



Trewavas, Breage, Cornwall

Conservation Management Plan



Historic Environment Projects

Trewavas, Breage, Cornwall

Conservation Management Plan

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The views and recommendations expressed in this report are those of Historic Environment Projects and those of the other authors and organisations whose reports are summarised here. They are presented in good faith on the basis of professional judgement and on currently available information.

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Cover illustration

A 2008 HES aerial view of Trewavas from the east. This gives a good impression of the coastal character of the property, whose inland boundary is almost wholly defined by the route of the Coast Path.

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Abbreviations

AGHV	Area of Great Historic Value
AONB	Area of Outstanding Natural Beauty
CCC	Cornwall County Council
CHL	Chain Home Low (radar)
CRO	Cornwall County Record Office
EH	English Heritage
HER	Cornwall and the Isles of Scilly Historic Environment Record
HE	Historic Environment, Cornwall Council
NGR	National Grid Reference
NVC	National Vegetation Classification
OS	Ordnance Survey
PRN	Primary Record Number in Cornwall HER
RIC	Royal Institution of Cornwall
RIGS	Regionally Important Geological and Geomorphological Site

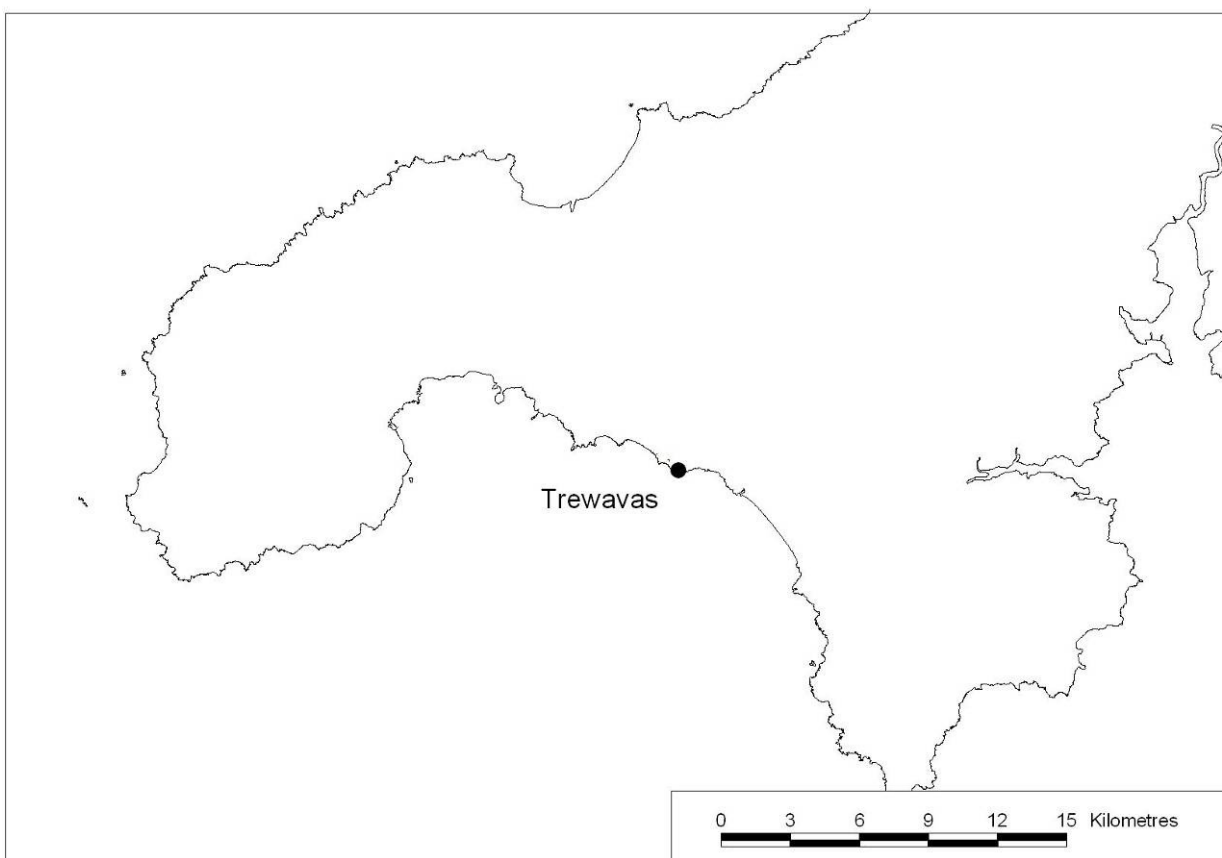


Fig 1. The location of Trewavas, Breage, West Cornwall.

Summary

Following the recent acquisition of a stretch of coastland at Trewavas, Breage which is rich in archaeological sites and ecological habitats, the National Trust quickly set in hand the conservation of a pair of iconic but increasingly structurally unstable engine houses and associated structures on the coastal fringes of the property.

In order to allow members of the project team carrying out the work to understand Trewavas and its significance as well as the natural and historic processes that created it, a Conservation Management Statement (CMS) was prepared by the projects team of the Historic Environment Service of Cornwall County Council in 2008. This document (Sharpe 2008b) also set out the issues which affected the property and which might arise during the works programme, together with the philosophy underlying the conservation project. The Conservation Management Statement was used in support of applications for Scheduled Monument Consent to undertake the works during 2008-9.

It was always intended that the CMS would be an interim document, and that once the works had been completed, this would be expanded into an holistic Conservation Management Plan which would guide the management of the Trewavas property. In June 2011, Jon Brookes, Countryside Manager for the National Trust in West Cornwall contacted Historic Environment Projects with a request to carry out this work.

The study confirmed not only the archaeological and historical importance of Trewavas, which is both scheduled and a component of the Cornish Mining World Heritage Site, but also its ecological and aesthetic significance. Trewavas is quite rightly treasured by those who already know this stretch of cliff and a delight to those who discover it whilst walking the Cornwall Coast Path. The study also revealed that Trewavas has untapped potential which could be unlocked through targeted vegetation management and through its introduction to groups of people who are, at present, unaware of its qualities.

Building on discussions with many of the groups involved in the interests of the site, the Plan sets out a range of actions through which this vision could be realised.

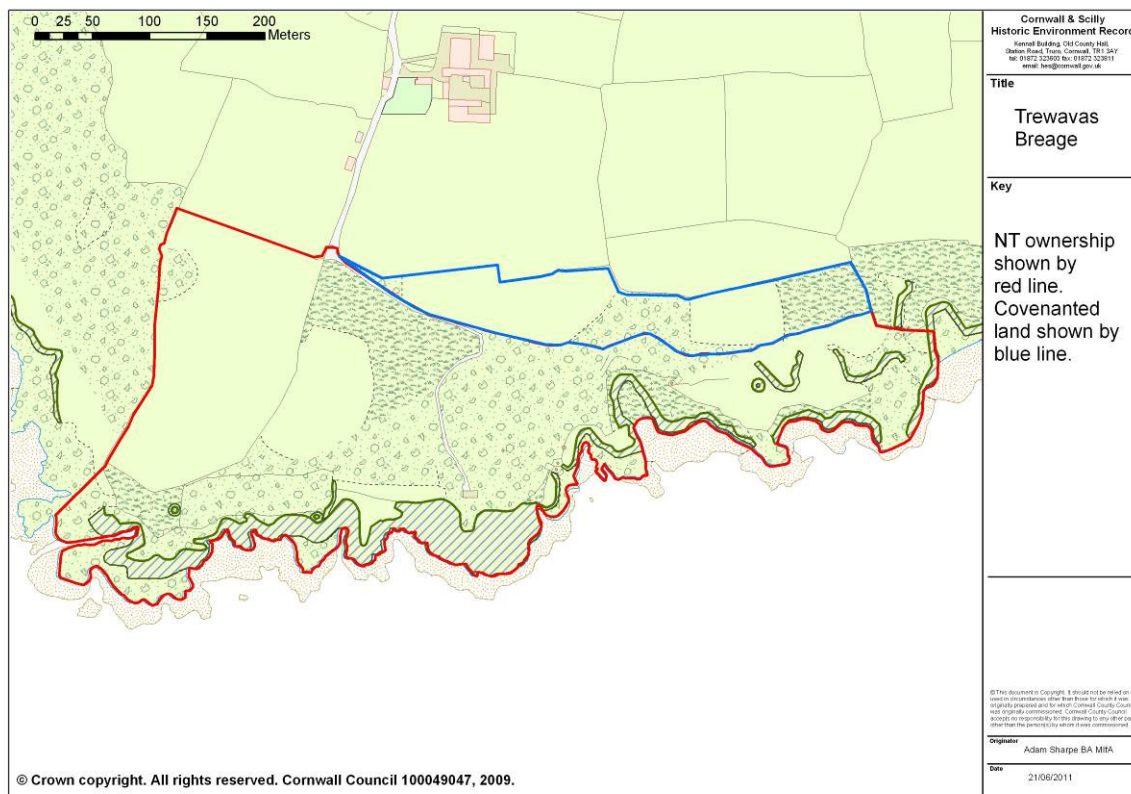


Fig 2. The extent of the NT Trewavas Mounts Bay Property.

Introduction

This Conservation Management Plan is intended to provide a readily comprehensible introduction to the National Trust Trewavas property which will allow the non-specialist reader to understand the site and its significance, as well as the natural and historic processes that have created it. It also sets out the issues which currently affect it, the philosophy underlying proposals for its future management and the ways in which the management vision for the site can be realised.

Project background

Following the acquisition of an area of coastal land at Trewavas in 2008 (Fig 2), the National Trust commissioned the Historic Environment Service of Cornwall County Council to prepare a Conservation Management Statement (CMS) to guide the conservation works planned for the Scheduled engine houses on the site. It was always intended that this CMS would be an interim document, and that once the works had been completed, this would be expanded into a Conservation Management Plan (CMP) which would guide the management of the whole of the Trewavas property.

In June 2011, Jon Brookes, Countryside Manager for the National Trust in West Cornwall contacted Historic Environment Projects, Cornwall Council with a request to carry out this work, which was undertaken during the late summer and autumn of 2011.

Aims

This Conservation Management Plan aims to set out how the National Trust will address the management of the Trewavas property as a whole in a sustainable, appropriate and long term fashion, following best conservation practice, resulting in enhancement of its conservation and other values, encouraging the wider public to discover its special qualities and avoiding unwanted and negative effects on significant aspects of the property.

Location, extent, setting, geology and soils

See Figs 1-2.

Trewavas came into to the ownership of the NT in early 2008 as the most recently-acquired element of the National Trust Mounts Bay Properties, which is presently made up of Trenow (near Marazion), Cudden Point, Sydney Cove (at Praa Sands), Lesceave Cliff, Rinsey East Cliff and Trewavas Cliff.

Trewavas Cliff is 8.25 Ha in extent, centred at SW 59936 26560 and occupies a south-facing stretch of open heathy cliffland within which are sited a range of features associated with an early 19th century copper mine. On its landward edge the property rises to 75m OD, whilst its seaward side is dominated by high granite cliffs.

Like the neighbouring Rinsey East Cliff, the geology of Trewavas is made up of Carboniferous lithium mica Tregonning granite exposed along its cliffs, whilst areas of remnant, highly metamorphosed meta-mudstones of the Devonian Mylor series occur as an ovoid area inland from the cliff at the eastern end of the property. The contact between the two geologies was revealed during trenching the access track for the water pipe laid in 2008. The soils are recorded as Moretonhampstead 611b, typically brown podzols forming well-drained gritty loams with humose surfaces in places.

The property's underlying geology, its aspect and its thin soils have given rise to a characteristic vegetation cover – a mixture of wind-clipped maritime grassland, areas of maritime heath, areas of bracken or gorse, bare rock habitats and an area of wet flush on the edge of the cliffs at the western end of the property (see Figs 8, 16-17, 48); the bracken and scrubber species are more dominant at the eastern end of the property (Fig 60) and on the upper slopes where the soils are deeper, and maritime influences are slightly attenuated. The property also includes one large field, most of which is

sown to ryegrass, and there are covenants over two adjoining areas of improved cliffland which are also sown with grass for silage crops.

Mining at Trewavas has produced significant spreads of relatively finely comminuted mine waste rich in copper and other sulphides near the centre of the property, in the area where the mine dressing floors were sited (Figs 23 and 59). The phyto-toxicity of this material has had marked effects on the landscape, preventing some species from becoming established and stunting those which are able to gain a toehold on these hostile substrates. Isolated and rather fragile patches of maritime heath, mosses, lichens and other low plants are typical of this area.

The inner boundary of the property is backed by improved agricultural land, whilst a former agricultural dump is sited near the centre of the northern part of the site within a shallow valley in which agricultural run-off from the farm upslope collects. This area of the site includes non-native species, as well as vegetation which has responded to man-made local increases of both soil depth and soil nitrogen levels.

The Historic Landscape Characterisation of Trewavas Cliff is Coastal Rough Ground (CRG).

Background research: What's already been done?

Although Trewavas has been the subject of several brief references in published works, these have all been focussed on a short period of its mining history. Linked to a campaign for the conservation of the engine houses at Trewavas, Laurence Holmes of the Carn Brea Mining Society drew together much of this information, and produced a guide to the site in 2003. However, some gaps in knowledge at the time led to this history of the mine being incomplete.

Also in 2003, in preparation for a submission for the scheduling of much of the property, Trewavas was the subject of a detailed walk-over survey by Cathy Parkes, Historic Environment Projects, Cornwall County Council. Cornwall Consultants were commissioned to undertake a desktop mining search of the property by the National Trust in the same year.

In 2008, Cornwall County Council's Historic Environment Service was commissioned by the National Trust to produce an archaeological assessment of their Mounts Bay Properties, including the recently-acquired Trewavas. This report (Sharpe 2008a, extracts in the CD accompanying this report) incorporated all readily available information in the public domain (including that produced by Holmes and Parkes in 2003), as well as the results of a walk-over survey. The report also included recommendations for the management of archaeological features at Trewavas.

A separate Conservation Management Statement addressing issues likely to be raised during the proposed conservation of the engine houses and chimneys at Trewavas was commissioned by the NT and produced by the projects team of Cornwall County Council's Historic Environment Service in August 2008 (Sharpe 2008b).

Prior to the 2008 conservation works, Cornwall Environmental Consultants (CEC) Ltd were commissioned by the National Trust to carry out a biological survey at Trewavas (included on the CD accompanying this report). A Phase I Habitat Survey (JNCC, 1993) of the site was carried out during suitable weather conditions in June 2008 together with a desktop survey using ERCCIS records. An invertebrate survey was undertaken in June and July 2008 using observation, sweep netting and the use of pheromone lures for clearwing moths. A lichen survey was undertaken in August 2008, and significant lichens were noted on the cliff slopes between the engine houses and the mine spoil dumps, and on the coastal outcrops used for recreational climbing. Bat emergence surveys were carried out in July and August 2008, targeting the mine shafts and the buildings proposed for conservation and a Bryophyte survey was carried out in December 2008.

Cornwall Consultants were commissioned to carry out a contamination survey of Trewavas (Hurst 2008). Their work identified the presence of elevated levels of heavy metals in the area of the former copper dressing floors at the western end of the site, and flagged up the possibility of asbestos contamination in the vicinity of the engine houses and their associated boiler houses.

In preparation for the conservation project, Nationwide Surveys were commissioned by Scott and Co in 2008 to provide baseline plans and elevations of the two engine houses prior to works being undertaken (Nationwide drawings SAC0801 and SAC0801 A&B). These plans were used as the basis for further drawings to set out the range of works required (Nationwide drawing S:644-01) as well as preliminary scaffolding design drawings (Drawings 08/OPT/336-001 and 002). Additional topographical survey of the areas surrounding the engine houses and associated structures, and of the area of the cliff slope proposed as a materials transport route to the Old Engine Shaft structures were also commissioned from Nationwide Surveys (Nationwide drawing SAC0802).

Following some vegetation management in preparation for the conservation works, HE Projects Cornwall Council undertook a walk-over survey of the site to check the locations of previously documented structures and to identify any unmapped features; the results of the walk-over survey were converted into a series of GIS shapefiles. A report on the conservation project was produced by HE Projects on completion of the works (Sharpe 2009).

Measured survey of the central part of the site where two demolished engine houses were sited will be undertaken by HE Projects Cornwall Council in the winter of 2011/12.

A full list of surveys and other information relating to the property is to be found in the Background Information section of this report. Some of these are included on the CD-Rom accompanying this report.

Who uses Trewavas, and what for?

The principal users of the Trewavas property are walkers – either those exploring significant lengths of the coast path, or those undertaking shorter walks, often starting out from the National Trust car parking area at Rinsey.

However, people also use the site for other activities, including:

- Mineral collection and identification
- Rock climbing (particularly on the outcrops at the eastern end of the property, see Fig 57)
- Underground exploration via shafts and adits (Fig 33)
- Bird watching
- Sketching and painting
- Photography
- Mountain biking
- Horse riding (occasionally and illegally)
- Canoeing
- Rock fishing
- Potting for crabs just offshore
- Tombstoning (the sport of jumping off rocks into deep water).

Designations

International

The coastal strip from the western end of Lesceave Cliff to the eastern end of Trewavas Cliff is Area A3ii of the **Cornwall and West Devon World Heritage Site**, inscribed in July 2006 (see Fig 4).

National

Most of the Trewavas site is a nationally protected **Scheduled Monument** SM 32989 – ‘*Wheal Trewavas copper mine 310m south of Trewavas*’ (see Fig 3).

Trewavas Old Engine Shaft pumping engine house chimney, Trewavas Old Engine Shaft pumping engine house, Trewavas New Engine Shaft pumping engine house and its chimney are all Grade II **Listed Buildings** No’s 65722, 65721, 65723 and 65724 respectively, Listed in 1987.

The site is wholly within Area 08 (South Coast Western) of the Cornwall **Area of Outstanding Natural Beauty** (AONB) (see Fig 5).

Regional/county

Trewavas (with Rinsey East Cliff) fall within a section of landscape proposed as an **Area of Great Historic Value** (AGHV) (see Fig 6).

The central area of the dressing floors at Trewavas is designated as a **Regionally Important Geological and Geomorphological Site** (RIGS) K/24 (see Fig 7). This is the type locality for Tristramite ($\text{Ca}_{0.6}\text{U}_{0.3}\text{Fe}^{3+}_{0.1}(\text{PO}_4)_{0.75}(\text{SO}_4)_{0.25}\cdot 2(\text{H}_2\text{O})$), a calcium uranium phosphate of the Rhabdophane group, the mineral having been identified from the mine spoil dumps, which are also rich in sulphide minerals including Arsenopyrite, Bornite, Chalcopyrite, Chlorite, Mica, Pyrite, Quartz, Siderite and Sphalerite.

Trewavas lies within the Praa Sands to Porthleven **County Wildlife Site**.

Access

See Fig 18.

Public Rights of Way traverse this area, most of which is registered as **Access Land** under the CROW Act 2000. The majority of the property is accessible, except where cliff slopes are steep or where bracken and scrub cover is presently too dense to allow this.

The **South West Coast Path** follows the edge of the coastal slope to the west, looping inland from a point near the former mine spoil dumps to follow a track which formerly served the nearby WWII radar station, this joining an inland right of way linking Rinsey East Cliff to Trewavas. The Coast Path continues to the east, passing just inland from New Engine Shaft.

A route opened up in 2008 as a contractors’ access to the head of the former incline serving Old Engine Shaft has been maintained for public access. A short, west-heading spur from this links to the Coast Path on the eastern side of the former dressing floors. A former tramway incline to Old Engine Shaft and an inclined track connecting the Coast Path to New Engine Shaft were cleared of vegetation during the 2008 works and have been maintained as public access routes to the engine houses.

It should be noted that the designated route of Rights of Way crossing Trewavas do not correspond with the long-established paths actually used by walkers, in particular the eastern section of the South West Coast Path, whose designated route runs through inaccessible sections of cliffland (see Fig 18).

Archaeology and history

Complementing the historic research into mining activity at Trewavas undertaken by Holmes (2003) and others, walkover surveys of the site have been undertaken by

Parkes (2003) and Sharpe (2008a). These results were updated to a degree by small-scale surveys undertaken prior to and during the conservation works (Sharpe 2008b and 2009), and have been further amended in the light of further recent research.

Summary

(See Figs 13-15 and supporting information on CD-Rom)

Trewavas Cliff adjoins Rinsey East Cliff to its west, and is similar in general character, comprising a narrow strip of open cliffland backed by long-enclosed farmland. Its principal features are those associated with Trewavas Mine, including two spectacularly-sited cliffside pumping engine houses and their associated shafts and chimneys.

However, the property also includes the remains of a large prehistoric funerary monument on the headland to the west (Fig 21) and a nearby possible cairn. These indicate prehistoric use of these clifflands, as does a small scatter of undated but probably mesolithic (9,000 BC to 4,000 BC) worked flint found in the coastal fields and exposed in nearby path surfaces (see Fig 22). Ploughed down lynchets (former field boundaries) within coastal fields which were open cliffland in 1840 may be evidence for later prehistoric occupation of this landscape, whilst the Trewavas place name incorporates the Cornish place name elements 'Tre', a homestead or farm and possibly 'Gwav', winter, suggests a seasonal residence during the pre-medieval period. The layout of the fields inland suggest a continuity of occupation from at least the early medieval period.

Trewavas mine was started for copper in 1834 from Old Engine Shaft, though was not shown on the *circa* 1840 Breage Tithe Map (see Fig 10), whose Apportionment names the area within which it was developed as '*Cliff Ground*' (plot 2949, Fig 10). This extended to 23 acres, 3 rods and 8 perches, was owned by the Reverend John Rogers and was occupied by Richard Cornish of Trewavas Farm. In 1836 a 45" diameter cylinder Hayle Foundry engine was erected at the mine, and by 1838 a further pumping engine had been installed, as well as a whim (winding) engine.

Between 1835 and late 1842 the mine produced 10,838 tons of ore with a value of £71,981, realising a profit of £7,680 (in modern terms this would be equivalent to about £5 million and £550,000). Despite reports in 1844 that sea water was finding its way into the shallow levels of the mine, a new diagonal shaft was sunk and in 1845 this was to be equipped with a large pumping engine on a site set back from the cliffs. However, eventually the sea did break into the mine, perhaps as the result of the company's decision in May 1846 following the accumulation of significant debts to strip out all remaining accessible minerals from the mine prior to its abandonment. A small scale and unsuccessful re-trial of the inland section of the mine took place in 1879 under the name New Penrose.

At the end of the late 19th century, stockproof boundaries were established around the clifftops and a number of areas of former cliffland were enclosed and improved for agricultural use, suggesting some intensification of this activity. Cliffland stock grazing was probably abandoned by the mid-20th century, however, leading to the reversion of the cliff vegetation and a gradual increase in the extent of areas of scrub and bracken, which increasingly masked some archaeological features within this zone.

During the early part of WWII, a Chain Home Low radar station was established on Trewavas Head. This site, established to detect low-flying enemy aircraft, was intended to be one of an extensive chain set 20 miles apart from one another along the south coast of Britain. In the event, the Trewavas site seems to have been short-lived, and at the end of the War the concrete buildings on the clifftop and the Nissen huts inland near the farm were demolished.

The scheduling of Trewavas in 2003, its inclusion in the Cornish Mining World Heritage Site in 2006 and the acquisition of the site by the NT in 2008 jointly mark the recognition of the importance of the site, and of an acknowledgement of a need for its

appropriate management. The conservation works undertaken in 2008/9 represented an important first stage in this process.

Ecology

(See also supporting information on CD-Rom)

Cornwall Environmental Consultants (CEC) Ltd were commissioned to produce a biological survey of Trewavas. An initial Phase I habitat survey was carried out in June 2008, together with invertebrate survey through casual observation and sweep netting. Incidental records of fauna (mainly birds) were also collected during the survey visits. The survey was reviewed by the NT and finalised in 2009.

A desk study consisting of a search of all existing ecological records within the 1km grid squares that include the property was carried out using the information held by the Environmental Records Centre for Cornwall and the Isles of Scilly (ERCCIS). The following section reproduces the principal findings of the CEC survey (the full text of which is contained on the CD accompanying this plan).

Summary

(See Figs 16-17)

The site supports a mixture of semi-natural coastal habitats, including the EU Habitats Directive Annex I habitat: **Vegetated sea cliffs of the Atlantic and Baltic coasts** and the priority UK Biodiversity Action Plan (BAP) Priority habitats: **Maritime cliff and slope, Hedgerows** and **Lowland heathland**.

Trewavas is characterised by a typical range of grassland and cliffland communities with a gradation from MC1 to MC8 and MC9, with smaller areas of MC5 and possibly MC12 communities. The presence of flush vegetation and rock crevice vegetation associated with fresh water seepage also adds to the biodiversity interest. Most of the more exposed cliffland coastal grassland was found to be stable, though some areas were noted as being subject to active invasion from bracken and European gorse, with a trend towards scrub dominance across the property.

Twelve main Phase 1 habitats were found to be present within the site. The NVC communities identified during the survey are listed below under the Phase I Habitat in which they occur.

- Scrub: W23 *Ulex europaeus* – *Rubus fruticosus* scrub, W22 *Prunus spinosa*-*Rubus fruticosus* scrub
- Unimproved neutral grassland: MG1 *Arrhenatherum elatius* grassland
- Improved grassland: MG7 *Lolium perenne* ley
- Bracken: W25 *Pteridium aquilinum* - *Rubus fruticosus* underscrub
- Tall ruderal: OV24 *Urtica dioica* – *Galium aparine* community
- Heath: H8 *Calluna vulgaris* – *Ulex gallii* heath.
- Swamp: S4 *Phragmites australis* swamp
- Maritime hard cliff: MC1 *Crithmum maritimum* – *Spergularia rupicola* maritime rock-crevice community
- Coastal grassland MC5 *Armeria maritima* – *Cerastium diffusum* ssp. *diffusum* maritime therophyte community, MC8 *Festuca rubra*-*Armeria maritima* maritime grassland, MC9 *Festuca rubra* – *Holcus lanatus* community.
- Coastal heath, H7 *Calluna vulgaris* – *Scilla verna* heath
- Spoil (no NVC)
- Hedge (elements of MC5 *Armeria maritima* – *Cerastium diffusum* ssp. *diffusum* maritime therophyte

The site supports (or has the potential to support) a number of species of nature conservation interest.

Flowering plants

Notable plant species recorded during the survey included Common dodder (*Cuscuta europaea*) present in quantity growing on European gorse within areas of gorse scrub and heathland. Though remaining comparatively common in suitable habitat in Cornwall this threatened species included as Vulnerable on the UK Red List, due mainly to unexplained decline in the northern part of its range and to some extent of habitat loss through development elsewhere. Bluebell (*Hyacinthoides non-scripta*) is widely recorded within maritime grassland and under more open canopies of scrub and bracken. Though common and widespread in Cornwall, the UK is thought to hold more than 25% of the European population of this species and it is consequently protected against sale by Schedule 8 of the Wildlife and Countryside Act 1981. Other notable species may be present within the site, including Hairy bird's foot trefoil (*Lotus subbiflorus*), Western clover (*Trifolium occidentale*) and Pale heath violet (*Viola lactea*). Pale dew plant (*Drosanthemum floribundum*), a non-native invasive species, is present in small amounts at one coastal location at Trewavas and should be controlled to prevent its spread, or removed.

Non-flowering plants

Specialist surveys were carried out for bryophytes and lichens, and both these groups were noted to be locally abundant in bare areas within the heath and spoil as well as on exposed rocks. Two Nationally Rare and thirteen Nationally Scarce lichen species were recorded, the most important areas of habitat being the maritime hard cliff and the maritime grassland. Both *Gyalecta jenensis* v. *macrospora* and *Porina curnowii* were found in both habitats. In relation to bryophytes, the Nationally Rare moss *Tortula wilsonii* (a UK BAP Priority Species) was found in a quarried area on a small open area of sea cliff, whilst the Nationally Scarce liverwort *Cephaloziella stellulifera* was found on open mine spoil together with other copper-tolerant species. The engine houses were not noted to support abundant bryophytes or lichens but the presence of notable species here should not be ruled out.

Invertebrates

A species list was compiled from the results of a rapid walkover and specimens were collected for later identification. One nationally notable species has been recorded: thrift clearwing (*Bembecia muscaeformis*, a moth), seen on the track to New Engine Shaft. Areas noted to be of potential interest have been recommended to be targeted for survey during any follow up visits; it is anticipated that further notable species are likely to be found. Areas noted to be of potential interest include south facing headlands with floristically diverse short turf and varied nectar sources, as well as bare ground (showing potential for aculeate hymenoptera – bees, wasps and ants), a small quarry featuring south-facing exposed soil which is floristically diverse (though suffers from some scrub encroachment), maritime heath with short turf and bare ground, common reed dominated swamp, and species rich hedges and south facing walls which also show potential for aculeates.

Birds

A species list drawn up from casual observation during field survey included

- Blackbird *Turdus merula* VC/FC
- Buzzard *Buteo buteo* FC
- Carrion Crow *Corvus corone* C
- Chough *Pyrrhocorax pyrrhocorax* R
- Fulmar *Fulmarus glacialis* FC
- Herring Gull *Larus argentatus* FC

- Linnet *Carduelis cannabina* C/FC
- Peregrine Falcon *Falco peregrinus* FR
- Rock Pipit *Anthus petrosus* FC
- Shag *Phalacrocorax aristotelis* FC
- Stonechat *Saxicola torquatus* FC

(VC: very common, C: common, FC: fairly common, U: uncommon, FR: fairly rare, R: rare, VR: very rare).

Trewavas is a long-standing site for Chough (see below) and Peregrine, both Schedule 1 species, with examples being present here all year round and nesting successfully most years. Dartford Warbler, a red-listed bird of conservation concern (BOCC) and BAP species has also been recorded in recent years. Linnet, house sparrow and yellowhammer are other priority red-listed/BAP species found at Trewavas as are herring gulls, which breed here annually.

One of the few remaining kittiwake colonies in the south west is found at Rinsey (124 pairs in 2011) and there is a small colony at Trewavas (13 pairs). Kittiwakes are doing very poorly in general in the UK, although the colonies here do better than most in the south west at present, making this area very important in geographical terms for them. Kittiwakes are, however, very susceptible to disturbance. Cormorant and shag also nest on the cliffs of Trewavas. Surprisingly, Shelduck a rare breeder in Cornwall, have bred successfully at Trewavas in recent years.

Other species

Adder (*Vipera berus*) was recorded within the hedgerow along the western perimeter of the site. Common frog (*Rana temporaria*) tadpoles were present within a water trough at the southern end of the access track leading to Trewavas Farm and within a number of shallow pools associated with the swamp/ flush west of Trewavas cliff; toads have also been recorded. The importance of the site to bats was considered, and open mine shafts were found to be used by Greater horseshoe (*Rhinolophus ferrumequinum*), Common pipistrelle (*Pipistrellus pipistrellus*) and Natterer's bat (*Myotis nattereri*). No signs of badger (*Meles meles*) were seen during the survey and the habitats are considered to be sub-optimal for this species, though the presence of this species within the site cannot be ruled out.

Choughs at Trewavas

Trewavas is an important site for Chough, a Schedule 1 species, which is protected from disturbance when nesting under the Wildlife and Countryside Act 1981. Choughs have used the area annually since 2004. Two successful nesting attempts have been made at Trewavas, in 2006 and 2007. In 2008, a pair held territory and there was a third attempt in 2009, but this was unsuccessful. The site is used by roosting choughs outside the breeding season and by young birds, especially when they leave family groups on the Lizard, the latest records at time of writing being mid August 2011. Cornwall is still the only place in England where choughs breed and as such, their present Cornish roost and nest sites should be deemed of the highest importance in nature conservation terms.

As Mucklow and Croft (2003) make clear, for Choughs to become naturally re-established on Cornish coastal sites, several factors need to be in place. Habitats which will provide good sources of food need to be available throughout the year. Choughs need ready access to the soil surface to feed on insects, and thus prefer short swards less than 5cm in height (and preferably between 2cm and 3cm in height) growing on friable soils. This should consist of grazed, unimproved coastal grassland, though this needs to be set within a foraging area consisting of a mosaic of grazed heathland,

weather-maintained short swards, rocky outcrops, bare cliff, short-grazed semi-improved pasture and over-wintered stubble fields.

Suitable, safe nest sites are also required. Choughs nest on ledges within sea caves, mine adits and shafts and (occasionally) in disused buildings. In practice the presence and disposition of nest sites partially determines the extent of chough territories. Historically, Cornwall supported a large population of choughs, given former agricultural practices combined with an eminently suitable coastline whose natural nest sites were augmented by accessible mine workings. The historic extinction of Choughs in Cornwall was predominantly due to the abandonment of rough grazing within cliffland, whilst their re-appearance has been due to programmes of suitable habitat creation undertaken by the National Trust and other land managers. In practice, chough breeding is likely to be most successful where nest sites are close to suitably extensive and rich foraging areas. The National Trust in Cornwall has worked in partnership with the RSPB over many years to modify coastal habitat under their management through grazing schemes, scrub management and the targeting of agri-environment schemes to make it suitable for choughs, and have assisted in ensuring that choughs are able to breed successfully.

In addition, however, these nest sites need to be inaccessible to egg collectors – in Cornwall, egg theft is a serious risk to the re-establishment of a thriving chough population, and on all of the small number of sites which choughs have re-colonised since 2001, security measures have had to be set in place during the nesting season.

The RSPB are keen to ensure that choughs at Trewavas are not unnecessarily disturbed (birds listed on Schedule 1 of the Wildlife and Countryside Act are protected from disturbance during the breeding season), and have recommended temporary restrictions on public access to significant areas of the site from March 1st to July 1st. The RSPB additionally suggest that temporary signs and a Chough Project volunteer presence on site during this period would help to explain the reasons for access restrictions, and provide information on the nature conservation interest of the site as a whole.

At Trewavas, the RSPB suggest that the introduction of grazing management to the cliffs at both Trewavas and neighbouring Rinsey on both NT in hand and tenanted or covenanted land would significantly enhance the potential for the establishment of choughs within this area, the majority of the coastal land currently being graded as 'unfavourable' (Mucklow and Croft 2003 p61). The principal recommendations for habitat improvement proposed by Mucklow and Croft concern control/clearance of scrub and bracken and the re-instatement of cliff grazing. They also noted that the neighbouring pastures are generally too long to support choughs, these being used for the growing of silage. In practice, the NT does not favour site management for single species, however.

Discussion

Good examples of species-rich maritime grassland are present with the potential to support notable plant species. This habitat is likely to be, to a large extent, self-regulating due to exposure, though scrub/bracken encroachment may be an issue in some more sheltered areas and maritime grassland has certainly declined in extent as a result of the spread of bracken and scrub.

The heath is generally species poor, and currently more or less restricted to areas with very high levels of maritime exposure and/or thin or metal enriched soils due to the spread of bracken and scrub elsewhere in the absence of grazing. CEC state that the heath is difficult to place within the NVC, presumably due to the contamination of soils. The distinction between H7 and H8 is predicated on the presence of western gorse (*Ulex gallii*) in the latter and a small maritime suite including thrift (*Armeria maritima*)

and sea campion (*Silene uniflora*) in the former. Bare areas show some potential for bryophytes and lichens (*Cladonia* spp.), which were noted to be locally abundant).

There are extensive areas of scrub and bracken. These habitats are not without conservation value (e.g. for certain species of invertebrate and bird) and are occasionally quite species rich, in the case of some areas of less dense bracken displaying a vernal element with bluebell. Having said this, the habitat is probably over-represented at Trewavas. Formerly open and more species-rich areas are subject to encroachment, which is likely to result in further overall losses of heath and maritime grassland. Opportunities exist for scrub control and the introduction of an extensive grazing regime to remedy this. The National Trust Wildlife & Countryside Adviser has suggested that a target of 5% to 20% scrub cover and a maximum of 10% dense bracken on the site should be set. Decisions concerning which areas to leave as scrub and bracken have been discussed with the property staff, and a management plan drawn up (Figs 66-67).

There are good examples of species-rich coastal hedges. Generally these appear to be in a good state of repair, though it was noted that management/restoration of these would be challenging where these run along cliff-edges. Improved fields may have a long term potential for reversion to species-rich semi-improved/maritime grassland. The swamp/flush area may support notable species.

The site supports a good range of notable bird species and shows good potential for a range of invertebrates, reptiles and amphibians. Bats make use of the mine shafts and engine house structures, whilst badgers could be present.

A quarter of the holding is given over to improved, rye/clover grassland. The sward was recorded as being species-poor and showing little variation in composition throughout its extent, though there are some fragments of unimproved grassland and areas of tall ruderal vegetation showing signs of enrichment within the farmed areas.

Potential contamination issues

In 2008, Cornwall Consultants undertook a soil contamination survey of the Trewavas NT property (Hurst 2008) based on a study of archive and geological mapping, aerial photographs and a site visit.

The survey showed that the soils are of the Moretonhampstead Series, which are typically free draining, gritty and loamy brown podzols. Such coarsely-textured, moderately thin soils have a high leaching potential, and readily transmit non-absorbed pollutants, but have some ability to attenuate absorbed pollution because of their clay or organic matter content.

The study identified a potential for ground subsidence within the vicinity of Old Engine Shaft, and suggested that this could affect the stability of the nearby engine house. A similar situation was also considered possible at New Engine Shaft. Close examination of these sites during the 2008 conservation programme suggested that both engine houses are likely to have been securely founded on bedrock, though sloping fracture planes noted in the bedrock adjacent to Old Engine Shaft may give rise to destabilisation. The basal stones in the bob wall of this engine house were pinned and plated in 2008 to anchor the building's foundations.

In relation to soil contamination, arsenic was considered likely to have most significant potential impacts, given the nature of the lodes worked here. The material in the area of the dressing floors and spoil dumps was thought to represent the greatest potential hazards.

The report raised the possibility that that asbestos might be found in the vicinity of the buildings. The old boiler houses were thought the most likely sites for such material,

and it was recommended that the ground surfaces in these areas should not be disturbed.

Three exposure pathways were identified, these being:

- skin contact with contaminated material
- inhalation or ingestion of contaminated material
- exposure to elevated levels of radioactivity (concentrations of radon gas in the underground workings of the mine).

Safe working practices to minimise exposure during the conservation works were recommended, including the use of appropriate PPE (personal protective equipment). In general, however, it was considered safe to carry out the management activities undertaken in 2008, including the conservation of the engine houses and chimneys. Cornwall Consultants recommended that the public should not be encouraged into areas containing mine spoil or disturbed ground.

One aspect of contamination not touched upon in this report relates to uncontrolled agricultural run-off. Nitrate-enriched surface water drains downslope from the farm through the intervening fields, and forms a pond in the field to the north of the causeway. It is assumed that there would have formerly been a culvert beneath the causeway, but that this is now blocked up. However some seepage beneath the causeway is enhancing nutrient levels in the soils in the shallow valley downslope, whilst the leaching of nutrients from material in the adjacent agricultural rubbish dump may be contributing to this problem.

Potential mining hazards

In 2003, Cornwall Consultants were commissioned by the NT to undertake a mining search of Trewavas (Blakesley 2003). The report outlined the known and documented mining history of the site and reported the locations of four mine shafts – Old and New Engine Shafts, a small shaft near the north-western site entrance and a trial shaft, probably on North Lode. The potential was flagged up for subsidence taking place within areas of backfilled shallow workings. The sites of four adit entrances were noted – three just above sea level and one (site 36) on a higher level immediately behind the engine house on Old Engine Shafts. A high potential for soil contamination was noted in the area of the dressing floors in the western part of the property. A walkover survey of the property by a qualified mining consultant was recommended.

Two additional adits (inventory sites 52 & 53) were recorded by HES in 2008, together with a further undocumented and possibly major shaft (inventory site 55) and three more apparently small shafts in the shallow valley just to the north of the dressing floors (see Fig 13).

Historic Landscape Character

(See supporting information on CD-Rom)

Historic Landscape Characterisation (HLC) is a tool used to gain a more holistic and integrated understanding of the ways in which our modern landscape has developed, identifying its values, potential and vulnerabilities. HLC is increasingly recognised as a valuable aid to landscape management.

Defining attributes

The HLC Type for Trewavas is predominantly **Rough Ground**, which consists of areas of generally un-managed grassland, heathland, and open scrub, usually on the higher or more exposed ground in a locality. The principal sources used when mapping this Type were the 1988 LIFE habitat mapping (held by the Environmental Records Centre for Cornwall and the Isles of Scilly) and aerial photographs. Rough Ground is subdivided according to its main locations - Upland and Coastal - and is distinguished from areas of Rough Ground on windblown sand (Dunes).

Coastal Rough Ground consists of unenclosed sloping ground beyond enclosed fields but above precipitous cliffs. It is generally a narrow band of land (from 50 to 800m wide) found on most stretches of the Cornish coast.

The semi-natural habitats here are, to a considerable extent, the product of thousands of years of human activity, particularly summer grazing, turf-cutting and extractive industry. These areas are now almost entirely neglected, with very little grazing, although there have been various initiatives to reintroduce grazing to coastal rough ground in the last decade or so. Long distance coastal footpaths run through the Type which can therefore be quite busy during the summer months.

Five subdivisions of Coastal Rough Ground have been defined:

- Coastal Rough Ground (unenclosed/undivided). This is Coastal Rough Ground which appears to have always been open and never divided by pasture boundaries. It is often common land.
- Coastal Rough Ground (enclosed/divided). Here, long pasture boundaries divided sections of 'private' rough ground attached to neighbouring farmsteads.
- Coastal Rough Ground subjected to former non-agricultural land uses (usually industrial).
- Bare cliffs.
- Precipitous vegetated cliffs.

Cornwall's cliffland has been utilised since at least the Bronze Age. Surveys have shown apparently Bronze Age cliff pasture-dividing boundaries in areas of west Cornwall and many cliff-tops are the sites of Bronze Age barrows (as at Trewavas). Some of the more dramatic Cornish headlands were turned into 'cliff castles' using ramparts and ditches in the Iron Age, but the cliffland's main use would have been as areas of summer grazing and as sources of fuel, principally 'furze' (gorse) but also, in poorly drained areas, 'turf' (peat). These agricultural and domestic uses continued through the medieval and post-medieval periods and into the first decades of the 20th century. Until the post-medieval period, most cliffs were undivided commons.

Some cliffs were the sites of mines or sited quarries. From at least the 16th century people looking out from the cliff-tops to the sea would have included generations of military men, coastguards, excise men, smugglers, and fishermen.

Safeguarding the Type.

An important means to achieve the future of this Type is through the reintroduction of summer grazing to recreate a variety of land cover and the open character of Cornish coastal rough ground. The National Trust and Natural England have been reintroducing cliff grazing with good results over stretches of its coast and other bodies should be encouraged to follow suit. Further loss of Coastal Rough Ground to agriculture (e.g. ploughing up to cliff-edges) potentially threatens the Type.

SWOT analysis

Strengths	Weaknesses
Trewavas and neighbouring Rinsey make up a very attractive stretch of the Cornish coast.	Because of the rugged terrain, the site is not physically accessible to those with impaired disability.
Trewavas is a discrete Area of the Cornish Mining World Heritage Site.	The nature of the site makes access for site management difficult in some areas.
Trewavas is a Scheduled Monument. The engine houses and chimneys are Grade II	There is currently no interpretation for Trewavas, either on site or at the car

<p>Listed Buildings.</p> <p>The site lies within the Cornwall AONB.</p> <p>The site has been owned and managed by the National Trust since 2008.</p> <p>The principal buildings on the site have been recently conserved to a high standard.</p> <p>Good levels of public access to the property exist via the coast path and under the CROW Act.</p> <p>A public car parking area of suitable size exists at Rinsey not far to the east.</p> <p>There is a dedicated NT Ranger in post for Trewavas and the Mounts Bay Properties.</p> <p>Both Old and New Engine Shafts have been adopted as Chough roosting and nesting sites.</p> <p>The site includes a good range of typical coastal habitats.</p> <p>Much of the site habitat is likely to be self-regulating due to exposure.</p> <p>Trewavas has a spectacular setting with wide ranging views westwards across Mounts Bay and south-eastwards to the Lizard.</p>	<p>parking area at Rinsey.</p> <p>There is little information available concerning the WWII radar station.</p> <p>No detailed measured survey is available for the majority of the site and its features.</p> <p>The history of Trewavas mine is confusing and poorly understood. Little is known of the demolished whim engine, the later pumping engine and the diagonal shaft sunk shortly before the mine's closure.</p> <p>Both open and choked shafts and adits on site are potentially hazardous to the visiting public.</p> <p>The unconsolidated capstan plat walling at Old Engine Shaft is likely to witness further collapse and would be expensive and difficult to stabilise.</p> <p>Significant areas of the site are dominated by scrub or bracken, obscuring archaeological features and compromising wildlife interests.</p> <p>Bracken and scrub are over-represented as wildlife habitat.</p> <p>Some areas of the site have been used as farm rubbish dumps.</p> <p>The NT only manages the coastal strip and not the adjoining farmland, limiting its ability to improve the range of habitats suitable for chough and other species.</p> <p>Climate change may potentially encourage the further spread of bracken.</p> <p>High levels of public access and the physical characteristics of the site make the introduction of a conservation grazing scheme potentially difficult.</p>
<p>Opportunities</p> <p>Targeted scrub and bracken management to enhance and increase site biodiversity, particularly if combined with the reintroduction of stock grazing.</p> <p>Enhancement of physical access to the site through regular path maintenance.</p> <p>Enhanced virtual access via NT and other websites.</p> <p>Enhanced interpretation via a leaflet or guide, and an interpretation panel at Rinsey carpark.</p> <p>Broadened appeal of Trewavas to groups</p>	<p>Threats</p> <p>Further uncontrolled bracken and scrub incursion over the site will result in an overall decline in site biodiversity.</p> <p>Changes in legislation relating to contaminated land may force remediation of the former dressing floors and spoil dumps.</p> <p>Climate change may result in increased cliff erosion, leading to losses of the seaward parts of the site.</p> <p>There is a significant potential for the collapse of the unconsolidated masonry</p>

<p>of people who do not or cannot currently make use of the site.</p> <p>Development of the use of the site as an open air classroom, and as the site for cultural and artistic activities.</p> <p>Development of the potential for additional volunteer engagement.</p> <p>An increased range of activities which might attract new visitors to the site.</p>	<p>forming the shaft collar at Old Engine Shaft, leading to loss of archaeological fabric and of an important Chough nesting site.</p> <p>The uncontrolled removal of mineral specimens from the mine spoil dumps, together with disturbance associated with this activity will degrade the RIGS site.</p> <p>Mine spoil is occasionally used to create cairns adjacent to the paths through the dressing floors, potentially damaging the RIGS site.</p>
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Issues and vulnerabilities

Together with the other areas making up the Mounts Bay properties, the practical day to day management of Trewavas is the responsibility of an NT Ranger, whilst the covenanted fields to the north and the NT-owned large enclosed field to the west are managed by its former owner, Mr. Vivian Penrose. If no changes from the current property management were envisaged, Trewavas would require very low levels of cyclical maintenance work, whilst the principal capital works required to conserve its structures have already been undertaken.

However, in order to realise the potential of the site, a range of issues, including those concerning the currently high levels of scrub and bracken cover will have to be addressed. This will require not only a programme of capital works, but also more intensive medium term management input by property staff.

Issues

- Spreading of scrub and bracken cover at the expense of coastal heath and grassland.
- The potential for climate change-driven cliff erosion leading to the loss of cliff edge archaeological features and chough nest sites in mine shafts.
- Path erosion.
- Uncontrolled agricultural run off raising nutrient levels in coastal land.
- A former agricultural rubbish dump adjacent to an area of heathland.
- Moderately high input management of the coastal fields reduces biodiversity and limits the extent of feeding areas for choughs and other birds.
- Lightly secured mine shafts and unsecured adits may be perceived as safety hazards.
- With the exception of Trenow, the NT Mounts Bay properties portfolio consists almost exclusively of cliffland, severely limiting the NT's ability to manage farmland to encourage the sustainable establishment of choughs and to control agricultural run-off into the coastal and marine environment.
- The mapped routes of definitive rights of way do not match those on the ground. The definitive routes are, in places, completely inaccessible, and can never have been traversable, particularly at the eastern end of the property.

Vulnerabilities

- The enhancement of Trewavas, in particular through the better management of scrub and bracken, and the development of the site's potential is likely to make significant demands on property staff time.

- Any significant increase in the size of the Mounts Bay Properties portfolio without concomitant enhancement or reorganisation of countryside staffing levels would reduce the NT ability to undertake improvement projects, manage contractors and develop educational and other uses of the site in addition to normal cyclic maintenance.
- Future NT staff and volunteer levels may be insufficient to ensure that areas cleared of scrub and bracken do not revert.
- Cliff grazing at Trewavas to enhance biodiversity may not prove possible due to constraints on the use of fencing, objections from other stakeholders in the site, non-availability of suitable stock or an inability to carry out regular stock inspections caused by insufficient dedicated staff levels or staff time.
- Future changes in legislation relating to contaminated land may threaten the RIGS site as well as bryophyte communities in the area surrounding the spoil dumps.
- The potential loss or degradation of related components at Trewavas would have a significant impact on the Outstanding Universal Value of the Cornish Mining World Heritage Site (of which sites at Trewavas are important constituent parts). It would also have a major impact on this stretch of coast, and the story of coastal copper mining – something of particular importance within the development of mining technology worldwide.

Statement of Significance

Trewavas is one of a very small number of early 19th century copper mining sites within Cornwall whose quality of survival and spectacular location provide visitors a particularly immediate relationship with the internationally-important industrial history of the Region.

As well as having considerable technological importance, these dramatically-located engine houses also have considerable aesthetic significance, being distinctive landscape features – much photographed, much visited, and located immediately adjacent to the popular Cornwall Coast Path.

Despite the dramatic evidence for former mining activity, Trewavas is greatly prized as an oasis of calm and natural beauty, unaffected by modern development and having sweeping views along the coastline of Mounts Bay. The site is also significant for wildlife and has the potential for enhancement for biodiversity.

Trewavas, together with the stretches of coastline which abut this property, are important not only in landscape terms, but also for their archaeology and ecology, containing as they do an intimate intermingling of evidence for human activity since prehistory, and for the habitats which have developed in response to a particular and unusual combination of geology, climate and human activities. As such, Trewavas is very well-placed to offer a range of opportunities for research, recreation and education.

Moving forward: vision and aims

Trewavas is, in many ways, a microcosm of all that is most attractive about the Cornish coast, incorporating prehistoric archaeology, dramatically-set mining features and coastal heathland backing rugged granite cliffs, which like the adjoining maritime environment are rich in wildlife.

Despite its apparently robust appearance, the appeal and importance of this landscape rests upon a potentially fragile combination of elements which requires sensitive management. Considerable strides have been made to achieving this aim through the conservation of the engine houses in 2008, whilst the adoption of the site by choughs marks an important stage in the natural re-establishment of this iconic species in Cornwall.

However, as is highlighted in the biological survey, scrub and bracken cover on the site are already over-represented. The HLC statement makes clear the principal reason for this – the abandonment of the coastal grazing practices which historically kept this habitat in check – though allied to this are the effects of climate change, in particular global warming, which is likely to encourage bracken growth. Strategic long-term vegetation management will be required to check, indeed to reverse, the spread of scrub and bracken across parts of the cliffland.

Trewavas has particular and special values, but also a largely untapped potential for its enhanced management for access, enjoyment and learning for local people and visitors alike in line with many of the National Trust's core aims. Achieving this will require imagination, sensitivity and an awareness of the need for balanced management, but most particularly, an understanding of its particular and special character.

This is one of the very few places in Britain where a visitor can encounter this extraordinary combination of turquoise sea and sunlit granite cliffs with their daringly-sited engine houses, the scent of heath in the air, and the bonus of choughs wheeling and calling overhead.

Key aims for the management of Trewavas should include:

- **Preserving** the special qualities of the site.
- **Communicating** the special nature of the site to a wider public through a range of means.
- **Enhancing** current levels of public access to key areas of the site as well as **creating** virtual access to the site through the development of web-based information.
- **Developing** activities at Trewavas which would draw in a wider range of visitors.
- **Encouraging** the use of the site as an outdoor classroom for local schools.
- **Reducing** the level of scrub and bracken cover across the site and undertaking other works to produce a sustainable wildlife-rich mosaic of heathland and coastal grassland.

How can the vision be achieved?

The following recommendations have been discussed with a range of consultees, and are considered to be achievable and appropriate.

Performance indicators, time-scales to achieve these objectives and any funds which might be required will be determined by the Trewavas property management team.

Survey and research

In order to address gaps in knowledge and give visitors to Trewavas a richer and more rewarding experience, the following areas of research are recommended:

- The history of the Trewavas Chain Home Low radar station.
- The history of Trewavas mine.

Detailed surveys of the following are recommended:

- The barrow and possible cairn on the headland.
- The extent and nature of the accessible underground elements of the mine, together with its value or potential value as a bat roosting site.
- As highlighted by the NT Regional Archaeologist, there is a need for a metrically accurate survey of key areas of the property to locate and record mining features such as tramway inclines, horse whim platforms and prospecting pits.

The historical research could be undertaken by interested volunteers, whilst the surveys of the cairns might be a suitable project for archaeological volunteers. The survey of the mine workings and assessment of its use by bats should be undertaken by suitably qualified specialists.

Explaining and informing

In order to enhance interpretation and access for Trewavas, the following are recommended:

- An interpretation/orientation panel should be set up in the car parking area at Rinsey East Cliff covering both properties.
- Consideration should be given to the production of a self-guided leaflet for both Trewavas and Rinsey East Cliff similar to those produced for Levant, Botallack and Mayon Cliff in West Penwith.
- Trewavas should be included in a revision of the NT Coast of Cornwall booklets.
- The provision of virtual access to the site should be considered through inclusion on the NT web site. Trewavas already figures on the Cornish Mining WHS Bid website at <http://www.cornishmining.net/sites/trewavas.htm>. This information is due to be transferred to the revised Cornish Mining WHS site at <http://www.cornish-mining.org.uk>. Further on-line information could be made available via social networking sites such as Facebook, Twitter and blogs.
- Discussions should take place with Cornwall Council access officers with the intention of realigning the definitive routes of Rights of Way at Trewavas to match those actually used by walkers.

Presenting and engaging

Trewavas (and Rinsey) are currently relatively under-utilised for education, outreach and engagement. This potential could be explored through:

- Approaches to local schools to see whether the Mounts Bay properties (Trewavas in particular) have the potential for use as outdoor classrooms.
- Working on elements of site development and management with bodies such as the RSPB, who through their Chough Project already have an interest in the site, as well as having a large national membership and access to volunteers. Opportunities to work with locally-based organisations such as the Cornwall Wildlife Trust and their Fox Club could also be explored.
- A programme of guided walks and talks should be developed for the West Cornwall properties. Trewavas (with Rinsey East Cliff) has the potential for walks based on their history and aspects of their wildlife, which could be delivered by local experts, by NT staff and by volunteers. Given the spectacular landscape at Trewavas, there is also some potential for open air art or photography workshops led by NT staff or by local artists working with NT staff.
- Engagement with the private sector is possible at this site. A number of locally-based businesses run maritime tours along the Mounts Bay coast and there exists some potential for the development of partnership working with these and other businesses – for instance marine bird watching, canoeing, snorkelling or coastal landscape photography expeditions which might be set up and run in collaboration with NT staff or volunteers.
- Trewavas presents a number of opportunities for engaging with volunteers. The RSPB have already demonstrated the willingness of their local members to be involved in chough watching during the nesting season, whilst the potential for other volunteers to undertake historical research, archaeological surveys, lead guided walks or become involved in site-based activities is highlighted above. Other

opportunities for locally-based volunteers could include assisting with activities such as path management, bird, butterfly and other wildlife surveys, as well as site monitoring.

Management works

The conservation of the major structures on the site was achieved to a very high standard in 2008. As well as cyclic management such as vegetation cutting on existing rights of way, path surfacing repairs, path drainage and the maintenance or repair of signs and safety fences, the following management works are recommended:

- A staged programme of scrub and bracken management should be undertaken. This should be preceded by a habitat assessment (preferably during the nesting season) to determine the nature conservation value of such areas, as well as the identification of those which can and should be cleared and those which should be left as part of the habitat mosaic. It will also be important to have a vision for what should replace any low-value habitats such as extensive areas of bracken and the means through which this could be sustainably achieved.

In the first instance, the removal of scrub could be achieved through brush-cutting, but its replacement with more preferable habitat would have to be addressed through roughland grazing. Consideration should be given to which species might be most suitably used to achieve this aim, at what times of year and whether managed in hand, by a tenant or by another organisation. Consideration would also have to be given as to whether this would be achievable without intrusive cliff edge fencing, and what the financial implications might be. Trewavas (with the other Mounts Bay, Godolphin and Porkellis properties) has already been put into Higher Level Stewardship, though grazing has not been proposed for Trewavas as yet. Consultation with DEFRA and with other stakeholders will also be necessary.

Fixed point photomonitoring should be implemented to monitor the effects of changes in the management regime.

- Prior to the replacement of some areas of scrub and bracken with maritime heath and grassland it will be necessary to open up and maintain some of the undesignated paths around the site by hand, in particular those linking the coast path with Old Engine Shaft. Given that these run through areas infested with bracken, cutting regimes will need to be suitably frequent to ensure that they remain open, particularly during the visitor season.

This might be a task which could be taken on by a locally-based volunteer or a group of volunteers, working with the Mounts Bay Properties Ranger. Obscuring vegetation should also be cut back on the capstan and horse whim plats associated with New Engine Shaft. Some of these works might be suitable opportunities for an NT Working Holiday.

- Vegetation management may be felt appropriate on the known barrow and the possible cairn on Trewavas Head, as this will add to visitor interest, particularly if these are interpreted at Rinsey car park and by other means. There is also some potential for a small-scale volunteer-based investigative excavation of the barrow. The potential for this work should be discussed with the NT Regional Archaeologist.
- In order to enhance habitat for wildlife and particularly to benefit and support the growing local chough population, consideration should be given to either partial reversion of all or part of the NT-owned field created from cliffland at the western end of the property during the 19th century, or to a significant reduction of inputs within this field and an appropriate grazing regime to encourage a shorter, more herb-rich mix of vegetation. The retention of un-sprayed field margins is recommended as well as discouraging the use of ivermectin pesticides to enhance invertebrate diversity. This approach would also indirectly favour species such as bats and plant species such as Hairy Birdsfoot trefoil.

Timetable and priorities.

- **Rights of Way management.** Cyclic and ongoing. High.
- **Management of other paths.** Cyclic and ongoing. High.
- **Bracken cutting.** Once or twice annually pending introduction of grazing scheme. High.
- **Bio-survey of scrub areas.** During 2012 nesting season. High.
- **Manual/mechanical reduction in scrub cover.** Within three years. High.
- **Introduction of grazing scheme.** Within five years. High.
- **Partial reversion of coastal field through reduction of inputs.** Within five years. High.
- **Underground bat survey.** Within three years. Low.
- **Underground mine workings survey.** When resources allow. Low.
- **Historical research.** When volunteer resources allow. Low.
- **Measured site survey.** When NT resources allow, preferably once vegetation management programme has reduced bracken and scrub cover. Medium.
- **Survey of cairns.** When volunteer resources allow. Low.
- **Trial excavation of cairns.** When volunteer resources allow. Low.
- **Establish interpretation board at Rinsey car park.** Within three years. High.
- **Develop self-guided leaflet.** Within three years. Medium.
- **Develop web-based information.** Within three years. Medium.
- **Develop links with other organisations.** Establish potential within three years. Low.
- **Develop walks, talks and events programme.** Establish trial programme in 2012. Medium.
- **Investigate links with private sector.** Establish potential within three years. Low.
- **Establish links with local education providers.** Establish potential within two years. Medium.
- **Develop volunteer opportunities.** Within two years. High.

Monitoring and improving the plan

A conservation plan should be a working document, one which underpins and informs site management and one whose vision provides the target destination for management actions. It should follow the **SMART(ER)** approach, in that objectives should be **S**pecific, **M**easurable, **A**ttainable, **R**elevant and **T**ime-bound, but also capable of **E**valuation and of **R**e-evaluation.

The success, partial success or failure of individual actions involved in achieving the plan objectives should be routinely monitored by the staff involved in carrying them out, as well as by the Property Manager. Where approaches are found not to work effectively, alternative methods should be sought.

No property or conservation management plan can anticipate the effects of unforeseeable future changes, whether in legislation, the effects of a changing climate on the natural environment, the effects of changes in the national or local economy or other factors. A successful plan is a relevant plan, and to ensure that this is the case, the Plan should be periodically re-evaluated, and if appropriate, revised. In view of

these and other factors, it is suggested that re-evaluation of this Plan should be undertaken by the National Trust Property Manager on a maximum of a five-yearly basis.

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<http://www.nationaltrust.org.uk/main/w-global/w-localtoyou/w-devoncornwall.htm>
The National Trust's Devon and Cornwall Regional website

<http://www.mine-explorer.co.uk/> A web archive of research and investigation into abandoned mine sites in the UK

<http://www.derelictplaces.co.uk/> A web archive of research and investigation into, amongst other site types, abandoned military sites

<http://www.radarpages.co.uk/> A website specialising in the presentation of the results of investigations into the development of radar

<http://jncc.defra.gov.uk/page-1374> EU Habitats Directive

Project archive

The HE project number is **2011059**

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. A copy of relevant sections of the archive has been deposited with the National Trust. The contents of this archive are as listed below:

1. A project file containing site records and notes, project correspondence and administration.
2. Background information held in the directory: G:\Historic Environment (Documents)\HE Projects\Sites\Sites T\Trewavas Conservation Plan 2011059\
3. Digital photographs stored in the directory: R:\Historic Environment (Images)\SITES.Q-T\Trewavas CMP 2011059
4. English Heritage/ADS OASIS online reference: cornwall2-104913
5. This report text held in digital form as: G:\Historic Environment (Documents)\HE Projects\Sites\Sites T\Trewavas Conservation Plan 2011059\Trewavas CMP 2011.doc

Appendix 1: study methodology

Review of information

A review of the 2008 Conservation Management Statement was undertaken in order to identify information contained within it which required updating as well as categories of information relating to the site which had not been included in the original report. A number of sources were also consulted, including:

- Cornwall HER
- Images of England online listed buildings database
- Early maps and photographs
- Published and other written information

- Relevant CC GIS layers
- Websites

Fieldwork

A walkover survey was undertaken following the review of information phase of the project in order to identify any specific problems or opportunities and to sketch survey the extent of areas presently covered by scrub and bracken.

A photographic survey of key features of the site was also undertaken, building on photographic records of the site undertaken in 2008.

Production of draft plan

A consultation draft of the Plan was produced, building on the Conservation Management Statement produced by Sharpe in 2008, but additionally addressing other aspects of the site and setting out issues and vulnerabilities, incorporating a SWOT analysis of the property and setting out draft recommendations and objectives for discussion with consultees.

Consultation

The draft Plan was circulated, in digital or hard copy form (as relevant), to a range of consultees for comment. Face to face, telephone and email consultations were also carried out. The consultation period spanned July to September 2011.

Consultees included:

- The National Trust: Property Manager, Mounts Bay Ranger, Archaeologist, Wildlife & Countryside Adviser
- English Heritage: Inspector of Monuments, Field Monument Warden)
- The Cornish Mining World Heritage Site Team
- The Cornwall AONB Team
- RSPB
- Cornwall Council Historic Environment Advice Team Leader (West)
- Cornwall Council South West Coast Path Team
- NT Tenant at Trewavas: consultation via the NT

Production of second draft plan for consultation

Following the consultation phase, comments and suggested amendments and additions to the plan were drawn together and discussed with the consultees to ensure that the final plan was appropriate and achievable.

Production of finalised plan

Following a second phase consultation between October and December 2011, hard copies of the finalised Plan were provided to the Client, Cornwall and Scilly HBSMR, English Heritage and to copyright libraries. Electronic versions were also provided to the Client. The report also included a CD-Rom containing copies of the archaeological, ecological surveys and other supporting information.

Archiving

All project materials, photographs and data were archived according to HE guidelines.

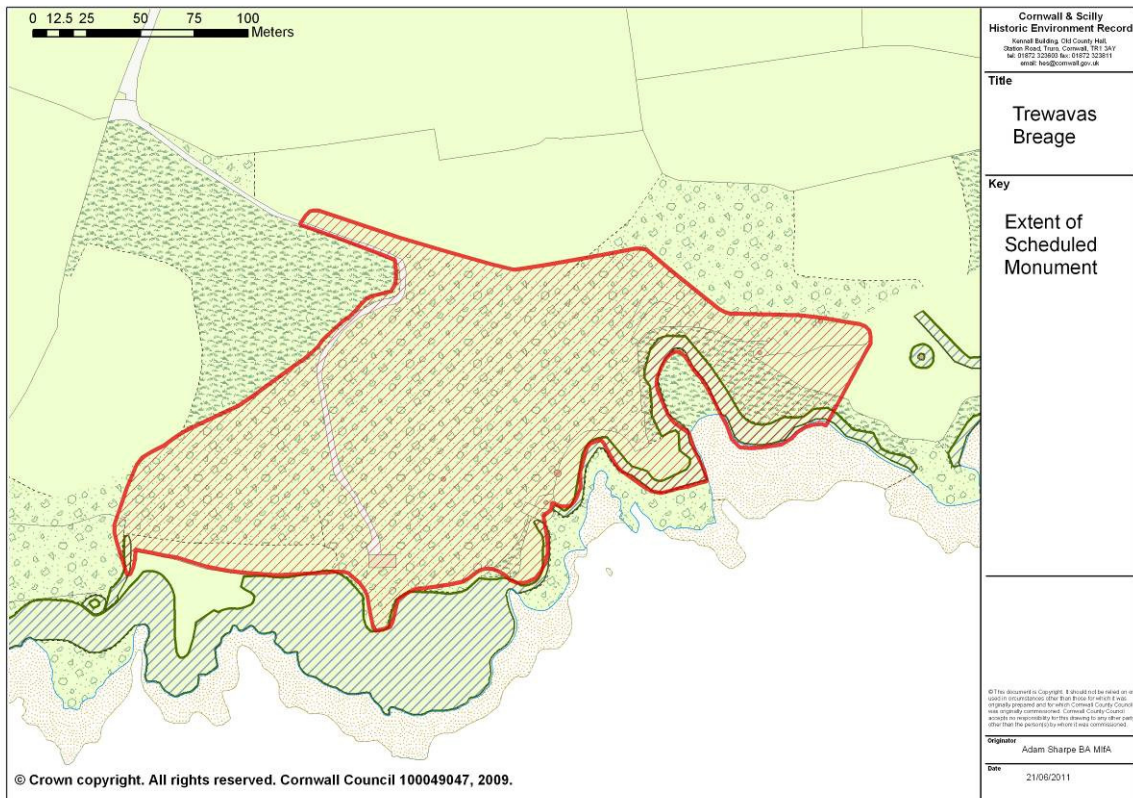


Fig 3. The extent of the scheduled area at Trewavas.

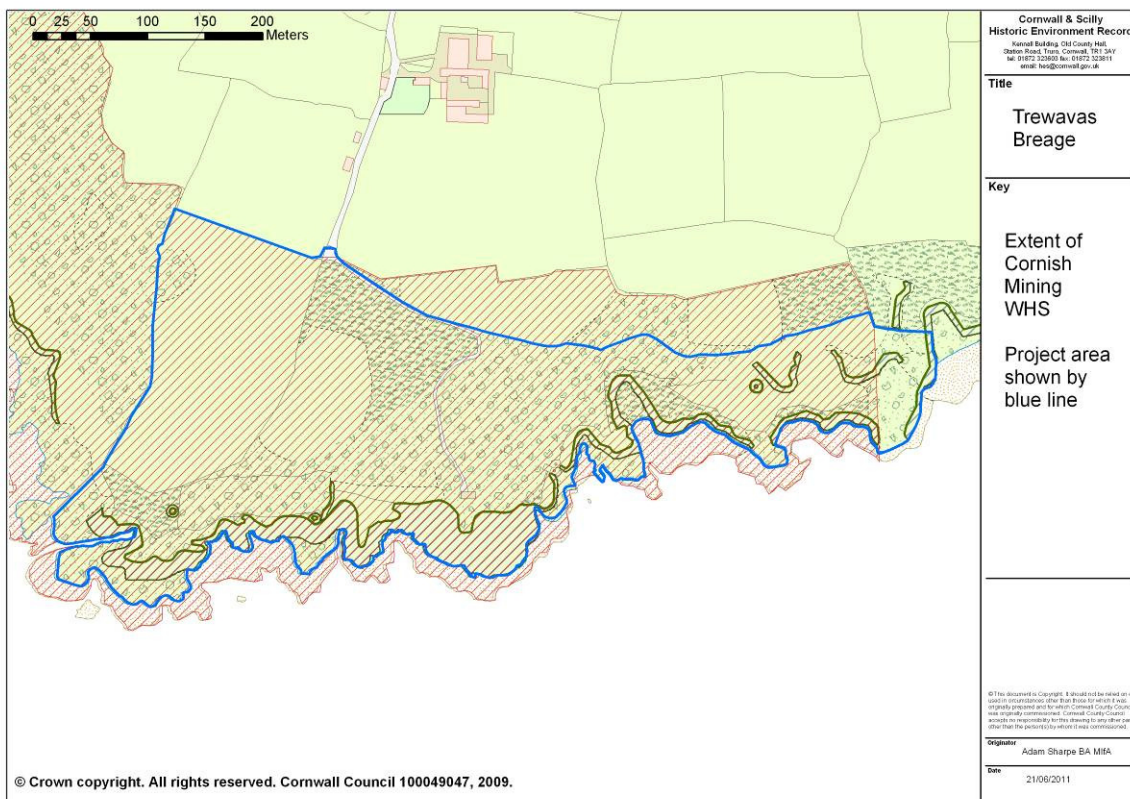


Fig 4. The extent of the Cornish Mining World Heritage Site at Trewavas (hatched area).

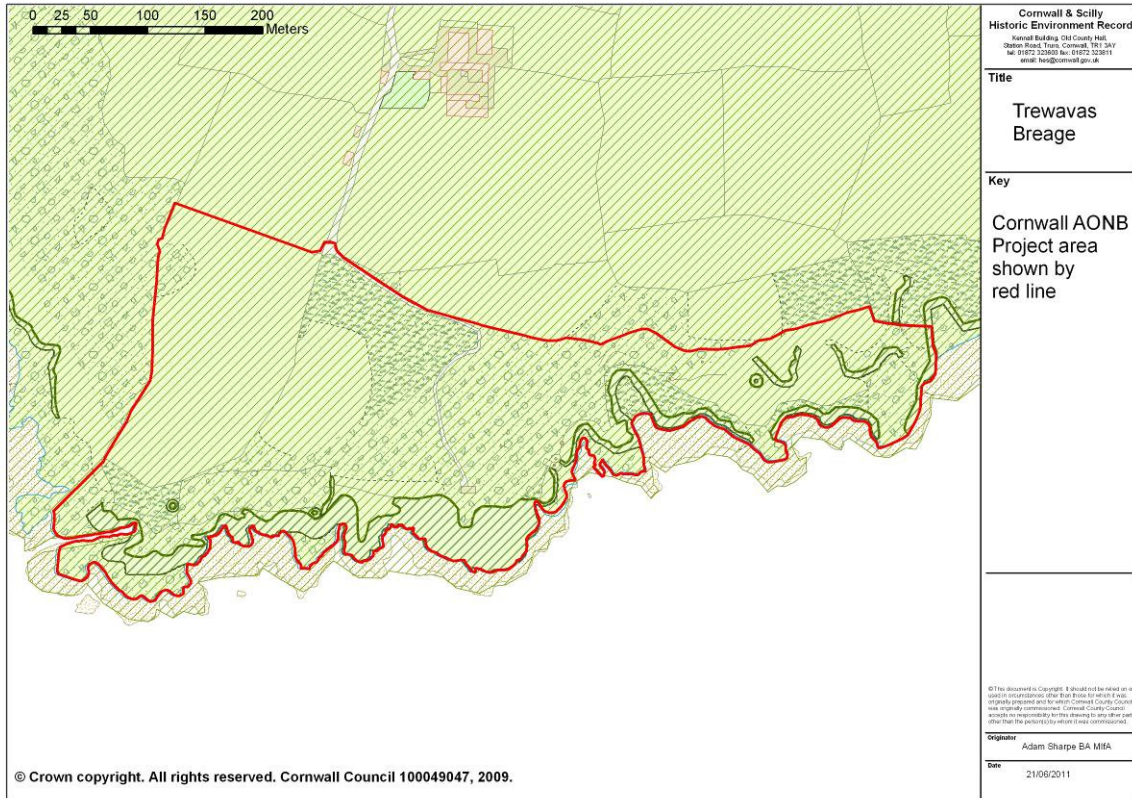


Fig 5. The extent of the Cornwall AONB at Trewavas (hatched area).

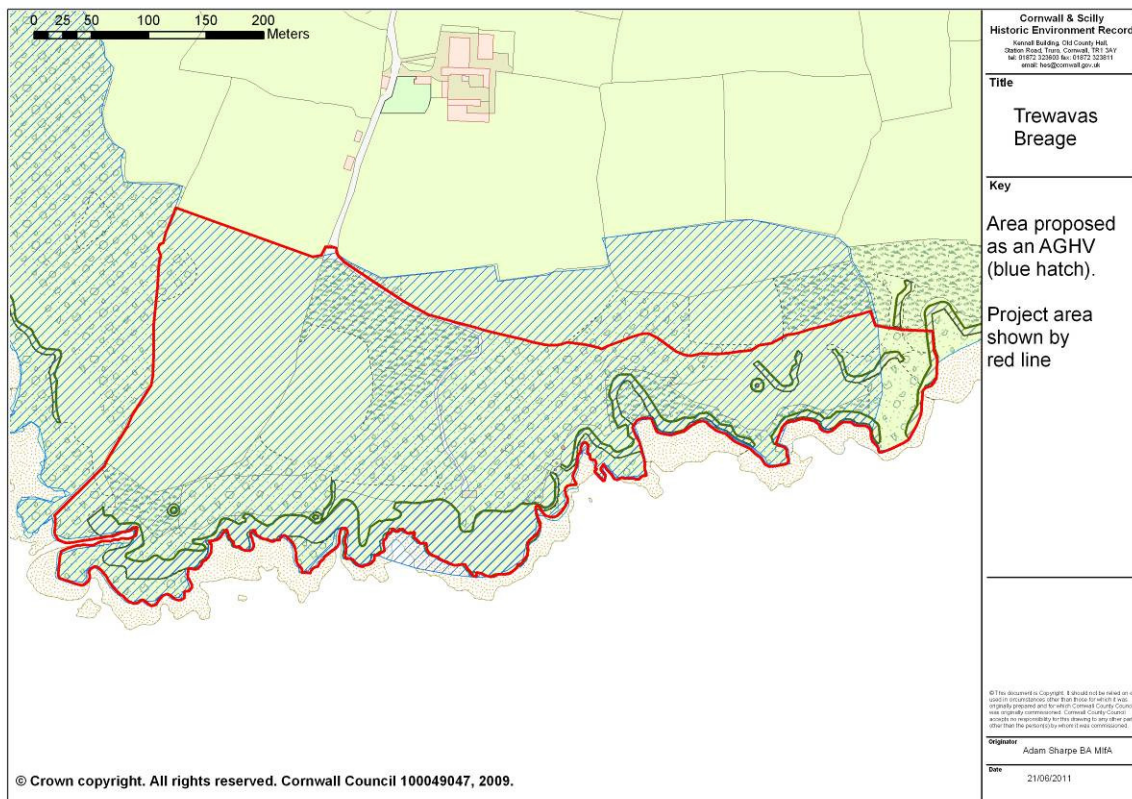


Fig 6. The extent of the proposed AGHV at Trewavas (hatched area).

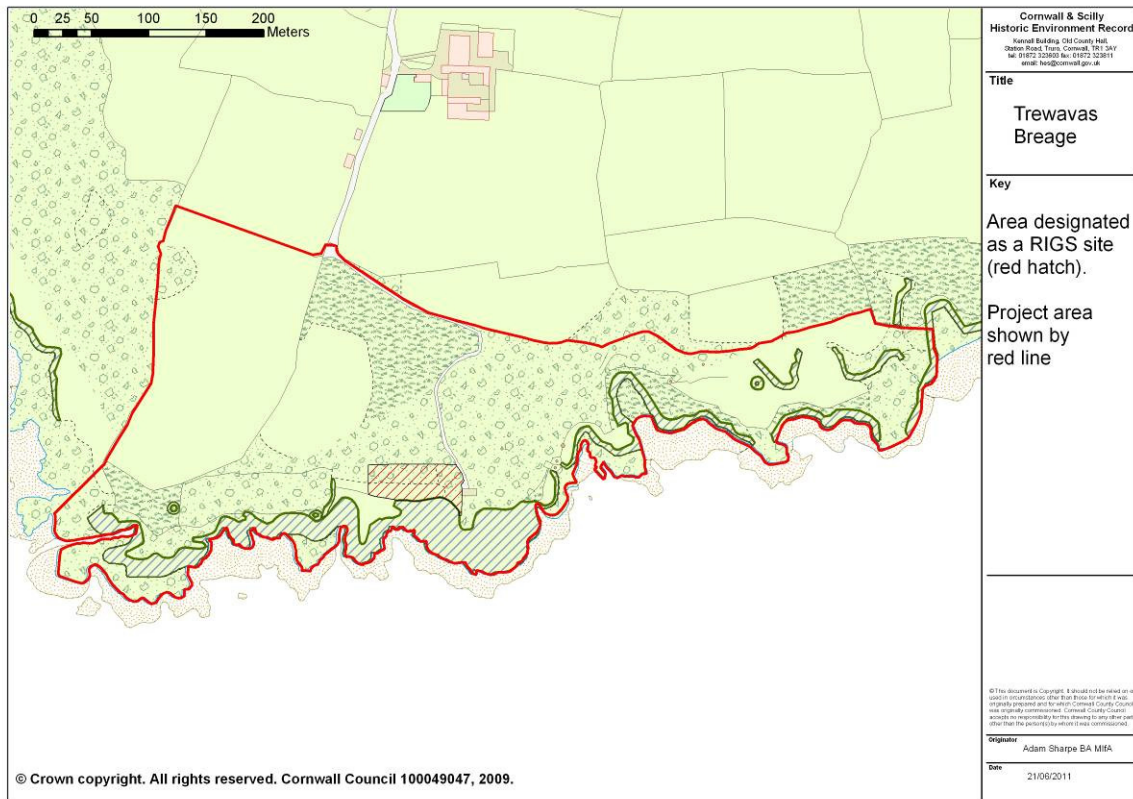


Fig 7. The extent of the RIGS site covering the spoil dumps at Trewavas (yellow hatched area).



Fig 8. CCC 2005 aerial mapping of Trewavas, giving a good impression of the topography and vegetation cover across the site.



Fig 9. Trewavas as depicted on the 1809 1st Edition OS 1" to a mile mapping.



Fig 10. Trewavas as shown on the circa 1840 Breage Tithe Map. Unfortunately the map has been damaged along a crease, though no indications of mining features seem to be shown.

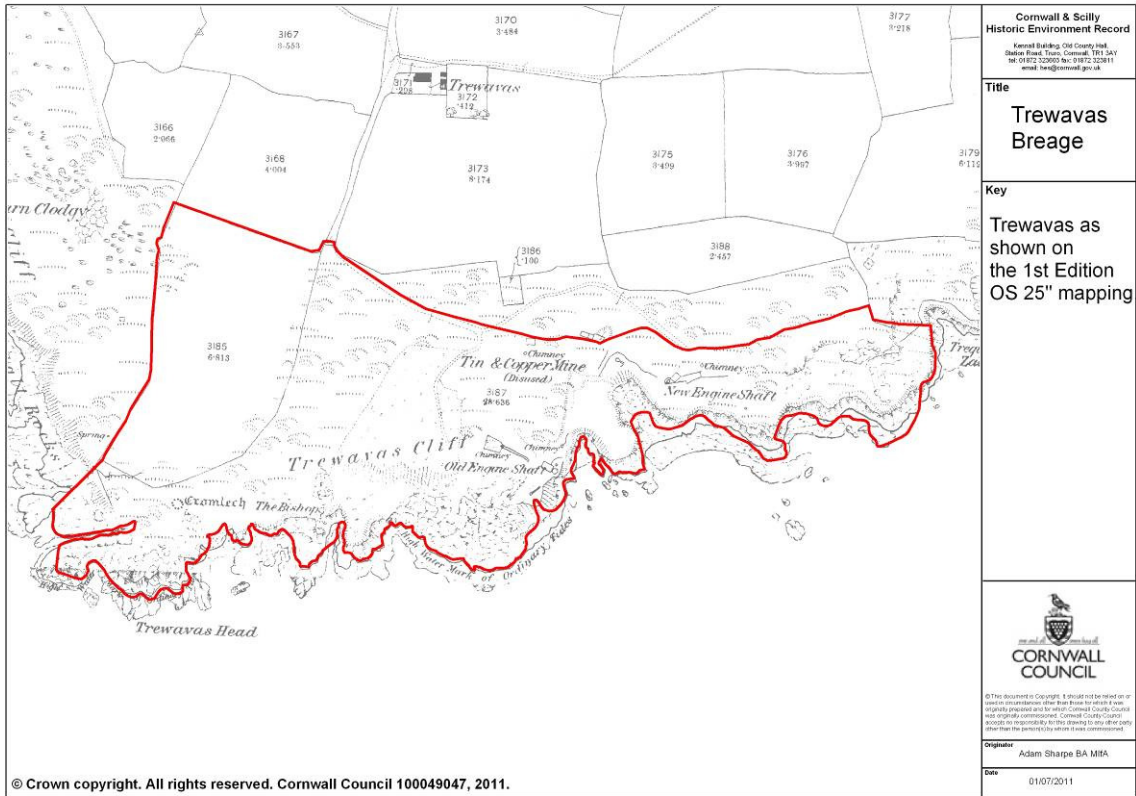


Fig 11. Trewavas as shown on the circa 1877 1st Edition OS 25" mapping. Note the whim engine house and chimney near the centre of the northern boundary of the NT owned area.

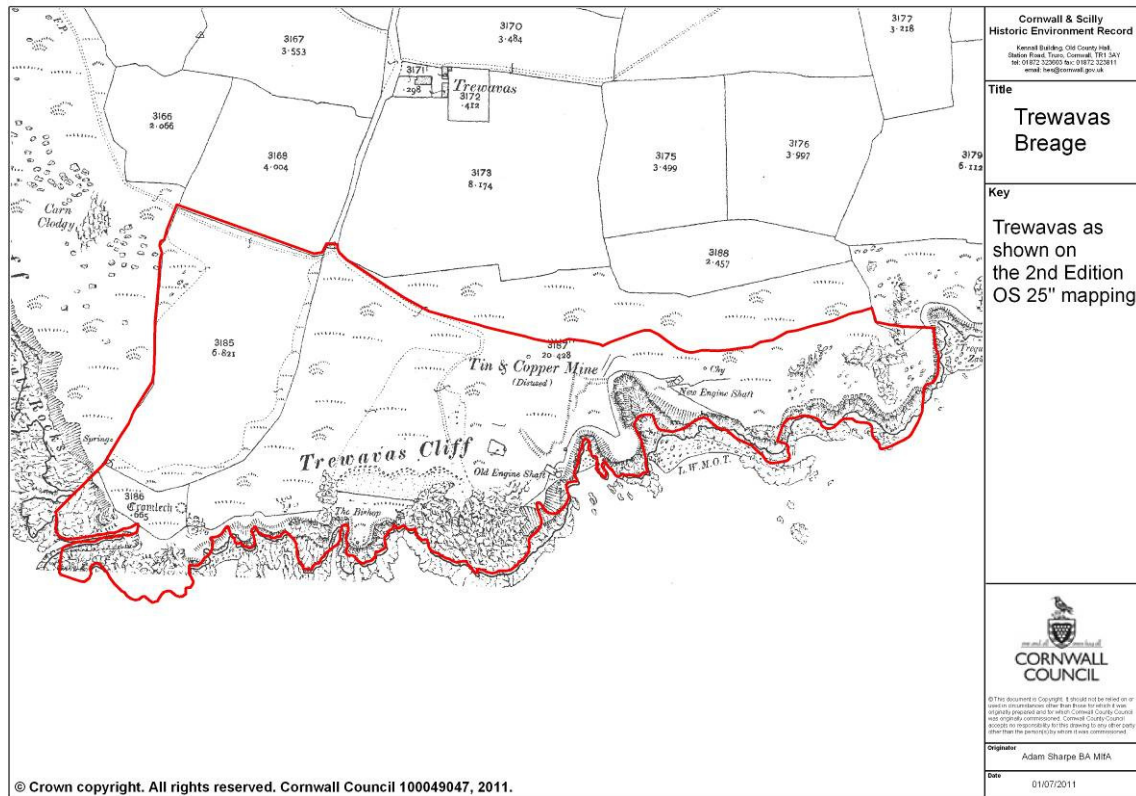


Fig 12. Trewavas as shown on the circa 1907 2nd Edition OS 25" mapping. By this date the whim engine house had been demolished and the enclosure at the south-western end of the property around the 'Cromlech' had been laid out.

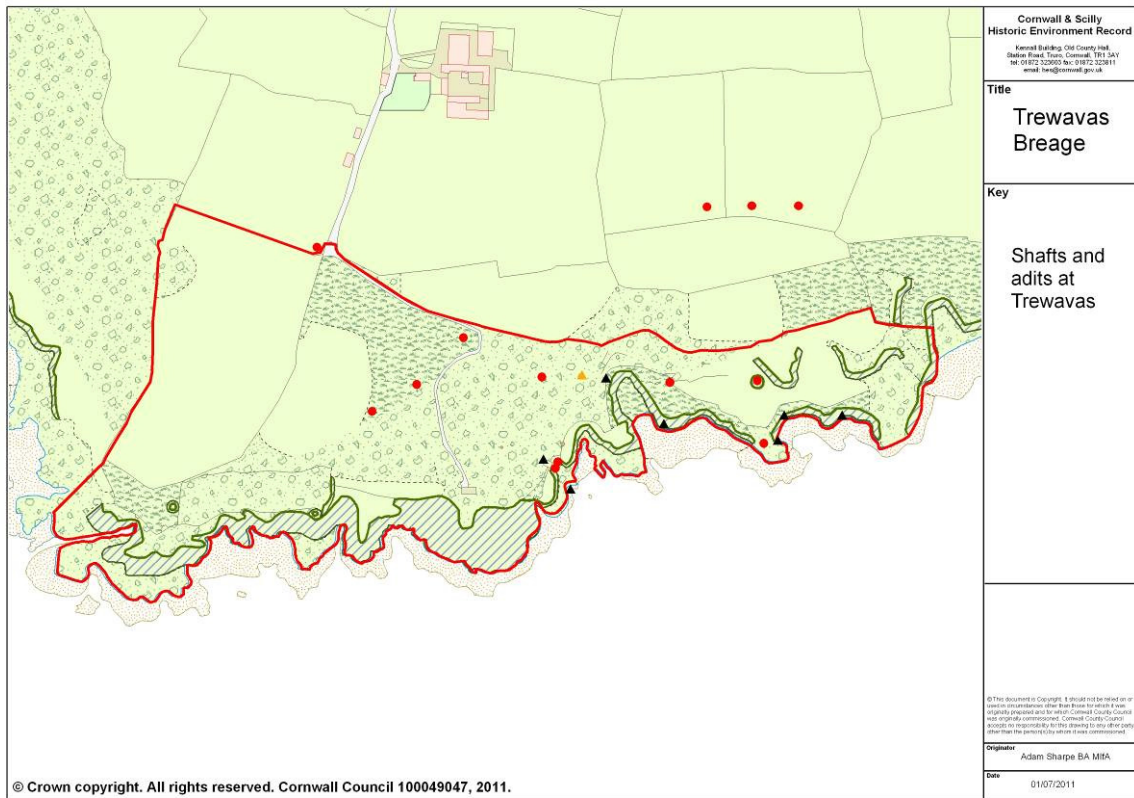


Fig 13. Shafts (dots) and adits (triangles) at Trewavas. Red- documented shaft, Black- documented or surveyed adit, Orange - trial adit.

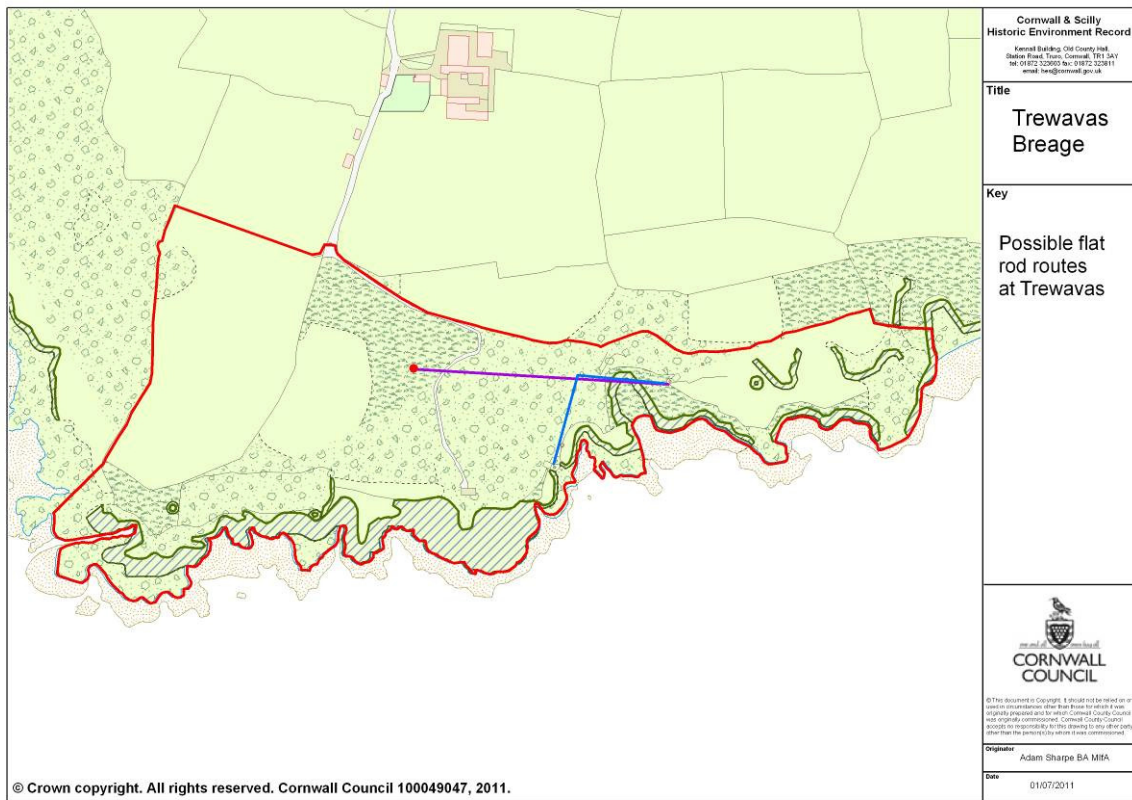


Fig 14. Flat rod routes at Trewavas. Blue - assuming a surface route linking the engine at New Engine Shaft with the pumps in Old Engine Shaft; Purple - via a shallow adit to a documented shaft to the west.

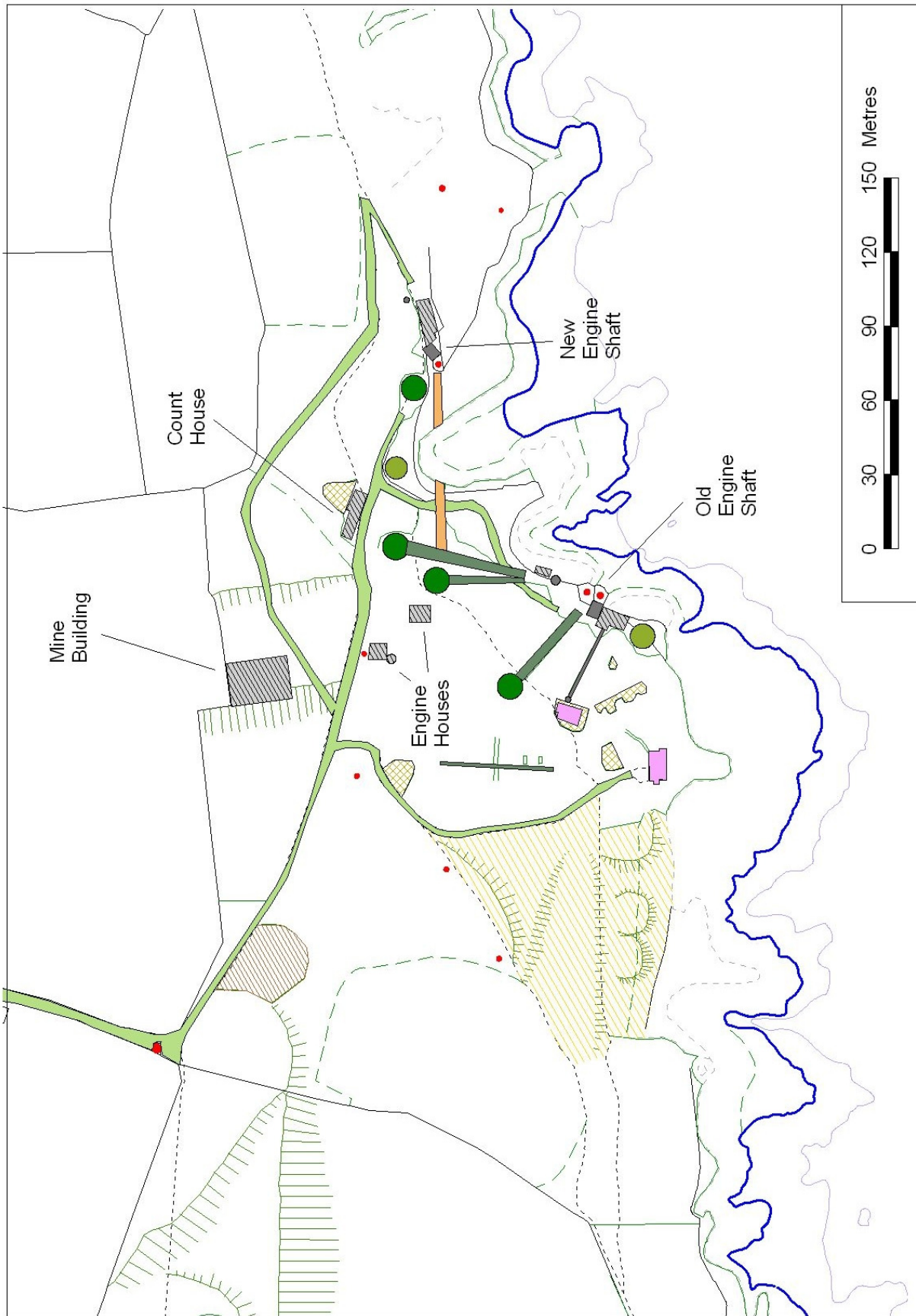


Fig 15. Principal archaeological features at Trewavas. Grey: standing structures; grey hatch: sites of structures; Pink: radar station features; Green circles: horse whims; dull green: capstan plats; Grey-green: tramways; pale green: mine roadways; Red: shafts; khaki hatch: quarries; Yellow hatch: dressing floors. Orange line: flat rod trench.

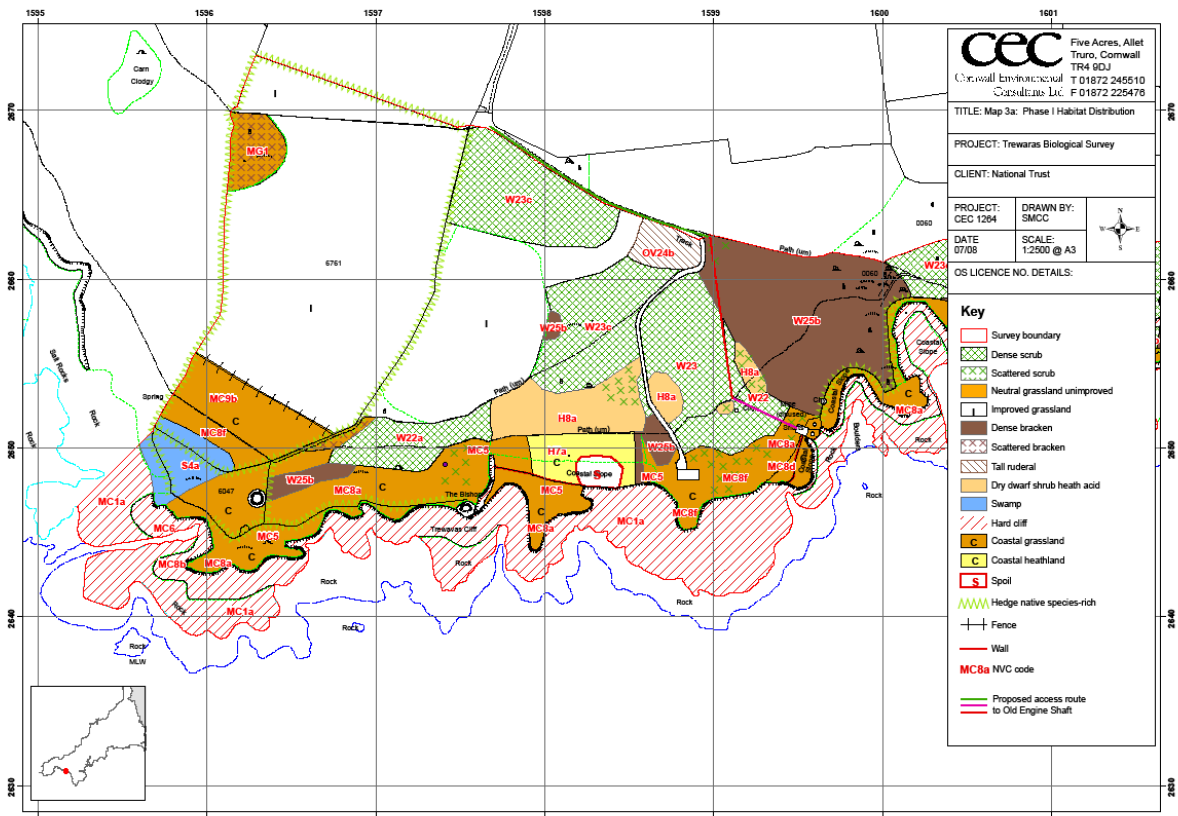


Fig 16. CEC 2008 habitat mapping for the western part of the Trewavas site.

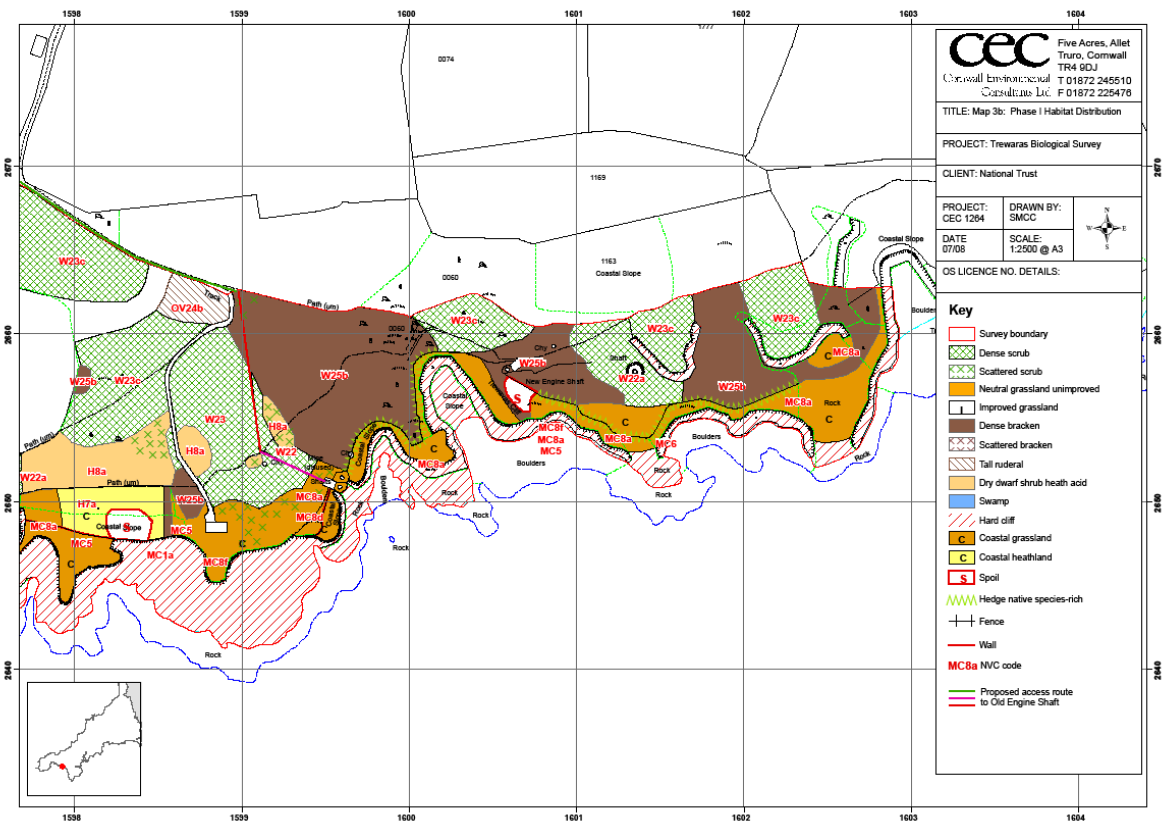


Fig 17. CEC 2008 habitat mapping for the eastern part of the Trewavas site. Note the extensive areas covered by bracken (brown) and dense scrub (green cross hatch).

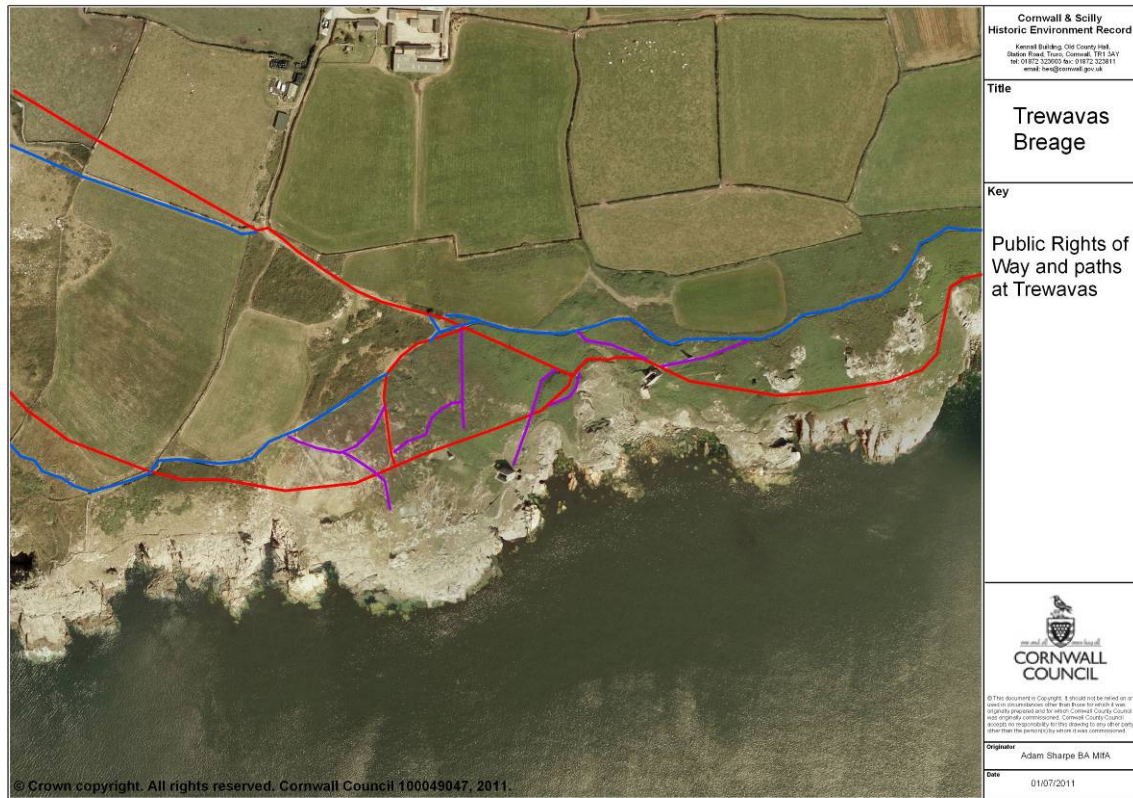


Fig 18. Rights of way and other paths at Trewavas. Red – definitive routes of Rights of Way; Blue – actual routes of Rights of Way; Purple – other paths.



Fig 19. The enigmatic D-shaped enclosure attached to a late 19th century enclosure wall on the headland at the western end of the Trewavas property.



Fig 20. The clifftop boundary at the western end of Trewavas in mid-July 2011, with Wild carrot, English stonecrop, Catsear and Thrift in flower in the maritime grassland on the clifftop and Pale dewplant on the outcrop by the wall.



Fig 21. The remains of the prehistoric cairn at the western end of Trewavas. Its kerbstones have been removed, leaving only some of the massive stones which made up the central cist set at the centre of a rather amorphous grassy mound near the coast path.



Fig 22. Fragments of worked flint exposed in the eroded surface of the coast path at the western end of Trewavas. 70mm diameter lens cap included for scale.



Fig 23. Looking eastwards across the dressing floors at Trewavas. The extensive spill of fine material near the centre of this view would have been dumped here by the bal maids working in this part of the mine. Note the wall to the south (right) which runs from headland to headland throughout the property.



Fig 24. Evidence for mining bee activity on bare ground on the dressing floors at Trewavas.



Fig 25. Looking westwards across the upper part of the dressing floors in late 2010, showing some of the recently-constructed cairns built from spoil dump material and the low heath cover around its edges. The cairns have since been dismantled.

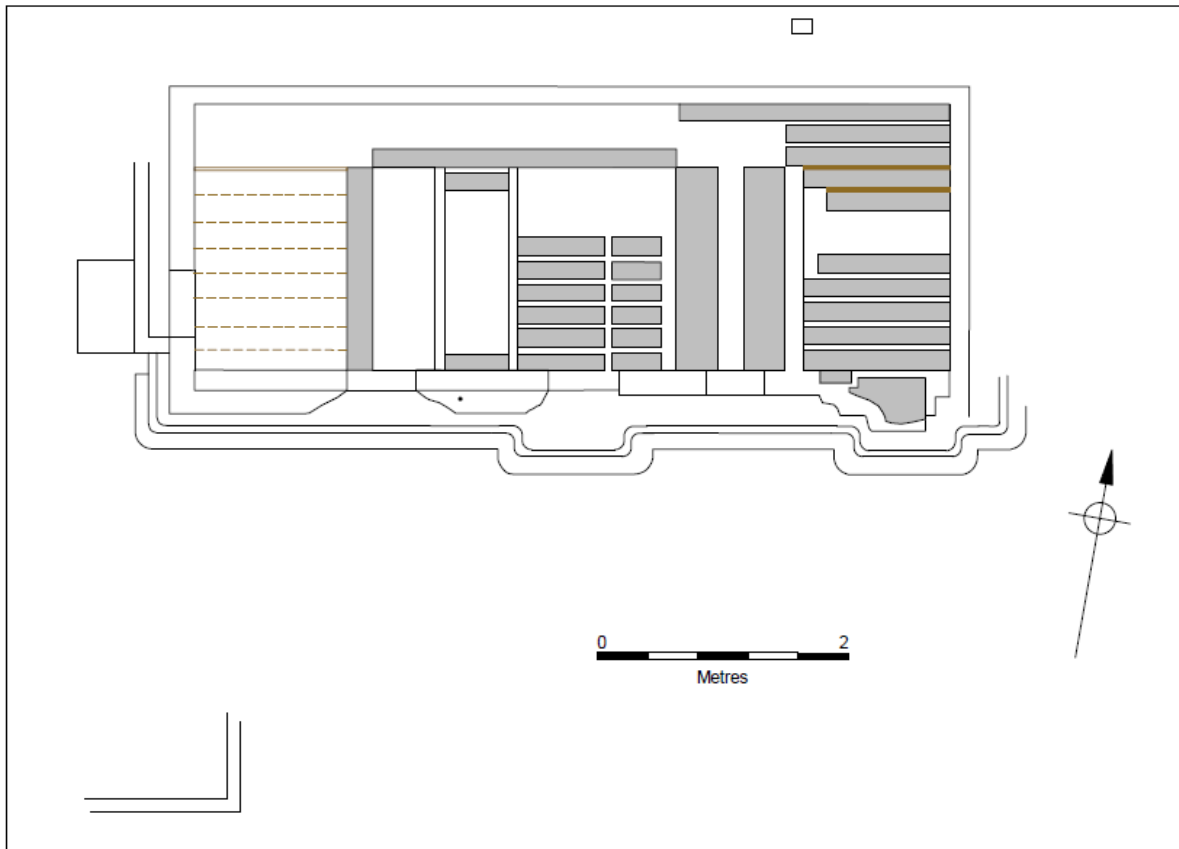


Fig 26. A 2011 measured survey of the foundations of the CHL station at Trewavas, showing its floor arrangement, and the two bulges protruding from the plinth which would have sited buttresses supporting the radar array above the roof of the building. A small masonry plinth is set on an outcrop to the south of the building.

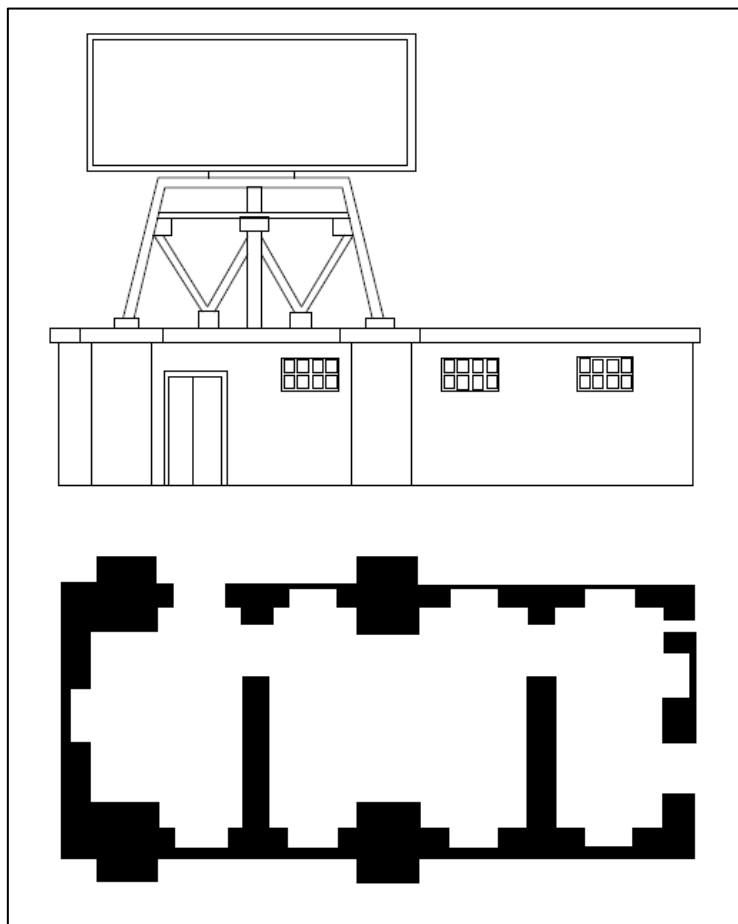


Fig 27. A simplified version of a survey of the Craster CHL station, Northumberland, redrawn from the Derelict Places website (www.derelictplaces.co.uk). The arrangement of doors is very similar whilst this plan and elevation show the buttresses supporting the aerial.



Fig 28. The main building of the Trewavas CHL radar station site seen from the east, showing its concrete floor and plinth (with its gutter), and the remains of one of the buttresses in its near left hand corner.



Fig 29. The coastal rock formation known as 'The Bishop' set amidst the high, lichen-encrusted granite cliffs at the western end of the Trewavas property.



Fig 30. Trewavas mine from the west, with Old Engine Shaft, its engine house and capstan plat in the foreground and New Engine Shaft engine house and chimney in the background. Note the extensive bracken cover on the upper cliffslopes.



Fig 31. The chimney stump at Old Engine Shaft which may be the only surviving remains of a shaft sinking engine house on this part of the site.



Fig 33. A mine explorer examining the open winze linking the upper and lower adits at Old Engine Shaft. Note the copper staining in the roof of the adit.



Fig 32. The clifftop chimney which served the boilers at Old Engine Shaft via a flue running up the cliffside.



Fig 35. The engine house on Old Engine Shaft from the east, showing the cliff edge rail and cable fencing around this side of the open shafts.



Fig 34. The engine house on Old Engine Shaft from the west, showing the boiler house door and the flashing line of its roof midway up this elevation.



Fig 36. Looking west from the head of the inclined mine trackway past the New Engine shaft chimney and engine house towards the structures at Old Engine Shaft.



Fig 37. The overgrown capstan plat serving New Engine Shaft with the mine access roadway to its right. The bracken-covered area in the left background sited the whim engine house, the diagonal shaft and the probable later pumping engine house.



Fig 39. The conserved engine house at New Engine Shaft seen from the north-east.



Fig 38. The conserved engine house and new safety fencing at New Engine Shaft seen from near the whim plat serving this shaft.

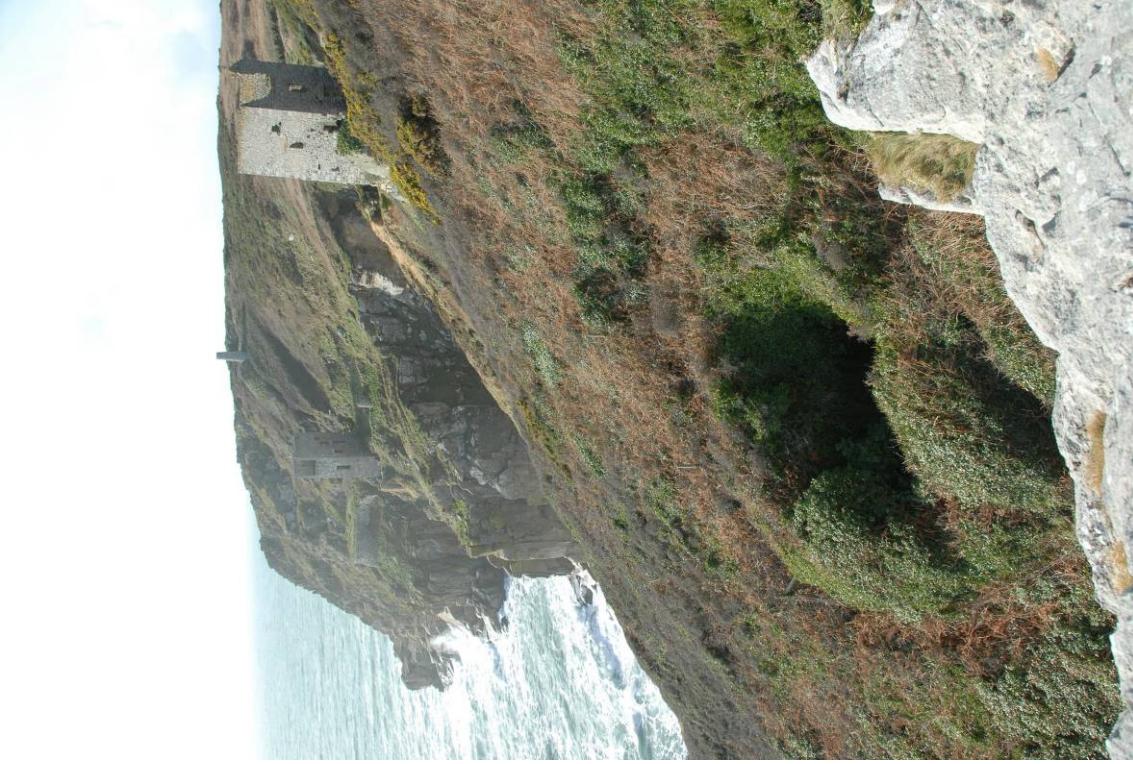


Fig 41. The open shaft on Nimble Cutter Lode at the eastern end of the Trewavas property.



Fig 40. The conserved boiler house chimney at New Engine Shaft.

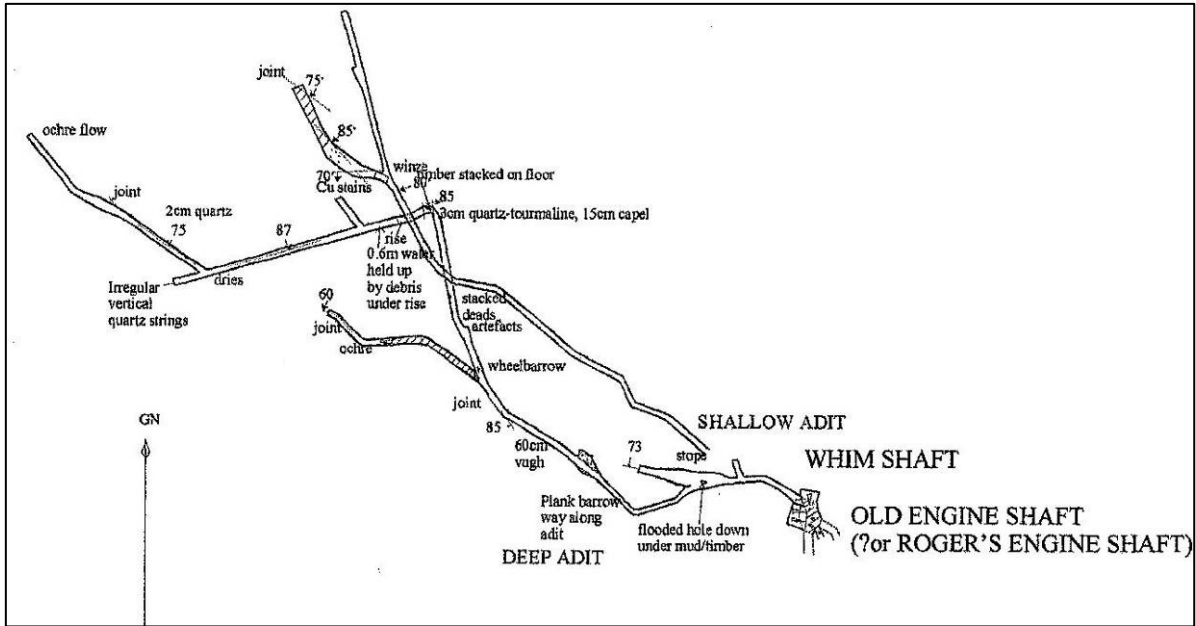


Fig 42. Low and high level adits associated with Old Engine Shaft. Survey by Plymouth Caving Group and Carn Brea Mining Society 2001-6.

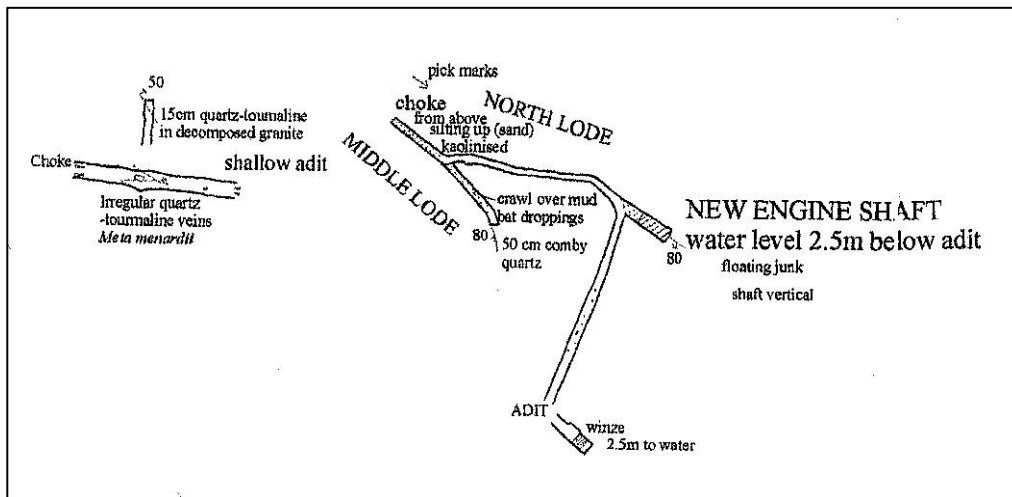


Fig 43. The low level adit associated with New Engine Shaft. Survey by Plymouth Caving Group and Carn Brea Mining Society 2001-6. To the left is the survey of the high level adit which might have carried underground flat rods from New Engine Shaft to the Diagonal Shaft, as also the trial adit in the east-west gully.



*Fig 44. The western end of the property, looking along the line of the Trewavas leat (centre) towards the Nine Wells springs. Wild carrot (*Daucus carota*) peppers the maritime grassland here.*

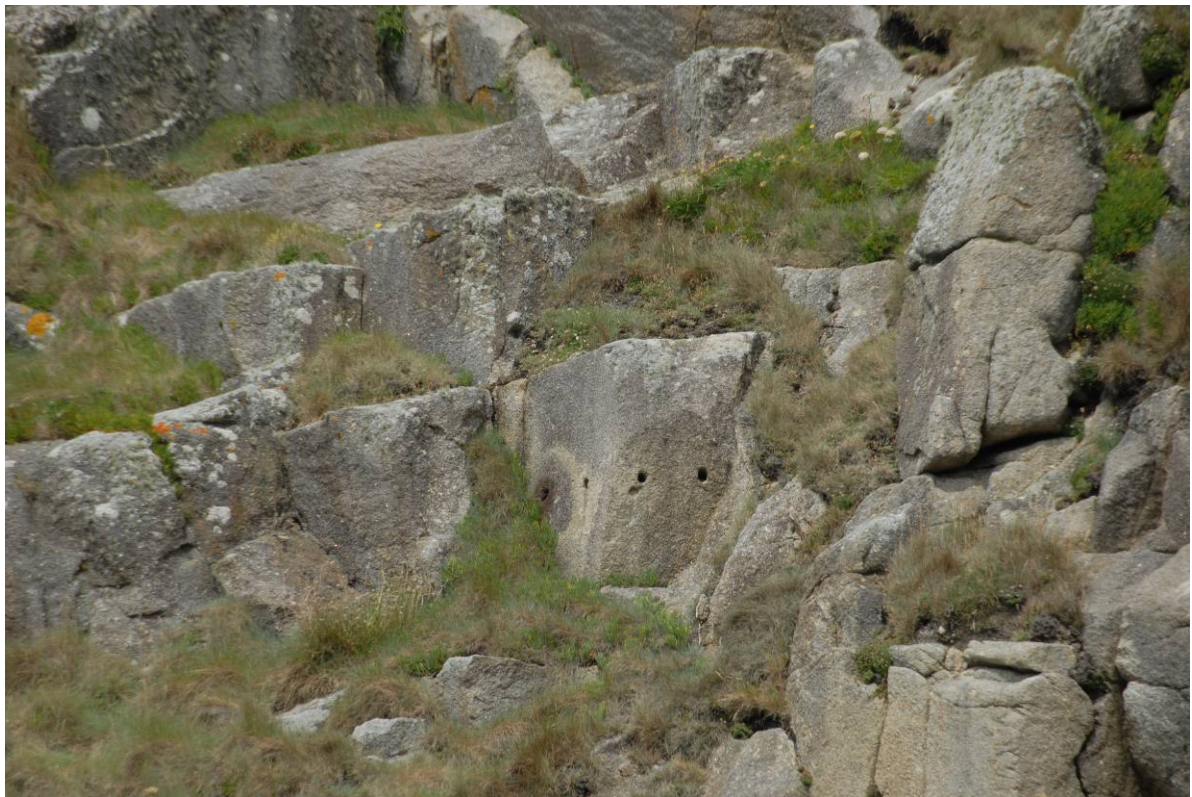


Fig 45. Drill holes in the cliff face just to the east of the Bishop which probably mark the line of the Trewavas mine leat at this location.



Fig 46. Rubble from the demolished radar station litters the cliffslope below its former site.



Fig 47. Kidney vetch (*Anthyllis vulneraria*) and Scarlet pimpernel (*Anagallis arvensis*) have begun to reclaim rubble from the old radar station.



Fig 48. Common reed (*Phragmites australis*) and Hemp agrimony (*Eupatorium cannabinum*) dominate the areas of wet flush at Nine Wells between Trewavas and Rinsey East Cliff.



Fig 49. Sea plantain (*Plantago maritima*) is abundant in short grassland near the cliff edge of the property.



Fig 50. Sea beet (*Beta vulgaris* ssp. *maritima*) seeding prolifically at the rear of the capstan plat near New Engine Shaft.



Fig 51. Lesser hawkbit (*Leontodon taraxacoides*) and Devilsbit scabious (*Sucissa pratensis*) growing alongside the coast path near New Engine Shaft.



Fig 52. Nationally vulnerable but locally common Dodder (*Cuscuta epithymum*) growing rampantly on Western gorse (*Ulex gallii*) near the former mine dressing floors.



Fig 53. Heather (*Calluna vulgaris*) and Cross-leaved heath (*Erica tetralix*) growing in an area of heathland near the old dressing floors. Bell heather (*Erica cineraria*) is also found in this area.



Fig 54. Pale dewplant (*Drosanthemum floribundum*) is found at one spot on the clifftops at the eastern end of the property (see Fig 20). The plant is dwarfed by its exposed position and the thin soils. Elsewhere in Cornwall the NT have treated this exotic as an invasive species and removed it.



Fig 55. Creeping cinquefoil (*Potentilla reptans*) forms a dense low mat of vegetation on dry ground adjacent to the Nine Wells springline.



Fig 68. Wild thyme (Thymus serpyllum agg.) forms abundant small mounds at the eastern end of the lower part of Rinsey East Cliff, but is almost completely absent in the adjacent area of Trewavas Cliff.



Fig 57. A pair of climbers above a vertical granite face of the outcrop at the eastern end of Trewavas. Some potentially problematic erosion of the cliff slope has developed as a result of this activity, whilst rare lichens grow on these outcrops.



Fig 58. The boundary wall between Rinsey East Cliff and Trewavas. Path erosion on the thin cliffslope soils is a minor problem. Note also the damage to the wall where the path crosses it. This stile should be repaired.



Fig 59. Finely crushed, sulphide mineral-rich, free-draining dressing floor waste has prevented all but the hardiest plants becoming established here, 166 years after the closure of Trewavas mine.



*Fig 60. A view of the eastern end of the Trewavas property, giving a good impression of the spread of dense stands of Bracken (*Pteridium aquilinum*) down the cliffslopes in the property.*



*Fig 61. Shags (*Phalacrocorax aristotelis*) use level slabs of granite at the cliff base near Old Engine Shaft as places to dry their plumage, whilst the nearby cliff faces provide safe nesting spots. The sea here is clean and clear and evidently well-stocked with fish.*

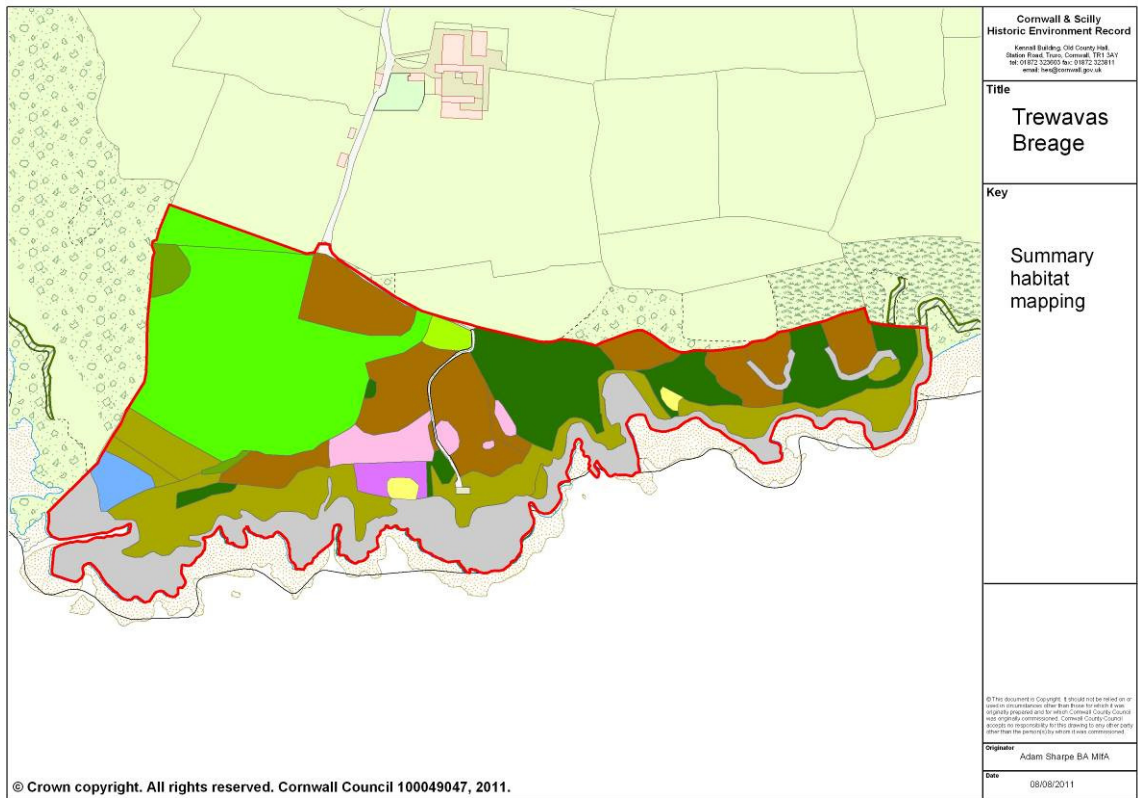


Fig 62. Principal habitat management recommendations. Scrub (brown) – reduce to 5% within property; Bracken (dark green) – reduce to 10%; Improved grassland (bright green) – reduce agricultural inputs to make more species rich. See also Figs 66-67.

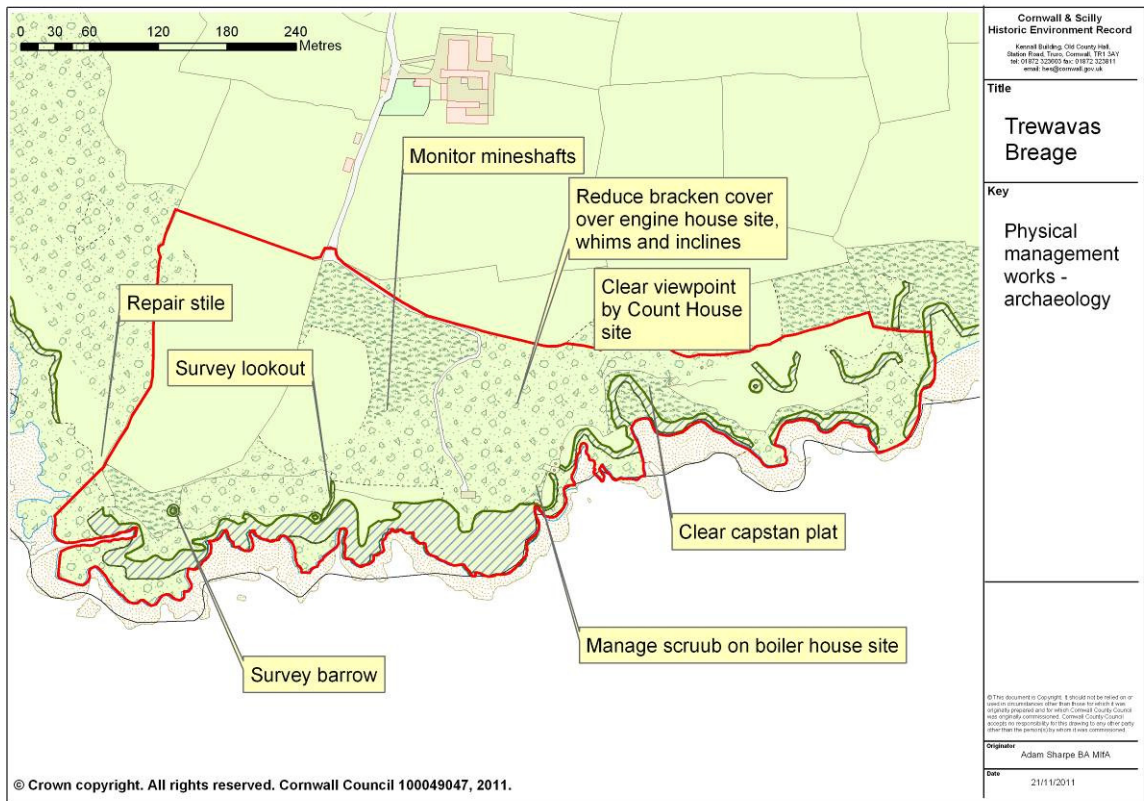


Fig 63. Principal physical management works – archaeology. Many of these link in with the habitat improvement recommendations shown in Figs 62, 66-67.

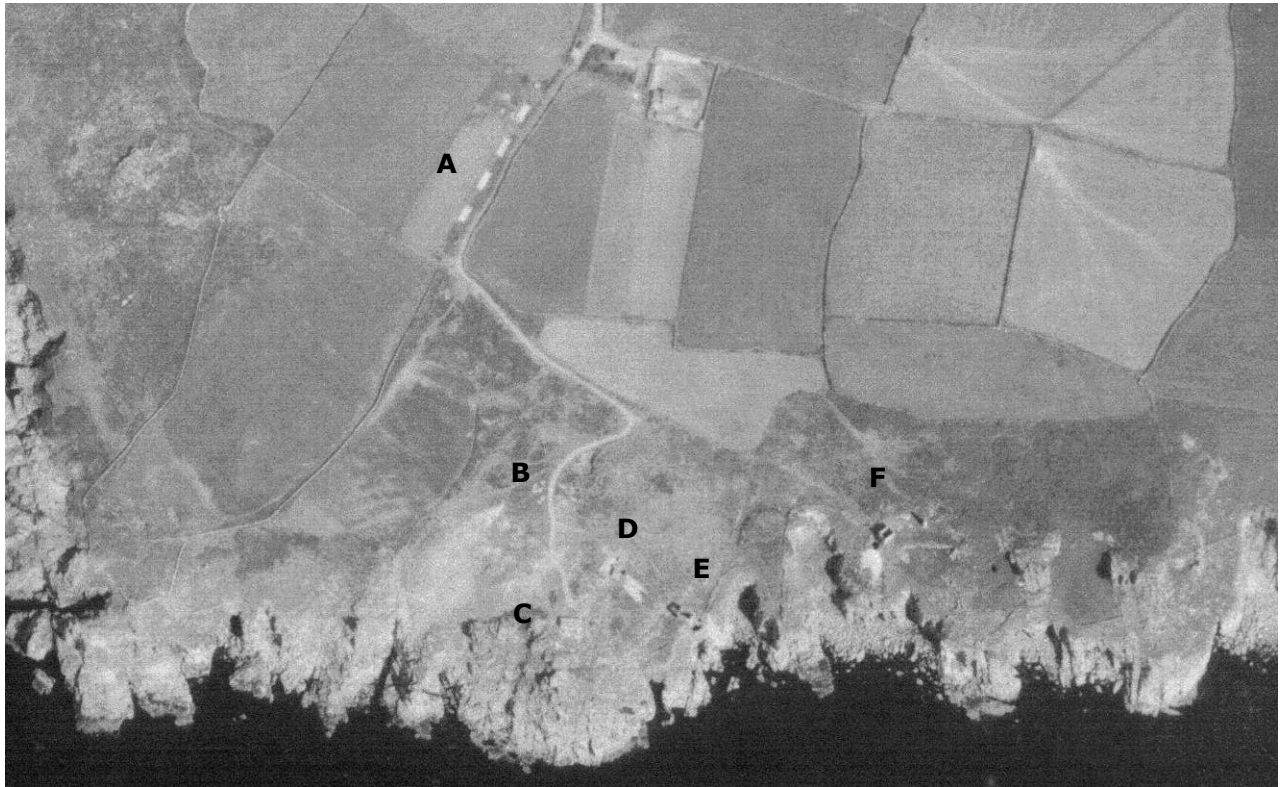


Fig 64. A 1946 aerial photograph of Trewavas showing A) the four Nissen huts near the farm, B) the military road to the radar station, C) the intact Chain Home Low station building, D) the intact CHL generator house, E) Old Engine Shaft, F) New Engine Shaft. Image 106G/UK 1663 12 July 46//F120 541 SQDN, frame 4283.



Fig 65. A chough perched on one of the conserved engine houses at Trewavas. Image by Andy Hay courtesy of Claire Mucklow, RSPB.



Fig 66. Scrub management proposals. Mapping © Crown Copyright. All rights reserved. Cornwall Council 100049047, 2011.

- Area 1.** Wind-clipped gorse and blackthorn having little scope to expand, being limited by location and maritime influences. Low priority for management, but control blackthorn spread by cutting adjacent to path.
- Area 2.** Large block of European gorse/bramble between access track and enclosed land. Potential for development of floristically diverse maritime grassland, though also for spread of bracken. Medium to high priority.
- Area 3a.** Partially stunted gorse scrub, abuts dressing floors to the south, spread in this direction substantially limited by high metal content in soils. Potential for heath development from adjoining areas. Control scrub within quarry with invertebrate potential to the north. Medium priority.
- Area 3b.** Block of European gorse with bramble understorey. Scrub spreading slowly west into heathland on the dressing floors, east into an area of dense bracken and south into maritime grassland. Spread of Blackthorn on upper and mid cliff slope should be controlled. High priority.
- Area 4.** Substantial block of gorse cover, the northern part being within the covenanted area. Potential to add diversity to adjacent grassland. The southern part over granite outcrops has some potential for scrub control to create a more diverse mosaic of habitats. Low priority.
- Area 5.** Relatively steep cliff slope including an open (hedged and fenced) mine shaft, covered with a mix of gorse, blackthorn and bramble. Lower slopes should be left as a scrub block, but some potential to reduce scrub cover on the southern fringes of the coast path, opening up views from it and creating a more floristically diverse habitat. Medium priority.
- Area 6a.** Large block of gorse/bracken within covenanted area. Some potential to reduce scrub cover immediately to the north of the coast path to create a more floristically diverse area. Low priority given covenanted status.
- Area 6b.** Block of European gorse cover between the coast path and the outcrop to the south. Probably worthwhile to manage the scrub adjacent to the path to increase biodiversity, but maintain a physical barrier between the coast path and the outcrop. The outcrop is used by climbers, who maintain a narrow, twisting path through the scrub.

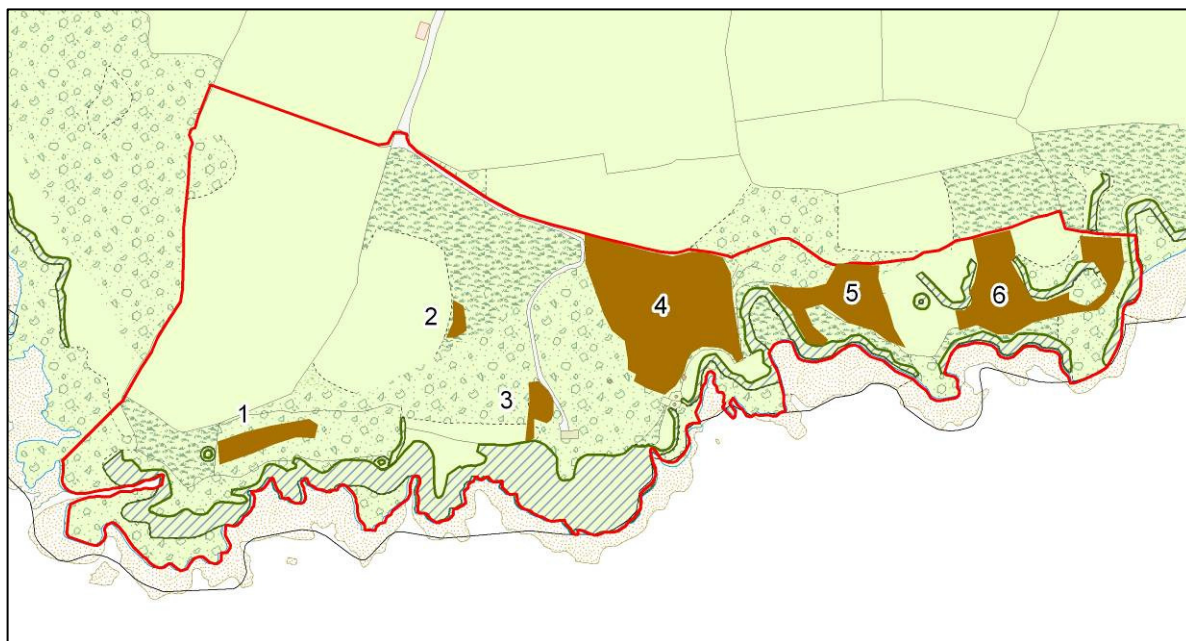


Fig 67. Bracken management proposals. Mapping © Crown Copyright. All rights reserved. Cornwall Council 100049047, 2011.

- Block 1.** A south-facing, fairly steep and relatively inaccessible area of cliff containing a trial adit where a relatively limited, linear patch of bracken has developed within maritime grassland. Low priority, though include within grazed area. Remove Pale dewplant on outcrop.
- Block 2.** A small patch of bracken fringing the boundary of an area of improved grassland to the west and a block of scrub to the east. This might have the potential to spread if the scrub cover is reduced, but being small and adjacent to the coast path, this is one of the areas which would be amenable to management by cutting. Medium priority.
- Block 3.** Another small area of bracken which has developed on the coastal slope adjacent to the dressing floors to the west. There is probably little potential for grazing management of this block, and any spread to the west is probably limited by metal rich soils. Low priority.
- Block 4.** A very large area of bracken with a developing bramble understorey, most of which is on relatively level or moderately sloping land. This block has the greatest potential for control by grazing, following a strategically-timed cut. If the bracken can be controlled this should develop into floristically-diverse maritime grassland with heathland. High priority.
- Block 5.** A block of bracken surrounding New Engine Shaft. The coastal sections of this block are on steep ground which grades either into clifftops or into blackthorn and gorse scrub, and could probably not be practically grazed. To the north, above the engine house, scrub dominates rather more than the CEC report suggests. In some areas, the bracken obscures archaeological features, and blocks access and views. Parts of this area should be managed by cutting.
- Block 6.** A fairly substantial area of bracken on the cliff slopes between the two rock outcrops here and covering the area to their east. The upper cliff slopes in this area are currently relatively inaccessible because of the bracken and scrub cover, though have some potential to be opened up without there being access issues, and would allow maritime grassland to develop. Medium priority, though higher in the area adjoining the coast path.