

## 7. ENVIRONMENTAL EVIDENCE

### 7.1 Summary

*Three sediment samples and a very small quantity of hand-collected bone from deposits of 18<sup>th</sup> to early 19<sup>th</sup> century date, revealed by excavations at Whitehall Shipyard, Spital Bridge, Whitby, North Yorkshire, were submitted for an evaluation of their bioarchaeological potential.*

*Two of the three samples examined gave copious evidence, in the form of uncharred wood fragments, for what may have been woodworking debris. Other plant and invertebrate remains were rather sparse.*

*A small vertebrate assemblage was recovered from deposits dating from the post-medieval period. Most of the material was recovered from Trench 5 deposits. A small collection of caprovid metapodials was recovered from Context 5006. These possibly represent a discrete dump of waste associated with tanning. The vertebrate assemblage is too small and too poorly dated for further analysis.*

*No further work is recommended on the current material.*

### 7.2 Introduction

An archaeological evaluation excavation was carried out by York Archaeological Trust at Whitehall Shipyard, Spital Bridge, Whitby, North Yorkshire (NGR NZ 8997 1025), in summer 2001. Three sediment samples ('GBA'/'BS' *sensu* Dobney *et al.* 1992) and a very small quantity of hand-collected bone were recovered from the deposits. Preliminary interpretation of the evidence gave dates from 18<sup>th</sup> to early 19<sup>th</sup> century for the deposits. All of the material was submitted to the EAU for an evaluation of its bioarchaeological potential.

### 7.3 Methods

#### 7.3.1 Sediment sample

The sediment samples were inspected in the laboratory and their lithology recorded, using a standard *pro forma*, prior to processing, following the procedures of Kenward *et al.* (1980; 1986), for recovery of plant and invertebrate macrofossils. The washovers and residues were examined for plant remains. The washovers were also examined for invertebrate remains, and the residues were examined for other biological and artefactual remains.

#### 7.3.2 Hand-collected vertebrate remains

Data for the vertebrate remains were recorded electronically directly into a series of tables using a purpose-built input system and *Paradox* software. For each context (or sample) subjective records were made of the state of preservation, colour of the fragments, and the appearance of broken surfaces ('angularity'). Additionally, where more than ten fragments were present, semi-quantitative information was recorded concerning fragment size, dog gnawing, burning, butchery and fresh breakage.

Where possible, fragments were identified to species or species group, using the reference

collection at the EAU. Fragments not identifiable to species were grouped into categories: large mammal (assumed to be cattle, horse or large cervid), medium-sized mammal (assumed to be caprovid, pig or small cervid) and completely unidentifiable.

## 7.4 Results

### 7.4.1 Sediment samples

The results are presented in context number order. Archaeological information, provided by the excavator, is given in square brackets.

**Context 2018** [upper fill/backfill of timber-lined pit 2039, ?early 19<sup>th</sup> century]  
Sample 2/T (1 kg sieved to 300 microns with washover)

Just moist, dark brown to black, crumbly, ?ashy, silty sand (to sandy silt) with abundant flaky wood fragments.

The subsample yielded a large residue of about 500 cm<sup>3</sup>, of which about one third by volume comprised flaky to granular wood fragments (to 30 mm in maximum dimension), mostly somewhat decayed. Some were clearly chips from woodworking and the large fine fraction suggested that sawdust was also present. At least some of the material was oak (*Quercus*) and some carried a tar or tar-like deposit, consistent with the odour of the whole sediment when examined in the laboratory sample. The remaining material in the residue was sand with some cinders (to 15 mm) and a little gravel and coal (to 10 mm). The only invertebrate remains noted were some poorly preserved scraps of earthworm egg capsule.

**Context 4025** [fill of feature 4026, ?late 18<sup>th</sup> - early 19<sup>th</sup> century]  
Sample 3 (2 kg sieved to 300 microns with washover)

Moist, somewhat varicoloured but mostly dark grey to black (oxidising to olive grey-brown), sandy silt with sand lenses. Stones (20 to 60+ mm, including rotted sandstone) and brick/tile were present and wood 'chips' were common in the sample.

The very large residue of about 1100 cm<sup>3</sup> included about 200 cm<sup>3</sup> of sand and gravel (to 40 mm) with traces of brick/tile (to 30 mm). The rest comprised rather flaky wood fragments, again probably mostly from wood-working—ranging in size from sawdust to chips and chunks up to 80 mm. The wood included oak and pine (*Pinus*). Amongst the wood were sparse remains of an unusual mixture of plant remains: traces of leafless twigs of heather (*Calluna vulgaris* (L.) Hull) and spines of gorse (*Ulex* sp.), modest numbers of fruits of alder (*Alnus glutinosa* (L.) Gaertner) and a single fruit fragment of the woodland plant, dog's mercury, *Mercurialis perennis* L. There were also modest numbers of fragments of thallus (frond) of seaweed of perhaps at least two types. Invertebrates recovered whilst checking the residue included the water beetle *Helophorus* sp. and the bright blue shield-bug *Zicrona caerulea* (Linnaeus).



**Context 5006** [possible 18<sup>th</sup> century backfill in building]

Sample 1/BS (7.2 kg)

Just moist, varicoloured (yellowish to orange-brown with patches of light blue-grey, buff, dark brown and black), stiff (working plastic), slightly sandy slightly silty clay. Stones (2 to 20 mm) and fragments of brick/tile were present in the sample.

There was a tiny washover of a few cm<sup>3</sup> of coal and 'char' (exudate from burning coal) with a few modern root fragments and modern and ancient (worn) seeds, though these plant remains were all very rare and of limited interpretative value. There were also a few scraps of fly puparium and traces of other insects including an unidentified spider beetle and the grain pest *Oryzaephilus* sp. The moderate-sized residue of about 850 cm<sup>3</sup> consisted mostly of sand and angular to subrounded gravel (to 50 mm), with traces of coal (to 25 mm) and brick/tile (to 45 mm).

*7.4.2 Hand-collected vertebrate remains*

A very small assemblage of vertebrate remains was recovered from deposits within Trenches 4 and 5. Five contexts (4000, 4007, 5000, 5005 and 5006) were represented, yielding a total of 110 fragments, of which 27 were from unstratified/and or clearance levels.

Most of the material (80 fragments) was recovered from ?18<sup>th</sup> century backfill deposits (Contexts 5005 and 5006) within a possible building that was revealed in Trench 5. The assemblage from Context 5005 was mainly composed of cattle cranium and horncore fragments, whilst material from Context 5006 appeared to represent a rather specialised deposit of caprovid metapodials and phalanges. Preservation was quite variable, with bones from 5006 and to a lesser extent 5005 being rather eroded. Some of the caprovid metapodials showed evidence of scorching and some had flaky, layered bone surfaces, also indicating heat damage.

Trench 4 vertebrate remains were limited to three sheep bones representing a single joint (distal humerus, proximal radius and ulna) from Context 4007.

**7.5 Discussion And Statement Of Potential**

Two of the three samples examined gave copious evidence in the form of uncharred wood fragments, including very small (<2 mm) material, for what may have been woodworking debris, though they probably do not warrant additional examination, given that other identifiable plant remains were sparse (although the sample from 4025 yielded some unusual remains they are difficult to interpret in the absence of a clear context). The same holds for the invertebrate remains.

Vertebrate remains from this site are rather limited in their potential by the small size of the assemblage and the rather uncertain dating of the deposits. Material from Trench 5 appears to be mainly dumped butchery waste and refuse possibly representing some specialist activity such as tanning. The caprovid metapodials could represent primary butchery waste but then it is likely that other remains, such as skull and mandible fragments, would also be present.

## **7.6 Recommendations**

Any further excavation at this site should be accompanied by a programme of sampling to recover and investigate plant and invertebrate remains further, provided that dating and context can be established more firmly.

No further work is recommended on the current vertebrate assemblage.

## **7.7 Retention And Disposal**

All of the current material should be retained for the present.

## **7.8 Archive**

All material is currently stored in the Environmental Archaeology Unit, University of York, along with paper and electronic records pertaining to the work described here.

## **7.9 Acknowledgements**

The authors are grateful to Mark Johnson of York Archaeological Trust for providing the material and the archaeological information, and to English Heritage for allowing AH and HK to contribute to this report.



## 8. FINDS

### 8.1 POTTERY

Context	no of sherds	date	description
2000	2	19 <sup>th</sup>	tin glazed earthenwares
2009	5	18/19 <sup>th</sup>	4 Black wares, 1 tin-glazed earthenware
2010	1	18 <sup>th</sup> /19 <sup>th</sup>	stoneware
2018	2	18/19 <sup>th</sup>	tin glazed earthenware and slipware
2026	13	19 <sup>th</sup>	tin glazed earthenware
3000	3	18/19 <sup>th</sup>	stoneware, tin-glazed earthenwares and post-med red wares
4000	1	19 <sup>th</sup>	tin-glazed earthenware
4002	9	19 <sup>th</sup>	tin-glazed earthenwares
4004	5	19 <sup>th</sup>	3 willow pattern, 1 caviar jar dated by manufacturers to 1890, 1 lustreware lid
4021	1	19 <sup>th</sup>	tin-glazed earthenware
4025	2	16 <sup>th</sup> -18 <sup>th</sup>	1 Cistercian and 1 post medieval red ware
5001	1	18 <sup>th</sup> /19 <sup>th</sup>	porcelain
5004	1	18 <sup>th</sup>	tin-glazed earthenware
5005	2	17 <sup>th</sup> /18 <sup>th</sup>	1 slipware and post medieval earthenware
5006	1	17 <sup>th</sup> /18 <sup>th</sup>	1 Ryedale-type open ware
5006	1	18 <sup>th</sup>	Post medieval green ware
5009	1	?	Very abraded

#### 8.1.1 Summary

This pottery is all very late in date and is likely to represent household debris. There is a little post-medieval material in the form of Cistercian ware, Ryedale ware, slipwares, stonewares and other earthenwares. There are some early types of tin-glazed earthenwares but most are likely to be of 19th century date. The caviar jar is marked 'V Benoist' a company still in operation who were able to date that form of jar to c.1890.

### 8.2 SMALL FINDS

73 objects were viewed for assessment. The metalwork had been X-rayed.

#### 8.2.1 Iron

35 objects were made of iron. These included several large apparently post-medieval to modern objects; sf1, c.2000 is a large circular band with very large nails, while sf2, c.2013 is a pickaxe head. Sf3, c.4004 is a large curving sheet fragment with large holes, its function is unknown. Also from c.4004, sf4 is a small wheel with handle, labelled "semi-rotary no.2". Sf20, c.4002 is a very large boss with central hole, and sf23, c.4000 is a large spoon. Large tools include a chisel (sf34, c.2009) and a two handled implement the function of which is unclear (sf35, c.2009). Sf70, c.3006 is a bar. Many of the iron objects are nails, some of which are very large (sf9, c.5003; sf10, c.2023; sfs13-15, c.4022; sfs17-18, c.4002; sfs25, 28, c.4000; sf36, c.2026; sf40, c.2019; sf56, c.2009; sfs58-9, c.2018; sf60, c.2025; sf62, c.4007; sf63, c.2007; sfs66-7, c.2009; sf72, c.3006). Sf26, c.4000 is a modern nut and bolt. Unidentifiable objects are sf6, c.4016; sf27, c.4000; sf68, c.2009; fragments are sf39, c.0; sf45, c.4010, both of which appear to be concretion.

### **8.2.2 Copper alloy**

Sf30, c.4000 may be a sail eyelet. Sfs33, c.3000; 42, c.2009; 48-9, c.4010; 54, c.2013; 73, c.3006 are all nails. Sf50, c.4010 may be a fragment of binding; sf53, c.2013 is a button.

### **8.2.3 Lead alloy**

Both finds of lead alloy appear to be sheet fragments – sf31, c.3000; sf71, c.3006.

### **8.2.4 Glass**

All the glass finds comprise post-medieval to modern vessel fragments – sfs7, c.4004; 21, c.5005; 29, c.4000; 38, c.043, c.4010.

### **8.2.5 Fired clay**

All the fired clay finds are post-medieval tobacco pipe fragments – sfs8, c.4018; 16, c.4005; 22, c.5005; 46, c.4010; 52, c.4021; 57, c.2009; 61, c.4007; 65, c.2007

### **8.2.6 Stone**

Sf69, c.2025 is the only stone object recovered – it is fragmentary with one curved edge and some ridging, but its identification is uncertain.

### **8.2.7 Slag**

Slag was found in the following contexts: 2009, 3000, 4000, 4010, 4016, 4021 and 4022.

### **8.2.8 Wood**

Sf44, c.4010 appears to be a fragment of a peg, plus two other unidentified fragments.

### **8.2.9 Miscellaneous**

Sf19, c.4002 may be a fragment of aluminium; sf41, c.3000 appears to be a fragment of linoleum.

### **8.2.10 Summary**

Some of the large iron objects may be more closely identified by a specialist with knowledge of maritime equipment – it all appears to be 19<sup>th</sup> or 20<sup>th</sup> century in date. All of the remaining finds are also likely to date from this period, and none of these are of significant interest or worthy of further research.

## **8.3 BRICK AND TILE**

### **8.3.1 Introduction**

Two boxes of ceramic building materials were submitted for examination. The material is post medieval in date.

### **8.3.2 Post medieval material**

The brick was mostly slop moulded, where the mould is wetted but not sanded. This is a typical post medieval feature, and in this sample it is often allied with measurements that also indicate the same sort of date. There are a couple of bricks with narrow thicknesses and relatively broad breadths (contexts 5006 and 5009) which is a more medieval trait, and it is possible that these are earlier than the rest, though the slop moulding still probably points to a post medieval date.



Two of the bricks from contexts 2005 and 2014 are evidently machine made during the 19<sup>th</sup> century. Both white in colour, these bricks are stamped PEASE, and are products of the Pease West Brickworks in County Durham. The base of one of the bricks is sooted and suggests possible use in an oven or hearth of some kind.

Pan tile roofing is present, and it is likely that this dates from the 18<sup>th</sup> century or later, though pan tile came into use during the 17<sup>th</sup> century in Britain. The examples from this site have a nib, and a cutaway at the top. There is a near complete example from context 2007

There is one fragment of ridge tile from context 5009, which by the manufacturing marks and refining of the fabric is post medieval in date.

### 8.3.3 Other material

There is a limestone block from context 3000.

### 8.3.4 Conclusion

This sample is post medieval in date. It shows the type of bricks in use in Whitby during the post medieval period, including material that was transported some distance from its place of manufacture. The sample should be retained until such time as it can be thoroughly recorded by a recognised ceramic building materials specialist, and matched with any local fabric or form collection.

### 8.3.5 Context Listing Table

#### Key

*Cxt* = Context      *L* = Complete length      *B* = Complete breadth

*T* = Complete Thickness      *FH* = Complete Flange Height

*Date range* = date range of form      *Date* = estimated date of context

\* = only minimum measurement available

*NB: This list indicates only forms present and any variations (such as slag attached, or paw prints). It does not list every fragment of CBM*

Cxt	Form	L	B	T	Comments	Date range	Date
2001	Brick	232	15	74	Weathered stretcher, slop moulded	19 <sup>th</sup>	19 <sup>th</sup>
2004	Brick	230	109	83	Creased stretcher, uneven, slop moulded, heavy mortar	19 <sup>th</sup>	19 <sup>th</sup>
2005	Brick	230	110	68	PEASE stamp, machine made, white fabric	19 <sup>th</sup>	19 <sup>th</sup>
2007	Pan					17-20 <sup>th</sup>	17-20 <sup>th</sup>
2007	Plain				Post medieval	17 <sup>th</sup> +	
2007	Pan	360	275	16	Nib end, cutaway at top, abraded	17-20 <sup>th</sup>	
2007	Pan				Fragments		
2014	Brick	230	110	67	PEASE stamp, machine made, sooted base, white fabric; from ?oven	19 <sup>th</sup>	19 <sup>th</sup>
2018	Pan					17-20 <sup>th</sup>	17-20 <sup>th</sup>
3000	Stone				Limestone block	?	?
3006	Brick		113	52	Slop moulded, bow mark, ½ bat, rough concrete	17-19 <sup>th</sup>	L19-20 <sup>th</sup>
3006	Brick					L19-20 <sup>th</sup>	
3006	Brick				Reused	17 <sup>th</sup> +	17 <sup>th</sup> +

4007	Pan					17-20 <sup>th</sup>	17-20 <sup>th</sup>
4025	Pan					17-20 <sup>th</sup>	17-20 <sup>th</sup>
4025	Brick				X 4 small frags	17 <sup>th</sup> +	
4025	Brick			58		17 <sup>th</sup> +	
5002	Brick	245	118	61	Slop moulded, mortar (in wall)	17 <sup>th</sup> +	17 <sup>th</sup> +
5005	Pan					17-20 <sup>th</sup>	17-20 <sup>th</sup>
5006	Pan					17-20 <sup>th</sup>	17-20 <sup>th</sup>
5006	Brick		126	56	Slop moulded, bow marks	16-18 <sup>th</sup>	
5006	Brick		126	60	Overfired, slop moulded	16-18 <sup>th</sup> ?	
5007	Pan				X 2 frags	17-20 <sup>th</sup>	17-20 <sup>th</sup>
5009	Ridge					13 <sup>th</sup> +	16-18 <sup>th</sup> ?
5009	Brick			46	Slop moulded, overfired	16-18 <sup>th</sup> ?	

## 9. CONSERVATION LABORATORY ASSESSMENT

### 9.1. Objectives

This report aims to meet the requirements of MAP2, Phase 3, Assessment of Potential for Analysis, (English Heritage, 1991). The work carried out has involved an X-radiographic investigation of selected finds, assessment of their condition, stability and suitability of their packaging for safe long-term storage. This report includes an evaluation of the potential of each group of material for further investigative conservation. There are recommendations for long term stabilisation, packaging and specialist support required.

### 9.2. Procedures

A selection of the iron and all the copper alloy finds were X-rayed using standard Y.A.T. procedures and equipment. Two sheets of film were placed in the cassette to produce a duplicate for archive purposes. The plates were laid out in number order as much as possible and the X-ray number written on each bag. Each image on the X-ray was labelled with its small find number. The plates were packaged in acid-free archival envelopes. The plate number and details were added to the Online Photo Archive and this was linked to the CIFR record for each object.

All categories of material were examined under a binocular microscope at X20 magnification as well as viewing the X-rays where they existed. The material identifications were checked and observations made the condition and stability of the finds. Any technological information deduced from the X-rays and/or microscope examination was recorded on CIFR in the Conservation Work Record area and printed below in section 5.

The structural timbers and one wood small find were washed and assessed by S J Allen, (see separate wood assessment report). The glass was washed in tap water to remove soil and allowed to air dry. All the other non-metal finds (mostly clay pipe fragments) had been washed and air dried prior to arrival in the lab and required no further treatment.

### 9.3. Quantification

A total of 72 small finds were assessed and 4 X-rays produced. The number of objects in each material category is listed below:

Copper alloy	9
Fired clay/tobacco pipe	8
Glass	5



Iron	35
Lead alloy	2
Other	2 (sf37 = tar, sf41 = Linoleum-type material)
Slag	9
Stone	1

#### 9.4. Condition

##### 9.4.1 Iron

The iron varies widely in condition. Some objects are well preserved with substantial metal core surviving while others have undergone partial or complete mineralisation. Where substantial cores survive, this occurs in the larger objects with thick metal cores or in the more modern material. Corrosion crusts are generally bulky and of orange and brown iron oxides in keeping with iron from well aerated burial environments. A few have cracks or spalling of the corrosion crusts, a sign that active corrosion has occurred since excavation. Those objects not kept in desiccated conditions are noticeably worse. Dry storage conditions of <15% RH should be arranged for the long-term storage of these items.

##### 9.4.2 Non-ferrous Metals

The copper alloy is in fair condition with some surface detail surviving. Corrosion crusts are generally fairly thin, showing the object surface clearly. However, some show signs of 'bronze disease' and storage conditions should be kept strictly desiccated <35% RH for these items. The lead alloy objects are in fair condition although some disruption of surface detail has occurred. The formation of crystalline corrosion products on the surfaces and some cracking and crumbling is evident. Again, dry storage is recommended of <35% RH.

##### 9.4.3 Organic Materials

For condition of the wood, see timber report by S J Allen.

##### 9.4.4 Glass, fired clay and stone

The glass is either eighteenth century bottle or modern in date and is generally in good condition with no flaking surfaces. The fired clay tobacco pipe fragments are stable and in good condition. The stone fragment (sf 69) is robust and in excellent condition with no crumbling or softening of surfaces. All are suitable for long-term storage.

##### 9.4.6 Packaging

A number of the larger iron objects are presently being stored either loose or in plastic bags without desiccation.

#### 9.5. Assessment

The finds and their X-rays were viewed together with the Artefact Researcher, Nicky Rogers, and the Finds Assistant, Jon Kenny in order to determine the potential for further research and investigative conservation in the light of the microscope examination, X-radiographic results. No context information was supplied. The results are listed below:

FIND	CONTEXT	MATERIAL	ASSESSMENT
SF00001	2000	IRON	Assessment notes: Large circular iron band with large nails piercing it at regular intervals, pointing inwards. Too large to X-ray at YAT. Not thought worth X-raying elsewhere since most of the surface information is visible. Covered in a relatively thin outer crust of soil and orange/brown iron corrosion products in keeping with iron from well aerated, damp burial environments, (i.e. no indication of having been waterlogged). Presently being stored in non-desiccated conditions, which have lead to extensive post-excavation corrosion activity. This has caused cracking and spalling of surfaces and resulted in the loss of considerable surface detail. If to survive long-term storage and to avoid further imminent loss of surface, this object should be desiccated below 15% Relative Humidity. Immediate identification by an industrial finds specialist is recommended before more detail is lost.
SF00002	2013	IRON	Assessment notes: Large pickaxe head with some wood remains surviving inside the socket. Too large to X-ray at YAT. Not thought worth X-raying elsewhere since most of the surface information is visible. Covered in a thick outer crust of soil and orange/brown iron corrosion products in keeping with iron from well aerated, damp burial environments, (ie. no indication of having been waterlogged). Presently being stored in non-desiccated conditions, which have lead to some post-excavation corrosion activity. This has caused cracking and a small amount of spalling of surfaces. If to survive long-term storage and to avoid further imminent loss of surface detail, this object should be desiccated below 15% Relative Humidity. Study by an industrial finds specialist is recommended to determine whether it is worth retaining.
SF00003	4004	IRON	Assessment notes: Large iron strap with numerous circular pierced holes at regular intervals-looks modern/industrial. Too large to X-ray at YAT. Not thought worth X-raying elsewhere since most of the surface information is visible. Covered in a thick outer crust of soil combined with orange/brown iron corrosion products in keeping with iron from well aerated, damp burial environments, (i.e. no indication of having been waterlogged). Small fragments of industrial debris, (coal, slag and wood) are adhering to the concretion. Presently being stored in non-desiccated conditions, which have lead to extensive post-excavation corrosion activity. This has caused spalling of surfaces and resulted in some loss of detail. If to survive long-term storage and to avoid further imminent loss of surface, this object should be desiccated below 15% Relative Humidity. Immediate identification by an industrial finds specialist is recommended before more detail is lost.
SF00004	4004	IRON	Assessment notes: Modern-looking industrial object consisting of a circular disc with a large angled bolt running through it. Too dense to be worth X-raying. Covered in a relatively thin outer crust of soil and some orange/brown iron corrosion products in keeping with iron from well aerated, damp burial environments, (i.e. no indication of having been waterlogged). Presently being stored in non-desiccated conditions, which will eventually lead to corrosion activity, resulting in the loss of surface detail. If to survive long-term storage this object should be desiccated below 15% Relative Humidity. Immediate identification by an industrial finds specialist is recommended if to be retained.
SF00005	4016	SLAG	Assessment notes: Fragment of slag with low iron content. Stable and suitable for long term storage in non-desiccated conditions. Refer to a metallurgy specialist if further information required.
SF00006	4016	IRON	Assessment notes: Heavily corroded iron fragment with complete mineralisation of the metal core. Roughly square cross-section with central voiding. Covered in a bulky corrosion crust. No indication of active post ex. corrosion. No investigative conservation recommended.
SF00007	4004	GLASS	Assessment notes: Two joining fragments of ?modern vessel glass.



			Washed in tap water and air-dried. Stable and suitable for long-term storage.
SF00008	4018	FIRED CLAY	Assessment notes: Fragment of tobacco pipe, washed and dry on arrival in lab. Suitable for long-term storage. No further treatment recommended.
SF00009	5003	IRON	Assessment notes: Large corroded iron spike with partial mineralisation of the metal core resulting in disruption of the surface detail. Rectangular cross-section. Covered in a bulky corrosion crust. Some cracking indicates possible active post ex. corrosion. Keep desiccated below 15% RH. No investigative conservation recommended.
SF00010	2023	IRON	Assessment notes: Heavily corroded iron nail with complete mineralisation of the metal core. Roughly square cross-section with central voiding. Covered in a bulky corrosion crust with fragments of mineralised wood adhering. No indication of active post ex. corrosion. No investigative conservation recommended.
SF00011	4022	SLAG	Assessment notes: 2 Fragments of slag with low iron content. Stable and suitable for long term storage in non-desiccated conditions. Refer to a metallurgy specialist if further information required.
SF00012	4022	SLAG	Assessment notes: Slag fragment, originally identified as an iron object. Low iron content, desiccated storage not necessary. No investigative conservation recommended.
SF00013	4022	IRON	Assessment notes: Heavily corroded iron object with patchy corrosion of the metal core, particularly towards both ends. Unusual fibrous mineralisation in these areas. Roughly square cross-section. Covered in a bulky corrosion crust. No indication of active post ex. corrosion. No investigative conservation recommended.
SF00014	4022	IRON	Assessment notes: Heavily corroded iron ?nail fragment with partial mineralisation of the metal core. Roughly square cross-section. Covered in a bulky corrosion crust and patches of mineralised wood. No indication of active post ex. corrosion. No investigative conservation recommended.
SF00015	4022	IRON	Assessment notes: Corroded iron bolt with partial mineralisation of the metal core, especially at the head end. Square cross-section. Covered in a bulky corrosion crust and patches of shiny 'weeping' corrosion indicating active post ex. corrosion has occurred. Keep desiccated below 15%RH. No investigative conservation recommended.
SF00016	4005	FIRED CLAY	Assessment notes: Fragment of tobacco pipe, washed and dry on arrival in lab. Suitable for long-term storage. No further treatment recommended.
SF00017	4002	IRON	Assessment notes: Large iron bar with substantial metal core remaining, circular in cross-section. Covered in an extremely bulky outer corrosion crust with an area of surface loss indicating some active post-excavation corrosion has occurred. Should be kept desiccated below 15%RH to avoid further activity. No investigative conservation work recommended.
SF00018	4002	IRON	Assessment notes: Large iron bar with patchy survival of metal core, circular in cross-section. Covered in an extremely bulky outer corrosion crust with some cracking which may indicate some active post-excavation corrosion has occurred. Should be kept desiccated below 15%RH to avoid further activity. No investigative conservation work recommended.
SF00019	4002	ALUMINIUM	Assessment notes: Large sheet of heavily corroded aluminium. Covered in a thick outer crust of soil and powdery white corrosion products with patches of wood and lifting flakes. Identification by an industrial finds specialist is recommended if to be retained.
SF00020	4002	IRON	Assessment notes: Large iron domed 'boss' with perforations around flange at regular intervals and in the body. Looks modern/industrial. Too large to X-ray at YAT. Not thought worth X-raying elsewhere since most of the surface information is visible. Covered in a relatively thin outer crust of soil and orange/brown iron corrosion products in keeping with iron from well aerated, damp burial environments, (i.e. no indication of having been waterlogged). Small amounts of mineralised wood and other industrial debris visible on the surface. Presently being stored in non-desiccated conditions which will eventually lead to corrosion activity. If to survive



			long-term storage this object should be desiccated below 15% Relative Humidity. Immediate identification by an industrial finds specialist is recommended.
SF00021	5005	GLASS	Assessment notes: Large fragment of glass bottle base. Covered in a thick opaque corrosion crust. Washed in tap water and air-dried. Suitable for long-term storage but corroded surfaces may flake further.
SF00022	5005	FIRED CLAY	Assessment notes: Fragment of tobacco pipe, washed and dry on arrival in lab. Suitable for long-term storage. No further treatment recommended.
SF00023	4000	IRON	Assessment notes: Large iron spoon-looks modern. Too large to X-ray at YAT. Not thought worth X-raying elsewhere since most of the surface information is visible. Covered in a relatively thin outer crust of soil and orange/brown iron corrosion products in keeping with iron from well aerated, damp burial environments, (i.e. no indication of having been waterlogged). Presently being stored in non-desiccated conditions, which will eventually lead to corrosion activity. If to survive long-term storage this object should be desiccated below 15% Relative Humidity. De-small find?
SF00024	4000	SLAG	Assessment notes: 3 Fragments of slag with some iron content. Stable and suitable for long term storage in desiccated conditions <15% RH. Refer to a metallurgy specialist if further information required.
SF00025	4000	IRON	Assessment notes: Four iron nail/nail fragments with varying degrees of corrosion. Appear to be modern from x-ray. No indication that active, post ex. corrosion has occurred. Keep desiccated below 15%RH. No investigative conservation recommended.
SF00026	4000	IRON	Assessment notes: Large iron bolt with nuts at both ends-looks modern/industrial. Too dense to X-ray-most of the surface information is visible. Covered in a relatively thin outer crust of soil and orange/brown iron corrosion products in keeping with iron from well aerated, damp burial environments, (i.e. no indication of having been waterlogged). Presently being stored in non-desiccated conditions, which will eventually lead to corrosion activity. If to survive long-term storage this object should be desiccated below 15% Relative Humidity. De-small find?
SF00027	4000	IRON	Assessment notes: Heavily corroded fragments of iron in a bulky corrosion crust. No indication of active post ex. corrosion. Keep desiccated below 15%RH. No investigative conservation recommended.
SF00028	4000	IRON	Assessment notes: Corroded iron ?nail fragment with partial mineralisation of the metal core. Square cross-section. Covered in a bulky corrosion crust with no indication of active post ex. corrosion. Keep desiccated below 15%RH. No investigative conservation recommended.
SF00029	4000	GLASS	Assessment notes: Two fragments of modern window glass. Washed in tap water and air dried. Stable and suitable for long-term storage.
SF00030	4000	COPPER ALLOY	Assessment notes: Copper alloy ?sail eyelet in fair condition. Fragments of textile survive in the groove. Surface covered in patches of soil above a reddish brown ?cuprite corrosion layer. The X-ray shows a complex internal structure with pointed tabs to hold the textile in place. Stable and in suitable condition for long term storage. No further investigative conservation recommended.
SF00031	3000	LEAD ALLOY	Assessment notes: Lead alloy strip, widening out towards one end and thickening at the other end. Possibly and fragment of waste lead sheet. Misshapen with extensive surface damage. Covered in a thin layer of soil and some white and grey, crystalline corrosion products. A small amount of cracking and crumbling of the surfaces is visible. Appears to be stable and suitable for long-term storage under desiccated conditions, <35%RH. No further investigative conservation is recommended.
SF00032	3000	SLAG	Assessment notes: Fragment of slag with low iron content. Stable and suitable for long term storage in non-desiccated conditions. Refer to a metallurgy specialist if further information required.
SF00033	3000	COPPER ALLOY	Assessment notes: Copper alloy nail with flat circular head in fair condition, possibly associated with timber no.6. Surface covered in a layer



			of soil combined with bright green powdery copper corrosion products. Stable and in suitable condition for long term storage. No further investigative conservation recommended.
SF00034	2009	IRON	Assessment notes: Iron chisel in good condition with substantial metal core surviving, just some mineralisation at the narrow end. Covered in a thin corrosion crust with no indication of active post ex. corrosion. Keep desiccated below 15%RH. No investigative conservation recommended.
SF00035	2009	IRON	Assessment notes: Modern-looking industrial object similar to a large pair of tongs in shape. Too large to X-ray at YAT. Covered in a thick corrosion crust of soil and some orange/brown iron corrosion products in keeping with iron from well aerated, damp burial environments, (i.e. no indication of having been waterlogged). Presently being stored in non-desiccated conditions, which will eventually lead to corrosion activity, resulting in the loss of surface detail. If to survive long-term storage this object should be desiccated below 15% Relative Humidity. Immediate identification by an industrial finds specialist is recommended if to be retained.
SF00036	2026	IRON	Assessment notes: Heavily corroded iron ?bolt with partial mineralisation of the metal core. Square cross-section. Covered in a bulky corrosion crust with no indication of active post ex. corrosion. Keep desiccated below 15%RH. No investigative conservation recommended.
SF00037	2026		Assessment notes: Three fragments of tar-like material. Dry and stable. Not worth retaining unless the context is significant.
SF00038	0	GLASS	Assessment notes: Two fragments of modern bottle glass. Washed in tap water and air dried. Stable and suitable for long-term storage.
SF00039	0	IRON	Assessment notes: Iron concretion or completely mineralised iron fragment. Covered in a bulky corrosion crust with no indication of active post ex. corrosion. No investigative conservation recommended.
SF00040	2019	IRON	Assessment notes: Completely mineralised iron spike fragment with square cross-section. Covered in a bulky corrosion crust with fragments of mineralised wood within it. No indication of active post ex. corrosion. No investigative conservation recommended.
SF00041	3000		Assessment notes: Originally labelled as possibly wood or cork. Examination under the microscope revealed a mineral-based material with no recognisable organic structure visible. Possible 'linoleum'. Washed and stable. De-smallfind?
SF00042	2009	COPPER ALLOY	Assessment notes: Two copper alloy nails and one ?nail head in fair condition. Possibly associated with timber No. 6. Square cross-sections and flat circular heads. Surfaces covered in a thick layer of soil and bright green fibrous copper corrosion products. Stable and in suitable condition for long term storage. No further investigative conservation recommended.
SF00043	4010	GLASS	Assessment notes: Two fragments of modern green bottle glass. Washed in tap water and air-dried. Stable and suitable for long-term storage.
SF00044	4010	WOOD	Assessment notes: Fragment of dry round wood and two smaller fragments. See wood report by S.J. Allen for details.
SF00045	4010	IRON	Assessment notes: Thin iron sheet fragment, with patches of copper corrosion on one surface, possibly a flake from a larger object. Covered in a bulky corrosion crust with no indication of active post ex. corrosion. No investigative conservation recommended.
SF00046	4010	FIRED CLAY	Assessment notes: Fragment of tobacco pipe, washed and dry on arrival in lab. Suitable for long-term storage. No further treatment recommended.
SF00047	4010	SLAG	Assessment notes: 2 Fragments of slag with possibly some iron content. Stable and suitable for long term storage in desiccated conditions <15%RH. Refer to a metallurgy specialist if further information required.
SF00048	4010	COPPER ALLOY	Assessment notes: Two copper alloy nails in fair condition with flat circular heads and square cross-sections. Possibly associated with timber No. 6. Surfaces covered in a thin layer of soil and bright green fibrous copper corrosion products. Stable and in suitable condition for long term storage. No further investigative conservation recommended.
SF00049	4010	COPPER	Assessment notes: Copper alloy ?nail with head missing, in fair condition,



		ALLOY	possibly associated with timber no.6. Surface covered in a layer of soil combined with bright green powdery copper corrosion products. Stable and in suitable condition for long term storage. No further investigative conservation recommended.
SF00050	4010	COPPER ALLOY	Assessment notes: Copper alloy pierced sheet with three square pierced holes and tapering towards a point at one end. In fair condition, surface covered in a thin layer of soil, reddish brown and bright green fibrous copper corrosion products. Stable and in suitable condition for long term storage. No further investigative conservation recommended.
SF00051	4021	SLAG	Assessment notes: Several fragments of slag some possibly with iron content. Stable and suitable for long term storage in desiccated conditions <15%RH. Refer to a metallurgy specialist if further information required.
SF00052	4021	FIRED CLAY	Assessment notes: Fragment of tobacco pipe, washed and dry on arrival in lab. Suitable for long-term storage. No further treatment recommended.
SF00053	2013	COPPER ALLOY	Assessment notes: Copper alloy button in fair condition. Surface covered in a thick layer of soil and bright green copper corrosion products. No decoration visible on X-ray. Stable and in suitable condition for long term storage. No further investigative conservation recommended.
SF00054	2013	COPPER ALLOY	Assessment notes: Copper alloy nail fragments with square cross-section and head missing. Possibly associated with timber no.6. Surface covered in a layer of soil combined with dark green powdery copper corrosion products. Stable and in suitable condition for long term storage. No further investigative conservation recommended.
SF00055	2009	SLAG	Assessment notes: 3 fragments of slag with low iron content. Stable and suitable for long term storage in non-desiccated conditions. Refer to a metallurgy specialist if further information required.
SF00056	2009	IRON	Assessment notes: Corroded iron ?nail with partial mineralisation of the metal core resulting in some disruption of surface detail. Square cross-section. Covered in a bulky orange/brown corrosion crust with some black powdery products closer to the metal core, possibly an iron sulphide which would indicate water-logging of the burial environment at some stage. No indication of active post ex. corrosion. Keep desiccated below 15%RH. No investigative conservation recommended.
SF00057	2009	FIRED CLAY	Assessment notes: Four fragments of tobacco pipe, washed and dry on arrival in lab. Suitable for long-term storage. No further treatment recommended.
SF00058	2018	IRON	Assessment notes: Iron strip, narrowing towards one end. Partial mineralisation of the metal core towards the narrow end, resulting in some disruption of surface detail. Rectangular cross-section. Covered in a thin corrosion crust mostly orange/brown corrosion but some patches of black powdery products, possibly an iron sulphide, which would indicate water-logging of the burial environment at some stage. No indication of active post ex. corrosion. Keep desiccated below 15%RH. No investigative conservation recommended.
SF00059	2018	IRON	Assessment notes: Large iron bolt, looks industrial. Corroded metal core towards narrow end. Rectangular cross-section. Covered in a thin corrosion crust of orange/brown and black ?sulphide product which would indicate water-logging of the burial environment at some stage. Some flaking indicates active post ex. corrosion. Keep desiccated below 15%RH. No investigative conservation recommended.
SF00060	2025	IRON	Assessment notes: Heavily corroded iron ?nail fragment with almost complete mineralisation of the metal core. Roughly square cross-section. Covered in a bulky orange/brown iron corrosion crust with no indication of active post ex. corrosion. Keep desiccated below 15%RH. No investigative conservation recommended.
SF00061	4007	FIRED CLAY	Assessment notes: Fragment of tobacco pipe, washed and dry on arrival in lab. Suitable for long-term storage. No further treatment recommended.
SF00062	4007	IRON	Assessment notes: Large iron nail with partially corroded metal core and some disruption of surface detail. Square cross-section. Covered in a thick



SF00063	2007	IRON	corrosion crust of orange/brown iron corrosion products combined with soil and small stones. No indication of active post ex. corrosion. Keep desiccated below 15%RH. No investigative conservation recommended. Assessment notes: 2 Large iron nails and one ?nail fragment. All have partially corroded metal cores and some disruption of surface detail. They have rectangular cross-sections, more square towards head ends. Covered in thin corrosion crusts of orange/brown iron corrosion products and black iron ?sulphide products which would indicate water-logging of the burial environment at some stage. Evidence of 'weeping' corrosion and flaking indicates active post ex. corrosion has occurred. Keep desiccated below 15%RH. No investigative conservation recommended.
SF00064	2007	SLAG	Assessment notes: 1 small fragment of slag with low iron content, one fragment of iron concretion and one heavily corroded iron fragment. Stable and suitable for long term storage in desiccated conditions, <15% RH. Refer to a metallurgy specialist if further information required.
SF00065	2007	FIRED CLAY	Assessment notes: Fragment of tobacco pipe, washed and dry on arrival in lab. Suitable for long-term storage. No further treatment recommended.
SF00066	2009	IRON	Assessment notes: Large iron nail or bolt with heavily corroded metal core and much disruption of surface detail. Covered in an extremely bulky corrosion crust of orange/brown iron corrosion products combined with soil and sand grains. No indication of active post ex. corrosion. Keep desiccated below 15%RH. No investigative conservation recommended.
SF00067	2009	IRON	Assessment notes: Large iron nail with partially corroded metal core and some disruption of surface detail. Square cross-section. Covered in a thick corrosion crust of orange/brown iron corrosion products combined with soil and small stones. No indication of active post ex. corrosion. Keep desiccated below 15%RH. No investigative conservation recommended.
<del>SF00068</del>	2009	IRON	Assessment notes: Large heavily corroded iron spike. Too dense to be worth X-raying. Covered in an extremely thick outer crust of soil combined with orange/brown iron corrosion products in keeping with iron from well aerated, burial environments, (i.e. no indication of having been waterlogged). The crust also contains industrial debris (brick, coal fragments and wood). Presently being stored in non-desiccated conditions, which will eventually lead to corrosion activity, resulting in the loss of surface detail. If to survive long-term storage this object should be desiccated below 15% Relative Humidity. Immediate identification by an industrial finds specialist is recommended if to be retained.
SF00069	2025	STONE	Assessment notes: Fragment of stone. Washed and dry. Stable and suitable for long-term storage. No further conservation recommended.
<del>SF00070</del>	3006	IRON	Assessment notes: Large, modern-looking iron bar. Too dense to be worth X-raying. Covered in a bulky outer crust of soil and orange/brown iron corrosion products in keeping with iron from well aerated, damp burial environments, (i.e. no indication of having been waterlogged). Some damage to one end, where extensive weakening due to corrosion of the core has occurred. Presently being stored in non-desiccated conditions, which will eventually lead to further corrosion activity, resulting in the loss of surface detail. If to survive long-term storage this object should be desiccated below 15% Relative Humidity. Immediate identification by an industrial finds specialist is recommended if to be retained.
SF00071	3006	LEAD ALLOY	Assessment notes: Fragment of thick, heavily corroded lead sheet, with a section folded over on one side. Misshapen with extensive damage to edges and some areas of the surface. Covered in a thin layer of soil and white and grey, crystalline corrosion products. Extensive cracking and crumbling of the surfaces is visible in places. Appears to be stable and suitable for long-term storage under desiccated conditions, <35%RH. No further investigative conservation is recommended.
SF00072	3006	IRON	Assessment notes: Large iron nail with partially corroded metal core, damage to pointed end and some disruption of surface detail. Difficult to see cross-section. Covered in a thick corrosion crust of orange/brown iron



SF00073 3006

COPPER  
ALLOY

corrosion products combined with soil etc. No indication of active post ex. corrosion. Keep desiccated below 15%RH. No investigative conservation recommended.

Assessment notes: Copper alloy nail with flat roughly circular head and a broken shank fragments, both with a square cross-section shank. Possibly associated with timber no.6. Surface covered in a thick layer of soil combined with bright green powdery copper corrosion products, possibly 'bronze disease'. Desiccation <35% RH is recommended for long term storage. No further investigative conservation recommended.

## 9.6. Statement of Potential

A large proportion of the finds appear to be 18<sup>th</sup> century to modern in date. Apart from some re-packaging, they require no further conservation. Assessment by an industrial finds specialist may be required in order to determine which finds are worth retaining in the long term.

Three iron objects from contexts 2007 and 2018 indicate from their corrosion products that water-logging may have occurred in the burial environment at some stage, (see table in section 5).

## 9.7. Recommendations

### 9.7.1 Further Investigative Conservation

The Artefact Researcher recommended no further investigative conservation for the small finds.

### 9.7.2 Analysis and specialist Support

Specialist support by an Industrial Finds Specialist may be required in order to assess some of the large metal finds, if in keeping with the projects research objectives. No further analysis of the small finds has been recommended at this stage.

### 9.7.3 Storage

#### Packaging

Apart from the larger iron objects, which are non-desiccated, all other categories of finds have been packaged appropriately for long term storage. The materials used are archive stable and acid-free. Plastic bags have been pierced to allow airflow within microclimates, reducing the risk of condensation and mould growth. 'Jiffy', (polythene) foam inserts have been added to the bags to provide additional support and protect against mechanical damage during transit. Any replacement of packaging materials should be carried out in consultation with a conservator. Avoid paper or card labels in association with metals, especially lead and lead alloys. Acid vapours will cause active corrosion, (Cronyn, 1990).

#### Storage Environment

Most of the metals and slag are packed in polythene 'Stewart' boxes with silica gel to provide a dry microclimates of less than 15% Relative Humidity which will halt any further corrosion, (Knight, 1992). **Similar desiccated storage should be arranged for the large iron items, presently being stored loose or in plastic bags only.** Each box should contain at least 2x100g bags of silica gel and a humidity indicator strip. It is necessary to monitor the indicator strips regularly; **if any part of the strip turns pink the gel will need to be regenerated.** The fired clay, glass and stone should be stored at 45-60% RH with a stable temperature.



## 10. CONSERVATION LABORATORY TIMBER ASSESSMENT REPORT

### 10.1 Objectives

This report aims to meet the requirements of MAP2, phase 3, Assessment of Potential for Analysis, (English Heritage, 1991). The work carried out has involved the cleaning and examination of the recovered wood assemblage, assessment of their condition, potential for further analysis, recording, dating, retention and conservation.

### 10.2 Procedures

Each piece of wood was unwrapped, washed and cleaned under cold running water, then examined for potential further study and conservation. The material has now been re-wrapped and awaits a decision based on the recommendations made below.

### 10.3 Condition

The wood was in a variable state of preservation. Waterlogged anoxic conditions were maintained in all contexts in which wood survived up to the time of excavation. Several pieces of wood exhibited decay or damage which had occurred before waterlogging, suggesting they had been exposed for some time prior to burial. Most of the wood that was identifiable may be Oak (*Quercus sp.*), but this awaits confirmation by microscopic analysis. Several of the pieces had heavy mineral deposits and/or tar adhering to the surface which could not be removed at this stage.

### 10.4 Dendrochronology and tree ring studies

The wood recovered has little, if any dendrochronological dating potential; most of the timbers were either boxed heart or tangentially faced slabs with insufficient rings for dating. A ring count (no of rings/cm) would give an estimate of growth rate and has been estimated in the recording process.

### 10.5 Listing and Recommendations

Structural timbers are listed first in context and Timber number order, followed by the single small find. Where a recommendation of further work has been made, in most cases this should depend on the importance of the context and the security of its dating. All dimensions are in millimetres.

Context	Timber no.	Comment	Record	Drawing	Sp. ID	Conserve	Notes
2007		Heartwood chipping. 88l, 38w, 23 th.	no	no	yes	no	eroded
2007		Board offcut, 190l, 128w, 24th. Radially faced.	no	no	yes	no	heavily concreted
2007		Board offcut, 180l, 205w, 22th. Radially faced.	no	no	yes	no	heavily concreted
2013	6	Box halved beam, one end sawn, other smashed and broken. Faces and edges hand sawn. One face has single blind mortice cut. Opposing face has an estimated 120 copper alloy nails and nail holes driven home in a variety of linear arrangements. There are also six through holes cut through the faces each of which contains a truncated circular cross section peg. Some of these pegs have saw cuts on the ends indicating	yes	yes	yes	no	much tar adhering

		preparation for fastening with wedges. 1866l, 248w, 98th. Mortice 155l, 44w, 48deep, pegs and peg holes 44dia.						
2018	3	Tangentially faced sawn board with several smaller timber fragments adhering. 854l, 392w, 35th	no	no	yes	no	very degraded and concreted	
2018	3	Complete box quartered peg with chisel point. Roughly octagonal cross section. 314l, 32w, 32th.	yes	yes	yes	no	much concretion/ tar on surface	
2018	3	Broken end of box quartered peg. Roughly septagonal cross section due to damage, originally octagonal? 127l, 43w, 35th.	yes	no	yes	no		
2023	5	14 charred heartwood chippings	no	no	yes	no		
2031	4	heartwood chipping from timber. 227l, 80w, 57 <sup>th</sup> .	no	no	yes	no	eroded before waterlogging	
2031	4	heartwood chipping from timber. 189l, 68w, 46th.	no	no	yes	no	eroded before waterlogging	
2045		Splinter, eroded. 64l, 5w, 4th.	no	no	yes	no		
4020	7	Tangentially faced plank, one end hewn, other end and both faces sawn. Both edges waney. 1278l, 406w, 95th.	no	no	yes	no	good condition, minor shrinkage cracks	
4020	8	Tangentially faced plank, one end hewn, other end and both faces sawn. Both edges waney. Cut from top of log. 715l, 298w, 83th.	no	no	yes	no	good condition	
4020	9	Boxed heart plate with sawn ends and faces. Single oblique drilled hole from one face to adjacent edge. 873l, 278w, 110th.	no	no	yes	no	good condition, some damage to both edges (sapwood loss)	
4025		Offcut from radially faced peg. 58l, 22dia.	yes	no	yes	no	good condition	
4025		Two small sections of roundwood.	no	no	yes	no	eroded	
5006		Section of box quartered timber. 278l, 72w, 52th.	no	no	yes	no	very eroded	
5006		Section of box quartered timber. 289l, 90w, 52th.	no	no	yes	no	very eroded	
Small Find								
4010	SF44	Section of roundwood. 81l, 18dia.	no	no	yes	no	dried. Two more dried heartwood chippings in same bag	

## 10.6 Summary

Further work will be dependent on the importance of the context concerned and on how secure the dating of that context is. Timber 2013, no. 7 is worth drawing at reduced scale and samples of the nails should be extracted for comparison with the small finds assemblage. The small finds include a number of Copper alloy nails or tacks (SF 33, 42, 48, 49, 54, 73) which are very similar to headed versions of those embedded in this timber. The few pegs or sections thereof would also merit further recording and reduced scale drawing. Species identifications on all pieces will need to be done. Unfortunately, unless they are of pressing importance locally, conservation cannot be recommended; the assemblage will need to be discarded once study is complete.



## 11. CONCLUSIONS AND RECOMMENDATIONS

The significance of the sail loft and recommendations are discussed in section 12.

The Whitehall shipyard was established in the 18<sup>th</sup> century and proved to have a longer working life than all other Whitby shipyards, closing only in the early years of the 20<sup>th</sup> century. The buildings associated with former Shipyard site have been demolished and the site has been levelled. However, excavated evidence suggests that the lower parts of the major structures associated with the Whitehall Shipyard survive largely intact below ground level. This includes buildings and shipbuilding and repair facilities. On the basis of the evidence from the limited areas examined these remains appear likely to span the late 18<sup>th</sup> – early 20<sup>th</sup> century. Whilst upstanding fabric of the yard has been removed the degree of truncation to below ground deposits and features appears to be limited. This no doubt relates to the lack of development at the site since the yard's closure. What below ground disturbance was apparent within the evaluation trenches appears to relate primarily to the robbing of structures for the retrieval of high quality stone. This was particularly apparent with the dry-dock in Trench 3, whilst in Trench 4 the same phenomenon may account for the loss of much of the timber floor. The only area examined in which below ground preservation was not good was at the extreme east of the site in the area of Trench 1. It appears almost certain that here the levelling of the site has involved a reduction in ground level, hence the non appearance of anticipated 19<sup>th</sup> century building remains in Trench 1. On the whole the excavated evidence points towards the below ground survival of extensive and well preserved parts of a late 18<sup>th</sup> – 19<sup>th</sup> century shipyard.

In the northerly part of the site the remains of a building were revealed 0.30 – 0.50m below ground. This building may have formed part of a range which may relate to the earliest surviving part of the sail loft. This building appears to stand on the site which historic evidence suggests was the site of a medieval hospital. There is no evidence to suggest that the remains of the building in Trench 5 were part of this hospital. However, the reuse of a 15<sup>th</sup> century moulded stone within the fabric of the northern wall may indicate that this building was constructed on the site of an earlier building, possibly reusing fabric from an earlier building, and possibly using similar construction techniques. Further excavation would be required to confirm the link of the remains in Trench 5 with the sail loft and to confirm the techniques of construction which have been surmised. Additional excavation might also help to establish whether a medieval building previously stood on this site.

The bulk of the excavated deposits encountered at a high level were dry, though at depth waterlogged deposits were encountered. The near anaerobic conditions within this latter category facilitated the preservation of timber and other remains. Some only partially decayed timbers were even present at the higher non waterlogged levels, though their preservation here no doubt relates to their being of relatively late date. The survey of the few upstanding remains necessarily focussed heavily on the river frontage. Perhaps the most significant feature here is the old stone quay in the northern part of the site. On the basis of cartographic evidence there is a good case to be made for this being of at least earlier 18<sup>th</sup> century date.

A fair degree of understanding of the development of the shipyard can be gained from the synthesis of cartographic and excavated sources of evidence. Some of the structures and buildings depicted on maps were located on the ground. The maps in particular offer great insight into the steady westward advance of the shipyard as its expansion narrowed the course of the River Esk. A number of slipways, inlets and indented quays are depicted in these sources.



Archaeologically, this process of land reclamation was attested by an extensive series of thick dumped deposits, which for the most part were derived from re-deposited natural materials.

Whilst the presence of well preserved shipyard features at the site is a matter of fact, the significance or importance of these is perhaps more difficult to assess. A considerable number of shipyards were present in Whitby until the 19<sup>th</sup> century though the Whitehall Yard was the longest lived of these and possibly also the largest. It was also the only local yard to successfully convert from the building of wooden ships to those of iron and later steel. Many of the Whitby yards, including the Whitehall, were of great contemporary renown within the larger shipping world. None of these great Whitby Yards survive as above ground features today. It is certain that some, at least, of these local yards have been disturbed below ground level by subsequent development, for example, by rail lines to the west of the river, the construction of electrical installations and most recently by the Co-operative supermarket and adjacent buildings. Viewed within this broader context then, the well preserved deposits of the Whitehall Shipyard may be considered as of at least local and regional significance.

In light of the significance of the Whitehall Shipyard, the archaeological deposits present should be taken into consideration in determining the form of any development at the site. The nature of this "consideration" will be largely dependent upon the character and degree of below ground disturbance that such development will cause. At the time of writing these are largely of unknown nature and location. That said, in the case of any deep ground disturbance it may be advisable that wherever possible this be targeted away from the location of significant known structural features. The digitised historic maps transposed to the modern digital Ordnance Survey map of the site have proved to be of tolerably accurate fit and may prove to be an aid in this regard. Mention must also be made of the old stone quay in the northern part of the site. This is a feature of some significance and is in a good state of preservation. Consideration should also be given to the preservation of certain of the shipyard remains as "exposed features" within the overall development. Should extensive or significant areas of the yard be subject to total loss through development then the opportunity to archaeologically record these in sufficient detail should be provided.



## 12. SOURCES

Atkinson, J.C., 1894, Memorials of Old Whitby

Browne, H.B., 1946, Chapters of Whitby History 1823-1946

CBA Yorkshire, 1998, Forum

Charlton, L. 1779, A History of Whitby and Whitby Abbey

Cronyn, J. M., 1990, The Elements of Archaeological Conservation, p207

Daysh, G.H.J., (ed.), 1958, A Survey of Whitby and the Surrounding Area

Dobney, K., Hall, A. R., Kenward, H. K. and Milles, A., 1992, A working classification of sample types for environmental archaeology. *Circaea*, the Journal of the Association for Environmental Archaeology 9 (for 1991), 24-6.

English Heritage, 1991, Management of Archaeological Projects

Jones, S.K., 1982, Maritime History of the Port of Whitby, 1700-1914, unpublished thesis UCL, London

Kenward, H. K., Engleman, C., Robertson, A. and Large, F., 1986, Rapid scanning of urban archaeological deposits for insect remains. *Circaea* 3, 163-172.

Kenward, H. K., Hall, A. R. and Jones, A. K. G., 1980, A tested set of techniques for the extraction of plant and animal macrofossils from waterlogged archaeological deposits. *Science and Archaeology* 22, 3-15.

Knight, B., 1990, A Review of the Corrosion of Iron From Terrestrial Sites and the Problem of Post-Excavation Corrosion, *The Conservator* No. 14, pp 37-43.

Lott, B., 1999, An Archaeological Desk Top Study, Green Lane, Whitby, North Yorkshire, Y.A.T Field Report 1999 number 1

Long, A and R., 1974, A Shipping Venture, Turnbull Scott and Co. 1872-1972

Northern Archaeological Associates, 1997, Assessment of Stage 1 Geotechnical Investigations Report, NAA97/32

Northern Archaeological Associates, 1998A, Archaeological Evaluation and Monitoring of Geotechnical Investigations Report, NAA9/25

Northern Archaeological Associates, 1998, Project Design for Archaeological Excavation and Monitoring Report, NAA98/28

Surtees Society Vol 69, 1878, Whitby Cartulary Vol. 1

Surtees Society Vol 72, 1879, Whitby Cartulary Vol. 2

Weatherill, R., 1908, *The Ancient Port of Whitby and its Ships*

White, A., 1993, *A History of Whitby*

YAJRS Vol. CLI, 116

Young, C., 1817, *A History of Whitby*

North Yorkshire Sites and Monuments Records

Photographic Archive Philosophical and Literary Society

#### Maps

Wooler, 1740, *Plan and Prospect of the Town and Harbour, Whitby Philosophical and Literary Society*, WHITM : Map 377 and WHITM : 70905

Charlton, L., 1778, *Plan of Whitby*,

Wood, J., 1828, *Town Plan of Whitby*, NYRO ZW(M) 1/91, MIC 2003/288

Pickernell, Francis, 1841, *Plan of the Town and Harbour of Whitby for Colonel Chomley*, NYCC RO ZW(M) 1/92, MIC 2003/292

Ordnance Survey, 1<sup>st</sup> edition, 1852, *Map of the Shipyard Area of Whitby*, scale 5 feet to 1 mile, NYCC RO ZW(M) 1/94, MIC 2003/287-301, 298

*Town Plan of Whitby*, published by Horne and Son, n.d, NYCC RO ZW(M) 1/102, MIC 2003/331

*Map of Church Street, Dry Docks, Shipyards, Whitehall and Porteus Slip, Fishburn's Docks*, n.d, (c. 1866), scale 11" to 1000 feet NYCC RO ZW(M) 1/106, MIC 2003/336

Ordnance Survey, 2<sup>nd</sup> edition, 1893, NYCC RO MIC 3014/69

Ordnance Survey 3<sup>rd</sup> edition, 25" to the mile, 1913, NYCC RO ZW(M) 1/119, MIC 2003/386



### 13. THE OLD SAIL LOFT by Colin Briden (Historic Building Archaeologist)

#### 13.1 Introduction

This report describes and assesses the building now known as The Old Sail Loft, Whitby. The building appears – as *The Shipyard Club* – at Grade II on the Statutory List of Buildings of Special Architectural or Historic Interest. The brief list description is appended to the text of the report.

The Old Sail Loft lies on the south bank of the Spital Beck on the east side of the Upper Harbour (Figure 1). The site – on an area of reclaimed foreshore – is an interesting one as 18<sup>th</sup> century sources claim that it was formerly occupied by the Hospital of St John the Baptist; some consideration was therefore given to the possibility of encountering fabric of earlier origin than the supposed early 19<sup>th</sup> century date of the Old Sail Loft itself. Immediately to the north-east lies Spital Bridge: a single round-headed masonry arch approached by high bridge ramps from each direction. This bridge is said to be of 18<sup>th</sup> century date in its present form but it may incorporate older fabric. The question is an interesting one as the masonry of the earliest phase of the Sail Loft is either inserted into, or overlaid by, the southern bridge ramp.

The purpose of the report is to inform future proposals for refurbishment. To that end it was hoped that all parts of the building would be examined but in practice this turned out to be difficult. A serious fire followed by partial demolition of the upper walls has affected the interior to such an extent that parts of the building must now be considered dangerous. In particular the upper floors of the main block were inaccessible either because they are on the point of collapse or because they are filled with fallen masonry and burnt roof members. However, the more interesting and historically important areas were reasonably accessible and much of the rest could be gingerly examined from the edges of floors or viewed with binoculars. The access difficulty has not affected the interpretation of the building.

The majority of the primary documentary research will be reported in the final report. However, some useful items were found in the collection of the Whitby Literary and Philosophical Society. These included a fine run of historical maps and a photograph album of 1914-1918 which has a number of views of the neighbouring Whitehall shipyard and the Old Sail Loft. This evidence is discussed more fully below.

The building is L-shaped on plan and consists of a long, narrow, east-west range and a more substantial block with its roof aligned north-south. On further acquaintance these two elements turn out to be chronologically, functionally, and (to a certain extent) structurally distinct; so in the description which follows they are labelled, for convenience, the *long range* and the *sail loft range* respectively. A sketch plan has been produced which illustrates both the general arrangement and also the phasing of the development of the building (Figure 12). There are in fact four identifiable phases:

<b>Phase I</b>	<b>pre-17<sup>th</sup> century</b>
<b>Phase II</b>	<b>late 17<sup>th</sup>/early 18<sup>th</sup> century</b>
<b>Phase III</b>	<b>before 1778</b>
<b>Phase IV</b>	<b>modern alteration</b>

The dating of each of these phases is based upon a combination of the rather contradictory map evidence with masonry detailing. There is no doubt that the dating of Phases I and II could be refined by opening-up work.

Sailmaking in Whitby was a major industry in the town; by the end of the American War of Independence it employed nine hundred people who between them produced 5000 yards of sailcloth a month. Nearly all of this material was used in the local production of new sails or in the repair of old ones. The traditional winter lay-up of large numbers of ships engaged in the coal and whaling trades also generated a need for storage – under dry and well-ventilated conditions – of vast areas of sailcloth. No sign of any of these functions was seen in the Old Sail Loft but the difficulty of reaching some areas of the upper floors may mean that the evidence has not yet been noticed. However it is possible that in the early 18<sup>th</sup> century the long range was used for spinning and weaving flax; while it is certain that the sail loft block was added to provide large areas of clear floor for manufacture and storage of the finished article.

## **13.2 HISTORIC MAP EVIDENCE**

### *13.2.1 Wooler 1740*

Wooler's plan of the town includes the site of the Old Sail Loft and shows the long range running down to a sea wall or quay (Figure 2). The obtuse angle made by the long axis of the range with its west gable is interesting as walls constructed at just this angle turned up in an evaluation trench excavated at the time of this assessment. This area now lies beyond the present building and the evidence from both these sources therefore implies that the range was once longer.

At the east end of the range Wooler shows a cross-wing. This is difficult to interpret as there is insufficient room on this part of the site for a structure of this size unless it were placed on higher ground. However the sketchy nature of the survey, and the conventional depiction of buildings, do not encourage speculation; all that can be said for certain is that Wooler confirms a date before 1740 for the long range.

### *13.2.2 Charlton 1778*

Although the evidence from the fabric is clear – the long range is older than the sail loft range – Charlton fails to show the former (Figure 25). This apparent omission may be because, like Wooler before him, he preferred to show buildings conventionally. Charlton confirms the date of the sail loft range and incidentally contradicts the early 19<sup>th</sup> century date given in the statutory list description. Charlton's plan also shows how the sail loft range was built so that its north gable end wall actually rose from the foreshore of the Spital Beck.