair works to both buildings as part of a wider heritage programme to repair and stabilise a number of mine buildings and structures.

Based on the proposals currently available, the Senior Development Officer (Historic Environment) Cornwall Council has requested that a rapid historic building record (level 2/3) should be made of the buildings in order to record historic fabric prior to any alterations. He has also requested that a record of the affected areas is also made following the completion of the repair works.

Cornwall Archaeological Unit have now been commissioned to carry out the historic building record.

Pascoe's Shaft Pumping and Winding Engine Houses, South Wheal Frances, Piece, Historic Building Record



Figure 1: site location (circled in red).

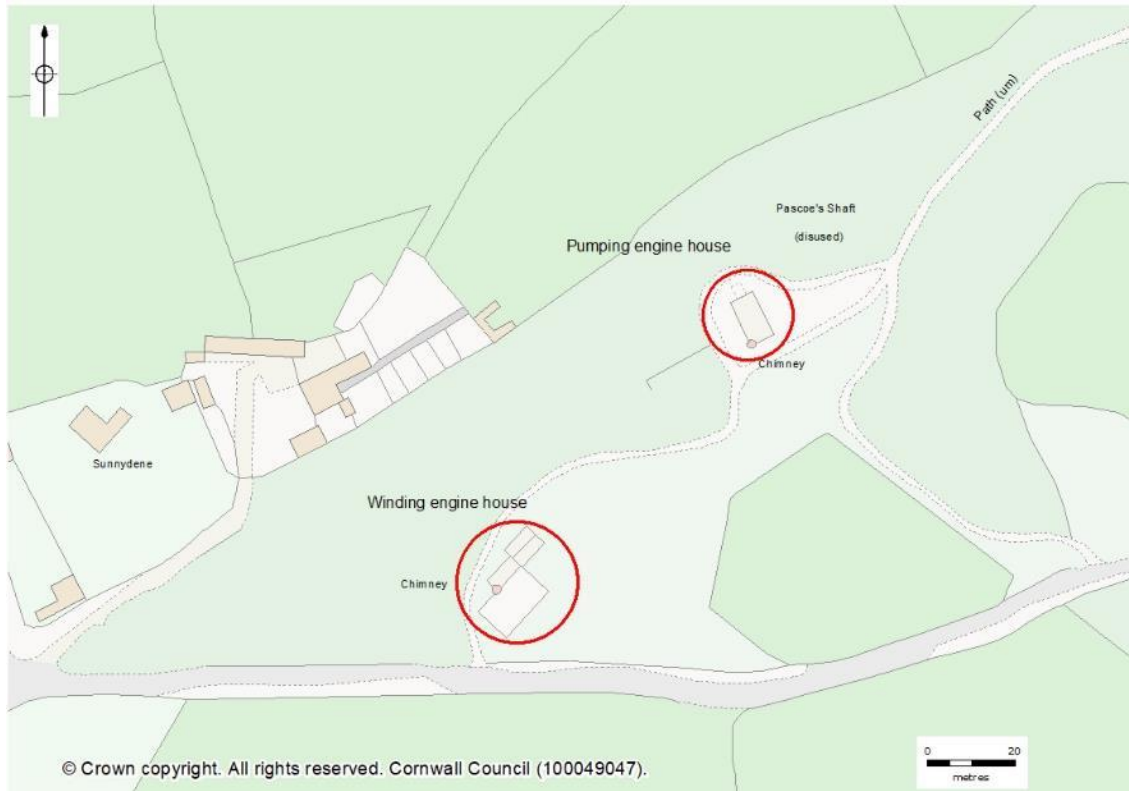


Figure 2: Location of engine houses (circled in red).

Project extent

A historic building record will be made of the both the pumping and winding engine houses and their immediate surroundings where relevant to the historic structures (see Fig 2).

Aims and objectives

The principal aim of the study is to create a rapid record of both buildings before and after repair works.

The objectives are to:

- Produce a record of the buildings along with their fabric, fixtures and fittings (Level 2 or 3 as appropriate and as defined by Historic England 2016).
- Create a basic phased historic development for the buildings (if found to be complex, recommendations for further work will be made).
- Outline any features and fittings which are of high significance.
- Record all areas subject to repairs before and after they have been completed.

Working methods

All recording work will be undertaken according to the Chartered Institute for Archaeologists (CIfA) guidance (CIfA 2014; 2017). Staff will follow the CIfA *Code of Conduct* (2014a). The Chartered Institute for Archaeologists is the professional body for archaeologists working in the UK.

Archive research

This stage of the project will involve a minimal rapid search for information from existing archives and records and other accessible and relevant primary and secondary documentary and map sources.

Archives to be consulted for documentary sources, including maps and pictorial material, will be limited to those that are directly relevant and readily available.

Copies of maps from each historic period will be used where available and copyright permits to show the evolution of the buildings.

Fieldwork: Historic Building record

A rapid historic building record (equivalent to a Historic England level 2/3 survey) will be undertaken.

- Floor plans and elevations of the building already exist and therefore do not need to be produced as part of this work. Measured detail will be added to the drawings along with annotations to provide details of both historic development and fabric.
- Colour photographs of all exterior elevations and interior room spaces along with architectural details and areas of the proposed and finished repairs will be taken with a digital camera (at a resolution of 8 million pixels or higher). Black and white photographs will also be taken to form part of the archive. Photographs will include a metric scale bar, except where Health and Safety considerations make this impractical.
- Brief descriptions of the exterior and interior will be made in note form and by annotation of plans to record their fabric and construction, phased development through time and architectural details. The interiors will be described room by room.
- Areas undergoing repairs/consolidation will be the main focus of the survey and will be recorded both before and after the repairs have taken place.

Creation of the physical and digital archive

The results from the fieldwork will be collated as an archive.

This will involve the following.

- All records (drawings, photographs, etc) will be ordered, catalogued and stored in an appropriate manner (according to CAU guidelines).

- Colour digital images taken as part of the site archive will be deposited with the Archaeology Data Service (ADS).
- Measured, annotated drawings will be created.
- Completion of the Historic England/ADS OASIS online archive index.
- All correspondence relating to the project, the WSI, and a single paper copy of the report, stored in an archive standard (acid-free) documentation box.
- Additional digital data (survey, external reports, etc)

Archive deposition

An index to the site archive will be created and the archive contents prepared for long term storage, in accordance with CAU standards.

- The project archive will be deposited initially at ReStore PLC, Liskeard and in due course deposited with a suitable archive repository.
- Digital data (CAU reports, external reports, survey data, geophysics data, digital photographs, etc) will be stored on the Cornwall Council network which is regularly and frequently backed up.

CAU uses the following file formats for stored digital data:

- DOCX Word processed documents
- XLSX Spreadsheets
- PDF Exports of completed documents/reports/graphics
- JPG Site graphics and scanned information
- DNG or TIF Digital photographs
- DWG AutoCAD drawings, measured surveys
- MXD ArcView GIS (electronic mapping) data
- AI Adobe Illustrator graphics

Reporting

The results from the project will be drawn together and presented in a report. The scope of the report will be dependent on the scale and significance of the results from the project.

The report will include the following elements:

- Summary
- Project background
- Aims and objectives
- Methodology
- Location and setting
- Designations
- Brief site history
- Brief phased historic development
- Building description and results
- References
- Project archive index
- Supporting illustrations: location map, historic maps, annotated plans and elevations, photographs

Timetable

The study is anticipated to commence during December 2021 CAU will require at least 2 weeks' notice before commencement of work, in order to allocate field staff and arrange other logistics.

The archive report will be completed within 4 months of the end of the fieldwork. The deposition of the archive will be completed within 3 months of the completion of the archive report.

Monitoring and Signing Off Condition

Monitoring of the project will be carried out by the Senior Development Officer (Historic Environment) (SDOHE). Where the SDOHE is satisfied with the archive report and the deposition of the archive, written discharge of the planning/Listed Building condition will be expected.

- The SDOHE will monitor the work and should be kept regularly informed of progress.
- Notification of the start of work shall be given to the SDOHE.
- Any variations to the WSI will be agreed with the SDOHE, in writing, prior to them being carried out.
- If significant detail is discovered, all works must cease, and a meeting convened with the client and the SDOHE to discuss the most appropriate way forward.

Monitoring points during the study will include:

- Approval of the WSI
- Completion of fieldwork
- Completion of archive report
- Deposition of the archive

References

CIfA, 2014. *Standard and guidance for the archaeological investigation and recording of standing buildings or structures*, CIfA, Reading

CIfA, 2014a. *Code of Conduct*, CIfA, Reading

CIfA, 2017. *Standard and guidance for historic environment desk-based assessment*, CIfA, Reading

Historic England 2015. *Guidance note on Digital Image Capture and File Storage*. Historic England, Swindon

Historic England 2016. *Understanding Historic Buildings: A guide to good recording practice*. Historic England, Swindon

<https://www.cornwall.gov.uk/environment-and-planning/planning/online-planning-register/> Online Planning Register – Cornwall Council

Ordnance Survey. *Mastermap Digital Mapping*

Cornwall Archaeological Unit

Cornwall Archaeological Unit is part of Cornwall Council. CAU employs 11 project staff with a broad range of expertise, undertaking around 120 projects each year.

CAU is committed to conserving and enhancing the distinctiveness of the historic environment and heritage of Cornwall and the Isles of Scilly by providing clients with a number of services including:

- Conservation works to sites and monuments
- Conservation surveys and management plans
- Historic landscape characterisation
- Town surveys for conservation and regeneration
- Historic building surveys and analysis
- Heritage Impact Assessments/Heritage Statements
- Maritime and coastal zone assessments
- Air photo mapping

- Excavations and watching briefs
- Assessments and evaluations
- Post-excavation analysis and publication
- Outreach: exhibitions, publication, presentations

Standards



CAU is a Registered Organisation with the Chartered Institute for Archaeologists and follows their Standards and Code of Conduct.

<http://www.archaeologists.net/codes/ifa>

Terms and conditions

Contract

CAU is part of Cornwall Council. If accepted, the contract for this work will be between the client and Cornwall Council.

The views and recommendations expressed will be those of CAU and will be presented in good faith on the basis of professional judgement and on information currently available.

Project staff

The project will be managed by Jo Sturgess who will:

- Discuss and agree the objectives and programme of each stage of the project with the client, the SDOHE and other field officers, including arrangements for health and safety.
- Monitor progress and results for each stage.
- Liaise with the client, the SDOHE regarding related issues.

Work will be carried out by CAU field staff. All staff will follow CAU's Health and Safety Policy and work in accordance with a site-specific risk assessment.

The project team is expected to include:

Jo Sturgess BA (Hons), MCIfA

Senior Archaeologist at CAU with a wide range of experience in recording historic buildings, landscapes, excavation, post-excavation and characterisation. Past historic building works have included Lanhydrock House (Cornwall), Port Eliot (Cornwall), Arlington Court (Devon), Bradley Manor (Devon), Buckland Abbey (Devon), Cutmadoc Farmhouse (Cornwall), the Piggery and Cider House at Godolphin (Cornwall), Poltesco Mill House (Cornwall), Molenick Farmhouse (Tideford), City Wharf (Truro), Harvey's Foundry (Hayle), Boswednack Serpentine works; Porthmeor farm; Bartle's Foundry (Pool), Manor Tannery (Grampond) Duchy Palace (Lostwithiel) and variety of mine buildings, farm buildings and industrial buildings. Other projects include Devon Extensive Urban Survey, Gwithian's past excavations, Lemon Quay excavation, Goonhilly Earth Station survey, Lower Boscawell and Trevesa in West Penwith landscape surveys. Expertise includes use of Total Station, CAD software and GIS. Holder of a CSCS card and qualified first aider.

Antony Angove, BSc (Hons), MA, ACIfA

Assistant Archaeologist at CAU who joined the team in February 2019 after completing his degree. He has experience in undertaking heritage impact assessments, measured

surveys, watching briefs, evaluations, excavations and building surveys as a sole worker or member of team.

Proficient archaeological investigation skills, site supervisory experience, driver of 4x4 vehicles, GIS, Leica GPS /GNSS, Total Station and CAT Scan user. Holder of a CSCS card.

Report distribution

A digital copy of the report will be sent to the client. A paper copy can be supplied on request.

Once verified by Cornwall HER, a digital copy of the report will also be publicly available online via the Archaeology Data Service (ADS) Library.

Copyright

Copyright of this Written Scheme of Investigation will be reserved to Cornwall Archaeological Unit, Cornwall Council. It may only be used/reproduced with permission from Cornwall Archaeological Unit.

Existing copyrights of external sources will be acknowledged where required.

Freedom of Information Act

As Cornwall Council is a public authority it is subject to the terms of the Freedom of Information Act 2000, which came into effect from 1st January 2005.

CAU will ensure that all information arising from the project shall be held in strict confidence to the extent permitted under the Act. However, the Act permits information to be released under a public right of access (a "Request"). If such a Request is received CAU may need to disclose any information it holds, unless it is excluded from disclosure under the Act.

Health and safety statement

CAU follows Cornwall Council's *Statement of Safety Policy*.

Prior to carrying out on-site work CAU will carry out a site-specific Risk Assessment tailored to follow Covid-19 restrictions if applicable.

Insurance

CAU is covered by Cornwall Council's Public and Employers Liability Insurance, with a policy value of £50m. The Council also has Professional Negligence insurance with a policy value of £10m.

Jo Sturgess

Senior Archaeologist

19/11/2021

Cornwall Archaeological Unit

Cornwall Council

Circuit House,

St Clement Street,

Truro, Cornwall. TR1 1DT

Tel: 07968 892162

Email: Jo.Sturgess@cau.org.uk

Cornwall Archaeological Unit

Pydar House, Pydar Street, Truro, Cornwall, TR1
1XUFal-Building, County Hall, Treyew Road,
Truro, Cornwall
TR1 3AY



(01872) 323603

enquiries@cau.org.uk

www.cau.org.uk

