



Tintagel Castle Cornwall: archaeological impact
 assessment of proposed geotechnical investigations

Tintagel Castle, Cornwall

Archaeological impact assessment of proposed geotechnical investigations

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The Project Manager was Jacky Nowakowski.

The views and recommendations expressed in this report are those of Cornwall Archaeological Unit and are presented in good faith on the basis of professional judgement and on information currently available.

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Cover illustration

An extract from Norden's 1604 view of Tintagel Castle

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Abbreviations

CAU	Cornwall Archaeological Unit
CIfA	Chartered Institute for Archaeologists
CRO	Cornwall Record Office
EH	English Heritage
HE	Historic England
HER	Cornwall and the Isles of Scilly Historic Environment Record
NGR	National Grid Reference
OD	Ordnance Datum – height above mean sea level at Newlyn
OS	Ordnance Survey

1 Summary

Tintagel Castle, Cornwall is an internationally significant Scheduled Ancient Monument owned by the Duchy of Cornwall and under the guardianship and management of English Heritage. It is one of the nation's premier visitor attractions.

The mainland and island parts of the site were originally linked by a land bridge, but this has gradually eroded away and has now almost completely disappeared. Access between the two parts of the site is currently by means of two steep, long flights of steps linked by a low level bridge, which constrains access to the Island to some visitors.

A new high-level bridge has been proposed by English Heritage to link the two areas of the Castle and the design for this feature is currently being developed. Geotechnical investigations have been proposed in order to determine the bedrock conditions at the bridge landing points, these comprising test pitting, evaluative drilling and rockface recording.

In 2016 English Heritage commissioned CAU to consider the archaeological impacts of the proposals following a site meeting with English Heritage, their geotechnical consultants and Historic England, to suggest any appropriate mitigation or modification to the proposals, and to report on the results of the impact assessment.

A range of potential impacts on the sub-surface archaeology of the site were identified, these including damage to archaeological deposits through pitting and drilling, potential soil compression and contamination resulting from oil and fuel spillages. A range of measures has been suggested to prevent these impacts occurring, minimise them, or mitigate those which would be unavoidable.

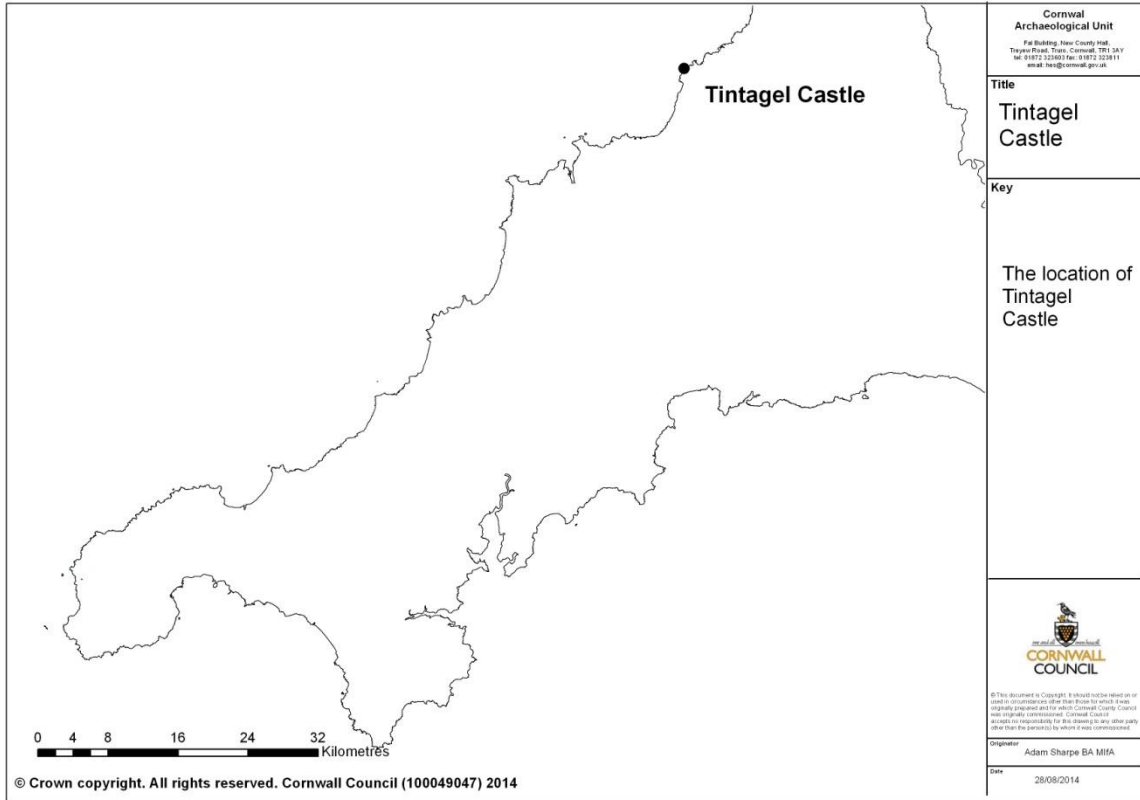


Fig 1. The location of Tintagel Castle.

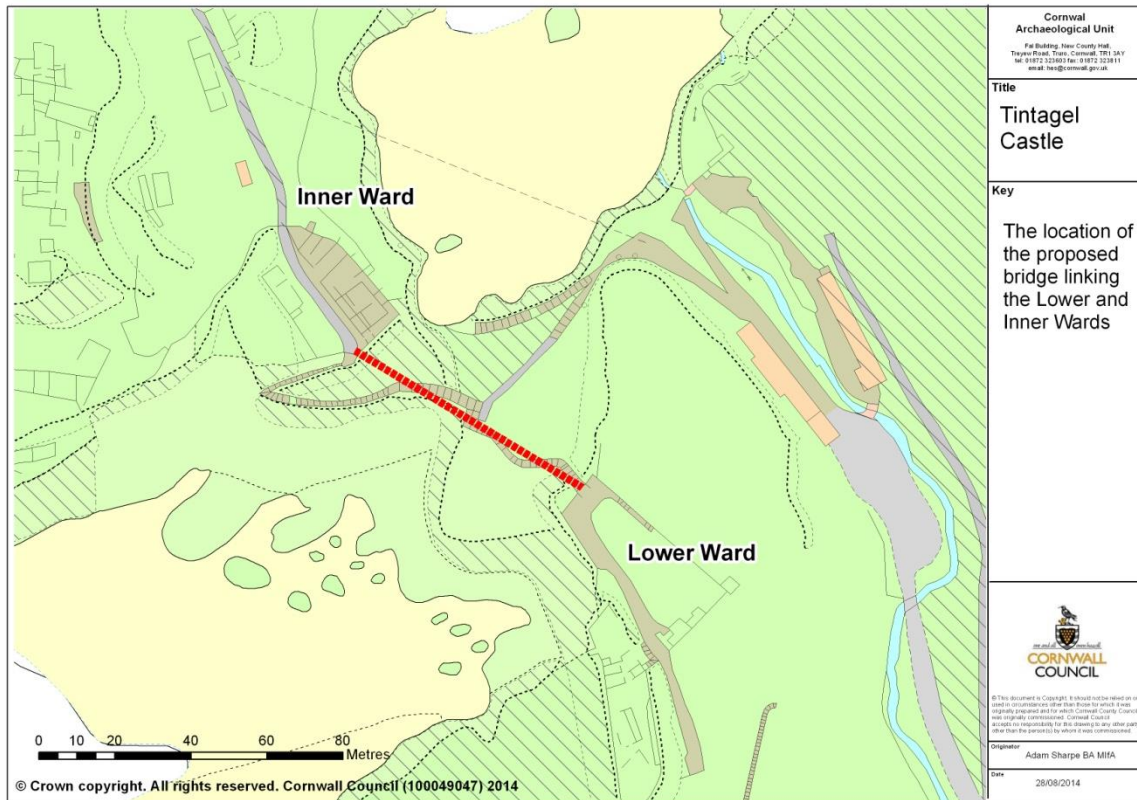


Fig 2. The locations of the Lower and Inner Wards at Tintagel Castle and that of the footbridge proposed to link them.

2 Introduction

2.1 Project background

Tintagel Castle, Cornwall is an internationally significant Scheduled Ancient Monument owned by the Duchy of Cornwall and under the guardianship and management of English Heritage. It is one of the county (and nation's) premier visitor attractions with yearly estimates of over 200,000 visitors.

Access to the castle site was originally from the south, along a path leading from the top of the valley leading into the Barbican and the Lower Ward and thence via a land bridge to the Inner Ward.

The originally substantial land bridge which was known to have connected the landward and Island elements of the site during the early medieval and medieval periods has been substantially eroded away and is now a slender and unstable neck of eroding rock. Visitors cross a modern bridge to the base of the Island across the remains of this isthmus, from where a flight of tortuous rock-cut steps cut during the Victorian period climbs steeply up to a narrow doorway in the crenellated wall constructed during the 19th century to form the southern side of the Inner Ward.

A new high-level bridge has been proposed by English Heritage to link the mainland and island wards at Tintagel Castle.

The design for the bridge is currently being developed, and it is now necessary to test the bedrock conditions at both abutment points in order to fine tune the design. In order to achieve this, it is proposed to drill two pairs of vertical boreholes to examine the nature of the bedrock at the anchorage points at each end of the bridge. A small tracked compressed air drilling rig is to be used for this purpose and the project engineers have produced a method statement and plan showing the proposed locations for these boreholes. Test pits will be excavated at these locations. In addition, a number of hand-excavated test pits may be used to test the ground adjacent to the foundations of the walls defining the eastern end of the Lower Ward at the mainland end of the proposed bridge. Geological and geotechnical mapping will also be undertaken for the rock faces below each abutment point.

English Heritage have commissioned CAU to consider the archaeological impacts of the proposals, to attend a site meeting with English Heritage, its appointed engineers and Historic England, to suggest any appropriate mitigation or modification to the proposals, and to report on the results of the impact assessment.

CAU have examined all known archaeological information relating to these locations, this is summarised in Sharpe 2014.

2.2 Aims

The project aim is to assess the potential impacts of the proposed geotechnical investigative works on the archaeology of Tintagel Castle.

The primary objective of the project is to provide English Heritage and its engineering consultants with the results of the impact assessment; a secondary objective is to create an entry to the Historic England OASIS/ADS-Online online database of archaeological projects.

2.3 Methods

2.3.1 Desk-based assessment

A desk-based assessment was undertaken by Cornwall Archaeological Unit in 2014 (Sharpe 2014) at an earlier stage in the development of the bridge proposals. This considered historical databases and archives in order to obtain information about the history of the site and the structures and features that were likely to survive.

2.3.2 Site meeting

A site meeting took place on 28 April at Tintagel Castle between Cornwall Archaeological Unit, Reuben Briggs (Project Director, English Heritage), Jake Taggart, (engineering consultant, Ramboll UK Ltd), Dan Ratcliffe (Inspector of Monuments, Historic England) and Win Scutt (Assistant Properties Curator (West), English Heritage).

3 Location and setting

Tintagel Castle occupies a coastal site on the rugged and exposed north Cornish cliffs, its structures being located both on the Mainland (the Upper and Lower Wards) and on a headland attached to it by a slender, eroding isthmus (the Inner Ward). Tintagel Island is centred at SX 04927 89115, its highest point being at 83m OD.

4 Designations

4.1 National

Tintagel Castle is owned by the Duchy of Cornwall, but is in the Guardianship of the State, being cared for by the Office of Works (and its successors) from 1929. Tintagel Castle was Scheduled in 1981 (Monument No 1014793).

5 Site history

There is currently very little evidence for pre-Roman occupation on the headland of Tintagel though occurrences of prehistoric flints and Neolithic/Bronze Age cup-marked stones do provide evidence for some activity at this time.

There is evidence that Tintagel was a relatively important place by the Roman period. Within the neighbourhood there are two inscribed Roman milestones that suggest a route passing near to Tintagel while Roman coins and pottery (Oxford Colour-coated Wares and native flanged bowls) have been found on the Island, suggesting a date *circa* AD 300 – 400. Radiocarbon dates obtained from the 1990s excavation of structures on the Lower Terrace, Site C, give a date range *cal* AD 395-460 (Harry and Morris 1997; Barrowman *et al* 2007). It has been suggested that Tintagel was possibly the "*Durocornovio*" (fort of the Cornovii) of the *Ravenna Cosmography* (Thomas 1993, 84).

During the post-Roman period (from the 5th to early 7th centuries AD) the headland of Tintagel developed into a major fortified citadel (the neck of the headland being separated from the Mainland by the excavation of the "Great Ditch"). It is suggested that this may point to the origin of the place-name, in Cornish '*dyn tagell*' means the fortress of the constriction or throat (Padel 1988).

The survey of the Island undertaken by RCHM(E) during the mid-1980s following the extensive fire which took place on it, together with excavations undertaken since the 1950s, have revealed numerous buildings and structures related to the post-Roman period, the density of settlement being such as apparently covering almost every available space on the headland, including on artificial terraces that had been cut into the precipitous sea cliffs that surround most of the site. Associated with these buildings are artefacts, especially pottery, that reflect the importance of this site at this time. Very large quantities of imported pottery (both fine table wares and coarsewares) originating from North Africa and the eastern Mediterranean have been found along with some exotic glass. This suggests that at Tintagel there was a degree of control, organisation and power to trade directly with the Byzantine Empire. The nature of the trade is not known though there is some evidence from other sites that the distribution of tin was an important element (Thomas 1993; Harry and Morris 1997; Barrowman *et al* 2007).

Subsequently the Island was abandoned (apart from a small chapel being built on the peak of the Island c 1100) until the present castle was constructed by Richard, Earl of

Cornwall during the mid-13th century. Though the more substantial buildings on the Island, along with the garden and the tunnel, date from this period, the ceramic evidence suggests that occupation appears to have been sporadic (it was sometimes used as a state prison in the 14th century), ceasing by the 15th century. In the 16th century, two small gun houses were built on the Island in response to a possible threat from the Spanish (it is uncertain if they were ever completed); the rest of the castle however was by then described as a picturesque ruin (Thomas 1993).

By 1602, the land bridge which had formerly joined the mainland to the Island had collapsed as described by Carew:

'Half the buildings were raised on the continent, and the other half on an Island, continued together (within men's remembrance) by a drawbridge, but now divorced by the down-fallen steep cliffs on the farther side, which, though it shut out the sea from his wonted course, hath yet more strengthened the late Island; for, in passing thither, you must first make descent with a dangerous declining, and then make a worse ascent by a path as everywhere narrow, so in many places, through his stickleness occasioning, and through his steepness threatening, the ruin of your life, with the failing of your foot. At the top, two or three terrifying steps give you entrance to the hill ...' (Carew 1602).

In the 19th century there was an attempt to mine the lead and silver lodes found on the Island as King Arthur's Mine and the haven developed as a harbour for servicing the surrounding slate quarries. In the 12th Century, Geoffrey of Monmouth had identified Tintagel Castle as that where King Arthur was conceived (not born); this attribution was popularised by Tennyson, Swinburne and Hardy, and Tintagel quickly became an increasingly popular and highly romanticised tourist destination, particularly following the coming of the main line railway to Cornwall and the construction of the Railway Hotel at Tintagel. The Reverend Kinsman, taking on the title of the Constable of the Castle, oversaw the reconstruction of some elements of the monument, and a guide was employed to take visitors around the Castle. A series of formerly rather narrow and dangerous paths were re-cut to enable visitors to access the Island at this time. Eventually the isthmus became too narrow, unstable and dangerous to carry the path linking the Island to the Mainland and the first of a number of low-level footbridges was constructed. This was replaced by the present bridge in 1975.

Archaeological investigations overseen by C.A. Raleigh Radford during the 1930s were followed by some landscaping, reconstruction and repair works. English Heritage commissioned some research excavation at Site C and elsewhere from 1990 to 1999, whilst Cornwall Archaeological Unit and its successors have undertaken a number of watching briefs during safety, visitor management and other works within the Castle site since the mid-1980s to the present day.

6 The archaeological evidence

Two specific areas of Tintagel Castle were considered in relation to the potential archaeological impacts which might result from the proposals for geotechnical investigation:

- The area of the landward Lower Ward immediately adjacent to the proposed bridge landing point.
- The area of the Inner Ward on Tintagel Island adjacent to the proposed bridge landing point.

6.1 The Lower Ward

Almost all upstanding structures within this part of the site are of medieval date and represent components of Earl Richard's Castle. This former extent of this part of the castle has been truncated by the geological processes which resulted in the almost complete loss of the isthmus which formerly linked the mainland and island components of the site.

A small number of archaeological investigations have been undertaken within this area. For the locations of archaeological interventions in the Inner Ward see Figure 10.

C A Raleigh Radford cut a series of investigative slot trenches along the inner northern face of the eastern wall of the Lower Ward in the early 1930s. Whilst the detail of his investigations is unknown, it is understood that bedrock was encountered in the trench bases at around 2m from surface.

A watching brief on the foundation trench for a new wall at the northern end of the Lower Ward was undertaken in 1983 by the Central Excavation Unit (McA1983; McAvoy 1984). This revealed a shallow holloway which was interpreted as forming part of the medieval route from the Barbican towards the entrance to the Inner Ward. The depth to bedrock at the midpoint of this trench was reported as being 0.35m.

Three small evaluation trenches were excavated within the Lower Ward and a rather larger area was opened up external to the eastern wall of this feature by CAU in 1986 (Fig 5) (Hartgroves and Walker 1986). (Locations shown as CAU A,B,C and D on Fig 10).

- Trench A near the north-western corner of the Lower Ward revealed a probably 19th century large ceramic pipe which has been interpreted as being part of the water supply for Victorian lead mining operations on the Island. Bedrock was found at 0.6m from surface.
- Trench B (made up of two narrow cuts) was excavated immediately adjacent to the inside of the north-eastern corner of the Lower Ward and was restricted in depth so as not to undermine the walling. The trench revealed the construction cut for the walling as well as the nature of the material utilised to provide a levelled platform within this part of the Medieval castle. Bedrock was located at 1.1m from surface.
- Trench C was located near the north-eastern corner of the Lower Ward. A fill similar to that revealed in Trench B was encountered, though this was shown to overlie a steeply-sloping shillet surface interpreted as the surface profile of the natural bedrock at this location. Bedrock was located between 0.5m and 1.25m from surface. The theoretical projection of this surface eastwards suggested that the backfill behind the inner face of the wall would be in excess of 2.5m in depth. These findings implied that the Lower Ward curtain wall had been constructed on a pre-existing terrace levelled into the side of a promontory with sloping sides.
- Trench D was excavated external to the eastern wall of the Lower Ward, effectively as an extension to Trenches B and C. As well as an elongated trench running parallel to and adjacent to the external face of the wall, a narrow extension was cut eastwards across the slope, including the buried terraced area and the Medieval bank and ditch paralleling the curtain wall. The additional area exposed by this trench proved particularly useful, revealing an extent of a pre-Medieval land surface containing a pair of stone-lined hearths, over 100 stakeholes, burnt animal bone, imported pottery, two fragments of early Medieval glass and a piece of copper alloy. A sealing layer contained 25 sherds of imported Mediterranean wares which elsewhere on the Island have been the principal dating evidence for a significant phase of post-Roman occupation at Tintagel. An extension to this trench revealed further sections of the pre-Medieval occupation surface, features and overlying layers. This terrace had been utilised as the foundation level for the medieval curtain walling, the levelled interior of the Lower Ward having been achieved through infilling with soil and rock fragments, a fill material similar to that recorded by McAvoy in 1983.

Although only a small proportion of the Lower Ward has been archaeologically investigated, the work which has been undertaken suggests that the bedrock underlying the modern ground surface has an asymmetric upper profile, being more or

less level under the western central part of the area at between 0.35m and 0.5m depth from surface though sloping gently to the west to around 0.6m from surface; to the east, the top of the bedrock slopes down more steeply, being around 2m from surface under the western curtain wall. It is uncertain whether or not the bedrock was partially levelled within the central part of the promontory during castle construction activities, but rocky fill material appears to have been utilised as a levelling layer within the whole of the northern part of the Lower Ward.

Trenching for the mine water pipe is likely to have resulted in some disturbance to archaeological deposits adjacent to the western wall of the Lower Ward. Some further (unrecorded) disturbance is likely to have taken place during the construction of the modern sections of curtain walling and the upper section of the modern steps leading down to the isthmus.

The archaeological investigations undertaken within the Lower Ward suggest that whilst the eastern section of this area has a high potential for the preservation of post-Roman archaeological deposits, the central and western sections of its northern end have low archaeological potential.

6.2 The Inner Ward

For the locations of archaeological interventions in the Inner Ward see Figure 11.

The Inner (Island) Ward at Tintagel has long been assumed to have sited the most important elements of any high status building, monastery or stronghold constructed at Tintagel. It is known that a number of investigations and other activities have taken place here over the centuries, but records for almost all are either rudimentary, have not survived or were never made. The large scale work undertaken on the Island during the 1930s by Raleigh Radford for the Office of Works has also left only a limited archaeological record for the area occupied by the Great Hall and its associated structures.

Raleigh Radford's principal task in relation to the works he undertook at this location at the Great Hall was presentation rather than investigation, and the depths of his trenches were dictated by the foundations and floors of the medieval structures he uncovered. As a result the underlying post-Roman deposits were not investigated at this time.

In 1933, Raleigh Radford oversaw the excavation of an elongated trench between two parallel walls near the centre of the Great Hall to create a relatively shallow soakaway. No records of the findings of this work have been identified. External to the eastern curtain wall of the Great Hall, Raleigh Radford excavated either two or three small test pits (his Site Z) to depths of around 0.6m against the internal angles of wall buttresses. Unfortunately his site notes and associated plans were destroyed when his house in Exeter was destroyed by bombing in the Second World War, though he subsequently mentioned that at least one trench revealed evidence for pre-Medieval walling. His finds register indicates that they also produced some post-Roman pottery. This general area was re-examined by Historic Environment Projects in 2014 during the installation of abseil anchor points (Thorpe 2014). Although only very limited areas were investigated, these small pits suggested the existence of a pre-Medieval occupation terrace and also produced a small quantity of post-Roman imported pottery.

During the later part of the 20th century there was a growing recognition that Raleigh Radford's interpretation of the early Medieval remains on Tintagel Island as being elements of an early monastic settlement was not supported by the artefactual evidence from the site, whilst the substantial fire on the upper part of the Island in the mid-1980s had revealed the foundations for a very large number of additional buildings. A new interpretation proposed by Professor Charles Thomas suggested that Tintagel should be interpreted as a high status early Medieval site with significant trading links to the southern and eastern Mediterranean.

A small trench was excavated by the Central Excavation Unit in 1988 adjacent to the south-western corner of the Great Hall at the location of a short section of hard-surfaced pathway. The feature they encountered was interpreted as a medieval rubbish pit, though re-examination of the finds recovered during this work showed that, with the exception of a single 15th Century sherd, all of the ceramics dated to the post-Roman period; some of the sherds suggested contamination by bronze-working. Butchered animal bones were also included in the finds assemblage. Thomas (1988) has suggested that the CEU trench may well have intersected the western edge of an early Medieval terrace beneath the Great Hall.

In terms of archaeological information relating to Phase II occupation on the Island, the most important investigation for which a record to modern standards was produced was that undertaken by Appleton for CAU in 1988, when the area adjacent to Raleigh Radford's soakaway was re-investigated (Appleton, Fox and Waters 1988, and Thomas 1988 in *Cornish Studies* 16). Appleton excavated a trench to a depth of 2.8m without encountering true bedrock at this location, indicating the very considerable depth of made ground underlying the foundations of the Medieval structures making up the Great Hall.

Although this area had witnessed considerable disturbance during the 1930s (and had possibly been originally excavated by Kinsman *circa* 1852), Appleton recorded a stratified sequence at this location. The 'modern' surface overlaid several mixed layers with a combined depth of 2.1m, these containing substantial amounts of post-Roman imported pottery and interpreted as fills/levelling material during the construction of the Great Hall. His underlying Layer 5 was interpreted as an old land surface pre-dating these construction activities and contained post-Roman ceramic material, whilst Layer 6 (the lowest recorded) appeared to incorporate a course of horizontal slate blocks and slabs bedded in a yellow clay, which he interpreted as evidence for a pre-Medieval structure underlying the Great Hall (Appleton et al, *ibid*)..

During a visit to the site in the same year, Professor Thomas noted that, following a period of prolonged wet weather which had dislodged superficial material, it was possible to make out a stratigraphic sequence in the exposed southern cliff face below the Great Hall (Figs 6 and 7). This was recorded by Thomas and Thorpe utilising a series of photographs as well as direct observation through binoculars (Thomas 1988). Most crucially, the recorded sequence not only confirms Appleton's findings from the soakaway pit the same year, but supplied extensive evidence supporting a construction sequence on the Island which Thomas had previously hypothesised. Indications of at least two rock-cut terraces were found to underlie the present Great Hall floor level, together with hints of walling separating these features, which must be of post-Roman date. The upper part of this cliff face has since been rock-bolted and netted as a safety measure, and the detail of this section is no longer clearly visible. Thomas and Thorpe (*pers. comm.*) have recently produced a plan from the available evidence suggesting the likely locations and extents of two terraces at the southern end of the Island Ward; these are typical of those which characterise other areas of post-Roman occupation on the Island.

Material eroded from this cliff face, and from the 1918 cliff fall on the eastern side of the Island below the north-eastern corner of the Great Hall which derive from these terraces and from material eroding from them incorporates post-Roman artefactual material, as have small-scale excavations between the Great Hall and the Iron Gate where further post-Roman occupation terraces have been identified (Thorpe 2007 and Thorpe 2013). A relatively large number of post-Roman sherds have been collected from the eroding surface of the path between the Great Hall and the Iron Gate, from the path running northwards from the Great Hall onto the Island, from hillwash deposits downslope from many of the small terraced features on the eastern slopes of the Island and from areas adjacent to the low remains of the buildings on the upper part of the Island. During the 1990s Glasgow University undertook the re-excavation of some of the structures investigated and reconstructed by Raleigh Radford at Site C at the

northern end of the eastern side of the Island, demonstrating that these were essentially of post-Roman date.

Whilst archaeological investigation of the early medieval archaeological deposits and structures within the Inner Ward has been somewhat limited, the evidence clearly suggests the existence of a possible high status structure underlying the medieval Great Hall, as well as a series of additional terraced areas adjacent to it which are likely to be of equivalent date (Fig 8). These terraces appear to occupy the whole of the area now occupied by the Inner Ward and the cliff slope to its east. The surface of the western terrace is partly buried by hillwash and backfill, though its eastern edge is exposed as a rib of bedrock leading northwards from Florence's Hut adjacent to the hard-surfaced pathway through the site. The western edge of the central terrace steps down steeply at this point, underlying the medieval Great Hall at a depth of over 2m and extends beyond its eastern curtain wall, whilst the third terrace lies under the coastal slope to the east of the curtain wall. The northern extents of these occupation terraces are uncertain. The archaeological potential of this entire area is considered to be very high.

7 Enabling works proposals

See Figures 10 and 11.

Two pairs of 15m depth vertical boreholes are proposed to examine the nature of the bedrock at or near the locations proposed for the anchor points for the new bridge. The southern pair are to be sited in the lower mainland ward at approximately the centre point of the ground to be intersected by the anchorages. The northern pair are to be located at an equivalent location within the Inner Ward. The method statement originally indicated that hand-dug inspection trenches were to be excavated to depths of 1.2m at each borehole location, subject to archaeological requirements. The drill rig, hydraulic power pack, compressor and other equipment are to be air lifted to each site using a helicopter.

Four hand excavated test pits were initially proposed to be excavated at the northern end of the Lower Ward against the enclosing walling to test their foundation conditions. Two of these were to be sited within the Lower Ward and two external to it at its northern end. On-site discussions on 27th April (see above) concluded that not all of these test pits initially proposed will now be required.

The drill holes proposed within the Lower Ward lie close to evaluation trenches excavated by Hartgroves and Walker in 1986 and by McAvoy in 1983 (see above) which both showed shallow stratigraphy which overlay bedrock and the presence of a large diameter water pipe on the western side. No test pits are required here, as these areas of the Lower Ward have already been archaeologically investigated down to bedrock.

The pair of test pits external to the Lower Ward were to be excavated to the north of the western wall and abutting the walling flanking the eastern side of the upper section of the steps leading down the slope to the north. The ground here has not been archaeologically investigated, but is expected to have been disturbed to some degree during the construction of the adjoining walling. The depths to bedrock within these areas will be shallow as outcrops are visible nearby.

Within the Inner (Island) Ward, a location on an area of exposed bedrock was selected for one of the boreholes; no test pit will therefore be required at this location. The second borehole is to be located a few metres to the north, adjacent to some recently-installed interpretative material. A test pit is to be archaeologically excavated at this location prior to drilling taking place.

8 Archaeological impact assessment

The following potential impacts on archaeological deposits and structures resulting from the geotechnical investigation programme have been identified:

- Damage to archaeological deposits or structures during trenching operations.
- The removal of artefacts from stratified contexts during trenching operations.
- Potential compression damage to underlying archaeological features and deposits through the use of the drill rig and associated equipment and the storage of materials; surface scuffing during the movement of the rig also has the potential to affect shallowly-buried archaeological deposits.
- The air flush emitted by compressed air rotary drill rigs incorporates a fine oil mist. This has the potential to contaminate *in situ* archaeological deposits which may, in future, be subject to radiocarbon (C14) or other forms of high precision dating which the presence of mineral oil would significantly negatively affect. Where the drill passes through relatively unconsolidated material, this high pressure air flush can travel for considerable distances, though the full extent of the potentially affected area cannot be quantified, as the degree of contamination will be dependent on variations in sub-surface conditions.
- The fine arisings from drilling activities also have the potential to migrate through unconsolidated material, again potentially giving rise to some degree of mixing and contamination.
- Drilling is a 'blind' process and the use of this technique has the potential to damage or destroy any archaeological deposits or features through which the drill passes without indication or record.
- There is the potential for the contamination of underlying deposits through the spillage or leakage of mineral oil, hydraulic fluid or diesel fuel from the drilling equipment.
- Positive impacts will arise from the works as the result of opportunities to undertake evaluative investigations within some areas of the Tintagel Castle site which have previously not been studied in this way.

9 Recommended mitigation

- The test pits within the Inner Ward should be archaeologically excavated and recorded in advance of drilling taking place. During the site visit (27th April 2016) new locations for the boreholes were identified which should minimise the impacts of the investigative works (see Figs 10 and 11).
- The test pits within the Inner Ward should be excavated to bedrock to avoid the contamination of surrounding or underlying archaeological deposits during the subsequent drilling operations.
- The results of all excavations associated with this phase of investigation should be archaeologically reported on. Any artefacts recovered during the excavations should be processed in line with CAU guidelines.
- The unexcavated deposits forming the sides of the test pit at the northern drilling point in the Inner Ward should be protected from contamination through the migration of fine arisings or oil mist during the drilling activity.
- Efforts should be made to contain any arisings from the drilling operations.
- Any surfaces within the Castle on which drilling and associated equipment will be temporarily sited or which will be traversed by the drill rig, hydraulic pack and compressor must be protected from the effects of compression or surface scuffing using road plates or equivalents if this activity is proposed on other than hard surfaced areas.
- All equipment and materials should be stored on hard surfaced areas.
- Potential contamination by oils, diesel fuel or other materials which could migrate into underlying archaeological deposits through leakage or spillage should be addressed by the use of bunded containment and by impermeable membranes within any areas likely to be so affected.

- The safety of visitors to Tintagel Castle during the delivery and removal of equipment and of materials and during drilling operations will need careful consideration. If at all possible, safe visitor routes should be identified which would allow the public to be able to continue to visit Tintagel Castle whilst the drilling work is under way. The areas where groundworks will take place should be cordoned off securely.

In addition, potentially significant impacts on the archaeology of Tintagel Castle are likely to arise during bridge construction activities, particularly at and adjacent to the two abutment points. Once the detail of the bridge abutment design has been finalised, a further archaeological impact assessment should be commissioned by English Heritage.

10 References

10.1 Primary sources

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The catalogue of all finds discovered on the Island since Raleigh Radford's 1930s excavations to 1991 produced by Professor Charles Thomas and Carl Thorpe

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Thorpe, C., 2014, *Tintagel Island trial pits, Tintagel Castle, Cornwall, Scheduled Monument 1014793: archaeological watching brief*, HE Projects report 2014R030

10.3 Websites

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11 Project archive

The CAU project number is **146583**

The project's documentary, digital, photographic and drawn archive is maintained by Cornwall Archaeological Unit

Electronic data is stored in the following locations:

Project admin: \\Sites\Sites T\Tintagel bridge impact assessment 2016

Electronic drawings: \\Historic Environment (CAD)\Sites T\Tintagel bridge assessment 2016

Historic England/ADS OASIS online reference: cornwall2-253571



Fig 3. Looking from the Inner Ward to the Lower Ward along the line of the proposed bridge.



Fig 4. A view along the proposed bridge line from the Lower Ward to the Inner Ward.

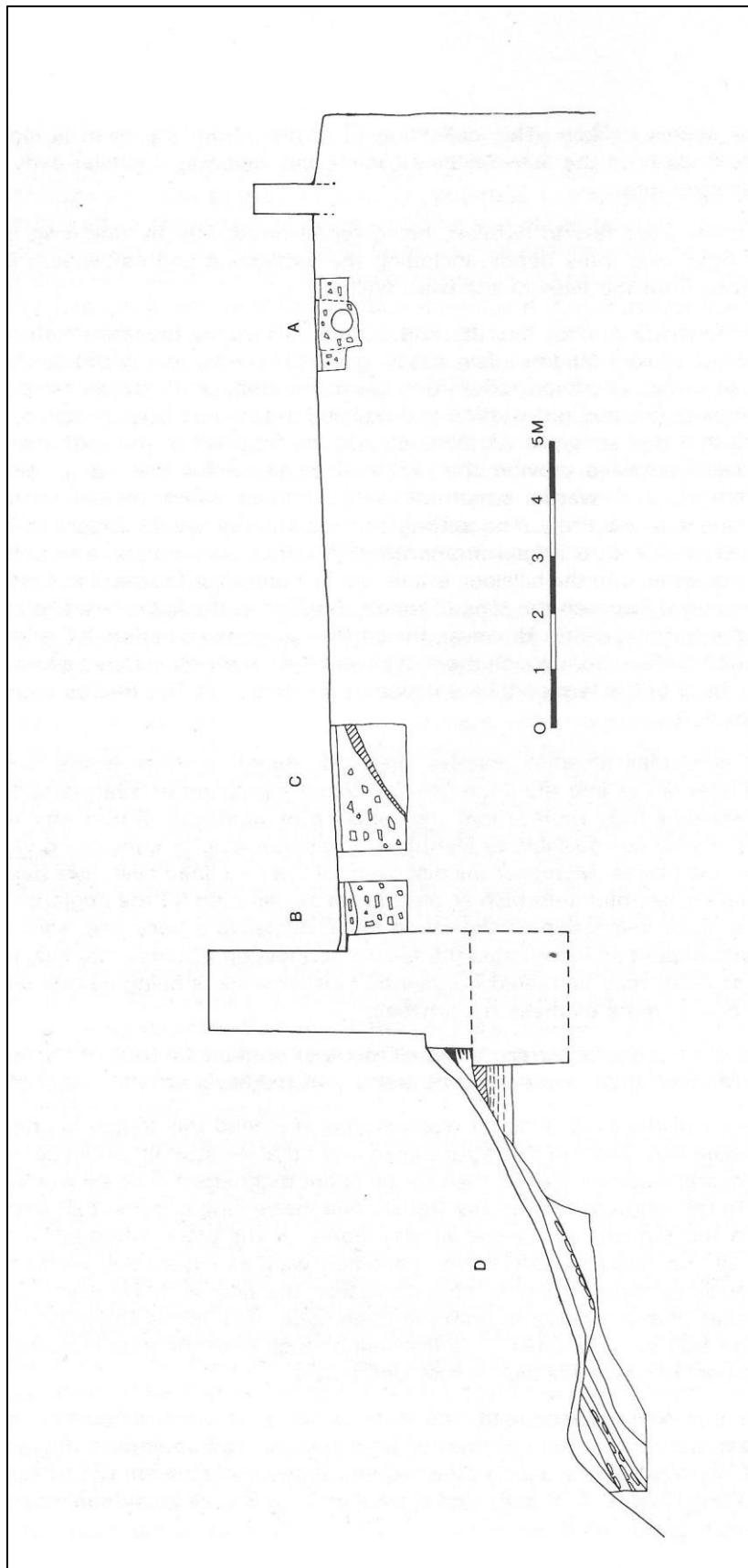


Fig 5. A composite east-west section across the north end of the Lower Ward derived from Hartgroves and Walker's 1986 trenching, showing the depths of medieval fill material and the profile of the post-Roman terrace beneath it. Source: Hartgroves and Walker 1988. Coded as CAM A, B, C and D on fig 10.

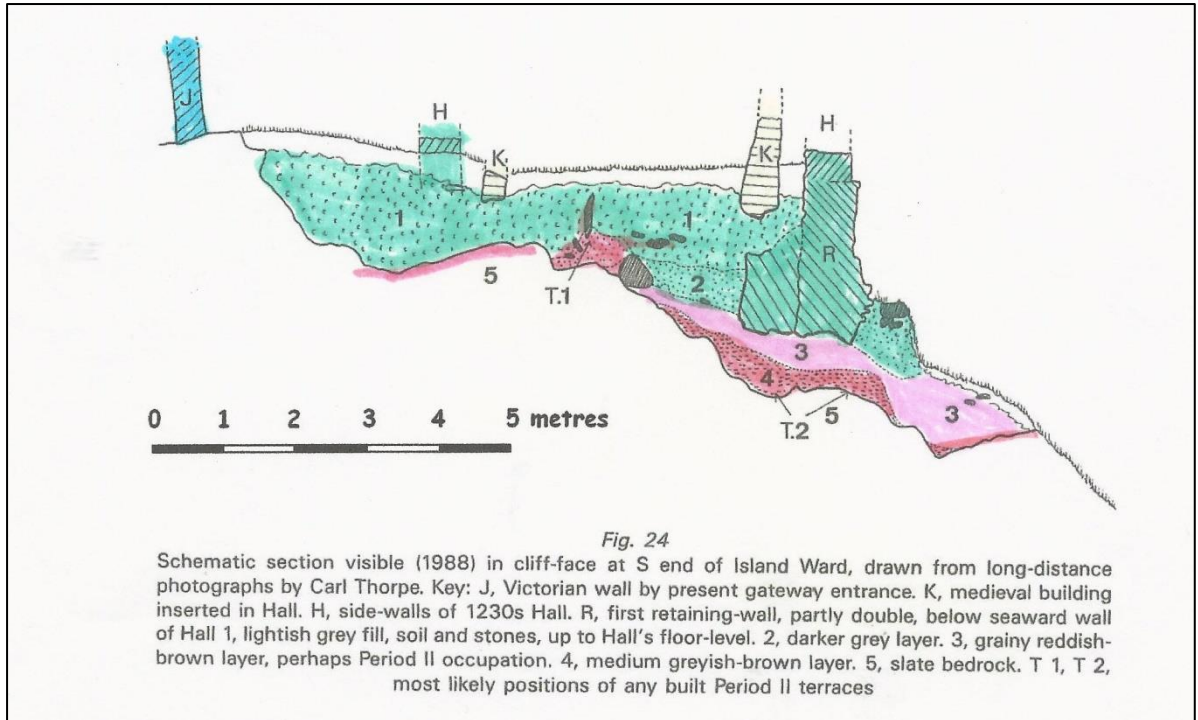


Fig 6. Thorpe and Thomas' 1988 sketch section of the upper cliff face showing post-Roman occupation terraces (Red and Pink) underlying medieval fills (Green) at the southern end of the Inner Ward. These exposures were subsequently meshed and rock-bolted. Source: Thomas 1993.

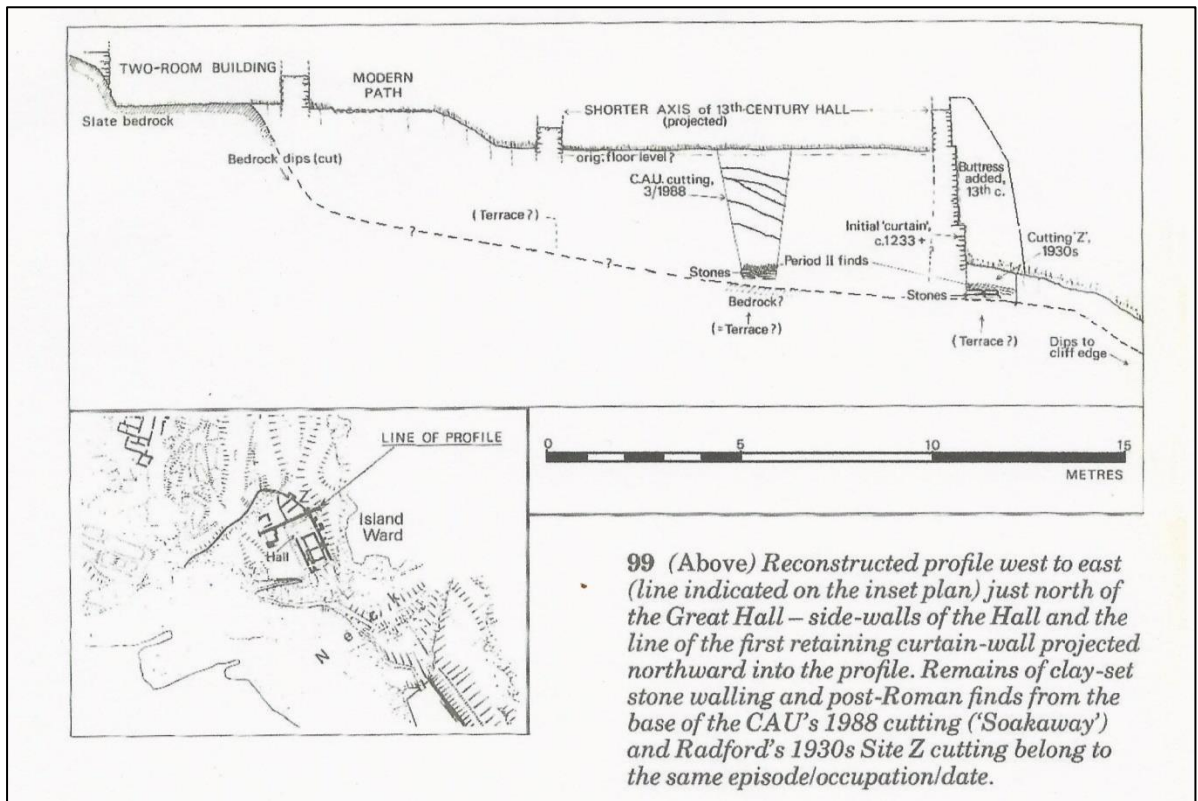


Fig 7. Thomas' hypothesised west to east section across the northern end of the Inner Ward. Source: Thomas 1993.

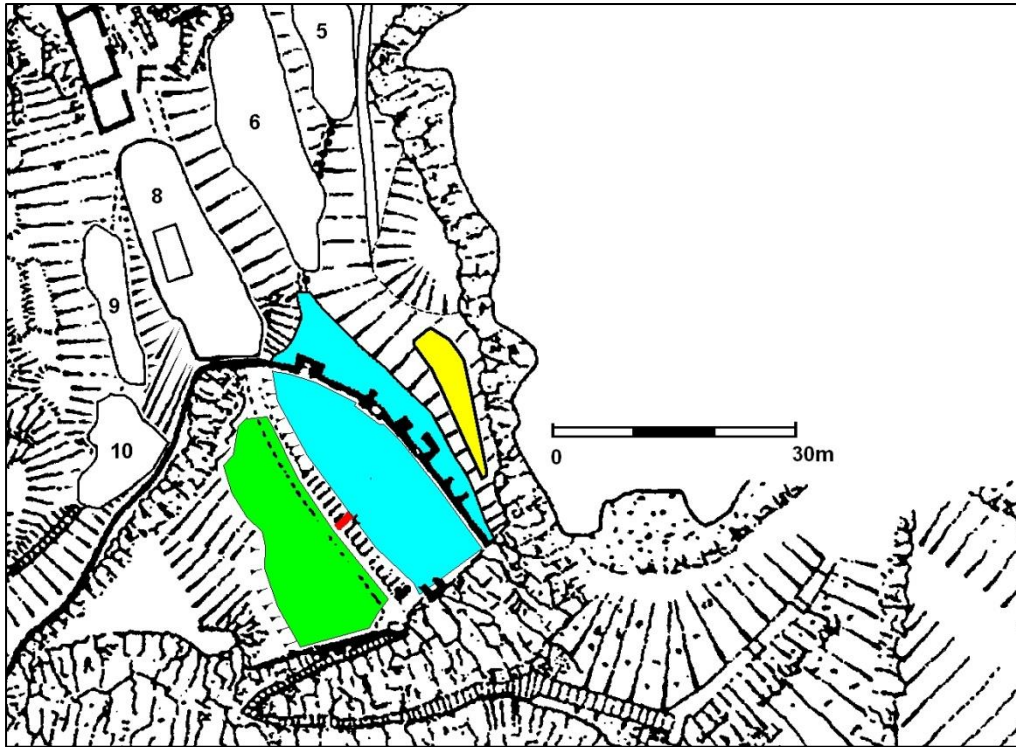


Fig 8. The locations of the three post-Roman terraces considered by Thomas and Thorpe as being likely from archaeological evidence to underlie the southern end of the Inner Ward. Source: Thomas 1993 and Thorpe 2013.



Fig 9. A 2013 Ramboll visualisation of one of the proposed designs for the bridge spanning the gap between the Lower and Inner Wards at Tintagel.

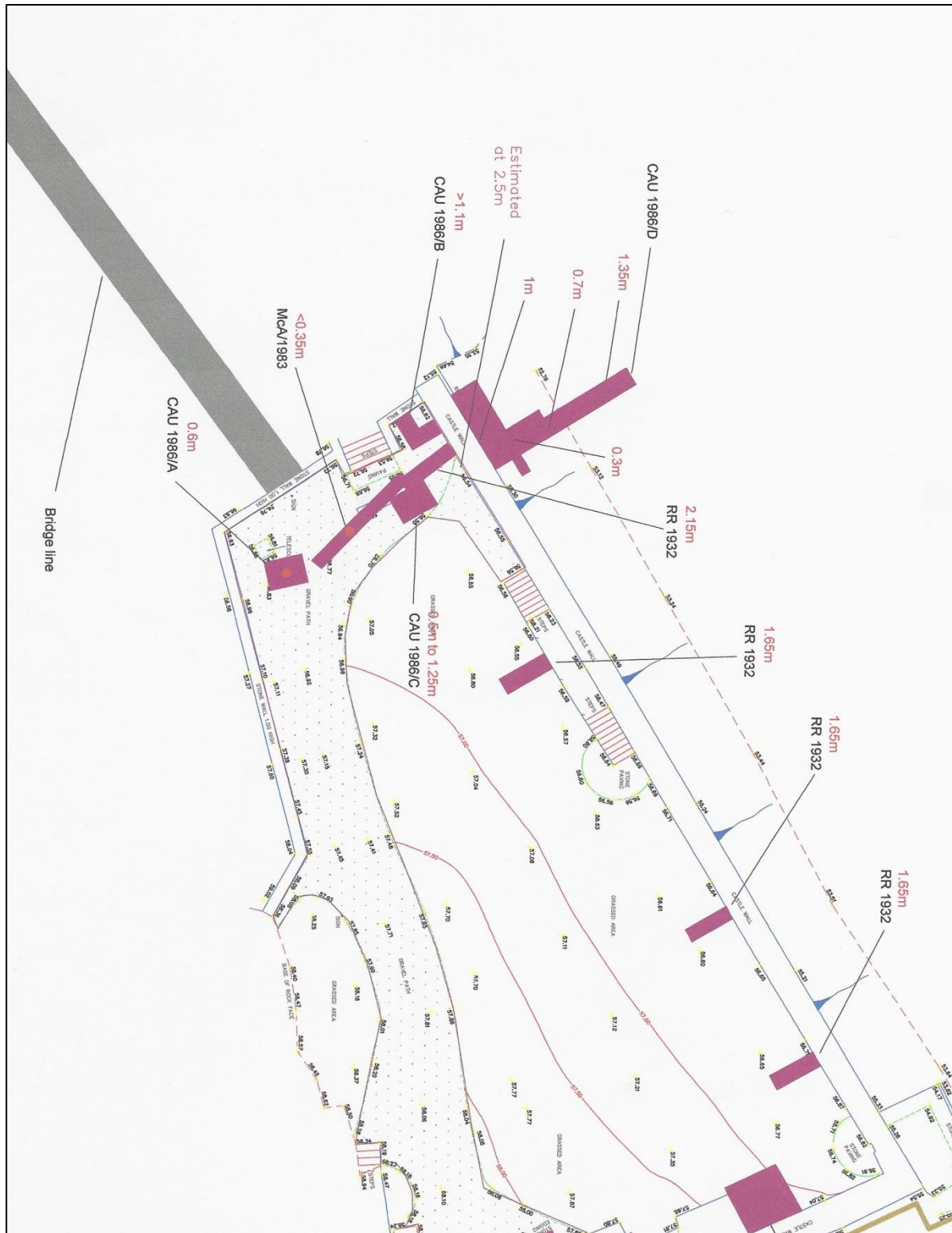


Fig 10. The locations of previous archaeological evaluation trenching (Purple) in the northern part of the Lower Ward together with dates and excavator information; additionally the approximate extent of the proposed bridge abutment and the locations proposed for the deep boreholes (red dots). Depths to bedrock are shown in red.

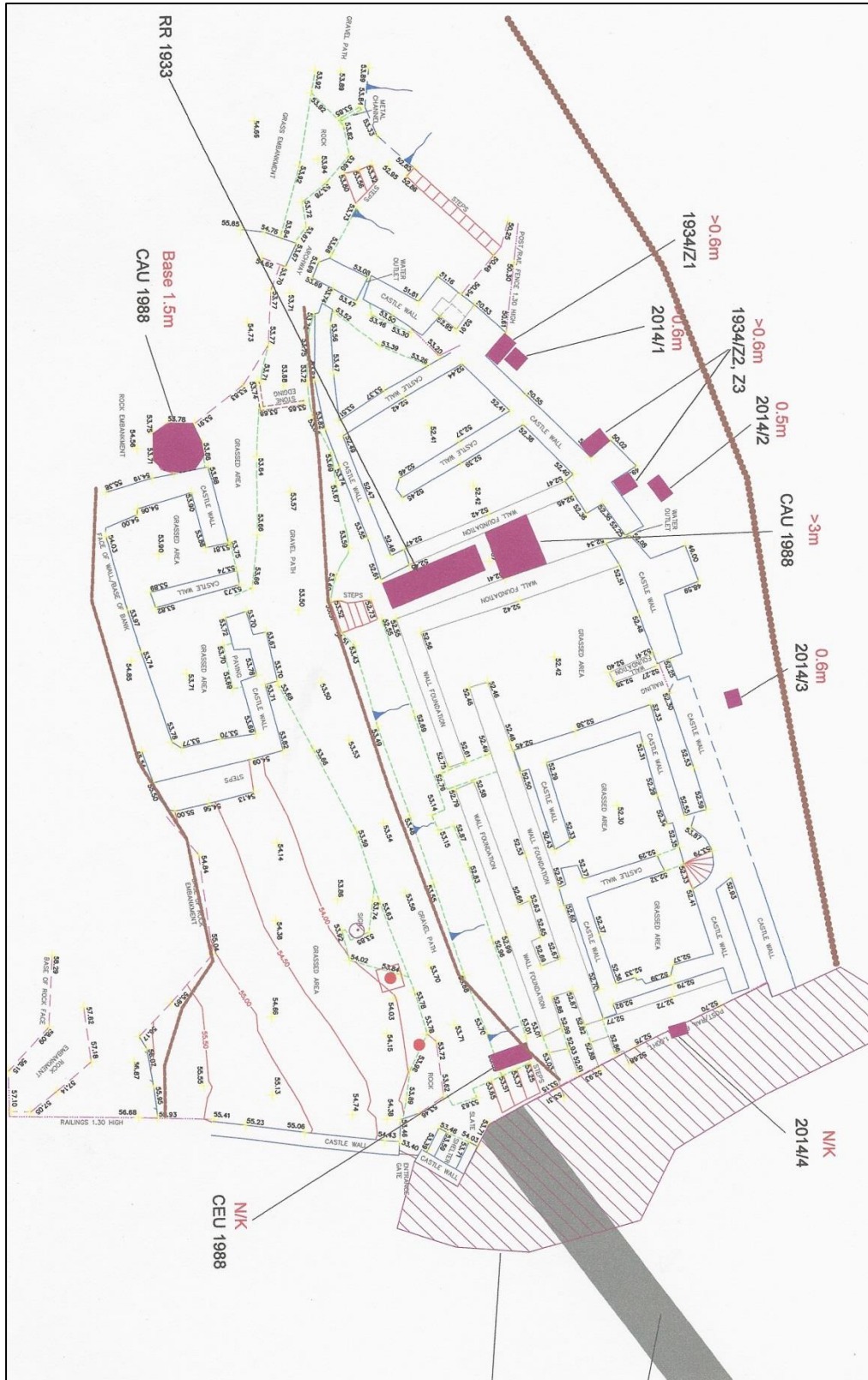


Fig 11. The locations of previous archaeological evaluation trenching (Purple) in the southern part of the Inner Ward together with dates and excavator information; additionally the approximate extent of the proposed bridge abutment and the locations proposed for the deep boreholes (red dots) and evaluative test pit (red square). Depths to bedrock are shown in red.

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