

# WHEAL FRIENDLY WHEAL FRIENDLY LANE ST AGNES CORNWALL

Historic Building Recording



South West Archaeology Ltd. report no. 171109



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# Wheal Friendly, Wheal Friendly Lane, St Agnes, Cornwall

## Historic Building Recording

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By E. Wapshott & B. Morris  
Report Version FINAL  
11<sup>th</sup> December 2017

Work undertaken by SWARCH for Lucia Brown of Studio Arc  
On behalf of Robin and Julia Chamberlayne

### Summary

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*South West Archaeology Ltd. was commissioned to undertake historic building recording at the Wheal Friendly enginehouse in St Agnes, Cornwall, prior to a planning submission. This work was undertaken in order to assess the fabric affected by the conversion, restoration and development.*

*The enginehouse was built in 1902 and functioned as such until 1913, when the engine was removed. The site was later run as an adjunct to Wheal Kitty Mine in 1926-1930, but was only used for de-watering the mine via an electric pump. Attempts were made in 1907-8 to establish dressing floors on the site but these ultimately proved unsuccessful. The remaining moveable equipment was relocated between 1937 and 1941 and the site gradually fell into ruin.*

*The enginehouse is a highly prominent GII Listed building within the St Agnes district of the Cornwall and West Devon Mining Landscape World Heritage Site.*

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## ACKNOWLEDGEMENTS

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## PROJECT CREDITS

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## 1.0 INTRODUCTION

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**LOCATION:** WHEAL FRIENDLY  
**PARISH:** ST AGNES  
**COUNTY:** CORNWALL  
**NGR:** SW 72008 51155  
**PLANNING REF:** PA17/01690  
**SWARCH REF:** AWF17

### 1.1 PROJECT BACKGROUND

South West Archaeology Ltd. (SWARCH) was commissioned by Lucia Brown of Studio Arc (the Agent) on behalf of Robin and Julia Chamberlayne (the Clients) to undertake building recording for Wheal Friendly, Wheal Friendly Lane, St Agnes, Cornwall. This work was undertaken in order to inform proposals for the future of the building.

### 1.2 TOPOGRAPHICAL AND GEOLOGICAL BACKGROUND

Wheal Friendly lies to the north of St Agnes, in the parish of the same name. It is located within the St Agnes Mining District World Heritage Site and is just north of the St Agnes Conservation Area. The soils of the area are the well-drained fine loamy or silty soils over rock of the Manod association (SSEW 1983). The underlying geology is the mudstone and sandstone of the Porthtowan formation (BGS 2017).

### 1.3 HISTORICAL & ARCHAEOLOGICAL BACKGROUND

The Wheal Friendly enginehouse (MCO52651) was built in c.1902 and belongs to the latest historic phase of mining in the St Agnes area. Wheal Friendly is a name associated with this sett from the second quarter of the 19<sup>th</sup> century, but this specific shaft was opened in the later 19<sup>th</sup> century and all of the visible structures date to the early decades of the 20<sup>th</sup> century. The early phase of use (1902-1913) can be characterised by direct mining activity. During the later phase (1926-1930) the site was run as an adjunct to Wheal Kitty and used for pumping only.

### 1.4 METHODOLOGY

The assessment of the buildings was conducted by Emily Wapshott in October 2017. The work was undertaken in line with best practice and follows the guidance outlined in: ClfA's *Standard and Guidance for the Archaeological Investigation and Recording of Standing Buildings or Structures* (2014) and Historic England's *Understanding Historic Buildings: A Guide to Good Recording Processes* (2016).

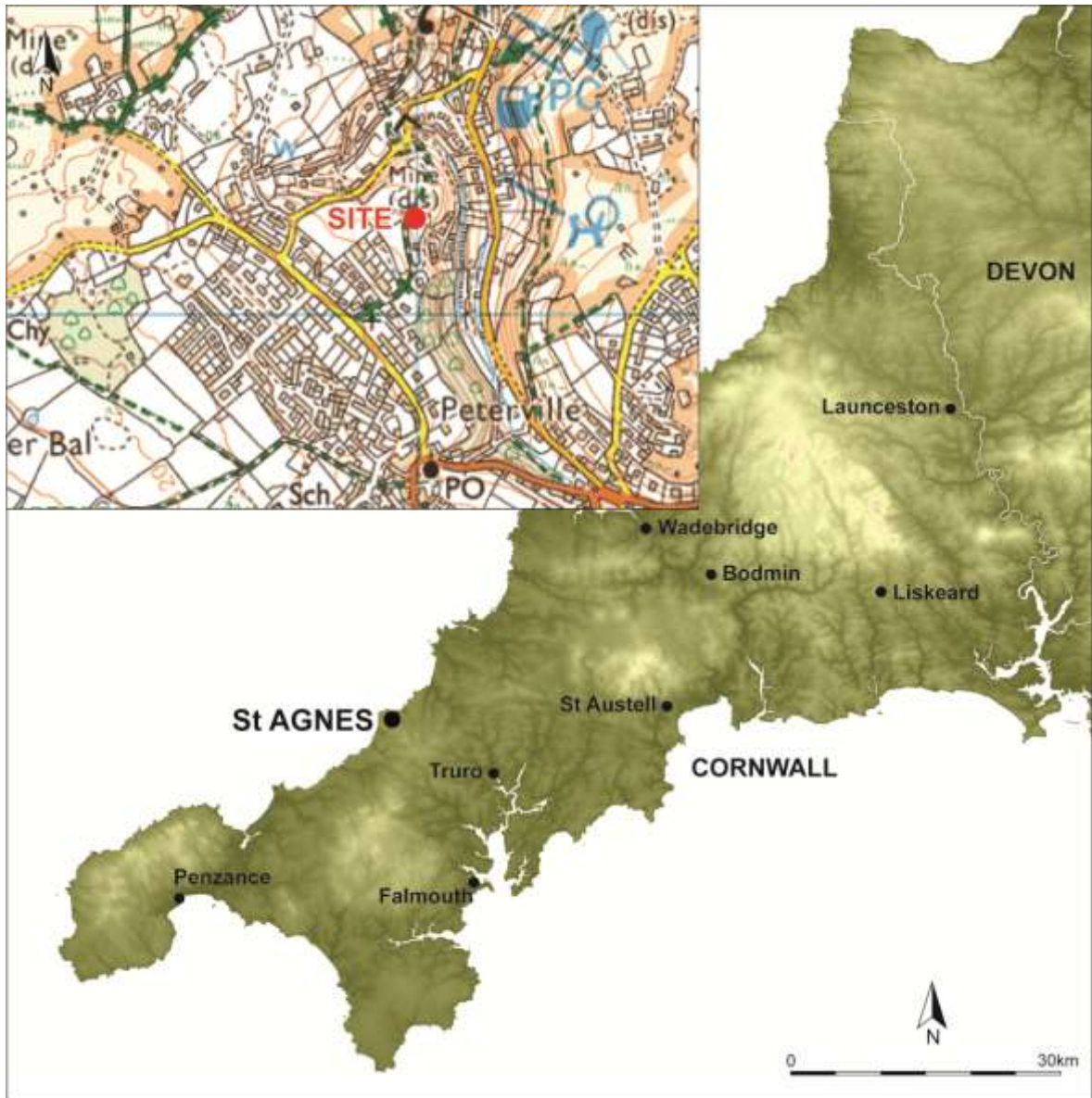


FIGURE 1: LOCATION MAP (THE SITE IS INDICATED).

## 2.0 DESK-BASED ASSESSMENT

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### 2.1 HISTORICAL BACKGROUND

The historical and cultural background of Wheal Friendly is thoroughly explored in the Silverlake DBA. What follows is a distillation of the main chronological points as derived from existing reports (Cahill 2007; Silverlake 2017) and Burt (2014). References to Wheal Friendly prior to c.1895 probably refer to Old Friendly Shaft [NGR SW717509], later referred to as Western Shaft. However, on the **1879 OS 25"** scale map a shaft is shown at the location of the later Wheal Friendly enginehouse. It is notable even for this late, short-chronology site (c.1895-c.1938) that mining operations at the Wheal Friendly Shaft only appear to have taken place for the years 1895, 1902-13, and 1926-30.

In **1891** Wheal Friendly Mining Company reached an agreement with West Kitty Mine to work the Wheal Friendly sett from the West Kitty shaft and use West Kitty machinery.

In **1892** Nicholas Vivian [WF mine captain] advised the company directors and shareholders to use all profits to sink the Wheal Friendly Shaft and erect all necessary plant.

In **1894** the cost of a timber-lined shaft, engine, boilers, and dressing floor was determined to be £6000.

In **1895** Wheal Friendly is described as having small plant on the property: two waterwheels, a stamp battery, axle and framework for a second battery, buddles, horse whim, tin burning house, stack, smiths shop, and office. These were probably located at the northern end of the sett.

"A portion of the ground being on the hillside is exceedingly suitable for the erection of a complete tin dressing plant... The shaftsmen are now engaged in cutting down the engine shaft to its proper size viz 12ft long by 7ft wide and fixing cistern bearers at the adit level; when this is completed to the 10 ftm level (say in about two months) it is intended to resume the sinking of the shaft vertically"

By November **1895** the collar was secured on the engine shaft and sunk to the 13f level, cased and divided with footways added. The enginehouse was yet to be erected. Also, the adit was enlarged, a cistern plat cut, ground cut for bearers, and bearers fixed.

In March **1896** The Wheal Friendly Mining Company went into voluntary liquidation following its failure to move from a cost book company to a limited liability company.

In **1900** the West Kitty Mine took control of Wheal Kitty.

In December **1901** West Kitty Mine agreed to complete the sump shaft at Wheal Friendly, and to install a pumping engine with a 50"+ cylinder within 12 months.

In **1902** the enginehouse was completed and a 60" 1863 Harveys engine installed (successively used at North Pool Mine, South Penstruthal Mine and Turnavoure Shaft at Polberro Mine).

By **1904** the Wheal Friendly Shaft had been sunk vertically to 76'. An air compressor for three rock drills was installed. It was noted that everything in associated with the shaft "was laid out as for a permanent mine".

In **1905** West Kitty Mine closed all setts except Wheal Friendly.

In **1907** work began on a dressing floor, to be completed in **1908**. Two sets of Holman pneumatic stamps were installed, 3 Wilfley Tables, 2 vanners, 72 ragging frames and 8 revolving frames. The equipment was driven by a 16×24 horizontal steam engine working off a 30by6 Cornish boiler. Success was limited – the percussion of the Holman Stamps caused the concrete foundations to break up, and there were seasonal shortages in the water required for processing. As a result, processing moved back to the Jericho Stamps.

By **1909** the cost of developing the mine was causing financial difficulties, and the London-based St Agnes Consolidated Mines Ltd. took *de facto* control of the mine.

A letter of **1910** notes water had risen in the shaft due to an accident involving the pump.

A survey of the site in **1910** suggested a six-drill compressor be moved from West Kitty (Reynolds Shaft) to Wheal Friendly, and the existing shaft plant and pump continue in use.

Production ceased in **1913** due to wartime labour shortages and low tin prices.

In November **1916** the plant and machinery at Wheal Friendly were seized under a distress order and put up for auction without reserve. The 60" engine, an electric lighting plant, and oil engine, were among those items for sale. The engine cylinder base was removed from the enginehouse, implying it was intended for reuse elsewhere.

In **1920** St Agnes Consolidated Mines Ltd. mooted proposals for restarting production at St Agnes included refurbished the shaft at Wheal Friendly, to convert the mill [finishing floors] at Wheal Friendly to electric operation, introduce the Elmore floatation process, and resume ore processing [not implemented].

In **1926** there is reference to 'sinking and developing' at Wheal Kitty, 98 men employed (73 above ground, 25 underground) [Burt 2014].

In **1927** A 10KV electricity line was built from Tolgus to Wheal Kitty, and thence to Wheal Friendly. Wheal Friendly was fitted with an electric Harland multi-stage sinking pump, and Wheal Friendly was sunk to 842'. All hoisting was done via an electric whim at Sara's Shaft. Plans were drawn up to install a 70" engine (from South Tincroft) at Wheal Friendly [not implemented]. 192 men employed (107 above ground, 85 underground) [Burt 2014].

In **1928** 210 men employed (95 above ground, 115 underground) [Burt 2014].

In **1929** there was a proposal to install a pump to the enginehouse, to be driven externally using a reciprocating arrangement to drive traditional pitwork. 288 men employed (100 above ground, 188 underground) [Burt 2014].

In **1930** works at Wheal Kitty were suspended. 206 men employed (80 above ground, 126 underground) [Burt 2014].

In **1931** 2 men employed (above ground) [Burt 2014].

In **1934-1935** 4 men employed (above ground) [Burt 2014].

In **1938-1941** the mill equipment was removed and installed at Turnavore. The sett continued to be worked until 1941, but the enginehouse etc. was abandoned.



2.2 CARTOGRAPHIC SOURCES AND HISTORIC PHOTOGRAPHS

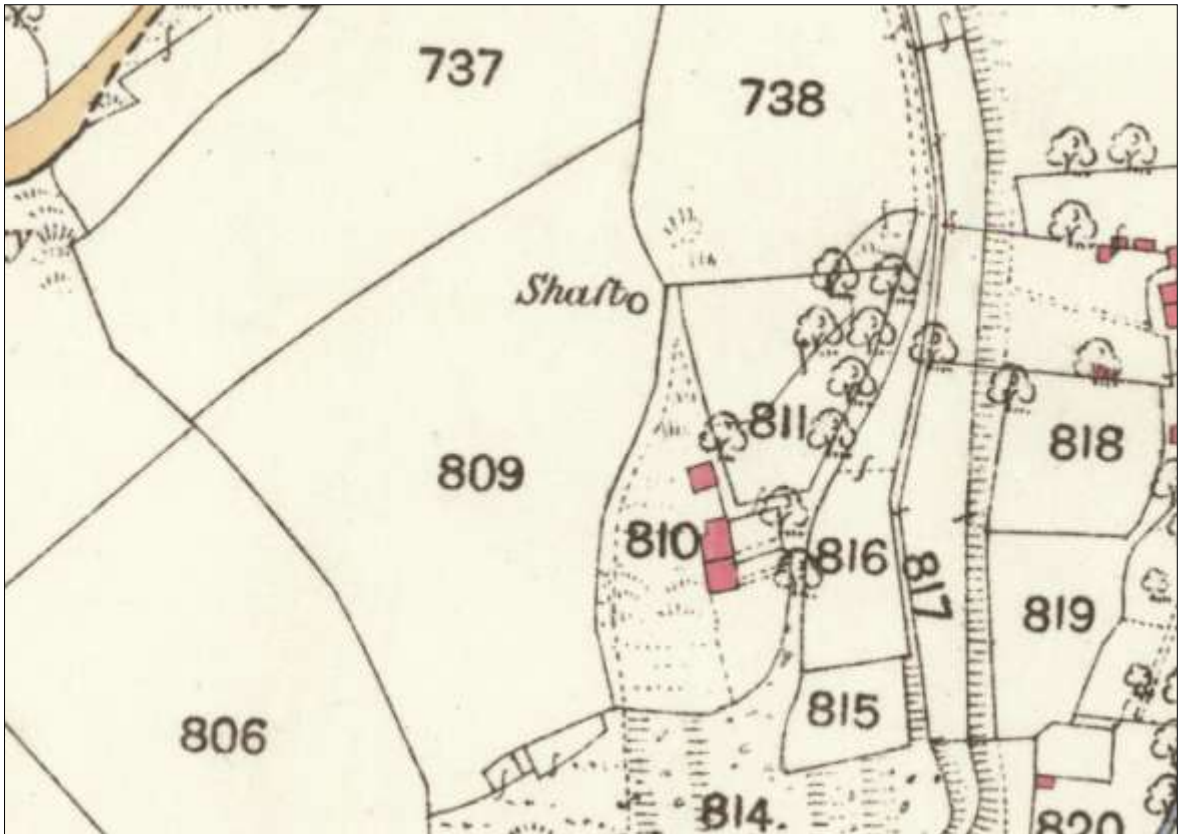


FIGURE 2: EXTRACT FROM THE 25" SCALE OS MAP OF 1879x1880 (CORNWALL SHEET XLVII.16)(CRO).

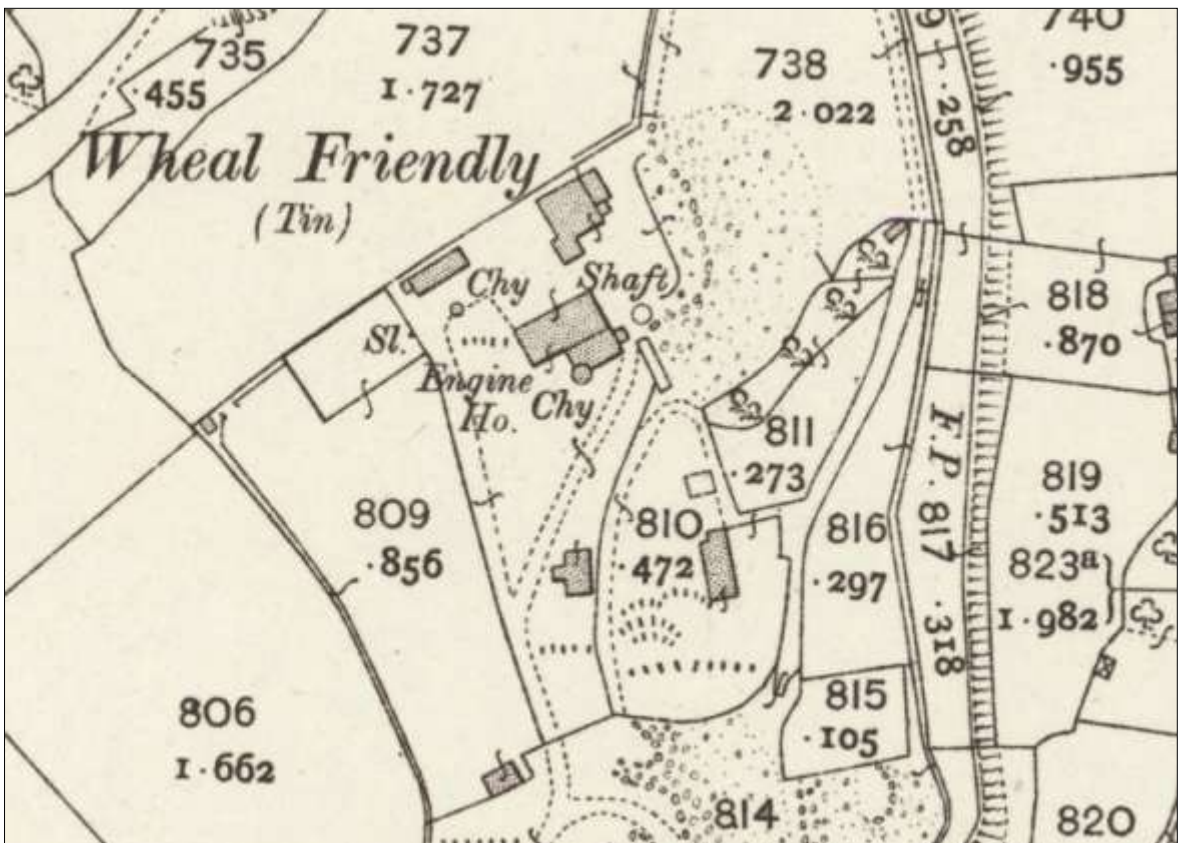


FIGURE 3: EXTRACT FROM THE 25" SCALE OS MAP OF 1806x1907 (CORNWALL SHEET XLVII.16)(CRO).



FIGURE 4: EARLY 20<sup>TH</sup> CENTURY PHOTOGRAPH, PHASE 2 (BULLEN 2002).



FIGURE 5: EARLY 20<sup>TH</sup> CENTURY PHOTOGRAPH, PHASE 2 (REDRUTH CORNISH STUDIES LIBRARY).



FIGURE 6: C.1910? PHOTOGRAPH, PHASE 3 (BUCKLEY 2005).



FIGURE 7: EARLY 20<sup>TH</sup> CENTURY PHOTOGRAPH, PHASE 3 (REDRUTH CORNISH STUDIES LIBRARY).



FIGURE 8: 20<sup>TH</sup> CENTURY PHOTOGRAPH, PHASE 3 (LATE) (BULLEN 2002).

## 3.0 HISTORIC BUILDING RECORDING

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### 3.1 SITE DESCRIPTION

The site is located on the edge of a gently-undulating coastal plateau, overlooking the deeply-incised valley that drops down to Trevaunance Cove. The remains of the Wheal Friendly Mine consist of an enginehouse with chimney stack, one corner of the attached boilerhouse, part of the original whim/compressor building, and the concrete foundations of the later stamps. The enginehouse survives in good condition, upstanding to its original height (16m) but stripped of internal features. Only the south-east corner of the boilerhouse survives. The walls of part of the whim/compressor building survive to a height of c.1.5m, and the walls of the stamp survive to their original height.

### 3.2 BUILDING DESCRIPTIONS

Detailed descriptions can be found in Appendix 1, with additional photographs in Appendix 2.

#### 3.2.1 ENGINEHOUSE

The enginehouse was built in 1902, but its bob wall addresses a capped shaft immediately to the north-east which is shown on the 1879-80 OS 1<sup>st</sup> edition map. The integral chimney stack is located on the south-west corner of the enginehouse. Ground levels to the rear (west) of the enginehouse are up to 2m higher than those to the front (east); historic photographs indicate mine waste was used to build up levels to facilitate access to the rear of the enginehouse. The enginehouse is gabled, formerly with a pitched slate roof.

The enginehouse is built of a heterogeneous mixture of roughly-coursed mottled pale-blue to brown slatestone and/or killas with dressed and shaped granite blocks to the corners (quoins). The bob wall also contains a high proportion of granite for the required structural strength to support the beam of the engine. However, granite is also employed rather randomly throughout the fabric of the structure; this is most obvious in the north-west elevation, which is also notable for containing the least consistent stonework overall. Given the boilerhouse was built abutting the enginehouse on this side, it is likely that the heterogeneous build on this side reflects both the availability of materials and the fact it would have been concealed from public view. The nature of the granite blocks used in the build (dressed and shaped, with some suggestion of rustication, particularly those used in the chimney) would imply they are re-used. There are two lines of putlogs in the south-east elevation; historic photographs indicate these were to carry a timber gantry facilitating access to the headgear and an aerial tramway.

There are iron plates to the north-eastern end of both the north-west and south-east elevations, indicating an iron tie-rod was inserted to strengthen the sides of the bob wall. Other iron fittings survive attached to the walls.

Above eaves height the stack is of yellow/cream brick with detailing (stringcourse) at the base and at the apex. There are traces of crenellation to the top. Tumbled bricks indicate it was built of specialist wedge-shaped header bricks stamped BURTHY in the frog. These were produced by *T. Nichols & Co.* at the Burthy Brickworks at Summercourt using china-clay waste. There are no openings in the stack, indicating they have been buried or that the crude rebuild of the boilerhouse wall has obscured the opening. The other yellow bricks are marked PAR.

Most of the openings have round segmental arches of yellow brick. The openings at ground floor level have granite quoins. The plug door in the bob wall is 4m high and 1.25m wide. The rear cylinder door is 3.8m high and 2.25m wide. The windows are crudely-splayed and have reveals of



yellow brick, built to mimic quoins (double-brick width); the historic photographs appear to indicate the windows were 6-over-6 horned sashes. There are four windows in the south-east elevation, and two windows in the south-west elevation. There are small square or rectangular openings in the south-west and north-west elevations; these have square reveals in yellow brick (single-brick width) and flat timber lintels (all renewed). There are two such openings in the south-west elevation (same level, probable spring-beams) and two in the north-west elevation (different levels, for either steam pipes or the cross beam); a plain doorway with timber lintel in the north-west elevation gave access to the boilerhouse.



(LEFT) FIGURE 9: THE NORTH-WEST AND NORTH-EAST ELEVATIONS OF THE ENGINEHOUSE; VIEWED FROM THE NORTH-EAST.

(RIGHT) FIGURE 10: THE SURVIVING REMNANTS OF THE BOILERHOUSE; VIEWED FROM THE NORTH-EAST (SCALE 2M).

The interior of the enginehouse is stripped and bare; the engine and all fittings were removed in 1916 leaving a ragged void in the floor open to the cataract pit. The enginehouse may have been re-purposed in 1926-30, but lifting was done at Sara's Shaft and pumping at Wheal Friendly was by electric motor.

### 3.2.1 BOILERHOUSE

The boilerhouse was built abutting the enginehouse to the north-west. The only visible element that survives is the south-east corner, between two door openings, one partly-blocked. The surviving fabric is of mottled pale blue to brown slatestone/killas, with quoins of yellow brick to the corner. One side of a door opening is visible in the south-east elevation, which has yellow bricks to the reveal. The doorway in the south-west elevation features part of a round segmental arch of yellow brick, partly blocked in brick and stone rubble to create one side of a narrower opening; this incorporates some red brick to its reveal. Historic photographs indicate the boilerhouse had an asymmetric pitched slate roof, monopitch where it abutted the enginehouse wall. The historic photographs also indicate the roof structure was removed, rather than decayed *in situ* (to remove the boiler/other machinery in 1916?).

### 3.2.2 WHIM/COMPRESSOR HOUSE/STAMPS

North of the boilerhouse was the whim/compressor house, extended after 1906 by the addition of the mass-concrete walls of the stamps. The surviving walls of the whim/compressor house are fairly narrow (c.0.5m) and are built of mottled pale blue to brown slatestone/killas bonded with an off-white lime mortar. There is a blocked doorway towards the western end in the north-west elevation, with a round segmental arch of yellow brick; it is blocked in stone rubble. The whim was a twin-cylinder horizontal non-condensing engine with a single-cylinder air compressor to supply the rock drills. The mass concrete walls are in poor condition (mundic) and are located on the north and east side of the earlier building. Historic photographs would suggest the earlier structure was partly rebuilt in mass concrete, rather than simply reused.



FIGURE 11: THE NORTH-EAST WALL OF THE STAMPS; VIEWED FROM THE NORTH-EAST.

## 3.3 EVIDENCE FOR PHASING

There is fairly clear evidence for phasing, but it is complicated by the short chronology of the site. The lack of an OS 3<sup>rd</sup> revision map (c.1930) is the main issue, given the investment in stamps etc. made in 1907-8.

### 3.3.1 PHASE 1

As depicted on the OS 1<sup>st</sup> edition map for 1879-80. A shaft is shown on the site, so it was clearly an existing development but lacking in permanent structures.

### 3.3.2 PHASE 2

As depicted on the OS 2<sup>nd</sup> edition map for 1906-07. Most of the site has been built, including the enginehouse, boilerhouse, whim/compressor house, dry and first reservoir/leats.

### 3.3.3 PHASE 3

As depicted in the later historic photographs and the 1973 OS map. The structures labelled Phase 3 on Figure 12 may date to 1907-8 (when the stamps were constructed), they may date to the period 1926-30 when it was run as an adjunct to Wheal Kitty, it probably include elements from

both periods, and excludes other structures (such as the aerial tramway and the buildings to the north) that also existed.

The mass concrete walls of the Phase 3 reservoirs may have been built after 1907-08 given the failure of the stamps arose due to a shortage of water.

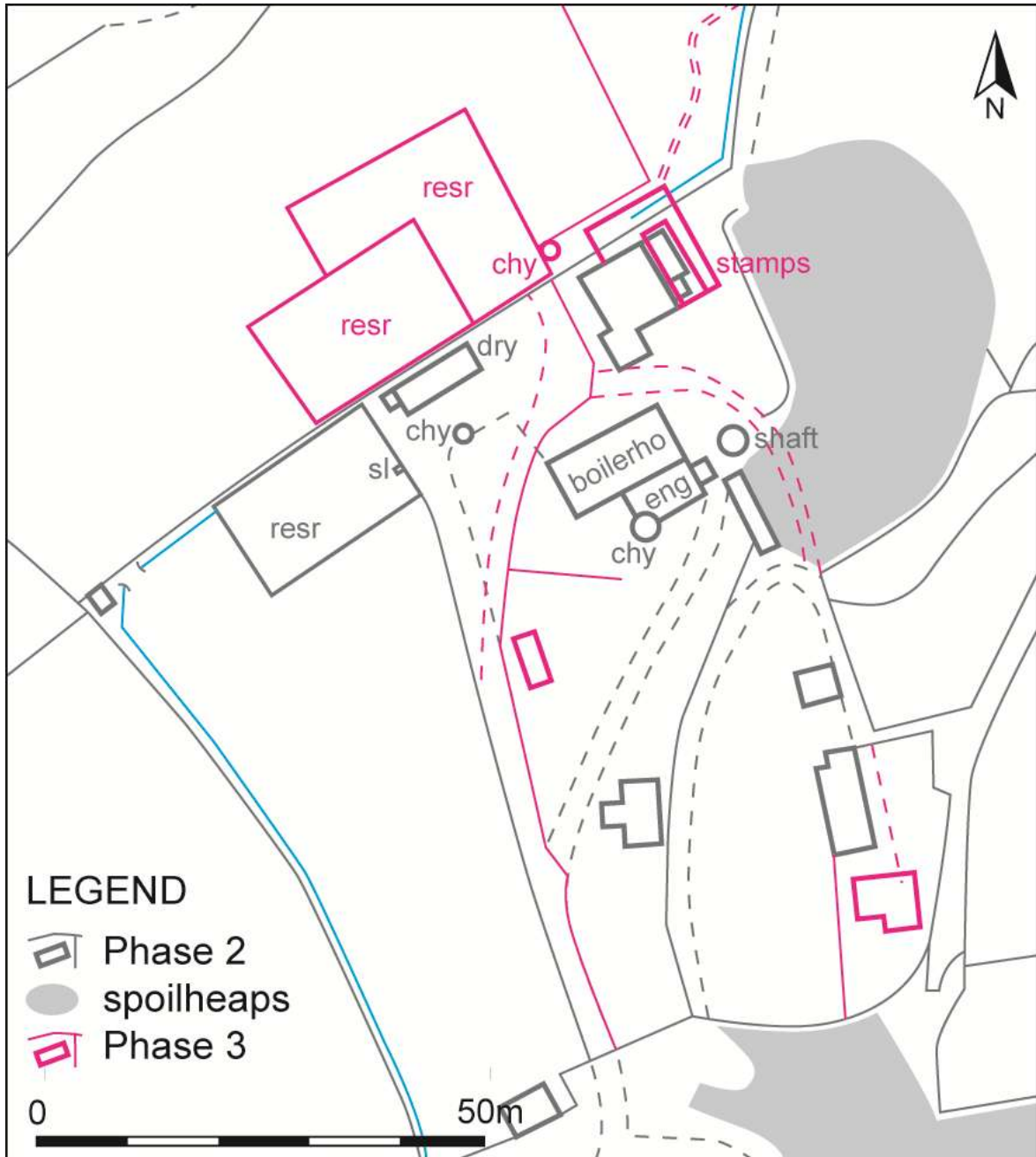


FIGURE 12: PHASE PLAN BASED ON THE OS 1906 AND 1973 MAPS; NOTE THIS MAP SHOWS FEATURES THAT WERE SUCCESSIVE RATHER THAN CONTEMPORARY.



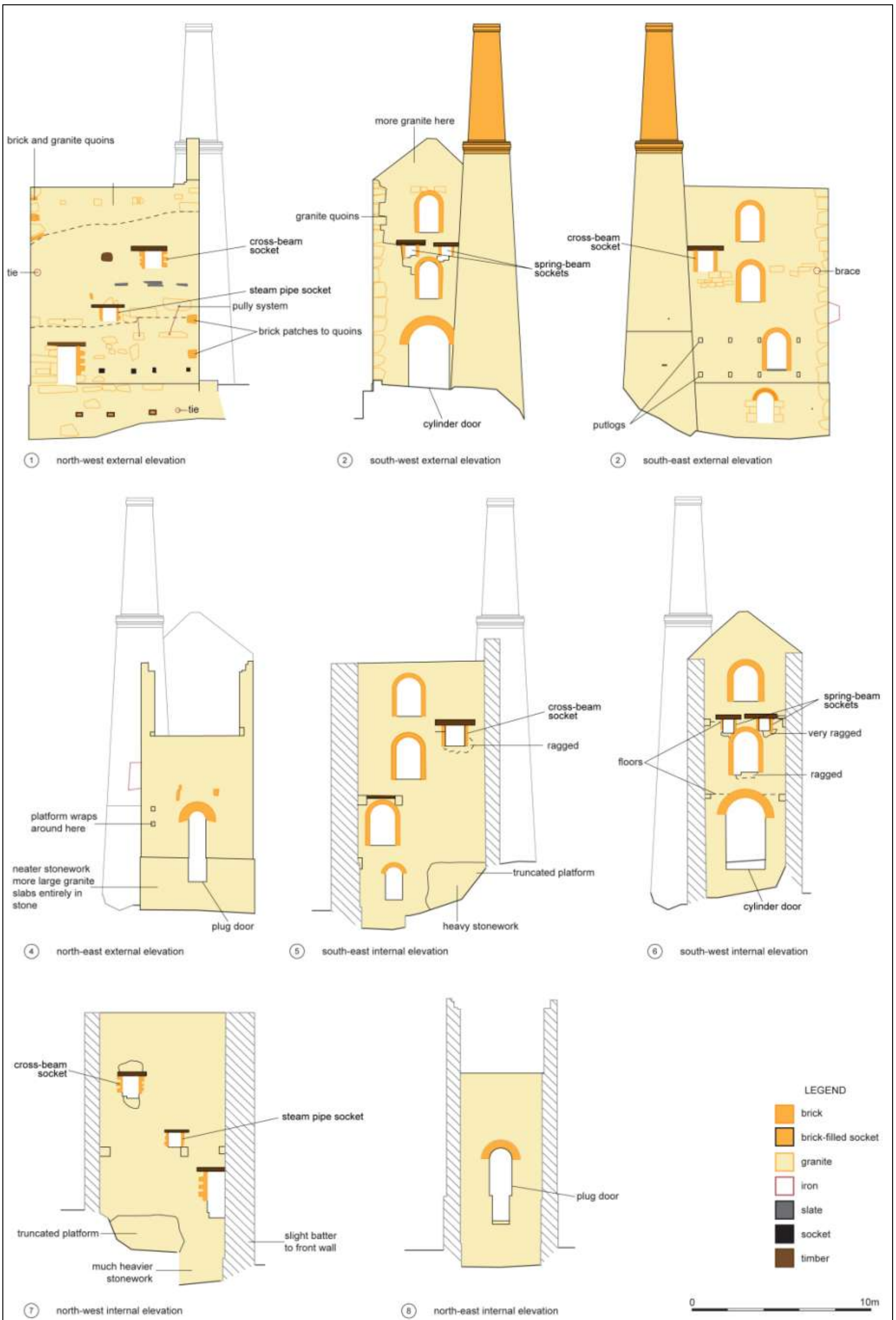


FIGURE 13: ANNOTATED ELEVATIONS OF THE ENGINEHOUSE (BASED ON SUPPLIED DRAWINGS).



## 4.0 CONCLUSIONS AND RECOMMENDATIONS

### 4.1 CONCLUSIONS

Enginehouses are necessarily sturdy structures and Wheal Friendly survives relatively well. It is constructed of a mixture of slatestone/killas and granite block, with details in yellow brick. The boilerhouse and whim/compressor house were much less substantial, and thus more readily demolished or plundered for materials. The mass concrete walls of the stamps are substantial but deteriorating due to the present of mundic in the fabric. Other structures, such as the aerial tramway, being made of timber, do not survive and are difficult to reconstruct from the historic photographs that survive.

The Phase 2 buildings were erected in 1902, with the stamps following in 1907-8. The mine operated from 1902 to 1913, and the engine was comprehensively removed in 1916. The mine was reopened as an adjunct to Wheal Kitty and operated from 1926 to 1930, but an electric pump was used to de-water the mine and no material was raised here. After 1930 the mine was decommissioned and the equipment transferred in 1937-41. It is not clear whether the boilerhouse and whim/compressor house were demolished during the working life of the site, or allowed to collapse later, perhaps when the tips were reworked in the 1950s.

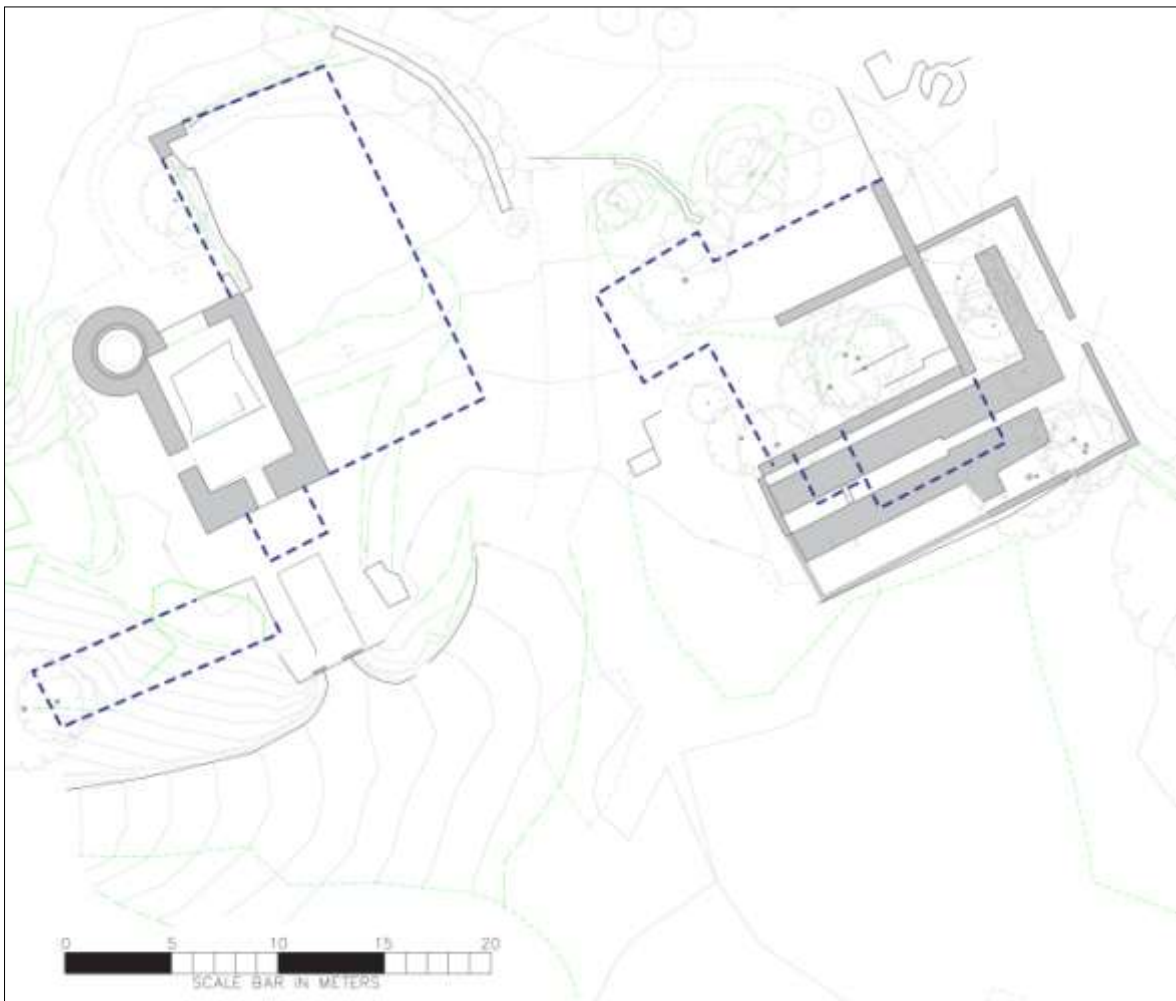


FIGURE 14: SITE PLAN SHOWING THE SURVIVING STRUCTURES ON THE SITE, AND THE ORIGINAL EXTENT OF THOSE STRUCTURES (SHOWN IN DASHED BLUE LINES) (BASED ON THE 1906-7 OS MAP; SITE PLAN SUPPLIED BY ARCHITECT).

## 4.2 IMPACT APPRAISAL

The history and development of the site has been explored in detail through the reports prepared for this and previous planning submissions. The potential effect of the proposed development on the setting of Listed buildings and the World Heritage Site is also dealt with elsewhere (see the *Heritage Statement and Heritage Impact Assessment*). However, it is the opinion of the authors that this is a carefully considered and sympathetic scheme that would ensure the long-term viability of the enginehouse as a landmark structure.

The OUV of the building is closely linked to its authenticity. In its current condition and setting, the enginehouse is a solitary roofless building on a break of slope overlooking a quiet, partly-wooded valley. As such, it is an authentic monument to a lost industry, long disused and reclaimed by nature. However, in historical terms this is a highly misleading impression: in 1908 this was a busy complex of buildings linked by aerial tramways within an open and barren landscape of tips overlooking a heavily-polluted valley filled with industrial structures (see Figures 4-8). The character and setting of the building is changing: the key is to manage that change in such a way as to best preserve its OUV for the longer term.

As the structural report makes clear, without conservation the building will deteriorate, leading to structural failure in the medium to long term. The great strength of the building is readily apparent, and the process may take decades, but it will fail. The cost and complexity of stabilising a failing structure is much greater, and the works would be subject to the same issue of long-time viability. The survival of the structure could be ensured by a programme of ongoing repair, but that would be reliant on the good will and financial wherewithal of successive owners for what is a difficult class of monument to maintain. Such a programme would also serve to erode the authenticity of the building over time, as repairs accumulate. On that basis a single phase of works that could clearly be distinguished from the earlier fabric could be preferable. With the exception of the proposed ground-floor link between the proposed residential block and the enginehouse, and the six concrete supports for the internal timber structure, harm to the historic fabric of the building appears minimal and can be justified by the benefit. It is arguable that a sympathetic and recessive restoration and use of the building that would ensure its long-term survival is in the best interests of its ability to convey the OUV of the structure.

## 4.3 RECOMMENDATIONS

In terms of the archaeology, all groundworks should be subject to monitoring and the footprint of the proposed build subject to a strip-map-sample exercise. Structural evidence (walls, floors, fittings etc.) relating to the boilerhouse and whim/compressor house may yet survive, and underground flues leading to the extant and demolished chimneys may be present. It is possible that evidence for less substantial structures (e.g. the aerial tramway) may also survive.

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APPENDIX 1: RECORDING TABLES

BUILDING 1		General Description
Function/Summary:		Engine house, for former Wheal Friendly mine, in St Agnes. Early 20 <sup>th</sup> century engine house, within the World Heritage Site.
Dating Evidence:		Documentary and photographic evidence; style and form of building.
Figure Numbers:		
B1 Exterior		
B1 Elevation North-East		Description
Fabric Description:		Narrow elevation; the principal front (bob wall), facing out across the valley. Roughly shaped and dressed granite block quoins to east and north corners, slate levellers between stone blocks, c.1.5m wide. Elevation is very slightly battered, the top sloping back from the base. The elevation is very cohesive in style and form of stonework, with slatestone/killas infill in and around granite blocks. Mortared with a heavy pale red-brown lime bond, mixed with white flecks, of shell or lime and some crushed slate.
Opening – Doorway:	1	There is one large round arched opening (plug door) rising from the top of the ground floor up to second floor level, in the centre of the elevation. 1.25m wide by 4m high. Roughly-dressed and shaped granite blocks to reveals, rising to round arch of yellow bricks. Quadruple segmental arch. Straight-sided opening.
Significant Details:		The third floor is open, with granite quoins rising and bracing the sides; this part of the elevation would have been clad with timber. There are some scattered socket holes in the elevation and iron bars and bracing fittings project from the first and second floors to both east and north corners. It can be clearly seen from the profile of the east corner of this elevation that the long south-east elevation is stepped out at the base forming a plinth. The elevation immediately abuts the concrete capped mine shaft.
Relationships:		The elevation is cohesive with the other elevations, although of heavier build.
B1 Elevation South-West		Description
Fabric Description:		Narrow gabled elevation, chimney attached to south corner. Roughly shaped and dressed granite block quoins to west corner, rising to third floor, with slate levellers between stone blocks, c.0.95m wide. The stonework is very cohesive in style and form of stonework throughout the elevation. Slatestone/killas stonework with granite blocks. Mortared with a heavy pale red-brown lime bond, mixed with white flecks, of shell or lime and some crushed slate.
Ground Floor:		Due to engine house being terraced into to the slope, this level is buried; a heavy stone retaining wall visible within slate and shale rubble. There are heavy granite block quoins on the west corner exposed at this level.
First Floor – Doorway:	1	A high proportion of stonework at this level is of granite blocks. One wide central doorway/access with round arch to the centre of the elevation. 2.25m wide and 3.8m high, cylinder door. Sits into the top of the ground floor level, rises through the first, to the very base of the second floor. Dressed and shaped granite block reveals and yellow brick segmental arch to top, quadruple segmental arch. Straight-sided opening.
Second Floor – Windows:	1 (3)	A high proportion of granite blocks within the stonework at this level, but concentrated to the west side, spreading out from the granite quoins. One central opening with round arch, symmetrically positioned over the doorway below. Yellow brick reveals to each side mimic quoins. Double segmental round arched head to opening, also in yellow clay bricks. The brickwork is splayed to the interior quite crudely, patched with later hard greyish mortar pointing which is smeared across the bricks. Heavy granite blocks form the sill. Just above this between the second and third floor are a set of forced sub-square openings, with chunky timber lintels, that to the right a later repair. These have rebuilt brick reveals of quoin form and ragged bottoms, where stonework has either been ripped out or fallen out due to dereliction. These should be sockets for the spring beams.
Third Floor – Windows:	1	Higher proportion of slatestone/killas at this level; above eaves height the raised gable is entirely slatestone build. One central opening with round arch, symmetrically positioned over the door and window below. Yellow brick reveals to each side mimic quoins. Double segmental round arched head to opening, also in yellow brick. The brickwork is crudely splayed to the interior.
Chimney Stack:		Large battered stone base rises four stages, topped by a tapering shaft of yellow brick. Built of slatestone/killas stonework, mostly of the softer bluish-purple killas blocks with a regular scatter of granite blocks tying the stonework together. Heavy brick ribbed cornice to top of stack, and shaft is topped by another double-ridged rim of brickwork.
Relationships:		This elevation is cohesive with the chimney stack and similar in style and form of stonework to the south-east and north-east elevations.
B1 Elevation North-West		Description
Fabric Description		Long elevation, of mixed stone rubble types. Some later hard cement mortar patching. Predominantly slatestone/killas stonework of three distinct types/styles. Includes some rough granite boulders or broken pieces of more shaped granite. Wall c.0.95m wide. Mortared with a heavy pale red-brown lime bond, mixed with white flecks, of shell or lime and some crushed slate. Repairs in a yellow lime mortar, with greyish-beige lime pointing, and a later greyer harder mortar phase of repairs. Very heavy granite quoins, roughly dressed and shaped to north corner, smaller quoins to west

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		corner, slate levellers between stone blocks.
Ground Floor:		Heavy slatestone/killas stonework, with sparse large irregular granite blocks. Very heavy quoins roughly shaped and dressed, granite string course projects from quoins of shaped long blocks, not complete. Mortared with a heavy pale red-brown lime bond, mixed with white flecks, of shell or lime and some crushed slate. There is a heavy iron plate tie to the west corner at the base of the wall.
First Floor:	1	Stonework differs to rest of build, much lighter in weight, lots of closely packed irregularly shaped purplish-brown slatestones, in a yellow-beige lime mortar. Hardly any granite stones but for heavy quoins to corners. Row of four long sockets from former abutting building run through this level of the elevation. Offset to the north end is a forced or heavily-altered opening. It is tall and rectangular, narrow, with roughly-dressed granite block reveals to its north side and has partly-rebuilt yellow brick reveals to the west side; one granite block remains to base of west reveals; this should be a steam pipe opening. Thick machine cut timber lintel, probably a repair. Two heavy parallel set iron bars project from the north quoins, on this north-west face, just to the left of the opening.
Second Floor:	1 (2)	Stonework is much heavier at this level, of predominantly slatestone of blue and brown colour with lots of heavy rusticated but shaped granite blocks. Numerous patching in yellow brick, either repairs or former sockets. Dark beige-brown lime mortar, sparingly used, tightly packed stonework. Row of slate slabs and possible cement flashing to west side near quoins, former abutting roofline? Heavy circular plate tie to north quoins, to opposing tie in south-east elevation. Several iron bars, hooks and loops are braced into the stonework for attaching machinery throughout this level and there is a heavy iron pulley set over the opening. One opening to the centre of the elevation, roughly square in shape, with yellow brick reveals forming quoins, with thin long timber lintel, heavily-weathered. Straight-sided opening, stone and brick in the reveals. This opening looks forced, the stonework around it clearly patched, but this should be a steam pipe opening or cross beam socket.
Third Floor:	(1)	Where the second and third floor meet there is a sub-rectangular opening. Unweathered heavy timber lintel. Yellow brick reveals to each side, except to the base on the south side, where it is stone. At third floor level the quoins change, becoming much lighter to both corners. To the north they then have alternating granite blocks and yellow brick. The quoins can also be seen to step back at this level. To the west corner the brick patching is only seen at the very top, but the granite becomes more finely dressed and much smaller in size. The actual stonework of the third floor is all of platey slatestone/killas of a darker grey-blue and closely packed in a light brown mortar bond. There appear to be a row of five sockets at eaves height, blocked with yellow bricks.
Relationships		This elevation has been heavily altered and repaired. At ground floor level it is probably cohesive with the rest of the engine house but has otherwise been reworked. The abutting platform of earth which accessed the south-west elevation has a loose revetment bank which abuts this elevation on its west corner.
<b>B1 Elevation South-East</b>		<b>Description</b>
Fabric Description:		Long elevation, of mixed stone rubble types. Some later hard mortar cement patching. Chimney stack attached to south corner. Slatestone/killas stonework with some inclusions of rough granite blocks or broken pieces of more shaped granite. Wall c.0.95m wide. Mortared with a heavy pale red-brown lime bond, mixed with white flecks, of shell or lime and some crushed slate.
Ground Floor:	1	Stepped out to ground floor, forming a plinth, topped with heavy slatestone slab string course. Rough granite block quoins to east corner, slate levellers between stone blocks. There is one large opening with round arch, offset to the east end. Slate slab sill. Granite roughly dressed and shaped blocks form reveals, rising to round arch of yellow brick. Double segmental arch. Straight-sided opening.
First Floor:	1	Rough granite block quoins rise contiguously from the ground floor on the east corner. Projecting iron bars and fixed bar, a piece of bracing for machinery, is bolted to the structure on the east corner. Very similar stonework to the ground floor. Two rows of four socket holes run parallel through this level, c.1.2m apart. There is one large opening with a round arch, offset to the east end. Slatestone sill. Yellow brick reveals to each side form shape of quoins. Double segmental round arch to opening in yellow bricks. The brickwork is crudely splayed to the interior, patched with later hard greyish mortar pointing that is smeared across the bricks.
Second Floor:	2	Rough granite block quoins rise from the ground floor on the east corner. Slatestone/killas stonework with a higher proportion of granite stones, including dressed and shaped blocks, some rusticated. One heavy iron plate-tie to the east end, bracing the east corner. One small sub-square opening to the upper part of the level, offset to the south side next to the chimney. Slatestone slab sill. Straight-sided opening, with chunky replacement timber lintel. Yellow brick reveals in the form of quoins. One large opening with round arch to the centre of the elevation. Yellow brick reveals to each side mimic the shape of quoins. Double segmental round arch to opening in yellow brick. The brickwork is crudely splayed to the interior, patched with later hard greyish mortar pointing that is smeared across the bricks.
Third Floor:	1	Rough granite quoins rise from the ground floor on the east corner. Slatestone/killas stonework with less granite than the second floor.

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		<p>One large opening with round arch to the centre of the elevation, directly above the opening on the second floor. Yellow brick reveals to each side mimic quoins. Double segmental round arch to opening in yellow brick. The brickwork is crudely splayed to the interior, patched with later hard greyish mortar pointing that is smeared across the bricks.</p> <p>One large socket or putlog hole to the right of the window opening.</p> <p>The wall is slightly ragged to the top.</p>
Chimney Stack:		<p>Large battered stone stack rises in four stages, topped by a tapering shaft of yellow brick. Built of slatestone/killas stonework with more of the large bluish-purple killas blocks and a scatter of granite blocks tying the stonework together. Heavy brick ribbed cornice to top of stack, and shaft is topped by another double-ridged rim of brickwork.</p>
Significant Details:		<p>This scattered use of more obviously dressed and faced granite blocks, rather than the rusticated but shaped ones, throughout the stonework of the upper elevation, could suggest reuse of quoins or dressings from other buildings?</p>
Relationships:		<p>The elevation seems cohesive with the chimney stack and similar in character to the north-east and south-west elevations, with similar treatment to the reveals of openings etc and use of materials.</p>
<b>B1 Interior</b>		<b>Description</b>
Function:		Pumping engine house interior, formerly contained machinery of engine.
Walls:		Exposed stone walls.
Floor:		Earth floor, deeply terraced, stepped into the slope, for engine pit and bob wall.
Significant Details:		Remains of dense bob wall which crossed the interior on a board west-east alignment. Other areas of slumping from collapsed upper walls.
Dating Evidence:		No fittings or features survive; the interior has been totally stripped.



APPENDIX 2: SUPPORTING PHOTOGRAPHS



THE SOUTH-EAST ELEVATION OF THE ENGINE HOUSE; VIEWED FROM THE EAST-SOUTH-EAST (SCALE 2M).





THE SOUTH-EAST ELEVATION AND CHIMNEY STACK; FROM THE EAST (SCALE 2M).





LEFT: THE SOUTH-EAST ELEVATION; FROM THE OBLIQUE, FROM THE SOUTH (SCALE 2M).

RIGHT: THE PRINCIPAL NORTH-EAST GABLE OF THE ENGINE HOUSE, FACING ACROSS THE VALLEY; FROM THE NORTH-NORTH-EAST (SCALE 2M).



LEFT: THE NORTH-WEST AND NORTH-EAST ELEVATIONS OF THE ENGINE HOUSE; VIEWED FROM THE NORTH (SCALE 2M).

RIGHT: THE LONG NORTH-WEST ELEVATION OF THE ENGINE HOUSE; VIEWED FROM THE NORTH-WEST (SCALE 2M).





LEFT: THE NORTH-WEST AND SOUTH-WEST ELEVATIONS OF THE ENGINE HOUSE; FROM THE WEST (SCALE 2M).

RIGHT: THE SOUTH-WEST GABLE ELEVATION AND CHIMNEY; VIEWED FROM THE WEST (SCALE 2M).





LEFT: THE SOUTH-WEST GABLE ELEVATION AND CHIMNEY; VIEWED FROM THE WEST (SCALE 2M).

RIGHT: THE INNER FACE OF THE NORTH-EAST OF THE ENGINE HOUSE; FROM THE SOUTH-WEST.





THE INNER FACE OF THE SOUTH-EAST OF THE ENGINE HOUSE; FROM THE WEST.





THE INNER FACE OF THE NORTH-WEST OF THE ENGINE HOUSE; FROM THE SOUTH.





THE FLOOR OF THE ENGINE HOUSE SHOWING DEEP ENGINE PIT TO THE NORTH END; FROM THE SOUTH-WEST.



THE ENGINE HOUSE AND THE REBUILT WALL OF THE BOILERHOUSE; FROM THE NORTH-WEST (SCALE 2M).





THE SURVIVING REMNANT OF THE BOILERHOUSE WALL; VIEWED FROM THE NORTH-NORTH-WEST.



THE SOUTH-EAST INTERNAL CORNER OF THE BOILERHOUSE, SHOWING THE NARROWED PHASE 3 OPENING WITHIN A PARTLY-BLOCKED PHASE 2 OPENING; VIEWED FROM THE NORTH-WEST.





THE NORTH-EAST FACING ELEVATION OF THE PHASE 3 STAMPS; VIEWED FROM THE NORTH-EAST.



AS ABOVE, THE SOUTH-EAST ANGLE; VIEWED FROM THE SOUTH-EAST.





THE NORTHERN ANGLE OF THE PHASE 3 STAMPS; VIEWED FROM THE NORTH.



AS ABOVE, SHOWING THE PHASE 3 CONCRETE RESERVOIRS AND PHASE 2 DRYING HOUSE TO THE NORTH-WEST; VIEWED FROM THE NORTH-EAST.





THE SOUTH-EAST CORNER OF THE PHASE 3 CONCRETE RESERVOIR, WITH PROBABLE CHIMNEY BASE; VIEWED FROM THE NORTH-EAST.



THE NORTH-WEST CORNER OF THE PHASE 2 COMPRESSOR HOUSE/WHIM OPENING WITH BRICK ARCH, BLOCKED IN PHASE 3; VIEWED FROM THE NORTH-WEST.



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