Report No: 2012R064

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CORNWALL COUNCIL

Morwell Wood Trail
Nr Morwellham, Devon
Impact assessment

Historic Environment Projects

Morwell Wood Trail,
nr Morwellham, Devon

Impact Assessment Report

Client	**Tamar Valley Mines Heritage Project**
Report Number	**2012R064**
Date	**September 2012**
Status	**Final**
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Within Historic Environment, the project manager was Colin Buck and figures reproduced in this report were compiled by Carolyn Royall, Colin Buck and Knevitt's Cons. Eng. The report was edited by Andy Jones.

The views and recommendations expressed in this report are those of the Historic Environment Service projects team and are presented in good faith on the basis of professional judgement and on information currently available.

Freedom of Information Act

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Cover illustrations

Front cover image (© C Buck CC) of the former Tavistock Canal Company seal.

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Abbreviations

CC	Cornwall Council
DCC	Devon County Council
DCMS	Department of Culture, Media and Sport
DGC	Devon Great Consolidated Mine
DRO	Devon Record Office
DHER	Devon Historic Environment Record
EH	English Heritage
NGR	National Grid Reference
OD	Ordnance Datum
SM	Scheduled Monument
TVCS	Tamar Valley Countryside Service
TVMHP	Tamar Valley Mining Heritage Project
WDBC	West Devon Borough Council
WHS	World Heritage Site

1 Summary

Construction of a new Tavistock Canal footbridge and path trail linking the Tamar Valley Mines Heritage path towards Morwellham and George & Charlotte Mine/New Quay are planned as part of the Tamar Valley Mining Heritage Project (see Fig 1). This impact assessment report is intended to inform and guide the Tamar Valley Mining Heritage Project (TVMHP), Devon County Council Historic Environment Service (DHES), and to be part of a Scheduled Monument application to English Heritage for crossing the bed of the Incline Railway and placement of a new footbridge over the Scheduled Tavistock Canal, respectively sited at the centre and eastern end of Morwell Wood. This report assesses the impact of the new trail works, as well as the design and placement of the proposed new footbridge upon the site's significant assets.

The Tamar Valley mines are nationally important sites, a proportion of the 19th century mining landscape is Scheduled and all are within the Cornwall and West Devon Mining Landscape World Heritage Site (WHS – Tamar Valley area Site A10). This report summarises the archaeological resource, and describes the impact and mitigation of the proposed works.

All of the study area (see Fig 1) is located within Morwell Wood, including the site of the western end of the early 19th century Tavistock Canal leading to the waterwheel powered incline to Morwellham. The area north of the canal was not actively mined, although its valley may well have been affected by streamworks in earlier centuries. Figure 2, a reproduction of an 1867 Bedford Estates Survey Plan shows the Tavistock canal, associated leats and the 1849 steam railway incline to Morwellham. The study area (west and north of the canal) has previously been assessed as part of a larger archaeological/historical survey (Buck 2006). Part of the study area (east of the canal) has previously been assessed as part of a larger archaeological/historical survey (Buck 2010).

The construction of a new track and footbridge for informed public access along the steep sides of the Tamar Valley (often crossing lode outcrop workings) often close to other archaeological features will slightly impact upon the present woodland environment, so characteristic of the Tamar Valley Area of Outstanding Natural Beauty (TVAONB). However, mechanisms can be put in place (by TVMHP) to ensure that there is an appropriate degree of consultancy and archaeological recording, as part of the project's impact remediation measures. Careful pre-works consultation with a site archaeologist has resulted in minimal impacts upon known archaeological features.

Archaeological impact recommendations include a programme of archaeological site consultancy before works start to ensure the footbridge design and construction, as well as the pathway construction works will have a minimal impact during works (for site supervision, archaeological recording, and liaison with DCHES) and after works, to ensure they are sensitively completed, as part of an overall mitigation strategy.

2 Introduction

2.1 Project background

The conservation and management of features relating to the TVMHP's mining heritage and enablement of safe public access forms the basis for a proposed new trail linking the TVMHP Devon Great Consols (DGC) Mine to Morwellham Bedford trail footpath with another route from near the creation and site conservation scheme. This report will assess the impact of the proposed new trail and Tavistock Canal Footbridge works within Morwell Wood and above Morwellham's significant assets. There are no detailed Schedule of Works and Specifications for the trail, although there is for the proposed new Footbridge over the Scheduled Tavistock Canal. This report will describe how the impact of the proposed works are minimised as part of a coherent mitigation strategy.

The Historic Environment Projects team, Cornwall Council produced an archaeological assessment of Wheal Russell Mine in 2006 (Buck 2006), which includes the section of trail north of the Tavistock Canal and the site of the proposed new Footbridge over the canal (see Fig 1). The section of Trail south of the canal has not been assessed in any recent archaeological report, although George & Charlotte Mine to the east has been assessed (Buck 2010).

The Historic Environment Service Projects team was commissioned in February 2012 (Project No. 2012011), by the Tamar Valley Mining Heritage Project (Chris Hariades as TVMHP Project Manager), to undertake archaeological consultancy, ensure DCHES and WHS consent, and to specify the nature and extent of the site impacts for the new Morwell Wood track. In addition, the impact assessment report will be used as part of an application for Scheduled Monument Consent (SMC) from DCMS for crossing over the Scheduled incline railway bed (SM No. 30973) and the placement of a new footbridge over the Tavistock Canal (also a Scheduled Monument: No. 30973).

An impact assessment project brief has not been produced, but it follows a similar project design by Cornwall Historic Environment Service; *'Project design for production of Scheduled Monument Impact Assessment Reports (Devon Great Consols and Gawton), as part of the Tamar Valley Mining Heritage Project (2006-2009)'*, dated 23/6/06 (Reproduced as Appendix 1).

A summary statement of significance relating to features likely to be affected by the proposed works has been produced (Section 3.3), followed by a summary table of each site's assets (Section 4). This report identifies the archaeological resources affected by the proposed building conservation scheme, and describes the impact and mitigation of the works on the site's significant assets. In addition the report refers to the Management and Maintenance Plan that has been produced by the TVMHP (2006) and summarises the proposed short and long term site management as part of relevant Conservation Management Plan Policies (TVMHP 2006), and appropriate WHS Management Plan policies (2005).

It is proposed that the project will address the following:

- The protection and consolidation of impacted significant archaeological remains in their settings.
- Health and safety aspects of the site relating to public access.
- Provision of low-key public amenity use where appropriate, incorporating access.
- Interpretation of the site to the public, including on-site and written materials.

In terms of the management of archaeological features, engineering works will be kept to a minimum, but in view of the fact that the entire site is part of the Tamar Valley component (Area 10) of the Cornwall and West Devon World Heritage Site mining landscape, particular attention has been paid to suggestions for the best mitigation of any such works.

2.2 Aims

The purpose of this impact assessment was to:

1. Assess the impact of the new track creation and of the construction and installation of a new bridleway/public footbridge on the significance and character of Morwell Wood and the Scheduled Tavistock Canal.
2. Indicate the steps that have already been taken by the archaeological consultant to avoid or minimise adverse impacts upon the site, its features and archaeology and to ensure that the site methodologies accord with general EH guidance to minimise impact.
3. Indicate that the proposed methods and techniques are appropriate to the history, character and Outstanding Universal Value (OUV) of the site.
4. Make recommendations for an archaeological mitigation strategy.
5. Ensure that any conditions of EH Scheduled Monument Consent (for the footbridge only) conform to the overall mitigation strategy for the site.

2.3 Conservation philosophy

All site works carried out by the project will be undertaken to the highest national standards, and in accordance with the policies and guidance set out in Conservation Principles: Policies and Guidance for the Sustainable Management of the Historic Environment (English Heritage 2008) and all other relevant guidance, irrespective of whether the heritage assets or components enjoy statutory protection or not.

The site conservation philosophy is based on respecting the character of each significant feature and its contextual relationship generally with other parts of the WHS. The long term conservation and preservation of the built and standing archaeology should reflect its individuality, character and construction. The methodology of using traditional materials and timber structural components (where appropriate), is intended to replicate 19th century techniques; however the end product is intended not to monumentalise the site but to provide safe but informed access.

An essential component of the mitigation strategy is the employment of an historic environment consultant who should ensure that English Heritage principles of conservation practice are adhered to both in terms of the design of appropriate schemes, to ensure that works are carried out to acceptable (EH) standards and to ensure close liaison between statutory agencies and the project scheme. In addition it is important that the nature, extent and development of the site conservation works should be guided by the relevant short and long term management plan policies (statutory, archaeological, conservation, ecological, mineralogical and WHS, etc), which are an important part of any mitigation strategy of the site.

The appropriate statutory authorities (Devon County Council Historic Environment Service) will ensure that Written Scheme of Investigations (or project designs), set standards for the archaeological recording and reporting during and after the works have ceased.

3 Statements of Significance

3.1 Definition of Outstanding Universal Value and Significance

The Outstanding Universal Value (OUV) of the Cornwall and West Devon Mining Landscape was described in the Nomination document for World Heritage Site Status (CCC, page 21) *'The Cornwall and West Devon Mining Landscape was transformed during the period 1700 – 1914 by early industrial development that made a key contribution to the evolution of an industrialised economy and society in the United Kingdom, and throughout the world. Its outstanding survival, in a coherent series of*

distinctive cultural landscapes, is testimony to this achievement'. The *'coherent series of distinctive cultural landscapes'* comprises ten areas of Cornwall, one of which is the Tamar Valley Mining District (Area A10). There are seven main components identified in the Nomination Document through which the OUV is physically expressed: Mine sites, Mine transport, Ancillary industries, Mining settlements and social infrastructure, miner's smallholdings, Great Houses and estates, and Mineralogical and other sites of scientific importance. Individual aspects of the cultural heritage making up the Site have differing levels of significance; some may be of an international importance, whilst others will be of national, regional or local significance (OUV of the Cornwall and West Devon Mining Landscape 2007, 2).

3.2 General Statements of Significance for the Tamar Valley Mining District

'The Tamar Valley forms the principal central landform of the district. Whilst the river flows from north to south, its great loops and bends follow a highly sinuous and changing course, its sides are often steep and frequently wooded. To the east the landscape above the banks of the river is rolling cultivated countryside that descends to the ancient market town of Tavistock, which nestles beneath the high granite uplands of Dartmoor. The 19th century mines of this district exploited an important concentration of (some) tin, but mostly copper, arsenic and silver-lead (north-south) lodes which run parallel with the east-west axis of the granite massif of Kit Hill and Hingston Down, and which were worked almost continuously from Callington to Tavistock' (Thorpe 2005, 64).

'*Many of the most important mines in the Area were sited near to the river, where the lodes outcropped on its banks, and adit drainage was readily available. On the Cornish bank of the river these include New Consols, Wheal Benny, Gunnislake Clitters, Old Gunnislake, Okel Tor, Danescombe and Cothele Consols, whilst a little away from the river were Calstock Consols, Wheal Zion, Wheal Edward and Wheal Arthur. On the Devon bank, Devon Great Consols and the Bedford United Mines were the largest and richest copper mines anywhere within the Site, the extraordinary amounts of ore they produced outstripping all other ventures; by the last decades of the 19th century they were supplying 25% of the world's arsenic. To the south are Russell United, George and Charlotte, Gawton, Tuckermarsh, South Ward, North and South Hooe, Furzehill and South Tamar Consols, the last of this group on the Bere Alston peninsula having been amongst the earliest to have been worked as true mines anywhere in Britain, their rich silver-lead deposits being exploited by the Crown from the 13th century*.

A mining district with a long pedigree and which shared to a degree in the upsurge in mining which took place through the mid-19th century, but whose high point was around the second and third quarter of the century when undertakings like Devon Great Consols were amongst the largest and most important working for copper and arsenic in the Cornubian orefield. There were small and medium-sized mines scattered throughout the landscape on the Cornish side of the river, though on the Devon bank they are more or less confined to the river bank. Though tin and wolfram were mined, arsenic and copper dominate. John Taylor and the Dukes of Bedford were the key players in the development of the Devon mines, ports and communications systems, whilst the Duchy of Cornwall and the Williams family played significant roles to the west of the river' (CCC 2007, Tamar Valley Mining District 94, 100).

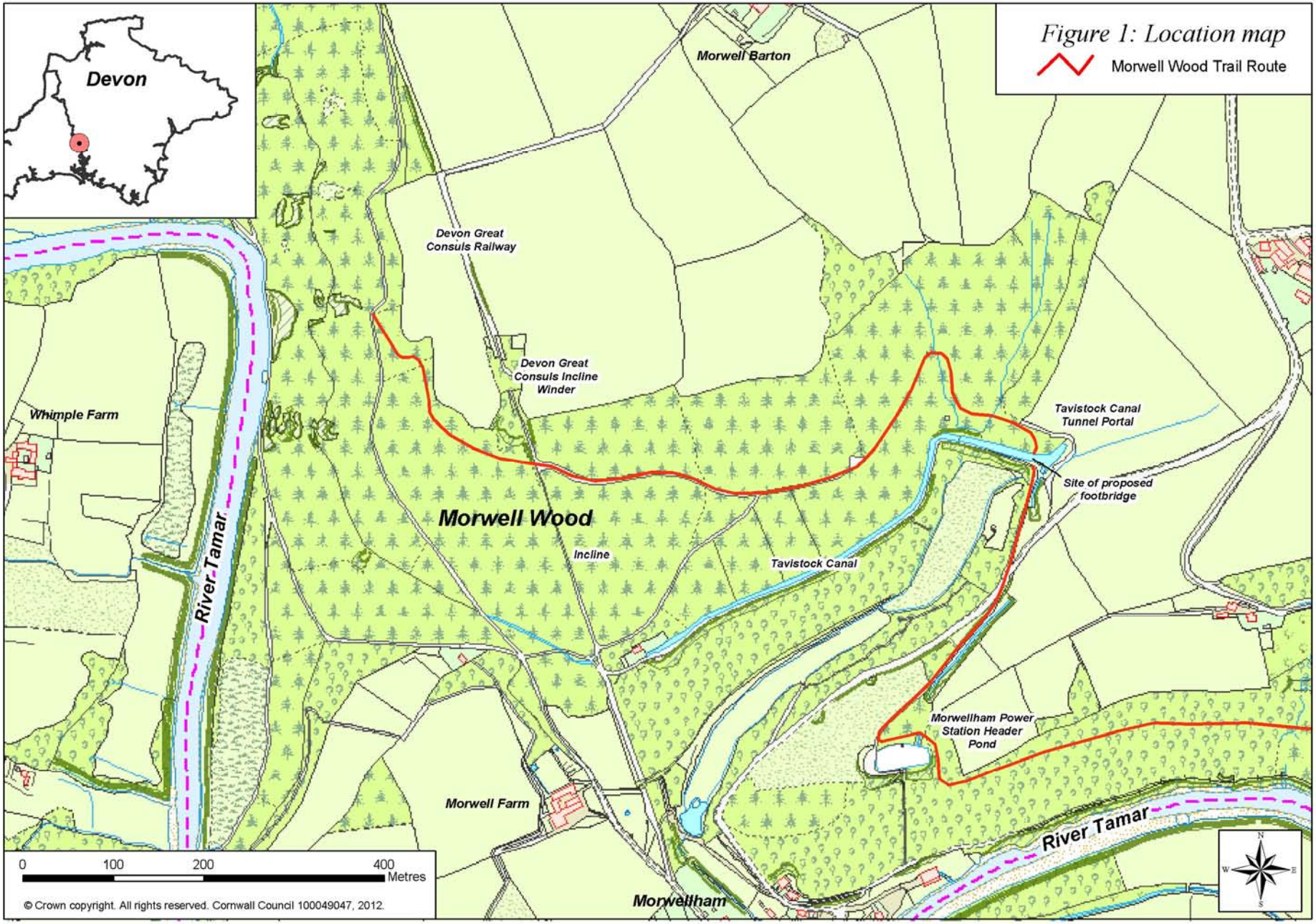
Figure 1: Location map
Morwell Wood Trail Route
Devon
Morwell Barton
Devon Great Consuls Railway
Devon Great Consuls Incline Winder
Whimple Farm
River Tamar
Morwell Wood
Incline
Tavistock Canal
Tavistock Canal Tunnel Portal
Site of proposed footbridge
Morwellham Power Station Header Pond
Morwell Farm
Morwellham
River Tamar
0
100
200
400
Metres
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3.3 Site specific Statements of Significance

A significant element of the TVMHP has focussed on identifying, prioritising and proposing a variety of site conservation works for the most significant elements of the Tamar Valley and mining landscape within the project area (see Fig 1). The following text includes a short statement of historical significance (denoting the reason why the site is worthy of having a permissive access route), and secondly, a short summary of the proposed works. Archaeological assessment site references (Buck 2006), are given following the historical summary, which will focus on the Devon Great Consols Incline Railway and the Tavistock Canal only – it appears there were no or insignificant 19th century mine workings close by the route of the new trail route. Refer to Figure 1 for the route of the new trail, and Figure 3 for archaeological features close to both the new trail route and the site of the proposed new footbridge over the Tavistock Canal.

Note: Detailed histories of Devonshire Great Consolidated (DGC) Mine, Wheal Russell Mine and George & Charlotte Mine are given in the following three archaeological assessment reports: DGC Mine, Buck 2002, 6-17), Wheal Russell Mine, Buck 2006, 7-11), and George & Charlotte Mine (Buck 2010, 15-19). The landowner for the project area (Fig 1) north of the Tavistock Canal is the Earl of Bradford, whilst the area south of the canal is owned by a combination of South West Water and Anne Furze (Sheepridge Farm).

Historical summary of the Devon Great Consols Incline Railway *(Buck 2006, 41)*
'The railway system at Devon Great Consols was a direct reflection of the productivity and wealth of these mines. Consols claimed the only standard gauge railway line to be entirely owned and worked by a specific mining concern within the West Country. It was built to connect the various parts of the Consols Sett with the Tamar and the port of Morwellham. Construction over the 4½ mile route began early in 1857, work being completed in November 1858. Transport costs by road had been considerable and when the new line opened it was found that expenditure (transporting the copper ore to the ore quay), *could be cut from 5 shillings a ton to 1 shilling a ton by rail'* (Bennett 1992, 22).

'The line of the railway from the mines to the Morwellham Quays, where the ores are sampled and all the goods for the mines imported, runs along the high ground on the east bank of the Tamar, …. the last half-mile down to the quays being a steep incline, up and down which the wagons are drawn and lowered by a 22"stationary engine and a 4"wire rope. The gauge is 4ft. 8½" (the ordinary narrow gauge), but the rails are, like those of the Great Western lines, laid on longitudinal sleepers, their weight being 39 lbs. to the yard. The ore wagons weigh 2 tons 5cwts each and carry 3½tons of dry ore… A train generally consists of eight or ten wagons'. (Hall 2000, 110, quoting an 1860 newspaper account of the mine).

Gilson Martin of the Bedford Estates Office, Tavistock, wrote a report to the Duke of Bedford on 31 December 1868 concerning mining and quarry within his land held in the Tamar Valley, and described the Incline railway: *'The trucks are lowered down this incline* (to Morwellham) *by a wire rope attached to powerful brakes, a fixed steam engine is used to for drawing the trucks up the incline. The other portion of the railway is worked by locomotives. Morwellham is situated upon the River Tamar where there are Quays, Docks, and floors for properly mixing and sampling ores and every convenience for carrying on the extensive business of the mines as well as the other general trade. Vessels from 100 to 200 tons burden come up and convey the ores into Wales where they are smelted'.*

The 1867 maps (Fig 2) show the Devon Great Consols Incline Winder complex during its heyday of copper ore production, whilst the OS 1884 map shows its operation during the arsenic refining phase. Both maps appear to show a passing loop of tracks just north of the main site, whilst the incline section of track is shown as a single track. The site appears to have changed little during the intervening period.

Figure 2 1867 Bedford Estates Plan of the study area (reproduced from Buck 2006, fig 7). The steam incline winder is shown at the top of the railway incline down to Morwellham. Note archaeological features on the north side of the proposed new footbridge.

Summary of archaeological features affected by the new Morwell Wood Trail

- Site 47 (the Incline Railway). This site has now been Scheduled.
- Site 57 (Costean pits).
- Site 61 (Streamworks).

Historical summary of the Tavistock Canal *(Buck 2006, 45)*

The opening of Wheal Friendship copper mine, Mary Tavy, in 1796/1797 led soon to the construction of the Tavistock Canal. It was built by John Taylor between 1803 (constructing the tunnel through Morwell Down) and 1817 (although a branch to the Mill Hill slate quarry was finished in early 1819), to provide a means of both transporting the products of copper mines in the Tavistock district to its place of export (Morwellham Quay), and importing products (timber, iron, coal, lime and sand in the opposite direction) from the same Quay to Tavistock and its mines. The canal connected the River Tavy to the River Tamar over a distance of 4.5 miles and for nearly 2 miles runs in a tunnel under Morwell Down. From the south portal tunnel (Site 58.1), it is connected to Morwellham Quay by an incline plane which has a height differential of 237 feet (71 m).

The first iron barges ever used on English canals were used here (the iron barges were towed along the open canal by horses but worked through the tunnel by 2 men using iron bars or iron-shod poles (against the rock face) which also carried ores from (and mine materials to): Wheals Crebor, Crowndale and Friendship (all managed by John Taylor). The barges '*were about thirty feet long and five feet (4ft 6in in Von Oeynhausen & Von Dechen's description. The rudder of one was found in the tunnel in 1976 and is on display at Morwellham – pers comm Robert Waterhouse) beam, the latter measurement being dictated by the narrow width of the tunnel. .. Each carried about eight tons of ore … Tolls of 4s 0d per ton on coal, 1s 6d per ton on copper ore were charged'* (Barton 1964, 93). Other products included granite, limestone, pig lead, and slates. Carriage was affected by the trade depression of the 1820's and 1830's, but by the 1840's and 1850's the mines for which the canal had been built had started to slow down as their lodes were quickly (and unexpectedly) exhausted. Although some attempt was made to compete with the main line railways (built in 1859 – particularly the South Devon Railway to Tavistock), the canal passed to the ownership of the Duke of Bedford in 1873, but by 1883 was derelict and subsequently disappeared from the list of canal returns six years later (Booker 1971, 103-123, DHER 3879, 3882). The canal still carries water, now used by the Morwellham electricity generating power station.

Summary Devon Great Consols Mine heritage features affected by the new Morwell Wood Trail and proposed new Footbridge (see fig 3)

- Site 58 (Tavistock Canal) This site has now been Scheduled.
- Site 58.1 (Tavistock Canal portal tunnel).
- Site 59 (1933 National Power sluice/feed to Reservoir Pond).
- Site 60 (Building remnant-Cottage).
- Site 60.1 (Stables/Smithy and Yard)

Historical summary of George & Charlotte Mine *(Buck 2010, 8)*

George and Charlotte Mine originated in the late eighteenth century, one of many in the locality starting at a small scale. However, the first decades of the 19th century brought about greater financial speculation and investment, resulting in larger neighbouring mine sett amalgamations. Thus, Devon & Cornwall United Mine (an amalgamation of George & Charlotte and William & Mary Mines), from the 1850s worked both sides of the Tamar and Tavy Valleys, pursuing and working the same lode. Although the mine

closed relatively early compared to other mines in the Tamar Valley (George & Charlotte in 1868, and William & Mary in 1872), it was likely that the easily available ore had been worked and processed. However, within the past three decades, George and Charlotte Mine has enabled, for many, an awakening of interest in industrial archaeology and history.

Summary George & Charlotte Mine heritage features affected by the new Morwell Wood Trail and proposed new Footbridge (see fig 9)

- Site 1 (Leat).
- Site 1.1 (Leat cutting).
- Site 2 (Wheelpit).
- Site 2.1 (Balance bob pit).
- Site 3 (Wheelpit header pond).

4 Summary table of sites affected by the scheme

The following sites are identified and described in detail in archaeological assessment reports. The impact significance column shows that some sites are regionally important '**R**', or Locally important '**L**'. The letter in brackets (**H**=High, **M**=Medium, **L**=Low) summarises the impact of the proposed works on the site, Section 5.1 and the site inventory text describes this in more detail (Section 5.2.2). The site number brackets refer to the specific report page number. Figures 3 and 9 show the spatial relationship of the site's significant assets that may be affected by the new Morwell Wood Trail.

Table of archaeological sites and features affected by the scheme (Bold sites are described in Section 5.2.2)

Site No:	Description	Summary condition	Proposed conservation works	WHS Management policies (2005)	Impact significance	Site impact
Wheal Russell Mine						
47 (41)	**Devon Great Consols steam Incline**	**Incline railway bed visible through undergrowth**	**Mitigation to minimise footfall erosion**	**Issue 10 (Policy 10) and Issue 11 (Policy 11c)**	**R (L)**	**New trail crossing over railway bed**
57 (44)	Costean pits	Pits visible from route of track (following old existing track)	None.	Issue 10 (Policy 10) and Issue 11 (Policy 11c)	L (L)	Sites visible from new track
58 (45)	**Tavistock Canal**	**Extant banks, but empty of water (except tunnel end)**	**Construction of new footbridge over canal**	**Issue 10 (Policy 10) and Issue 11 (Policy 11c)**	**R (M)**	**Foundation excavation for new bridge over canal**
58.1 (45)	Tavistock Canal Tunnel Portal	Extant – but top section collapsed and repaired in 1990	None.	Issue 10 (Policy 10) and Issue 11 (Policy 11c)	L (L)	Site visible from new track
59 (46)	National Power Sluice/canal feed	Extant and operational	None.	Issue 10 (Policy 10) and Issue 11 (Policy 11c)	L (L)	Site visible from new track
60 (46)	Building remnant (Cottage)	North wall visible – remainder missing	None.	Issue 10 (Policy 10) and Issue 11 (Policy 11c)	L (L)	Site visible from new track
60.1 (46)	Site of smithy/stable	Site visible as building platform only	None.	Issue 10 (Policy 10) and Issue 11 (Policy 11c)	L (L)	Site visible from new track
61 (47)	Streamworks	Extant visual evidence	None	Issue 10 (Policy 10) and Issue 11 (Policy 11c)	L (L)	Site visible from new track

Site No:	Description	Summary condition	Proposed conservation works	WHS Management policies (2005)	Impact significance	Site impact
George & Charlotte Mine						
1 (26)	Leat	Extant (in places)	None	Issue 10 (Policy 10) and Issue 11)	L (L)	New trail close to original leat
1.1 (26)	Leat cutting	Extant (partially infilled)	None	Issue 10 (Policy 10) and Issue 11)	L (L)	Feature visible from new trail
2 (27)	Wheelpit	Extant (but infilled)	None	Issue 10 (Policy 10) and Issue 11)	L (L)	Feature visible from new trail
2.1 (27)	Balance bob pit	Extant (but infilled)	None	Issue 10 (Policy 10) and Issue 11)	L (L)	Feature visible from new trail
3 (27)	**Wheelpit header pond**	**Extant (but infilled)**	**Routeway for footpath**	**Issue 10 (Policy 10) and Issue 11)**	**R (H)**	**New trail crossing over header pond**

5 Assessment of impact and mitigation

5.1 Impact significance definitions

The potential impacts during works are described below (and summarised in Section 4), for each site. Impacts are described in the text section for each site on a feature-by-feature basis. The following site impact terms are used within each site identification description relating to the impact assessment and site gazetteer:

Major positive	Site continues in, or is restored to, its original design and use.
Moderate positive	Site restored as far as possible respecting its original function, but its use is altered.
Minor positive	Site partially restored; interpretation introduced.
Negligible positive	Stabilisation/maintenance of site.
Negligible negative	Benign neglect – losses of fabric over a long period of time.
Minor negative	Site suffers areas of alteration or damage, which contribute to loss of meaning.
Moderate negative	Significant loss of fabric or alteration, leading to erosion of original character.
Major negative	Complete demolition/removal.

5.2 Site works

5.2.1 Site impact and remediation summary

The TVMHP has included all the track creation works within the new Morwell Wood Trail into a single programme starting from the end of March 2012 to the end of May 2012. It is likely that the successful tenderer will undertake the new trackway works, with separate contractors for the installation and erection of the new bridleway bridge.

There is no detailed schedule of works and specifications report, although basic specifications are given on the Knevitt site drawings (Figs 5 and 6). However, there has been an ongoing process of site consultation between the TVMHP site archaeologist, the project engineer and the TVMHP manager, to ensure that the nature and extent of the proposed works/impacts for every site is mitigated and minimised.

Figures 3 and 9 indicate the proposed route of the new trail, and the proximity to known archaeological sites. For the most part the 'new' track will be using existing paths and tracks through Morwell Wood. Only the last 50 metres will be formed as a new track around Sites 60 and 60.1. This comment also applies to the track east of the canal, where the last 100 metres traverses the upper archaeological remains of a wheelpit west of George & Charlotte Mine. There are no sites for building conservation. Site meetings and consultations will be held to ensure compliance with conservation guidelines.

Other general impacts:

Site compounds and site (vehicular) access

There is a SWW track access to the Tavistock Canal (from the south), which is likely to be used for site access, trail works and footbridge installation. This is shown on Figures 1-3.

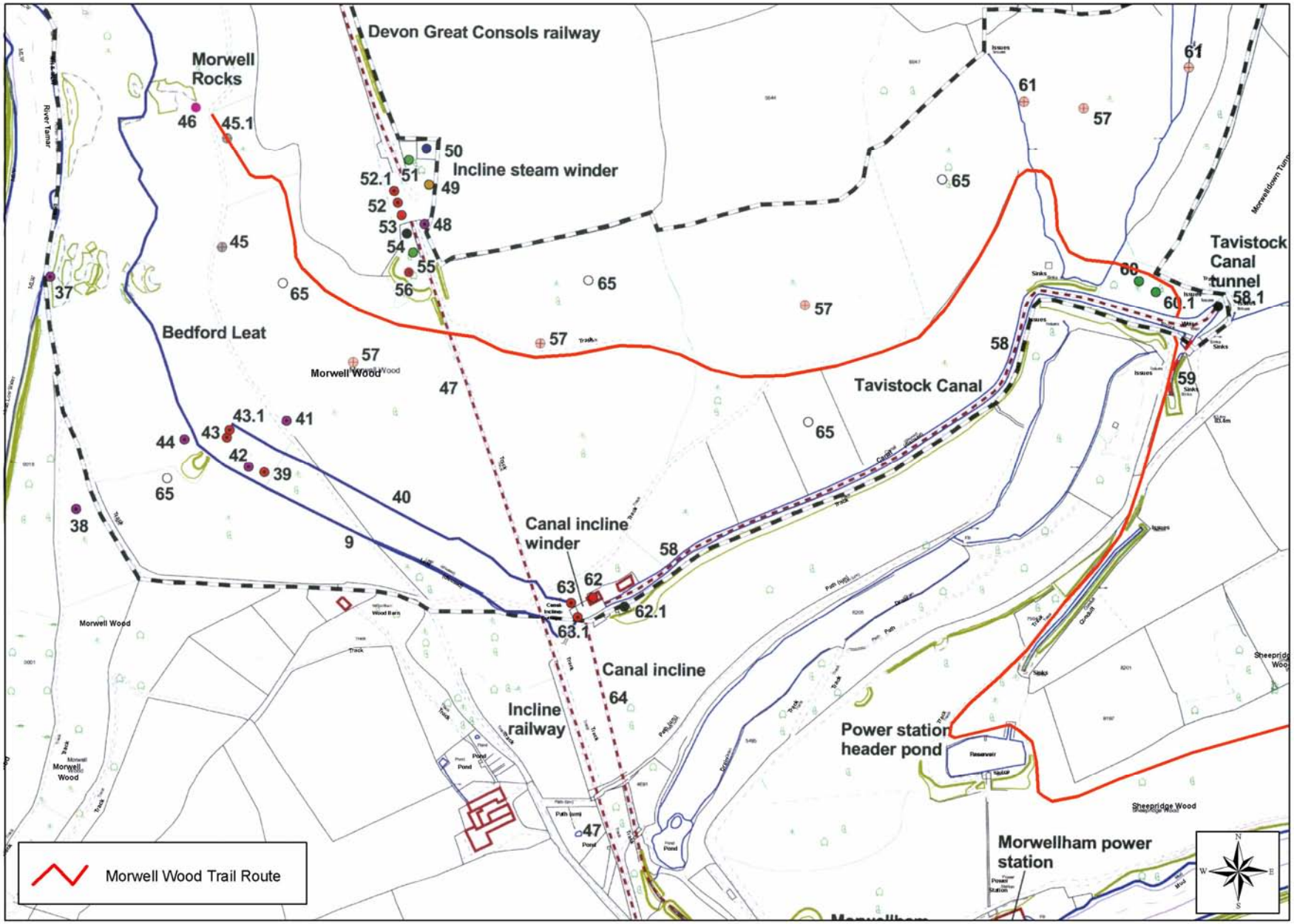


Figure 3 Map showing archaeological sites (Buck 2006) relating to the new Morwell Wood Trail

Impact reduction measures:

A method statement will be produced by the TVMHP, and (where relevant) by the site contractors in order to promote a reduction of the impact of creating the new track works on the fabric and character of the site.

An archaeological consultancy and archaeological recording during the site works may be able to minimise any further below ground site impacts, but also record any visible/disturbed archaeological features and to record the nature and extent of the building conservation works. A Cornwall Council project design for this function has been produced in the Appendix (9.1) at the end of the report.

Residual impact mitigation:

There will be the residual impact of the creation of a new footpath (timber stepped at steep locations), and new fencing where necessary along a short section leading down to the new footbridge over the Tavistock Canal and further south through the top of Sheepridge Wood. However, the residual visual impact will soon fade, as the benefits in terms of increased public access and increased site information will come to fruition as a substantial public gain.

For the new footbridge installation project, there will be the visual effect of a new structure – although this will fade from memory in time. However, it is hoped that by using a careful choice of a simple timber footbridge design which carefully reflects some of the perceived characteristics of an early 19th century canal, its 'newness' will be mitigated and in fact be seen as being both practical and positively reflecting the site's character.

It is certain that there will be regular visiting members of the public throughout the year, and that there will initially be a small increase in site visitor numbers. However, the scheme has been carefully and thoughtfully designed by the TVMHP to minimise negative affects to the character of the site.

5.2.2 Site inventory impact description and remediation measures

The following sites are described in detail in the relevant archaeological assessment report (Wheal Russell Mine, Buck 2006; 2010), each summarised in bold in Section 4, but all are shown on a site plan in Figs 3 and 9. All the sites mentioned above have variable impacts, but most are very low (i.e., only visible from the new trackway), see Figure 4 for impact remediation sites. Therefore the following detailed site descriptions only refer to site or safety impacts that have a direct impact (i.e., bold sites in Section 4). The impact of the works on each site is described, followed by a section describing the reduction (or mitigation and remediation) of each impact, then a final section which details the residual impact. To avoid repetitive duplication in this site inventory section, site impact and remediation measures already given in Section 5.2.1 are not reproduced, simply referred to.

Devon Great Consols Incline Railway (Site 47) SM 30973

SX 44281 70353 (Incline Winder) to SX 44527 69571 (Morwellham)

Site impact

The incline railway crossover site is at SX 44304 70435 (see Fig 4). The main impact on the steam incline railway track bed would be one of footfall wear and tear. This narrow site is now a Scheduled monument, but visually it consists of a cleared tree line of hillside 6.0m wide sloping down towards Morwellham. There are no visible archaeological features. It is proposed to protect the surface of this feature (which does not appear through the undergrowth to have any evidence of visible track bed material), by applying a cover (2.0m wide and 4.0m long) of stone, edged by timber kept in place by small timber stays (see Fig 5). An alternative design can be accommodated if it is a condition of the Scheduled Monument Consent.

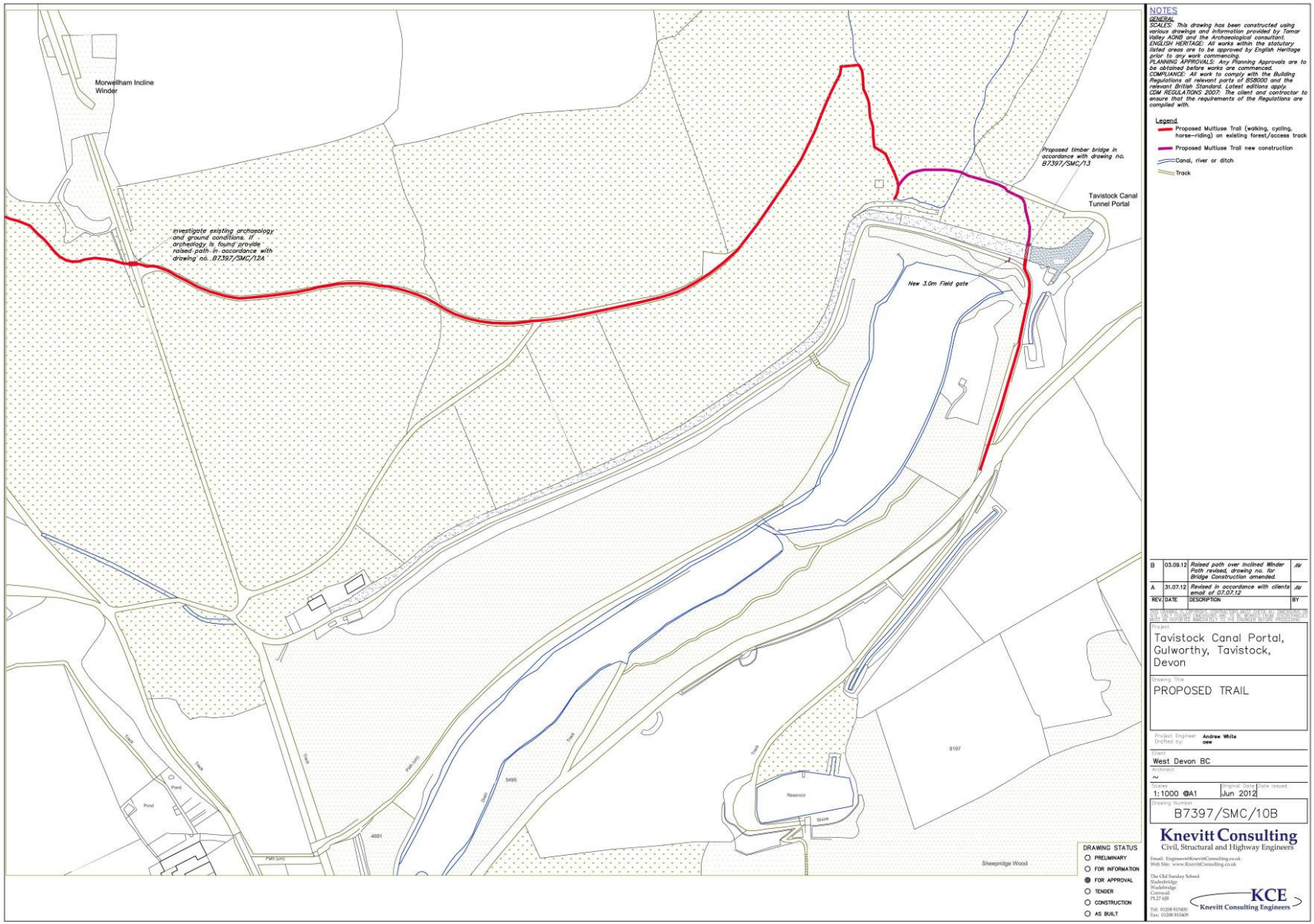


Figure 4 Map showing trail impact sites (Knevitts)

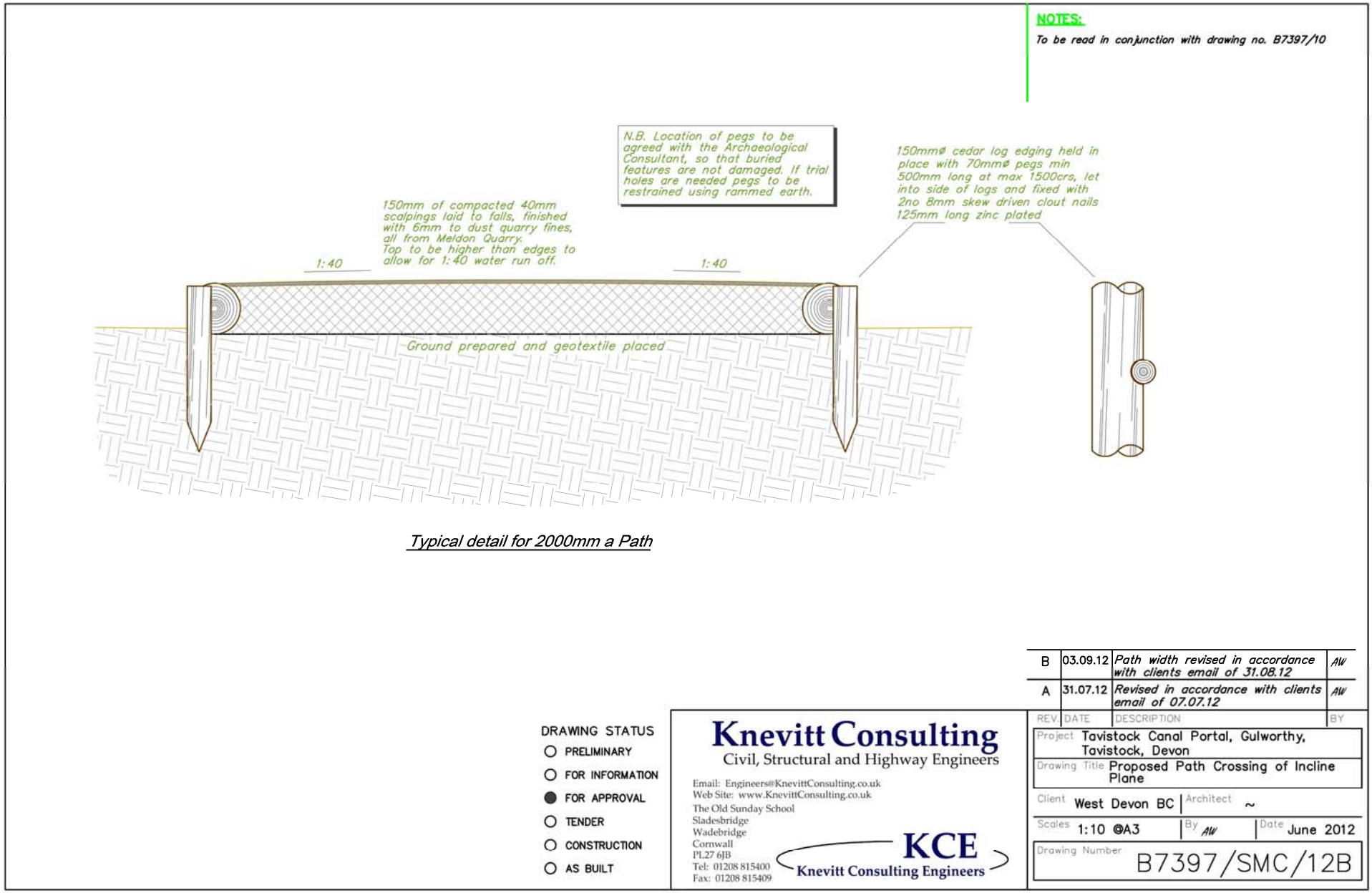


Figure 5 CAD section drawing of impact remediation for crossing incline track bed (Knevitts)

Given that the land north of the proposed crossing point over the incline track bed is privately owned, it may be prudent to erect signage near this point to restrict public access upslope.

The overall impact of the proposed works on this feature can be defined as *'Negligible positive'*. The works will provide a safe access route and inform the site's mining background to its visitors.

Reduction of impact

The site contractors and the TVMHP have attempted to minimise the visual impact of the scheme by giving careful thought to the specifications and design of the material designed to protect the surface of the Scheduled incline railway. In addition, the design of the fencing (located north of this cross-over site), with timber post and wire fencing, should have a minimal visual impact, which should not detract from the character of this linear feature.

Residual impact

The main significant residual impact is the presence of a protective material (probably crushed bark) over the feature, and new site fencing (for approximately 10m). However, natural oak/chestnut timber is being used for the works where possible. It is expected that there will be a steady increase of site visitor numbers, as local walkers learn of and appreciate.

New track through Morwell Wood (see Figs 1, 3 and 4 for site location)

SX 4412870435 (west end) to SX 44857 70281 (new footbridge)

Site impact

A high percentage of the route is along pre-existing tracks and paths (see Fig 1). Some of these tracks are old and are shown on archive maps (Buck 2006, fig 8: 1884 OS). Thus, there will be no site impacts – apart from that described in Site 47 (DGC Incline Winder) and wear and tear through footfall.

However, part of this project will necessitate the creation of a short 50 metre section of new track to deviate from the old route (across the top of the Tavistock Canal – see Fig 2), down to the new bridleway footbridge across the Tavistock Canal (see Figs 3 and 4). This will be created by cutting and infilling the ground surface for a very shallow depth and width of 1.5m between/around the archaeological site numbers 60 and 60.1, possibly using oak timber edging to form the side of the trackway. There may be the necessity of fixing and insertion of oak timber steps and short posts (of varying sizes), into the ground – if the ground slope is deemed to be too steep. These ground impacts should be minimal. However, the main impact is the visual effect of these new features on the setting and character of the woodland landscape.

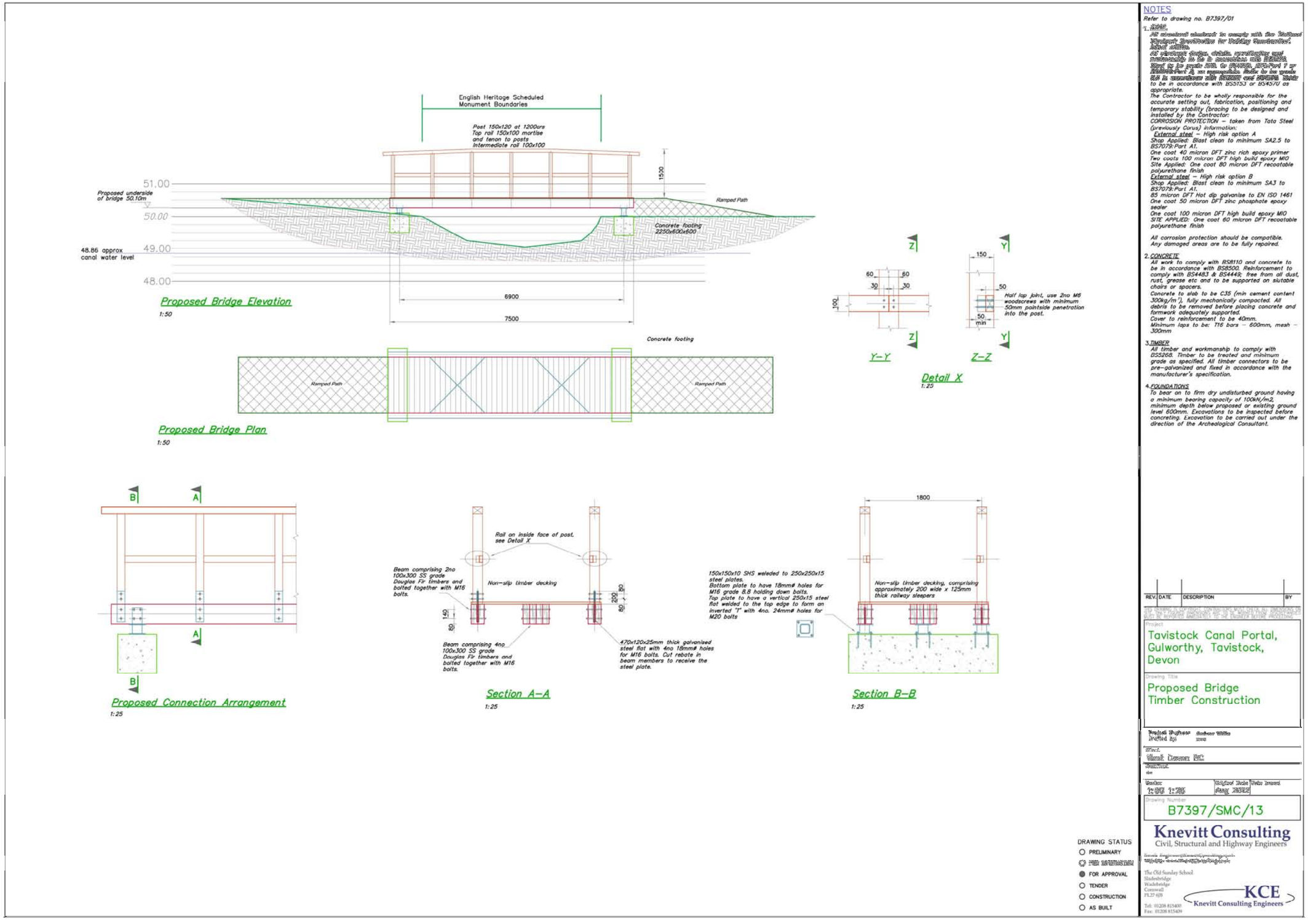
The overall impact of these proposed works on the site can be defined as *'Negligible positive'*. The works will provide a greater element of safety and minimise footfall, although it will negatively affect the site's visual authenticity as a natural woodland environment.

Reduction of impact measures:

The site contractors and the TVMHP have attempted to minimise the visual impact of the scheme by giving careful thought to its route, location and extent.

Residual impact mitigation:

There will be residual visual impacts of the track creation itself, mainly visible from the track itself. If timber sides or steps are to be used, natural oak timber will complement the surrounding deciduous tree landscape, and will naturally discolour and age, in its original woodland setting.



NOTES

Refer to drawing no. B7397/01

1. GENERAL
All structural steelwork to comply with the National Structural Specification for Building Construction, latest edition.
All structural design, details, specification and workmanship to be in accordance with BS5950.
Steel to be grade 43A to BS4360, S275JR or S275J0 or Eurocode A as appropriate. Bolts to be grade 8.8 in accordance with BS3692 and BS4190. Welds to be in accordance with BS5135 or BS4570 as appropriate.
The Contractor to be wholly responsible for the accurate setting out, fabrication, positioning and temporary stability (bracing to be designed and installed by the Contractor.
CORROSION PROTECTION – taken from Tata Steel (previously Corus) information:
External steel – High risk option A
Shop Applied: Blast clean to minimum SA2.5 to BS7079: Part A1.
One coat 40 micron DFT zinc rich epoxy primer
Two coats 100 micron DFT high build epoxy MIO
Site Applied: One coat 80 micron DFT recoatable polyurethane finish
External steel – High risk option B
Shop Applied: Blast clean to minimum SA3 to BS7079: Part A1.
85 micron DFT Hot dip galvanise to EN ISO 1461
One coat 50 micron DFT zinc phosphate epoxy sealer
One coat 100 micron DFT high build epoxy MIO
SITE APPLIED: One coat 60 micron DFT recoatable polyurethane finish

All corrosion protection should be compatible.
Any damaged areas are to be fully repaired.

2. CONCRETE
All work to comply with BS8110 and concrete to be in accordance with BS8500. Reinforcement to comply with BS4483 & BS4449; free from all dust, rust, grease etc and to be supported on slutable chairs or spacers.
Concrete to slab to be C35 (min cement content 300kg/m³), fully mechanically compacted. All debris to be removed before placing concrete and formwork adequately supported.
Cover to reinforcement to be 40mm.
Minimum laps to be: T16 bars – 600mm, mesh – 300mm

3. TIMBER
All timber and workmanship to comply with BS5268. Timber to be treated and minimum grade as specified. All timber connectors to be pre-galvanized and fixed in accordance with the manufacturer's specification.

4. FOUNDATIONS
To bear on to firm dry undisturbed ground having a minimum bearing capacity of 100kN/m2, minimum depth below proposed or existing ground level 600mm. Excavations to be inspected before concreting. Excavation to be carried out under the direction of the Archeological Consultant.

REV.	DATE	DESCRIPTION	BY

Project
Tavistock Canal Portal, Gulworthy, Tavistock, Devon

Drawing Title
Proposed Bridge Timber Construction

Drawing Number
B7397/SMC/13

DRAWING STATUS
- PRELIMINARY
- NOT APPROVED
- FOR APPROVAL
- TENDER
- CONSTRUCTION
- AS BUILT

Knevitt Consulting
Civil, Structural and Highway Engineers
The Old Sunday School
Sladesbridge
Wadebridge
Cornwall
PL27 6JB
Tel: 01208 815400
Fax: 01208 815409
KCE
Knevitt Consulting Engineers

Figure 6 Detailed plan, section drawing and specifications of the proposed new footbridge crossing the Tavistock Canal (Knevitts)

Tavistock Canal (Site 58) SM 30973 SX 44857 70281 (Site of new Footbridge)

Site impact

The main impact on this Scheduled feature is an excavation for concrete footings 0.5m outside the Scheduled area of the canal basin of an area dimensioned as 2250m x 600m X 600m on each side of the canal bank.

These foundations would support each side of the bridleway/footbridge. The other impact is one of visual change and character impact. The simple timber design of the bridge (see Fig 6) attempts to give credence to the early 19th century origin and character of the canal – although the section bridged over is currently empty of water. In addition, the wooden design of the bridge reflects the nature of the surrounding woodlands as well as the traditional 19th century nature of a bridge of this type. The ground either side of the bridge would be ramped up to provide easy access onto the bridge. A positive impact however, is to slightly increase public access to this part of Morwell Wood, and to raise awareness of the location and history of the Tavistock Canal. The overall impact of the proposed works on this feature can be defined as *'Negligible positive'*.

Reduction of impact

The timber design of the bridge has attempted to fulfil both structural and Health & Safety issues (for a bridleway bridge), but also to maximise the character of the 18th century canal and its woodland setting. The bridge has been built using timber to reflect a traditional 19th century design, and the site's woodland setting.

Residual impact

The main significant residual impact is the construction of a bridge where there has never been a bridge at this site (although when the canal was operational in the 19th century, there were a number of small footbridges over the canal (either rope or timber).

Fig 7 A view of the new Footbridge site over Tavistock Canal © CC HE Projects 2012

Fig 8 A view of the Tavistock Canal west tunnel portal © CC HE Projects 2002

New track through Sheepridge Wood SX 44857 70281 (new footbridge) to SX 45101 69962 (existing new trail from Morwellham)

Site impact

Figures 1 and 3 are excerpt plans of the location of the new footpath. Part of this project will necessitate the creation of a new track route from the new Tavistock Canal footbridge, south of Sheepridge Farm along the top of the steep Tamar Valley to join up with existing tracks at SX 45101 69962. The approximate location of adjacent (visually impacted) archaeological features (Site 3), are shown on Figure 4. These features, relating to George and Charlotte Mine have previously been assessed as part an archaeological assessment of the mine (Buck 2010). The impact of the footpath creation will involve the on-site construction of ground level timber stepped features (to ensure a stable footpath at locations where necessary), whose design and use will minimise the impact of the scheme in a woodland setting, within an area of great historic character.

This new route will primarily utilise an existing (un-designated) footpath, with a new section formed at its eastern end – by cutting and infilling, and using oak timber edging to form the side of the trackway where appropriate. Other sections will consist of occasional fencing and vegetation/tree branch removal, etc) and insertion of oak timber steps and short posts (of varying sizes), into the ground. These impacts should be minimal. However, the main impact is the visual effect of the trackway on the setting and character of the woodland landscape.

The overall impact of these proposed works on the site can be defined as *'Negligible positive'*. The works will provide a greater element of safety and minimise footfall, although it may negatively affect the site's visual authenticity as a natural woodland

environment. However, it will enhance the public access and understanding of the site as part of a new route from east to west.

Header Pond (Site 3) SX 45145 70020

Site impact

The Header Pond functioned to provide a head of water for the waterwheel (Site 2 – see Fig 4), which worked flat rods up the side of the valley to pump out shafts sunk on the lode. The header pond is visible, with an intact wall constructed at the south end of the valley slope. Water from an upslope stream still cascades through the pond site. The main impact on the header pond site will be one of footfall wear and tear.

The overall impact of the proposed works on this feature can be defined as *'Negligible positive'*. The works will provide a safe access route and inform the site's mining background to its visitors.

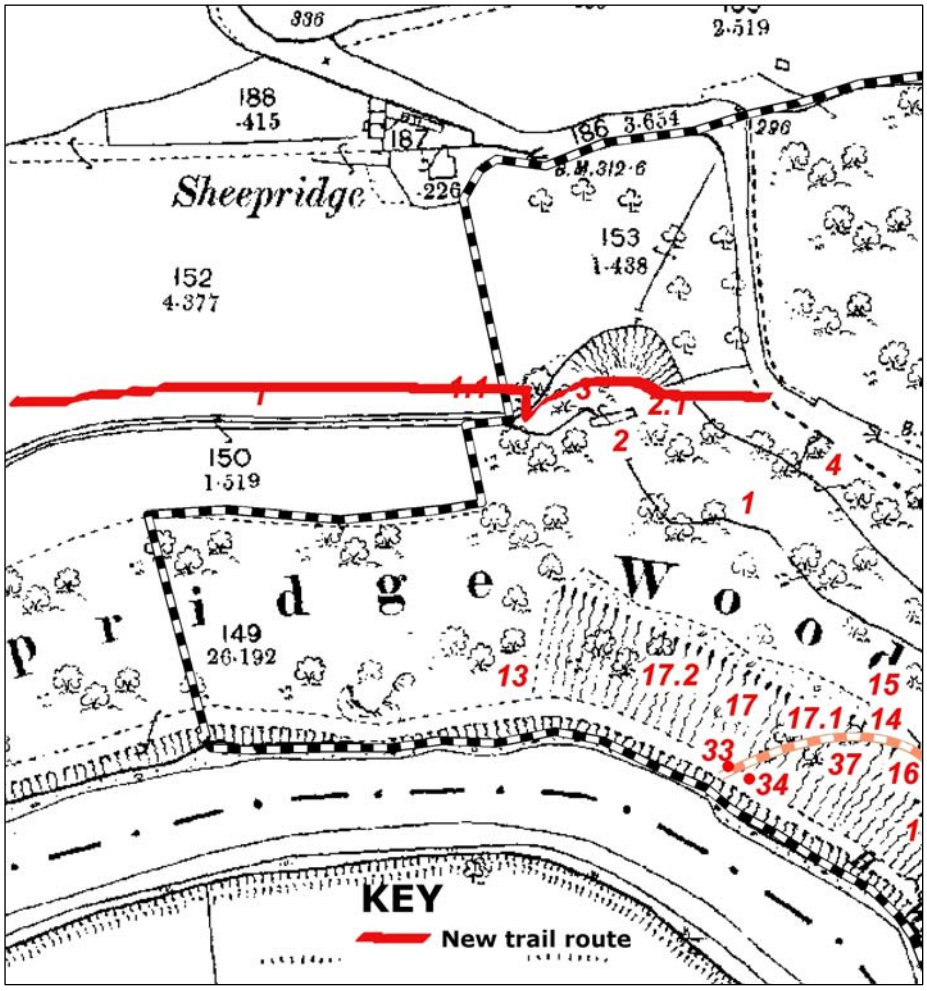


Figure 9 Inventory map excerpt (Buck 2010, fig 18) showing archaeological sites relating to the proposed new trail around part of George & Charlotte Mine

Reduction of impact

The site contractors and the TVMHP have attempted to minimise the visual impact of the scheme by giving careful thought to the specifications and design of the material designed to protect the ground surface. In addition, the design of the fencing (located north of this cross-over site), with timber post and wire fencing, should have a minimal visual impact, which should not detract from the character of this linear feature.

Residual impact

The main significant residual impact will be the visual clearance of vegetation and creation of the new footpath through the feature. It is expected that there will be a steady increase of site visitor numbers, as local walkers learn of and appreciate the site.

5.3 Fencing works

Safety remediation works to newly opened tracks and footpaths have been undertaken during the TVMHP for the past three years. Additional fencing has been necessary in places along the new routes for safety reasons. The specifications for the fencing have been designed to reflect the woodland character of the site. These works have been formulated and constructed with the agreement of the TVMHP, Devon Historic Environment Service and each landowner. Archaeological recording and consultancy have been undertaken during these works by Historic Environment Projects, Cornwall Council. An archaeological watching brief report will be produced to include these fencing/trail works and construction of the new footbridge.

5.4 Public access & interpretation

5.4.1 Site description, site impact and impact remediation

Public access is restricted to well-defined (multi-use and trackway) routes within and from Devon Great Consols to Bedford Mine. They are primarily owned by a private landowner, Adrian High.

Site interpretation facilities have been installed at the Tavistock Woodlands Car Park (SX 43829 728969), in a newly built 'Orientation centre'. Smaller and site specific information boards and sign posts/way-link guides will be distributed along the new Tavistock trail at appropriate sites. However, in addition, web based site information and leaflets are planned for production by the TVMHP via the Tamar Valley Area of Outstanding Natural Beauty (TVAONB).

An archaeological watching brief recording and archaeological consultancy during the fencing safety works may be able to minimise any further site impacts.

Site impact

The overall impact of the public access and interpretation project on the site can be defined as '*Negligible positive*', and of very low impact. The works will provide a greater element of site information and safety and should not negatively enhance the site's visual authenticity.

Residual Impact

Fencing, signage, etc will have a localised, visual impact on the site and increased trampling may damage habitat/disturb wildlife.

Reduction of Impact

The visual impact of fencing, signage, etc will be reduced through careful project design, siting and installation of these features. Limited public access is to be provided, routed away from sensitive/hazardous areas.

5.5 Description of impacts during the post-project stage

The TVMHP aims to utilise a newly created localised network of multi-use trails (using former railway lines and footpaths), in and around the mining landscape of Devon Great Consols southwards to Morwellham Quay (via Wheal Russell Mine, George & Charlotte Mine towards New Quay/Gawton). It is likely that in the future these will link up to other footpath and trail routes in the west Devon area (and possibly into Cornwall, for example, Kit Hill). As a result there may be the physical consequences in the short term of having a slightly greater number of people visiting these sites than

previously. In addition there will be an ongoing need for annual vegetation maintenance from some paths and buildings with very occasional repair of occasional dislodged masonry. It is expected that the TVAONB will undertake site inspections (utilising public volunteer groups as part of an agreed Management Plan), along trackways and parts of the site that are subject to building conservation works.

The TVAONB has produced a Ten Year Management and Maintenance Plan (2006), in order to define and advise the various groups (volunteers, etc) that will be involved in managing and maintaining the archaeological features within both Scheduled Monument areas and other adjacent World Heritage Site areas (Area 10: Tamar Valley).

5.6 Residual impacts

Any short term residual and regular maintenance issues (for example, vegetation growth and possible vandalism) will be inspected (and work undertaken) by the TVAONB volunteer group. This should ensure that impacts to the site, if they occur, should be short lived and quickly mitigated.

After the building conservation work has ceased and the site is open to members of the public, the main residual impact will be visual – in terms of new fencing and new bridleway bridge construction. However, after a relatively short period of time the 'newness' of the bridge will fade in time and become part of the character of the Scheduled site.

5.7 Assessment of impact on landscape character

The Tavistock Woodlands Estate, a private company working the woodland as a business (owned by Lord Bradford), owns much of the east side of the Tamar Valley. However, part of this area landscape is characterised not by 19th century mine working remains, but earlier streamworking activity of the 13/14th centuries within Morwell Wood.

Devon's Historic Landscape Characterisation project has been consulted and characterises most of the area as 'Ancient Woodland' and 'Woodland'. It is likely to date back at least to the medieval period, if not beyond.

The existing management of the site, and its impact could be defined as being of 'partial benign neglect'. The TVMHP (Management Plan) aims to conserve the most important and significant sites within the upper reaches of the Tamar Valley.

The overall impact of the proposed works on this significant site can be defined as **Negligible positive**: *Stabilisation/maintenance of site.* Within the project area the landscape character will be changed in the short term through track creation, vegetation clearance, and construction/use of the new bridleway bridge. On balance the negative effect of these changes are minor and will diminish in the short term while providing a safe access route through Morwell Wood and across the canal. There will also be an interpretation board to understand the history and function of the Tavistock canal which does not exist at present).

6 Impact mitigation strategy: archaeological consultancy

The impact mitigation strategy methodology is described below in three main stages: The pre-works consultancy, the archaeological consultancy during works and the archaeological recording record (during and after works). This mechanism demonstrates the steps that have been taken to avoid or minimise adverse impacts, confirms that the proposed works have been designed in close liaison with the historic environment consultant. This is based on a clear understanding of the significance of the site using appropriate methods and techniques for site monitoring and recording.

6.1 Pre-works consultancy

The process developed by Historic Environment, Projects team, Cornwall Council when undertaking archaeological consultancies includes an important element of mitigating the impact of the works on the site during the project planning and specification stage. This process has been ongoing during the past year. It has included an extensive dialogue with the project's structural and geotechnical engineer and the TVMHP officers. When the minimal impact of the scheme on any historic feature, landscape resource and historic character has been achieved as far as possible, the scheme progresses to any statutory/non statutory consent application and then the tendering stage for site contractors leading to site implementation works.

6.2 Site Consultancy

The TVMHP manager has commissioned an archaeological consultant based on the Cornwall Council project design (re-produced in Appendix 9.1). Once the project details and specifications have been agreed and contractors commissioned, the project team (project manager/structural engineer/ecological consultant/archaeological consultant), will ensure through dialogue that the impact of the conservation works by the site contractors is minimised as far as possible.

The archaeological consultant will monitor and advise on compliance to ensure (through a site meeting), that the methodologies and techniques of all aspects of the site works accord with the method statements and agreed methodologies outlined in any schedule of works and specifications. In addition the TVMHP Principal Officer will enforce requirements based on the archaeological consultant advice.

A site meeting will be held at the completion of works to ensure that the site contractors clear the site of all debris, etc and to undertake a final visual check of the completed works. Site monitoring meetings and communication strategies with Cornwall Council (WHS Advice) are also described in detail in the Cornwall Council Historic Environment Project (C Buck) project design (Appendix 9.1).

Consultancy with other related specialists prior to and during the works (for example, geotechnical and structural engineers, and the TVMHP manager), will be an ongoing process, an integral part of the archaeological consultancy, in order to create a site that will not be unduly affected by loss of significance or historic character as a result of carrying out the works, but rather its access, historic importance and site interpretation is enhanced by the project.

Regular site progress updates (every two weeks) will be provided by the archaeological consultant to the TVMHP Principal Officer and DCC archaeology (Bill Horner, County Archaeologist), usually in the form of emails. If an issue occurs where any remediation or design/construction works may go beyond that given approval by existing consents, as much advanced notification as possible will be given to EH/DCC archaeology for a site consultation, etc.

6.3 Programmes of archaeological recording

The TVMHP will commission an archaeological consultant who will also undertake the archaeological watching brief recording and production of a final report. A Cornwall Council project design describes a detailed programme of archaeological recording, site monitoring and watching brief report production (Appendix 9.1). DCC archaeology and the Cornwall Historic Environment Service (Advice) should approve this before works start.

Given the very small amount of new construction work, the detailed on-site archaeological recording techniques will only include detailed site photography (black/white and digital colour). The archaeological recording report will include detailed 'before and after' site photographs as well as a descriptive text of the general works (refer to Appendix 9.1).

7 References

7.1 Primary sources

DRO Mine Plans:

T1258M (Bedford Estates Archive-leases, maps and Reports on Mines/Quarries)

TVMHP., 2006, *HLF TVMHP Management Plan*

7.2 Publications

Barton, D.B., 1961, *A History of Copper Mining in Cornwall and Devon*, Truro.

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Bennett, A., 1992, *Images of Cornwall*, Runpast Publishing

Booker, F., 1971, *The Industrial Archaeology of the Tamar Valley*, Newton Abbot

Brooke, J., 2001 ed *Kalmeter Journal*, Twelveheads Press, Truro

Buck, C., 1998, *Preliminary assessment of industrial sites of archaeological importance*, CAU Report

Buck, C., 2002, *Devon Great Consols Mine – Assessment Report*, CAU Report (2002R069)

Buck, C., 2006, *Wheal Russell Mine – Assessment Report*, CAU Report (2006R004)

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Collins, J.H., 1912, *Observations on the West of England Mining Region*, 1988.

Dines, H.G. and Phemister, J., 1956 (reprinted, Beer, K.E., 1988), *The Metalliferous Mining Region of South-West England*, HMSO

Hall, G.W., 2000, *Mines of the Sixties*, Griffin Publications

Jenkin, A.K.H., 1974, *Mines of Devon, The Southern Area*, Vol. 1 David and Charles

Patrick, A., 1983, *Copper production in the Tamar Valley in the Eighteenth Century*, Tamar Journal, Vol 5

Richardson, P, H, G., 1992, *Mines of Dartmoor and the Tamar Valley after 1913*

Thorpe, S, 2005, *Cornwall and West Devon Mining Landscape-Management Plan*, HES/CCC

7.3 Websites

http://www.stastier.co.uk A particularly useful website by the manufacturers of St. Astier brand lime products detailing methodologies for their application.

http://www.cornishlime.com The website of the Cornish Lime Company

http://www.matchingbrick.co.uk A useful website for those seeking matching brick for the repair of historic structures

8 Project archive

The HES project number is **2012011**

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

1. A project file (2012011) containing site records and notes, project correspondence and administration.
2. This report held in digital form as: G:\TWE\Waste & Env\Strat Waste & Land\Historic Environment\Projects\Sites\Devon\Morwell Wood trail 2012011\ Morwell Wood Trail IA Report 2012011.doc
3. OASIS No. 134894

9 Appendices

9.1 Historic Buildings Consultancy and archaeological watching brief project design (Appendix 1)

Tamar Valley Mining Heritage Project: 21/9/2012

Written Scheme of Investigation:

Tavistock Canal archaeological consultancy and watching brief during footpath and Footbridge construction over Tavistock canal

Client: Tamar Valley Mining Heritage Project

Client contact: C Hariades, Tamar Valley Mining Heritage Principal Officer

Client tel: 01872 888125

Client email: chariades@cornwall.gov.uk

1 Background

1.1 Introduction

The Tamar Valley Countryside Service, through the Tamar Valley Mining Heritage Project Officers, is managing conservation works to five historic industrial/mining sites in West Devon (Tamar valley) as part of the second stage of a Heritage Lottery Funded Mining Heritage Project. All of the sites are located within the proposed Cornwall and West Devon Mining Landscape World Heritage Site (see Thorpe, 2005 and Buck 2002-6).

This Written Scheme of Investigation (WSI) has been prepared by the Historic Environment Service (Projects), Cornwall Council, to set out how the archaeological recording and consultancy works are to be undertaken. These consist of an appropriate level of archaeological recording likely to be required by conditions on the appropriate Planning, and Scheduled Monument Consents, which are yet to be granted. These conditions are likely to require that a WSI should be produced by the archaeological contractor for:

A programme of archaeological recording and site consultancy

This WSI will be submitted by the Tamar Valley Mining Heritage Project (TVMHP) to the Devon County Historic Environment Service (DCHES), the Local Planning

Authority (LPA) where relevant, English Heritage (for Scheduled sites), and the World Heritage Site Advice Team, CC, for written approval before work begins on site.

1.2 Project Background

The conservation and management of features relating to the TVMHP's mining heritage and enablement of safe public access forms the basis for a proposed new trail linking the TVMHP Devon Great Consols (DGC) Mine/ Morwellham trail footpath skirting Morwellham via George & Charlotte Mine. This report will assess the impact of the proposed new trail and Tavistock Canal Footbridge works within Morwell Wood and above Morwellham's significant assets. There are no detailed Schedule of Works and Specifications for the trail, although there is for the proposed new Footbridge over the Scheduled Tavistock Canal. A report has been produced which describes how the impact of the proposed works are minimised as part of a coherent mitigation strategy.

The Historic Environment Projects team, Cornwall Council produced an archaeological assessment of Wheal Russell Mine in 2006 (Buck 2006), which includes the section of trail north of the Tavistock Canal and the site of the proposed new Footbridge over the canal (see Fig 1). The section of Trail south of the canal has not been assessed in any recent archaeological report, although George & Charlotte Mine to the east has been assessed (Buck 2010).

The Historic Environment Service Projects team was commissioned in February 2012 (Project No. 2012011), by the Tamar Valley Mining Heritage Project (Chris Hariades as TVMHP Project Manager), to undertake archaeological consultancy, enable DCHES and WHS consent, and to specify the nature and extent of the site impacts for the new Morwell Wood track. In addition, the impact assessment report will be used as part of an application for Scheduled Monument Consent (SMC) from DCMS for crossing over the Scheduled incline railway bed (SM No. 30973) and the placement of a new footbridge over the Tavistock Canal (also a Scheduled Monument: No. 30973).

A summary statement of significance relating to features likely to be affected by the proposed works has been produced, followed by a summary table of each site's assets (See Buck 2012, Section 3.3).

It is proposed that the project will address the following:

- The protection and consolidation of impacted significant archaeological remains in their settings.
- Health and safety aspects of the site relating to public access.
- Provision of low-key public amenity use where appropriate, incorporating access.
- Interpretation of the site to the public, including on-site and written materials.

In terms of the management of archaeological features, engineering works will be kept to a minimum, but in view of the fact that the entire site is part of the Tamar Valley component (Area 10) of the Cornwall and West Devon World Heritage Site mining landscape, particular attention has been paid to suggestions for the best mitigation of any such works.

2 Site information and structures to be treated

The suggested level of archaeological consultancy/recording for the project area should be referred to when reviewing Section 2 below.

(March 2012 – May 2012)

The proposal is to open 1km of a new footpath route within parts the former Wheal Russell Mine and George & Charlotte Mine, utilising existing forest tracks and features (See Buck 2012, Figure 2). The route has been designed to make the most of the natural beauty and archaeological history of the area, while at the same time avoiding disturbance to local residents, and to sensitive ecological sites.

The project will include carrying out safety works (and reducing vegetation), within a buffer zone of the new track, including fencing known mine shafts.

Site consultancy will include footpath detouring around any known archaeological features. These features are described in detail in Buck 2005 (Report No. 2006R0004):

Summary of archaeological features affected by the new Morwell Wood Trail

- Site 47 (the Incline Railway)
- Site 57 (Costean pits)
- Site 61 (Streamworks)
- Site 58 (Tavistock Canal) Scheduled Monument (SM 30973)
- Site 58.1 (Tavistock Canal portal tunnel)
- Site 59 (1933 National Power sluice/feed to Reservoir Pond)
- Site 60 (Building remnant-Cottage)
- Site 60.1 (Stables/Smithy and Yard)

An archaeological impact assessment report describing in detail the archaeological site impacts has been produced (Buck 2012, Rep No. 2012R064), and forms part of Scheduled Monument Consent.

3 Aims and objectives

The purpose of the archaeological consultancy and archaeological recording is:

- To ensure that site works are undertaken in such a way as to maintain the integrity and authenticity of the historic resource, minimising adverse impact upon the resource.
- To ensure that the highest possible standards of workmanship are maintained during the construction/erection works, which must be carried out to recognised current best standards in this discipline.
- To ensure that works are undertaken in such a way as to allow adequate recording of remains affected by the works,
- To record sites, features, deposits and artefacts affected by or uncovered by the works.
- To record the character and extent of works to the sites.
- To disseminate the results of the project appropriately and arrange for the deposition of the project archive.

4 Working methods

All archaeological recording work will be undertaken according to the Institute of Field Archaeologists *Standards and Guidance for Archaeological Investigation and Recording.* Staff will follow the IFA *Code of Conduct* and *Code of Approved Practice for the Regulation of Contractual Arrangements in Archaeology.*

The principal factor in effective project delivery will be the employment of key project staff who are expert in the management and recording of the industrial heritage. Cornwall Historic Environment Service project staff are able to draw upon a substantial track record in undertaking similar work throughout Cornwall, as well as a detailed knowledge of the project area and its sites.

4.1 Archaeological consultancy

- HES (Senior Archaeologist) will attend a pre-works meeting to agree site access and site compound and stockpile areas in order to minimise damage to archaeological features, agree site compound location, agree details of

location/preparation/number of mortar test panels, agree working methods and any changes to proposed work programme and discuss Health and Safety issues and requirements.

- The HES (Senior Archaeologist) will liaise with the Devon County Historic Environment Service - DCHES (Bill Horner), English Heritage (Inspector for buildings and ancient monuments (Phil McMahon) the WHS Management team (Phil Copleston) and the TVMHP Officers (Chris Hariades and Richard Halliwell). The HES Senior Archaeologist will liaise with any additional archaeological recording officer on the extent of works carried out and the appropriate level of recording.
- HES (Senior Archaeologist) will provide archaeological consultancy advice to the site engineer and site contractor in line with English Heritage guidelines (referred to in section 7 below) during regular site visits.
- It is anticipated that an HES Senior Archaeologist (Colin Buck), will undertake archaeological recording as part of this work. This person will also photograph any sites that are to be impacted before, during and after works take place – liaising with any additional project recording archaeologist and undertake to fulfil any specific recommendations made by DCHES and DCMS as part of the Scheduled Monument Consent.
- The HES Senior Archaeologist will attend regular site meetings at an approximate frequency of 0.5 day per week (or when appropriate). The meetings will be held with the site engineer, site contractor and possibly EH as appropriate, to discuss ongoing site work methods, and resolve any other site problems that may impact upon archaeological features (or vary from the agree SMC).
- The HES Senior Archaeologist will liaise with any additional archaeological recording officer on the extent of works carried out and the appropriate level of recording.
- HES will ensure that site conservation works are carried out to standards recommended by English Heritage best practice, and will halt inappropriate or sub-standard work and inform DCHES, the site engineer and TVMHP Project Officer.
- HES will advise the Structural Engineer/TVMHPPO (Chris Hariades), where variations to repair and conservation work and recording may need to be agreed with the LPA/English Heritage; this will be discussed with the DCHES (Bill Horner) in the first instance.

4.2 Fieldwork: archaeological recording

- Detailed archaeological recording will be undertaken for all newly exposed archaeological features through foundation excavation (for the new footbridge or raised track over the Incline railway). Recording will also include the extent of repointing and rebuild.
- Ensure, as part of the consultancy, that the extent of all the proposed engineering works and footbridge construction concurs with the detailed specification drawings (supplied to DCMS as part of the SMC application).
- Measured survey will be carried out by hand measurements (using offset techniques at a scale of 1:50), using a paper copy of the survey supplied by the Client. This record will then be added to the original survey using CAD (or equivalent) software.
- The resulting survey output will be a revised measured survey drawing showing all works that have been undertaken. This will be reproduced at a scale of either 1:50 or 1:100 (appropriate to the size of area recorded) and will form part of the Historic Buildings archive watching brief report.
- Fieldwork results for the footpath creation will be recorded in the form of field notes and written up at the archive report production stage. Recording will be undertaken

using a mix of direct measurement, sketch plotting and photography, as appropriate (constrained by safety factors).

- The DCHES (Bill Horner) has advised that archaeological recording should be undertaken during any excavation that has revealed archaeological features.
- Where significant remains are encountered the site archaeologist will be given the opportunity to make an appropriate form of record before work proceeds; where a temporary stop of work is required to undertake this, the site archaeologist will make a request via the project resident Engineer.
- If archaeological deposits of a regional or national importance are uncovered, contingency should be allowed within the works programme to review options to ensure their preservation in situ. In the event that significant remains cannot be preserved in situ, strategies for their relocation or detailed recording will be agreed with the Devon County Archaeologist.
- Any variation in named personnel for archaeological recording and historic buildings consultancy will be agreed with DCHES, and the TVMH Project Officer.
- The chosen site archaeologist will adhere to Health and Safety Policies (see below), under the direction of the designated Site Safety Officer.

4.2.1 Site recording (general)

- Site drawings (plans, sections, locations of finds) will be made by pencil (4H) on drafting film; all plans will be linked to the Ordnance Survey landline map; all drawings will include standard information: site details, personnel, date, scale, north-point.
- The site archaeologist will undertake recording in line with recommendations given by IFA. Sections and plans will be drawn on site at appropriate scales which will adequately record structures or features at appropriate levels of detail, and appropriate sections reproduced in the archive report at either 1:50 or 1:100 to adequately demonstrate revealed archaeological features.
- All features and finds will be accurately located by means of a National Grid reference.
- All archaeological contexts will be described using a standard format and linked to a continuous numbering sequence.
- A location plan will be made which will allow site detail to be accurately placed within the context of the Ordnance Survey Landline mapping.
- The archaeological watching brief report will detail (and if appropriate summarise) all forms of archaeological recording that has been undertaken at each of the mine sites. Each major mine site will have a single archaeological watching brief report that details all project related work to that site (ie trails works, building conservation works, interpretation works etc).

4.3 Treatment of finds

- It is recognised that fieldwork may produce artefactual material.
- It will be important to agree the arrangements for deposition of any finds prior to the start of the project, and ensure that transfer agreements are arranged and signed..
- An allowance has been made for discussions with landowners for the deposition of archaeological finds in an appropriate museum have been included in the cost tender.
- All significant finds in stratified contexts will be plotted on a scaled base plan and described.

- All finds will be collected in sealable plastic bags which will be labelled immediately with the context number or other identifier.
- Plymouth City Museum is the designated museum for finds other than paper records. Their guidelines should be followed and accession numbers for finds and archives for each project should be obtained at the start of the project. Unless otherwise agreed, mining-related artefacts and small finds to be removed from site will be deposited at the Plymouth City Museum, pending detailed discussions over their final place of deposition or loan to other local smaller museums and interpretation centres (for example Morwellham and Tavistock) etc.

4.4 Photographic recording

To include:

1. Black and white scaled photography using either a 35mm camera or medium format camera using fine grain archive quality film (400ASA).
2. Provision will be made for a range of lighting conditions and the photographic equipment will be available to the historic building recording personnel listed in the WSI.
3. Each shot will be carefully composed, focused and lit appropriately with a flash gun if necessary.

The photo record will comprise:

- general views
- examples of structural and architectural detail.

Methodology for the archive standard photography is set out as follows:

- Photographs of details should be taken with lenses of appropriate focal length.
- Difficulties of back-lighting should be dealt with where necessary by balancing the lighting by the use of flash.
- A range of appropriate photographic scales should be used and a metric scale included in all archive recording photographs, except where health and safety considerations make this impractical.
- A photographic location plan for each building recorded will be produced for the report and each film will be fully printed to 6 x 4 or 7 x 5 size prints. Selected prints will be scanned into the archive reports.
- Black and white photographs will be archived to HER standards and incorporated into the HES photo database.
- Supporting colour photographs will be taken with a high resolution digital camera (3MP or higher), to illustrate the report and for possible presentation purposes. This will be archived electronically onto each report CD.
- Care will be taken that each shot is focused and that with delayed shutter action that camera shake does not occur. Each shot will be of appropriate quality and used for reports and/or power-point presentation.
- Digital colour photographs will be stored according to the Historic Environment Service's guidelines. Copies of the images will be provided to the client.
- The archaeological record will include a plan showing the location of the photographs reproduced in the report.

4.5 Post Fieldwork

Following completion of the fieldwork stage the results from the Historic buildings, Trails and any other main sites within the mine project will be combined into a single concise report for each major mine site.

4.6 Report production

Each site report will summarise the results of the measured survey, photographic recording and archaeological recording for buildings and shafts treated as part of this project, and will include the following components:

- Summary
- Project background
- Aims and objectives
- Methodology
- Summary description of conservation works undertaken at all structures
- Description of conservation works and works programme, together with results of any archaeological recording.
- Recommendations for future management, including any further requirement for conservation works or other archaeological work.
- Conclusions
- References
- Project archive index
- Supporting illustrations: location map, historic maps, plans, elevations/sections, - photographs.

4.6.1 Draft and summary report

- A summary report will be produced within two months of the completion of the fieldwork for each site and circulated to the DCHES Team and WHS Advice teams.
- A draft report containing the project results, as outlined above, will be produced and circulated to the DCHES Team for comment.

4.6.2 Final report format

- A paper copy and a digital (PDF) copy of the report, illustrations and any other files will be held in the Cornwall HER.
- Four paper copies of each report, and a CD containing an electronic copy of the report and the digital photographic archive will be produced for the client and the DCHER.
- Paper copies of the report will be distributed to local archives (including the Historic Environment Record) and national archaeological record centres.

4.7 Archiving

Following review with the HES Project Manager the results from the fieldwork will be collated into an archive following the Society of Museum Archaeologists Guidelines. This will involve washing and cataloguing relevant finds, the indexing and cross-referencing of photographs, drawings and relevant context records.

- All finds and samples, etc will be stored in a proper manner (being clearly labelled and marked and stored according to HES and IFA guidelines).
- Following any necessary cleaning, stabilisation and recording, artefacts or small finds will be deposited at an appropriate location.
- All paper and photographic records will be ordered, catalogued and stored in an appropriate manner (according to HES guidelines). It is expected that the depository site for these records will be the Devon County Record Office, Exeter.
- An EH OASIS entry (on-line) will be prepared at this stage of the project summarising the site impacts for each mine and referring to each archaeological watching brief report.

4.7.1 Cornwall HES archive deposition

An index to the site archive will be created and the archive contents prepared for long term storage, in accordance with HES standards (which will follow Society of Museum Archaeologists Guidelines). Archiving will comprise the following:

- All correspondence relating to the project, the WSI, a single paper copy of the report together with an electronic copy on CD will be stored in an archive standard (acid-free) documentation box.
- The drawn archive will be stored in A2 plastic wallets.
- Photographic material will be stored in archive standard negative holders and archive print holders within an archive standard box.
- All black and white photographs are to be archived using captioned labels, appropriate record forms and location plans. Other photographic records to be supplied with written captions and subject to appropriate batch archiving to be held in safe archival storage.
- Devon's Historic Environment Service/Devon Museums (if appropriate) will receive a copy of all site photographs, reports and relevant correspondence etc.

The written archive will be deposited in a registered Cornwall archive or museum, in accordance with their deposition guidelines and within 4 months of the completion of fieldwork.

5 Public presentation

Given the importance of the Tamar Valley mine sites, the significant impact to local communities of the remaining engine houses and the inclusion of all the sites in the proposed World Heritage Site, it is acknowledged that there is scope for wider public dissemination of the results of this project. This dissemination could take the form of one or more of the following, subject to the agreement of funding for this work by the Project Manager (this may not be included in the tender associated with this WSI, although it can be included if requested by the Project manager/DHES):

- Community Open Days to show members of the public around the mine sites
- Provision for public lectures to local organisations
- Provision of information about the sites, works carried out and dates of open days etc via web sites (CC, DCC, WHS)
- Popular publications:
    - Devon: DAS Newsletter, Articles in DAS proceedings/monographs
    - Cornwall: WHS Newsletters/Archaeology Alive/ CAS Journals
- Media/newspaper articles via TVCS publicity officer.

6 Project staff

- The Historic Environment Service (Projects) has accumulated unparalleled experience in industrial archaeology, having been involved in this aspect of archaeology for the last twenty years (see the HES CV and the specific personnel CV). The project will be managed and carried out by an HES Senior Archaeologist with proven experience in industrial archaeology. The project manager will:
- Take responsibility for the overall direction of the archaeological consultancy and archaeological recording watching brief report.
- Discuss and agree the detailed objectives and programme of each stage of the project with DHES and TVCS PO, including arrangements for health and safety.
- Monitor progress and results for each stage.
- Edit the project report.

Key personnel within the proposed team are (CVs summarised in the Appendix):

Colin Buck, DipCert, Senior Archaeologist. cbuck@cornwall.gov.uk

Specialist in Cornish mining landscapes and assessments since 1993. Involved in numerous recording and appraisal projects including conservation works to many engine houses and other structural conservation works, shaft safety works and mine site access improvements, particularly in the east of Cornwall. Projects include many archaeological impact assessments. Helped Tamar Valley AONB Service prepare CMP for West Devon Mining. Involved in the preparation of policies for the Cornish Mining World Heritage Site Bid's Management Plan and produced the Mineral Tramways Conservation Management Plan.

7 General arrangements

Timetable

Following guidelines provided by the TVMHP Principal Officer (Chris Hariades), the consultancy and fieldwork (for a projected duration of three years), is anticipated to be commenced during winter of 2012. HES will require at least three weeks notice before commencement of work, in order to allow the allocation of field staff time and arrange other logistics.

Monitoring and Signing Off Condition

- Monitoring of the project will be carried out by CC Historic Environment Service (Projects) and DCHES (Bill Horner).
- The Devon County Historic Environment Service Planning Advice Officer should be informed 1 week in advance of the intention to start the recording (although a three year project timetable has been prepared).
- HES will liaise with the DCHES Officer to discuss the programme, progress of work, and agree site meetings as required.
- A summary of the results for each major contract stage will be presented to the DCHES Officer within 2 weeks of the completion of the relevant fieldwork.
- Draft reports will be provided to the DCHES Advice Team for comment.
- Where the DCHES Officer is satisfied with the archive report and the deposition of the archive, written discharge of the planning condition will be expected from the local planning authority (LPA).

Monitoring points during the study will include:

- Approval of the WSI
- Completion of fieldwork for each mine site
- Completion of archive report and summary note
- Deposition of the archive

Professional standards

The historic building and archaeological recording will be carried out to the standards of the Institute of Field Archaeologists and all work and advice will be carried out in line with the IFA Code of Conduct and Code of Approved Practice for the Regulation of Contractual Arrangements in Field Archaeology.

Copyright

Copyright of all material gathered as a result of the project will be reserved to Cornwall County Council and their funding partners (Devon County Council). Existing copyrights of external sources will be acknowledged where appropriate.

Compliance and Variations

Minor variations to this WSI will be discussed in liaison with the client and the Devon Historic Environment Planning Advice Officer. The TVMHPO will then agree these with

the LPA/EH as appropriate. Major variations may require detailed agreement from the Local Planning Authority.

Contract

The HES projects team is part of the Historic Environment Service, within Environment and Heritage, 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 the Historic Environment Service projects team and will be presented in good faith on the basis of professional judgement and on information currently available.

Health and safety

- The Service follows the Cornwall Council's *Statement of Safety Policy*. For more specific policy and guidelines the Unit uses the manual *Health and Safety in Field Archaeology* (2002) endorsed by the Standing Conference of Archaeological Unit Managers and also the Council for British Archaeology's Handbook No. 6 *Safety in Archaeological Field Work* (1989).
- The historic building consultant and the historic building/archaeological recording team will adhere to the Health and Safety Statement of the Principal Contractors.
- Prior to carrying out on-site work HES will carry out a Risk Assessment.

Insurance

As part of Cornwall Council, HES is covered by Public Liability and Employers Liability Insurance.

C Buck Senior Archaeologist

CC HE Projects

21/9/2012