ARCHAEOLEG CAMBRIA ARCHAEOLOGY
DYFED ARCHAEOLOGICAL TRUST

MANORBIER TO TENBY LINK SEWER - ARCHAEOLOGICAL WATCHING BRIEF

MANORBEER CASTLE.

Project Number 33715

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Prepared for Dwr Cymru / Welsh Water
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ARCHAEOLOGICAL WATCHING BRIEF
MANORBIER TO TENBY LINK SEWER, PEMBROKESHIRE

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I. SUMMARY

An archaeological watching brief was conducted during the excavation of four sections of the Manorbier-Tenby link sewer pipeline trench. Archaeological features of varying significance were discovered during the excavation of the trench, ranging from local to regional significance. Several former ditches, drains, and flint waste flakes were identified as being of local significance. A hedgerow, possibly associated with an existing Anglo-Norman field system was identified as being of regional significance, and two monolithic millstones, possibly of early medieval origin, were also identified as being of regional significance.

II. ACKNOWLEDGEMENTS

The initial desk-based archaeological assessment for this project was conducted by K. Murphy and P. Sambrook. The fieldwork was conducted by M.Trethowan and N. Ludlow. This report was prepared by M.Trethowan, Project Officer, Archaeoleg CAMBRIA Archaeology Field Operations.

1.0 INTRODUCTION

In 1993 Dwr Cymru / Welsh Water, presented the field operations section of Archaeoleg CAMBRIA Archaeology with details of the proposed route for the new link sewer scheme from Manorbier to Tenby. Field Operations reviewed the plans and produced a report highlighting the sites of known archaeological interest in the vicinity of the pipeline route, and suggesting four sections of the route along which an archaeological watching brief should be conducted. These proposals were implemented and an archaeological watching brief was conducted along the four sections shown in Figure 1. The results from each section are shown below.

1.1 Content and scope of the watching brief

An archaeological watching brief is defined by the Institute of Field Archaeologists as a formal programme of observation and investigation conducted during an operation carried out for non-archaeological reasons - normally a development or other construction project - within a specified area where archaeological deposits may be disturbed or destroyed. The programme will result in the preparation of a report.

The watching brief will be intended to allow, subject to resources, the preparation by record of archaeological deposits in advance of their disturbance or destruction and to provide an opportunity, if necessary, for the watching archaeologist to alert all interested parties to the presence of an archaeological find for which the resources allocated to the watching brief are insufficient to support satisfactory treatment.

The watching brief is not intended as a substitute for contingent excavation.

The client will be supplied with 3 copies of the archaeological report of the results of the watching brief. The report will be fully representative of all the information recovered. A copy of the report will also be deposited with the Dyfed Sites and Monuments Record, housed the Dyfed Archaeological Trust.

1.2 Purpose and methodologies of the watching brief

The purpose of the watching brief is to undertake as complete a record as possible of any archaeological feature affected by the client's scheme of works. In the case of larger archaeological sites it will seldom be possible or necessary to undertake a record of the entire site ; the record will be undertaken only on those areas of the site that may be affected. The work will be closely observed by an archaeologist from the Field Operations section who will undertake a full drawn, written and photograph record of any archaeological features which may be disturbed by the scheme, and any artefact or find exposed during the works. Recording will be carried out where necessary and when convenient : it is the Field Operations section's aim to minimise any disruption to the client's schedule. However, if any archaeological features may be lost due to the scheme, it may be necessary for the archaeologist to request a postponement of the works in order that the archaeology may be recovered. larger areas affected may require fuller excavation and / or survey.

2.0 RESULTS OF THE ARCHAEOLOGICAL WATCHING BRIEF

2.1 Watching Brief Section One - Results

Geology and Soil Types :

The geology of this area is comprised of the following groups ;
Alluvium (drift)
Lower Devonian Old Red Sandstone - Ridgeway Conglomerates
- Red Marls
Upper Devonian Old Red Sandstone - Skinkle Sandstones
Carboniferous Lower Avonian Limestone Shales - Cleistopora Zone
- Zaphrentis Zone

The main soil types in this area are Typical Brown Earths (Milford and East Keswick 3).

Archaeological Features Identified :

As Figure 2 indicates, several areas of archaeological interest were located along Section One of the pipeline route. Each location shall be discussed individually below.

Location A - NGR - SS06319785

Context No.	Depth	Description
001	0.00m - 0.15m	Topsoil
002	0.15m - 0.30m	Dark greyish brown, friable silty clay soil. Frequent small and medium angular stone inclusions.
003	0.30m - 0.56m	Mid reddish brown friable silty clay soil, with frequent small and medium angular and sub-angular stone inclusions.
004	0.56m - 0.62m	Dark brown silty soil with occasional small and medium stone inclusions.
005	0.62m - 1.00m	Mid yellow fine sand.

Context 003 contained two intact monolithic millstones (see dimensions below). There were also several large limestone shale boulders contained within this context at this location, although they did not appear to have been worked in any way, and did not seem to be associated with the two millstones.

Millstone 1 - Plate 1
Fabric : Millstone Grit
Diameter : 0.5m
Width : 0.08m
Diameter of Eye : 0.08m
Length of Rynd : 0.33m
Depth of Rynd : 0.02m

Millstone 2 - Plate 2
Fabric : Lower Devonian Old Red Sandstone / Quartz Conglomerate
Diameter : 0.50m
Width : 0.08m
Diameter of Eye : 0.06m
Length of Rynd : 0.26m
Depth of Rynd : 0.01m

Investigations into the possible date, origin, and use of the millstones have involved several members of the Welsh Mill Group.

It seems likely that the stone used to make the millstones was quarried locally as both Old Red Sandstone and Millstone Grit can be found in the vicinity of Manorbier.

Attempting to establish the use of the stones relies heavily on assessing the size and format of each millstone. Initial investigation revealed that both stones are monolithic, upper, or 'runner' stones, i.e. the top rotating stone in a pair of millstones. Both stones are relatively small in size (0.5m diameter) which would generally suggest an animal mill or a large handmill. However, neither of the stones show any sign of a socket to incorporate a handle on the back, thus discounting the handmill option.

It is possible that stones of this size could have been used in a watermill with very little power. This would have been the case at the post-medieval watermill (PRN 15930 NGR-SS06269775) located below the castle and approximately 100metres from Location A. The building is now in ruins, although a survey conducted by Anthony Parkinson, RCAHM(W), has established that this was a two storey water-powered corn-mill, with an internal overshot waterwheel fed from a launder through the North wall. Parkinson also states that fragments of one 'granite' millstone were discovered at the milling area, and he felt there would have been two pairs of small stone used here rather in one pair of large stones. Correspondence with Mr. Owen Ward of the Welsh Mill Group, clarified that Parkinson's use of the term 'granite' to describe the fabric of the millstone fragments, more specifically meant ORS/quartz conglomerate. It is therefore possible that the two millstones recovered were used in this post medieval corn-mill.

There was however, an earlier mill referred to by the 12th Century cleric and chronicler, Geraldus Cambrensis, which was thought to occupy the same site. It is equally possible therefore that the recovered millstones are associated with this earlier mill.

As shown above, it is possible to predict the origin and use of the millstones with a degree of certainty. This is not the case however when assessing the date of the millstones. As Mr Owen Ward stated, "it is difficult to tell when a piece of rock stops being a piece of rock and becomes a millstone." It is necessary to rely on certain characteristics, which the millstones may or may not exhibit, to estimate their age.

The material used to construct the millstones has been used from Roman times to the late 19th or early 20th Century, and therefore cannot provide a specific date of manufacture. However, there are several characteristics of these millstones which suggest a simple, and possibly ancient origin. For example, the extent to which they are 'dished' seems exaggerated, also the use of a two-armed rynd, and the absence of furrows or other sophisticated dressing. It is possible that due to the extensive wear which the millstones exhibit, that any form of dressing has worn away, although it is unlikely there would be no trace of worn-out furrowing on either of the stones.

In conclusion therefore, the two millstones appear to have been quarried locally, and used at the present day location of the water-powered corn mill (PRN 15930). It is not clear however, whether they were used in the post medieval water-mill which currently occupies the site, or the early medieval mill described by Geraldus Cambrensis in the 12th Century. The simple nature of the characteristics present on the two millstones however, suggest an earlier rather than late date.

Location B - NGR - SS06339790

As illustrated on Figure 2, Location B is situated approximately 10m before the first bend of the pipeline. The trench section revealed a ditch (Figure 3) which is possibly associated with the medieval fishponds east of this location. The ditch [006] appeared to be cut into the natural sand (005) and was located below the mid reddish brown friable silty soil layer (003). The ditch was 3.5 metres wide and 0.7metres deep at its deepest point.

The fill of the ditch (007) consisted of a dark greyish brown clayey silt with occasional, small and medium, angular stone inclusions and frequent charcoal inclusions. A band of clayey silt with a higher percentage of charcoal was present within the fill, as indicated in Figure 3. There was no evidence within the fill of any preserved wood, leather, or other organic materials.

The precise association between this ditch and the fishponds to the east, cannot be established without further excavation in this area.

Context No.	Depth	Description
001	0.00m - 0.15m	Topsoil
003	0.15m - 0.39m	Mid reddish brown friable silty clay sub-soil with frequent small and medium, angular and sub-angular, inclusions.
005	0.39m - 1.40m	Mid yellow fine sand
006		Ditch cut
007	0.39m -1.09m	Ditch fill. Dark greyish brown clayey silt with occasional small and medium angular stone inclusions and frequent charcoal inclusions.

Location C - NGR - SS06369802

As Figure 4 indicates, there was a possible ditch situated at this location. The ditch measures 3.20 metres at its widest, and decreases to 0.9m at the base of the trench. The section of the ditch revealed by the pipeline trench was 0.6 metres deep, although it appeared to continue to a depth greater than the base of the trench. The ditch appeared to be cut into a layer of mid reddish brown sandy clay (012), and lay beneath the sub-soil layer 003. The ditch cut [014] had a single fill (015) which consisted of a mid greyish brown silty sandy soil containing occasional charcoal flecks and medium angular stone inclusions.

Aerial photographs indicate the former existence of rectilinear earthwork banks within an elliptical enclosure (PRN 14829) to the west of this location. It is therefore possible that the ditch was in some way associated with those features which are thought to be of medieval origin, although further excavation would be necessary to clarify the nature of the association.

Context No.	Depth	Description
001	0.00m - 0.15m	Topsoil
003	0.15m - 0.43m	Mid reddish brown friable silty clay sub-soil, with frequent small and medium angular and sub-angular stone inclusions.
014	0.43m - 1.00m	Ditch Cut
015	0.43m - 1.00m	Ditch Fill - mid greyish brown friable silty sandy soil with occasional charcoal flecks, and occasional medium angular stone inclusions.
012	0.43m - 1.00m	Mid reddish brown compact clay with frequent medium angular inclusions.

Location D - NGR - SS06359804

Figure 5 illustrates a possible field drain bisected by the pipeline trench at location D (see figure 1). It was cut into the mid reddish brown silty clay subsoil (003), directly beneath the topsoil (001). The ditch cut [018] was 'U'-shaped and was 1.65m wide at the top, and 0.4m wide at the base. There were two fills within the ditch (019) and (020). The primary fill (019) consisted of a friable mid greyish brown silty clay with a high charcoal content (soil sample 01). The secondary fill (020) was the same colour, compaction and composition as (019) although it had a lower charcoal content. Also contained within the secondary fill were several shale slabs, approximately 0.30 metres high, by 0.04 metres wide, by unknown length. Presumably these were originally used to construct the drain. Beneath the sub-soil (003) there was a layer of compacted plastic mid greenish grey clay (021), separated from 003 by an interface layer comprised of the two contexts.

As this feature was cut into the sub-soil layer 003, it is presumably of post-medieval origin, although C14 dating of the charcoal within soil sample 01 (primary fill 019) would produce a more precise date.

Location E - NGR - SS06309807

The pipeline trench sectioned a stream channel as the route began to run NE between the lime kiln (PRN 16506 NGR-SS063981) and the site of a Mesolithic flint assemblage (PRN10010 NGR-SS06219811). The stream channel is still in use today, and the section revealed two separate episodes of clayey still deposition within the channel.

The channel was cut [027] into the mid reddish-brown friable silty clay subsoil (003) and the mid orangey grey clay which lay beneath (026), and was 0.55m deep by 1m wide. The primary deposit was a waterlogged light greenish grey silty clay (028), and the secondary deposit was a waterlogged dark greenish grey silty clay (029).

No artefacts or other datable material was discovered within either of the deposits although it is presumably of 19th or 20th Century origin.

Location F - NGR - SS06309808

The pipeline trench revealed a possible ditch, illustrated in Figure 6, within the enclosure shown in Figure 1. The ditch [031]appeared to be cut into a layer of light orangey grey compact clay with frequent small, medium, and large angular shale inclusions (033). The ditch cut and fill (032) lay beneath a layer of mid greyish green plastic silty clay (030) and mid reddish brown friable silty clay sub-soil (003). The fill of the ditch (032) consisted of a mid orangey brown plastic silty clay with frequent small and medium manganese inclusions. The ditch cut was 'U'-shaped and measured 1.4 metres at its widest point and 0.37 metres at its deepest.

Context No.	Depth	Description
001	0.00m - 0.15m	Topsoil
003	0.15m - 0.39m	Mid reddish brown friable silty clay sub-soil with frequent small and medium, angular and sub-angular stone inclusions.
030	0.39m - 0.49m	Mid greyish green plastic silty clay with occasional small and medium angular stone inclusions.
031		Ditch cut
032	0.49m - 0.86m	Ditch fill. Mid orangey brown plastic silty clay with frequent small and medium manganese inclusions.
033	0.49m - 1.20m	Light orangey grey compact clay with frequent small, medium and large angular shale inclusions.

The precise nature and date of this possible ditch cannot be established without further excavation at this location. No dateable material was recovered from the ditch fill.

Findspot 1 - NGR - SS06309808

During the excavation of the pipeline trench at Findspot 1 (see Figure 2) a flint flake was discovered. It is thought to have come from context 030, a greyish green plastic silty clay layer. This find is of particular interest as flint is not native to this area, and a Mesolithic flint assemblage (PRN 10010) consisting of a core, blade, scraper, microlith, and flake, had previously been discovered in the vicinity (NGR - SS06398).

The flake discovered is 1.5cm wide at the base, and 0.5cm wide at the top. It is 2.0cm long and 0.5cm wide. It does not show any signs of being worked.

Findspot 2 - NGR - SS06339810

Several post-medieval pottery sherds were discovered within the topsoil (001) and subsoil (003)in the vicinity of the lime kiln (PRN 16506 NGR - SS06219811). This area appeared to have been until relatively recently used as a dump for these and other items such as bottles, slabs of concrete, old shoes and wellington boots.

2.2 Watching Brief Section Two - Results

Section Two of the watching brief involved recording hedgerows which had been cut by the preparation of the pipeline route, along the section marked on Figure 1.

Four hedgerows were affected along this section of the pipeline route, as indicated in Figure 7, each of which is discussed below.

Hedgerow 01 - NGR- SS06959898

As shown in Figure 8, this appears to be a relatively recently establish hedgerow. The topsoil either side could be seen to continue beneath the hedgerow (003). This context also included a length of barbed wire, suggesting the hedgerow was not associated with the post-medieval field system (PRN 6298) which has been selected as defining one of Dyfed's Historic Landscapes.

Context No.	Description
001	Topsoil. Mid greyey brown, friable silty clay loam with a high organic content.
002	Upcast Sub-soil. Mid orangey brown friable silty clay loam with occasional small and medium, angular and sub-angular, stone inclusions. Evidence of root disturbance.
003	Mid greyish brown firm silty clay loam. Contained moderate blades of grass and a length of barbed wire. Similar to 001 although 003 had a lower organic content and a slightly higher percentage of clay.
004	Mid orangey brown compact friable silty clay loam sub-soil with occasional small and medium, angular and sub-angular, stone inclusions. Same as 002 although more compact and no evidence of root disturbance.

Hedgerow 02 - NGR - SS07039903

As shown in Figure 9, hedgerow 02 was comprised largely of upcast subsoil and was affected severely by root disturbance.

Context No.	Description
001	Topsoil. Mid greyish brown, friable silty clay loam with a high organic content. Moderate medium and large angular inclusions.
002	Upcast sub-soil. Mid orangey brown friable silty clay loam with occasional small, medium and large, angular and sub-angular, stone inclusions. Evidence of severe root disturbance.
004	Mid orangey brown compact silty clay loam sub-soil with occasional small and medium, angular and sub-angular, stone inclusions. Same as 002 although 004 is more compact and has less evidence of root disturbance.

Hedgerow 03 - NGR - SS07199908

Hedgerow 03 appeared to have been constructed in a similar manner to hedgerow 02, comprising of topsoil (001), upcast sub-soil (002), and sub-soil (004). However, the sub-soil in hedgerow 03 was very compacted and appeared to form a bank shape (see Figure 10). It is therefore a possibility that context 004 may have been upcast which was used to construct an earlier earth bank which had become compacted when the larger hedgerow was constructed.

Context no.	Description
001	Topsoil. Mid greyish brown, friable silty clay loam with a high organic content. Moderate small and medium angular inclusions.
002	Upcast sub-soil. Mid orangey brown friable silty clay loam with occasional medium and large angular and sub angular, stone inclusions. Evidence of root and animal disturbance.
004	Very compact mid orangey brown silty clay loam subsoil, with occasional small and medium, angular and sub-angular, stone inclusions.

Hedgerow 4 - NGR - SS07569918

Hedgerow 4 was the largest of the four hedgerows to be affected by the pipeline route. It measured 1.10 metres at its highest point and was 5.90 metres wide. As with the other hedgerows recorded, it consisted of topsoil (001), upcast sub-soil (002), and sub-soil (004).

Context No.	Description
001	Topsoil.
002	Upcast sub-soil. Mid orangey brown friable silty clay loam with occasional medium and large, angular and sub-angular, stone inclusions. Evidence of root action.
004	Mid orangey brown compact silty clay loam sub-soil, with occasional small and medium, angular and sub-angular, stone inclusions.

2.3 Watching Brief Section Three - Results

Due to the proximity of site PRN 4227, to the NE of the pipeline route, where several mesolithic flint flakes had been found in the early 20th Century, it was recommended that a walkover survey should be conducted at this location (see Figure 1) after the initial top-soil removal.

The walkover survey identified three main finspots (see Figure 11) each of which shall be discussed in turn below.

Findspot 3 - NGR - SS10419899
Several flint waste flakes, some of which appear to have been burnt, where found at this location. No worked material was recovered.

Findspot 4 - NGR - SS10369908
Several flint waste flakes where found at this location, as well as part of a flint core which had had several flakes struck off it. A post-medieval pottery sherd was also recovered.

Findspot 5 - NGR - SS10339910
A flint core, which appears to have had several flakes struck off it, was found at this location (dimensions : 5cm by 4cm by 2.5cm).

The flints found at the above locations can be identified as of prehistoric origin, although further detailed analysis would be necessary to confirm whether they are of mesolithic date as were those found at PRN 4227.

2.4 Watching Brief Section Four - Results

As illustrated in Figure 1 , Section Four of the watching brief extended along the roadside verge of the A4139, from the B.P. petrol station as far as Holloway Bridge. The watching brief was recommended in this area due to the possibility of discovering preserved barge hulks, organic objects, and drainage embankments, as the area of Holloway Marsh has relatively recently been won from the sea. It was also necessary to avoid damage to the remains of several lime kilns in the area.

The geology of the area consists of alluvium drift geology and Upper Avonian carboniferous limestone solid geology.

In the vicinity of the B.P. petrol station, below the forecourt and road make-up, the excavation of the pipeline trench revealed a mid reddish brown friable silty sandy loam sub-soil (approximately 0.25 metres deep) above a solid plastic layer of orangey brown clay, with frequent small and medium, angular and sub-angular stone inclusions.

The pipeline trench became increasingly waterlogged as its route descended towards the stream, and there was an increased occurrence of fine yellowy brown sand , and a decrease in the occurrence of clay.

The pipeline trench crossed the stream, up the SW facing bank, and continued in a NE direction for approximately 10metres. At this point, i.e. the end of the specified watching brief, the trench was approximately 3 metres deep and consisted of the following deposits ;

0.00m - 0.35m	Make-up layer for road
0.35m - 1.50m	Mid reddish brown silty sandy loam with moderate small and medium angular and sub-angular stone inclusions
1.50m - 1.75m	Dumped material, e.g. glass bottles and burnt material (early 20th Century).
1.75m - 2.95m	Fine mid yellowy brown sand.

3.0 CONCLUSIONS OF ARCHAEOLOGICAL WATCHING BRIEF

3.1 Watching Brief Section One - Conclusions

Section One of the watching brief revealed six locations of archaeological interest (Loc. A to F - Figure 2), and two separate findspots (1 & 2). The locations of archaeological interest consisted of several ditches which had become silted-up, a former field drain, and a stream channel. The most significant find occurred at Location A where two monolithic millstones were recovered. The two millstones appear to have been quarried locally, and used at the present day location of the water-powered corn-mill (PRN 15930). It is not clear however, whether they were used in the post-medieval water-mill which currently occupies the site, or the early medieval mill described by Giraldus Cambrensis in the 12th Century. The simple nature of the characteristics present on the two millstones suggest an early rather than late date.

A flint flake was discovered at Findspot 1 (Figure 2) during Section One of the watching brief. It appears to be of pre-historic origin, and although it shows no signs of being worked, it is possibly a waste flake associated with the Mesolithic flint assemblage (PRN 10010) discovered at NGR - SS063981.

3.2 Watching Brief Section Two - Conclusions

The recording of the hedgerows cut by the construction of the pipeline produced some interesting results. In one of the four hedgerows recorded (No. 3), a smaller, compact, bank-shaped feature was visible at the base of the present day hedgerow. It is possible therefore, that this was part of the Anglo-Norman open field system identified by Evans (1973). This field system which extensively lies to the South of those hedgerows recorded, exists throughout the parish of Manorbier, and is one of Dyfed's Historic Landscapes (PRN 6298).

None of the other three hedgerows recorded, however, showed similar characteristics which may have associated them with the Anglo-Norman field system. Hedgerow 1 (Figure 8) was constructed of loose upcast sub-soil (002) beneath a layer of topsoil. However, the original topsoil layer (003) was also visible beneath the hedgerow, and the section revealed a length of barbed wire contained within this context. This suggests that the hedgerow was constructed relatively recently and was not part of the Anglo-Norman field system.
Hedgerows 2 & 4 were constructed in the same manner as Hedgerow 1, therefore suggesting that these were also of relatively recent origin. Despite suffering root disturbance, they showed no signs of being associated with the Anglo-Norman field system.

No dateable material was recovered from any of hedgerows recorded.

3.3 Watching Brief Section Three - Conclusions

Several prehistoric flints were recovered from three findspots within this section of the watching brief (Figure 11). The flint assemblage was comprised largely of waste flakes and two cores. No worked flint was recovered during the fieldwalking. Further analysis would be required to establish whether these are of Mesolithic origin.

3.4 Watching Brief Section Four - Conclusions

The watching brief in this section did not reveal anything of archaeological significance.

4.0 APPENDIX

APPENDIX ONE : CATALOGUE OF WATCHING BRIEF ARCHIVE

The project archive has been indexed and catalogued according to National Monument Record (NMR) categories and contains the following :

A. Copy of final report.

B. Site records, including context record sheets and site notebook.

C. Drawings - non publication.

D. Photographs - black and white negatives and contact prints, and colour slides.

E. Finds data.

G. List of references including primary and secondary sources.

I. Archive report and draft copies of final report.

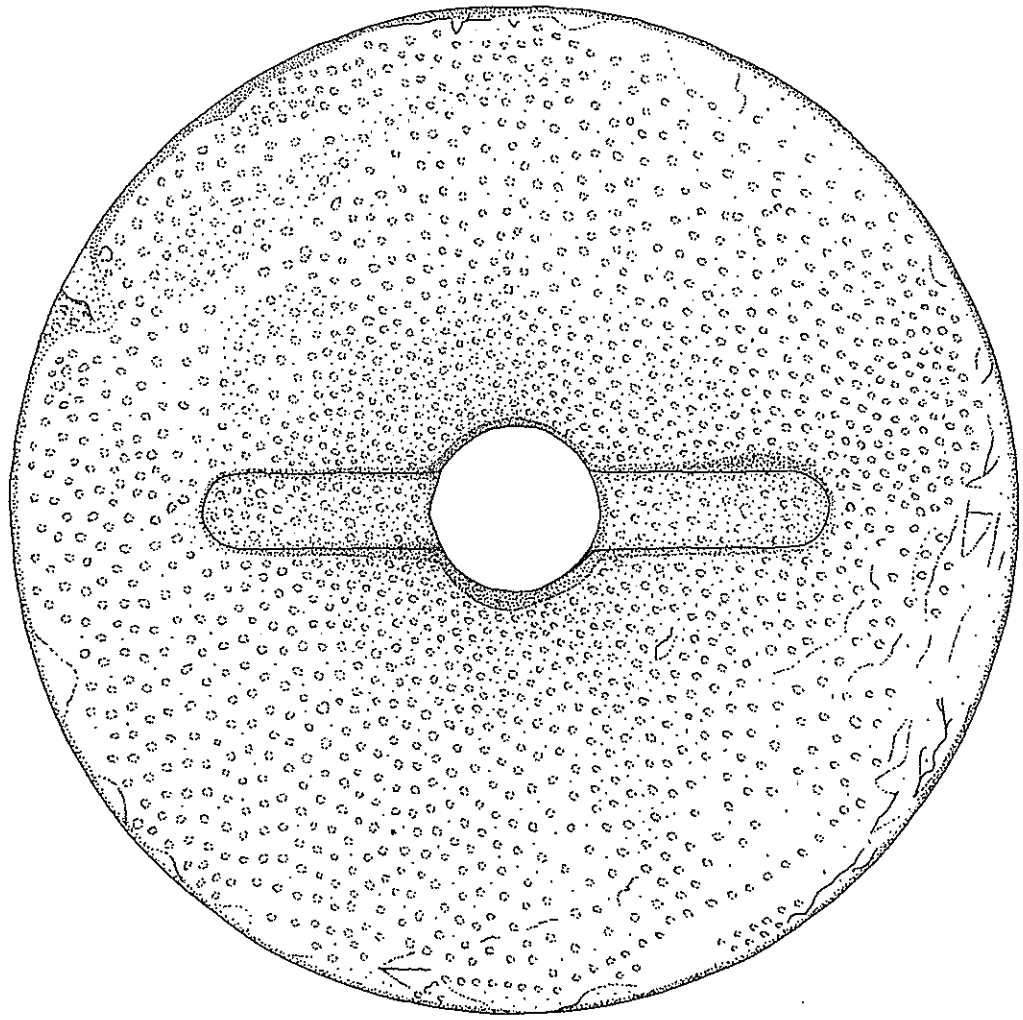
J. Publication drawings.

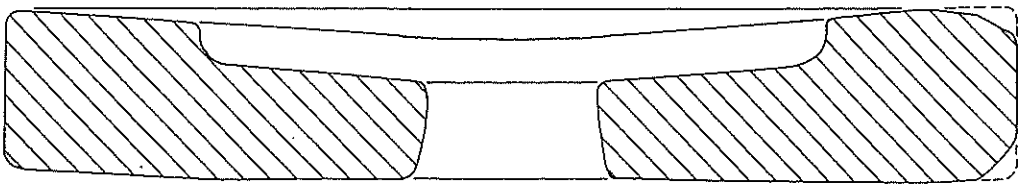
M. Miscellaneous correspondence.

The archive is currently held by Archaeoleg CAMBRIA Archaeology Field Operations, Llandeilo, Dyfed, as project number 33715.

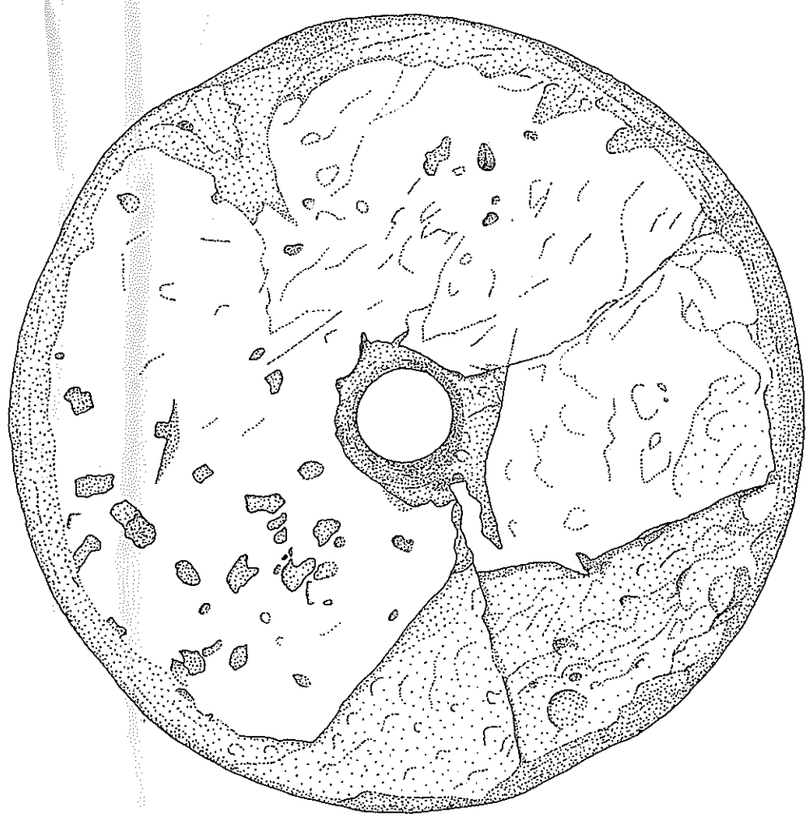
Plate 1

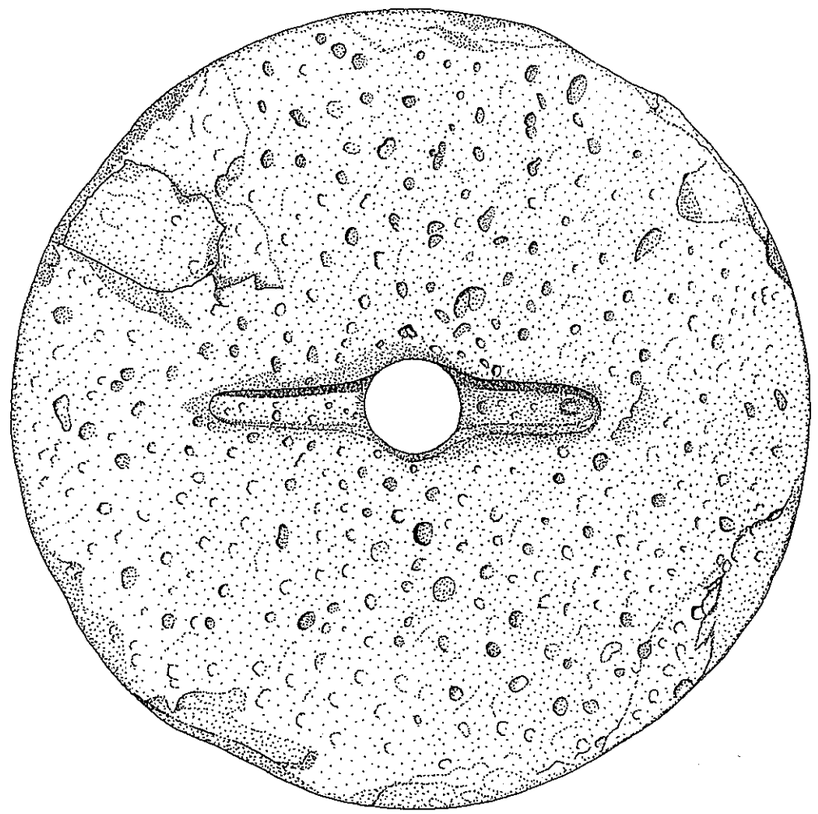
Millstone No. 1
75% Reduction

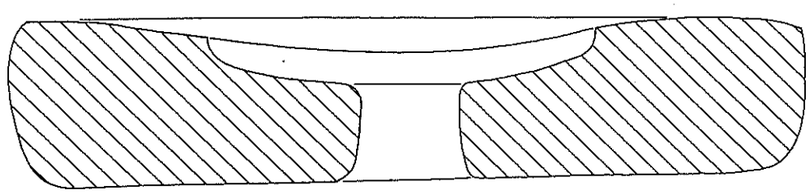




Fabric : Millstone Grit
Diameter : 0.5m
Width : 0.08m
Diameter of Eye : 0.08m
Length of Rynd : 0.33m
Depth of Rynd : 0.02m







Fabric : Lower Devonian Old Red Sandstone
Diameter : 0.50m
Width : 0.08m
Diameter of Eye : 0.06m
Length of Rynd : 0.26m
Depth of Rynd : 0.01m

FIGURE 1

MANORBIER - TENBY LINK SEWER

FOUR SECTIONS RECOMMENDED FOR ARCHAEOLOGICAL WATCHING BRIEF

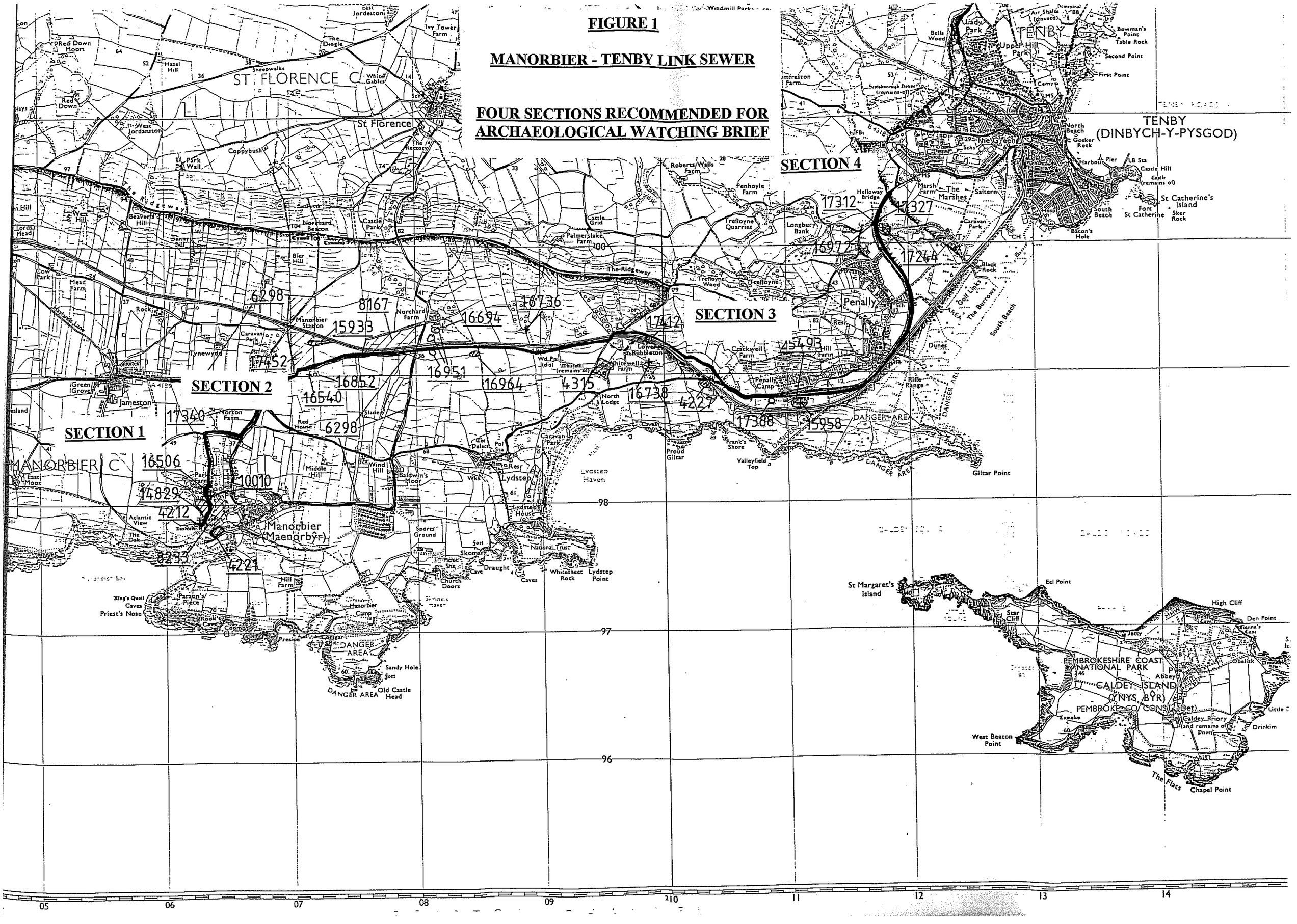
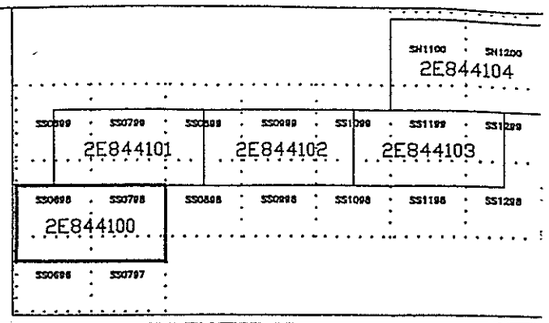


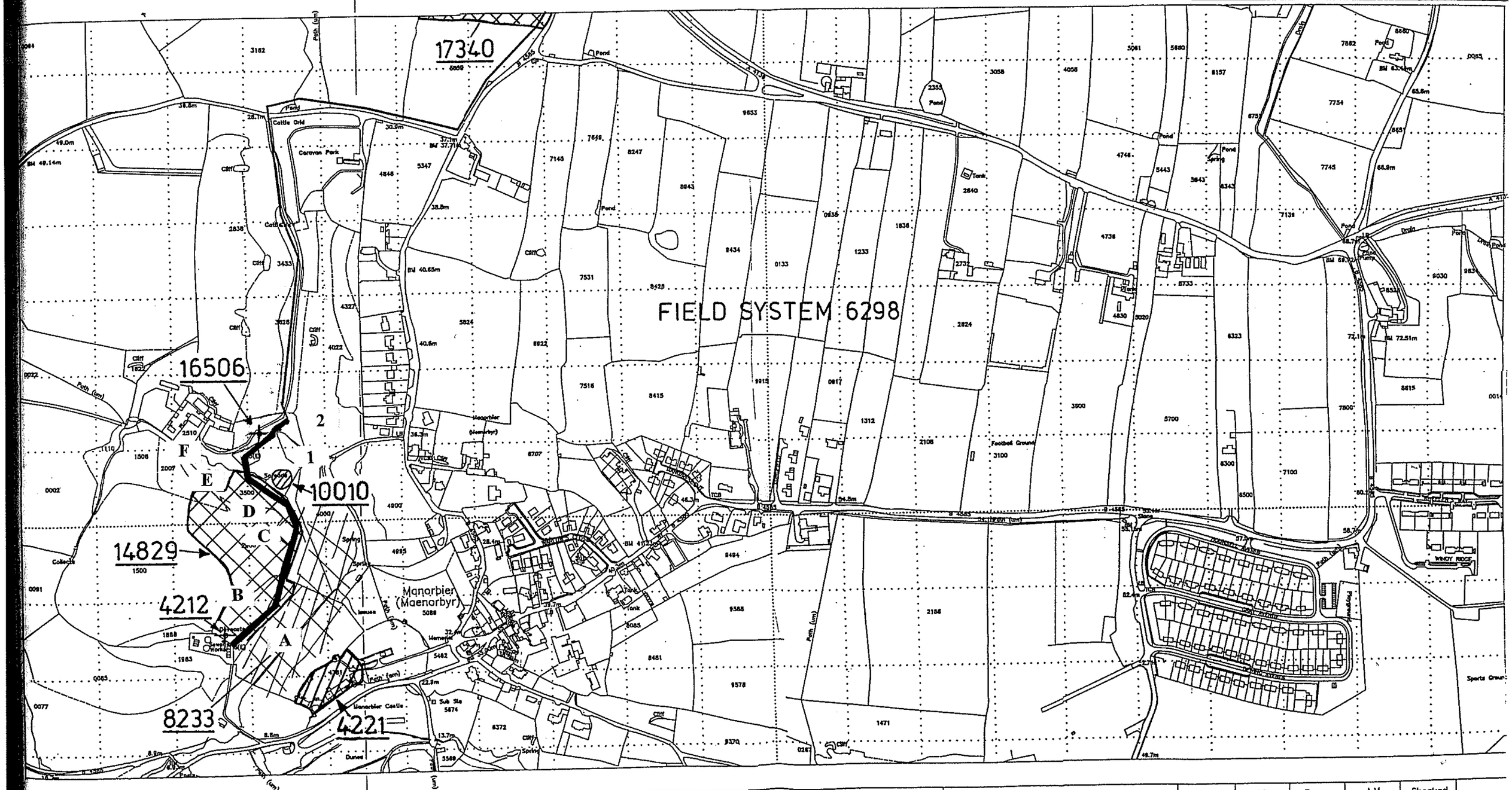
FIGURE 2

MANORBIER - TENBY LINK SEWER
ARCHAEOLOGICAL WATCHING BRIEF

IDENTIFIED LOCATIONS OF ARCHAEOLOGICAL INTEREST

KEY
Locations = letters
Findspots = numbers





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SOUTH WESTERN DIVISION
FFYNNON HENTER
PHOENIX WAY
SWANSEA ENTERPRISE PARK
SWANSEA . SA7 9HW

Scheme: MANORBIER TO TENBY LINK SEWER.

Title: RISING MAIN ROUTE PLAN. SHEET No.1

Scale	1:2500	Drawn	A.M.	Checked	
Initiated	P.O.W.	Date	OCT.93	Approved	
Drawing No.	2E844/100		Rev.		

Figure 3

Sketch section of ditch at Location B, after topsoil strip.
Scale 1:20

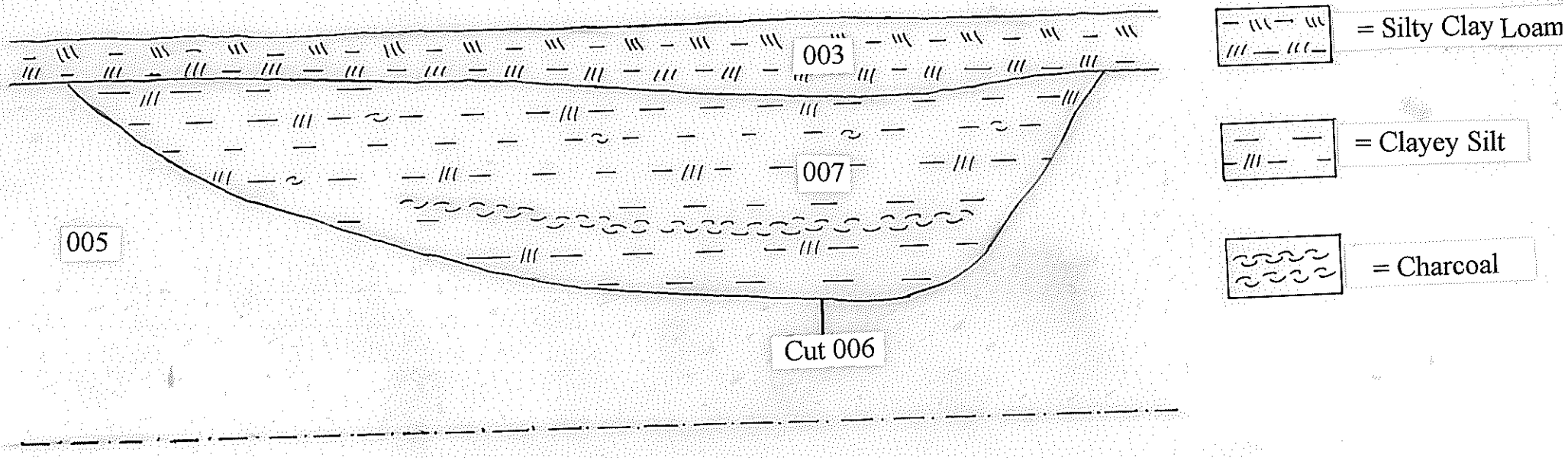
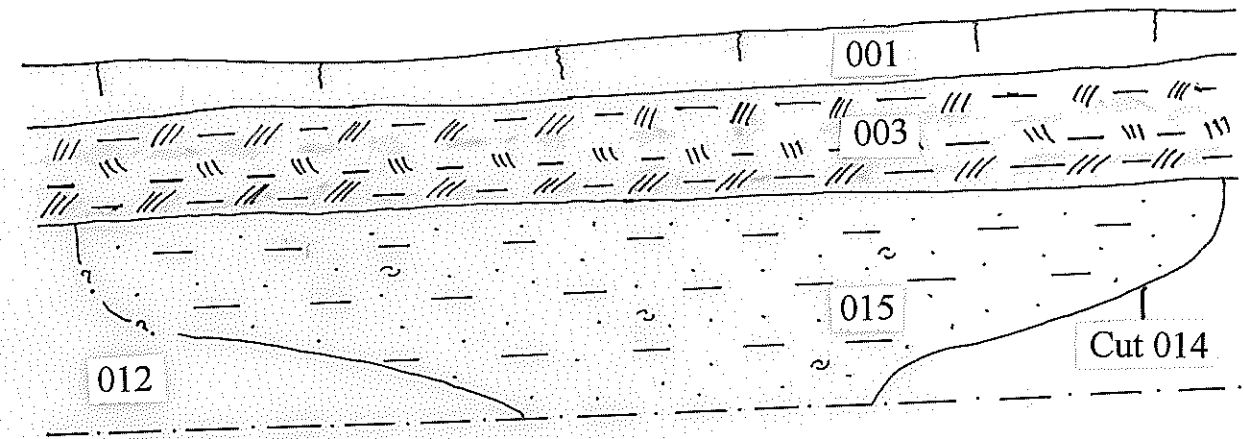


Figure 4

Sketch section of ditch at Location C.

Scale 1:20



= Topsoil

= Silty Sandy Loam

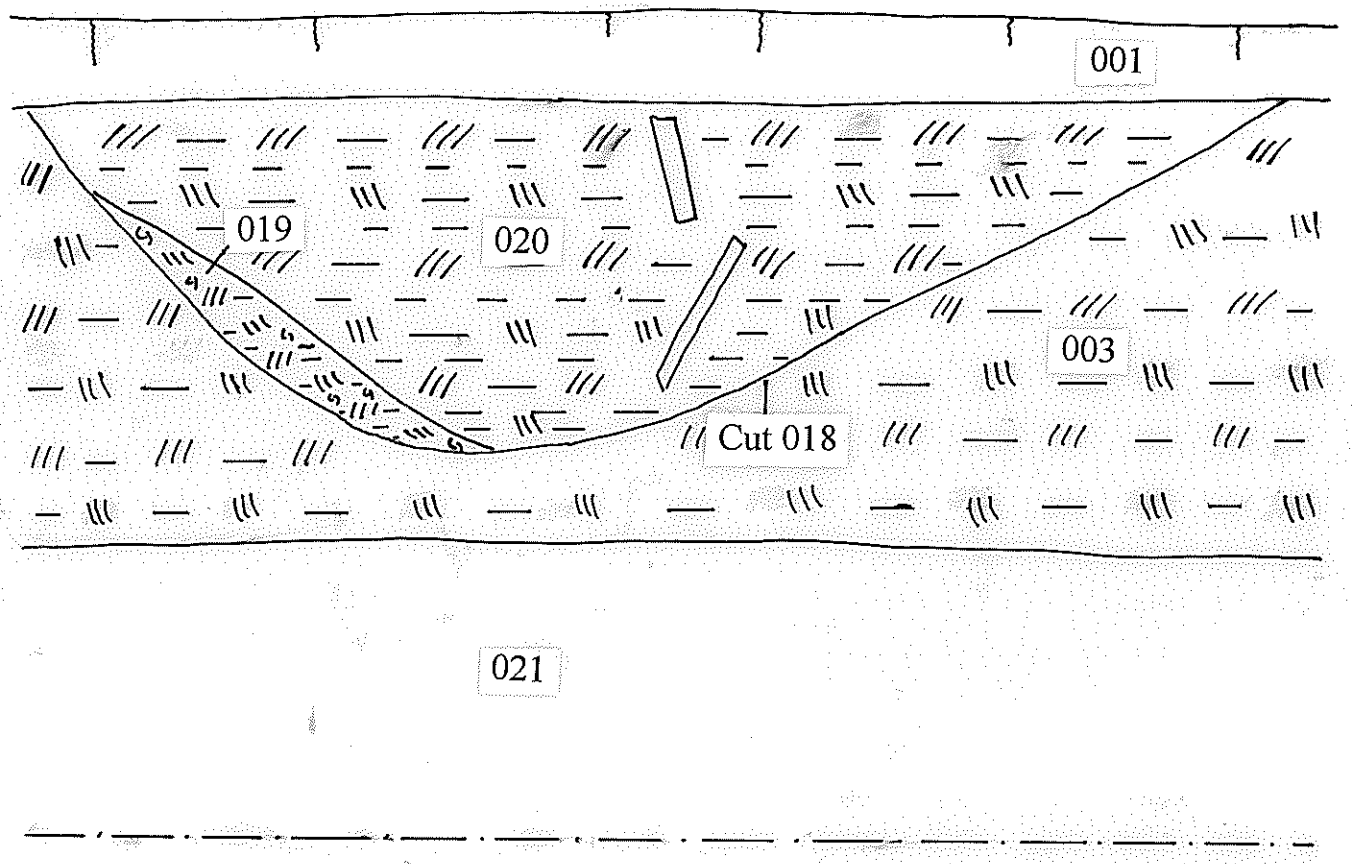
= Silty Clay Loam

= Charcoal flecks

Figure 5

Sketch section of field drain at Location D

Scale 1:10



= Topsoil

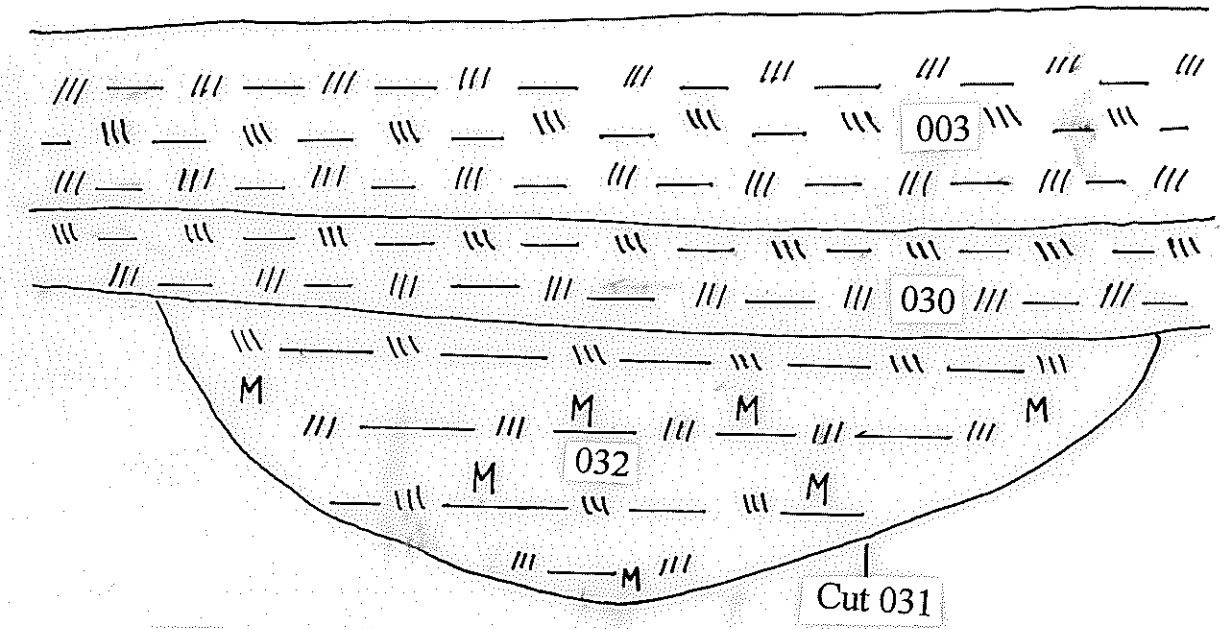
= Silty Clay Loam

= Very Silty Clay Loam

= Very Silty Clay Loam with High Charcoal Content

Figure 6

Sketch section of ditch at Location E, after topsoil strip.
Scale 1:10



= Silty Clay Loam

= Silty Clay with Manganese Inclusions

FIGURE 7

WATCHING BRIEF SECTION 2

HEDGEROWS AFFECTED BY PIPELINE ROUTE

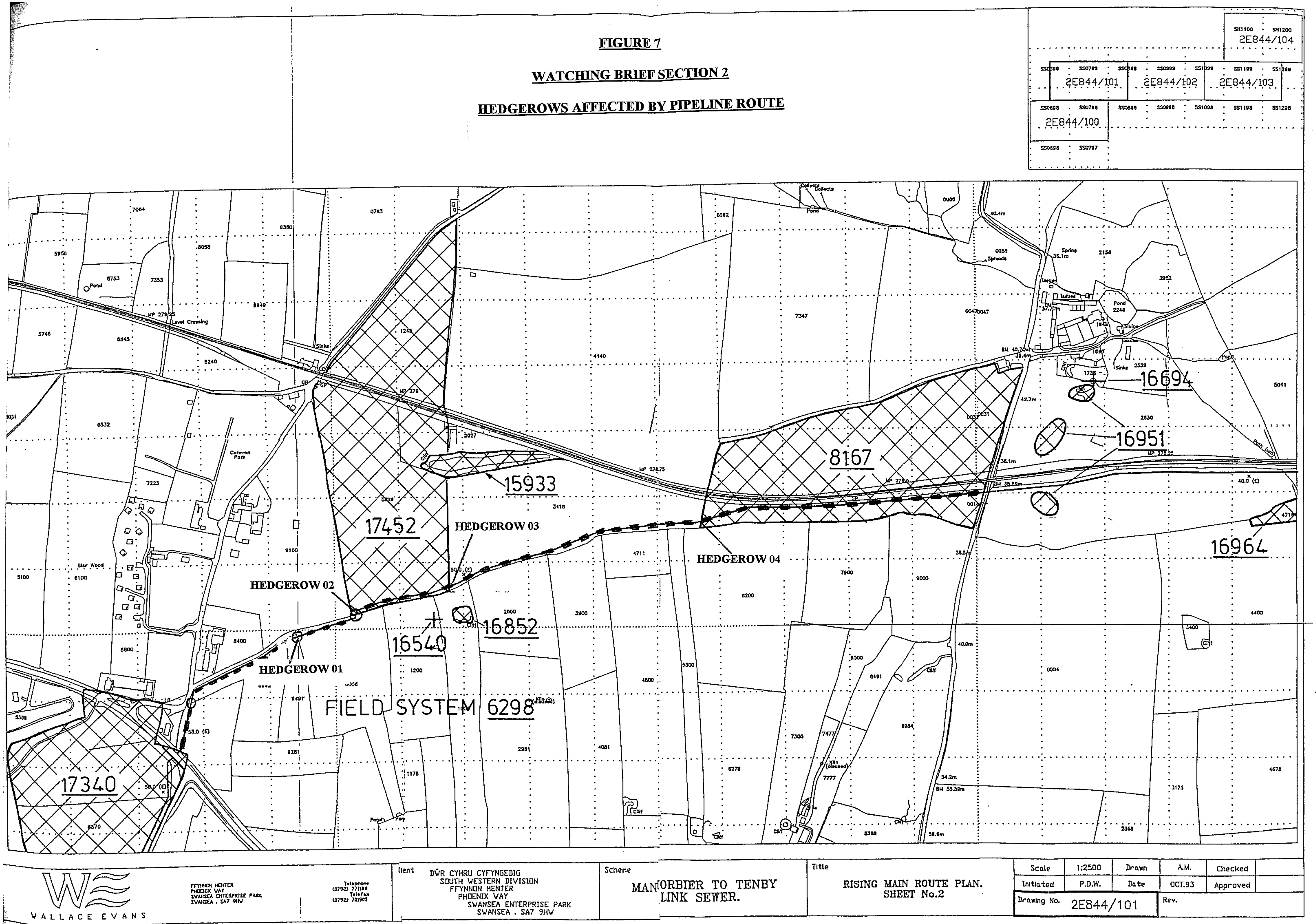


Figure 8

Section of Hedgerow 01
Scale 1:10

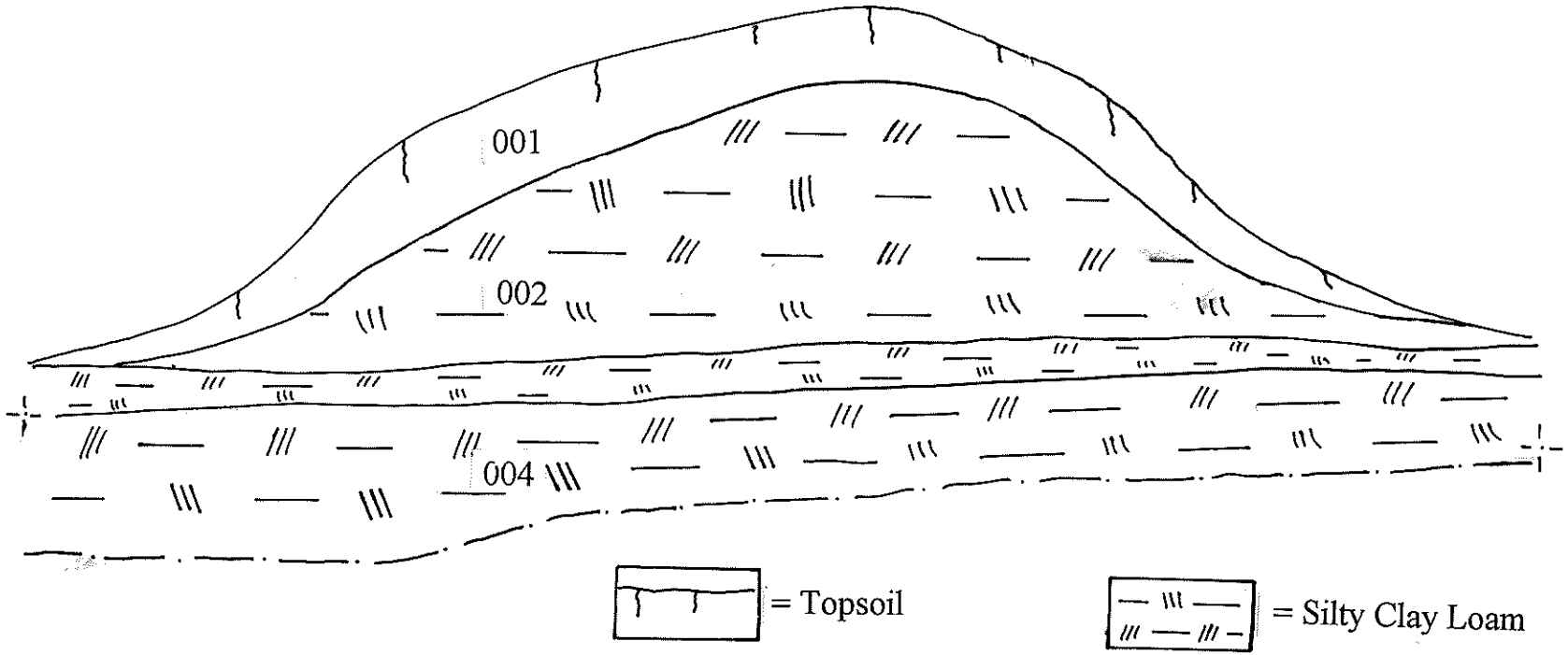


Figure 9

Section of Hedgerow 02

Scale 1:10

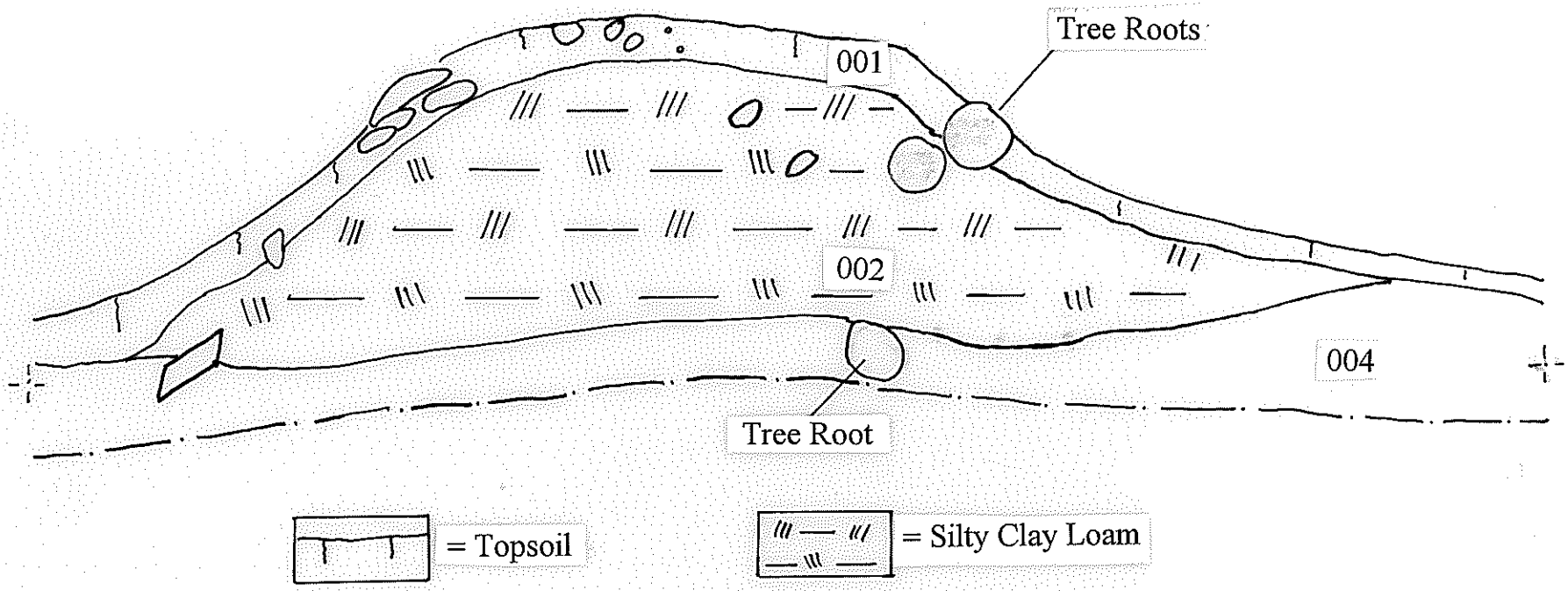


Figure 10

Section of Hedgerow 03
Scale 1:10

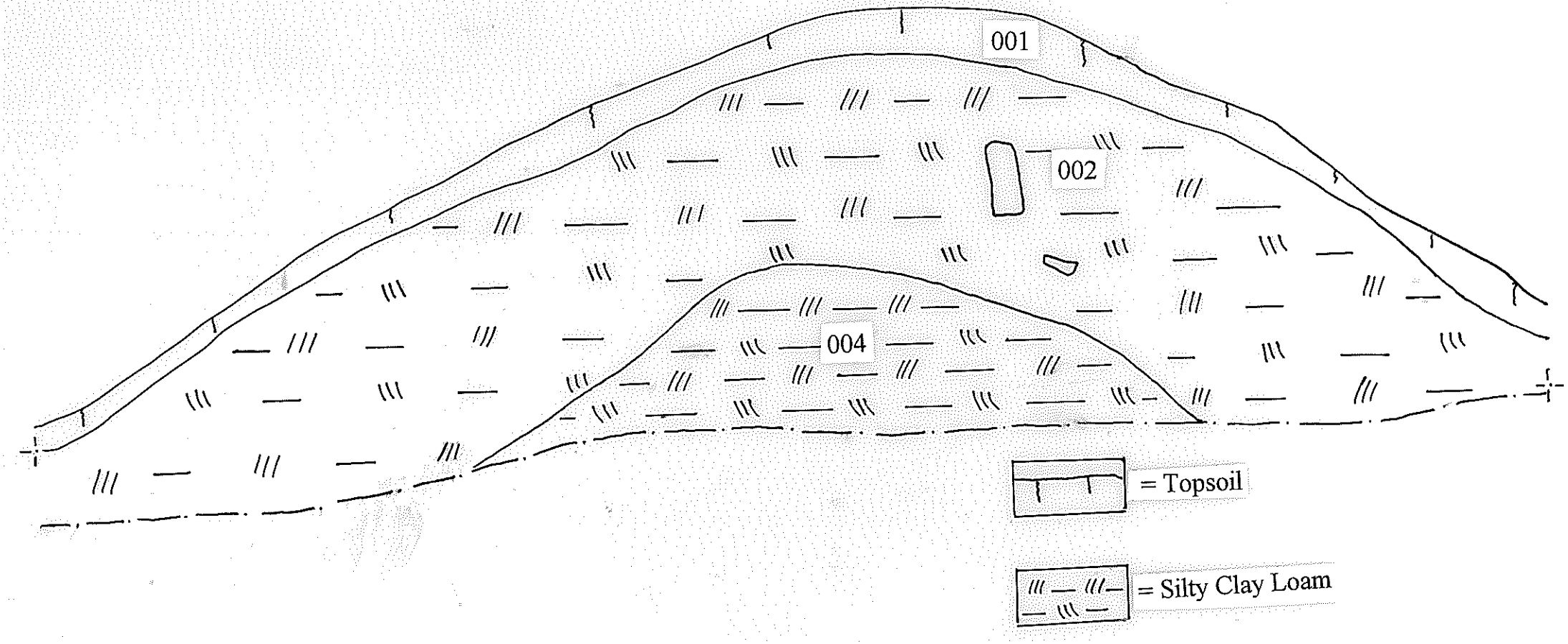
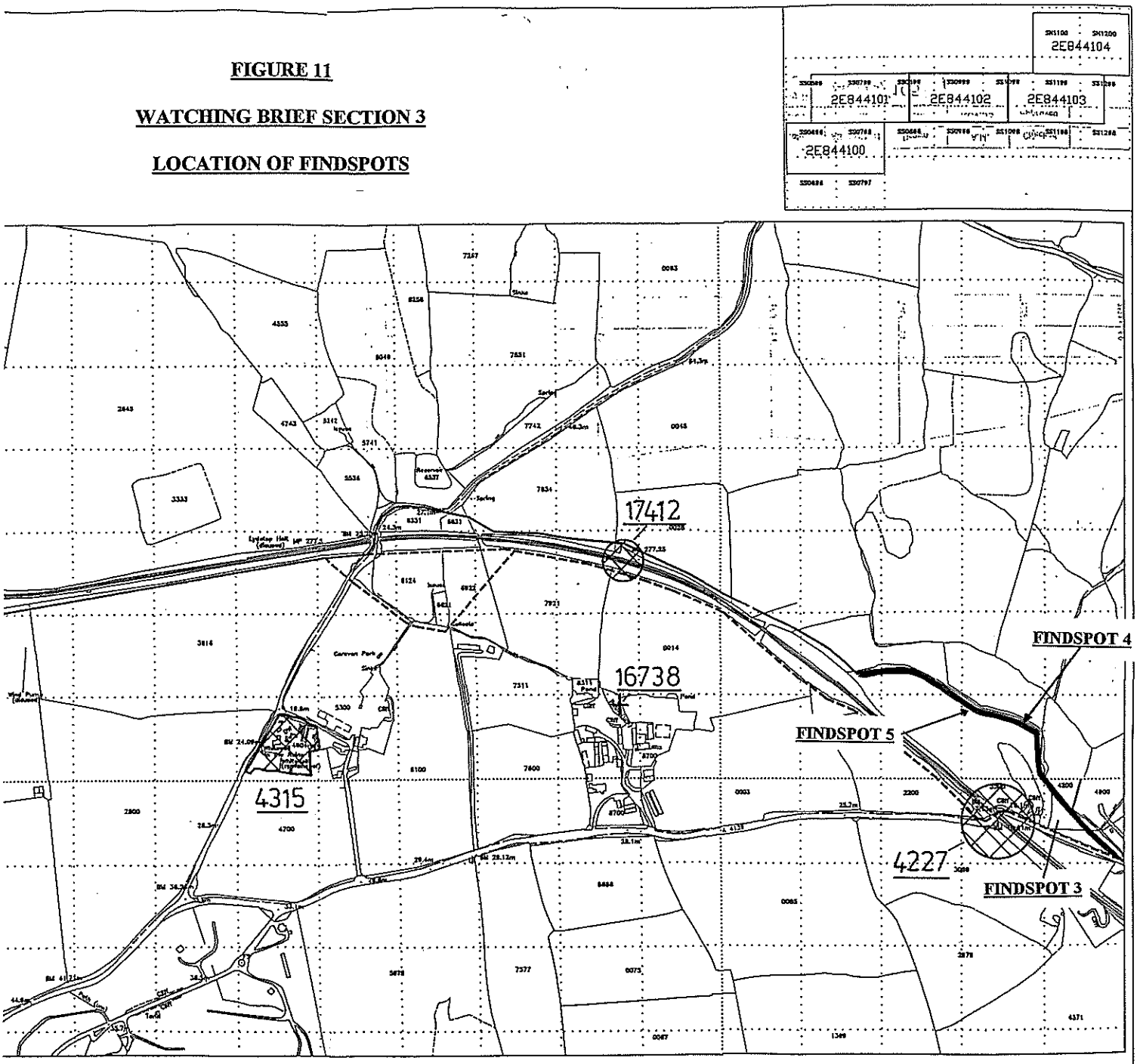


FIGURE 11

WATCHING BRIEF SECTION 3

LOCATION OF FINDSPOTS



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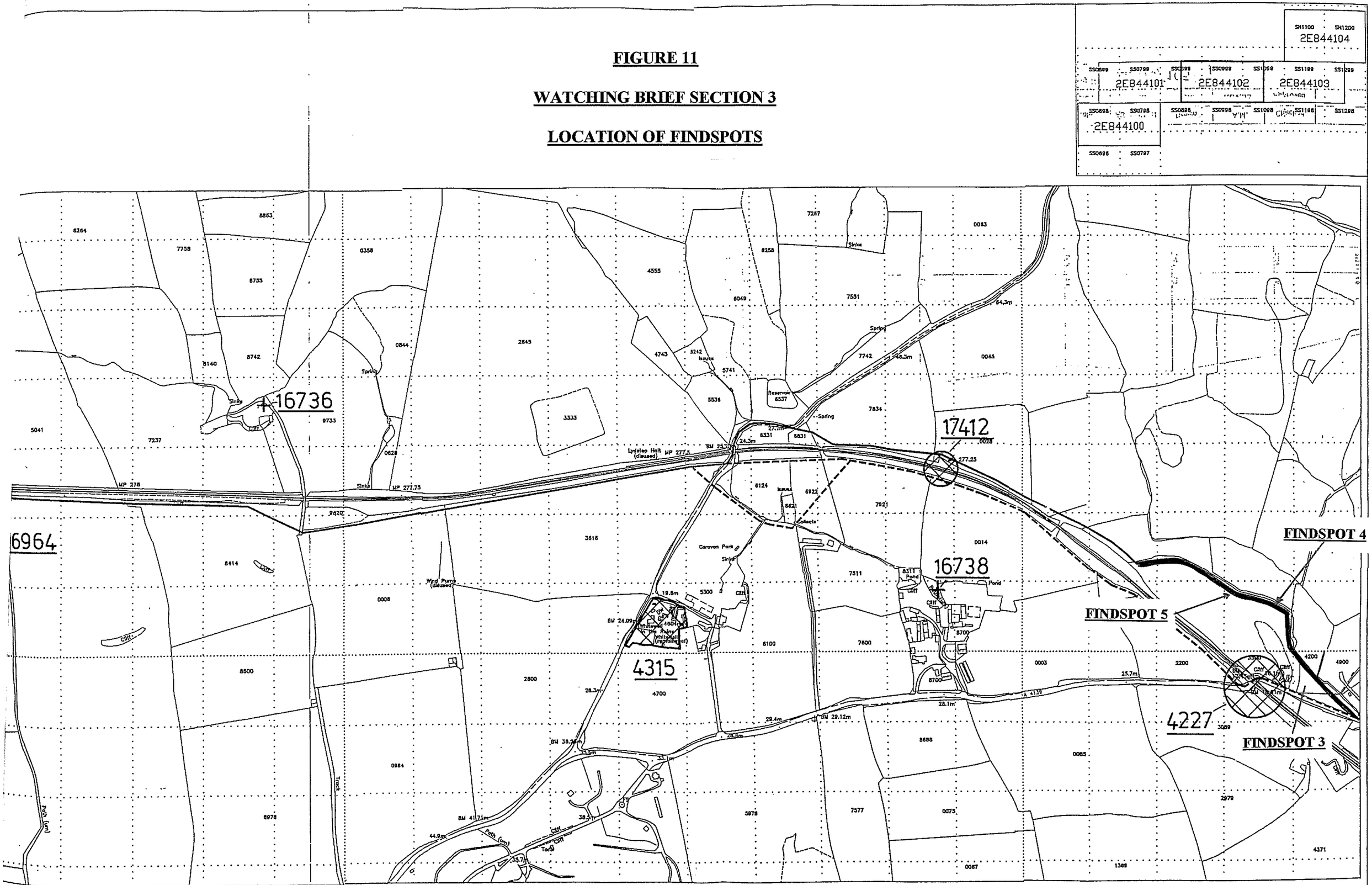
			Initiated: P.D.W.	Date: OCT.93	Approved
			Drawing No. 2E844/102	Rev.	

30-11-93

FIGURE 11

WATCHING BRIEF SECTION 3

LOCATION OF FINDSPOTS



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