

TREGARGUS VALLEY, ST STEPHEN

Repair work to two bridges



Cornwall Archaeological Unit

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Richard Cole BA

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CORNWALL ARCHAEOLOGICAL UNIT

A service of the Historic Environment Section, Planning Transportation and Estates,

Cornwall County Council

Kennall Building, Old County Hall, Station Road, Truro, Cornwall, TR1 3AY

tel (01872) 323603 fax (01872) 323811 E-mail cau@cornwall.gov.uk

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Much of the background information in this report is taken from the 2002 archaeological and historical assessment written by Richard Cole and edited by John Smith.

Within Cornwall Archaeological Unit, the report was commented on by Ann Preston Jones.

Cover illustration

The bridge to the rear of Big Wheel Mill prior to the repair works.

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Abbreviations

CAU	Cornwall Archaeological Unit
EH	English Heritage
NGR	National Grid Reference
PRN	Primary Record Number in Cornwall HER
HER	Cornwall and the Isles of Scilly Historic Environment Record
SM	Scheduled Monument

1 Summary

The Tregargus Valley is situated to the north of St Stephen-in-Brannel in mid-Cornwall. China stone was quarried and milled in the valley from c. 1870 until 1965. The valley contained seven china stone mills, of which five survive.

The Tregargus Trust leases the valley from Goonvean Ltd and IMERYS and is carrying forward proposals to manage and conserve the valley for public access and recreation. An archaeological and historical assessment of the valley was carried out by CAU in 2001 (see Cole 2002) and a wide-ranging set of recommendations presented to the Trust. This included various conservation works to the extant structures.

Urgent conservation works had to be carried out on two historic bridges and this report details the repair and reconstruction work.

The repair works were carried out to a very high standard and provide an important benchmark for further works which may be carried out on structures throughout the valley.

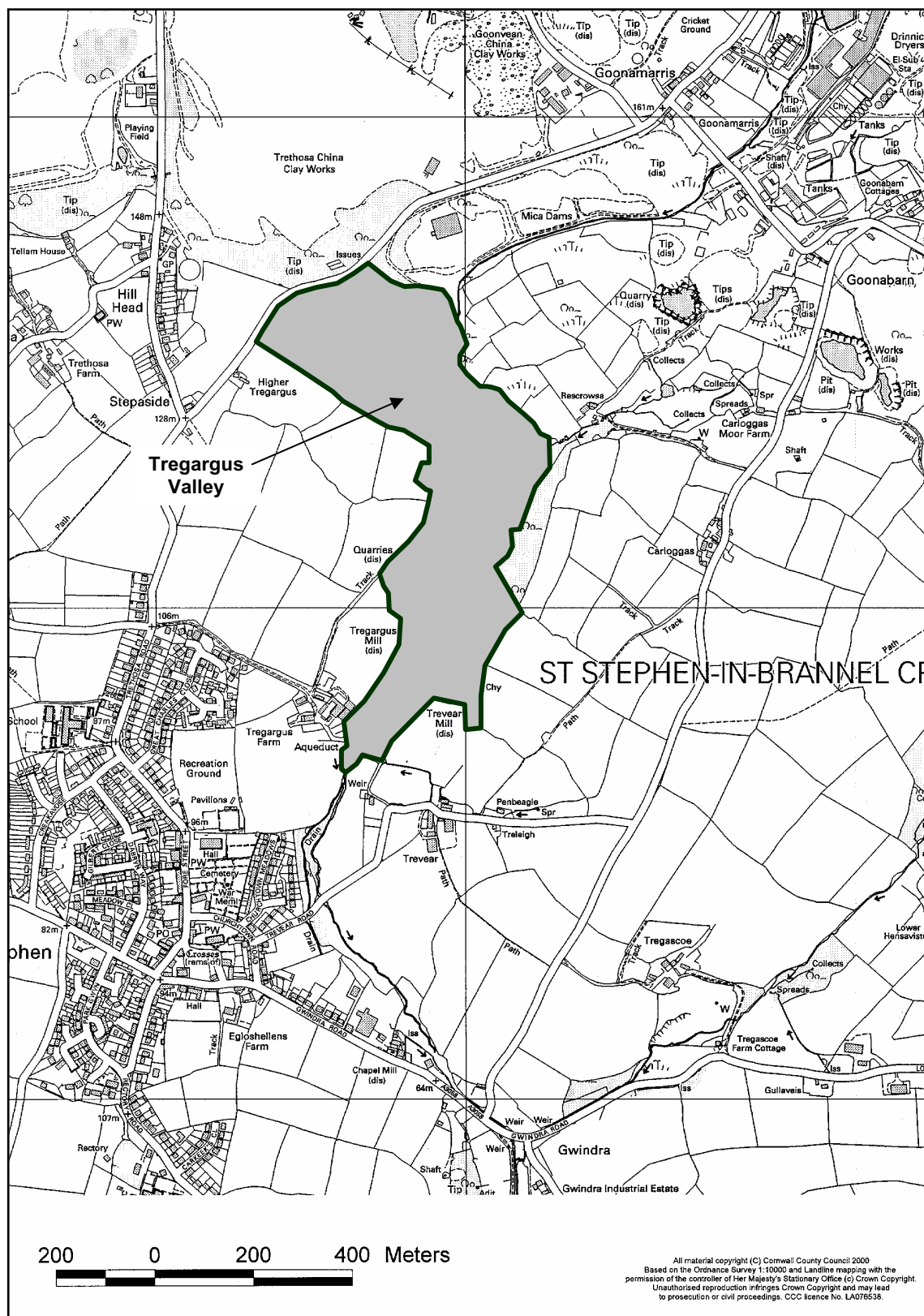


Fig. 1 Location of Tregargus Valley. This map shows the extent of the valley for the purposes of the 2002 archaeological assessment.

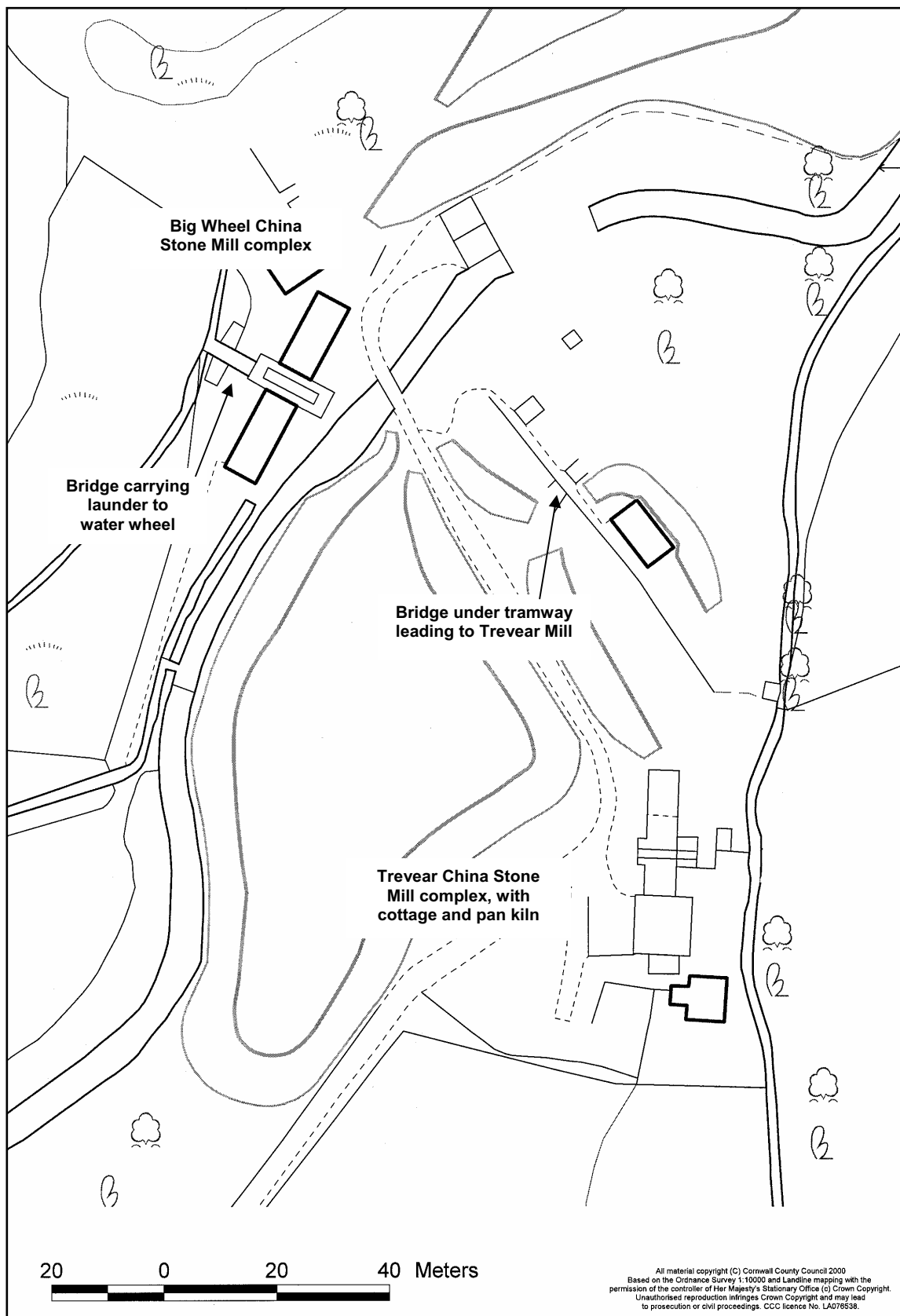


Fig. 2 Location of the two bridges.

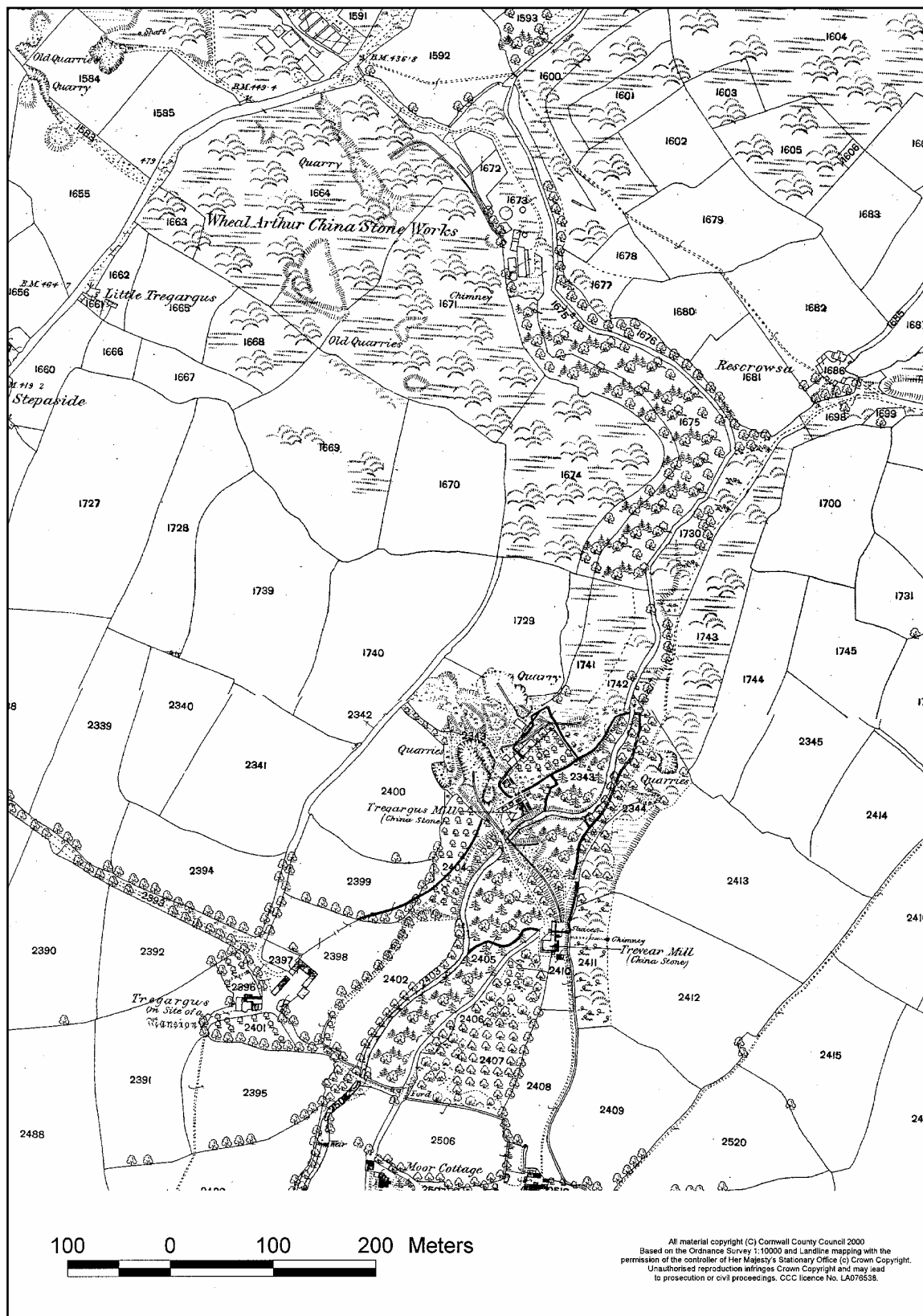


Fig. 3 The Tregargus Valley in 1907.

2 Introduction

The Tregargus Valley is situated to the north of St Stephen-in-Brannel in mid-Cornwall, (centred on NGR SW 9502 5410). The steep-sided, wooded valley contains the Barn River, which was used to provide water for a series of seven china stone mills. China stone was quarried and milled in the valley from c. 1870 until 1965, when the market for lower grades of china stone collapsed and the mills were abandoned. Since then, the Tregargus quarries have been infilled with mica waste and two of the central mills have been completely demolished or buried.

In the spring of 1999, the China Clay Area LEADER project headed by Len Smith initiated a proposal for public access and conservation in the Tregargus Valley. This proposal has since been adopted and developed by the Tregargus Trust, a registered charity whose aim is to manage and conserve the Tregargus Valley for public access and recreation. The Trust leases the valley from Goonvean Ltd and IMERYS.

An archaeological and historical assessment of the valley was carried out by CAU in 2001 (see Cole 2002) and a wide-ranging set of recommendations presented to the Trust. This included various conservation works to the extant structures.

It was subsequently agreed that some urgent conservation work could be carried out by the Trust on two bridges; one to the rear of Big Wheel China Stone Mill (Scheduled Monument Cornwall 668; Cornwall and Isles of Scilly Historic Environment Record 162183) which carried a launder for the water wheel over a tramway, and a further tramway bridge to the east (Cornwall and Isles of Scilly Historic Environment Record 110953). It was also agreed that the repair to Big Wheel Mill could take place without Scheduled Monument Consent, due to CAU being involved in the preliminary recording and the design of the specification for the repair. The nature of the repairs to the other structure were also recorded.

3 Background

The below sections are an edited version of similar sections in Cole (2002).

3.1 Medieval and later landscape

The Tregargus Valley is a Steep Sided Valley, surrounded by Anciently Enclosed Land associated with a range of settlements dating to the medieval period. It takes its name from the settlement of Tregargus to its south. First recorded in 1356, the name of this farm is derived from the Cornish place-name element **tre** 'farmstead' which suggests an origin in the pre-Norman period (Padel 1985, 223-232).

Later (19th century) settlements which grew up to the north of the study area were Hill Head (recorded on 1813 OS 1 inch map), Stepside and Higher Tregargus. Higher Tregargus immediately to the west of the study area was first recorded on the 1840 St Stephen Tithe map as Trethewy's Tenement. This map also shows that the majority of the study area was associated with Tregargus Farm in 1840, while the accompanying apportionment documents a range of different land-uses prior to the development of china stone milling in the valley.

Of paramount importance to the development of the valley was the Barn River which, from early times, is likely to have been used as a source of water power for corn mills while possibly also being used in early tin extraction in the area.

Post-medieval activities in the Tregargus Valley were probably not that dissimilar to other valleys in Cornwall at this time. Its woodland would have been exploited by farmers and craftsmen of the Tregargus, Trevear and possibly Rescrowsa holdings as pasture grounds (underwood), sources of fuel, coppice wood and timber. Local mines and miners may also have had a close relationship with the valley, which could have provided both timber and charcoal (for smelting). Field banks are clearly visible within the woodland and there may be many other redundant features such as tracks, charcoal burners' platforms etc.

Analysis of the 1880 and 1907 OS maps (see Fig. 3) shows that the entire valley bottom included both deciduous and coniferous trees, suggesting a policy of deliberate planting which could have been undertaken after the end of early mineral exploration in this area as a means of partially reclaiming an 'industrial' landscape.

3.2 Mining extraction

Charles Henderson records early evidence of mining in the parish of St Stephen-in-Brannel with a list of tin bounds in Brannel Manor dating to 1685 (Henderson 1935, 133-134). Sandy Gerrard (1986) meanwhile has compiled a list of early tin works from various historic documents. Possible tin streaming remains were identified through the 2002 assessment and it may be that some of the tin bounds recorded by Henderson or Gerrard relate to the valley.

By 1807, R. M. Barton has noted that there were seven china clay pits in the St Stephen area, each with its own china stone quarry. "These comprised two at Treviscoe, two at Hendra and one each at Trethosa, Goonvean and Goonamarris. One, and perhaps both, of the Treviscoe works was on lease to Wedgewood; the Goonvean and Trethosa pits were those being worked by Warrick and Dickins and the Hendra Works (Hendra and Treleavour) worked by the Hendra Company. To these must be added the pit on Carloggas Moor occupied by Spode and Wolfe, and the works of Warrick and Dickins on Hallow Moor to the north, and also 'at St Stephens'" (Barton 1966, 40).

She attests that the land noted 'at St Stephens' refers to the Tregargus Stone Quarry, which was recorded for sale in 1807 (Sherbourne Mercury, 16th November 1807) as "adjoining the great china clay works of Wedgewood, Spode, Woolf, Close and others."

As well as the evidence for china stone extraction, the valley contains more limited evidence of china clay extraction and processing. The 1840 Tithe map records a large area of pasture as 'Moor and Clay Pits,' an area which includes the site of three disused quarries marked on 1880 and 1907 OS maps as well as the site of the Rescrowsa China Clay Works.

A total of seven china stone mills can be documented within the Tregargus Valley, of which five survive. The earliest two mills were Wheal Arthur and Trevear, with their own associated pan kilns. These complexes were both recorded on the 1880 OS map as were three more mills in the centre of the Valley which, it might be argued, were later in date than the above. These mills did not have their own dries and pumped the clay slurry to Gwindra. Two of these mills have been destroyed and the other only survives in part.

Big Wheel Mill (see below) and the Lower Tregargus Mill, which has a double wheel, were both constructed in the last decade of the 19th century.

3.3 The Tregargus Valley and China Stone

The Tregargus Valley contains the finest assemblage of china stone mills in Cornwall. They are set within a wider landscape which also includes the surviving industrial infrastructure of associated quarries, leats, pan kilns and tramways. China stone mills as a monument class are confined to Cornwall and the Staffordshire potteries, but the Staffordshire stone

mills were not used solely for china stone and were principally used for flint. Only in Cornwall are these stone mills found in direct association with their raw materials, and their complex supporting infrastructure is thus regionally distinctive. The Tregargus Valley mills, have a combination of Group Value, Survival and Completeness found nowhere else in Cornwall or Britain.

There are other china stone mills in Cornwall, some very close to the Tregargus Valley. Just to the south is Chapel Mill, which is the only stone mill still to have its machinery intact. This is an isolated example, however, and does not have the group value of the Tregargus Mills. At Coombe there is the Coombe Vale Mill, which has been demolished to its foundations. Trenowth Mill survives in a reasonably complete condition, but is again an isolated example. The only other stone mills in Cornwall are the group of three at Kergilliack, near Penryn. Only the lowest mill survives intact, and although it is an excellent mill, the Kergilliack group cannot rival Tregargus in terms of Setting or Group Value.

The study area is also uniquely placed in terms of its potential for public access and amenity. The valley already possesses the rudiments of a footpath network, and the scenery, despite years of industrial activity, is beguiling and attractive. As is the case elsewhere in Cornwall, in sites such as the Kennall Vale Gunpowder Works or the Luxulyan Valley, the remains of industry now lend an additional dimension of mystery and romance to the landscape. Such opportunities for multi-faceted conservation initiatives which can involve the local community and a whole range of environmental partners are few and far between.

The Tregargus Valley is thus of prime importance and sits within the very top rank of such sites in Cornwall.

3.4 Big Wheel Mill

Big Wheel Stone Mill is the main focus of this report, with the works carried out on the bridge to the rear of the structure.

The mill was constructed in 1898, with photographs of the works surviving at the Cornwall Record Office. It had six grinding pans and was one of the biggest such mills in Cornwall. The waterwheel also survives *in situ* and this mill is protected as both a Scheduled Monument and a Listed Building. This complex includes the mill itself, the later winder house, tank, a leat and a tramway. In the general area to the south and east of the mill, there are a series of buildings, blacksmith's shop and associated chimney.

The Listing reads as follows:-

“Mill: formerly used for stone-grinding. Early-mid C19, with few later alterations. The mill was in operation until circa 1965. Granite rubble with granite dressings and quoins. The roof was formerly of slate and shingles, with gable ends.

Plan: There are two rectangular mill houses with the wheelpit between the two; overshot wheel formerly powered by a leat at the rear, with the tailrace running along the front of the mill houses.

Exterior: Each mill house is 2-storey at the front, built into the bank and single storey at the rear. Each has a symmetrical front, each the same, with two round-arched doorways at ground floor with keystones and window openings above. The front is much overgrown. The wheel is set centrally, cast iron wheel with cast iron launder at the rear. The right gable end of the mill house has a central loading door at upper ground level with granite lintel and small gabled hoist housing above the pulley wheel. At the rear the mill house to left has 2 door openings and 2 small

window openings, with an unexplained projection in stone rubble to left. The mill house to right has similar door and window openings.

Interior: No internal machinery remaining; the roof trusses only survive, halved and bolted at the apex of the principal rafters.”

It is a large and late period china stone mill. It is the end of the evolution of the technology, as it contains the usual central wheelpit with the waterwheel still in position, with the mill building abutting the wheelpit on either side.

Three grinding pans survive on the southern side of the wheelpit, though they have been partially demolished. These were of brick construction, which contrasts with some in the valley which are granite construction. The three pans to the north do not survive. A total of six grinding pans would have made this one of the largest china stone mills in the area.

The mill buildings are of granite rubble construction and are now unroofed, while the window openings to the front have been blocked with concrete block addition.

At the rear of the mill is the damaged bridge which carries the launder for the waterwheel over the tramway which ran at the rear of the mill (see Section 4.1). There is a flying arch of brick which supports the launder just before the wheel. The bridge, of brick and granite construction, which carries the leat over the tramway, is in poor condition and part of the western side of the arch has collapsed.

The waterwheel itself is of all iron construction, supplied by T. Bartle and Son, Carn Brea. It is now in a very poor state of repair with several of the iron spokes rusted completely through. Most of the buckets have rusted out on the upper run. Like all the other waterwheels in the valley, it is of an overshot construction. Chiswell and Mitchell record that the wheel has 15 pairs of spokes and 105 buckets

The tunnels for the horizontal shafts and gearing, which would have been powered off the waterwheel, are extant although all the ironwork has been removed. There are no shafts and no gears remaining *in situ*.

On the southern end of the mill there is a roughly circular brick built water tank with the remains of a sluice mechanism which would have supplied the pans with water. There are two features of unknown function on the northern end of the structure. One is a circular feature, which looks like the base of a chimney-like structure, and contains an opening in its northern face which has an iron lintel. The second is a small wooden hoist, which may represent the support for a bell, with an attached wooden pulley.

4 Archaeological recording

The 2002 assessment report concluded that each of the china stone mill complexes in the valley would need to be assessed by a structural engineer in order to consider their condition, immediate threats to their fabric and character. Detailed archaeological survey work on the buildings was also suggested.

This report however deals with two pieces of consolidation work, which needed to be carried out as a matter of urgency.

4.1 Condition of the bridge (Big Wheel Mill)

At the rear of the Big Wheel Mill is the bridge which carried the launder for the waterwheel over a tramway, which ran along the rear of the mill. The iron launder for the waterwheel

is still *in situ*, as are the remains of the diversion sluice at the rear of the wheel which allowed water to flow back into the wheelpit when the wheel was stopped.

The bridge is largely of granite construction, with the arch and parapets built out of red brick (see Figs. 4, 6 and 7). The south-facing arch was in a very poor condition, with much of the stonework of the main column having collapsed. Part of the brick parapet above the column was missing while a small number of bricks had fallen away from the brick arch (see Figs. 6 and 7).

Roots from various small trees growing out of the bridge were also pushing out various sections of stonework on both sides of the bridge. Both the parapets were damaged or cracked and had been undermined by root activity, making them clearly unstable and a health and safety problem.

English Heritage have already noted problems with Big Wheel Mill. An internal memo in March 2000 noted that “one area of immediate concern is the column of masonry supporting the mill race to the rear of the building. Water penetration has resulted in the collapse of several granite quoin stones and the exposure of the core, with several other elements left unsupported” (Badcock 2000).

Vandalism has also been a problem. It is clear that local youngsters have deliberately knocked out stones from the damaged column.

4.2 Condition of the bridge (tramway)

A bridge to the west of Big Wheel Mill was first recorded at this location on the 1880 OS map. It carried a tramway over a lower trackway or access road, between the Big Wheel Mill complex and the Trevear Stone Mill complex. Constructed of granite masonry with a very fine arch, its western face had collapsed leaving the remainder of the structure open to further deterioration (see Fig. 9).

Again, English Heritage have noted problems with this site. In 2000, it was stated that “the other area of concern was not in the environs of the scheduled monument but to the small circular brick arched bridge over which the tramway ran away from the scheduled building. This has again been subject to the ingress of the elements causing dislocation and localised collapse of the arch and I feel this should be supported or repaired immediately” (Badcock 2000).

As well as the collapsed arch, the stone-faced abutment to the west of the arch had collapsed while tree roots had also caused considerable damage to similar walling on the eastern side of the bridge.

4.3 Archaeological recording

The archaeological recording consisted primarily of a general watching brief of works. This included regular visits to ensure that the work was being carried out according to the guidelines in the specification, discussing variations that were necessary and advising on the finished appearance of the monuments.

No modifications to the works programme were deemed necessary. The unstable nature of the red brick parapets at Big Wheel Mill were discussed and how these would best be repaired. It was decided to retain the parapets in position and to mend the slightly damaged areas.

A selection of colour photographs were taken in advance of the works. Black and white record photos were also taken, to illustrate the structure of the bridges and the extent of the damaged areas. These were taken during and after works.

5 The repair work

5.1 Bridge (Big Wheel Mill)

This bridge was repaired during November 2003. This work involved the rebuilding of upstanding stonework and no excavation around the above ground remains was undertaken.

The contractor removed those sections of stonework from the bridge which were unstable, marking each individual stone. The various roots and areas of unstable fill were then removed and the individual stones replaced in their original positions using a lime mortar.

The south-facing column which had suffered most damage was rebuilt. This included the missing section of walling directly beneath the red brick arch, as well as the top of the column where part of the parapet was also missing. This parapet was reconstructed using red brick brought onto site and a small section of missing arch was also replaced.

The north-facing parapet was in a better condition but a small part of it had to be reconstructed. Both parapets appeared very unstable. Concrete was laid inside the parapets in order to stabilise the structure.

5.2 Bridge (tramway)

This bridge was repaired during July 2003. The contractor cleared away collapsed stonework from the bridge and the associated abutments. Overhanging vegetation and the roots of tree which had caused considerable damage were then removed.

The bridge and associated walling were then rebuilt in a style similar to that of the original construction, using adjoining sections as a guide. The arch itself was reconstructed over a wooden frame.

The abutment to the west was largely rebuilt. Some mortar was used in the rebuilding and for filling in behind the stonework, but no mortar was showing giving the impression of a drystone wall, retaining the character of other walling in the area. The walling to the east was also rebuilt in a similar fashion, as was the edging to the tramway.

Mr Piper primarily used the stone lying loose in the general area to undertake the repair, though a small number of voussoirs had to be specially prepared off-site in order to reconstruct the face of the arch (see Fig. 10).

6 Conclusion

This report has detailed the repair and reconstruction of two bridges in the Tregargus Valley. The repair works were carried out to a very high standard and provide an important benchmark for further works which may be carried out on structures throughout the valley.

Specifications for consolidation or other repair works to structures in the valley should be agreed as appropriate with the County Archaeologist and should be in line with the good conservation practice set out in the 'Guide to Conserving Historic Mine Buildings in Cornwall' published in 1996. Basic ground rules concerning issues such as appropriate materials and limited rebuilding, etc, should also be agreed in advance.

Each of the china stone mill complexes also need to be assessed by a structural engineer in order to assess their condition and any immediate threats to their fabric and character. It is

sensible that such works are carried out immediately following or in tandem with a detailed archaeological surveys of the buildings.

7 References

7.1 Primary sources

1839 Tithe Apportionment Survey

1880 OS 25 inch map

1907 OS 25 inch map

7.2 Publications

Badcock, P J, 2000, Internal memo – Conservation Engineering Branch, English Heritage

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Smith, J R, 1992, *Cornwall's China Clay Heritage*, Twelveheads Press, Truro

8 Project archive

The CAU project number is **2003016**.

The project's documentary, photographic and drawn archive is housed at the offices of Cornwall Archaeological Unit, Cornwall County Council, Kennall Building, Old County Hall, Station Road, Truro, TR1 3AY. The contents of this archive are as listed below:

1. A project file containing site records and notes, project correspondence and administration.
2. Black and white photographs archived under the following index numbers: GBP 1602 16-30, 1603 6-18. Colour slides have been archived under the following index numbers: 34417-31427.

This report held in digital form as: G:\CAU\DOCUMENT\THE PROJECTS\SITES\SITES T\TREGARGS.LRF\TREGARGUS BRIDGE REPAIR REPORT.DOC



Fig. 4 Bridge to rear of Big Wheel Mill prior to repair work (from north).



Fig. 5 Bridge to rear of Big Wheel Mill following repair work (from north).



Photographs from top right - clockwise.

Fig. 6 – Bridge to rear of Big Wheel Mill prior to repair work (from south). Fig. 7 – Close-up of damaged column. Fig. 8 – Bridge to rear of Big Wheel Mill following repair work (from south).



Fig. 9 (top) – Bridge under tramway prior to repair work (from west).

Fig 10 (bottom) – Bridge under tramway following repair work (from west).

