

POST-EXCAVATION ASSESSMENT REPORT

SCCAS REPORT No. 2009/087

**UCS Orwell Quay, Ipswich, Suffolk
IPS 601 (IAS 9013)**

Kieron Heard

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Lucy Robinson, County Director of Environment and Transport
Endeavour House, Russell Road, Ipswich, IP1 2BX.

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Summary

This report presents the evidence from an archaeological evaluation and excavation at Orwell Quay, Ipswich, Suffolk. It provides a quantification and assessment of the site archive and considers the potential of the archive to answer specific research questions. The significance of the data is assessed and recommendations for dissemination of the results of the fieldwork are made. In this instance it is recommended that little further analysis or reporting is required and that this post-excavation assessment should be made available through the OASIS archaeological database as a 'grey literature' report.

The site is located within the former floodplain of the River Orwell, to the east of the Ipswich Wet Dock. Deposits of river terrace sand and gravel were recorded at a maximum (truncated) height of 3.50m OD in the eastern half of the site, sloping down gradually to the west; due to increasing depth they could not be observed on the riverward side of the site. They are presumably overlaid by alluvial clays and silts but again because of depth restrictions these could not be observed. Cartographic evidence confirms that the western part of the site was within the inter-tidal zone of the river until the early 19th century, and documentary sources refer to this as an area of mudflats.

The river terrace deposits are overlaid by a natural soil profile of weakly argillic brown sands, approximately 0.40m thick. These have been amended by medieval or later agricultural/horticultural activity and include small amounts of medieval pottery.

A large, cellared building (Building 1) stood on the edge of the slightly higher ground overlooking the river. It was probably built in the 17th- or early 18th century, perhaps as a merchant's warehouse. Its walls were constructed of brick and stone, the latter including a large percentage of re-used architectural mouldings derived from a 14th-century ecclesiastical building or high status lay building such as a guildhall. In the 18th century Building 1 was sub-

divided into three units and perhaps converted to domestic use. Various alterations were recorded, including the laying of new floors and the installation of fireplaces, a new entrance and a sub-floor drainage system. The building can be identified from cartographic and documentary sources as being part of *White's Cottages*, recorded as early as 1746 and perhaps shown on Ogilby's map of 1674.

As stated above, the western (riverward) part of the site remained within the inter-tidal zone of the river until the first decades of the 19th century. At that time the Commissioners of the River Orwell reclaimed the land to create a new ballast wharf and adjoining yards. Extensive dumped deposits recorded to the southwest of Building 1 relate to this period of activity.

In the 1840s the site was acquired by Robert Ransome for an extension to his nearby ironworks, and soon afterwards Building 1 was demolished to make way for a new road and expansion of Ransome's *Orwell Works*. The Orwell Works occupied the site until just after the Second World War, and many of its buildings were still in use as warehouses until they were demolished in the 1990s. Extensive remains of the Orwell Works survive on the site, just below ground level. These include linear foundations and stanchion bases of brick or concrete, cellars, drainage pipes and flues or brick-lined channels.

1 Introduction

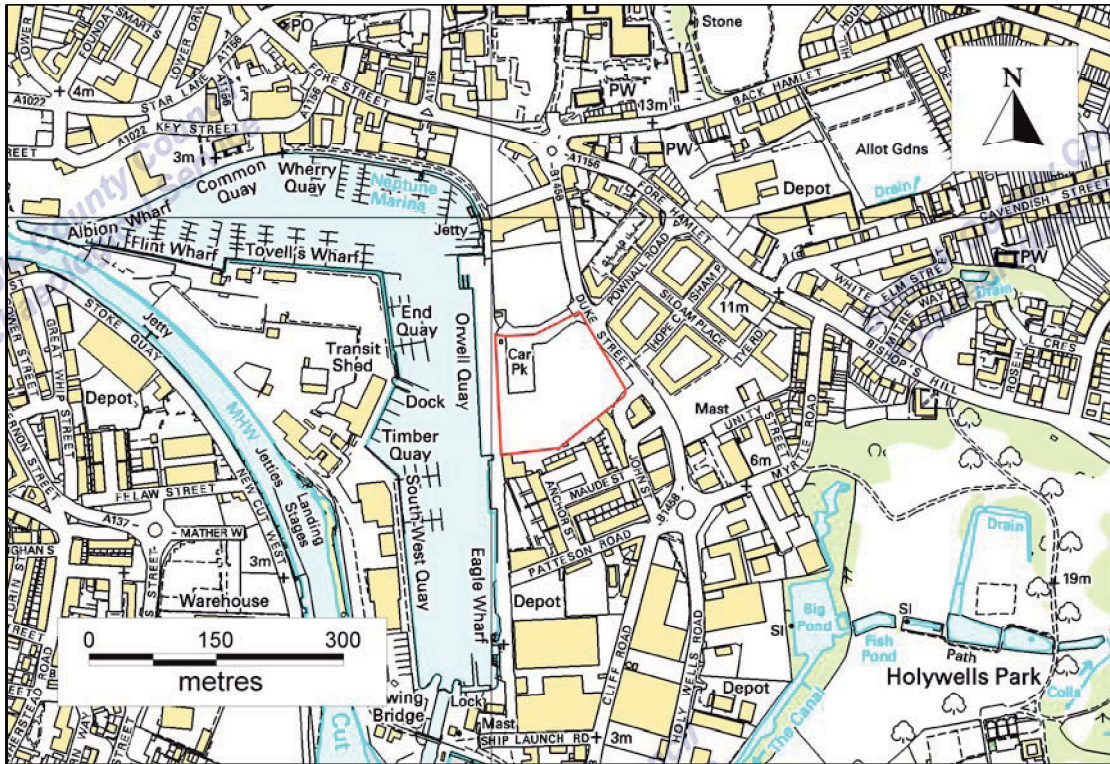
1.1 Site location

An archaeological trenched evaluation and subsequent excavation took place at Orwell Quay, Duke Street, Ipswich, described hereafter as 'the site'. The site is in the centre of Ipswich at Ordnance Survey National Grid Reference TM 17081 43804 (Fig. 1) and encompasses an area of approximately 17670m². It is bounded by the Ipswich Wet Dock (Ipswich Marina) to the west, Duke Street to the east, a car park to the north and apartment blocks to the south (Fig. 2).



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Figure 1. Site location map (general)



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Figure 2. Site location map (detailed)

1.2 The scope of the project

This report was commissioned by Turner and Townsend Project Management Ltd on behalf of University Campus Suffolk (UCS) and was produced by the Suffolk County Council Archaeological Service (SCCAS). It has been prepared in accordance with the relevant Brief and Specification (Wade, 2008) and is consistent with the principles of Management of Archaeological Projects 2 (MAP2), notably appendices 4 and 5 (English Heritage, 1991). The principal aims of the project are as follows:

- Summarise the results of the archaeological fieldwork
- Quantify the site archive and review the post-excavation work that has been undertaken to date

- Assess the potential of the site archive to answer research aims defined in the Brief and Specification (Wade, 2008) and the relevant Desk-Based Assessment (Gardner & Breen, 2007)
- Assess the significance of the data in relation to the relevant Regional Research Framework (Brown & Glazebrook, 1997; Glazebrook, 2000)
- Make recommendations for further analysis and dissemination of the results of the fieldwork

1.3 Circumstances and dates of fieldwork

The fieldwork was carried out by SCCAS, Field Team in response to an archaeological condition relating to planning permission for Phase 2 of the UCS Development (Application number: IP/08/00750/FUL). Specifically, the proposed development includes the construction of two student residence blocks, an academic building, retail units and a car park.

Prior to the archaeological fieldwork the site was in use as *ad hoc* car park. During the fieldwork part of the site was still in use as a car park and associated access road, and was therefore not available for evaluation.

A trenched evaluation took place from 19 August to 12 September 2008, in accordance with a Brief and Specification issued by SCCAS, Conservation Team (Wade, 2008) and a Safety and Method Statement prepared by SCCAS, Field Team (Gardner, 2008).

Following the breaking-out of the ground slabs an evaluation trench (Fig. 3) was excavated using a tracked 360° mechanical excavator fitted with a 1.8m wide, toothless bucket. The trench was excavated either to the surface of the natural stratum or to the top of archaeological deposits and structures. A short stretch near the west end of the proposed trench could not be broken out due to the proximity of the trench to parked cars.

The exposed archaeological features, soil horizons and natural strata were recorded using a unique sequence of context numbers in the range 0001–0440. They were drawn in plan (at 1:20) and section (at scales of 1:10 and 1:20, as appropriate) on 290 x 320mm sheets of gridded drawing film. Written records were made on *pro-forma* context sheets. A photographic record was made, consisting of monochrome prints and high resolution digital images.

A total station theodolite was used to locate the evaluation trench. An on-site temporary bench mark of 3.79m OD was established by reference to an Ordnance Survey bench mark of 4.95m OD located at Island House, adjacent to the site.

The evaluation trench measured 134m long (including a short, right-angled extension at its western end) and covered an area of 241m², representing 1.4% of the total area of the proposed development and 1.7% of the area available for evaluation.

The Brief and Specification (Wade, 2008) called for a second phase of evaluation consisting of three trench-sheeted boxes positioned strategically along the evaluation trench in order to provide access to deeper deposits. Initial results from the evaluation trench suggested that this approach was inappropriate; after consultation with Keith Wade the second phase of evaluation was cancelled in favour of a targeted area of excavation (Fig. 3) to expose the remains of a cellared building identified towards the northeast end of the evaluation trench. This area of excavation measured 95m².

The excavation was carried out from 15 September to 07 October 2008. The backfill of the cellar was excavated mechanically and the structural remains and associated deposits and features were excavated and recorded using the same methods employed for the evaluation phase.



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Figure 3. Plan of the evaluation trench (blue) and area of excavation (green)

2 Geological, topographic, archaeological and historical background

2.1 Introduction

The geological, topographic, archaeological and historical backgrounds to the evaluation are described in the relevant Desk-Based Assessment (Gardner & Breen, 2007). The historical background is explored more fully in Appendix 2. The following brief summaries are drawn largely from the Desk-Based Assessment and Appendix 2, with some additional data based on subsequent cartographic research and a review of published sources.

2.2 Geology and topography

The site is located within the former floodplain on the east side of the River Orwell; the natural ground surface will therefore slope downwards from east to

west. The superficial geology in this part of Ipswich comprises glaciofluvial drift deposits of sand and gravel, formed into terraces by fluvial erosion. These deposits have been recorded extensively in the course of previous archaeological investigations along the waterfront and are generally sealed by alluvial silts and land reclamation dumps.

Modern ground level within the site falls slightly from east to west, being at 4.00m AOD along the Duke Street frontage and 3.30m AOD along the Orwell Quay frontage.

2.3 Archaeology

Apart from the stray find of a Neolithic/Bronze Age greenstone axe at the Orwell Works in 1935 (Historic Environment Record number: IPS 138) there is no evidence of prehistoric activity within 250m of the site. Evidence of Roman activity is absent entirely.

The site is located at least 550m southeast of the Early to Middle Saxon trading centre of *Gipeswic* – the historic core of modern Ipswich. A possible waterfront revetment of Middle to Late Saxon date at the Neptune Quay site, approximately 250m north of the Orwell Quay site, suggests some suburban activity or occupation outside the main area of Saxon settlement; it is unlikely that such activity would have extended downstream as far as Orwell Quay although exploitation along the riverbank is likely to have taken place and might have left some evidence in the form of submerged boats, jetties, fish traps, oyster pits, etc.

The Neptune Quay site also provided evidence for medieval activity in the form of ditches, pits, isolated burials and an oven. Significantly, that site contained part of a 14th–16th century stone quay wall with associated metallised surface behind, demonstrating late medieval land reclamation and consolidation of the riverbank outside the town. This evidence is supported by scattered finds of medieval material and deposits in the vicinity of Orwell Quay, but it is considered unlikely that there was significant activity or

occupation on the site in the medieval period when much of it was located within the inter-tidal zone.

2.4 History

Cartographic evidence confirms that until the early 19th century the site was largely within the inter-tidal zone of the River Orwell, as shown on Figure 4. To the north of the site were the St Clement shipyards, which for several hundred years had been at the heart of Ipswich's shipbuilding industry. On their landward side the shipyards were bounded by Duke Street (Duck Street on Pennington's map); this road continued southwards beyond the shipyards and along the edge of the river. Over the years it was known by various names including 'the way to Greenwich'.

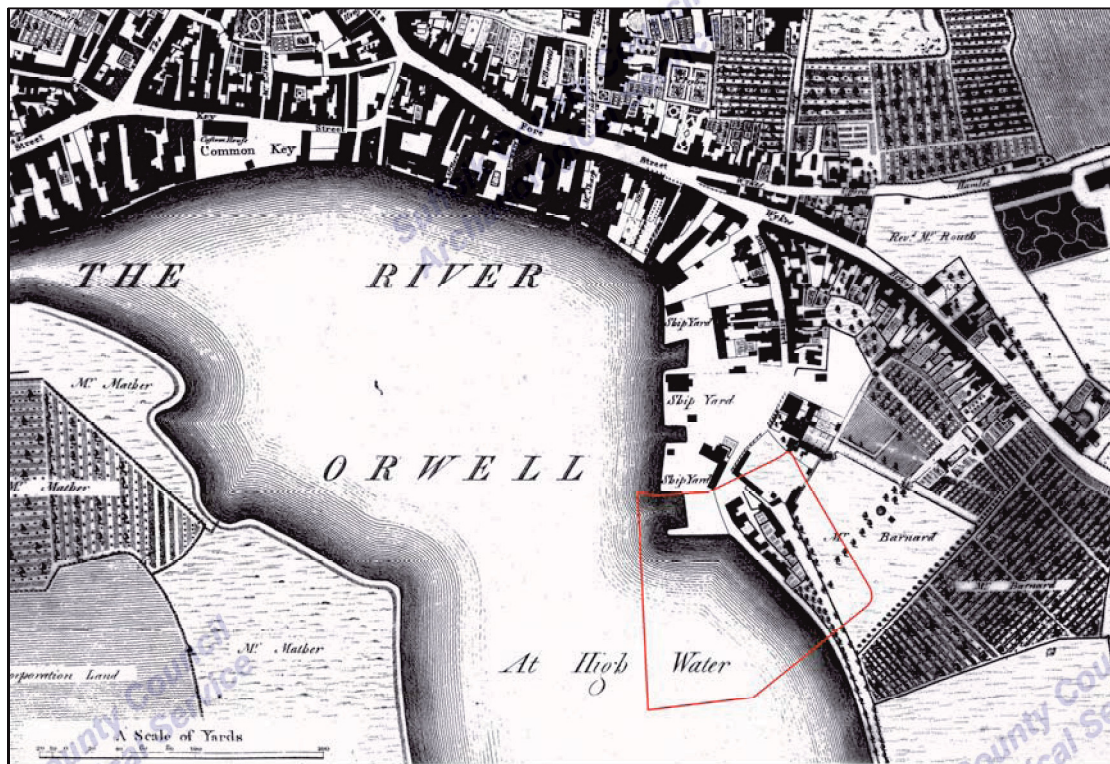


Figure 4. Extract from Pennington's map of 1778 showing the approximate location of the site (red)

The buildings that lined the road and overlooked the river were known as White's Cottages and the area where they stood was called Green Yard. Their date of construction is not known; there are certainly buildings shown at this location on Ogilby's map of 1674. The cottages were described in 1746 as 'six

several messuages adjoining together their divided into twelve tenements or dwellings ... to the eastward of the Ship-yards there late the estate of Christopher Mallett'. In 1801 three of the cottages were described as 'lately rebuilt', and in the same year they were depicted on a print of 'Raymond's Lower Shipyard, St Clement's, shortly before reclamation of the shallows' (Moffat 2002, 97). In 1851 the cottages were described as 'lately been pulled down and the site thereof laid partly into the public road & partly into the land & yards of R. Ransome'. Until 1811 White's Cottages were in the ownership of Joseph Barton, an Ipswich builder. In 1851 John Chevalier Cobbold sold the site of these cottages to Robert Ransome, owner of the Orwell Works.

By the beginning of the 19th century Ipswich's maritime trade and commerce were suffering greatly as a result of the silting up of the River Orwell and the inability of larger ships to access the town's Common Quay. By an Act of Parliament in 1805 River Commissioners were appointed to take over management of the river from Ipswich Corporation, who had been negligent of their responsibilities for many years. The task of the Commissioners was to deepen the river channels and straighten them to allow vessels up to 250 tons to reach the Common Quay. To this end, they purchased a 'Steam Dredging Engine' and this went into operation in July 1806, excavating thousands of tons of silt, sand and gravel from the bed of the river.

The sand and gravel was an important source of income for the Commissioners since it could be sold as ballast to the owners of un-laden, outward bound ships. Initially the Commissioners acquired the lease of a former shipyard for use as a ballast wharf. In 1808 they purchased from Ipswich Corporation 3.5 acres of mudflats lying to the south of the St Clements shipyards – effectively the western half of the archaeological site. Deposits dredged from the river bed were dumped here to create two areas of new land separated by an inlet or dock, as shown on Figure 5.



Figure 5. Extract from Ellis's map of 1839 showing the approximate location of the site (red)

The land to the south of the new dock became the River Commissioners' new Ballast Wharf, with the original site being vacated by 1820. The stone walls of the Ballast Wharf projected into the river, beyond the former waterfront (as shown on Figure 5) until they were incorporated into the present Orwell Quay in 1968.

The new land to the north of the dock was ready for industrial development by 1819 and was divided into two yards. The northern yard was leased for the erection of a limekiln, and the southern yard was let to Benjamin Raymond for a shipyard, although no vessels of note were ever built there by Raymond. Two smacks and a barge were built at the yard by a subsequent owner in the late 1820s and early 1830s, but the site seems to have been used mainly as a timber yard.

Both of these yards saw several changes of ownership before the northern one was acquired in 1837 by the firm of Ransome, Sims and Jefferies for an extension to their ironworks, based since 1789 at St Margaret's Ditches, Ipswich. By that time the company was already famous, notably for the discovery in 1803 of a process of chilling cast iron to harden it. They introduced gas lighting to Ipswich in 1817, built the new cast-iron Stoke Bridge in 1818 and began making the first lawnmowers in 1832.

The Commissioners made considerably improvements to the river but were unable to keep pace with the increasing demands of trade and industry. In 1836 a proposal was made for the construction of the Ipswich Wet Dock – the largest of its kind in England. Construction began in 1838 and took four years to complete. The old St Clement shipyards were enclosed by the new dock wall and associated Public Quay and the former wet docks (including the one to the north of the Ballast Wharf) were backfilled. The River Commissioners were replaced by Dock Commissioners, who had a new ballast wharf built further downstream.

Robert Ransome acquired the former Ballast Wharf (and the yard to the north) in 1847 for an extension to his ironworks, and the former site at St Margaret's Ditches was abandoned in 1849. Ultimately the Orwell Works expanded to include all the land between the new Wet Dock to the west and Duke Street to the east. At the Orwell Works site the company was able to expand its lawn mower production and also manufacture a wide range of other agricultural machinery (including portable steam engines) and railway equipment. They remained at Orwell Works until just after the Second World War when production was gradually moved to a new site at Nacton.

Many of the old buildings of the Orwell Works were extant in the 1990s and were used by the Port Authorities and other dock users for warehousing. The complex development of the Orwell Works over the one hundred years of its history can be traced through maps and plans, and is described more fully in the Desk-Based Assessment and Appendix 2 of this report.

3 Original research aims

The original research aims of the project, as defined in the Brief and Specification for the trenched evaluation (Wade, 2008), were as follows:

OR1: Identify the date, approximate form and purpose of any archaeological deposit within the application area, together with its likely extent, localised depth and quality of preservation

OR2: Evaluate the likely impact of past land uses and natural soil processes

OR3: Define the potential for existing damage to archaeological deposits

OR4: Define the potential of alluvial deposits

OR5: Establish the potential for waterlogged organic deposits in the proposal area. Define the location and depth of such deposits and their vulnerability to damage by development

A number of more specific research aims were defined in the Desk-Based Assessment (Gardner, 2007):

OR6: Confirm and record the presence of the 17th-century quay wall, likely to be encountered along the far western boundary of the site

OR7: Determine the extent of truncation caused by cellaring/occupation along the former Foundry Road on the north-eastern boundary of the site

OR8: Assess the extent and nature, and confirm the date, of reclamation activity across the site

OR9: Record the topography of undisturbed natural river gravels where possible

OR10: Identify and record any evidence for the post-medieval shipbuilding known to have taken place on the site, particularly any evidence for large, deliberately dug docks

OR11: Assess whether any earlier occupation (late medieval or earlier) took place along this stretch of the river prior to the major post-medieval reclamation episodes

4 Site sequence: results of the fieldwork

4.1 Introduction

The following is a chronological summary of the results of the fieldwork. For the purposes of this post-excavation assessment the archaeological deposits and features have been assigned to *Groups* of related contexts (numbered G2001–G2156), the most significant of which are described below. A complete list and brief descriptions of the Groups are presented in Appendix 3.

4.2 Natural strata and topography

Natural strata (G2006; not illustrated) were recorded only in the north-eastern part of the evaluation trench. They consist of horizontally bedded sands and gravels and occur at a maximum (truncated) height of 3.50m OD at the extreme northeast end of the trench. The surface of these deposits slopes gently down to the southwest, to an un-truncated height of 3.00m OD at a distance of 26m from the end of the trench, indicating a very shallow gradient of 1 in 52. A similar deposit (G2098; not illustrated) was recorded at 1.40m OD in a machine-dug sondage 44m from the end of the trench, indicating that the gradient increases to approximately 1 in 11. Beyond this point the natural

strata were not observed, being at considerable depth below ground level; certainly, at the west end of the trench they are below –0.70m OD.

4.3 Medieval

The natural sands and gravels at the northeast end of the evaluation trench (G2006) are sealed by a fairly homogenous deposit of mid to dark brown silty sand containing small to medium fragments of pottery, bone and ceramic building material (G2005). This deposit has been truncated horizontally but has a maximum surviving thickness of 0.44m. Detailed analysis (see Appendix 4) indicates that it is ‘an over-thickened and weakly amended, cultivated soil formed in the local weakly argillic, brown sands’ – in other words, a worked soil horizon. Seven small sherds of pottery recovered from the deposit are dated to the 13–15th centuries.

4.4 Post-medieval

Introduction

Post-medieval activity on the site can be divided into three broad and overlapping phases:

- the construction and use of a large, cellared building (Building 1)
- wholesale land reclamation in the western part of the site
- the construction and use of the Orwell Works (ironworks)

Building 1

Phase 1 (construction)

The earliest evidence for occupation of the site is a large, cellared building (Building 1; Figs. 6–15) located near the northeast end of the evaluated area.

The building measures 11.30m northwest–southeast x 3.60m northeast–southwest and its walls survive to a maximum height of 0.95m. The construction cut for the cellar has removed worked soil deposit G2005 and extends into the underlying natural sand and gravel G2006 to a depth of approximately 0.60m. The bases of the walls are at approximately 1.90m below the current ground surface.

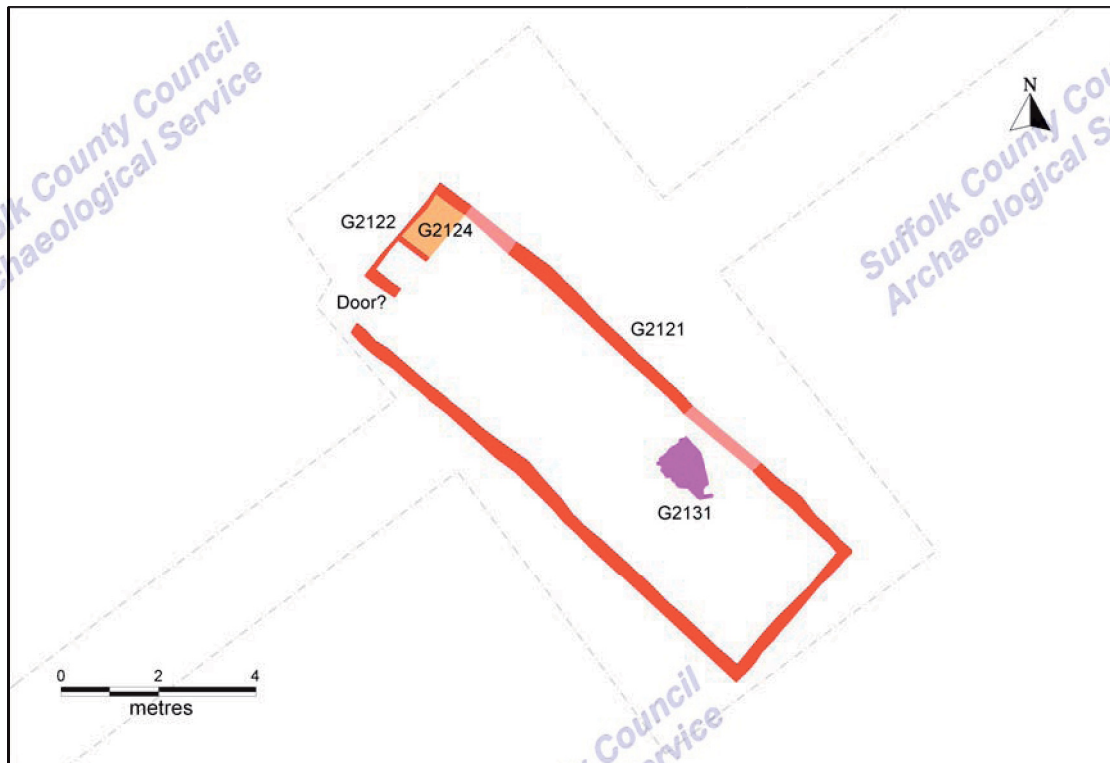


Figure 6. Plan of Building 1 (Phase 1)

Key: Red = walls (found); Pink = walls (conjectured); Orange = hearth; Purple = floor

Generally the walls (G2121; Fig. 6) are about 0.30m wide and built free-standing against the vertical sides of the construction cut for the cellar. They are constructed of a randomly coursed mixture of stone blocks and bricks (70:30) bonded with a degraded, buff-coloured, sandy mortar. At the base of each wall there is an offset course of brick headers (including half- and three-quarter bats) backed by brick rubble that projects 70mm from the face of the wall.

The walls are fair-faced internally but with brick and stone rubble infill behind. The exposed blocks have at least one dressed face but include a large number of squared (ashlar) blocks and re-used architectural mouldings. Provisional petrological identification suggests that clunch and limestone are used primarily for the ashlar blocks and mouldings, with occasional septaria and flint occurring mainly as rubble behind the face.

The bricks are relatively soft, red and un-frogged, with average dimensions of 240 x 110 x 60mm. They are generally concentrated in discrete areas, where they are laid on bed in random bonding patterns (Fig. 7). There is also occasional use of roof tiles and re-used fragments of mortar.



Figure 7. Part of the northeast wall of Building 1, displaying the extensive re-use of architectural mouldings. Note that the brick masonry bonded with grey mortar above and to the right of the photographic scale is part of a later structure (1m scale)

At the northwest end of Building 1 the walls are constructed entirely of bricks (G2122), surviving to a maximum height of 0.60m (nine courses). The bricks are relatively soft, red and un-frogged with average dimensions of 240 x 110 x 60mm (apparently the same as those used elsewhere in the building), and are bonded with the same buff-coloured, sandy mortar. The end wall of the building is rather flimsy, being stretcher-built and only one brick-width wide. The two walls that are perpendicular to this end wall (see Figure 8) are more substantial, being one brick-length wide and built of alternate header/stretcher courses. These form an 'alcove' 2.0m long x 0.70m wide, bisected by a narrower (stretcher-built) wall on a base of headers. The larger space to the

northeast of the dividing wall is interpreted as a fireplace; it contains a hearth of broken bricks and flagstone fragments (G2124) with a surface coating of charcoal and soot (Fig. 8).

A gap in the walls at the northwest corner of Building 1 (Figs. 6 & 8) is interpreted as a probable doorway or stairwell into the cellar. It is unclear whether the end wall and fireplace at the northwest end of Building 1 were part of the original structure or represent a subsequent rebuild; the building might originally have been open-ended to the northwest.



Figure 8. View of the northwest end of Building 1, showing fireplace G2124 to the right and the probable doorway or stairwell to the left (1m scale)

There is no conclusive evidence for the original cellar floor. A patch of brick flooring (G2131; Fig. 6) near the southeast end of the cellar *might* be original since it appears to have been truncated during Phase 2 of the building's development. It is built of rows of bricks laid diagonally to the walls of the cellar. Alternatively, it is possible that the projecting brick courses at the bases of the walls supported timber joists for plank flooring; this would have been removed during later phases of development.

There are no indications that Building 1 was divided into separate rooms; certainly at cellar level it seems to have contained a single large space. However, there might have been timber-framed or lath-and-plaster partition walls that were removed during later refurbishment, leaving no evidence.

Phase 2 (refurbishment)

During Phase 2 an internal fireplace was inserted and new floors were laid in the cellar, suggesting a major refurbishment of Building 1 (Fig. 9).

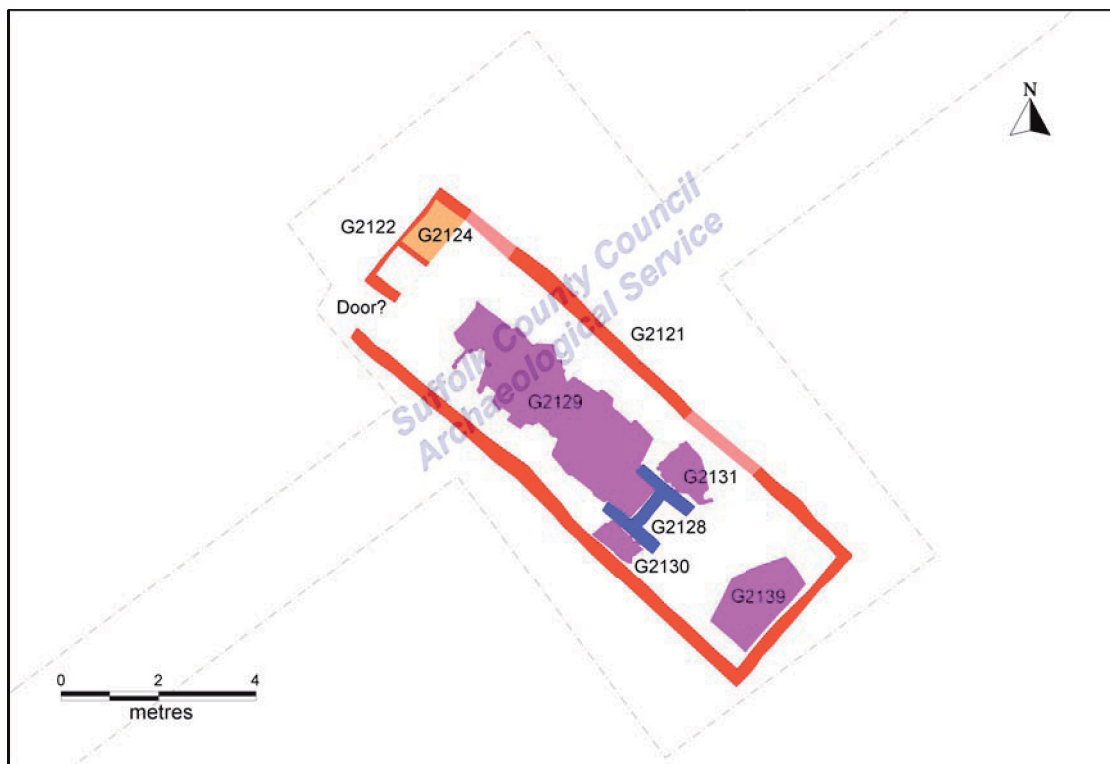


Figure 9. Plan of Building 1 (Phase 2)

Key: Red = retained walls (found); Pink = retained walls (conjectured);
Blue = new fireplace; Orange = retained hearth; Purple = floor

An H-shaped brick structure (G2128; Figs. 9 & 10) in the south-eastern half of Building 1 is interpreted as a back-to-back fireplace, or perhaps the base for fireplaces at higher levels – there is no clear evidence of scorching or sooting of the bricks at cellar level. It is built (free-standing) of hard, red, un-frogged bricks measuring 220 x 120 x 60mm and bonded with hard, light brown mortar. The bricks are thought to date to the 18th century. The fireplace

survives to a maximum of three courses, being deeper on its northwest side. It is assumed to have been inserted (rather than being part of the original design of Building 1) because of its off-centre location and the fact that the bricks and mortar used in its construction are not the same as those used in the original walls of the cellar.



Figure 10. View of fireplace G2128 and associated floors G2129 and G2130, looking southeast. Note the different alignment of the bricks forming floor G2131, to the left of the fireplace (0.5m scale)

The presence of a back-to-back fireplace suggests that during this phase of its development Building 1 contained at least two rooms on each storey.

Although there is no evidence for a dividing wall at cellar level (during Phase 2) this might have been of timber-framed or lath-and-plaster construction and its subsequent removal would have left no trace. It can be postulated that the larger space to the northwest of fireplace G2128 was partitioned similarly, thus dividing the building into three equal-sized units.

The insertion of fireplace G2128 seems to have truncated brick floor G2131, which is tentatively identified as part of the original cellar floor of Building 1. Another two areas of brick flooring (G2129 and G2130; Figs. 9 & 10) that are

clearly contemporary with the fireplace were built at the same level as floor G2131, suggesting that the latter was retained. All three areas of floor were laid on a bed of sand containing brick and mortar rubble (G2123; not illustrated) that is interpreted as disturbed natural sand incorporating debris left over from the construction and subsequent refurbishment of the building.

The new floors were constructed of red bricks (whole and broken) with occasional cobbles, square stone tiles and broken flagstones (Fig. 11). Where whole bricks have been used (such as where floor G2129 runs into fireplace G2128) they are laid in neat rows parallel with the long axis of the building; otherwise the materials have been put down rather haphazardly. A fourth area of disturbed flooring (G2139; Fig. 9) at the southeast end of Building 1 incorporates the same materials and is likely to have been contemporary with those described above.



Figure 11. General view of Building 1 (Phase 2) looking northwest (2m scales)

Phase 3 (refurbishment)

Phase 3 is represented by a substantial remodelling of the northwest end of Building 1, the laying of new brick floors and the insertion of a drainage system (Fig. 12).



Figure 12. Plan of Building 1 (Phase 3)

Key: Red = retained walls (found); Pink = retained walls (conjectured); Green = new walls (found); Orange = hearth; Purple = floor; Grey = drain; broken line = pit

The most significant development was the construction of a new entrance through the northeast wall of the cellar. A large pit (G2136) was dug against the outside of the wall to facilitate its partial demolition. The pit seems to have been over-dug since it extended about 0.40m below the base of the cellar wall; it was backfilled partially with mortared brick rubble and some large architectural mouldings than were derived presumably from the demolition of the wall.

A new brick floor (G2134 / G2137) was laid at the northwest end of the cellar and this extended into the new opening. The northern part of the floor (G2137) was constructed mainly of brick fragments, with a row of flagstones

along its northwest edge. The rest of the floor (G2134) was constructed of rammed brick rubble and fragments of flint, tile and septaria (Figs. 12 & 13); occasional fragments of 19th-century pottery are embedded in the floor. The new floor was laid on top of earlier floor G2129 (Building 1, Phase 2), and where the earlier floor had slumped the ground was levelling with spreads of mortar (G2133, not illustrated).

At the southeast end of the cellar successive brick and mortar floors (G2141 and 2142; not illustrated) survive partially where they abut the end wall; in this area of the cellar make-up dumps and a number of small pits (G2140 & G2143; not illustrated) contain early 19th-century pottery and associated kitchen refuse.

A narrow brick wall (G2138; Fig. 12), surviving as two separate fragments only one and two courses high, was built on top of and along the edge of the floor where it extends into the new doorway; the wall is interpreted as a threshold or the support for an (assumed) flight of wooden steps that would have provided access to the cellar from outside the building.

A drainage system (G2132; Figs. 12 & 14) was installed at the same time as floor G2134. This consisted of a square iron 'sump' with an inset lid that was flush with the surface of the floor, connecting with a ceramic pipe below floor level. The pipe was laid in a narrow trench that was tunnelled under the southwest wall of the cellar, so that water could be drained into the river. Clearly, the cellar was prone to flooding; the present water table is only just below the base of the cellar, as can be seen in Figure 14.



Figure 13. View of the northwest end of Building 1 (Phase 3), looking north (2m scale)



Figure 14. Drainage system G2132, looking northwest (0.5m scale)

An internal buttress (G2125; Figs. 12 & 13) was constructed around the partition wall that bisected the alcove at the northwest end of the cellar. It was built of red bricks measuring 240 x 110 x 55mm and bonded with light grey mortar. The bricks are of 18th- or early 19th-century date. The corners of the buttress facing into the room were rounded off, indicating an attention to detail that suggests Building 1 was of reasonably high status. To the rear, the buttress abuts the flimsy back wall of the fireplace and it seems likely that it was built to support that wall. It overlies part of the fireplace hearth G2124, which otherwise continued in use. A new hearth (G2126; Fig. 12) was laid on the other side of the buttress.

A quadrant-shaped, brick structure (G2127; Figs. 12 & 15) was built in the former doorway at the northwest corner of the cellar. Its two, free-standing walls are stretcher-built of whole and broken bricks bonded with a poor-quality mortar, and they abut the earlier cellar walls. A rough floor of broken flagstones, bricks and flint cobbles was laid inside the structure on a bed of soil containing pottery dated 1740–1880. The function of the structure is unknown.



Figure 15. Quadrant-shaped structure G2127, looking north

A small, L-shaped remnant of brick walling (G2135; Fig. 12) was built free-standing between the back-to-back fireplace (G2128) and the southwest wall of the cellar (G2121), overlying earlier floor G2130 (Building 1, Phase 2). Its function is not clear but it might represent part of a partition wall that originally extended the width of the cellar. This is the only possible evidence that the cellar was ever divided into separate rooms.

There is limited evidence for contemporary land use in the immediate vicinity of Building 1. Two large pits (G2153 and G2154; Fig. 12) near the southeast end of the building might have been sand/gravel quarries. The backfilling of G2153 contained a mixed assemblage of medieval and post-medieval pottery (up to 1800), while the fill of G2154 produced pottery with a broad date range of 1740–1880. Another large pit of unknown function (G2043) to the southwest of Building 1 was backfilled with horizontal deposits of sand, gravel, silt and crushed mortar containing some building rubble and pottery with a *terminus post quem* of 1807.

Phase 4 (demolition)

Building 1 was demolished and its cellar was filled with soil and demolition rubble (G2018). Pottery dating indicates that this occurred after 1825.

Ground-raising dumps to the southwest of Building 1

Although there is little direct stratigraphic evidence it is clear that to the southwest of Building 1 the natural ground surface slopes increasingly steeply towards the river (see 4.2). In this area of the site ground level was raised deliberately by the dumping of layers of sand, silt or gravel (G2038, G2061 and G2103). In the central part of the evaluation trench these layers are fairly horizontal but at the west end of the trench they slope moderately steeply down towards the river. It is possible that these changing slopes reflect the gradient of the underlying natural topography.

The dumped deposits could be observed and recorded at only a few locations and generally (for Health and Safety reasons) not to their full depth; a summary of the depths and locations of the deposits is shown in Table 1. Some of the dumps produced mixed assemblages of post-medieval pottery that suggest a *terminus post quem* in the early 19th century. Generally the surface of the dumps slopes gently from 3.55m OD near Building 1 to 2.40m OD at the southwest end of the evaluation trench – a gradient of only 1 in 77. They have a maximum recorded thickness of 2.35m, but are likely to be considerably thicker than that, particularly at the west end of the site. At one location (45m from the northeast end of the evaluation trench) the dumped deposits appear to overlie natural sand and gravel G2098.

Distance from NE end of trench	Ground level	Dumped deposits: G2038, G2061, G2103	Worked soil: G2005	Natural strata: G2006, G2098
0m	4.00m OD	n/a	no survival	3.50m OD
12m	4.00m OD	n/a	3.45m OD	3.35m OD
26m	4.00m OD	n/a	3.45m OD	3.00m OD
Building 1				
30m	3.95m OD	n/a	no survival	3.15m OD
40m	3.95m OD	3.55 – 2.55m OD	n/a	not observed
45m	3.90m OD	3.35 – 1.40m OD	n/a	1.40m OD
49m	3.80m OD	3.35 – 2.25m OD	n/a	not observed
56m	3.70m OD	3.30 – 2.45m OD	n/a	not observed
60m	3.65m OD	3.35 – 2.55m OD	n/a	not observed
69m	3.55m OD	2.45 – 1.55m OD	n/a	not observed
77m	3.65m OD	2.65 – 2.00m OD	n/a	not observed
85m	3.55m OD	2.50 – 0.15m OD	n/a	not observed
113m	3.70m OD	2.50 – 2.00m OD	n/a	not observed
118m	3.70m OD	2.60 – 1.90m OD	n/a	not observed
129m	3.70m OD	2.40 – 0.20m OD	n/a	not observed

Table 1. Summary of deposits

The Orwell Works and other 19th-century buildings

The ground-raising dumps are overlaid by extensive structural remains that are associated mostly with the Orwell Works (see 2.4) but include parts of contemporary houses to the east of the ironworks. These include linear foundations and stanchion bases of brick or concrete, cellars, drainage pipes and flues or brick-lined channels. These survive almost up to modern ground level, being sealed only by make-up deposits for the concrete slabs that form the ground surface.

The structural remains were recorded comprehensively but were not generally excavated. This, coupled with the fact that they were seen only within the confines of a narrow evaluation trench prevents detailed interpretation or further analysis. The evidence for the Orwell Works and contemporary buildings is presented in Appendix 3.

5 Quantification and assessment

5.1 Post-excavation review

The following post-excavation tasks have been completed:

Task 01: Completion and checking of the primary (paper and digital) archive

Task 02: Microsoft Access database of the stratigraphic archive

Task 03: Microsoft Access database of the finds archive

Task 04: Catalogue and archiving of digital colour images

Task 05: Catalogue and archiving of monochrome print images

Task 06: Compilation of stratigraphic matrix

Task 07: Worked stone record images

Task 08: Contexts allocated to Groups

Task 09: Group description/discussion text

Task 10: Survey data uploaded and converted to MapInfo format

Task 11: Plans digitised and integrated with survey data

Task 12: Processing, dating and assessment of finds

Task 13: Documentary research and reporting

Task 14: Soil micromorphology assessment and reporting

5.2 Quantification of the stratigraphic archive

The stratigraphic archive is quantified in Table 2:

Type	Number	Format
Context register sheets	16	A4 paper
Context recording sheets	440	A4 paper
Worked stone register sheets	2	A4 paper
Plan drawing sheets	70	290 x 320mm film
Section/elevation drawing sheets	32	290 x 320mm film
Stratigraphic matrix	7	290 x 320mm film
Digital colour images (site)	126	3008 x 2000 pixel .jpg
Monochrome print images (site)	1	Contact sheet
Digital colour image register sheets	5	A4 paper
Monochrome print image register sheets	1	A4 paper
Digital colour images (worked stone records)	59	3008 x 2000 pixel .jpg

Table 2. Quantification of the stratigraphic archive

5.3 Quantification and assessment of the finds archive

Richenda Goffin (with Bob Carr)

5.3.1 Introduction

Table 3 shows the quantities of bulk finds collected during the investigation. A full quantification listing by context is included as a Microsoft Access database in the site archive.

Find type	No.	Wt/g
Pottery	232	3982
CBM	45	25384
Fired clay	6	59
Stone	18	3172
Glass	1	9
Clay tobacco pipe	25	73
Flint	2	35
Animal bone	7	129
Shell	6	43

Table 3. Quantification of the bulk finds

5.3.2 The pottery

Introduction

A total of 232 fragments of pottery was recovered, weighing 3.982kg. The assemblage is almost entirely late post-medieval in date, with a small quantity of medieval ceramics. The size and condition of the pottery is variable but most sherds are small, and there are no examples of complete or near complete vessels. None of the ceramics are considered to be worthy of illustration.

Methodology

The ceramics were quantified using the recording methods recommended in the MPRG Occasional Paper No 2, *Minimum standards for the processing, recording, analysis and publication of Post-Roman ceramics* (Slowikowski et al., 2001). The number of sherds present in each context by fabric, the estimated number of vessels represented and the weight of each fabric were noted. Other characteristics such as form, decoration and condition were recorded, and an overall date range for the pottery in each context was established. The pottery was catalogued on *pro forma* sheets by context using

letter codes based on fabric and form and has been inputted into a Microsoft Access database in the site archive.

The codes used are based mainly on broad fabric and form types identified in *Eighteen centuries of pottery from Norwich* (Jennings, 1981), and additional fabric types established by SCCAS (S. Anderson, unpublished fabric list).

Pottery by period

Medieval

Eight fragments of medieval pottery were recovered (0.061kg). Seven sherds of medieval coarseware dating to the 13th–15th century were collected from a worked soil horizon (G2005). A fragment of a medieval glazed ware, possibly a Hedingham variant, was present with a slipped and glazed ware of a slightly later date (14th–15th C) in pit fill G2153.

Post-medieval

The remainder of the assemblage (224 fragments @ 3.921kg) is post-medieval, and consists for the most part of pottery dating to the first half of the nineteenth century. The ceramics will be briefly described below by the main stratigraphic elements.

Building 1

86 fragments of pottery weighing 5.508kg were recovered from deposits associated with the demolition of Building 1 (G2018). A wide range of different vessels are represented, ranging from redware flowerpots, stoneware bottles, chamberpots, storage jars and tablewares (Table 4). Some of the fabrics are long-lived ones that cannot be dated with any degree of precision, but the presence of several types of decorated finewares enables a closer date range for the demolition of Building 1.

Fabric name	Fabric code	Date range	No of sherds	Weight (kg)	% by weight
Eng stoneware	ENGS	17th–20th C	17	1.542	27.90
Lte p-med earth	LPME	18th–20th C	2	0.249	4.52
Blk basalt stware	BLSW	1770–1900	2	0.052	0.94
Creamware	CRW	1740–1880	20	0.319	5.79
Pearlware	PEW	1770–1850	11	0.078	1.41
Mocha	MOCH	1780–1900	1	0.031	0.56
Yellow ware	YELW	18th–19th C	2	0.039	0.70
Ironstone	IRST	19th C+	8	1.033	18.75
Late slip redware	LSRW	18th–19th C	11	0.566	10.27
Gl rd earthenware	GRE	16th–18th C	12	1.599	29.03
Total			86	5.508	99.84

Table 4. Breakdown of pottery from G2018

By weight, the largest groups present are the English stoneware, Late slipped redwares and Glazed earthenware storage containers and vessels, together with Ironstone china. By sherd count, the finewares form the greatest proportion of this assemblage. Plain and decorated creamwares form the largest group, with annular wares and mocha wares which date to c. 1820. Plain and decorated pearlware is also present, including transfer-printed decorated wares that date to c. 1825+. The remains of a moulded, black basalt ware vessel, probably a teapot, also dates to c. 1820.

Eight sherds of pottery from G2140, representing dumped domestic refuse within Building 1, is considered overall to also date to the early 19th century.

The remains of a very large vessel, possibly a ceramic washbasin, were found amongst other debris making up floor G2134 in Building 1. It is discoloured and perhaps burnt, but is made from a hard-fired stone china that dates to the early 19th century.

Other ceramics of a similar date were identified in another part of the cellar of Building 1. A pit (G2143) produced blue and white and polychrome pearlwares dating to the early 19th century and a sherd of polychrome creamware.

Large pit southeast of Building 1 (G2153)

Three fragments of pottery from fill 0429 include a fragment of Staffordshire white salt-glazed stoneware dating to the 18th century and a sherd of Staffordshire slipware that may also date to this period, with a single fragment of English stoneware that cannot be closely dated.

Large pit southwest of Building 1 (G2043)

Thirty fragments (0.673kg) were recovered from three contexts, all of which are of a similar date. The group includes creamware and pearlware and dates to the early 19th century.

Ground-raising dumps to the southwest of Building 1

25 fragments of pottery (0.329kg) were recovered from dumped deposits raising the ground level to the southwest of Building 1. Some earlier wares including German stonewares dating to the 16th–17th century are present in these groups (G2038, G2061), but the majority of the pottery is much later and includes pearlwares and creamwares; a notable find is a plate with a stamped base of the St Anthony factory that dates from the late 18th- to early 19th century.

Conclusions of the pottery assessment

Apart from the small number of sherds of medieval/late medieval pottery found in a worked soil deposit (G2005) there is no indication in the ceramic assemblage of earlier activity. The demolition deposits backfilling Building 1 contain a variety of ceramics, many of which date to the early part of the 19th century, probably c. 1825–40. The assemblage consists of a wide range of utilitarian coarsewares, including sanitary wares and horticultural vessels, plus decorated and plain tablewares.

5.3.3 Ceramic Building Material and fired clay

Introduction

45 fragments of ceramic building material were recovered (25,384kg). The assemblage has been quantified by fabric and form and recorded in a

Microsoft Access database in the site archive. A number of complete post-medieval bricks were sampled for dating purposes, in addition to the roof tiles and malting bricks which were also collected. A small quantity of fired clay was also identified (0.059kg).

The Assemblage

Bricks

24 fragments of late brick were collected, some of which were retained as samples from *in-situ* structures. The bricks were all made in medium sandy red-firing fabrics such as *ms* and *msfe*. The bricks with complete dimensions have been listed in Table 5.

Context	Group	Form	Fabric	Length	Width	Height	Date
0044	2121	LB	ms	240	110	56	18 th C?
0044	2121	LB3?	msfe	224	109	65	L17 th –18 th C?
0044	2121	LB	msfe	227	112	58	17 th –18 th C
0382	2122	LB	fsfe	242	118	60	18 th C+
0382	2122	LB	fsfe	228	118	57	17 th –18 th C+
0382	2122	LB	msfe	240	114	58	18 th C+
0358	2125	LB	fsfe	225	105	63	17 th –18 th C
0358	2125	LB3	msfe	230	109	70	18 th C
0358	2125	LB3	msfe	230	109	70	18 th C
0372	2128	LB6	fscp	222	104	60	17 th –18 th C
0372	2128	LB6	fs	222	108	65	L17 th –18 th C
0372	2128	LB6?	fs	218	104	64	L17 th –18 th C
0331	2134	FB	ws	233	123	41	18 th –19 th C

Table 5. Dimensions of bricks (mm), by group

Three brick samples were taken from the west wall of Building 1 (G2121). The lengths and thicknesses of the bricks are variable, and there is some indication that the bricks could have been reused. A comparison of brick dimensions was made with the table of brick measurements from dated buildings (Lloyd, 1925), but no consistent parallels were found. Further samples were retained from a wall at the northwest end of the building (G2122), but building parallels for bricks with these dimensions were also not found.

Several bricks were sampled from the double-sided brick fireplace (G2128). The complete measurements suggest that they are probably 18th century in date.

Three complete or nearly complete bricks were recovered from G2125, a brickwork modification around the partition wall in the fireplace in Building 1. Two of them have a thickness of 70mm (2⁵/₈ inches) and although close dating is not possible the bricks are likely to date to the 18th century at least.

The remains of other bricks are much more fragmentary and were recovered from pits and other features of post-medieval date. A complete white-firing floor brick (FB) was retained from floor G2134, dating to the 18th- or 19th century. There is evidence of some sooted material on one of its faces.

Roof tile

23 fragments of roof tile were recovered. These were made from red-firing clays in fabrics that date to the late medieval and post-medieval periods (*msfe*, *mscp*, *fscp*, *ms*). Fragments of unglazed pantile were present in a ground-raising dump (part of G2038) and rectangular feature (G2043), and a possible ridge tile was identified in another ground-raising dump (part of G2061).

Malting tile

The remains of two malting tiles were found in G2018, one of the demolition backfill deposits in the cellar of Building 1 (0.465kg). These were made in two fabrics, one of which is a white-firing clay with grog inclusions dating to the 18th- or 19th century. Both tiles have ventilation perforations with similar diameters, and both show evidence of mortar.

Fired clay

Several small and featureless pieces of fired clay, made in a fine, pale orange silty fabric with clay pellet inclusions, were recovered from one of the ground-raising dumps (part of G2038).

Conclusions of the ceramic building material and fired clay assessment

The assemblage is entirely post-medieval in date and consists mostly of bricks and roof tiles that have been incorporated in pits and dumped layers. In

addition a number of brick samples were taken to provide some dating indicators for the construction of Building 1 and its subsequent modifications.

5.3.4 Clay tobacco pipe

25 fragments of clay tobacco pipe were recovered (0.073kg). Nearly all are fragments of stems, but a single, slightly bulbous complete bowl with a lined rim dating to the second half of the 17th century was present in 0104, a ground-raising deposit (part of G2038). Two joining fragments of pipe bowl were identified in another dumping layer 0129 (also part of G2038) cannot be closely dated.

5.3.5 Glass

A single fragment of post-medieval bottle glass was present in 0379, the fill of a small pit (G2143) in the southern part of Building 1.

5.3.6 Stone

Several stone fragments were recovered. 11 small pieces of Rhenish lavastone were collected from 0145 – one of the fills of a large cut feature (G2043). The remains of a worn grinding surface were noted on one fragment (height 20mm). Samples of clunch have been provisionally identified from the east wall of Building 1, including an off-white variant which may be Barrington clunch, a greyish white rock with a greenish tinge due to the presence of glauconite.

5.3.7 Iron

Three iron nails (0.043kg) were recovered.

5.3.8 Small finds

Introduction

Six small finds were recovered. These are listed by small find number in Table 6.

Small Find No	Context	Period	Material	Object	Description
1001	0293	Post-med?	Iron	Unidentified	Many small fragments
1002	0293	Post-med?	Ivory	Handle	Implement handle?
1003	0344	Post-med?	Iron	Unidentified	Fragment
1004	0344	Post-med?	Iron	Unidentified	Fragment
1005	0369	Post-med	Iron	Horseshoe	
1006	0417	Post-med?	Stone	Hone	Sandstone
1007	0431	Unknown	Iron	Vessel?	Base of possible vessel?

Table 6. Small Finds

The assemblage

A small quantity of small finds was recovered from the excavation. The majority of them are made of iron, and most of them are too fragmentary for identification before radiography. Four stained fragments of an ivory object, probably the rounded end of a knife handle or similar implement, were found in the demolition backfilling of Building 1 (G2018). The remains of a worn stone hone were identified in a layer of modern dumping (part of G2149).

Conclusions of the small finds assessment

Most of the small finds are unidentified, post-medieval iron objects, but radiography may enable further descriptions to be added. None of the small finds are worthy of illustration or photography.

5.3.9 Worked stone

Bob Carr

Introduction

There are 28 pieces of worked stone, numbered WS 01 to WS 28. All the worked stone came from the cellar walls of Building 1. The walls were formed of brick and stone laid regularly, in rough courses not as random rubble. However, there is no doubt that the stone-work is re-used. The date of the

wall cannot be determined stratigraphically, but the brick style indicates a *terminus post quem* of the 17th century.

The use of the stone in large, contiguous quantities in a single wall is indicative that it is likely to have originated from a single source, and should, therefore, be regarded archaeologically as a group.

Summary description

This report is based upon a photographic record provided by the excavator, not first hand examination of the material. The record is adequate to provide a reasonable assessment of the type and significance of the material.

Examination of the photographic archive suggests that all the worked stone is of the same geological type, although it would be beneficial to check this in-house to establish whether it is a fine grained oolitic limestone or whether there are other types.

Characteristically the finished face surfaces show close-set parallel tooling. The faces for bonding have a coarser tooling, probably cut with an axe / adze, with additional 'pecking' to provide a key for the bonding mortar.

The form of the majority of the stones, and the mouldings on them, are characteristic of jambs and arches from doorways / entranceways (WS 1, 2, 3, 4, 6, 7, 9, 10, 12, 14, 15, 16, 17, 27, 28) of which some show the radius of the arch (WS 3, 4, 8, 14) and two a sharp angle suggestive of a rebate for a door seating (WS 13, 20). There are two fragments that appear to show a glazing groove (WS 11, 24) and come from windows; another (WS 8) appears to be a fragment of window tracery, but has no groove for glazing.

The decoration is characterised by simple rolled and hollow mouldings. There are examples of a keel (WS 6) straight chamfers (WS 5, 21, 23) and billeting (WS 27).

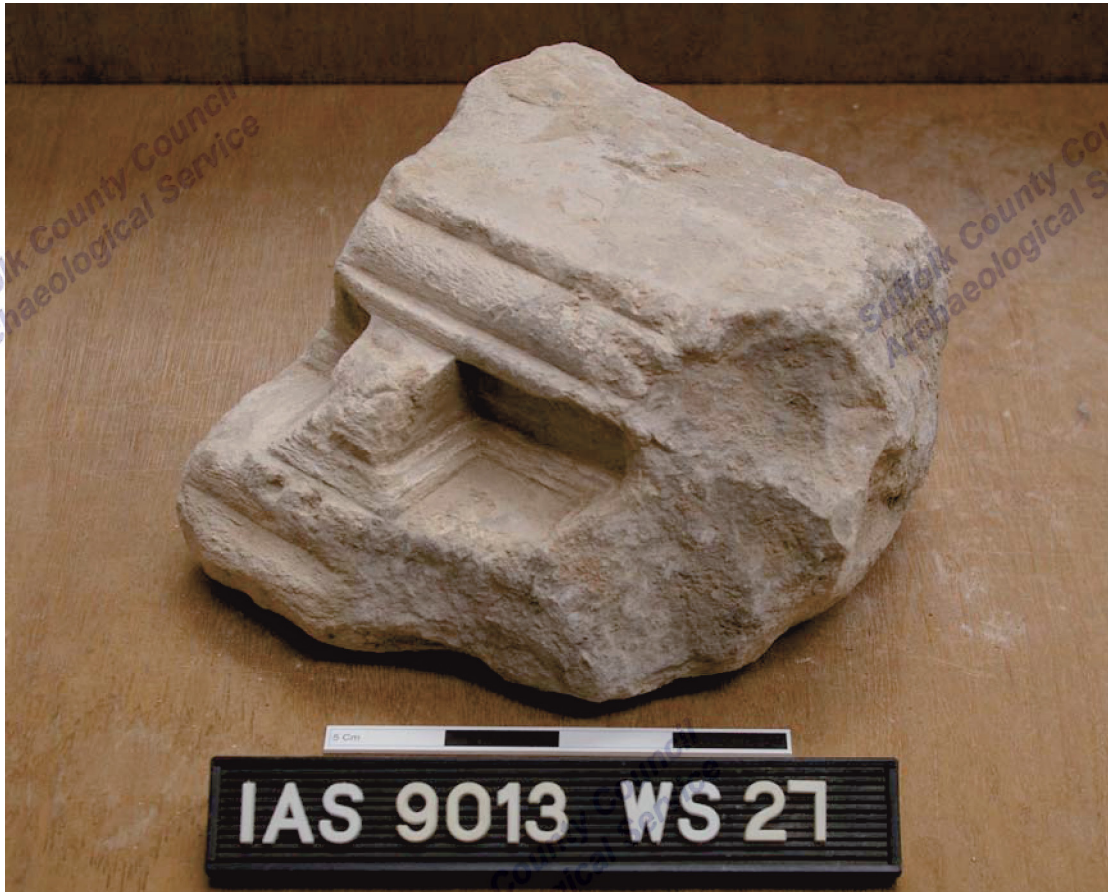


Figure 16. One of the worked stones recovered from the walls of Building 1
(0.20m scale)

Conclusions of the worked stone assessment

All the worked stone is of medieval date, probably from the 14th century. It is representative of high quality architectural detailing from a significant building, almost certainly a religious building, but conceivably from a high status lay building such as a guildhall.

Although the stone was re-used in a later wall the probability is that that this is a group from a single primary source. The group is of sufficient size to offer some evidence for the form and detailing of the primary source.

Potential of the worked stone

Since this is a secondary deposit without a known primary origin, it is not felt that publication is a requirement. However, it is an important group and has the potential to provide significant information on the primary source. As the primary source was clearly a large and impressive building that was

demolished (possibly at the Reformation) it is probable that similar groups from the same source exist elsewhere and will be uncovered in the future with the potential for a source to be identified and the group size to be greatly increased.

This group of stone is worthy of further minor analysis to confirm and formalise the impressions of the assessment. It is worthy of further recording to secure its adequate preservation in archive. This should take the form of descriptions of individual stones coupled with measured sketch illustrations of the moulding profiles and additional photography.

5.3.10 Biological evidence

Animal bone

Seven fragments of animal bone were recovered, weighing 0.129kg. The assemblage is small and fragmentary.

The majority consists of small, undiagnostic fragments of bone from small and medium-sized mammals. The remains of a mandible of a young sheep were present in 0344, and part of a bovine horn core was found in 0429, with a rib in 0431. Two stained and featureless pieces of bone were present in 0438 and 0439.

5.3.11 General discussion of the finds archive

The finds assemblage from the site consists for the most part of a considerable quantity of pottery dating to the early decades of the 19th century, recovered from the demolition backfills of Building 1. This includes examples of pearlwares and creamwares that were not studied in great detail and could contribute to a study of local ceramic types.

A group of re-used worked stones from the walls of Building 1 are likely to have derived from the same primary source and are worthy of further analysis and recording.

6 Potential of the data

6.1 Realisation of the Original Research Aims

OR1: Identify the date, approximate form and purpose of any archaeological deposit within the application area, together with its likely extent, localised depth and quality of preservation

Realisation: A soil horizon (G2005) overlying geological strata at the northeast end of the evaluation trench is likely to have been cultivated in the medieval or early post-medieval periods. All other archaeological deposits (and structures) are of post-medieval and modern date.

Building 1 is a waterfront building, probably a warehouse that was converted to dwellings, dating to the 17th- or early 18th century. Its extent, depth and quality of preservation have been established and are described above (4.4). All other remains (principally brick and concrete buildings and structures) relate to the Orwell Works and contemporary houses, and date to the 19th- and 20th centuries. They are well-preserved and presumably extend across much of the site, although in most cases their depths have not been determined.

OR2: Evaluate the likely impact of past land uses and natural soil processes

Realisation: The cultivated soil horizon (G2005) has been analysed in great detail (see Appendix 4) and provides much evidence for natural soil processes and subsequent development.

The most significant impacts of past land uses are the land reclamation that occurred in the early 19th century and the subsequent construction and development of the Orwell Works.

OR3: Define the potential for existing damage to archaeological deposits

Realisation: As stated above, most of the archaeological evidence relates to the construction and development of the Orwell Works in the 19th- and 20th centuries; these buildings and structures were demolished in the 20th century but are well preserved beneath the current ground slab.

Building 1, a post-medieval, cellared building that predates the construction of the Orwell Works, survived reasonably intact because it is located outside the main area of development of the ironworks in the 19th century. Contemporary (or earlier) buildings might exist on other areas of the site but will not necessarily be so well preserved.

OR4: Define the potential of alluvial deposits

Realisation: Alluvial deposits were not encountered and their potential cannot be defined. It is clear that they must be at considerable depth; a machine-excavated sondage at the southwest end of the evaluation trench extended to 3.4m below ground level but revealed only 19th-century reclamation dumps.

OR5: Establish the potential for waterlogged organic deposits in the proposal area. Define the location and depth of such deposits and their vulnerability to damage by development

Realisation: Waterlogged organic deposits were not encountered. It is likely that they exist on the site, particularly along its western edge, but will be at considerable depth.

OR6: Confirm and record the presence of the 17th-century quay wall, likely to be encountered along the far western boundary of the site

Realisation: No river walls/revetments were encountered. A recent re-appraisal of the cartographic evidence suggests that if these survive they will be located to the north of the evaluation trench in the area of the site used currently as a car park.

OR7: Determine the extent of truncation caused by cellaring/occupation along the former Foundry Road on the north-eastern boundary of the site

Realisation: Localised 19th-century cellaring and truncation by service trenches was recorded at the northeast end of the evaluation trench but this has had a limited impact on earlier deposits such as cultivated soil G2005.

OR8: Assess the extent and nature, and confirm the date, of reclamation activity across the site

Realisation: Thick, horizontal deposits of sand, gravel and silt (G2038, G2061 and G2103) were recorded at several locations in the central and south-western parts of the evaluation trench. They pre-date the construction of the Orwell Works and are interpreted as early 19th-century land reclamation dumps. Similar deposits are likely to extend across much of the western half of the site.

OR9: Record the topography of undisturbed natural river gravels where possible

Realisation: Undisturbed natural sands and gravels (G2006) were recorded in the north-eastern part of the evaluation trench, sealed by cultivated soil G2005. Elsewhere the evaluation trench was not deep enough to expose these deposits.

OR10: Identify and record any evidence for the post-medieval shipbuilding known to have taken place on the site, particularly any evidence for large, deliberately dug docks

Realisation: No ship-building activity was encountered. A recent re-appraisal of the cartographic evidence suggests that this activity was located in the northern half of the site, in an area that was not evaluated.

OR11: Assess whether any earlier occupation (late medieval or earlier) took place along this stretch of the river prior to the major post-medieval reclamation episodes

Realisation: There is no conclusive evidence for occupation of the site (which is located in the agricultural hinterland of medieval Ipswich) in the late medieval or earlier periods. Cultivated soil G2005 appears to represent medieval or later agricultural/horticultural activity. Building 1 provides the earliest evidence for occupation on the site and dates to the post-medieval period.

6.2 General discussion of potential

The archaeological investigation of the Orwell Quay site has provided evidence for the local geology and topography, medieval or later agricultural/horticultural activity, a long-lived post-medieval riverside building, early 19th-century land reclamation and the development of an important ironworks in the mid to late 19th century.

Direct evidence for the local geology and topography is confined to the northeast part of the site where river terrace deposits of sand and gravel were recorded; due to the greater depth of these deposits at the southwest end of the evaluation trench it is not possible to reconstruct a complete topographic profile across the site. No evidence was obtained for alluvial deposits within the inter-tidal zone of the River Orwell that might have provided some indication of the local environment.

A locally typical soil horizon of weakly argillic brown sands (broadly included within the Newport 4 soil association) survives on the higher ground in the eastern part of the site, overlying the river terrace sands and gravels. This soil was amended by medieval or later agricultural/horticultural activity. Since the site is located in the agricultural hinterland of medieval Ipswich such activity is to be expected. However, given the limited area of evaluation it is not known if

cultivation extended across the whole of this part of the site, and no evidence was obtained for patterns of medieval land use.

The archaeological evidence suggests that Building 1 was located on the edge of the higher ground overlooking the river to the west. It is assumed therefore to be one of the buildings shown in this location on Pennington's map of 1778 (Fig. 4) and probably relates to the buildings known in the 18th century as White's Cottages (see 2.4 and Appendix 2). Its precise date of construction is unknown, although the dimensions of bricks used in its original fabric suggest that it was built in the 17th- or early 18th century. Documentary research has provided much evidence for the ownership and occupation of White's Cottages in the second half of the 18th century but not for their original date or function.

The function of Building 1 is not understood clearly. In its original form it was a long, thin building of a type that is more likely to have had an industrial or commercial use – given its location next to the river it might have been a merchant's warehouse, although the presence of a (possibly original) hearth at one end of the building might argue against that interpretation. Subsequent rebuilding and refurbishments, such as the insertion of a back-to-back fireplace, suggest that whatever its original function the building was subdivided and perhaps converted to domestic use. Certainly, the earliest known documentary reference to White's Cottages, in 1746, describes them as six *messuages* divided into 12 tenements or dwellings.

It is possible that the major alterations to Building 1 (Phase 3) occurred around 1800; in 1801 three of the White's Cottages were described as 'lately rebuilt'. Fifty years later the cottages were demolished and, as shown by the archaeological evidence, their cellars were backfilled with demolition rubble and soil.

The extensive re-use of decorative mouldings of 14th-century date in the walls of Building 1 is of interest, although there is no way of identifying the source of

this material at present. The potential of the worked stone lies in its adequate recording as part of the site archive.

Much of the pottery from the investigation was derived from the backfilling of the cellar of Building 1 and although some of it has the potential to advance the study of local ceramics it can contribute little to the understanding of the development of the site.

Cartographic evidence (see Figures 4 and 5) suggests that buildings contemporary with Building 1 existed elsewhere within the site, in areas that were not evaluated archaeologically. Consequently, Building 1 has been studied in isolation and there is no opportunity to compare and contrast it with others in the immediate vicinity, or to examine its wider setting.

The evidence for ground raising and land reclamation to the southwest of Building 1 clearly relates to the period when the River Commissioners created new land for their Ballast Wharf and adjoining yards in the early 19th century. There is no potential for further study of the stratigraphic or artefactual evidence for this activity.

A review of the cartographic evidence suggests that the St Clements shipyards extended into the northern part of the site (see Figure 4), in an area that was not evaluated. The wet dock shown to the north of the Ballast Yard on the Ellis map of 1839 (Fig. 5) is probably located just to the north of the evaluation trench, beyond the area that was available for evaluation. The site archive has no potential therefore to contribute towards the study of shipbuilding, dock construction or associated riverside activity.

The evaluation provided considerable evidence for buildings and structures associated with Ransome's 19th-century ironworks (the Orwell Works) but this evidence is difficult to interpret because of the limited areas that were exposed. There is slight potential for phasing the major buildings and structures and identifying them by comparison with maps and plans of the ironworks, some of which have come to light in the course of the documentary

research. However, this would add little to what is known already about the development of the ironworks and the processes that were carried out therein.

In the light of these comments it is proposed that there is little potential for analysis of the stratigraphic, finds and documentary archive, beyond that contained in this assessment report. The worked stones require detailed recording in order to complete the site archive.

7 Significance of the data

The results of the archaeological investigation of the Orwell Quay site have some *local* significance. The site has provided a rare opportunity to make a full record of the remains of a post-medieval riverside building of a type that must once have been common along the Ipswich waterfront. Most will have been destroyed in the course of subsequent large-scale development but the cellar of Building 1 survived reasonably well because of its location outside the town centre in an area that was not developed until relatively recent times. The building was constructed in a vernacular style using materials that were available locally; the re-used architectural mouldings are significant locally since they were presumably derived from one of the 'lost buildings' of Ipswich.

In historical terms the Orwell Works once had considerable local and regional significance, as a major employer and large-scale manufacturer of innovative goods that were exported worldwide. Consequently there is considerable interest among industrial and agricultural historians, and collectors, in the plant and machinery that was produced at the Orwell Works by the firm of Ransome, Sims and Jefferies. By comparison, the archaeological record of the structural remains of the Orwell Works has little significance, because of the small proportion of the site that was evaluated and the difficulty of interpreting the evidence.

The archaeology of industrialisation and manufacture 1750-1960 is a subject that has been highlighted as part of a proposed regional research agenda

(Gilman, Gould and Green, in Brown & Glazebrook 2000, 39) and it is regretted that an opportunity was not afforded to investigate this important industrial site more fully.

8 Recommendations for further work and publication

It has been proposed (6.2) that little further analysis of the site archive is required, other than completion of a worked stone report. Similarly it is proposed that the potential and significance of the archive are not such that additional reporting or publication of the results is required. This post-excavation assessment will be disseminated as a 'grey literature' report *via* OASIS (Online Access to the Index of archaeological investigationS), and a summary of the results will be submitted to the Proceedings of the Suffolk Institute of Archaeology and History.

9 Acknowledgements

Turner and Townsend Project Management Ltd commissioned the archaeological work on behalf of University Campus Suffolk, who funded the project.

Keith Wade (SCCAS, Conservation team) produced the Brief and Specification and monitored the archaeological project.

The project was managed by Rhodri Gardner and supervised by Kieron Heard. Sabra Hennessy, Steve Manthorpe and Simon Picard assisted with the fieldwork. Surveying was by Jonathan Van Jennians (all SCCAS, Field Projects Team).

The finds assessment report is by Richenda Goffin (SCCAS, Finds Manager). Robert Carr (SCCAS, Conservation Team) commented on the worked stone assemblage.

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EL1/3/96/4 Title Deeds & Writings relating to the Freehold reversion of the leasehold lands & Hereditaments comprised in 1 acre and 1 rod purchased of the Ipswich Docks in 1847 the property of Ransomes Sims & Jefferies Ltd

EL1/3/96/9 Title Deeds of the sites of Houses called White Cottages purchased of J C Cobbold

EL1/3/96/35 Title Deeds of piece of land late Ballast Wharf

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Appendix 1: Brief and Specification

SUFFOLK COUNTY COUNCIL ARCHAEOLOGICAL SERVICE - CONSERVATION TEAM

Brief and Specification for an Archaeological Evaluation

ORWELL QUAY (UCS), DUKE STREET, IPSWICH

1. Background

- 1.1 A planning application is to be made by UCS for development on the Orwell Works site, Duke Street, Ipswich.
- 1.2 The Planning Authority will be advised that any consent should be conditional upon an agreed programme of work taking place before development begins (PPG 16, paragraph 30 condition). **An archaeological evaluation of the application area will be required as the first part of such a programme of archaeological work; decisions on the need for, and scope of, any further work will be based upon the results of the evaluation and will be the subject of additional briefs.**
- 1.3 The archaeological potential of the area has been adequately assessed in *Land adjacent to the southern half of Orwell Quay, Ipswich (IPS 588): Archaeological Desk-Based Assessment* (SCCAS Report No 2007/187). In summary the potential is for:
 - a) Pre 1620: foreshore with occasional activity/alluvial deposits at depth across the site; may contain boat remains, jetties, oyster pits, etc.
 - b) 1620-1830s: reclamation and shipyard use; Duke Street ran across the centre of the site and the quay edge lay within the western boundary of the site.
 - c) 1820s on northwards: Orwell Iron Works.
- 1.4 The nature of all waterfront developments is such that little in the way of preserved archaeological deposit is likely to survive the 21st century development process.

2. Brief for the Archaeological Evaluation

- 2.1 Characterise the depth and nature of any archaeological deposit within the area.

- 2.2 Identify the date, approximate form and purpose of any archaeological deposit within the application area, together with its likely extent, localised depth and quality of preservation.
- 2.3 Evaluate the likely impact of past land uses and natural soil processes. Define the potential for existing damage to archaeological deposits. Define the potential of alluvial deposits.
- 2.4 Establish the potential for waterlogged organic deposits in the proposal area. Define the location and depth of such deposits and their vulnerability to damage by development.
- 2.5 Provide sufficient information to construct an archaeological conservation strategy, dealing with preservation, the recording of archaeological deposits, working practices, timetables and orders of cost.
- 2.6 An outline specification, which defines certain minimum criteria, is set out below.

3. Specification: Field Evaluation (Phase 1)

- 3.1 A linear trench is to be excavated east-west across the entire site (a minimum of 1.8m wide). If excavation is mechanised a toothless 'ditching bucket' must be used. The trench design must be approved by the Conservation Team of the Archaeological Service before field work begins.
- 3.2 The topsoil may be mechanically removed using an appropriate machine fitted with toothless bucket and other equipment. All machine excavation is to be under the direct control and supervision of an archaeologist. The topsoil should be examined for archaeological material.
- 3.3 The top of the first archaeological deposit may be cleared by machine, but must then be cleaned off by hand. There is a presumption that excavation of all archaeological deposits will be done by hand unless it can be shown there will not be a loss of evidence by using a machine. The decision as to the proper method of further excavation will be made by the senior project archaeologist with regard to the nature of the deposit.
- 3.4 In all evaluation excavation there is a presumption of the need to cause the minimum disturbance to the site consistent with adequate evaluation; that significant archaeological features, e.g. solid or bonded structural remains, building slots or post-holes, should be preserved intact even if fills are sampled.

- 3.5 There must be sufficient excavation to give clear evidence for the period, depth and nature of any archaeological deposit. The depth and nature of colluvial or other masking deposits must be established across the site.
- 3.6 It is assumed that the Phase 1 evaluation will not exceed 1.2m depth.
- 3.7 The contractor shall provide details of the sampling strategies for retrieving artefacts, biological remains (for palaeoenvironmental and palaeoeconomic investigations), and samples of sediments and/or soils (for micromorphological and other pedological/sedimentological analyses. Advice on the appropriateness of the proposed strategies will be sought from J Heathcote, English Heritage Regional Adviser for Archaeological Science (East of England). A guide to sampling archaeological deposits (Murphy and Wiltshire 1994) is available.
- 3.8 Any natural subsoil surface revealed should be hand cleaned and examined for archaeological deposits and artefacts. Sample excavation of any archaeological features revealed may be necessary in order to gauge their date and character.
- 3.9 All finds will be collected and processed (unless variations in this principle are agreed with the Conservation Team of SCC Archaeological Service during the course of the evaluation).
- 3.10 Human remains must be left *in situ* except in those cases where damage or desecration are to be expected, or in the event that analysis of the remains is shown to be a requirement of satisfactory evaluation of the site. However, the excavator should be aware of, and comply with, the provisions of Section 25 of the Burial Act 1857. "*Guidance for best practice for treatment of human remains excavated from Christian burial grounds in England*" English Heritage and the Church of England 2005 provides advice and defines a level of practice which should be followed whatever the likely belief of the buried individuals.
- 3.11 Plans of any archaeological features on the site are to be drawn at 1:20 or 1:50, depending on the complexity of the data to be recorded. Sections should be drawn at 1:10 or 1:20 again depending on the complexity to be recorded. Any variations from this must be agreed with the Conservation Team.
- 3.12 A photographic record of the work is to be made, consisting of both monochrome photographs and colour transparencies.
- 3.13 Topsoil, subsoil and archaeological deposit to be kept separate during excavation to allow sequential backfilling of excavations.
- 3.14 Following completion of the Phase 1 evaluation, a short report must be prepared recommending the locations for the three Phase 3 evaluation

'boxes' (see 4.1 below), and these should be agreed with the Suffolk County Council Archaeological Service Conservation Team.

4.0 Specification: Evaluation (Phase 2)

4.1 A series of three trench sheeted boxes will be excavated within Phase 1 evaluation trench to examine the full sequence of deposits below 1.2m.

- a) At the west end of the evaluation trench to examine potential river edge revetments and the reclamation sequence.
- b) Alongside and including part of the early line of Duke Street (if it can be located by the evaluation trench).
- c) In the area east of the former line of Duke Street (to establish if this was dry land/occupied prior to the 19th century).

4.2 The excavation must be carried out to the same standards as the evaluation (see paragraphs 3.7, 3.8, 3.9, 3.10, 3.11 & 3.12).

5. General Management

5.1 All arrangements for the field evaluation of the site, the timing of the work, access to the site, the definition of the precise area of landholding and area for proposed development are to be defined and negotiated with the commissioning body.

5.2 This project will be carried through in a manner broadly consistent with English Heritage's *Management of Archaeological Projects*, 1991 (MAP2), all stages will follow a process of assessment and justification before proceeding to the next phase of the project. Field evaluation is to be followed by the preparation of a full archive, and an assessment of potential. Any further excavation required as mitigation is to be followed by the preparation of a full archive, and an assessment of potential, analysis and final report preparation may follow. Each stage will be the subject of a further brief and updated project design, this document covers only the evaluation stage.

5.3 Detailed standards, information and advice to supplement this brief are to be found in *Standards for Field Archaeology in the East of England*, East Anglian Archaeology Occasional Papers 14, 2003.

5.4 In accordance with the standards and guidance produced by the Institute of Field Archaeologists this brief should not be considered sufficient to enable the total execution of the project. A Project Design or Written Scheme of Investigation (PD/WSI) based upon this brief and the accompanying outline specification of minimum requirements, is an essential requirement. This must be submitted by the developers, or

their agent, to the Conservation Team of the Archaeological Service of Suffolk County Council (Shire Hall, Bury St Edmunds IP33 2AR; telephone/fax: 01284 352443) for approval. The work must not commence until this office has approved both the archaeological contractor as suitable to undertake the work, and the PD/WSI as satisfactory. The PD/WSI will *provide the basis for measurable standards* and will be used to establish whether the requirements of the planning condition will be adequately met.

- 5.5 Before any archaeological site work can commence it is the responsibility of the developer to provide the archaeological contractor with either the contaminated land report for the site or a written statement that there is no contamination. The developer should be aware that investigative sampling to test for contamination is likely to have an impact on any archaeological deposit which exists; proposals for sampling should be discussed with this office before execution.
- 5.6 The responsibility for identifying any restraints on field-work (e.g. Scheduled Monument status, Listed Building status, public utilities or other services, tree preservation orders, SSSIs, wildlife sites &c.) rests with the commissioning body and its archaeological contractor. The existence and content of the archaeological brief does not over-ride such restraints or imply that the target area is freely available.
- 5.7 A timetable for all stages of the project must be agreed before the first stage of work commences, including monitoring by the Conservation Team of SCC Archaeological Service.
- 5.8 The developer or his archaeologist will give the Conservation Team of the Archaeological Service of Suffolk County Council (address as above) five working days notice of the commencement of ground works on the site, in order that the work of the archaeological contractor may be monitored.
- 5.9 The composition of the project staff must be detailed and agreed (this is to include any subcontractors).
- 5.10 A general Health and Safety Policy must be provided, with detailed risk assessment and management strategy for this particular site.
- 5.11 No initial survey to detect public utility or other services has taken place. The responsibility for this rests with the archaeological contractor.
- 5.12 The Institute of Field Archaeologists' *Standard and Guidance for 3Field Evaluations* should be used for additional guidance in the execution of the project and in drawing up the report.
- 5.13 If the approved evaluation design is not carried through in its entirety (particularly in the instance of trenching being incomplete) the

evaluation report may be rejected. Alternatively the presence of an archaeological deposit may be presumed, and untested areas included on this basis when defining the final mitigation strategy.

6. Report Requirements

- 6.1 An archive of all records and finds must be prepared consistent with the principles of English Heritage's *Management of Archaeological Projects*, 1991 (particularly Appendix 3.1 and Appendix 4.1).
- 6.2 The data recording methods and conventions used must be consistent with, and approved by, the County Historic Environment Record.
- 6.3 The objective account of the archaeological evidence must be clearly distinguished from its archaeological interpretation.
- 6.4 An opinion as to the necessity for further on site recording and its scope may be given. No further site work should be embarked upon until the primary fieldwork results are assessed and the need for further work is established
- 6.5 Reports on specific areas of specialist study must include sufficient detail to permit assessment of potential for analysis, including tabulation of data by context, and must include non-technical summaries.
- 6.6 The Report must include a discussion and an assessment of the archaeological evidence. Its conclusions must include a clear statement of the archaeological potential of the site, and the significance of that potential in the context of the Regional Research Framework (*East Anglian Archaeology*, Occasional Papers 3 & 8, 1997 and 2000).
- 6.7 The assessment report should include detailed proposals for the analysis and publication of the results.
- 6.8 Finds must be appropriately conserved and stored in accordance with *UK Institute of Conservators Guidelines*. The finds, as an indissoluble part of the site archive, should be deposited with the County HER if the landowner can be persuaded to agree to this. If this is not possible for all or any part of the finds archive, then provision must be made for additional recording (e.g. photography, illustration, analysis) as appropriate.
- 6.9 The site archive is to be deposited with the County HER within three months of the completion of fieldwork. It will then become publicly accessible.

- 6.10 Where positive conclusions are drawn from a project (whether it be evaluation or excavation) a summary report, in the established format, suitable for inclusion in the annual 'Archaeology in Suffolk' section of the *Proceedings of the Suffolk Institute for Archaeology*, must be prepared. It should be included in the project report, or submitted to the Conservation Team, by the end of the calendar year in which the evaluation work takes place, whichever is the sooner.
- 6.11 County HER sheets must be completed, as per the county HER manual, for all sites where archaeological finds and/or features are located.
- 6.12 At the start of work (immediately before fieldwork commences) an OASIS online record <http://ads.ahds.ac.uk/project/oasis/> must be initiated and key fields completed on Details, Location and Creators forms.
- 6.13 All parts of the OASIS online form must be completed for submission to the HER. This should include an uploaded .pdf version of the entire report (a paper copy should also be included with the archive).

Specification by: Keith Wade

Suffolk County Council
Archaeological Service Conservation Team
Environment and Transport Department
Shire Hall
Bury St Edmunds
Suffolk IP33 2AR

Tel: 01284 352440

Date: 14 April 2008

Reference: /Orwell Quay (UCS), Duke Street

This brief and specification remains valid for 12 months from the above date. If work is not carried out in full within that time this document will lapse; the authority should be notified and a revised brief and specification may be issued.

If the work defined by this brief forms a part of a programme of archaeological work required by a Planning Condition, the results must be considered by the Conservation Team of the Archaeological Service of Suffolk County Council, who have the responsibility for advising the appropriate Planning Authority.

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Appendix 2: Documentary research

Anthony M Breen

Introduction

The research for this report has been carried out at the Suffolk Record Office in Ipswich and follows the excavation of part of the site of the former Ransomes, Sims and Jefferies 'Orwell Works'. The documentary sources relating to this site were first examined in 2005 (Gardner & Breen, 2005) and reproduced in a subsequent report (Gardner & Breen, 2007). During the excavation of the site in 2008 a cellared building was found and this report relates to the site and date of this building.

Amongst the deeds in the Ipswich Port Authority Collection there is a bundle (ref. EL1/3/96/9) relating to a property known in 1853 as White Cottages. These were described in 1746 as "six several messuages adjoining together their divided into twelve tenements or dwellings ... to the eastward of the Ship-yards there late the estate of Christopher Mallett". They had been built at "Green Yard". In 1801 three of these cottages were described as "lately rebuilt" and in 1851 the premises was described as "lately been pulled down and the site thereof laid partly into the public road & partly into the land & yards of R. Ransome". Unfortunately the bundle does not include a plan of the site, though it is reasonable to suggest that these had been the cottages in Duke Street shown on the maps before 1848 and that they had been demolished after the closure of this road in 1850. Until 1811 these buildings were in the ownership of Joseph Barton, an Ipswich builder. In 1851 John Chevalier Cobbold sold the site of these cottages to Robert Ransome.

There are considerable difficulties in precisely locating the cottages in documentary sources and this is due to the inconsistent use of road names. On White's 1867 map of Ipswich the street to the east is known as 'Foundry Road'. The name 'Foundry Road' appears in William Ranger's 1856 report to the General Health Board. The street is not listed in Steven's 1881 Directory of Ipswich and the entire street is shown as enclosed within the Orwell Works on the first edition of the Ordnance Survey map surveyed in 1880. This street was closed in March 1850 and the roadway straightened. The name of the then new road appears on a property deed plan of 1849 as 'East Strand Road'. On another plan attached to a deed dated 30 October 1827 the road is known as 'Greennorthwestich Way'; this same plan was used on a latter deed of 25 June 1847 and the road was still named 'Greennorthwestich Way'. On another plan attached to a deed of the same date for the adjoining property the road is labelled as 'Duke Street leading to the Cliff Brewery'. As far as the census enumerators were concerned in each of the census years 1841-1871 the street was simply known as Duke Street. Unfortunately the houses were not numbered in 1841 and 1851. In the Poor Rate books for St Clements 1850-53, there is a single heading for Duke Street and no references to Foundry Road, White Cottages or Green Yard. Even in the later list for 1867,

there is no reference to Foundry Road, instead in 'Orwell Works Road' there were 25 houses.

Ipswich Borough Council's Museums and Galleries hold a number of important pictures and prints directly relevant to this site. These illustrations have been used in Hugh Moffat's 'Ships and Shipyards of Ipswich 1700-1970'. In particular on page 17 of his work there is a copy of part of John Cleveley's 1753 'Prospect of Old Ipswich' showing a house to the left of the wherry and sloop. This building with others is again shown on 'a print of Raymond's Lower Shipyard, St Clement's in 1801 shortly before the reclamation of the shallows' shown on page 97 of his work. The buildings are shown on Pennington's 1778 map of Ipswich.

The 'shallows' were first reclaimed for a new Ballast Wharf following an Act of Parliament passed in 1805 and the subsequent ownership of the site is described in three bundles of deeds. The entire area was sold to Robert Ransome in June 1847. The site of 'White Cottages' is described in a separate bundle of deeds. It is necessary to expand on the description of these records given in the 2005 report to further identify the owners of each site and, more importantly in relation to the cottages, the occupiers.

Title Deeds of the sites of Houses called White Cottages purchased of J C Cobbold

There are no plans in this bundle of 30 documents (ref. EL1/3/96/9). A number of documents are property deeds though few relate to the conveyance of the property and most relate to mortgages raised on the property. The documents are described in two abstracts of title beginning with an 'Abstract of Title to the several messuages or tenements & Premises called The Green Yard in St Clement in Ipswich'. The document consists of 5 pages and describes the deeds from 4 July 1746 to 9 November 1801. The first deed described was dated 3 July 1746 between John Rolfe of Ipswich miller Esther his wife of the one part and John Kirby of Shotley ... bricklayer 'for the docking & baring of all & every the intails that might be upon the premises ... the said John Rolfe with said John Kirby his heirs & assigns to levy a fine'. This was a clumsy device for transferring a freehold property through creating a fictitious legal dispute. The property was then described as

All those six several messuages adjoining together then divided into twelve tenements or dwellings then in the several tenures of Richard Basket, William Greenleaf, Andrew Davis, John Clark, John Knights, Samuel Candy, John Cole, Richard Billett, Mary Manning & three tenements empty situate ... in the parish of St Clement ... to the eastwards of the ship-yards there ... were then late the estate of Christopher Mallett deceased Father of the said Esther Rolfe.

In the contemporary rate list for 1748-49 (ref. FB98/E3/2) contained in the churchwardens' accounts for the parish of St Clements, Ipswich under the heading 'Duck Street', there is an entry for 'Wm Greenleaf'; his house was valued at £3 and he paid 1s 9d in rates. He also paid 5s 10 for a mill and marsh valued at £10. Andrew Davis' property was valued at £1 10s and

Samuel 'Cordy' (not Candy) had property valued at £2, Widow Mary Manning's property was valued at £1s 10s and the property of John 'Nole' (not Cole) was valued at £2. There is another property, that of James Read, valued at £1 10s. These appear to be the six tenements mentioned in the deed with those of Richard Basket, John Clark and John Knights all empty.

After the entry for James Read the list continues with 'Mr Thomas Cobbald house & brew office £10' and Greenorthwestich Farm valued £90. A little further down the list Mrs James French the tenant of 'Petts Farm' had her property valued at £97. This last farm was later the site of Holywells Mansion. Better comparisons of rateable values from the same list are Mr John Barnard's house and yard (£20), his timber hills (£3), his stables (£2), his dock & yard (£3) and his orchard (£8). Other examples are the Carpenters Arms inn, owned by Thomas Moore and valued at £8 and The Anchor inn, owned by Robert Pizzey and valued at £5.

In the list for the previous year there is 'Wm Greenleaf house £3, Andrew Davis £1 10s, Samuel Cordey £2 and Widow Manning £1 10s'. The next entries are 'Mr Robert Harrison rope ground £4, Wm Greenleaf mill & marsh £10, Mr John Noble £6, Samuel Read £1 10s' (ref. FB 98/E3/1). From 1742 to 1748 the list is set out in alphabetical order of surname and earlier lists only have three sub headings of 'Backside', 'Church Lane' and 'Lands' until 1736 when under a heading 'The hamblets' there are the names of William Greenleaf £1, Mr John Clark £1'. Samuel Cordey, a shipwright, is named in the alphabetical list for 1746 as is William Greenleaf but not the other tenants.

Though the names of the tenants do not appear in the church rate lists, in the overseers' accounts for 1749 (ref. FB98/G12/5), there are under 'Duck Street' 'Richard Baskett, Susan Mouse, Widow Hill, Thomas Billett, John Cole'; no valuation or rate was entered against the properties they occupied, instead sums are entered under the column 'Valuation Empty'. The list continues with Andrew Davis £1 10s, John Clarke (no valuation or rate), Samuel Cordey £2, 'late John Raymond valuation empty £1 10s' and Mary Manning widow £1 10s.

The abstract has correctly copied the names as they appear in the original deed. Folded with the deed there is a copy of the will of Margaret Mallett dated 22 November 1745. She, in pursuance of the 'last will and testament of Christopher Mallett my late Husband' bequeathed to 'my daughter in law Esther the wife of the said John Rolfe'

all those several messuages or tenements scituate lying and being in the parish of Saint Clement ... which were my late husband's and now are or late were in the occupations of Richard Baskett, Samuel Cordy, Andrew Purvis, Mary Hill, John Knights, Peter Rowland, Billett, Clark, Cole, Greenleaf, Manning.

She also bequeathed to Esther another property in St Peter's in the 'occupation of John Rolfe and John Wright, but no other part of my said late husbands real effects'. The term 'daughter in law' here means stepdaughter.

The fine for '7 Messuages 2 gardens & 2 orchards' was entered into the record of the court at Westminster during the Trinity Term of 1749 or '22 Geo II'. On 29 September 1747 James and Esther Rolfe raised a mortgage of £102 10s on this property and the house in St Peter's from Thomas Crawley and an additional sum of £20 on 29 September 1748 endorsed on the back of the 1747 deed. On 12 March 1749 the mortgage is assigned to Mary Foulser, on 29 June 1751 to William Sparrow, on 1 May 1758 to George May and on 30 July 1761 to Sarah Baker. On 24 March 1769 Sarah Burn of Harwich 'called Sarah Baker widow' assigned the mortgage to Sarah Cobbold who on 7 April 1773 assigned it to Simon Baker. Simon Baker was an executor of the will of James Rolfe and he held the mortgage for the benefit of Christopher Rolfe of Ipswich, fellmonger.

These deeds also give the names of later occupants of the cottages. For example, the deed of 1769 names the occupants as 'James Sutton, Porter widow, John Bryant, Smyth, Peter Aldous'. These names appear in all the deeds from 29 June 1751, though the church rate list for 1752 gives the names of the occupants as 'William Baskett, Samuel Cordy, Mary Manning and James Read' and the poor rate list 'William Baskett at the Dolphin, late John Blackshall, Richard Baskett, Susan Mowse, Widow Hill, Thomas Billett, John Cole, late John Seaborne, Samuel Cordey, late John Raymond, Mary Manning widow'. In the poor rate list no valuation is given for the properties of Richard Baskett through to Seaborne or for 'Late John Raymond'.

On 28 May 1798 'Christopher Rolfe did demise the aforesaid premises to the said Joseph Barton for 21 years at the yearly rent of £20 and setting forth that it was the intention of Joseph Barton to lay out & expend in altering & improving the said premises a considerable sum of money'. The lease to Joseph Barton was for a term of 21 years. The property was described as 'now or late in the several tenures or occupations of John Warner, the widow Sidney, Martha Pollard, the Widow Osbern, Stephen Lord, the widow Beaumont, Hipkin, Gooch, Ginn and others'. These names do not appear in the rate list for 1798 (ref. FB 98/E3/5) and the details in the later list are generally poor. It is possible that because the mortgages relate to both the tenements/cottages in St Clement and the house in St Peter's these vaguely listed sub-tenants lived in the latter parish and not in St Clement.

In his will dated 9 November 1801 Christopher Rolfe bequeathed

all those messuages ... commonly called the Green Yard situate lying & being in the parish of St Clement in Ipswich aforesaid & now in lease to Joseph Barton unto & to the use of my aforesaid reputed son John Rolfe.

This will was proved at the court of the archdeaconry of Suffolk. The first abstract of title ends with this document.

In a affidavit dated 7 June 1828, it was declared that 'John Rolfe otherwise John Sawyer late of Ipswich aforesaid Fellmonger' was 'the reputed son of

Christopher Rolfe late of the same place fellmonger deceased and natural son of Sarah Sawyer of Ipswich’.

In a second abstract of title prepared in 1853 and written on 11 pages the records begin with the lease of 1798. In deeds dated 23 & 24 December 1801 the property was sold to Joseph Barton who had ‘laid out & expended a considerable sum of money in altering, rebuilding & improving the said messuages’. The property is further described as ‘all those several messuages ... near adjoining to each three whereof had been then lately rebuilt’. The names of the supposed occupant were the same as in 1798. Again, the property was mortgaged for £1200 to a John Laws, a farmer.

Joseph Barton made his will in December 1811 though it was not proved at the archdeaconry court until June 1825. A bond made out for the mortgage is endorsed with payments from Joseph Barton until 1825. John Laws made his will in June 1817 and this was proved at the Prerogative Court of Canterbury in 1819. These documents do not describe the cottages at ‘Green Yard’. There are further deeds relating to the mortgage and title of the property until 14 September 1831 when John Chevalier Cobbold first acquired an interest in the property. The later deeds name the same occupants as in 1798.

On 29 December 1851 Robert Ransome acquired both the title and mortgage of the property. These are described in the same terms as in 1798 except for one additional phrase underlined in the abstract ‘But which messuages had then been lately pulled down and the sites thereof laid partly into the public road & partly into the land & yards of the said Robert Ransome’.

Title Deeds of piece of land late Ballast Wharf

These deeds (ref. EL1/3/96/35) relate to the north part of Ballast Quay. The earliest documents in the bundle are the deeds of 1 and 2 February 1821 relating to the conveyance of ‘ooze land’ in the parish of St Clement from the Corporation of Ipswich to Mileson Edgar esquire and others in trust for the Commissioners of the River Orwell described as

All that piece or parcel of ooze late of them the said Bailiffs ... containing by survey three acres one rood and twenty eight perches and situate and being in the parish of St Clement in the town of Ipswich ... and which ooze or piece of ground abuts on the ship yard and premises of the said John Cobbold late in the occupation of Benjamin Raymond and now of Bayley towards the north on the road leading from the Town of Ipswich aforesaid to the Cliffe Brewery towards the east and extends in length from the said premises Bayley towards the north along the said road five hundred and seven feet the ooze belonging to the Corporation of Ipswich leased to Benjamin Batley Catt towards the south as the same is now divided therefrom by a pale fence extending in a line towards the Channel of the said River Orwell and by the said channel towards the west and in now in the hands of the said Commissioners of the River Orwell.

Cobbold had claimed that this ooze belonged to his manor of Wix Bishop and the deed is a settlement of a lengthy dispute between the two parties.

In another deed dated 25 June 1847 relating to a mortgage between Messrs Ransome and the Ipswich Dock Commissioners the property is described as

All that piece or parcel of freehold land situate lying and being in the Parish of St Clement ... containing by admeasurement Two Hundred and Ninety Six rods and an half ... which said piece or parcel of land was lately in the occupation of the said Commissioners and lately formed part of the premises used by them as a Ballast Wharf And also all that messuage or tenement with outbuildings near and adjoining thereto standing and being upon part of the said piece or parcel of land and lately in the occupation of Samuel Smith as the said premises do abut upon the premises formerly used as a Ship Yard belonging to John Cobbold esquire and formerly occupied by Benjamin Raymond afterwards of William Bayley then Messrs Colchester and Company and now of Messrs James, Robert and Allan Ransome and Company and towards the north west upon the Road leading from the town of Ipswich ... to the Cliff Brewery towards the north east upon a New Road lately formed by the said Commissioners in pursuance of the provisions of said act also lately forming part of the said Ballast Wharf towards the west upon a piece or parcel of land also forming part of the said Ballast Wharf afterwards converted into a Wet Dock called Gas Dock and since filled up and now belonging to the Ipswich Gas Light Company in part and upon the premises also formerly forming part of the said Ballast Wharf but now forming part of the said Ballast Wharf but now forming the site of the Gasometer and other works belonging to the said Company in other part on the part of the south east And secondly All That piece or parcel of freehold land situate lying and being in the parish of Saint Clement and containing by admeasurement twenty five rods and an half ... which said last mentioned piece or parcel of land was also lately in the occupation of the said Commissioners and also lately formed part of the said premises used by them as a Ballast Wharf and abuts on the said New Road so lately formed ... on the part of the east upon the said piece of land lately forming the said Dock called the Gas Dock towards the south and upon the Wet Dock constructed by the said Commissioners in pursuant to the provisions of the said Act towards the North and West

All which said premises together with certain other erections and buildings, since thereon are now in the occupations of the said Messrs ... Ransome and Company ... and the same are more particularly delineated and described in the map or plan thereof drawn in the margin of now reciting Indenture in which said map the said piece or parcel of land firstly therein described is distinguished by being colored blue and the said piece of land secondly therein described is distinguished by being colored Pink.

The plan was on an indenture dated 19 June 1846 and this deed is mentioned in the recital clauses at the start of the deed.

Many of the deeds relate to mortgages such as that dated 17 September 1849 and endorsed 'Appointment and release by way of a mortgage of part of Orwell Works and messuage and buildings thereon at Ipswich to secure £3950 and interest'. The mortgage was between Messrs Ransome & Co and

Messrs Stewart & Gandell and a plan of the plot of land is attached to the document (a digital photograph of this plan can be found in the site archive as Ransomes 1849-17-9.jpg). The deed recites the deed of purchase of 25 June 1847 and continues

Whereas considerable alteration has been made in the site of the said premises since the purchase thereof from the said Commissioners and various buildings and works have been erected or otherwise set up thereon for the purpose of the said business and the same appearing in their present state together with the triangle piece of land adjoining thereto hereinafter referred to are set forth in the plan drawn on the sixth skin hereof of the premises purchased from the said commissioners as aforesaid being colored Pink and the said Triangular piece colored Yellow.

The yellow piece was to be exchanged for land owned by John Cobbold and others. This plan shows this part of the Orwell Works in some detail including the positions of the five foundries, two smiths' shops, and other buildings.

This bundle also includes copies of the three acts of Parliament; 'The Port of Ipswich Act' 1805 (45 Geo III cap 101), 'Amend and Act of Port of Ipswich Act' 30 June 1837 (1 Vict c 74) and 'An Act to enlarge the Powers of the Ipswich Dock Commissioners' 9 May 1843 (6 Vict c 20). These acts gave the commissioners the necessary powers to develop the docks.

Details of the deeds are contained in two abstracts of title dated 1853, prepared when the full possession of the property passed to the ownership of Ransomes and Sims. Robert Ransome had purchased two properties in June 1847 and there are plans attached to copies of both deeds. The 'Copy Conveyance of the Property late Ballast Wharf from Ipswich Dock Commissioners to Mr Robert Ransome dated 25 June 1847' relates to the southern half of the site consisting of '295 rods and 46 feet' (see digital photograph in the site archive, named Ransome 1847-25-6.jpg) and the 'Copy Conveyance of land & Buildings late part of Ballast Wharf from the Ipswich Dock Commissioners to Mr Robert Ransome' also dated 25 June 1847 shows the former malting on the northern side of the site (see digital photograph Malting Site Ransome 1847.jpg). The original deeds for the malting site are in two other bundles of deeds (ref. EL1/3/96/2 & 4). The plan was originally used on a deed dated 30 October 1827.

In 1878 there was a legal dispute between 'Messrs Ransomes Sims & Head' and the Ipswich Dock Commissioners and a further copy of the '295 rods' plan was made (see digital photograph named Case Papers Plan 1878.jpg). The case papers include three photographs of the docks taken in January 1878.

In the same bundle there is an undated plan of the docks showing the positions of the 'Old Ballast Wharf' and 'Gas Dock' based on similar plans to that of 1842.

The bundle includes copies of papers for 'Diverting turning and stopping up an old Highway in the parish of Saint Clements in Ipswich, Ipswich Borough

Sessions 6 March 1850'. There are no plans of this road. The road was viewed on 24 December 1849 and described as

A certain Old Highway called Duke Street situate in the said parish commencing at a point opposite a messuage and Beer House in the occupation of George Welch and extending from thence to a terminating point adjoining or near the works of the Ipswich Gas Company and containing in length five hundred and ten feet or thereabouts which said Old Highway is proposed to be diverted turned and stopped up.

The justices also viewed

a certain New Highway also situate in the said parish commencing on the east side at or near the said messuage and beerhouse of the said George Welch and extending from thence over the land late of James Ransome deceased and of Robert Ransome James Allen Ransome Charles May and William Dillwyn Sims unto or near the lower end of Wycks Bishop Street on the same side and the said Works of the Ipswich Gas Light Company on the West Side and bounded on the west side by the ironorthwestorks houses walls and fences and premises late of James Ransome.....being in length of Four Hundred and Eighty Five feet ... and of uniform width of thirty feet measuring from the Western Boundary line thereof proposed to be made and appropriated in substitution of the said Old Highway so proposed to be diverted.

The Sale Plans dated 20 June 1842 entitled a 'Waterside Property at Ipswich known as the Old Ballast Wharf also a desirable piece of Freehold Land lying between the Dock and New Channel' relates to the southern part of the site. On the plans the second piece, lot 3, was in the parish of St Peters (see digital photograph in the site archive, named Sale Plan 1842.jpg). The first two lots were described as

Comprising of an area of 116 rods and extending 202 feet from the termination of the Quay, and public roadway, at the point denoted by the letter A on the annexed plan ... The purchaser of the lot will be entitled to the sole and exclusive right of laying vessels, and of loading and discharging cargoes along the whole line of frontage and of erecting buildings to the water's edge.

As not comprised in Lot 1, and the public roadway as denoted in the plan by the letters CC ... abutting towards the north on the Bonding Yard &c in the occupation of Messrs Colchester and Co., with the substantial Brick-Built Dwelling-House and Buildings thereon, now in the occupation of the Harbour Master.

Lots 4 and 5 related to the rents of £10 and £20 arising from the lease of the properties. The leases are in another bundle (ref. EL1/3/96/4).

Title Deeds & Writings relating to the Freehold reversion of the leasehold lands & Hereditaments comprised in 1 acre and 1 rod

purchased of the Ipswich Docks in 1847 the property of Ransomes Sims & Jefferies Ltd

This bundle (ref. EL1/3/96/4) begins with a duplicate 99-year lease dated 30 October 1827 between Mileson Edgar and others 'trustees for the River Commissioners' and Benjamin Raymond and relates to 'Land in the parish of Saint Clement in Ipswich late Parcel of the Ballast Wharf and of Buildings thereon erected'. This was the northern part of the site purchased in 1847.

The deed of 30 October 1827 contains the plan later copied in 1847 and begins with two recital clauses beginning 'Whereas'. The first relates to a decision made at a meeting of the commissioners held in 9 November 1824 to lease to Benjamin Raymond:

All that piece or parcel of land being late part and parcel of the Ballast Wharf of them the said Commissioners and heretofore used and occupied therewith situate ... in the Parish of St Clement ... being the piece of land coloured pink on the said plan ... together with the two messuages tenements or dwelling houses and the malting office and other erections and buildings thereon.

The lease was for 99 years at an annual rent of £10. A condition of this lease was that Benjamin Raymond was to erect

a good and substantial brick and tiled house with no less than two rooms on a floor nor less than four rooms in the whole which tenement was to be left at the end of the demise (that is at the end of the term of the lease) but all other erections or buildings were to be then taken or not at the option of the said commissioners at valuation.

At further meetings held on 11 July and 11 November 1826 a further piece was leased to Benjamin Raymond for an annual rent of £20. This piece is described as

All that piece or parcel of land being late also part and parcel of the aforesaid Ballast Wharf of them the said commissioners and is the piece coloured blue on the said plan and is situate also in the said parish ... and also full and free liberty for the said Benjamin Raymond ... to lay any vessel in the dock ... also shown on the plan on the side of the dock adjoining to the same.

The boundaries were 'delineated and set forth in the ground plan'. Raymond covenanted to repair a building coloured in dark green on the plan and these repairs are set out in detail in the lease.

In July 1829 there was a small exchange of land between Benjamin Raymond and the Commissioners. A paper copy of the agreement is attached to the 1827 deed. Beneath the agreement there are two copies of an assignment of the lease made after the death of Benjamin Raymond. The first is dated 5 November 1835 and relates to the lease of

All that piece or parcel ... firstly described in the lease (30 October 1827, the piece coloured in pink) now in the several tenures and occupations of Bayley Joseph and Jeremiah Cousins and the said malting office is intended was duly assigned unto the said Enos Page.

Enos Page was a 'master mariner' and further deeds relating to this property are in another bundle (ref. EL1/3/96/4). The second copy is dated 8 November 1835 and relates to the second piece described in the lease of 30 October 1827 and coloured green on the plan. In 1835 this piece was described as

lately in the tenure or occupation of William Cordingly and the said Benjamin Raymond and are now in the tenure or occupation of the said William Cordingly and Benjamin Garway Hamblin ... and also full and free liberty for the said Benjamin Garway Hamblin ... to lay any vessel in the dock....

The remaining term of this lease was assigned to Hamblin, again described as a 'master mariner'.

In 1847 pieces of land and the rents of £10 and £20 passed to Ransome. The property originally coloured green is further described as 'since erected and built thereon by Benjamin Raymond a former lessee ... is now in the occupation of Messrs Ransome & May'.

Other deeds in this bundle relate to mortgages and the final conveyance from Mrs Sarah Ransome, Robert's widow, to Messrs Ransomes & Sims dated 30 July 1853.

Title Deeds Leasehold land formerly Page's

The deeds in this bundle (EL1/3/96/2) have not been examined in detail. The bundle does contain the sale particulars of the premises sold on 6 July 1846 at the Vine Inn, in St Clements. The property was described as a

large yard, extensive warehouse formerly used as a malting and two cottages now in the occupation of Messrs Bentley & Worby ... held under a lease dated about the 30th of October, 1827 from the Commissioners ... for a term of 99 years.

There are also sale particulars for the previous sale of 19 September 1834:

Leasehold Malting Office and Premises situate near the Gas Works, in the hamlet of Wix-Bishop Ipswich consisting of a most substantial newly-erected Brick-Built Malting Office 100 feet long and 24 feet wide with Two Granaries extending the whole length; and Two well-built Cottages, Sheds, Saw-Pit &c.

The abstract of title for this property, consisting of 42 pages, mentions that in April 1833 Robert Raymond had contracted to sell some of his property at auction to settle various debts. There is a copy of the will of Benjamin Raymond 'shipbuilder' in this bundle. The will was proved at the Consistory Court of Norwich in November 1830. A deed dated 21 February 1845

mentions that the premises was in the occupation of Messrs Ransome and that 'the said Malting Office having been by them lately converted into a warehouse or factory'.

Rate Books and Census Records

The churchwardens' accounts held in the Parish Collection for St Clement end in 1812. The overseers' accounts end in 1830. In 1838 a new poor law passed much of the responsibility for the care of the poor to the Ipswich Poor Law Union. The poor rate books in the Ipswich Borough Council Collection for this parish begin with the rate book for May 1850 (ref. DC2/17/1). In this list the entire street is listed under the single heading 'Duke Street'. William Cordingley, the shipwright, is listed in the rate list in an entry numbered 284. He is listed in the 1851 census (ref. HO107/1800/111 page 25) with the schedule number 107. The next schedule numbers in the census, James Naunton 'pilot' (108) and George Rumsey 'foundry labourer' (109) correspond to 285–286 in the rate books. Elsewhere the order is very different - 110 Henry Rudland was an innkeeper, 111 Ebenezer Goddard, civil engineer of the 'Ipswich Gas Light Company' and 112 William Worby who was the manager of the Orwell Iron Works 'employing 757 men & 100 boys' listed as 255 in the rate book. George Welch whose beerhouse is mentioned in the highway diversion papers of 1849–1850 is not listed in Duke Street in the 1851 census. He is named in the 1850 rate list at 260 and in the following year (ref. DC2/17/2) Henry Wilkinson is listed at the same address but not in the census. In the two rate lists there is a block of some 23 houses ranging from 263 to George Rumsey at 286 that were transferred from the occupation of John Cobbold to 'Ransomes & May' between May 1850 and May 1851. None of these houses were demolished in this period. In the 1851 census there are references to empty houses in this area between the schedule numbers 101 and 102; in the rate lists these empty properties were occupied in the following year. The same block of properties appears in later rate books as 'Orwell Works Road'.

William Cordingley the shipwright is listed with his family in the 1841 census (ref. HO107/1043/2/38) as is Samuel Smith the harbour master who is mentioned in the property deeds. The next property listed after Samuel Smith's is Daniel Goddard at the gas works. The order seems to follow the houses along the street from the north to the south. This places John Pittock, bricklayer labourer and his family, John Ransome mariner, Martha Chatness laundress, John Planten pauper and his family, Maria Curtis charwoman and her family, Robert Worledge waterman and Abraham Garwood agricultural labourer and his family, James Harbut and his family in the area north of Samuel Smith's house. His house is shown on the property plans and this suggests that these labourers were the last occupants of White Cottages. These same families are not listed in Duke Street in the 1851 census.

Other Documents

In a photographic collection of the drawings of W. Trent, there is an illustration of 'Green Yard' (ref. K423/15). The drawing is not dated but is believed to be about 1820. The photographs were taken from an exhibition of his work in

1975. The illustration shows some of White Cottages and the adjoining boatyard.

The card index to wills for the archdeaconry of Suffolk was searched for all the named occupants of the cottages as they appear in deeds of 1749 without success.

Conclusion

The site of these cottages is shown on the area coloured yellow on the 1849 plan of the Orwell Works. This plan is attached to a deed of 17 September but the cottages are not shown on this plan. The road to the east of the cottages was straightened in 1850. In another deed dated 29 December 1851 relating to 'White Cottages' it states 'Which said messuages had then been lately pulled down and the sites thereof laid partly into the public road & partly into the land & yards of the said Robert Ransome'.

The area was the subject of an exchange of land between Ransome's and John Cobbold. The deeds relating to this exchange have not been located. There is no full catalogue for the additional deeds deposited in the Ipswich Port Authority collection described in this report.

As late as June 1847 the property deeds use an earlier plan of this site from a deed of 1827. The 1827 plan shows the position of a malting office and two cottages. The malting office had come into the use of Ransome before 1847 though it is unlikely that it and other buildings were demolished until after June 1847. In 1847 the firm moved from its original site in Old Foundry Road to the site at Orwell Quay. It is reasonable to suggest that the cottages were demolished in the period 1847-1849.

The cottages existed in 1748 though three were described in the contemporary deeds as empty. Some of the occupants were shipwrights though not owners of any yard. The properties were valued at £2 or less and this valuation can be compared with that of the nearby stables valued at £3. None of the occupants left a will. In the overseers accounts other occupants are listed in properties of no rateable value. In all respects these cottages can only be viewed as the homes of employees, not employers. Documentary evidence, in the deeds of 1798, shows that they had been rebuilt and refurbished at that date.

There are no rate books for this parish in the period 1830-50. A list of possible final occupants of the cottages has been gathered from the 1841 census. This list is based on the probable order of the enumeration and on the fact that the same families are absent from this area in the next census of 1851.

Appendix 3: Group descriptions

Please note, groups marked with an asterisk are discussed more fully in the main body of the report

Group 2001: Current ground slabs and associated deposits

Contexts: 0001, 0002, 0055, 0076, 0185, 0195

0001 is the general number given to concrete slabs, of varying date, that extend site-wide and form the current ground surface. 0195 is a series of parallel concrete ground beams that underlying the slab at the southwest end of the evaluation trench. 0002, 0055, 0076 and 0185 are associated make-up/levelling deposits of soil and rubble.

Group 2002: Unspecified cut and fills

Contexts: 0003–0005

0005 is a large, undulating cut feature, possibly associated with recent demolition. 0003 and 0004 are fills of sand, gravel and soil containing concrete fragments.

Group 2003: Drain / sewer pipe

Contexts: 0006–0008

0007 is a large, ceramic pipe in trench 0008, backfilled with soil 0007.

Group 2004: Brick foundation

Contexts: 0009–0011

0010 is a shallow, stepped brick foundation oriented northwest–southeast in construction cut 0011. 0009 is the associated construction backfill.

Group 2005*: Former worked soil / ploughsoil

Contexts: 0012, 0439

These two context number refer to the same deposit of mid to dark brown silty sand containing occasional pottery, bone and ceramic building material, at the northeast end of the evaluation trench. See main text and Appendix 4 for further discussion. Note that Group 2155 represents unstratified finds from the surface of deposit 0439.

Group 2006*: Natural strata

Contexts: 0013–0015, 0147, 0148

These are deposits of natural sand and gravel, seen only at the northeast end of the evaluation trench.

Group 2007: Probable cellar

Contexts: 0016–0018

Two walls of heavily mortared brick with some flint running northwest–southeast form two sides of a cellar 4.0m wide and at least 0.70m deep (not excavated fully). The walls are built against construction cut 0018, and the cellar is backfilled with soil and brick/concrete demolition rubble.

Group 2008: Cast iron pipes

Contexts: 0019–0021

Two cast iron pipes 0020, with external diameters of 80mm, run northwest–southeast in trench 0021. The trench is backfilled with soil and demolition rubble 0019.

Group 2009: Cast iron pipe

Contexts: 0022–0024

Cast iron pipe 0023, with an external diameter of 80mm, runs northwest–southeast in trench 0024. The trench is backfilled with soil 0022.

Group 2010: Unspecified cut and its fill

Contexts: 0025, 0026

Shallow cut feature 0026 is 1.10m wide and 0.30m deep. Fill 0025 is loose, ashy soil containing frequent coal and some bone but no datable artefacts. The function of this feature is unknown but it is assumed to be relatively recent in date.

Group 2011: Probable pipe trench and its fill

Contexts: 0027, 0028

Linear cut 0028 is >2.00m long x 0.60m wide x >0.80m deep with vertical sides, and is oriented northwest–southeast. Its fill 0027 is loose soil containing building rubble and coal but no datable artefacts. It is likely to be a relatively modern pipe trench.

Group 2012: Unspecified cut and its fill

Contexts: 0029, 0030

Small cut feature 0030 is 0.60m wide and 0.42m deep. Fill 0029 is loose soil containing building rubble but no datable artefacts. The function of this feature is unknown but it is assumed to be relatively recent in date.

Group 2013: Manhole and associated sewer pipes

Contexts: 0031, 0032, 0367, 0392–0397, 0400–0402, 0407, 0408, 0413, 0414

0396 is a large manhole / inspection chamber made of modern, frogged bricks, in construction cut 0397. It is backfilled with soil and demolition rubble

0395, 0367, 0394, 0401 and 0407 are large ceramic pipes (up to 0.23m internal diameter) connected to the manhole. Other contexts are associated pipe trenches and their fills.

Group 2014: Inspection chamber and associated pipe trench

Contexts: 0033, 0034, 0403–0406, 0409, 0410

0406 is a rectangular brick chamber, 0.50m wide internally. It is flanked by two brick walls 0403 and 0405 that seem to be of contemporary construction. These structures are within construction cut 0404. 0034/0410 is a probable pipe trench associated with the chamber, filled by 0033/0409.

Group 2015: Unspecified cut and its fill

Contexts: 0035, 0036

0036 is a relatively modern, sub-circular pit, 1.00m in diameter x >1.00m deep. Its lower fill 0035 is soil containing some building rubble and coal. An upper, concrete, fill was not recorded.

Group 2016: Unspecified brick structure

Contexts: 0037, 0038

0037 is a truncated brick structure of unknown form and function, within construction cut 0038.

Group 2017: Drain / sewer pipe

Contexts: 0039, 0046

0039 is a truncated ceramic pipe, in trench 0046.

Group 2018*: Demolition backfill of Cellared Building 1

Contexts: 0040–0042, 0293

These are dumps of soil and demolition rubble filling Cellared Building 1.

Group 2019: Brick plinth/concrete stanchion and associated strip foundation

Contexts: 0045, 0050

0045 is a stepped brick plinth on a square concrete stanchion, with associated stepped brick, strip foundation, all in construction cut 0050. This feature probably relates to Group 2022 – a line of concrete stanchions thought to be associated with the enlargement of the Orwell Works in the 1880s.

Group 2020: Unspecified cut and its fill

Contexts: 0047, 0048

0048 is an irregular cut, 1.66m wide x 0.90m deep, with a stepped profile. Its fill 0047 is soil and brick/concrete rubble, with some scrap metal. It is clearly of relatively recent date.

Group 2021: Brick “tank” and associated drain pipe

Contexts: 0051–0053, 0065–0068

0052 is a rectangular “tank”, 3.55m wide x at least 1.00m deep (not excavated fully). It is made of modern, machine-made bricks and is rendered internally. It is built in construction cut 0053 and backfilled with ashy soil and demolition rubble 0051. Ceramic pipe 0067 (in trench 0068) runs into the southeast side of the “tank” – the pipe trench is backfilled with 0065 and 0066. The function of the structure is not known but it is clearly of 20th-century date.

Group 2022: Concrete stanchions

Contexts: 0057–0059, 0196, 0197, 0201–0204, 0215–0218

0058/0059, 0196, 0201, 0203, 0215 and 0217 is a line of six (probably square) concrete stanchions, approximately 2.00m wide and at least 1.70m deep, at the northeast end of the evaluation trench. Other numbers are their construction cuts. The stanchions are assumed to be associated with the enlargement of the Orwell Works in the 1880s, when the transit sheds were built (as shown on the 1890 Ordnance Survey map). Note that Group 2019 is probably associated with this line of stanchions.

Group 2023: Brick chamber/tank

Contexts: 060–062, 0070, 0087

0061 is a rectangular chamber or tank built of modern, machine-made bricks on a concrete base 0062. It measures 1.10m wide internally and >1.00m deep. It is backfilled with soil containing building material, pebbles and slag 0060. 0063 is the construction cut, 0070 and 0087 are associated construction fills. The function of the structure is unknown but it is clearly of 20th-century date.

Group 2024: Unspecified deposit

Context: 0069

A dumped deposit of soil containing building material but no datable artefacts, recorded in section only.

Group 2025: Brick conduit/channel

Contexts: 0071–0075

0073 is a northwest–southeast conduit or channel with side walls and base of red, unfrogged bricks, in construction cut 0075. It is 0.24m wide internally. It is possibly the housing for an iron shaft, seen in section on the northwest side of the evaluation trench; note that the base on that side has a concave depression worn in its upper surface. It is backfilled with ashy silt 0071. 0072 is a localised area of demolition.

Group 2026: Concrete dump

Context: 0077

This is a small, localised dump of concrete with no obvious structural function, seen in section only.

Group 2027: Demolition cut and fill

Contexts: 0078, 0079

0079 is a localised area of demolition of wall 0080, filled by soil and building rubble 0078.

Group 2028: Brick wall

Contexts: 0080, 0081

0080 is a red brick wall surviving to two courses, in construction cut 0081. It is possibly a rebuild of underlying wall 0084.

Group 2029: Brick-built tank/chamber

Contexts: 0082, 0114, 0115

0114 is assumed to be a square or rectangular brick-built tank or chamber, in construction cut 0115; only two walls were seen. It is backfilled with soil and demolition rubble 0081.

Group 2030: Brick conduit/channel

Contexts: 0083, 0089–0091

0083 and 0089 are walls of red and yellow, machine-made bricks forming the sides of a conduit or channel running northwest–southeast. 0090 is a foundation of cemented brick rubble below wall 0089 on the northeast side of the channel and was traced over more than 7m. 0091 is the construction cut, and the channel is backfilled with soil and rubble containing modern material, including plastic sheeting (not numbered). The channel is connected to northeast–southwest channel Group 2031 by a semi-circular, inverted arch (subsequently blocked).

Note that the northeast side of the channel seems to correspond with the northeast side of the Orwell Works building, as shown on the 1880 Ordnance Survey map.

Group 2031: Brick conduit / channel

Contexts: 0084, 0088, 0108, 0109, 0132

0084 and 0132 are walls of red, unfrosted bricks forming the sides of a conduit or channel running northeast–southwest. These are built on a base of bricks, laid on bed as a single course (0108). The channel is built in construction cut 0109. 0088 is a deposit of rusted, slag-like material that fills the lower part of the channel.

Group 2032: Brick structure

Context: 0092

This is a highly truncated, yellow brick structure of unknown original form and extent.

Group 2033: Concrete slab and associated make-up / levelling

Contexts: 0056, 0093

0056 is a thick concrete slab underlying surface slab 0001 (Group 2001).

0093 is a make-up/levelling layer of ashy soil; below the slab.

Group 2034: Brick foundation

Contexts: 0094, 0095

0094 is a northeast–southwest foundation of yellow bricks surviving to three courses, in construction cut 0095.

Group 2035: Brick foundation

Contexts: 0097, 0098

0097 is a (highly truncated) stepped, red brick foundation oriented northeast–southwest with an associated projection (perhaps a buttress) on its southeast side. The latter incorporates a rectangular void, of unknown function. The foundation is within construction cut 0098.

Group 2036: Unspecified cut and fill

Contexts: 0099, 0102

0099 is a deposit of ‘lean mix’ and slag-like material filling cut 0102. It has no obvious structural function, so might represent a localised area of ground consolidation.

Group 2037: Concrete stanchion

Contexts: 0100, 0101

0100 is a rectangular concrete stanchion with one surviving course of bricks on top, in construction cut 0101.

Group 2038*: Dumping / land reclamation

Contexts: 0104–0107, 0118–0120, 0123–0131, 0135, 0149–0151, 0176, 0219, 0222, 0232, 0233, 0280, 0281, 0283, 0288, 0289

Horizontal deposits of sand, gravel and silt recorded at several locations in the northeast half of the evaluation trench. They pre-date the ironworks buildings and structures, and are assumed to represent dumping and land reclamation in the early 19th century.

Group 2039: Unspecified cut and fill

Contexts: 0110, 0111

0110 is a deposit of 'lean mix' and slag-like material filling cut 0111. It has no obvious structural function, so might represent a localised area of ground consolidation.

Group 2040: Possible conduit / channel

Contexts: 0112, 0113

0113 is a highly truncated brick structure, possibly a northwest-southeast conduit or channel, in construction cut 0113.

Group 2041: Archaeological sondage

Context: 0116

Group 2042: Brick wall

Contexts: 0121

0121 is a red brick wall, five courses high, abutting wall 0084 (part of Group 2031). It is probably the end wall or blocking of conduit/channel Group 2031.

Group 2043: Unspecified cut and its fills

0133, 0138–0146

0133 is a large, sub rectangular cut, more than 4.70m long and 0.76m deep (not bottomed). It has rounded corners and steep, sometimes undercut, sides. Its form and function are unknown; it pre-dates ironworks buildings/structures and is adjacent to Cellared Building 1. It is filled with a sequence of horizontal deposits of sand, gravel, silt and crushed mortar containing some building rubble and pottery.

Group 2044: External dumping

Contexts: 0134

This is a horizontal deposit of silty clay with frequent pebbles and fragments of cockle shell. It overlies truncated foundation 0098.

Group 2045: Unspecified cut and its fill

Contexts: 0136, 0137

0137 is an unspecified cut feature (only one edge seen) cutting earlier feature Group 2043 and filled with loose sand 0136. Its form and function are unknown; it predates ironworks buildings/structures.

Group 2046: Drain / sewer pipes

Contexts: 0152–0155, 0167

0154 and 0167 are large ceramic drain or sewer pipes (0.20m internal diameters) with mortared joints, within trench 0152. The trench is backfilled with soil 0155.

Group 2047: Brick foundation/plinth

Contexts: 0156, 0157

0156 is a rectangular block of brickwork consisting of five courses over a bedding course of mortared brick rubble, within construction cut 0157. Its full extent, form and precise function are unknown.

Group 2048: Concrete tank

Contexts: 0158–0160

0158 is a rectangular concrete tank (2.40m x >0.90m internally) with walls 0.30m thick, abutted to the southwest by a sequence of three thin concrete slabs. It is within construction cut 0159 and is backfilled with soil and demolition rubble 0160. This is a modern feature with an assumed industrial function.

Group 2049: Brick tank

Contexts: 0161–0163

0162 is a large brick-built tank up to 2.40m wide x >0.90m deep. It is made of machine-made bricks that are the same as those used for chamber/tank Group 2023. It is within construction cut 0163 and is backfilled with soil and demolition rubble 0161. It is clearly of 20th-century date and presumably had some industrial function.

Group 2050: Cellar

Contexts: 0164–0166

0165 comprises three walls of red, frogged bricks, 0.35m thick, representing the northwest side of a small cellar 2.60m wide. It is within construction cut 0166 and is backfilled with ashy soil containing modern metal objects.

Group 2051: Cast iron pipe

Contexts: 0168–0170

0169 is a cast iron pipe in trench 0170, backfilled with soil 0168.

Group 2052: Concrete tank

Contexts: 0171, 0172

0171 is a rectangular concrete tank (0.90m x >0.60m internally) surrounded by a thick concrete slab. It is within construction cut 0172. It is an obviously modern feature with an assumed industrial function.

Group 2053: Probable pipe trench

Contexts: 0173, 0174

Linear cut 0174 is probably a pipe trench. It is filled with soil and brick rubble 0173 (not excavated).

Group 2054: Brick foundation

Contexts: 0177, 0178

0177 is a shallow foundation of frogged, red bricks oriented northwest–southeast. It survives to a depth of only three courses, and is within construction cut 0178.

Group 2055: Cast iron pipe

Contexts: 0179–0181

0180 is a cast iron pipe with an external diameter of 0.20m. It is within trench 0181, backfilled with soil 0179.

Group 2056: Unspecified external deposit

Context: 0175

This is a deposit of soil, brick rubble and slag, recorded in section only and of unknown form, function and original extent.

Group 2057: External deposit

Context: 0182

0182 is a horizontal deposit of sand with building rubble, chalk and coal. It was seen in section only and its form, function and original extent are unknown.

Group 2058: Possible robber trench

Contexts: 0183, 0184

0184 is a linear cut oriented northwest–southeast. It is >1.40m long x 0.80m wide x 0.30m deep and is filled with un-coursed brick rubble and mortar. It might be a robbed out foundation.

Group 2059: External dumping / ground raising

Contexts: 0186, 0187, 0207, 0235

These are thick deposits of compacted soil (up to 0.80m) containing varying amounts of building rubble, coal, metal inclusions etc. They are confined to the southwest end of the evaluation trench, where they have been dumped around the foundations of late 19th-century Orwell Works buildings.

Group 2060: Concrete stanchion and brick plinth

Contexts: 0189–0191

Stepped brick plinth 0189 overlies concrete stanchion 0190 (1.70m wide). The stanchion is within construction cut 0191 but the plinth was built free-standing and is buried by deposit 0186 (part of Group 2059). This is assumed to be associated with a late 19th-century extension to the Orwell Works.

Group 2061*: Dumping / land reclamation

Contexts: 0188, 0198–0200, 0213, 0214

Horizontal deposits of sand, gravel and silt recorded at several locations in the southwest half of the evaluation trench. They pre-date the ironworks buildings and structures, and are assumed to represent dumping and land reclamation in the early 19th century.

Group 2062: Concrete foundation

Context: 0192

This is a rectangular concrete block, presumed to be part of a strip footing or pier base, at least 2.0m long x 0.80m wide x 0.50m thick.

Group 2063: Unspecified cut and its fill

Contexts: 0193, 0194

Cut 0194 runs parallel with concrete foundation 0192 (Group 2062) and might be an associated construction trench. It is filled with compacted soil 0193.

Group 2064: Concrete foundation / pier base

Contexts: 0205, 0206

0205 is a rectangular concrete block, >0.60m and 0.44m deep, against the outside corner of foundation 0209. It is within construction cut 0206. Its function is unknown.

Group 2065: Cast iron pipes

Context: 0208

Two parallel cast iron pipes with external diameters of 0.12m are within deposit 0207 (Group 2059). There is no associated trench and they are assumed to have been laid during the dumping of deposit 0207.

Group 2066: Brick and concrete foundation

Contexts: 0209, 0210

0209 is a substantial, L-shaped brick foundation, generally 0.35m wide but stepping out at its base, on a concrete strip footing. The concrete part of the foundation is within construction cut 0210 but the brick part was built free-standing. Deposit 0207 (Group 2059) was subsequently deposited against the foundation. It forms the southwest corner of a late 19th-century building within the Orwell Works.

Group 2067: Brick foundation

Contexts: 0211, 0212

0211 is a shallow, red brick, stepped foundation with four surviving courses, oriented north–south. It is within construction cut 0212.

Group 2068: Possible robber trench

Contexts: 0220, 0221

0221 is a linear cut oriented northeast–southwest. It is >0.90m long x 0.38m wide x 0.10m deep and is filled with un-coursed brick rubble and mortar 0221. It might be a robbed out foundation.

Group 2069: Manhole and associated drain / sewer pipe

Contexts: 0223–0225

0224 is a large diameter ceramic pipe encased in concrete and a brick-built manhole / inspection chamber. These are within construction trench 0225, which is backfilled with soil and rubble 0223.

Group 2070: Brick wall

Context: 0226

Red brick wall 0226 is stretcher built and only one brick wide. It is oriented northwest–southeast and abuts concrete tank 0171 (Group 2052). Its function is unknown.

Group 2071: Brick-built conduit / channel

Contexts: 0227–0229

0228 is an L-shaped conduit or channel with brick walls to the sides and southwest end and a brick base. The channel is 0.60m wide internally. It is within construction cut 0229 and is backfilled with ashy soil containing building rubble, coal and slag.

Group 2072: Brick foundation

Contexts: 0230, 0231

Shallow brick footing 0230 has only one surviving course and is oriented northwest–southeast. It is within construction cut 0231.

Group 2073: Demolition deposit

Context: 0234

This is a localised area of crushed concrete interpreted as demolition debris.

Group 2074: Brick structure

Context: 0236

0236 is a row of red brick headers, one course high, against the inside corner of wall 0209 (Group 2066). Its function is unknown.

Group 2075: Concrete raft

Context: 0237

This is an extensive concrete raft, up to 0.70m thick, incorporating some bonded masonry and broken concrete slabs. Its precise function is unknown, but it might have been an exercise in ground consolidation.

Group 2076: Brick-built chamber/tank

Contexts: 0238, 0239

Rectangular chamber or tank 0239 is represented by two parallel, stretcher-built walls, 1.30m apart, at right angles to and abutting conduit/channel 0228 (Group 2071). The chamber was ultimately filled with concrete 0238.

Group 2077: Brick foundation

Contexts: 0240, 0241

0240 is a red brick foundation oriented northwest–southeast, 0.38m wide and surviving two courses deep. It is within construction cut 0241.

Group 2078: Brick chamber

Contexts: 0242, 0286, 0287

0242 comprises two red brick walls that have been built against pre-existing structures to create a rectangular chamber. 0286 is a layer of brick stretchers forming the base of the chamber. It is filled with ashy soil containing obviously modern building rubble, scraps of leather and metal objects. The function of the chamber is not known.

Group 2079: Brick pier

Contexts: 0243, 0244

0243 is a block of brick masonry, irregular in plan and seven courses deep, interpreted as a pier base. It has been inserted between the buttresses of foundation 0279 (Group 2095) and is within construction cut 0244.

Group 2080: Brick foundation

Contexts: 0117, 0245, 0246

0245 is a red brick foundation, oriented northwest–southeast, It has seven surviving courses, the lowest two being off-set. It is within construction cut 0246, which is backfilled with sand and crushed brick 0117. The foundation is similar to and presumably contemporary with 0269 (Group 2090). It might also be associated with brick gully/channel 0268 (Group 2089).

Group 2081: Brick chamber

Contexts: 0247, 0265

Red brick walls 0247 form three sides of a rectangular chamber 0.62m wide internally and of unknown depth. They are built within construction cut 0265. The function of the chamber is unknown.

Group 2082: Concrete pier

Context: 0248

This is an irregular concrete block incorporating four iron rods or bolts. It is interpreted as a pier for some kind of metal structure.

Group 2083: Cellared building

Contexts: 0249, 0250, 0258, 0261–0264

0249 is the north wall of a cellared building. 0261 is a wall at a right angle to 0249 that divides the cellar into two rooms. The cellar is backfilled with soil deposits 0262 and 0263. 0264 is the construction backfill against the outer face of wall 0249, and 0250 is the construction cut for the cellar.

Group 2084: Probable brick pier

Contexts: 0251, 0252

0251 is a block of red brick masonry, highly truncated, which incorporates two large, vertical iron rods. It is interpreted as a pier for some kind of metal structure.

Group 2085: Probable brick pier

Contexts: 0253, 0254

0253 is a block of red brick masonry, at least 0.46m deep but of unknown dimensions in plan. It incorporates two large, vertical iron rods, and is interpreted as a pier for some kind of metal structure.

Group 2086: Brick foundation and iron rail

Contexts: 0255–0257, 0284

0255 is a foundation of modern pinkish bricks, oriented northwest–southeast, supporting a grooved rail bedded in concrete 0284. The rail is visible at ground level over a distance of 25m northwest of the evaluation trench. The foundation is for the southwest side of the transit shed building(s) shown on the 1971 Ordnance Survey map, and the grooved rail is assumed to be for sliding doors on the riverward side of those buildings. 0257 is the construction cut for the foundation and 0256 is the associated construction backfill.

Group 2087: Concrete block

Contexts: 0259, 0260

0259 is a concrete block of unknown extent and function. It is within construction cut 0260.

Group 2088: Brick and tile foundation

Contexts: 0266, 0267

0266 is an insubstantial, L-shaped foundation of alternate courses of brick stretchers and tiles. It is within construction cut 0267.

Group 2089: Brick-built gully or channel

Context: 0268

This structure consists of a concave layer of brick stretchers, one course deep and bedded on a layer of white mortar. It might be associated with flanking walls 0245 (Group 2080) and 0269 (Group 2090).

Group 2090: Brick foundation

Contexts: 0269, 0270

0269 is a red brick foundation, oriented northwest–southeast. It has eight surviving courses, the lowest two being off-set. Its construction cut is not recorded, but is backfilled with sand and gravel 0270. The foundation is similar to and presumably contemporary with 0245 (Group 2080). It might also be associated with brick gully/channel 0268 (Group 2089).

Group 2091: Brick foundation

Contexts: 0271, 0272

0271 is an insubstantial red brick foundation, only two courses high, in construction cut 0272.

Group 2092: Cellar/chamber wall

Contexts: 0273, 0274

Red brick wall 0273 (in construction cut 0274) is 0.23m wide, has a fair face to the southwest and abuts cellar/chamber wall 0275 (Group 2093) to the southeast. It is interpreted as a probable extension to the Group 2093 cellar or chamber.

Group 2093: Cellar/chamber

Contexts: 0275, 0276

Red brick walls 0275, 0.24m wide, form three sides of a rectangular cellar or chamber measuring 1.50m x >1.20m x >0.70m deep. They are built in construction cut 0276.

Group 2094: Probable brick pier

Contexts: 0277, 0278

0277 is a rectangular block of brickwork, >1.10m long x 0.68m wide x 0.32m deep (four courses), built against the outside face of cellar/chamber wall 0275 (Group 2093). It is within construction cut 0278. It is interpreted as a probable pier base.

Group 2095: Brick foundation

Context: 0279

This is a red brick foundation, oriented northeast–southwest, with buttresses on its northwest side; the width and depth of the foundation are unknown, but it is assumed to be a major structural element of the ironworks.

Group 2096: Demolition cut and its fill

Contexts: 0282, 0285

Cut 0282 represented the partial demolition of the northwest wall of the Group 2093 cellar/chamber. Fill 0285, soil and demolition rubble, fills the chamber and the area to the northwest.

Group 2097: Dumping or foreshore deposit

Context: 0290

This is a layer of loose, mid-dark grey sand and gravel containing occasional building material, 0.30m thick, recorded at depth in a machine-excavated sondage. It is unclear whether it represents dumping/land reclamation or is a foreshore deposit. It overlies probable natural sand/gravel 0291 (Group 2098).

Group 2098: Probable natural

Context: 0291

0291 is a deposit of loose, yellowish brown sand and gravel recorded at depth in a machine-excavated sondage. It is probably a natural stratum.

Group 2099: Alluvium or dumped deposit

Context: 0292

This is a thick (>1.40m) deposit of compact, dark grey-black fibrous silt with pockets and lenses of light grey sand, recorded in a machine-dug sondage. It contains moderate pebbles and roots/twigs and occasional roof tile, bone, shell, pot and iron objects. It is unlike any other deposit on the site and its interpretation is difficult; it could be an alluvial deposit within the former river channel or the fill of a large and unidentified cut feature.

Group 2100: Current ground surface (tarmac)

Context: 0294

This is a layer of tarmac, 0.10m thick, forming the current ground surface at the west end of the evaluation trench.

Group 2101: Concrete slab

Contexts: 0295, 0296

0295 is a concrete slab, 0.20m thick and 0.76m wide, running along the north side of wall/foundation 0327 (Group 2112). It is probably contemporary with tarmac surface 0294 (Group 2100). 0296 is its construction cut.

Group 2102: Concrete slab

Contexts: 0297, 0298

0297 is a concrete slab, 0.26m thick and 0.76m wide, running along the north side of wall/foundation 0327 (Group 2112).

Group 2103*: Dumping / land reclamation

Contexts: 0299, 0300, 0317–0323, 0347, 0348, 0355, 0356

Deposits of sand, gravel and silt recorded at several locations at the west end of the evaluation trench. They pre-date the ironworks buildings and structures, and are assumed to represent dumping and land reclamation in the early 19th century.

Group 2104: Unspecified cut and its fill

Contexts: 0301, 0302

0302 is a deep cut with a vertical edge against concrete stanchion 0303 (Group 2105). It is filled with soil, brick rubble and concrete 0301. Its extent and function are unknown, but it is clearly relatively modern.

Group 2105: Concrete stanchion

Contexts: 0303, 0304

0303 is a concrete stanchion approximately 2.00m square and >1.20m deep, in construction cut 0304.

Group 2106: Concrete foundation

Contexts: 0305, 0306

Concrete strip foundation 0305 (in construction cut 0306) is oriented east–west. It is 1.10m wide and 0.90m deep.

Group 2107: Concrete pier base

Contexts: 0307, 0308

0307 is a square or rectangular concrete block, 1.0m wide and 0.90m deep. It is interpreted as a pier base and might be contemporary with nearby pier 0309 (Group 2108).

Group 2108: Concrete pier base

Contexts: 0309, 0310

0309 is a square or rectangular concrete block, 1.0m wide and 0.80m deep. It is interpreted as a pier base and might be contemporary with nearby pier 0307 (Group 2107).

Group 2109: Brick-built chambers

Contexts: 0311, 0312, 0324, 0326, 0349–0351

Two adjacent chambers are represented by red brick walls 0350 and 0351 and associated brick floors 0326 and 0349. The chambers are built within construction cut 0312, to the rear of foundation 0352 (Group 2119). The northern chamber has a narrow brick-built chute associated with it, suggesting that these might have been coal cellars. The chambers are filled with soil and demolition rubble 0324.

Group 2110: Drain / sewer pipe

Contexts: 0313–0315

Ceramic pipe 0315 has an internal diameter of 0.20m. It is within trench 0314, backfilled with soil 0313.

Group 2111: Unspecified concrete deposit

Contexts: 0325, 0353

0325 is a mass of concrete against the rear of foundation 0352 (Group 2119). It is thought to be too irregular to have a structural function, but might represent infilling/consolidation after the partial demolition of the Group 2109 chambers. It is within cut 0353.

Group 2112: Concrete wall / foundation

Contexts: 0327, 0328

0327 is a concrete wall and foundation incorporating S-section sheet piles, in construction cut 0328. It is oriented east–west, extending to 0.50m above ground level and with a tapered top; its depth is unknown. It is similar to the wall along the W edge of site and another east–west wall located 14m to the south.

Group 2113: Brick pier base

Contexts: 0329, 0330

0329 is a square block of red brickwork, 0.60m wide x four courses deep, in construction cut 0330. It is interpreted as a pier base.

Group 2114: Concrete stanchion

Contexts: 0332, 0333

0332 is a concrete stanchion measuring >1.40m x 1.20m x depth unknown, in construction cut 0333.

Group 2115: Concrete stanchion

Contexts: 0335, 0336

0335 is a concrete stanchion measuring >1.30m x 1.80m x depth unknown, in construction cut 0336.

Group 2116: Demolition cut and its fill

Contexts: 0337, 0338

Cut 0338 represents the demolition of cellar 0341 (Group 2118) and adjoining wall 0339 (Group 2117). It is filled soil and rubble 0337.

Group 2117: Cellar / chamber wall

Contexts: 0339, 0340

Wall 0339 (in construction cut 0340) is of red brick construction with a rendered face on its south side. It is interpreted as the north wall of a cellar/chamber abutting cellar 0341 (Group 2118).

Group 2118: Cellar walls

Context: 0341

This is a substantial L-shaped wall of red bricks (alternate header/stretcher courses) faced internally with yellow headers. It is 0.70m wide but of unknown depth. It is interpreted as part of the north and east side of a cellared building.

Group 2119: Brick foundation

Context: 0352

This is a substantial red brick foundation, oriented north–south. It is 1.20m wide x 0.70m deep and has two offset courses at its base. It is thought to be the rear wall of a quay-side building shown on the 1880 Ordnance Survey map.

Group 2120: External dumping / ground raising

Context: 0354

These are various dumps of sand, gravel and soil containing building rubble and iron objects (not kept). They tip down to the W and are deposited against foundation 0352 (Group 2119) to the east. They are probably broadly contemporary with Group 2059.

Group 2121*: Walls of Cellared Building 1

Contexts: 0043, 0044, 0054, 0436, 0437

The walls on the southwest (0044), southeast (0436) and northeast (0043 and 0437) sides of Cellared Building 1 are within construction cut 0054. The walls are of random coursed brick and stone construction, with an offset course of brick headers at the base.

Group 2122*: Walls of Cellared Building 1

Contexts: 0334, 0364, 0382–0384

The walls at the northwest end of Cellared Building 1 are of brick construction, and are possibly not contemporary with the brick and stone walls of the rest of the building (Group 2121). They form an alcove with a central division, interpreted as a fireplace.

Group 2123*: Construction debris / trample in Cellared Building 1

Context: 0387

This is a layer of sand in the base of Cellared Building 1. It contains varying amounts of building rubble, and is thought to represent the accumulation of debris and trampling of the natural sand during construction of the cellar.

Group 2124*: Hearth of Cellared Building 1

Context: 0385

A layer of brick fragments and stone flags within the alcove at the northwest end of Cellared Building 1 is interpreted as a hearth.

Group 2125*: Brick buttress

Contexts: 0358, 0359

0358 is a rectangular block of brickwork with rounded corners, built around the remains of partition wall 0384 in the fireplace at the northwest end of Cellared Building 1 (Group 2122). It is interpreted as a thickening of the partition and an attempt to shore up the flimsy brick wall at the rear of the fireplace. 0359 is its construction cut, although since the buttress was built free-standing the cut represents only the partial demolition of earlier wall 0384.

Group 2126*: Floor/hearth

Context: 0377

This is a layer of bricks and stone flags in the floor of the alcove to the southwest of buttress 0358 (Group 2125). It post-dates the construction of the buttress.

Group 2127*: Brick structure

Contexts: 0361–0363, 0368, 0369

Walls 0361 and 0363 form a quadrant-shaped structure in the northwest corner of Cellared Building 1, abutting the group 2122 fireplace. 0368 is a brick and stone floor/base over a deposit of coal-rich soil 0369. 0362 is the associated construction cut.

Group 2128*: Brick fireplace

Contexts: 0372, 0373

This is an H-shaped brick structure, surviving to a maximum of three courses, interpreted as the base of a double fireplace in Cellared Building 1.

Group 2129*: Floor

Context: 0374

The floor is composed mostly of red bricks, with some cobbles, square stone tiles and broken flagstones. It is the earliest of a sequence of floors in Cellared Building 1, and runs into the northwest side of fireplace 0372 (Group 2128).

Group 2130*: Floor

Context: 0064

A localised area of brick flooring between structure 0372 (Group 2128) and wall 0044 (Group 2121) to the southwest. It is possibly contemporary with floor 0374 (Group 2129).

Group 2131*: Floor

Context: 0085

A remnant of brick floor to the northeast of fireplace 0372 might be contemporary with floor 0374 (Group 2129) but its bricks are oriented differently.

Group 2132*: Metal drain and associated drain pipe

Contexts: 0342, 0344–0346

0342 is a square, iron drain with an inset lid on the southwest side of Cellared Building 1. It is connected to a horizontal ceramic pipe (0.12m diameter externally) which runs out of the building below wall 0044 (Group 2121). Pipe and drain are within construction cut 0346, which is backfilled with soil and rubble 0344. They are contemporary with floor 0331 (Group 2134).

Group 2133*: Make-up / levelling dumps

Contexts: 0343, 0360

These are localised deposits of crushed mortar that overlie earlier floors (Groups 2129, 2130, 2131) and under-lie floor 0331 (Group 2134). They are interpreted as make-up/levelling deposits.

Group 2134*: Floors

Contexts: 0049, 0331

These two numbers were assigned to the same floor of rammed brick rubble, flint, tile and septaria (possibly more than one surface) within the central part of Cellared Building 1. It abuts and is presumably contemporary with floor 0365 (Group 2137) to the northwest.

Group 2135*: Wall

Context: 0357

0357 is a small, L-shaped piece of brick walling between wall 0044 (Group 2121) and fireplace 0372 (Group 2128). Its function is uncertain.

Group 2136*: Construction pit and its fills

Contexts: 0371, 0375, 0376, 0440

Pit 0375 has removed the northwest end of wall 0043 (Group 2122) on the northeast side of Cellared Building 1, to facilitate the construction of alcove 0366 (Group 2138). Its primary fill is a line of mortared brick rubble 0440 and above this is a row of three large stone moulding (derived probably from the demolition of wall 0043); these deposits are assumed to have been attempts

to consolidate the soft (waterlogged) ground below the proposed alcove. The rest of the fill consists of silty sand 0376.

Group 2137*: Floor

Contexts: 0365, 0370

These two numbers represent two parts of the same floor of mostly brick rubble, with a row of flagstones along its northwest edge, in the northwest part of Cellared Building 1. The floor abuts and is probably contemporary with floor 0049/0331 (Group 2134), and extends into the alcove represented by wall 0366 (Group 2138).

Group 2138*: Brick wall (alcove)

Context: 0366

This is an L-shaped wall remnant, only two courses high, abutting the northeast side of wall 0382 (Group 2122) and partially overlying floor 0365 (Group 2137). It is interpreted as part of a brick-built alcove added to the northeast corner of Cellared Building 1.

Group 2139*: Floor

Context: 0386

This is an area of highly disturbed brick and tile flooring at the southeast end of Cellared Building 1, apparently the earliest phase of floor in that part of the building.

Group 2140*: Internal dumping

Contexts: 0096, 0122

A discontinuous layer of soil 0122 (with occasional pot, bone, tile and shell) at the southeast end of Cellared Building 1 is interpreted as dumping of domestic refuse following the partial demolition of floor 0386 (Group 2140). 0096 is a localised deposit of some unidentified white substance than overlies the dumped soil.

Group 2141*: Floor

Context: 0086

This is a floor remnant consisting of a line of brick fragments and stone rubble on a mortar bed, against the wall in the southwest corner of Cellared Building 1.

Group 2142*: Floor

Contexts: 0380, 0381

Two remnants of mortar flooring against the walls in the southwest and southeast corners of Cellared Building 1 represent the latest of a sequence of floors in the southeast end of the cellar.

Group 2143: Pit and its fill

Contexts: 0378, 0379

A small oval pit 0378 in the southeast part of Cellared Building 1 is filled with soil contained pot, bone and building material. Similar pits in the same area were not recorded. They are assumed to represent the disposal of domestic refuse following the disuse and partial demolition of the building.

Group 2144: Unspecified cut and its fill

Contexts: 0388, 0389

0389 is a small cut feature of unknown form and function, filled with soil containing domestic refuse. It is truncated by the construction cut for Cellared Building 1.

Group 2145: Concrete stanchion

Contexts: 0390, 0391

0390 is a circular concrete block, 1.80m wide and 0.65m deep, in construction cut 0391. Its precise function is unknown.

Group 2146: Unspecified pit and its fill

Contexts: 0398, 0399

0399 is a large pit, at least 2.40m wide, just outside Cellared Building 1. It is filled with soil containing demolition material (unexcavated) and its function is unknown.

Group 2147: Brick pier

Contexts: 0411, 0412

0411 is a square or rectangular block of brickwork, 1.06m wide and 0.62m deep, in construction cut 0412. It is interpreted as a brick pier, although its precise function is unknown.

Group 2148: Drain / sewer pipe

Contexts: 0415, 0416

0415 is a ceramic pipe (internal diameter 0.23m) and its overlying backfill, in northwest-southeast trench 0416.

Group 2149: Dumping / levelling

Contexts: 0417-0420

These are horizontal dumps of soil containing building material and domestic refuse just below the current ground slab in the vicinity of Cellared Building 1. They are clearly of relatively recent date.

Group 2150: Posthole and its fill

Contexts: 0421, 0422

0422 is a large posthole filled with soil 0421. Its precise function and associations are not known.

Group 2151: Posthole and its fills

Contexts: 0423–0425

Posthole 0425 contains decayed timber post 0423 and post packing 0424. Its precise function and associations are not known.

Group 2152: Dumping / levelling

Contexts: 0426–0428

This is a sequence of soil layers containing domestic refuse and building debris, immediately to the southeast of Cellared Building 1.

Group 2153: Unspecified pit and its fills

Contexts: 0429–0433

0433 is a large pit, at least 2.50m wide and at least 0.90m deep, just outside the southwest corner of Cellared Building 1. It is filled with a sequence of sand, gravel and silt deposits containing some domestic refuse and building material. The nature of the fills suggests deliberate infilling. The function of the pit is unknown, but given its size it might be a sand/gravel quarry.

Group 2154: Unspecified pit and its fill

Contexts: 0434, 0435

0435 is a large pit, at least 2.00m wide and at least 1.00m deep. It is filled with silty sand and gravel containing occasional pottery. The function of the pit is unknown, but given its size it might be a sand/gravel quarry.

Group 2155: Unstratified finds

Context: 0438

This number was assigned to unstratified finds recovered during hand-cleaning of the surface of deposit 0439 (Group 2005).

Group 2156: Archaeological sondage

Context: 0103

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Appendix 4: Soil micromorphology, chemistry and magnetic susceptibility

Dr R I MacPhail & Dr J Crowther

Please note, figures and tables referred to in Appendix 4 can be found in the full soil micromorphology report in the site archive

Summary

Three thin sections and three bulk samples were employed to investigate a buried soil at the Orwell Quay site. Post-medieval make-up deposits buried an over-thickened and weakly amended cultivated soil formed in the local weakly formed argillic brown sands. The Ap horizon, which could be partially colluvial in character, is probably medieval, but may possibly have its origins in late prehistory, and was perhaps associated with burned rock middening. No evidence of marine flooding was found.

Introduction

The site was visited and discussed with Kieron Heard (SCCAS) on 06 October 2008. The chief aim of the visit was to examine and evaluate a buried soil below post medieval make-up deposits. After this evaluation (Macphail, 2008) a soil micromorphology, chemistry and magnetic susceptibility study was carried out in order to:

- characterise the natural pedogenic processes at the site
- examine the possibility that the soil was over-thickened by colluvium
- identify any arable features
- investigate any evidence of marine flooding

Samples and methods

Monolith samples comprised large monolith M1 (20-250 mm: thin sections M1A and M1B) through the upper Ap horizon immediately under the post-medieval make-up (Fig 1), and M2 (320-395 mm; thin section M2) from the junction of the lower Ap horizon and the subsoil sands (Table 2). These undisturbed monoliths from the upper and lower Ap horizon were complemented by bulk samples 1 (upper Ap) and 2 (lower Ap), respectively; a subsoil control bulk sample (bB&C) was also analysed from 630–830 mm.

Chemistry and magnetic susceptibility

Analysis was undertaken on the fine earth fraction (i.e. < 2 mm) of the samples. Phosphate- P_i (inorganic phosphate) and phosphate- P_o (organic phosphate) were determined using a two-stage adaptation of the procedure developed by Dick and Tabatabai (1977) in which the phosphate concentration of a sample is measured first without oxidation of organic matter (P_i), using 1N HCl as the extractant; and then on the residue following alkaline

oxidation with sodium hypobromite (P_o), using 1N H_2SO_4 as the extractant. Phosphate-P (total phosphate) has been derived as the sum of phosphate- P_i and phosphate- P_o , and the percentages of inorganic and organic phosphate calculated (i.e. phosphate- $P_i:P$ and phosphate- $P_o:P$, respectively). LOI (loss-on-ignition) was determined by ignition at 375°C for 16 hours (Ball, 1964) – previous experimental studies having shown that there is normally no significant breakdown of carbonate at this temperature.

In addition to χ (low frequency mass-specific magnetic susceptibility), determinations were made of χ_{max} (maximum potential magnetic susceptibility) by subjecting a sample to optimum conditions for susceptibility enhancement in the laboratory. χ_{conv} (fractional conversion), which is expressed as a percentage, is a measure of the extent to which the potential susceptibility has been achieved in the original sample, viz: $(\chi/\chi_{max}) \times 100.0$ (Tite, 1972; Scollar *et al.*, 1990). In many respects this is a better indicator of magnetic susceptibility enhancement than raw χ data, particularly in cases where soils have widely differing χ_{max} values (Crowther and Barker, 1995; Crowther, 2003). χ_{conv} values of $\geq 5.00\%$ are often taken as being indicative of some degree of susceptibility enhancement, as might be associated with burning. A Bartington MS2 meter was used for magnetic susceptibility measurements. χ_{max} was achieved by heating samples at 650°C in reducing, followed by oxidising conditions. The method used broadly follows that of Tite and Mullins (1971), except that household flour was mixed with the soils and lids placed on the crucibles to create the reducing environment (after Graham and Scollar, 1976; Crowther and Barker, 1995).

Soil Micromorphology

The three thin section subsamples (M1A, M1B and M2) were impregnated with a clear polyester resin-acetone mixture; samples were then topped up with resin, ahead of curing and slabbing for 75x50 mm-size thin section manufacture by Spectrum Petrographics, Vancouver, Washington, USA (Goldberg & Macphail, 2006; Murphy, 1986). Thin sections (Fig 2) were further polished with 1,000 grit papers and analysed using a petrological microscope under plane polarised light (PPL), crossed polarised light (XPL), oblique incident light (OIL) and using fluorescent microscopy (blue light – BL), at magnifications ranging from x1 to x200/400. Thin sections were described, ascribed soil microfabric types (MFTs) and microfacies types (MFTs) (see Tables 2 and 3), and counted according to established methods (Bullock *et al.*, 1985; Courty, 2001; Courty *et al.*, 1989; Goldberg & Macphail, 2006; Macphail & Cruise, 2001; Stoops, 2003).

Results and discussion

Chemistry and magnetic susceptibility

The analytical data are presented in Table 1. As would be anticipated, there is a progressive reduction in organic matter content down the profile, with LOI decreasing from 1.20% in the bAp? horizon to 0.426% in the bB&C horizon. It should be noted that even the bAp? horizon has quite a low organic matter content, which could simply reflect post-burial decomposition (i.e. the original

organic matter content of the topsoil may have been much higher). However, ploughing and associated crop production would also have led to a reduction in organic matter concentration as a result of reduced organic inputs and the formation of a deep, fairly homogenous and well-aerated topsoil, thereby leading to reduced organic matter concentration through physical mixing (ploughing) and active decomposition. The fact that the bAp(lower)/B horizon at 320–395 mm has a similar LOI (1.04%) as the bAp? horizon certainly supports the idea that the topsoil was ploughed.

The phosphate-P data also show a progressive reduction down the profile from 1.28 to 0.365 mg g⁻¹. While this could be the result of the naturally elevated concentrations that often occur in topsoils as a result of the uptake and cycling of phosphate by plants, it is possible that the higher concentration at the top has been enhanced through manuring (see soil micromorphology). As is typically the case with buried soils (as a result of decomposition), the majority of the phosphate is present in an inorganic form. However, the phosphate-P_i:P ratios (which fall from 79.0% in the bAp? horizon to 61.4% in the bB&C) are not as high as are often encountered, which perhaps adds further support to the idea that the low LOI is not simply due to post-burial decomposition. The increase in the phosphate-P_i:P ratio down the profile, which appears counter-intuitive, is attributable to the fact that the concentration of phosphate-P_i decreases much more quickly than phosphate-P_o. This is a common feature of relatively sandy soils which tend to have a low (inorganic) phosphate-retention capacity.

The magnetic susceptibility data show a progressive reduction in both χ (from 39 to 23 x 10⁻⁸ SI) and χ_{conv} (3.22 to 2.65%) down through the profile. This again is a pattern typical of many soil profiles and is likely attributable to higher levels of microbial activity ('fermentation') in the topsoil (Le Borgne, 1955). It should be noted that the χ_{conv} values are well below the 5.00% threshold which is often taken as being indicative of enhancement through burning – i.e. there is no evidence of *in situ* burning or the incorporation of burnt material (as might be derived from hearth ash in midden material used for manuring).

To summarise, the LOI and phosphate data are consistent with a buried soil profile. The fact that the bAp? horizon has a relatively low organic matter content (LOI, 1.20%) and that the bAp(lower)/B horizon at 320–395 mm has a similar LOI (1.04%) as the bAp? horizon certainly supports the idea that the topsoil was ploughed. A somewhat elevated phosphate concentration is evident in the bAp? horizon, but on present evidence it is impossible to establish whether this is simply due to natural processes of phosphate enrichment or includes some degree of enrichment through manuring. The magnetic susceptibility data provide no evidence of *in situ* burning or the incorporation of burnt material.

Soil Micromorphology

The results are presented in Tables 2 and 3, and illustrated in Figs 2-10; the report is supported by a CD-Rom microphotographic archive.

Upper Subsoil/base of Ap (thin section M2) This is a massive leached medium sandy soil containing coarse angular flints including calcined/burned examples (Figs 2-3); only traces of fine charcoal and one very fine burned bone fragment also occur as anthropogenic inclusions (Fig 4). Many broad (probable earthworm) burrows occur that are characterised by more humic fine soil and traces of very fine charcoal. They are also the focus of microlaminated clay coatings and infills, although rare very thin clay coatings occur ubiquitously in these sands.

This thin M2 across the junction of the lower Ap and subsoil B horizon records the presence of acid leached medium sands (e.g., only a trace of mica survives) with thin clay grain coatings. The soils are acid brown sands/argillic brown sands (Newport soil association; cf. St Albans soil series; Hodge *et al.*, 1983), with a history of clay translocation. The presence of numerous coarse flint and examples of burned flint, and one fine burned bone fragment show a primary input of anthropogenic materials, perhaps from a burned rock midden or possibly reflecting an early example of manuring.

In addition, the soil is characterised by weakly humic burrow infills, and these are a focus for clay translocation. This 'humic' burrowing is a presumed characteristic of the soil cultivation here which has homogenised the Ap horizon – producing a uniform organic content – albeit now low because of oxidation (see Table 1). The associated concentration of clay coatings and infills is enigmatic, but as the uppermost Ap horizon does not contain these (see below) they cannot be a post-depositional/post-medieval product of the overlying deposits. Instead, they likely record physical soil disturbance, cultivation or colluviation (see below).

Ap horizon (thin section M1B) This massive, homogenised medium sand, was once a weakly humic soil. It contains charcoal, stones and examples of burned flint, with once humic burrow fills containing much charcoal, fine rubefied mineral material and examples of fine chalk and possible ash or relict mortar cement (Fig 7). There are also small patches of sands with thin clay coatings, while occasional poorly birefringent dusty clay coatings occur throughout.

This sandy soil shows very strong burrowing and homogenisation by probable earthworms associated with cultivation, and the poorly birefringent dusty clay coatings are probably relict of this cultivation. Patches of sands with thin clay grain coatings are likely fragments of the earlier-formed subsoil that has been coarsely mixed by cultivation. The presence of charcoal and other mineral material including chalk and ash/weathered mortar, although possibly in part relict of manuring, are more likely burrowed-in post-medieval material (see below).

Upper Ap horizon (under post-medieval chalk and brick makeup deposits) (Thin section M1A) This is a burrowed and homogenised poorly sorted, charcoal- and anthropogenic inclusion-rich once-humic loamy sand. It contains sand-size examples of coprolite/leached bone, brick/burned daub, an iron fragment, chalk and mortar (including examples tempered with partially

melted quartz sand)(Fig 8). Burrow mixing and weathering examples of biogenic calcite granules indicate working by earthworms (Figs 9-10).

This uppermost part of the homogenized Ap horizon is very strongly affected by burrowing by earthworms that have mixed numerous anthropogenic inclusions from the overlying post-medieval make-up deposits. It can be perhaps inferred that the cultivation soil had been abandoned and undergone natural acidification, and hence why the earthworm granules and mortar fragments, which have been introduced by burrowing, show partial decalcification characteristics.

Discussion

Local soils are typical brown sands/argillic brown sands, broadly included within the Newport 4 soil association. Natural pedogenesis on glaciofluvial drift comprised acid leaching and translocation of clay down profile forming very thin clay grain coatings. This would have produced an impoverished soil profile by later prehistoric times, including podzols in the Ipswich area (Macphail, 1987; Murphy, 1984). There is clear field, chemical (LOI) and soil micromorphological evidence of a ~400 mm thick cultivated Ap horizon being present in the upper part of the argillic brown sand soil profile. The Ap is homogeneous, with a similar organic content throughout, and shows broad burrowing and coarse inclusion of subsoil B horizon material. These characteristics, alongside dusty textural pedofeatures and concentrations of translocated clay associated with 'humic' burrow fills down profile indicate both physical mixing by tillage and high levels of biological activity associated with cultivation (Courty *et al.*, 1989; Gebhardt, 1992; Macphail, 1998; Macphail *et al.*, 1990; Simpson, 1997). The thickness of the Ap argues for over-thickening of this horizon, either by plough-associated colluviation and/or by amendment (Macphail, 1992); a simple ard-ploughed soil would only be ~150-200 mm thick. Kieron Heard (pers. comm.) suggested that a 1 in 8 slope was present at this location. The formation of plough colluvium would also have contributed to clay translocation down profile. Although deep mixing by earthworms in these essentially poorly fertile soils must have been encouraged by at least some additions of organic matter/manuring, there is little chemical or micromorphological evidence of intensive soil amendment, although the presence of much burned flint and a fragment of burned bone was noted (cf. manured sandy soils at Phoenix Wharf, Bermondsey, London; Macphail *et al.*, 1990). On the other hand, these coarse anthropogenic inclusions may simply be relict of a prehistoric burned mound material.

Clearly, the soil was rather acid when buried by the post-medieval make-up deposits, although earthworms mixed many anthropogenic inclusions into the topmost layer of the buried soil. It can therefore be suggested that the cultivated soil predates this post-medieval period, and may even have its origins in late prehistory. The uppermost part of the buried soil includes weathering mortar and some secondary calcium carbonate, and hence why it probably seemed to have a finer texture in the field. In fact, no evidence of marine flooding (and clay deposition) was noted.

Conclusions

At the Orwell Quay site, post-medieval make-up deposits buried an over-thickened and weakly amended cultivated soil formed in local weakly formed acidic argillic brown sands. The Ap horizon, which could be partially colluvial in character, is probably medieval, but may possibly have its origins in late prehistory, and was perhaps associated with burned rock middening.

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