

National Cycle Network, Anderton Lane to Horrabridge, River Walkham Crossing, Gem Bridge, Tavistock

NGR SX 495 706

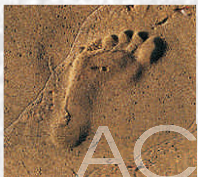
Results of an archaeological watching brief

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archaeology

NATIONAL CYCLE NETWORK, ANDERTON LANE TO HORRABRIDGE, RIVER WALKHAM CROSSING – GEM BRIDGE, TAVISTOCK

(NGR SX 495 706)

Results of an archaeological watching brief

CONTENTS

Summary

1.	Introduction	1
2.	Historical and archaeological background	1
3.	Aim	2
4.	Methodology	2
5.	Results	2
6.	Conclusion	4
7.	Archive and OASIS entry	4
8.	Sources consulted	5

List of Figures

Fig. 1: Location of site and areas observed.

Fig. 2: Sections.

List of Plates

Plate 1: Short length of leaf wall exposed in pier B excavations.

Plate 2: Remains of original viaduct pier base in Pier C excavation.

Plates 3-6: Terraced footings of original viaduct pier base in northern abutment excavation.

Plates 7-8: South abutment excavations showing brick pier base exposed after a landslide.

Summary

An archaeological watching brief was carried out by AC archaeology during the construction of Gem Bridge – a new cycle bridge over the River Walkham near Tavistock (SX 495 706). The new bridge was constructed on the site of the former Grenofen Viaduct designed by Isambard Kingdom Brunel in 1859, and upgraded in 1910.

Archaeological monitoring was carried out during groundworks for a temporary haul bridge, the four new piers and the north and south bank seat abutments. In three locations parts piers were exposed, two dating to 1859 and a third possibly representing a supported added in 1859. There are extensively remains of tin, copper and arsenic mine in this stretch of the Walkham Valley and part of a leat was exposed in on the south bank of the river. All these features were sealed by demolition rubble when the viaduct was removed in 1965.

1. Introduction (Figure 1)

- 1.1** This document sets out the results of archaeological monitoring during the construction of a new bridge, known as Gem Bridge, over the River Walkham near Tavistock, West Devon (SX 495 706; Figure 1). The work was commissioned by Gifford Archaeological Consultants, on behalf of Dawnus Construction and Devon County Council (DCC) and carried out by AC archaeology between 22 March 2011 and 5 July 2011. All work was carried out in accordance with an Archaeological Management Plan prepared by Gifford Archaeological Consultants (2011).
- 1.2** The scheme comprises the construction of a new bridge on the site of the former Grenofen Viaduct designed by Isambard Kingdom Brunel. The new development aims to recreate the form and appearance of the former railway viaduct and will link two existing sections of the Devon Coast to Coast cycle and walking route currently under development by DCC.
- 1.3** Gem Bridge is a 200m long five-span, steel truss structure supporting a reinforced concrete deck. It is supported by four piers and two bank seat abutments. Archaeological investigations of the groundworks involved the monitoring of the temporary haul bridge foundation pads, bridge construction works including all four piers and the two bank seat abutments. It was proposed that part of the haul road, bridge assembly area and crane standing pads would also be monitored. However, the bridge assembly area was abandoned and due to site topography, the crane pads and haul road were built up rather than excavated.
- 1.4** The underlying solid geology comprises slate bedrock of the Kate Brook Slate Formation of the Upper Devonian Age.

2. Historical and Archaeological Background

- 2.1** The main sites of archaeological interest in the area are the remains of Grenofen Viaduct and mine workings associated with West Sortridge Consols Mine (also known as Walkham Valley/Little Gem Mine) which in the second half of the 19th-century produced tin, copper and arsenic. Historic Ordnance Survey maps depict a number of adits and similar mine workings on both sides of the valley, and an archaeological survey by Exeter Archaeology (Andrew Passmore pers. comm.) prior to an initial phase of construction works in 2010 recorded the remains of structures and dressing floors on both sides of the River (cf Rendell 1996, cover photograph10-

11) as well as identifying previously-unrecorded features such as leats, trackways and gullies.

- 2.2** Grenofen viaduct formed part of the South Devon and Tavistock Railway. The railway was opened in 1859, and the upper timber superstructure of the viaduct replaced in brick and steel in 1910. The railway closed in 1962 and the viaduct was demolished in 1965. When the bridge was demolished debris was strewn across the valley. The two embankments survive, and the 2010 survey identified what appeared to be the bases of some of the viaduct piers on both sides of the valley. Further architectural fragments associated with the viaduct (see also Gifford 2011, plates 5-8) are present on the north side of the river and were also recorded. During 2010 the original southern abutment partially lowered in height (and excavated material removed for use elsewhere on the cycle route). A small railway worker's hut was recorded, as were several pieces of the steel viaduct that were excavated from the 1960s demolition rubble.
- 2.3** The 2010 survey also identified two field boundaries on the north side of the river west of the line of the original railway embankment.

3. Aim

- 3.1** The aim of the watching brief was to preserve by record any archaeological features or deposits exposed during groundworks associated with the development, with particular reference to Brunel's viaduct, mine workings or any earlier archaeological features

4. Methodology

- 4.1** The watching brief was carried out in accordance with an archaeological written scheme of investigation prepared by Gifford within their archaeological management plan (Gifford 2011). The following areas of the scheme were monitored: excavation of the temporary bridge area, bridge construction works, and abutment construction.
- 4.2** Excavations were extremely deep and often unstable, and at one point a landslide occurred. Close access to excavated areas, and the preparation of accurate drawn records, was therefore unachievable. However, where practicable, all deposits revealed were recorded using the standard AC Archaeological *pro forma* recording system, comprising written and photographic records and in accordance with AC Archaeology's General Site Recording Manual, Version 1 (Revised April 2005). An emphasis was placed on the creation of a good photographic record.

5. Results

5.1 Temporary Bridge

A twin-span Mabey Quick-Bridge was erected onto concrete pad foundations across the river. Footings for the temporary bridge were excavated on both sides of the river. The southern footings are located close to two former mine working buildings – arsenic calciners.

The trench for the footings on the northern side measured 8.4m long, 7.3m wide and 1.6m deep. The excavations encountered demolition material, which included large cemented blocks of granite. No structural or archaeological remains were present.

The trench for the footing on the southern side measured 6.3m long, 2m wide and 1.6m deep. The excavations encountered demolition material overlying grey sandy-clay gravels and black soft clay. These clay deposits were waterlogged and

contaminated with mineral deposits associated with the mining activity. No structural remains were present.

5.2 Bridge Construction Works

The groundworks for the pile caps of the new bridge piers involved deep excavations. The pile caps were excavated prior to the piling, then following piling the pier footings were reduced further depending on where the piles were on the topography.

The Pier A foundations measured 8m long, 4m wide by approximately 3m deep. The excavations encountered demolition material including large sections of masonry and brick from the viaduct. No *in-situ* structures or archaeology deposits were found during the excavations.

The Pier B foundations measured 8m long, 4m wide by approximately 6m deep. The excavations encountered bridge demolition material, overlying the dark grey sandy clay deposits as seen in the nearby temporary bridge footings. Within the clay deposits and in the north facing section of the foundations a short length of granite wall was exposed (Plate 1). The wall was uncovered approximately 3m below the existing ground level and the exposed masonry measured approximately 2m long and stood at a height of 1.5m. The wall forms one – probably the upper – side of a leat that is visible as an earthwork west of the rubble from the demolished viaduct.

The Pier C foundations measured 8.4m long, 7.3m wide by approximately 3m deep. At this location an original viaduct pier base had been encountered in a geotechnical trial pit (TP2A), where it was recorded as extending to a depth of about 4.2m from the surface (Gifford 2011, 4). A 2m-wide area of masonry, comprising granite blocks bonded with a stony lime mortar, including what appeared to be the western face of the pier base was exposed in the northern part of the trench (Plate 2). The pier was overlain by demolition material containing brick, metal debris and large masonry fragments.

The Pier D foundations measured 7.3m long, 6.8m wide by 2.6m deep. The excavations encountered demolition material from the viaduct, but no *in-situ* structures or archaeology were exposed. This demolition material included a large block of masonry wrongly identified in the 2010 survey as a pier base.

5.3 Abutment Construction

A reinforced earth bankseat abutment was constructed on either side of the river valley.

The excavated area for the north abutment measured approximately 10m square by 10m deep. The northern section showed a general layer sequence comprising 0.6m of modern bank material of mid brown silty clay with abundant slate. This overlay 0.4m of mid orangey-brown silty sand topsoil, which in turn overlay approximately 5m of viaduct demolition material comprising large granite boulders, brick, slate and mortar. This covered a dark brown-black black gritty sandy silt deposit measuring 0.3m thick and which probably represents buried topsoil, i.e. the 19th-century land surface. Below this was a mid-orangey-brown clay silt deposit measuring approximately 3.7m thick and which probably represents a colluvial build up. This overlies a possible stepped/terraced structure in the very eastern edge of the abutment (Plates 3, 4, 5 & 6). The structure comprised slate bonded with a limestone mortar. It measured approximately 6.3m across and approximately 2m thick (Figure 2a). It appears to follow the slope of the valley was cut into slate bedrock. The feature may represent the footings of one of the original viaduct piers.

The southern abutment foundations were trapezoidal in shape; the back southern edge measured 15m long, the front northern edge was 10m long and the whole area was 10m wide. Due to steep slope of the hillside, the back southern edge was 6m deep and the front northern edge was 3m deep.

The north facing section of the abutment showed demolition material had slumped down to the east and at its deepest was approximately 3m below ground level (Plates 7 & 8). At the north end of the trench solid slate bedrock was exposed, overlain by orange-brown clay silt subsoil. The natural topography slopes down to the east and at the west end of the trench the subsoil was approximately 4m thick. (Figure 2b). At this stage no in-situ structural or archaeological remains were exposed.

However, after a period of heavy rain the southern abutment witnessed a landslide, and the demolition material behind the excavated area collapsed. This exposed the north-west corner of a viaduct pier base (Plates 7 & 8). The base was visible approximately 2m below existing ground level, and an area of approximately 2.20 square metres was exposed.

6. Conclusion

- 6.1** The scope of the archaeological investigations was more limited than originally intended due to the reduced areas of groundworks associated with the temporary works for the construction of the bridge. As a consequence, there was significantly less impact on the mining remains than had been originally proposed. The only mining feature to be exposed during the works was a section of wall forming part of a leat. At this location this had been obscured by demolition rubble from the viaduct. However, the leat can be traced as an earthwork to the west of the site.
- 6.2** Partial remains of three piers from Brunel's 1859 viaduct were uncovered during the groundworks. Different construction materials were observed. The footings for the piers (as observed in the northern abutment excavation) were constructed of local slate, whereas the main above-ground masonry of the piers was constructed of granite, which corresponds with descriptions of the standing structure. The brick structure uncovered in the southern abutment excavations corresponds with the projected position of the end pier from the 1859 viaduct. However, the use of blue industrial bricks probably indicates that this masonry relates to the 1910 rebuilding of the upper superstructure. It is therefore likely that the exposed brickwork forms a 'buttress' around the original pier, perhaps to support the weight of cranes working from the end of the structure.
- 6.3** The exposure of remains of the piers is likely to be indicative of the survival of other viaduct piers across the site. These will be preserved under the deep deposits of 1960s demolition material. This material has also preserved archaeological features associated with the 19th-century mines.

7. Archive and OASIS entry

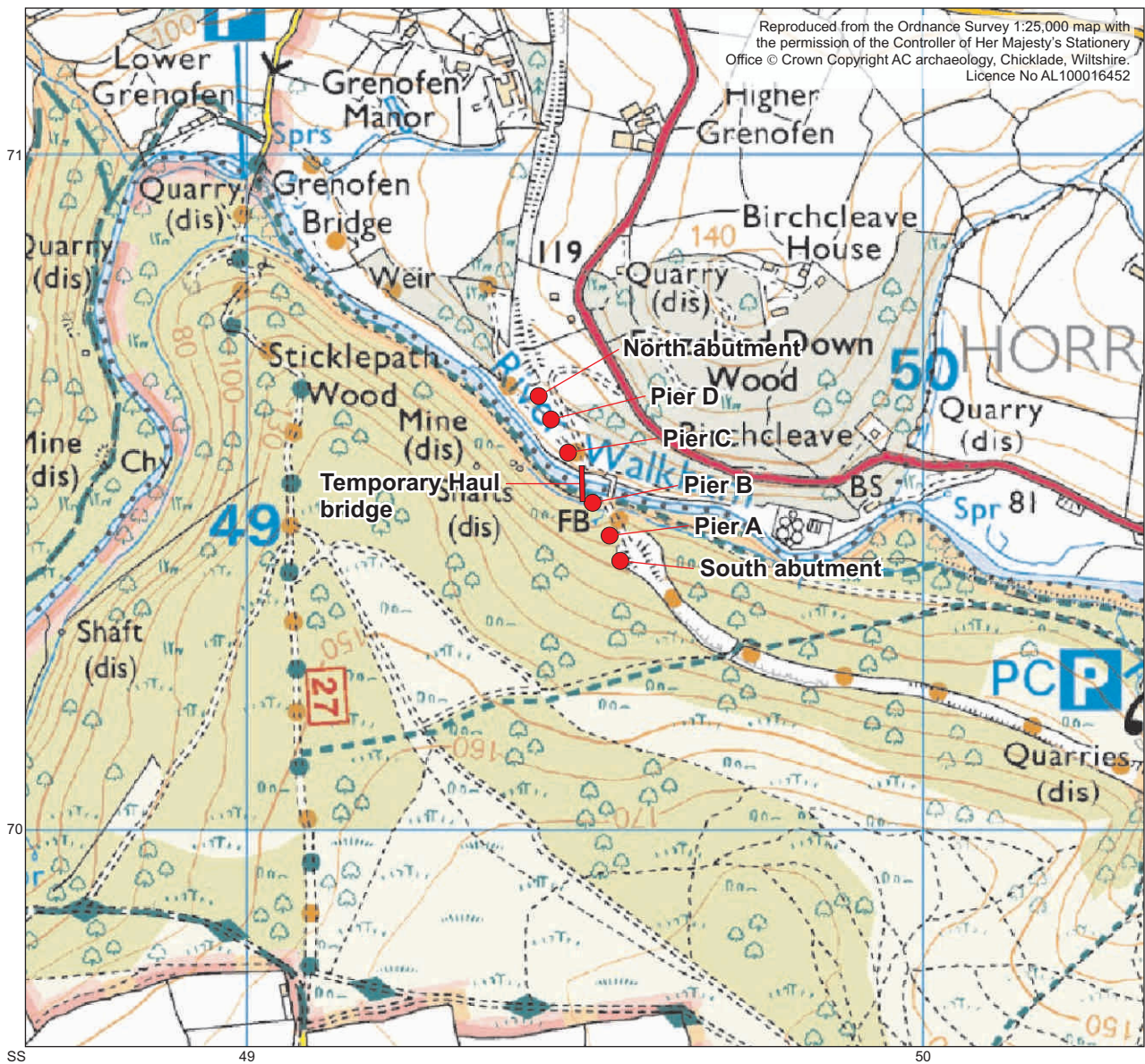
- 7.1** The paper and digital archive is currently held at the offices of AC archaeology Ltd, at 4 Halthaies Workshops, Bradninch, near Exeter, Devon, EX5 4LQ. The archive will be deposited at the Plymouth City Museum and Art Gallery under the relevant accession number (pending).
- 7.2** The OASIS (Online AccesS to the Index of Archaeological InvestigationS) entry has been completed with the unique identifier 111941.

8 References

- Gifford, 2011, *NCN Anderton Lane to Horrabridge River Walkham Crossing – Gem Bridge, Archaeological Management Plan*. Report Number 17619/INFPLA./R04.
- Rendell, P., 1996, *Exploring the Lower Walkham Valley* (Forest Publishing).



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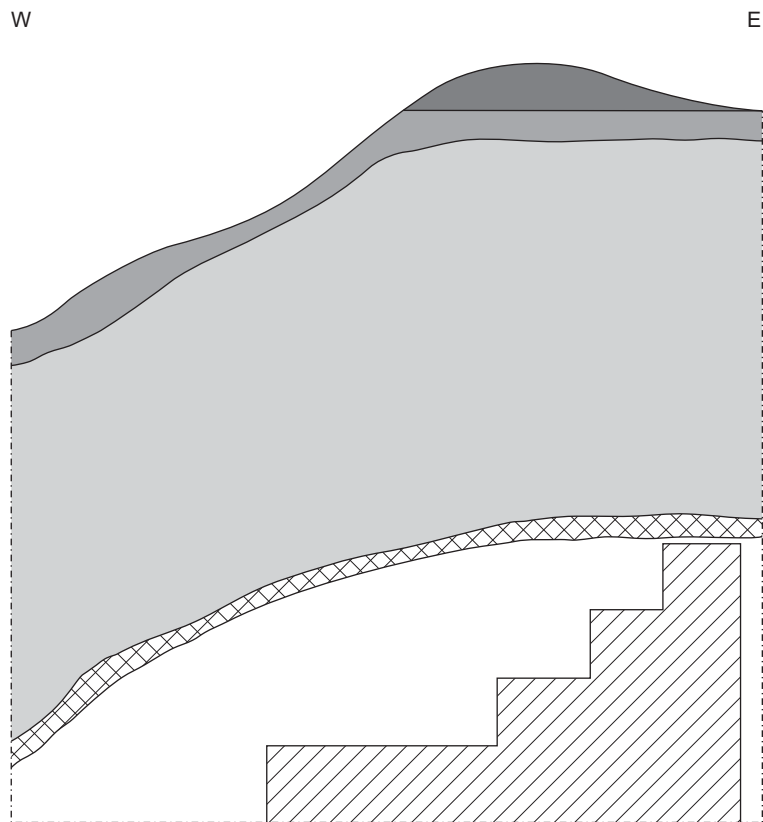
Gem Bridge, Tavistock

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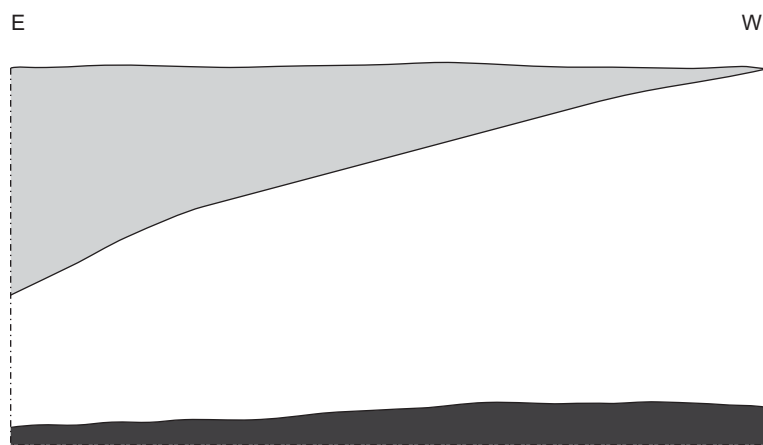
Fig. 1: Location of site and areas observed










a) South facing section of northern abutment



b) North facing section of southern abutment



-  Modern bank material
-  Topsoil
-  Viaduct demolition material
-  Buried topsoil
-  Subsoil colluvium
-  Pier footing
-  Slate bedrock



PROJECT

Gem Bridge, Tavistock

TITLE

Fig.2: Sections



Plate 1: Short length of leaf wall exposed in Pier B excavations, view to south



Plate 2: Remains of original viaduct pier base in Pier C excavation, view to north.



Plate 3: View to north



Plate 4: View to north

Terraced footings
of original viaduct
pier base on
northern abutment
excavation



Plate 5: View to west



Plate 6: View to south



Plate 7



Plate 8

South abutment excavations showing brick pier bas exposed after landslide, view to south.

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