

**An Archaeological Watching Brief on the Site of the  
Museum of Liverpool, Mann Island  
Liverpool, Merseyside (centred at NGR SJ 3394 9004)  
Interim Assessment Report**

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## **Non-Technical Summary**

This report describes the results of an archaeological watching brief on the site of the new Museum of Liverpool at Mann Island, Liverpool (NGR centred at SJ 3394 9004) which was conducted on behalf of National Museums Liverpool during construction of the new museum. The project was conducted in three phases during the first half of 2007.

The final report will contain a full historical background, description of the excavated deposits, assessment reports of the finds, the results of environmental analysis of samples and fully annotated plans and sections.

The site of the new museum had formed part of the tidal estuary of the Mersey until the late 18th century when the process of land reclamation on the waterfront at Liverpool encroached on this area with the extension westwards of the man-made Mann Island. Documentary and map evidence shows that the area contained part of Manchester Dock, including part of the entrance lock, and the southern wall of the Chester Basin. Manchester Dock was constructed as a tidal basin in 1785 with the entrance lock added in the early 1800s. Chester Basin was constructed in 1795 but remained a tidal basin and was never converted to an enclosed dock. In addition to these structures, the documentary study and subsequent trial trenching had found extensive evidence for remains relating to the dock infrastructure.

The construction groundworks required the excavation of an extensive single trench covering the building footprint of c. 6500 m<sup>2</sup> on a plot which measured c. 110 x 50 m and was excavated to a depth of c. 3.5m below the modern ground surface. The earliest deposits encountered related to the infill and consolidation of reclaimed land in the late 18th century. A north-south aligned wall c. 2m thick and extending the full length of the excavation probably represented the waterfront constructed between 1796 and 1803. There is some evidence that this wall was never completed and it was partly demolished, probably during the construction of the entrance lock to Manchester Basin in c. 1803 to 1807.

The area had been infilled with a wide range of material, principally sands and gravels probably derived from dredging the river, but also incorporating demolition material and hardcore from central Liverpool and the docks. The latter deposits contained substantial dumps of pottery manufactured in Liverpool and Staffordshire including a large group of sugar moulds as well as the first archaeological evidence for the manufacture of clay tobacco pipes in Liverpool.

Much of the dock infrastructure was revealed during the excavation, including the lock gates and sandstone walls of Manchester Dock along with its lock gate mechanism and sluices, all of which were in an excellent state of preservation. The southern wall of Chester Basin was located at the northern end of the site.

The brick foundations of 19th-century warehouse structures were also uncovered, along with cobbled surfaces and roadways. Two subterranean chambers to the northwest of the lock were probably part of the hydraulic system used to power cranes and other plant situated within the dock. The foundations of some of this plant survived within the excavated area. The well-preserved remains of an engine house were situated on the south-east quayside of the Manchester Dock and various sheds and a possible former dwelling house were exposed across the site.

### **Acknowledgements**

Mike Stammers and Adrian Jarvis provided valuable guidance. Richard Hawes kindly provided access to various historic maps in his private collection including the Neele map of 1807.

# **An Archaeological Watching Brief on the Site of the Museum of Liverpool, Mann Island Liverpool, Merseyside (centred at NGR SJ 3394 9004): Interim Report**

## **1. Introduction**

This report is an interim statement of the results of a watching brief undertaken during groundworks for the construction of the new Museum of Liverpool. The project was undertaken for National Museums Liverpool to a project design prepared by National Museums Liverpool Field Archaeology Unit (NMLFAU).

The final report will contain a full historical background, description of the excavated deposits, assessment reports of the finds, the results of environmental analysis of samples and fully annotated plans and sections.

### ***1.1 Site Location and Description***

The site of the new Museum of Liverpool lies on Liverpool's Historic Waterfront (Fig. 1) and forms part of the Albert Dock Conservation Area and the UNESCO World Heritage Site (centred at NGR SJ 3394 9004). Before the development began the site was bounded by the Pier Head and garages fronting Mann Island to the north, the River Mersey forms the western boundary, the Graving Docks lie just south of the site whilst the south-eastern corner was formed by the entrance lock to the Albert Dock. The eastern boundary was formed by Irwell Street.

Prior to the excavation most of the site was used as the Mann Island car park, serving the Museum of Liverpool Life and contract parking, situated at the southern end of the site in the former Pilotage Buildings and Tide Surveyor's Office. Most of this area was surfaced in tarmac, though large areas on the southern and eastern sides of the site were surfaced with stone setts. The only other standing building on the site was the GWR Building, a former railway shed in use in 2006 as office and temporary display space, and a porter's lodge at the entrance to the car park constructed in the late 1980s.

### ***1.2 Historical Background***

The detailed historical background to the site is given in Harthen and Adams (2005) and is provided in summary only here.

The site occupies the location of the former Manchester Dock and lies to the north-west of the mouth of the Pool of Liverpool. Until the late 18th century it was situated within the River Mersey, since all of Liverpool's present waterfront is the result of land reclamation from the early 18th century onwards as the town's docks were extended into the river.

By the late 18th century Liverpool's waterfront had developed into a complex network of wet and dry docks with an associated infrastructure of shipbuilder's yards, offices, inns, shops, warehouses, commercial and industrial operations. These were involved in a continuous process of evolution and innovation resulting in a perpetually changing busy landscape.

Expansion of the docks resulted in the extension of the Mann Island quays and the sea-wall was progressively pushed westwards into the Mersey to expand the area of what was referred to on Gore's map of 1796 as the Manchester Old Quay. Examination of the map sequence shows that the line of the sea-wall which marked the western edge of the Mann Island quay as shown on Charles Eyes's map of 1785 had been moved westwards by 1796 (Gore's map) and further west again by 1807 (Cole's map). The Walkers' plan of 1823, followed in greater detail

by the 1850 OS map (60 inches to one mile), show the sea wall further west still (in its present position as in 2008).

Manchester Dock was situated between the Canning Graving Docks, built 1756 and 1765-9, and George's Dock, built between 1762 and 1771 (Hutchinson, 1978, 3; see also Rees, 1991, 7). It was first constructed as a tidal basin in 1785 by the Corporation of Liverpool and replaced an earlier quay built c. 1772 by Henry Berry 'to the west of the Dry Pier'. It was intended for barges using the inland waterways and was the depot for the flats (barges) of the Shropshire Union Canal Co. and later the Great Western Railway (Ritchie-Noakes 1984, 35; Stammers 1999, 70). Chester Basin was constructed in 1795 to the north of Manchester Basin and was intended for the use of river craft.

The construction of the basin was prompted by the growth in river traffic partly as a result of the development from 1720 of the Mersey and Irwell Navigation Company terminals in Warrington and Manchester (Baines 1870, 311) and improvements to the Rivers Mersey and Irwell. In addition the increased river traffic was frequently a hazard to both navigation and operation (Ritchie-Noakes 1984, 35). Another small inlet for traders from the Chester and Ellesmere Canal was constructed adjacent to George's Parade in 1795' (Hutchinson 1978, 3).

The overall form of Manchester Basin seems to have developed piecemeal over the following twenty years. The basin is first shown in plan on Charles Eyes's Plan of Liverpool dated 1785 (Fig. 2) which depicts it as a shallow open basin with no associated infrastructure. Sheds and cranes were fitted in 1789 (Ritchie-Noakes 1984, 35) and John Gore's Plan of Liverpool of 1796 (Fig. 3) shows the quayside extended further westwards with a slight breakwater extending to the south. Richard Horwood's map of 1803 (Fig. 4) shows a further extension westwards, though evidence from this excavation suggests it is likely that this was never completed, the work being redesigned to include an entrance lock to Manchester Dock.

The entrance lock was added between 1804 and c. 1807 to convert Manchester Basin to a dock. It is shown on Gore's map of Liverpool dated 1804 (Fig. 5) but is not present on a map included with 'The Picture of Liverpool' for 1805 (Fig. 6) which could be interpreted as suggesting that it was then a work in progress. The entrance lock is first shown in its final form on Thomas Troughton's 'Plan of Liverpool', dated 1 September 1807 (Fig. 7) which was included with Troughton (1810) who is the first to refer to the enclosure of what was then called 'Old Quay Dock' (Troughton 1810, 282). The lock gates were therefore added to Manchester Dock between 1804 and 1807 and it is likely that Chester Basin was extended westward at the same time. The dock and waterfront is shown in its final form on Kaye's 'Plan of Liverpool with the Environs' of 1816 (Fig. 8).

The minutes of the Liverpool Dock Committee (Merseyside Maritime Museum Archives) shed a little more light on the date of construction of the entrance lock. A minute dated 16 March 1807 contains a reference to a '...wall and pierhead....on the south side of their [i.e. the Mersey & Irwell Navigation Co's] new basin' being under construction at the time. It is not clear exactly what is being referred to but it implies that the lock was finished by then. The entrance lock must have been completed by 23 August 1808 as the minutes for that date record a payment of £80 19 s 0d to the Manchester Old Quay company for the freight of stone from Runcorn. It is less clear when the work started, though there are a number of references in the minutes for 1805 which seem to relate to intended extensions of the waterside in the area around Manchester Dock.

Consequently it seems likely that the work was planned in 1804-5 and that construction was started shortly afterwards with design changes to include an entrance lock to Manchester Basin c. 1806 and the works were finished by early 1807. This date range is probably the actual period over which the work progressed, the few available contemporary accounts (e.g. Troughton 1810, 271) provide little detail as to how the work was actually undertaken, though they do give an indication of the difficulties encountered working on the foreshore where

'...impetuous tides... repeatedly, in an hour, destroy the exertions of weeks'. Jarvis (1996, 144) outlines the basic sequence of work, firstly the dock was excavated and retaining walls built around the edges to form the dock walls. There then had to be a delay for the mortar to gain strength so that backfilling could begin. If this were done too quickly then the resulting settlement of the fill could cause the quayside to settle or worse, the load on the dock wall could cause it to distort or collapse. Hydraulic lime mortar could take anything up to a year to cure completely so it is likely that works proceeded at a suitably pedestrian pace, even into the late 19th century backfilling remained a 'wheelbarrow job'. Consequently a 3-4 year period is probably a realistic timescale for the completion of the entrance lock.

This dating represents a substantial revision to earlier dating of the lock such as 1815 (Ritchie-Noakes 1984, 35) or 1818 (Picton 1873, 646; Rees 1991, 7; Hutchinson 1978, 3). Troughton supplies a few other interesting details, such as that in 1810 sandstone masonry cost twenty-one shillings per cubic yard.

Over the next 35 years the Irwell Street and Mann Island area was developed as offices, warehouses and agents' residences. During the early 19th century Manchester Dock's trade was predominantly in coal and manufactured goods to Liverpool and corn and cotton back inland and it is estimated that it handled an average of 1000 tons per day (Ritchie-Noakes 1984, 36). From the mid-19th century Manchester Dock was used for lighterage in conjunction with the railway companies. A covered berth was constructed in the south-east corner of the dock c. 1860. By 1872 the whole dock was leased to the London and North Western Railway Company (by then representing the Shropshire Union Railway and Canal Company, the Great Western Railway and Birkenhead Joint Lines). Alterations continued and in 1875 the GWR erected an engine boiler house, 5 ton crane and road weigh-bridge. The Shropshire Union Railway and Canal Company enclosed a portion of the north quay to make coal depot in the same year (Ritchie-Noakes 1984, 36). The GWR goods shed was constructed (or possibly rebuilt following a fire (North Western Society for Industrial Archaeology & History c. 1982-4, 3)) in 1890 adjacent to Manchester Dock and serviced barges from Birkenhead. It was closed 1960, becoming derelict, being rehabilitated 1990 as museum accommodation' (Rees 1991, 7). Other additions to the dock included a 22ft radius, one-ton hydraulic crane (1909) and various hydraulic appliances in the GWR depot on Irwell Street (Ritchie-Noakes 1984, 36).

As a result of competition, first from the Manchester Ship Canal (opened 1894), and later from road hauliers, which contributed to a decline in the use of the inland carriers, Manchester Dock became largely redundant. By the mid-1920s the Shropshire Union Railway & Canal Company had given up its cross-river lighterage business and the Great Western Railway Company was considering discontinuing the use of Manchester Dock for barging. In addition, the whole site was settling dangerously as a result of the Mersey Tunnel excavations being carried out below. Once the decision had been taken to close the dock, it became necessary to fill it, and 'between 1928 and 1936 Manchester Dock and Chester Basin were filled with 60,000 tons of spoil from the tunnel works' (Ritchie-Noakes 1984, 36; Stammers 1999, 70). The area was later paved with granite setts by MDHB (North Western Society for Industrial Archaeology & History 1982-4, 2).

## **2. Methodology**

Full details of the methodology are given in the project design though this section provides a summary and any variations in the methodology from the project design.

The construction of the new museum required excavation of a large open area measuring c. 110 x 50 m matching the building's footprint of c. 6500 m<sup>2</sup> to a depth of c. 3.5 m below ground level. The archaeological component to monitor the development was conducted as a series of phased operations. The first stage consisted of monitoring the machine-stripping of the tarmac in the former car park of the Museum of Liverpool Life at Mann Island which began in January

2007. A single trench (Trench I) was excavated across the whole site to expose dock walls and quayside structures known to survive below the tarmac.

This exposed large areas of the former quayside to Manchester Dock and Chester Basin and the two infilled docks. In addition much of the dock infrastructure was revealed including the entrance shafts leading to sandstone-lined chambers and the enclosed tunnels below the surface which housed the chains for opening and closing the lock gates. These were not investigated further until Stage 2 began some weeks later during February 2007.

Rather than plan this extensive area by hand using conventional direct drawing techniques, black and white and colour digital photographs were taken from a 60 m mobile access platform. These were rectified to quasi-vertical photography during post-excavation and used as the basis of detailed site plans which were created in AutoCAD.

During Stage 2 the shafts were partially excavated by mechanical mini-excavator and the remaining spoil (context 12) removed by hand to reveal the worked sandstone blocks lining the chambers and tunnels. The clean and uniform sandstone rubble fill of Manchester Dock was excavated using a mechanical excavator. The dock walls were recorded using a Trimble 3D laser scanner. This produces a detailed three-dimensional digital model of the surface which can be linked to video footage and digital images. The walls were also recorded using colour digital photographs, black and white 35 mm film and written records. Rubbings were taken of tool marks and masons' marks. The southern wall of Chester Basin wall was recorded in the same manner.

Following the recording of the quayside four test pits were excavated across the site in an unsuccessful attempt to locate the revetment wall which was first recorded on the 1803 map. Later in the development, the revetment wall was identified and recorded when the whole area was reduced in level.

The final stage of the watching brief saw the monitoring of machine-excavation to formation level for the new Museum of Liverpool towards the end of March 2007, from which point all excavations were constantly monitored by NML Field Archaeology Unit staff.

Full preservation *in situ* of the dock walls was considered unviable in view of the requirements of the building foundations. Consequently six slots – four in the northern wall and two in the southern wall - were cut through the dock walls using specialist masonry-cutting equipment and a JCB to remove the excess sandstone blocks. Further slots which were shallow but had a large surface area were also removed from the top of the dock wall using a circular saw and JCB with hammer attachment. All slots were monitored throughout the cutting and subsequent removal.

Some fittings associated with the dock were removed prior to demolition of the walls, including an iron access ladder affixed to the northern dock wall (3), a timber depth gauge (159), a lock gate roller mechanism (8) and the upper part of the lock gates which were finally removed at the end of April 2007, by mechanical digger and a chainsaw at formation level. They were then lifted, again by mechanical digger, and were eventually stored temporarily at the back of the GWR building pending a decision on their final destination.

### **3. The Excavation**

Excavation did not extend to the base of the land reclamation infill and was confined to the area and depth necessary for construction of the new museum. Therefore it was not possible to obtain a full stratigraphic sequence for the site. However, given the documented site history it is unlikely that any deposits pre-dating those discussed below were present, other than foreshore deposits.

### **3.1 Phase I (Extended Walls of Manchester Dock and Riverside Revetment Wall c. 1803)**

#### **3.1.1 Manchester Dock**

The earliest structural features encountered were the walls of the early extension to Manchester Dock probably built shortly before c.1803. The dock was constructed in 1785 as a tidal basin, but was extended westwards some time before 1796. These elements can be shown from map evidence to lie to the east of the excavated area and consequently the earliest sections of dock wall present in Trench 1 (Fig. 9) are those first shown on Horwood's map of 1803. However, it is likely that this was never finished, because the Horwood plan suggests it was intended to be a single work with the revetment wall described below, and there is strong stratigraphic evidence that that work was never completed.

Only a short section of dock wall at the extreme east of the trench could be identified as possibly relating to this Phase. The wall was constructed using alternate courses of brick and sandstone, although a horizontal piece of timber had been set into the wall between sandstone blocks and brick presumably to act as some kind of reinforcement (Plate 1). The section to the west was constructed differently in sandstone ashlar throughout, and at the level excavated to probably related to the insertion of the entrance lock, only the lower levels of wall in this area (which were not exposed) relating to this Phase. An alternative interpretation of the brick and stone section of wall is that it relates to a later repair but insufficient was exposed to resolve this.

Although shown in plan on the Horwood map, it is likely that it was not completed to full height in the area to the west. To the rear of this section of wall there was a marked change in construction, soft yellow sandstone being used in the extension westwards of 1803-1807 (Plates 2 and 3). The distinction was less clear in the southern wall of the dock but appeared to coincide with the eastern end of the entrance lock (Plate 4). These changes in construction suggest that there may have been a hiatus in construction whilst changes were made to the design.

#### **3.1.2 Revetment wall c. 1803**

This feature consisted of a sandstone wall (233) which had not survived to its full height or more likely was never completed (Plates 5, 6 and 7). It ran north-south and was first exposed during bulk excavation of the central northern sector of the trench (Fig. 9), and further sections were exposed to the south during the excavation of the 'Ground Improvement Trenches' discussed below but these could not be recorded in detail because of the unstable nature of the deposits in that area. The alignment of the wall appears have continued further south as context 253 and it was probably intended to tie into the Manchester Dock wall described in section 3.1.1.

The top of the wall appeared at a height of c. 4.7 m AOD for only a short section 8.30 m long and c. 3.80 m thick; to either side the wall survived at a lower level, broadly coinciding with formation level at c. 2.5m AOD. However, its junction with the wall of Chester Basin was not exposed and so the stratigraphic relationship between the two walls could not be determined. The upstanding section measured c. 2.0 m in height from the base of the trench and was constructed using yellow sandstone blocks of masonry with a chiselled/punched finish laid in courses. The blocks varied in size from 0.23-0.40 by 0.82-1.00 by 0.90m. These were very similar in character to the blocks used for the rear elevations and core of the Manchester Dock lock which suggests that either dismantled sections of this wall were re-used in the entrance lock or that they formed part of the same phase of works. The west-facing (external) side of the wall was finished to a high standard while the east-facing section was more roughly coursed.

The position of wall 233 suggests that it is the sea wall first shown on the Horwood map of 1803 (Fig. 4). The map preceding Horwood's is the Gore map of 1796 (Fig. 3), indicating construction

between those two dates, as part of the rapid expansion of the quaysides and docks in Mann Island during the late 18th and early 19th centuries. Detailed consideration of the map and documentary evidence (Section 1.2) suggests that the later part of this date range is more likely. However, it was almost certainly never completed because the infill deposits of Phase II sealed it and extended to east and west (Plate 5). If wall 233 had been completed, this stratigraphic sequence would demand that it be dismantled shortly afterward construction and the recently reclaimed land to its east then re-excavated and in-filled again following the construction of the new waterside further west. A simpler explanation is that 233 was never completed and that the scheme was redesigned to include lock gates to Manchester Dock requiring the extension of the waterfront further west than originally intended. In addition, no variation could be seen in the construction of Chester Basin at this point (See Section 3.2.5) where if the wall depicted on Horwood's map had been completed some difference might be expected.

In common with many contemporary map makers, Horwood seems to have shown intended or partly constructed works in the same style as existing elements of the landscape. The sequence of construction appears to have involved constructing the new sea wall further to the west, perhaps requiring the temporary sealing off of the mouth of the Manchester Basin. Troughton (1810, 282) indicates that this had occurred by 1810, while the Cole map pushes the date of construction to 1807 or earlier.

### **3.1.3 Land reclamation c. 1803**

It has been assumed that land to the rear (landward) of dock walls could not be reclaimed until the walls were at least partly complete, though it is likely that the two works progressed in tandem, spoil from the excavation of the dock being used to infill behind the dock wall as it was erected.

Unfortunately formation level coincided with the upper surface of these deposits, which were therefore not investigated in detail and largely remain *in situ*. Investigation was confined to a series of thirteen 'ground improvement' trenches excavated by machine to the rear of the northern wall of the Manchester Dock Lock (Fig. 10, Plate 3). These were c. 15 m long, 2 m wide and 2 m deep.

To the east (landward) of the Phase I revetment wall (233) they were sealed by Phase II land reclamation deposits to a depth of c. 2 m and consisted of a compact blue-grey clay seen at the base of the ground improvement trenches. However, the narrow confines of the trenches and highly unstable nature of the deposits through which they were cut meant that their composition and stratigraphic relationship with the overlying deposits could not be examined in detail. The deposition of a blue clay, probably derived from the excavation of the dock, may have been a deliberate choice of a firm but plastic material to provide a solid foundation for the more varied and mixed deposits of landfill above.

## **3.2 Phase II (Manchester Dock Lock and Chester Basin Extension c. 1803-c. 1807)**

It seems likely that the new riverside wall, entrance lock to Manchester Dock and the extension to Chester Basin were constructed first and the landward area to the west filled in afterwards. The entrance lock to Manchester Dock and the section of Chester Basin within the excavated area are dated from map and documentary evidence to 1803-1807, and probably in the latter half of this date range (See Section 1.2).

### **3.2.1 The Manchester Dock Lock Walls**

The lock and dock walls (Fig. 11, Plates 8 to 13) were in an excellent state of preservation, with of the dock fittings, including a timber depth gauge on the northern wall 3, cast iron bollards, iron rope tie rings and heelpost strap anchors for securing the lock gates survived *in situ*.

The walls (Contexts 2 and 3) were constructed entirely in fine-grained red sandstone ashlar masonry with occasional repairs in brick or granite. The curved recesses for the lock gates survived in excellent condition and were constructed using masonry of a significantly better quality than that used within the rest of the lock (Plates 12 and 13). It was not possible to determine if this was an original feature or a result of rebuilding.

Masons' marks were observed throughout the entrance lock and included letters, numbers and symbols such as arrows and diamonds. The predominant mason's mark was the letter 'T' which had been used at varying sizes in the southern lock gate recess. Other masons' marks included 'R', 'H4' and symbols such as lozenges (Plate 14).

Within the lock a set of access ladders was present on the southern wall 2 (Plate 12) and consisted of wooden rungs attached to the wall with iron bolts and brackets. This set had not survived particularly well and partly collapsed during excavation. Another access ladder was set on the northern wall 3, almost opposite the set seen on the southern wall 2. The ladder had been made from timber and repaired with concrete with a slot cut into the sandstone.

A timber depth gauge (159) was exposed on the inner face of the northern dock wall 3, adjacent to gate 6 at a depth of 0.85 m below the dock wall (Plate 15). This recorded water levels in feet, beginning with '20' at the top and had the numbers carved into wood that had been painted over in white. The base of the gauge was not reached and it was only exposed to a maximum depth of 10 feet (c. 2.40 m) before hitting the water table. It had been fastened to the dock wall with iron brackets at regular 1m intervals and traces of a bituminous coating were also visible. The upper part of the gauge was removed at the 10 foot mark by NML conservators.

Within the northern dock wall (3) were lengths of timber aligned north-south through the eastern part of the wall approximately 3 m below the original ground level. It is not clear at this stage what the purpose of these were. No similar timbers were apparent in the southern dock wall 2 during demolition.

### **3.2.2 The Lock Gates**

It is unlikely that the excavated lock gates were those originally fitted in c. 1806-7 as these items would have been periodically replaced as part of the maintenance of the dock. They are described here for ease of reference.

At a depth of c. 0.75 m below original ground surface the top of the inner timber lock gates, 6 and 7, were exposed *in situ* in a closed position (Plates 11 and 16). The gates had a slight curve or arch to the front (Plate 17) which fitted into a similar curve in the gate recesses, a design in use by at least 1810 as it is described by Troughton (1810, 278). The top of the heel posts and iron brackets securing gates to the stays had been removed during the filling of the dock in the 1920s. However one of the heel post heads was recovered from the fill. Its upper section was faceted, probably to allow fixing of the bearing (Plate 18).

The front face (east-facing) was clad with vertically aligned c. 0.26 m thick softwood planks, which were in a very poor condition with a large number of holes where wood had rotted away (Plate 19). Various iron fittings remained *in situ* on this side including rods, brackets and a pair of staples for securing the operating chains (Plate 20). The fittings for the gates will be examined and recorded fully during post-excavation analysis.

The main structural elements were in a much better condition and were clearly visible on the back (western) faces of the gates (Plate 21). Two short, horizontal softwood fenders were present, near to the top of the gates but were very badly decayed. They were attached to the second and sixth horizontal beams. It is possible that this set of fenders may have been recycled boat masts. The visible section of the frame was composed of six horizontal timbers, c. 0.24 m thick, bolted to two upright timbers in greenheart (A. Jarvis pers. comm.) on either side.

In addition, iron brackets on the third and fourth horizontal were also attached to the upright nearest the walls. Diagonal braces had been added between horizontals on both gates as strengtheners. These appear to have been fixed in place using a lap joint.

Gate 6 had one diagonal joint missing between the fifth and sixth horizontal. It was unclear whether it had been removed or had rotted away. The three lower beams on both gates were in slightly better condition, probably as a result of more favourable burial conditions, and had not been covered in bitumen like all the other timber used in the gates.

Compacted grey clay with pockets of sand had been packed in between the horizontal timbers, though it was not present between the first and second horizontal. It is unlikely that this was an original component of the gate, though it was not clear whether the clay had naturally silted up against the gates or if it had been deliberately packed in to seal the gates before backfilling.

The use of the tropical hardwood Guyanese Greenheart (*Ocotea rodiae*) for dock gates in Liverpool began in the 1830s, although the timber was already in use in the North West of England by 1830 when it was employed in the construction of the L&MR Warehouse at Liverpool Road Station, Manchester (Patrick Greene 1995; MSI 2002). Greenheart was preferred over oak or other timbers for its organic durability and toughness, resistance to rot and marine worms, with the advantage that it was available in long lengths (Jarvis 1996, 197-200; Scholfield and Smith 1999, 56). The date of the introduction of greenheart means that the surviving dock gates were not the original set but must be replacements dating to the period once greenheart became available. The durability of the timber, however, means they could be as early as mid 19th century in date. Greenheart gates installed in Canada Dock in 1856 still survived in use by 1950 (Scholfield and Smith 1999, 56).

In addition to the gates themselves there were two timber stops 157 and 158 (Plate 22) which were pinned to the dock wall with two iron nuts and bolts at the eastern corner of each recess. The timber been sawn to lengths of 0.90 m and 1.00 m, and were 0.23 m thick. The outer core of each timber was in a relatively poor state of preservation probably due to the decay of relatively soft sapwood. These were almost certainly late 19th or perhaps 20th century replacements of the original.

### **3.2.3 The Lock Gate Chain Mechanism Housings**

Each gate was opened and closed by a combination of four gate operating mechanisms, two for each gate (Fig. 12), based on the four-engine system (Jarvis 1996, 200-1). Each set worked in opposition, one for opening and one for closing the gates and were operated using winches. The winches would have been situated above one of four square chambers constructed under the quayside and connected to the lock by inclined shafts through the dock walls (Fig. 11, Plates 23 and 24). The shafts housed ropes or chains (the latter in use on Liverpool docks from April 1808: Philips 1983, 14) which were connected to staples on the gates and winding in one set of chains would have caused the gates to open or close. A photograph of the entrance lock taken c. 1928 (Ritchie-Noakes 1984, 35) suggests that these were Type 4.2(W2) winches (Philips 1983, 14) which had two horizontally mounted axles; the lower axle was mounted at or just above ground level and carried the chain drum between a large gear wheel and a brake wheel. The upper axle carried a small cog which meshed with the large gear. The winch was turned by a removable crank handle on either side with a friction shoe acting on the brake wheel.

Although the winches and chains had been removed prior to filling of the dock the masonry survived in excellent condition. All four winch chambers were rectangular in plan with an apsidal end pointing towards the dock (Plate 25); however, this had probably been created by partial collapse on this side as a result of thinning of the stonework caused by abrasion from the chain used to operate the gate (Plate 26). The chambers were arranged symmetrically with two (8 and 11) aligned south-east by north-west and the other two (9 and 10) running north-east by south-

west. Although constructed using similar methods and materials, each chamber was slightly different in size and in the details of its construction. This may be a consequence of each having been built by different work parties working to a general plan rather than detailed drawings.

Although only one of the shafts (10) was clear of infill, their general character was established. The internal walls of the shafts were lined with high quality sandstone masonry finished with 'punched' chisel marks. The floors were constructed using granite, probably prevent them eroding as a result of wear from the chain and possibly to reduce friction. The roof of each shaft had a series of grooves worn into the softer sandstone by constant wear from chains (Plate 27). All of the shafts were fitted at either end with cast iron rollers to aid the passage of the chains and protect the surrounding masonry from further erosion. Each had a horizontal roller in the main chamber (Plate 27) whilst at the exits to the lock there was both a horizontal roller to stop the chains dropping onto the sandstone walls and a vertical roller at the most vulnerable edge which varied depending on the orientation of the shaft in relation to the gate (Plate 22).

Little survived of the winch mechanisms. The scarring from the lower axle and drum was just visible on the side wall of one of the chambers (Plate 28) as an arc or corrosion product. The winch housings were probably mounted on iron bars into holes on the upper edge of the chambers (Plate 28).

### **3.2.4 Sluice Mechanism Shafts**

Two sluice housings constructed red sandstone ashlar were situated just to the south of the entrance lock (Fig. 11). One of these 263 was only partially excavated as it had been truncated at formation level by construction of the Steam Underwriters' Sheds (Plate 29). However, the second 259 was still fully preserved under a concrete and paved walkway at the western extreme of the site (Plate 30), and contained water with the sluice gate *in situ* complete with chain attached (Plate 31). The sluice gate was removed for future preservation.

A similar sandstone block-constructed chamber (151) to the operating mechanisms was discovered adjacent to the area of the western lock gate recess on the north side. However, after excavation to a depth of approximately 2 m, it became apparent that this was constructed differently from the other chambers as there did not appear to be a shaft running from the chamber into the lock and, furthermore, no signs of any tunnel exit within the lock. It is uncertain whether the feature is a sluice mechanism or a lock gate mechanism chamber similar to those already discussed. This requires further research.

### **3.2.5 Chester Basin**

Although Chester Basin is recorded from 1795 as a small rectangular open basin, the section exposed within the excavation was probably constructed during the westward extension of the waterfront in c. 1803-7 which saw the expansion of Manchester Old Quay.

At the far northern edge of the trench lay a section of the southern wall of Chester Basin, running east-west (Fig. 11). The upper coping stones had been replaced in concrete (Plate 32), though below this the original sandstone wall survived. This was uniform throughout the length of the trench, with no changes in construction, suggesting it was constructed in a single phase. This is despite Horwood's map which suggested that the extension westwards of 1803 should have been visible.

During demolition an octagonal timber became visible in section at the western extreme of the wall. It measured approximately 1.5 m in length and 0.5 m wide and was set vertically into the sandstone wall around 1 m below original ground level. The purpose of this has not been ascertained but it appears to have been used merely as a 'filler' either when the wall was constructed or when it was rebuilt in part.

### **3.2.6 Land Reclamation Deposits c. 1803-c. 1807**

These deposits are dated by map evidence and the stratigraphic sequence outlined above to the period 1803-1807 and represent the final phase of land reclamation in this part of Liverpool.

To the west of the Phase I wall the lowest deposits relating to reclamation were clay deposits similar to those of Phase I. However, there was a marked change to red brown clays becoming greyer with depth. Unfortunately investigation of these deposits was confined to the ground improvement trenches described above. This change probably resulted from the different origins of the deposits, those to the east being part of the earlier land claim pre-dating 1803, those to the west being the 1803-1807 reclamation relating to the construction of the lock gates to Manchester Dock. Unfortunately the upper surface of these deposits coincided with formation level so they could not be investigated

The broad character of the upper levels was established by four trial trenches excavated across the site in an effort to locate the Phase II revetment wall (Fig. 13) which at the time was presumed to be buried at a depth of no more than c. 1 m.

Trench 2 was located near the western edge of the main open area (Trench 1) and measured 3.9 m long by 2 m wide and was up to 1.4 m deep. An upper layer of rubble (166) c. 200 mm thick sealed contexts 169–178 (Fig. 14) which included stratified layers of black clinker (178) and very clean, pale sand (175) below a reddish brown sandy clay (170). The clinker and pale sand deposits both contained a large quantity of sugar mould fragments in a concentrated area, suggesting a dump of material for the ground make-up. Other finds included fragments of syrup jars, other dark-glazed earthenwares, china and bone.

Trench 3 was aligned east-west across nearly the whole width of the site at the northern end of Trench 1 and measured 2 m wide by approximately 35 m long. Below a concrete slab was a uniform deposit of brown sand and rubble (context 195) which extended for the full depth of the trench, c. 1.2 m. A small deposit of grey ashy material (204) containing a quantity of clay tobacco pipe fragments lay within 195 at the eastern end of the trench. Context 195 sealed lensed deposits of yellow sand (199) c. 200 mm thick which in turn sealed a deposit of stiff black silty clay (202) at the base of the trench, though its relationship to the overlying deposits was not established. A second brick wall appeared at the base of the northern end of the test pit in a brown sandy rubble fill (200). The wall was two courses wide and approximately 6 m long, running east-west along the centre of the base of the test pit but did not appear to be tied into any other structure in the surrounding area. To the north of this wall a small deposit of sugar mould fragments was recovered from a mixed context of white clay, clinker and reddish sand 203.

Trench 4 was also aligned east-west and was excavated through the bitumen-covered brick floor surfaces (context 100) between the foundations (Context 58) of a shed at the eastern end of Trench 1, to the north of the dock wall 3. The walls ran east-west and the area between them was excavated to a depth of 1.67 m below ground surface depth. The deposits consisted of horizontal layers of sand of different colours, grey (275), olive green (276), and yellow (278), sandy gravels and grey clay on a bed of red clay (280). These layers measured a total of c. 1.7 m thick and represent the upper levels of land reclamation deposits. A deposit of brown sand (277) containing sugar mould and syrup jar fragments was revealed in the section below the northern brick wall (58). Two metal pipes with flanged ends in a wooden housing were recovered from the sand and rubble fill (281). These probably relate to hydraulic pumping equipment but a specialist opinion will be sought to interpret these.

Trench 5 was located immediately to the north of the two cellar structures in the south west area of the trench. The main deposit below the rubble make-up layer (196) consisted of clean yellow sand with inclusions of large fragments of yellow sandstone (197). This layer was 0.92 m thick and the pit was excavated to a depth of 1.3 m.

The remainder of these deposits were excavated during the watching brief. Because of the scale and pace of excavation, detailed recording was difficult and was confined to the excavation of significant lenses of material within what appeared to be large dumps of material similar to the deposits of sands, gravels and building material described above (Plate 33). Tip lines suggest that the deposits in the north of the site had been deposited from the riverside, probably after transportation up-river. Elsewhere tipping appeared to be from the landward side (Plate 34). To the east of the Phase I revetment wall the fill consisted of horizontal bands of red and yellow crushed sandstone (Plate 35), whilst to the west more mixed material was present. However, elsewhere the wall was sealed by a continuous run of tipping from east to west.

Most of the material appears to have consisted of crushed red sandstone, crushed yellow sandstone and clean white sands possibly from river dredgings. The most significant material consisted of lenses consisting almost entirely of broken pottery, broken or discarded sugar-refining pottery, clay tobacco pipe manufacturing waste, molluscs and clinker, all of which appear to have been available in the town for use as hard-core in the land-fill. The pottery includes small quantities of glazed earthenwares, but predominantly consists of fine wares such as pearl and cream ware, clay tobacco pipes, glass bottles, oyster shells and occasional bone fragments; these are described in more detail in Appendix B. The locations of dumps containing significant quantities of finds, either artefacts or mollusca are shown on Fig. 15.

Extensive deposits of clinker and sand containing sugar mould fragments were uncovered across the whole site. These occurred in lenses between c. 0.30 - 0.65 m thick, though in most cases the depth of these deposits was not fully determined. Given the considerable volume of material present, only diagnostic sherds (i.e. rims and bases) were retrieved. Fragments of syrup jars were also present, usually in the same context as the sugar moulds although there was at least one deposit, on the western periphery of the site, which contained only syrup jars within a dark grey clayey matrix (214).

Several small deposits containing clay tobacco pipes were present across the northern area of the trench along with three significantly larger deposits (211, 225 and 266). No similar deposits were found anywhere south of the Manchester Dock walls. Some of the larger deposits contained fragments of clay and kiln furniture which suggests that they were waste from a factory. These are discussed in more detail in Appendix B.

The largest deposit of ceramics was context 215 which sealed a very similar dump (235) though the latter contained considerably less material. Both deposits contained mainly fragmentary pieces of Staffordshire pottery although some whole cups, lids and figurines remained intact. There are a small number of cross-joining sherds between 215 and 235 indicating that the two dumps of pottery were probably derived from a single original source, such as a substantial tip of discarded pottery from a warehouse in the town. The inclusion of a small number of residual 17th or earlier 18th-century finds amongst a huge quantity of material of material uniformly datable to the end of the 18th or first years of the 19th century suggests that some soil or sand deposits, containing earlier material, were also collected up with the discarded pottery and incorporated in the land infill dumps.

Two large deposits of oyster shells, 218 and 227, were also present and probably derived from the town centre as 'hardcore' infill material. They may derive from deposits of waste shells from the sale and consumption of oysters in the town. Abundant oyster shells were deposited in the early 18th-century fish market in Liverpool before 1726 (Davey and McNeil 1985, 13; McMillan 1985).

Other finds from these deposits are discussed in Appendices A and B below.

### **3.3 Phase III. 19th-Century Quayside Structures**

Although assigned to a single phase, these structures demonstrate the continual development of the dock from the construction of the entrance lock. Most of them probably date to the second half of the 19th century.

Most of Trench 1 north of the dock walls was covered in a variety of cobbled and brick surfaces of differing periods, mainly 18th to 19th century in date (Fig. 16, Plate 36). In general many of the rounded, less uniformly laid cobbles are considered to be earlier than the regularly laid rectangular setts. It is assumed that many of the earlier areas of cobbles (27) near the quayside would have been contemporary with the dock complex.

The quayside southwest of the entrance lock was relatively poorly preserved and none of the cobbled surfaces present elsewhere survived. The exception was a worn square sandstone crane base (155), c.1.57 by 1.44 m, constructed in two halves and dating to the late 19th century.

#### **3.3.1 Crane Bases**

The best preserved feature relating to the many cranes known to have been situated on the site was set on the quayside at the north-eastern end of the lock (Fig. 17) and was the base for a hydraulic crane shown in a photograph taken c. 1910-1920 (Ritchie-Noakes 1984, 35). The crane is probably that shown on a blueprint dated 10 February 1891 in the Merseyside Maritime Archives. The base consisted of a large area of concrete (24/25), measuring c. 2.80 by 5.00 m, with a square central brick setting (192), 1.30m across and approximately 0.50 m deep. Many of the hydraulic fittings and pipes were present below the concrete base within brick constructed retaining walls.

#### **3.3.2 Engine House**

Excavation in the south-eastern corner of the site revealed the foundations of an engine house, constructed c. 1875, which was first shown on the OS map of 1891. A layer of compacted red brick fragments (179) over the engine house was initially thought to be demolition rubble and was removed to reveal more of the actual wall structures but this was later re-interpreted as material deposited as make up for the engine house floor.

The excavated section of the structure was defined by three external walls (Plate 37). The north-west corner (20) comprised the western exterior wall aligned north-south and the northern exterior wall fronting on to the Manchester Dock and aligned east-west; the latter was built over the north-facing dock wall (2). A parallel north-south aligned wall (187) was present at the eastern side which, coupled with the other two walls, was provisionally interpreted as the boiler house.

The northern part of this area, beyond the area where the boilers were seated, had a solid concrete block surface (206) which measured 5.13 x 2.46 m and underlay the red brick rubble (179). In contrast, the boiler seatings appeared to be much less stable in this respect with only brick rubble and coursed bricks for support. The area containing the boilers can be split into five main blocks of brickwork - two housing the actual boilers with the other three constructed as a possible aid to support the external casings. Running from a rectangular brick enclosure, which was situated to the north of the western boiler seating, to the edge of the dock wall was a cast iron pipe. This was seated on a bed of crushed red brick (179) overlain by two courses of laid bricks. The same layout was initially visible running from the opposing eastern boiler seating.

To the east of the boiler room was an incoherent arrangement of sandstone and brick walls, coupled with a concrete lined, single-coursed, brick wall which was housing what appeared to be some kind of hydraulic feed or drainage system. Although this room is shown on plans as a

single structure, it is likely that the building had a dual function of boiler room (to the west) and hydraulic pump room (to the east).

At the eastern end of the southern dock wall the demolition of the engine house foundations were also monitored. It became apparent that a large concrete slab running approximately 5 m in length along the front of the engine house, with a width of 2.5 m and a depth of 0.25 m, constituted most of the foundation for the front part of the building. At the eastern extreme of the building was another colossal concrete block which, although not measured accurately due to the fact that it was inaccessible at the time, was around 2 m wide and 3 m deep. It is possible that the concrete blocks were a later addition to the engine house as a solution to subsidence. Overlying this was a large sandstone slab but as both were on the outer edge of the footprint for the new museum building they were not investigated further, although photographic records are available and will be studied in due course for inclusion in the final report.

During excavation of the engine house a number of metal fittings were noted; in particular a large sheet of metal lining part of the floor was observed at the point of removal and was presumably related to the boiler seatings housed within. At the eastern edge of the excavation a semi-circular metal plate was also discovered well below ground level within what was probably the pump room. This may have been associated with a hydraulic system within the engine house.

### **3.3.3 Hydraulic Chambers**

The remains of two subterranean structures provisionally interpreted as hydraulic chambers, (146 and 147) were uncovered just north of the dock wall 3 (Fig. 16, Plate 38). The chambers had been backfilled with a loose sandy silt rubble fill containing moderate amounts of 19th and early 20th-century finds including chimney pot, ceramics, window glass and drain pipe. The backfill also produced large quantities of glass bottle and stoneware vessel fragments. A representative sample of bottle bases and necks, some with the corks still in position, was retained. A short section of hydraulic pipe, c. 0.50 m long, was also found within the backfill. Both chambers were c.1.75 m deep.

Chamber 146 was the smaller of the two, measuring 2.65 m x 2.30 m. It had a double brick construction lined with plaster, both on the floor surface and walls. An iron pipe was visible at the base of the western wall while a ceramic circular pipe lay flush against the top of the same wall. Context 147 measured 3.75 x 2.80 m and had been constructed from sandstone blocks with only the walls lined with plaster. The floor was made up of large sandstone blocks with the carved masonry marks 'M' or 'W'. Iron pipes were observed at the base and top of the western wall, adjacent to cellar 146. It was unclear if these pipes passed through into the next cellar. It is likely that these cellars, or tanks, represented the subterranean foundations for a building housing a hydraulic pump mechanism associated with the dock.

### **3.3.4 Warehouses**

Brick and concrete foundations extended across the northern quayside (running the full width of the trench on an east-west alignment) and on the eastern edge of the car park directly to the north of the northern Manchester Dock wall 3 (Fig.16). According to map evidence, these were used as warehousing and date to the second half of the 19th century and will be described more fully in the final report.

## **3.4 Phase IV: Dock Infilling (late 1920s-early 1930s)**

The disuse of Manchester Dock in the 1920s was followed by infilling with waste from the excavation of the first Mersey road tunnel in the late 1920s and early 1930s. This consisted of throughout of crushed brownish red sandstone. The material was clean and contained very few finds but included a metal sign. The consistency of the material as it was observed at the start

of the watching brief together with the documentary evidence recording its origin from tunnel excavations meant that this material was not considered a priority for examination in detail.

### **3.5 Phase V: Post-Dock Structures**

A set of concrete and brick foundations uncovered in the far northwest corner of the site was identified as the 'River View Rest Room' on the 1953 OS map, originally built as a fire station during World War II.

## **4. Finds and Environmental Samples**

Finds from the excavation are currently being processed (August 2008) and consist of the following categories:

- 18th, 19th and 20th-century ceramics, clay tobacco pipes and manufacturing waste, glass, building material, leather, wood, animal bones, oyster shells, coins and tokens, ferrous fittings and hydraulic pipes.

The ceramics included a large quantity of sugar mould fragments, an important collection, considering the range of shapes and sizes of vessels recovered.

No environmental samples were taken during the excavation. However, once the clay tobacco pipe dumps were identified, a specialist opinion was sought from Dr David Higgins on the most appropriate methodology to maximise the yield of information on the manufacturing process. Accordingly, numerous soil samples were taken from material in the clay tobacco pipe dumps, in particular 266, in order to conduct analyses from the material to gain further evidence for manufacturing techniques.

The ceramics in contexts 215 and 235 will probably yield the most information with regard to dating and furthering the history of the site as a whole. Indeed, it has already been established that some of the multiple sherds of black transfer-printed creamware from Staffordshire, excavated from the first major ceramics deposit 215, can be dated accurately to c. 1800. Additionally, found within the same context was a halfpenny of George III dated 1799 (SF1590) and a probable Lancaster halfpenny token of the last decade of the 18th century, showing John of Gaunt (SF1591). Two other coins from the same deposit require cleaning to be legible. Expert analyses of pottery fragments will be undertaken before submission of a full report.

A more detailed appraisal of the significance of these finds appears in Appendix A.

## **5. Conclusions**

The results of the excavation were consistent with the findings of the desk study which concluded that the area had remained part of the River Mersey foreshore until about 1800 when Mann Island was extended westwards into the river. Consequently the earliest deposits found related to the reclamation of land from the river at the beginning of the 19th century.

Manchester Basin was originally constructed around 1785 by the Corporation of Liverpool for the use of barges and flats which, by this stage, had come to need a more readily available mooring point due to a growth in river traffic (Ritchie-Noakes 1984, 35). It had been altered substantially by 1807-8 when the entrance lock and gates were added to convert it to an enclosed dock. Chester Basin was constructed in 1795 to ease some of the river barge traffic converging on the Manchester Dock and was extended westwards at about the same time as Manchester Dock.

A north-south aligned wall c. 2 m thick and extending the full length of the excavation probably represented the waterfront constructed c. 1803. However, the stratigraphic evidence suggests that this was never completed and that around 1804-7 the plans were revised to include lock gates for Manchester Basin to convert it to a dock and a further extension of the waterfront into the Mersey.

The area behind the new walls was infilled with a wide range of material. The lower levels principally consisted of clays and silts which was probably material derived from the excavation of the new dock and lock. However, this would eventually have been exhausted as the base of the new dock was reached. The clays were sealed by more mixed deposits including large quantities of sands and gravels which were probably river dredgings and demolition material from central Liverpool and the docks. The latter deposits contained large dumps of pottery from Liverpool and Staffordshire including a large group of sugar moulds and evidence for the manufacture of clay tobacco pipes. The use of this material, which was not ideal, was probably a result of the shortage of backfill in Liverpool in the late 18th and 19th century. For example in 1810 the Surveyor responsible for building George's Dock and the Dry Dock reported that he had been unable to obtain sufficient earth ballast or rubbish to backfill behind the walls which were consequently being constantly damaged by the effects of tides and storms due to the lack of supporting material (Ritchie-Noakes 1984, 103).

The excavation found that the entrance lock and dock walls of Manchester Dock, had survived in a good state of preservation. Many of the associated dock fittings had also survived intact along with the foundations of sheds and other buildings including an engine house which was built in 1875 by the Great Western Railway Company. An apsidal-shaped building immediately west of the engine house is recorded on contemporary plans as the dock gateman's house; however, very little of this survived.

Subterranean features included two chambers, probably relating to the hydraulic mechanisms driving the crane and other dock equipment which was situated on the north quayside, and four lock gate mechanism chambers, which led to tunnels exiting in the lock. Additionally, at least one sluice mechanism chamber was uncovered on the south quayside at the western edge of the trench.

## **6. Recommendations for Further Work**

Beyond minor revisions, the structural narrative is largely completed and the bulk of the remaining work relates principally to an assessment of the socio-economic context of the dock, engineering aspects of the dock, a review of the extant documentary evidence, revisions to drawings and analysis and recording of the large finds assemblage. A detailed schedule of further work will be the subject of a separate document. Further work will include the following:

### **6.1 Documentary Research**

Examination of the observations recorded in the remainder of the eastern part of the dock during construction of the Neptune Development and the construction of the canal link, projects undertaken by Oxford Archaeology North, will enable an assessment of the construction techniques and materials for the whole of the dock walls and the production of an integrated report covering the whole dock excavations.

Some archives relating to Manchester Dock are likely to be held in the Ellesmere Port Boat Museum archives which has a transcript from the Shropshire Union records made by Alf. Hayman in 1982 and this relates to the activities of the Shropshire Union Canal and the Mersey & Irwell Navigation Company in Liverpool docks (M. Stammers pers. comm.).

Other papers relating to Manchester Dock may be held in the Duke of Bridgewater's records archived at the Clifford Whitworth Library at Salford University. The largest part of the collection concerns the purchase of land for the Bridgewater Canal, though there is quite a large section devoted to the Duke's dealings with Liverpool. Most probably relates more to the Bridgewater Dock but there may be some details about Manchester Dock as the Bridgewater Canal took it over later. There may also be papers in the archive at Manchester Library, as they have some records of the Mersey & Irwell Navigation (Mike Clarke pers. comm.)

## **6.2 Review of Structural Narrative**

Some sections, in particular relating, require further detail. The engineering and technical aspects of the dock and 19th-century quayside structures should be discussed.

## **6.3 Revisions to Drawings**

Drawings presented with this report are provisional and require more detail. Furthermore, data gathered from laser scans of the docks require further processing before they can be used in the publication and in presentations.

## **6.4 Finds Reporting**

Considerable further work is required in analysis of the finds assemblage, in particular in relation to the ceramics and clay tobacco pipes. This comprises the major part of the post-excavation analysis and is detailed in Appendices A and B.

## **6.5 Publication and Dissemination**

The structural remains and the artefactual assemblages are of considerable importance, and in some cases are of international significance. Professional archaeological standards require dissemination of the results of excavation with minimum standards of reporting set out in documents such as the IFA *Standard and Guidance for Archaeological Excavation* (IFA revised edn 1999, 6), English Heritage's *Management of Archaeological Projects* (EH 1991, 39-41).

Detailed publication of the structural remains, the key finds assemblages and the historical evidence for the docks is a high priority. Ideally this should be undertaken as an integrated study in conjunction with Oxford Archaeology North who have undertaken the archaeological work on part of Manchester Dock and Cheshire Basin as well as on the wider docks along the Liverpool waterfront.

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Troughton T. 1810 *The History of Liverpool, from the earliest authenticated period down to the present time*, William Robinson, Liverpool.

Wilkinson C. 1993 *The Streets of Liverpool – A Photographic Record*, The Bluecoat Press, Liverpool.

### **Maps and Other Cartographic Evidence**

1725 J. Chadwick 'The Mapp [sic] of all the Streets, Lanes & Alleys within the Town of Liverpool'.

1765 John Eyes's Plan of Liverpool, with elevation of Town Hall in top right-hand corner.

1765 John Eyes's 'Plan of the Town and Lordship of Liverpool...shewing (sic.) the land held by leases under the Corporation' (Corporation Estates plan).

1769 George Perry's Survey Plan of the Town and Port of Liverpool.

1785 Charles Eyes's Plan of Liverpool

1796 John Gore's Plan of Liverpool.

1803 R. Horwood's Plan of Liverpool.

1807 G. Cole and J. Roper, 'Liverpool' produced to accompany the series *The Beauties of England and Wales; Or, Original Delineations, Topographical, Historical and Descriptive, of Each County. Volume IX Lancashire, Leicestershire and Lincolnshire*, J. Britton ed., pub.1807.

1816 Thomas Kaye 'Plan of Liverpool', published for the guidebook: *The Stranger in Liverpool*.

1823 J. & A. Walker 'A Plan of Liverpool and the Environs, Containing the Latest Improvements'.

1823-1824 William Swire 'Liverpool and its Environs'.

1829 Liverpool, published for the guidebook: *The Stranger in Liverpool*.

1836 M. A. Gage 'Map of the Town and Port of Liverpool'.

1841 Bennison 'Liverpool from an actual survey'.

Ordnance Survey 5 feet: 1 mile, Liverpool Sheets 23, 28 and 29, surveyed 1848, published 1850.

Ordnance Survey 6 inch: 1 mile, Sheet 106, surveyed 1845-49, published 1851.

Ordnance Survey 10 feet: 1 mile, Sheets CVI.14.6, CVI.14.7, CVI.14.11, CVI.14.12, surveyed 1890, published 1891.

Ordnance Survey 25 inch: 1 mile, Sheet 106.14, surveyed 1890, published 1893.

Ordnance Survey 25 inch: 1 mile, Sheet 106.14, resurveyed 1889-90, revised 1906, published 1908.

Ordnance Survey 25 inch to the mile, Sheet 106.14, revised 1924, re-levelled 1925, published 1927.

**8. Figures**



Fig. 1. Site location and extent of excavated area.

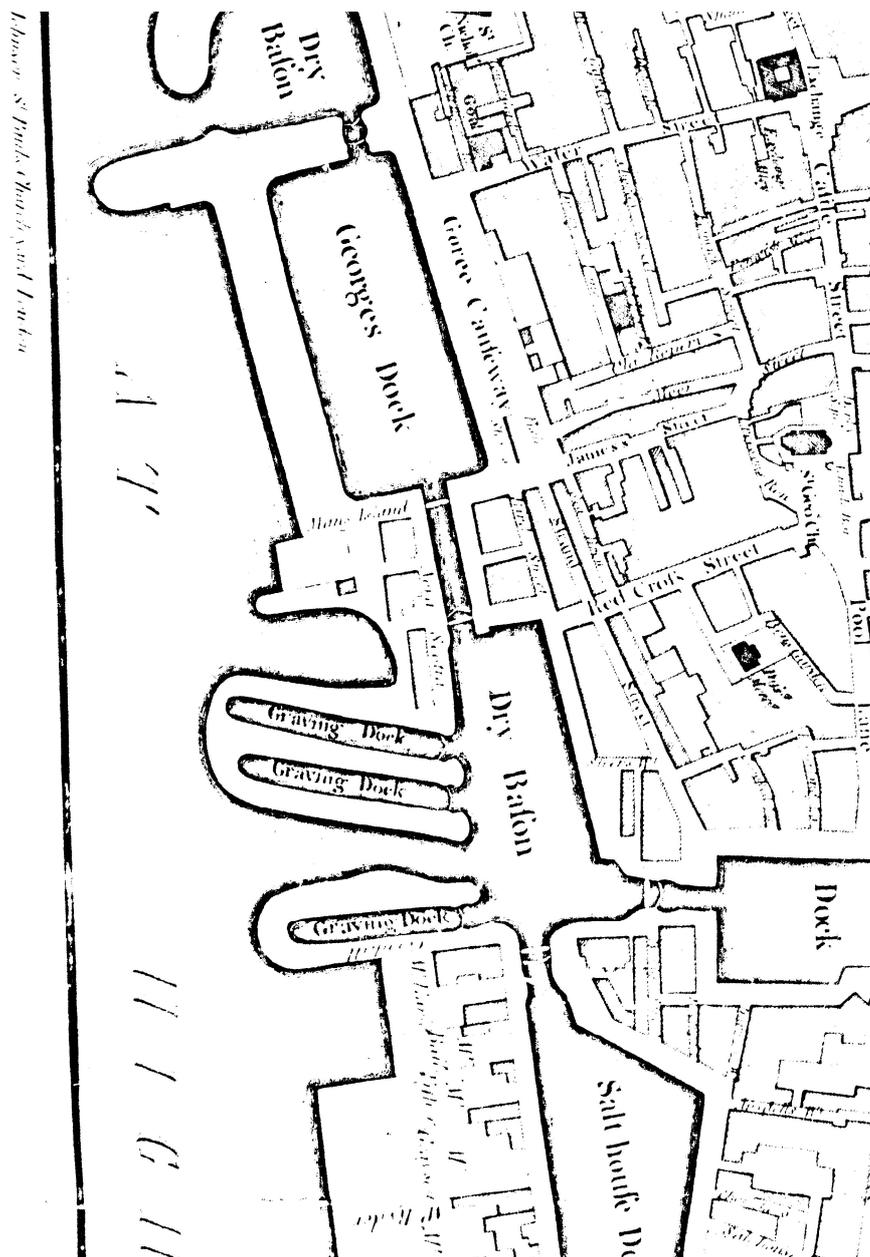


Fig. 2. Part of Charles Eyes's Plan of Liverpool, 1785.

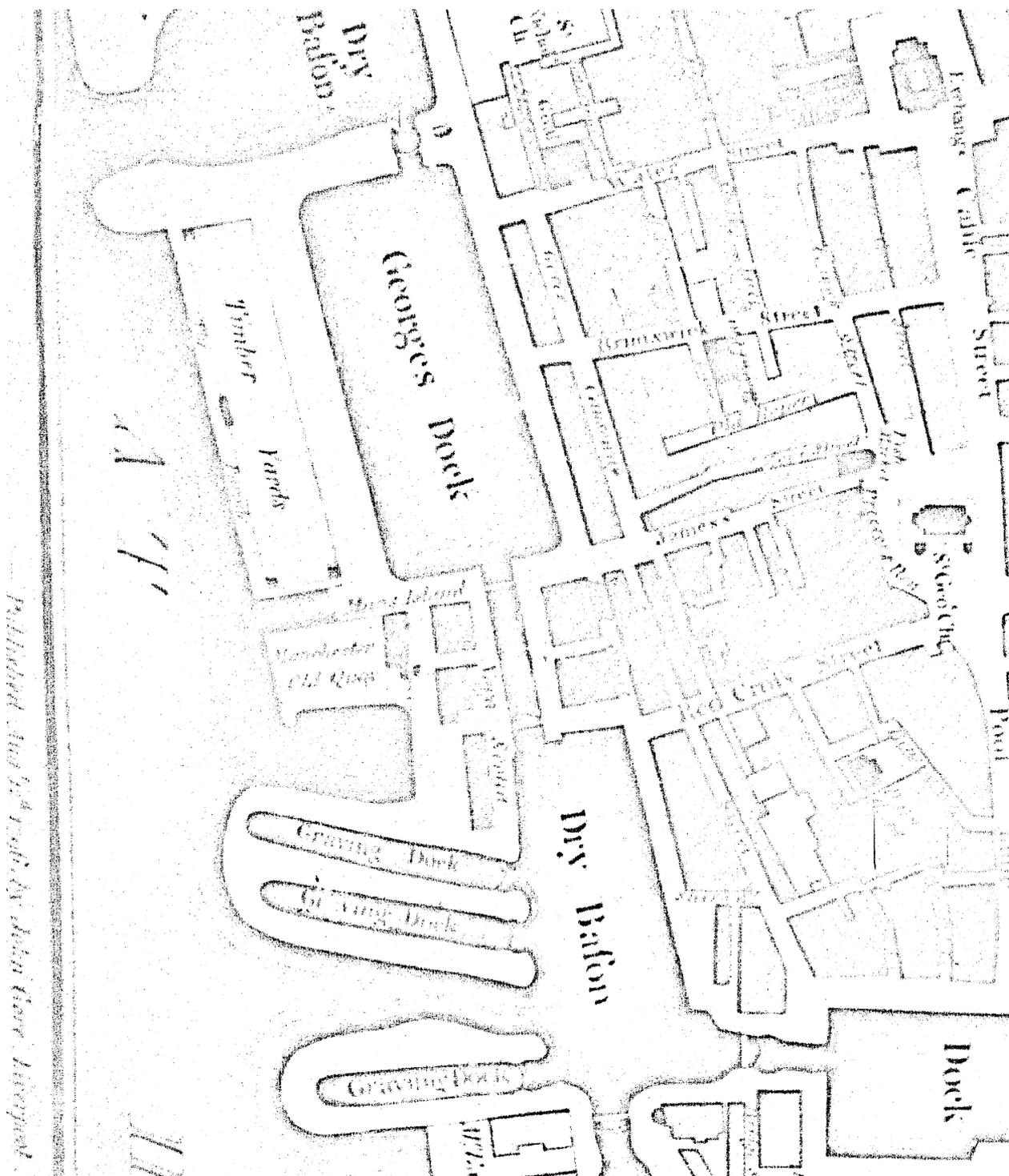


Fig. 3. Part of John Gore's Plan of Liverpool, 1796.



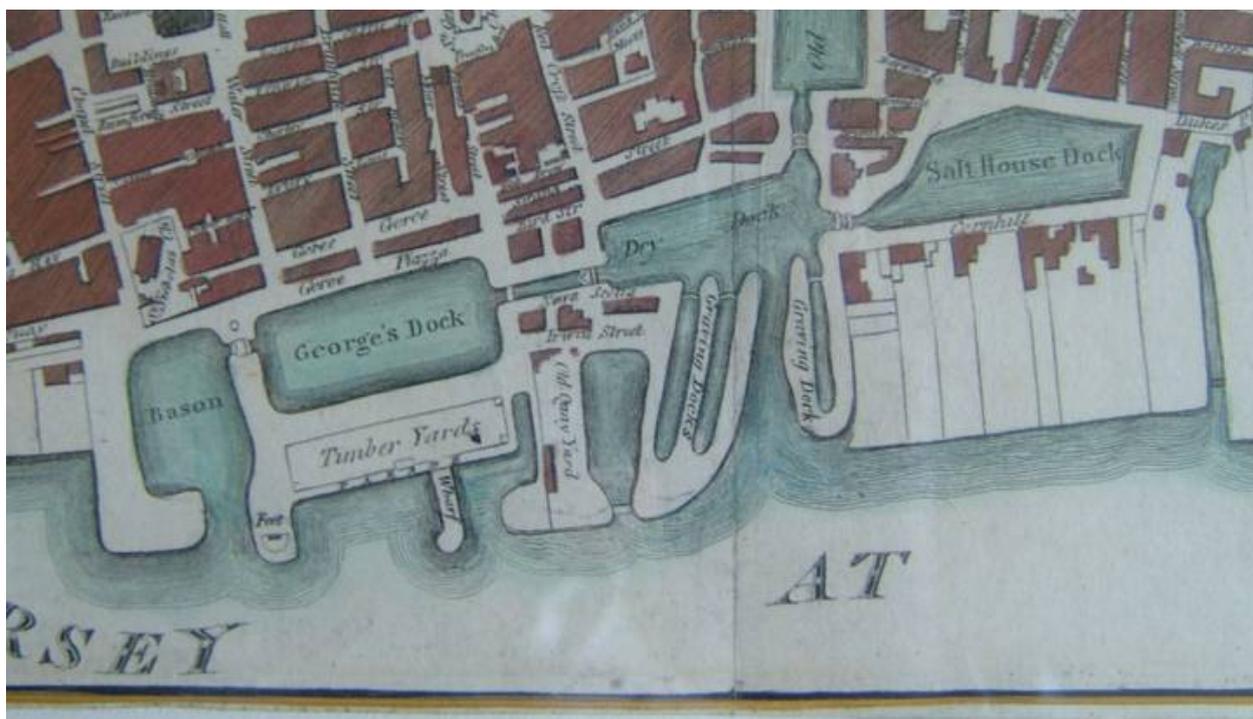


Fig. 5. Part of Gore's Map of Liverpool 1804 (courtesy Richard Hawes). This is the first map to show an entrance lock on Manchester Dock.



Fig. 6. Part of a map of Liverpool included with the 'Picture of Liverpool' published in 1805 (courtesy Richard Hawes).



Fig. 7. Part of 'Plan of Liverpool', by T. Troughton, engraved by S.J. Neele, Strand, London, and published 1 September 1807, Liverpool (courtesy Richard Hawes).

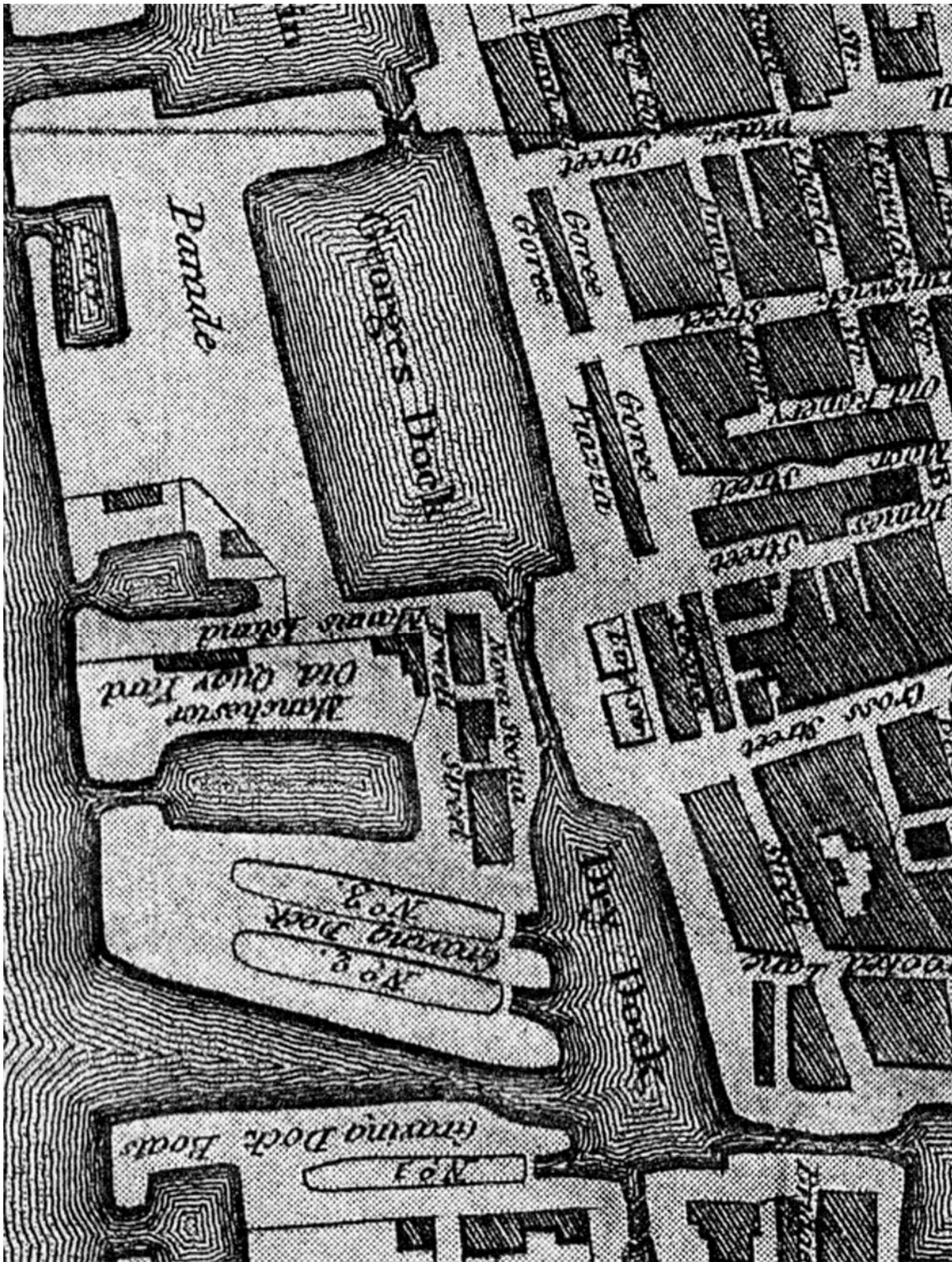


Fig. 8. Part of Kaye's 'Plan of Liverpool with the Environs', 1816.

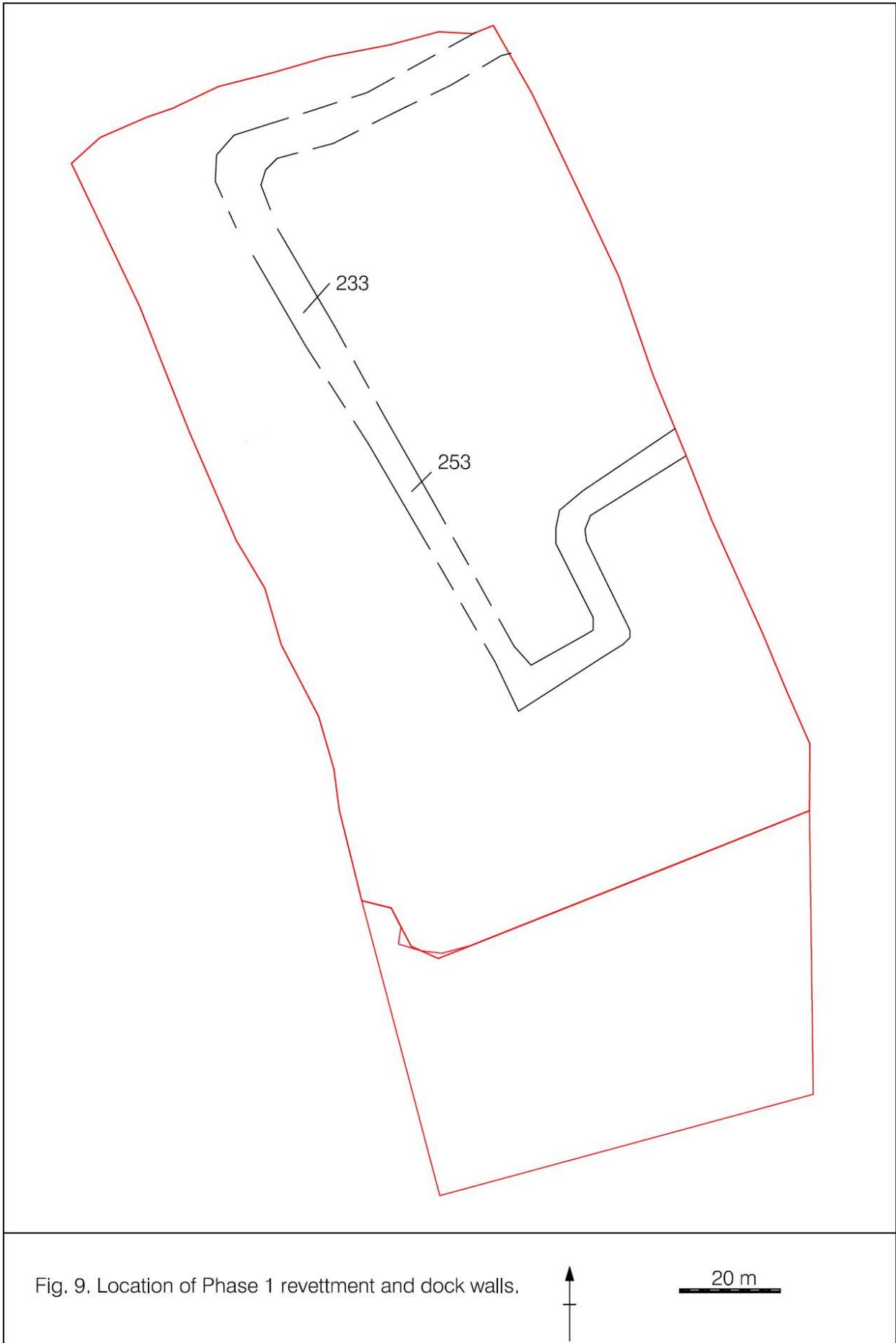


Fig. 9. Location of Phase 1 revetment and dock walls.

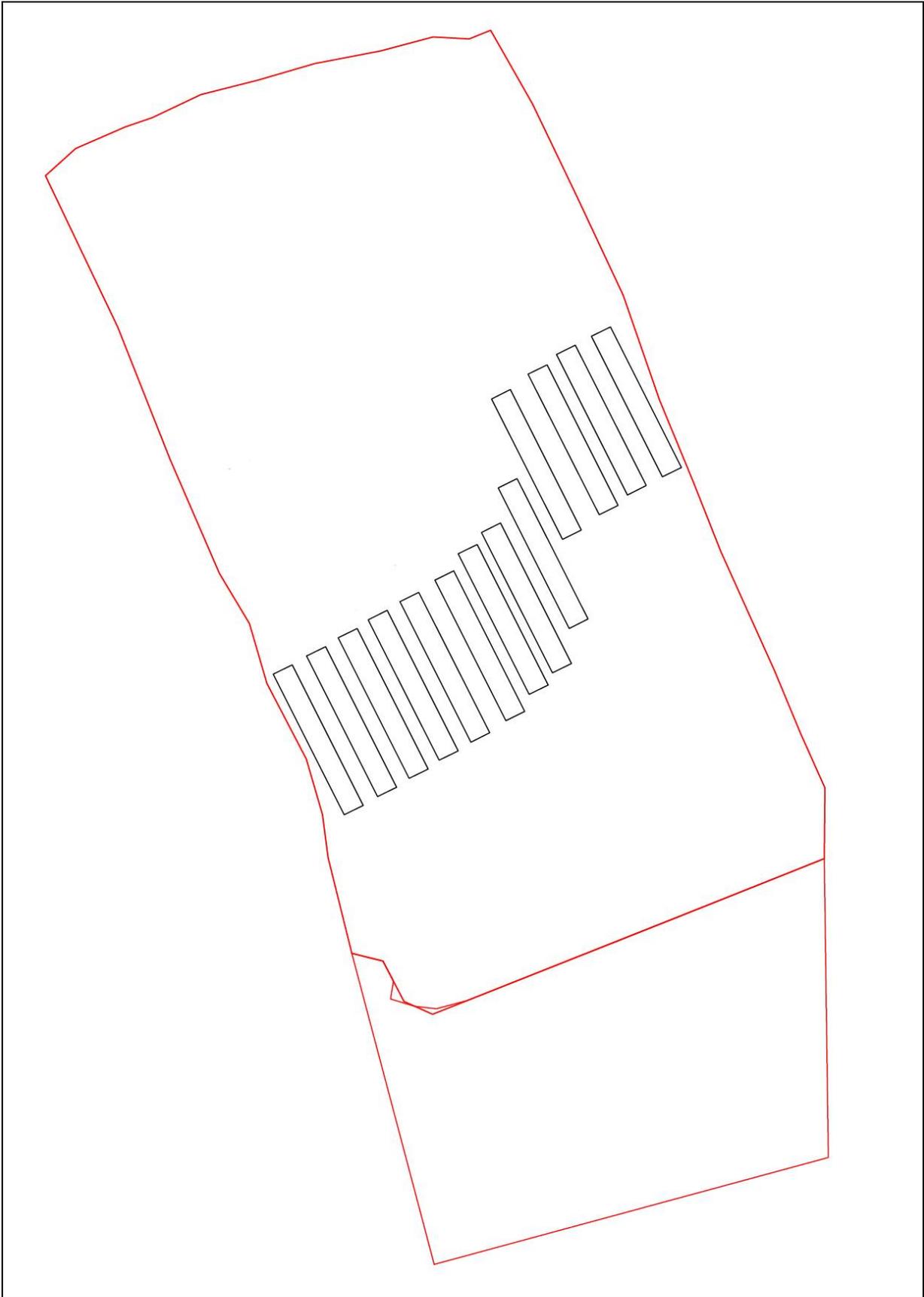


Fig. 10. Location of ground improvement trenches.

20 m

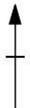




Fig. 11. Phase II Dock walls.





Fig. 12. Detail of eastern entrance lock gates.

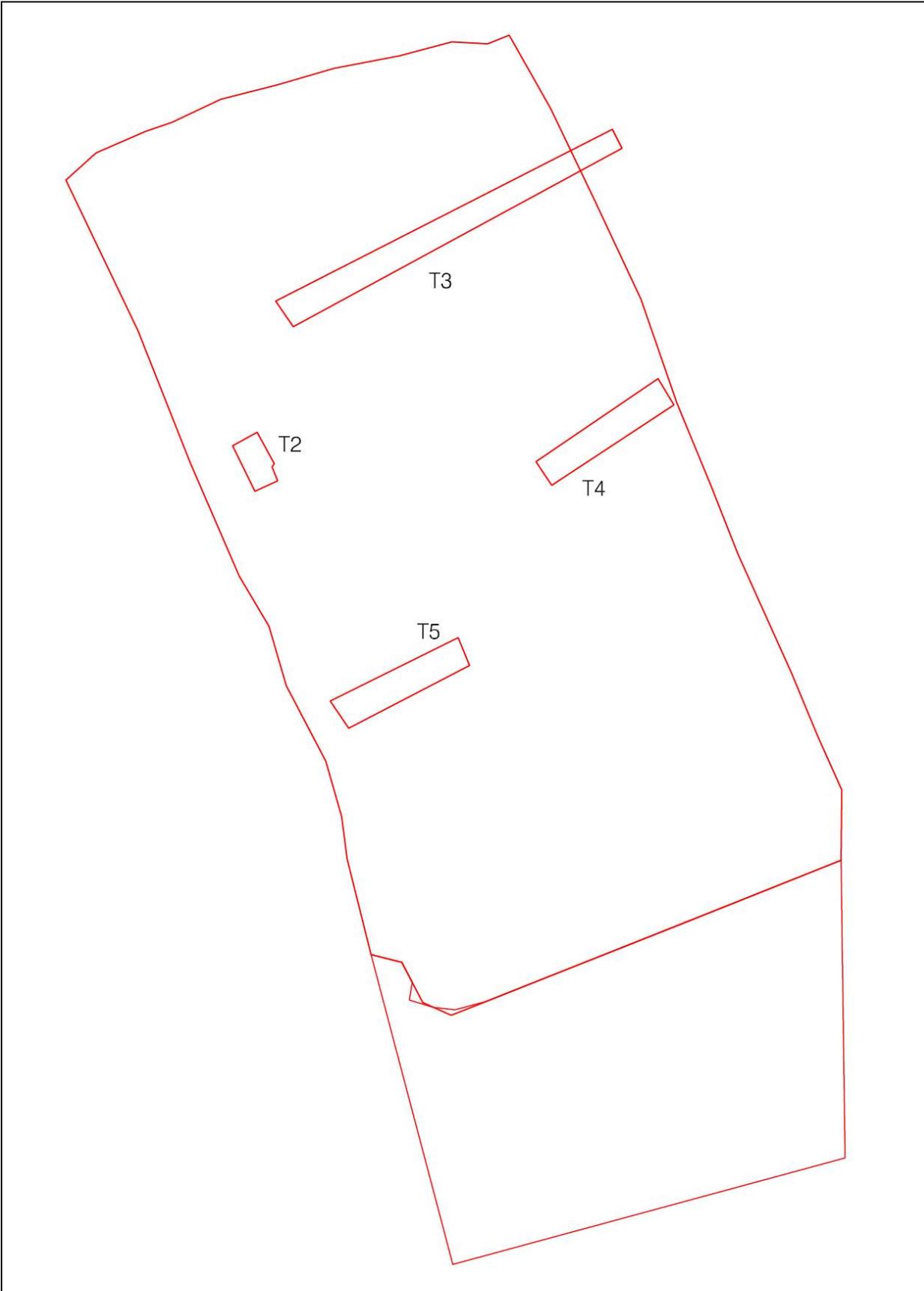


Fig. 13. Location of test-pits.



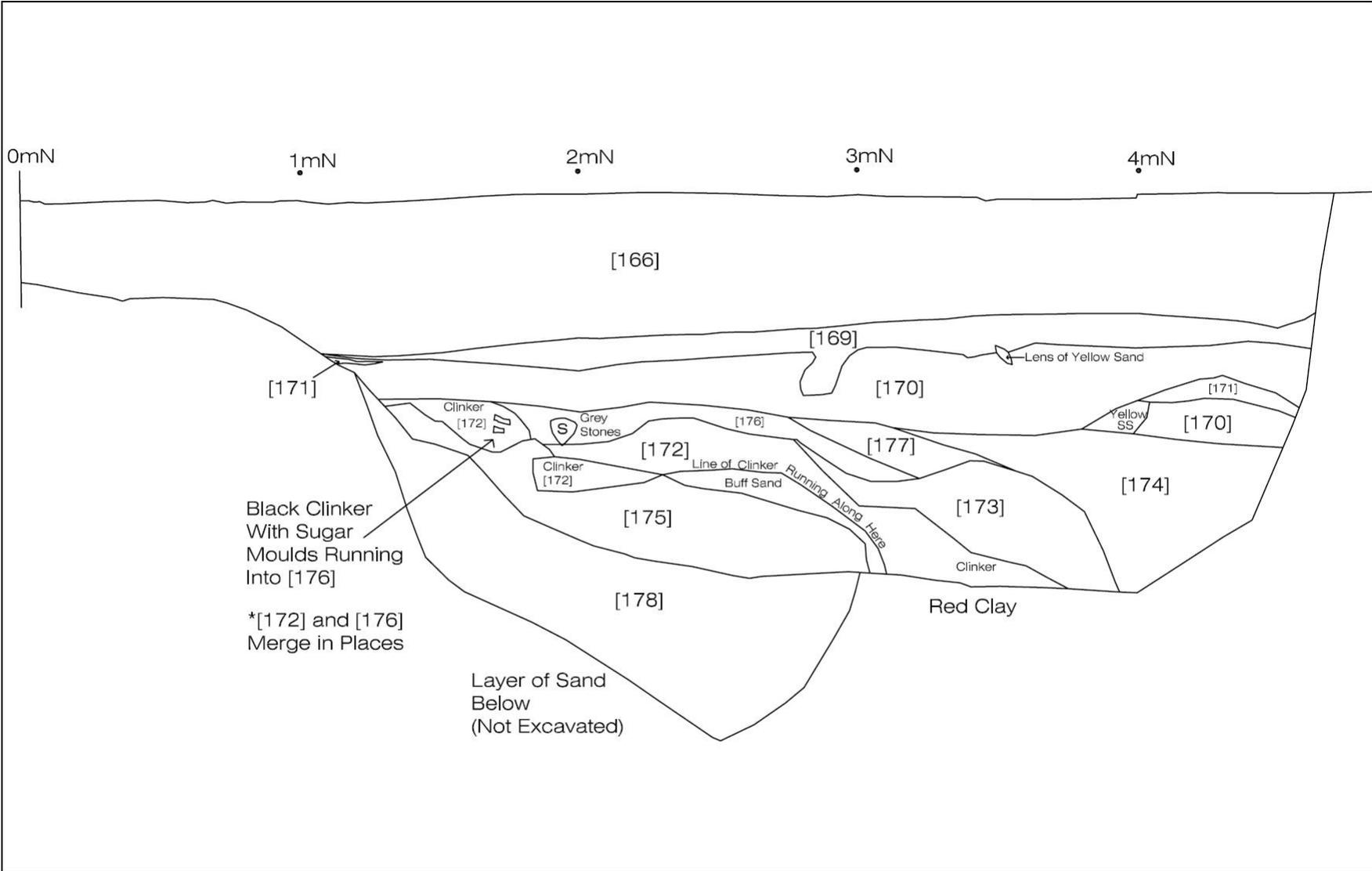


Fig. 14. Trench 2, west facing section.

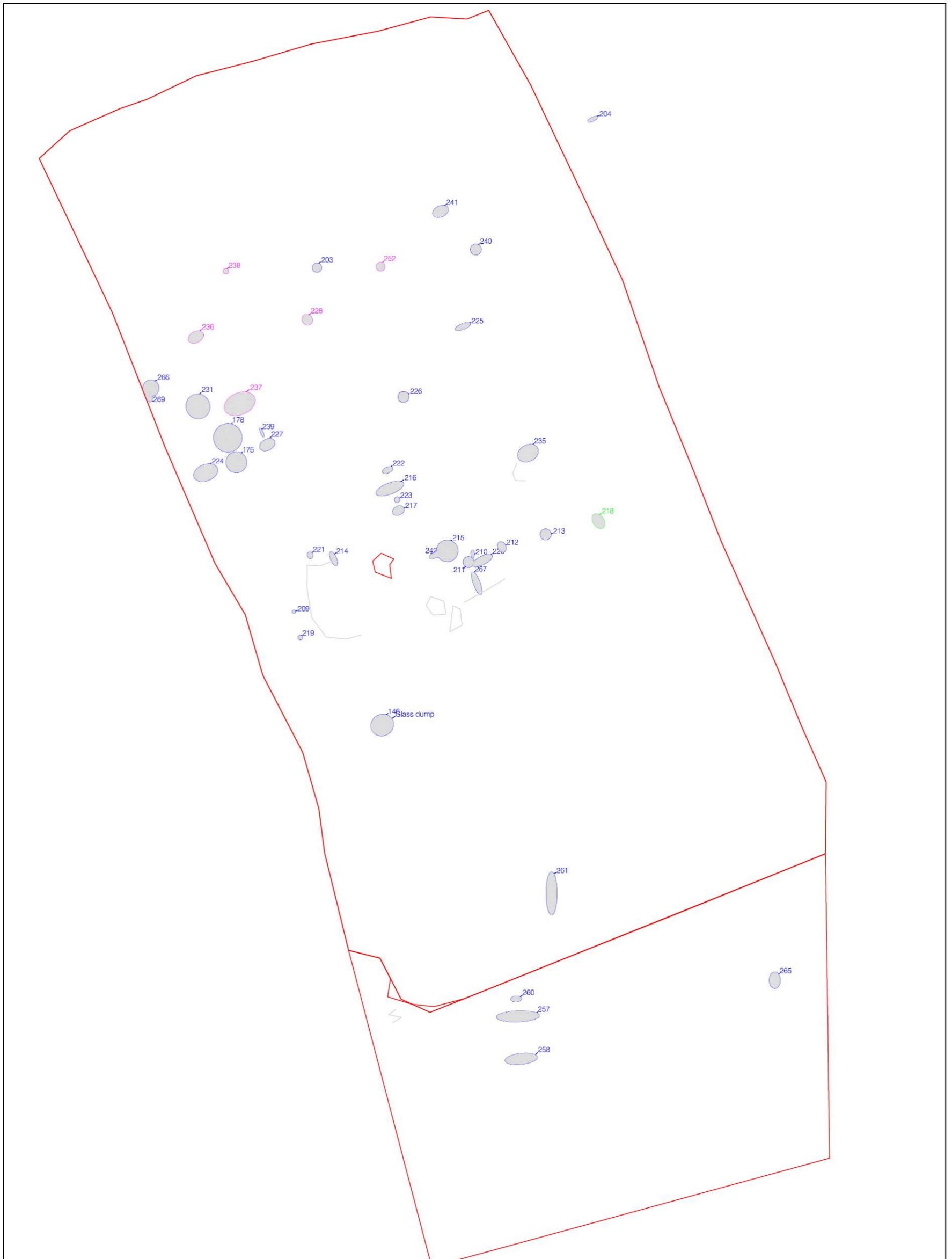


Fig. 15. Location of ceramic dumps.

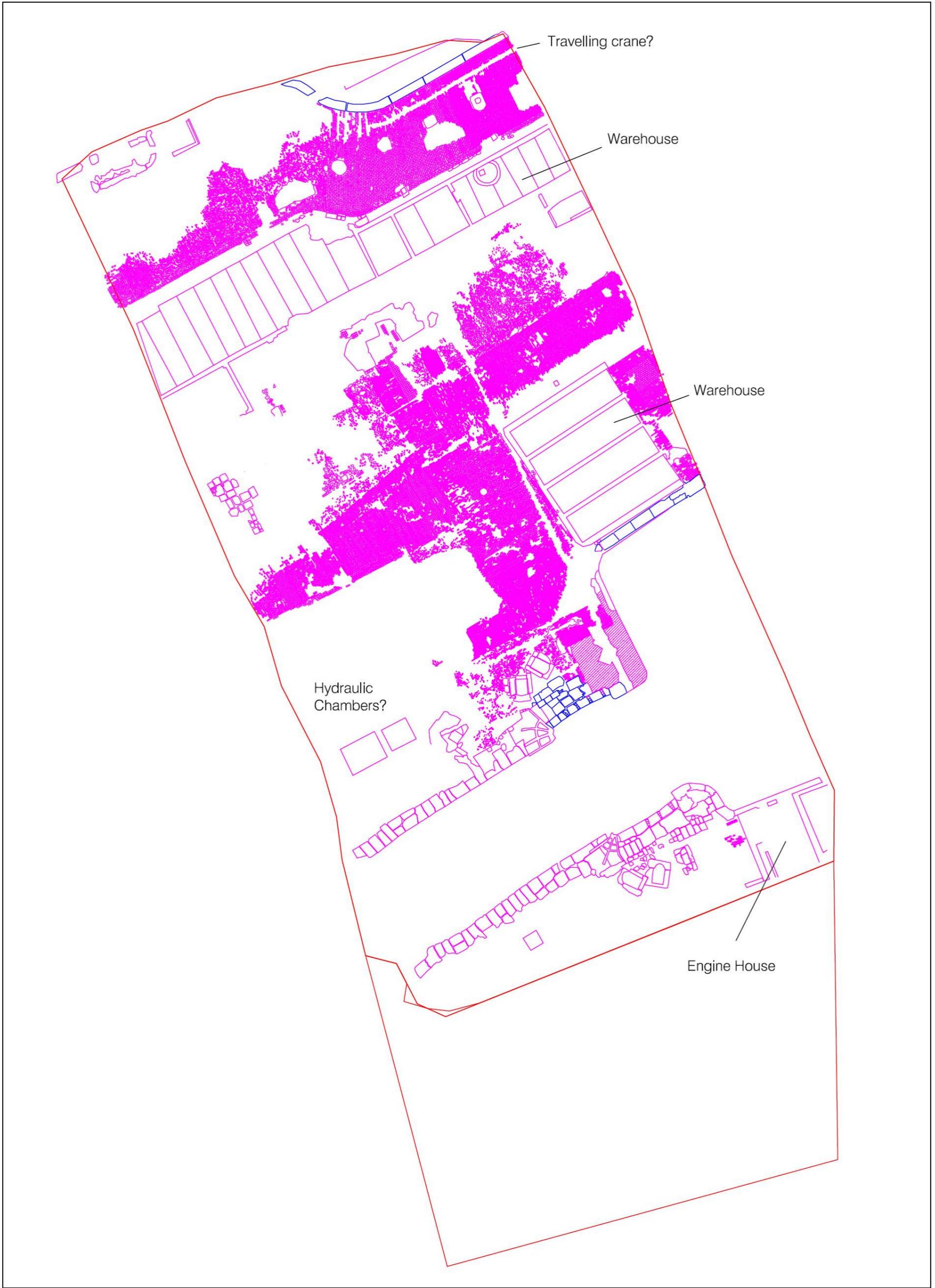


Fig. 16. 19th century quayside structures.



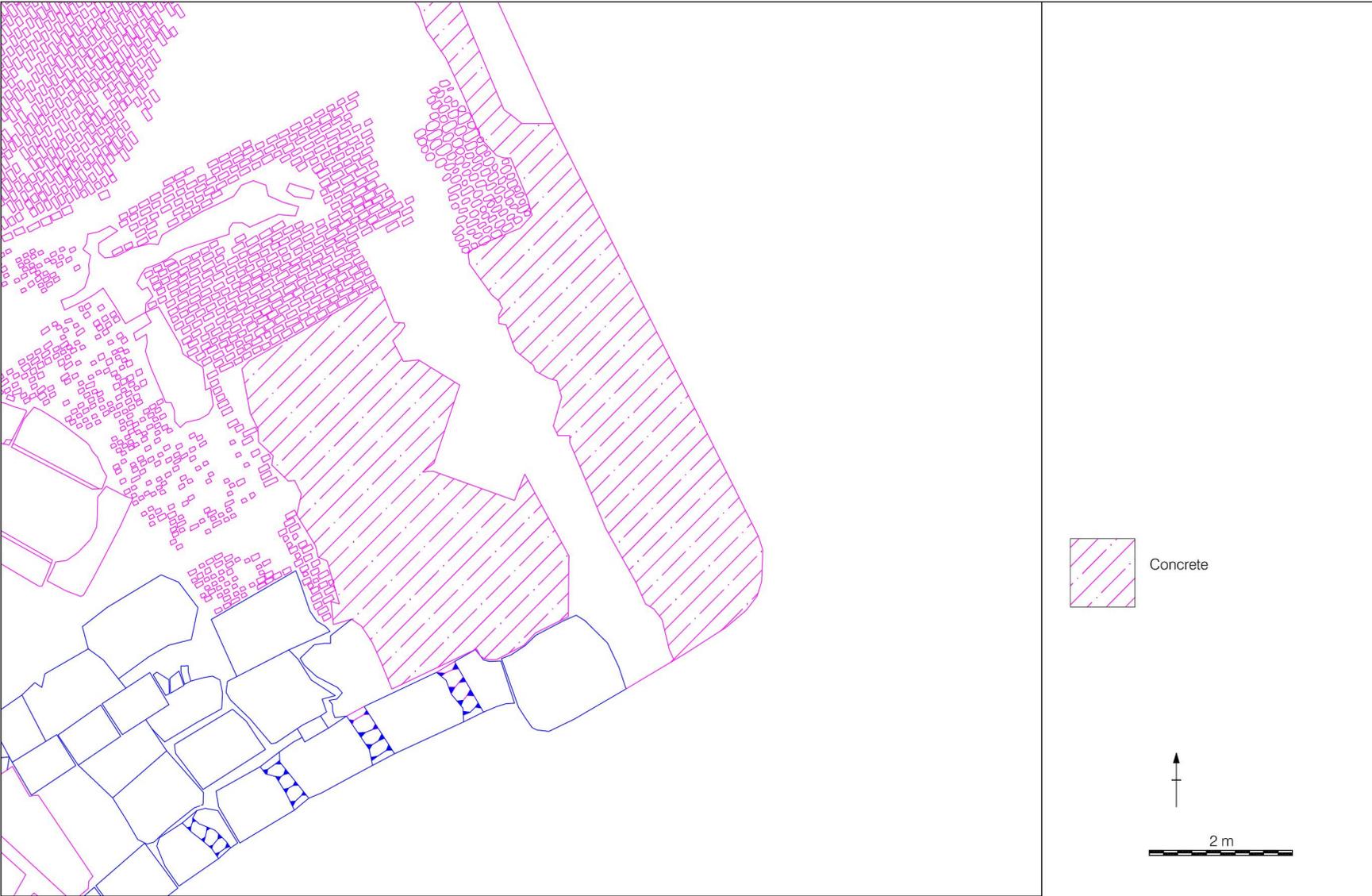


Fig. 17. Detail of concrete crane base.

**9. Plates**



Plate 1. South facing elevation of north wall of Manchester Dock showing the brick and stonework of c. 1785 on the right-hand side and the masonry of the westward extension to the left.



Plate 2. Rear elevation of north wall to Manchester Dock showing the junction between the soft yellow sandstone of the 1803-7 extension and the earlier work of c. 1785 to the east. The upper brickwork courses relate to a later 19th-century warehouse.



Plate 3. Ground improvement trenches from the north. The northern elevation of the north dock wall is visible in the rear ground showing the use of soft yellow sandstone to the west indicating the westwards extension of 1803-1807.



Plate 4. View looking south-west into to the angle between the south wall of Manchester Basin and the entrance lock. The more work to the left with putlog holes probably relates to the work of 1785. That to the right is probably of 1803-7 but features evidence of extensive repairs.



Plate 5. View of standing section of the 1803 waterfront (Context 233) from the south-west. The section to the north shows the deposits which sealed the wall and which seal the unexcavated section (Context 253). Note the tip lines which show that these were deposited from the riverward side of the site.



Plate 6. The 1803 waterfront (Context 233) under excavation showing its relationship with adjacent deposits.



Plate 7. Detail of west facing elevation of the 1803 waterfront.



Plate 8. Aerial view of the entrance lock to Manchester Dock.



Plate 9. Manchester Dock entrance lock from the west.



Plate 10. The eastern end of Manchester Dock entrance lock from the south-east.



Plate 11. The eastern end of Manchester Dock entrance lock from the north-east.



Plate 12. North facing elevation of south wall of Manchester Dock entrance lock from the north.



Plate 13. South facing elevation of north wall of Manchester Dock entrance lock from the south. Detail of the lock gate recess, note the use of higher quality masonry than that in Plate 12.



Plate 14. Examples of masons' marks on Manchester Dock entrance lock.



Plate 15. Timber depth gauge, with depth to sill marked in feet, fixed to north wall of entrance lock.



Plate 16. Plan view of the eastern lock gate recesses, west is at the top of the frame. The top of the lock gates are just visible pointing east. The iron stays for the heel posts are at the top of the frame.



Plate 17. View of the lock gates looking north showing the arched front.



Plate 18. Upper section of the lock gate heel post.



Plate 19. East facing side of the lock gates, central section.



Plate 20. Detail of staple which fixed the chain used to open the gate projecting from east face of lock gate.



Plate 21. Eastern lock gates from the west.



Plate 22. Timber gate stop 157 on southern lock gate recess and outlet for gate operating chain with rollers.



Plate 23. View of lock gate operating mechanism housings 10 and 11 on the north side of the eastern entrance lock.



Plate 24. View of lock gate operating mechanism housings 8 and 9 on the south side of the eastern entrance lock.



Plate 25. Detail of lock gate operating mechanism housing 8 from the north-west.



Plate 26. Detail of lock gate operating mechanism housing 8 from the south-east. Note the unfinished edge to the northern side which suggests that there had been some collapse on that edge.



Plate 27. Detail of chain roller in gate operating mechanism 9. Note the grooves worn in the roof by the chain.



Plate 28. Detail of winch chamber showing settings for iron bars or grill and scarring from gear wheel.



Plate 29. Truncated sluice shaft 263 view looking south.



Plate 30. Top of sluice operating mechanism shaft 151.



Plate 31. Timber sluice gate in place in sluice operating mechanism shaft 151.



Plate 32. Part of the southern wall of Chester Basin looking west.



Plate 33. Typical example of upper back fill deposits.



Plate 34. North facing section through pottery dump 215 showing tipping from the landward (east) side.

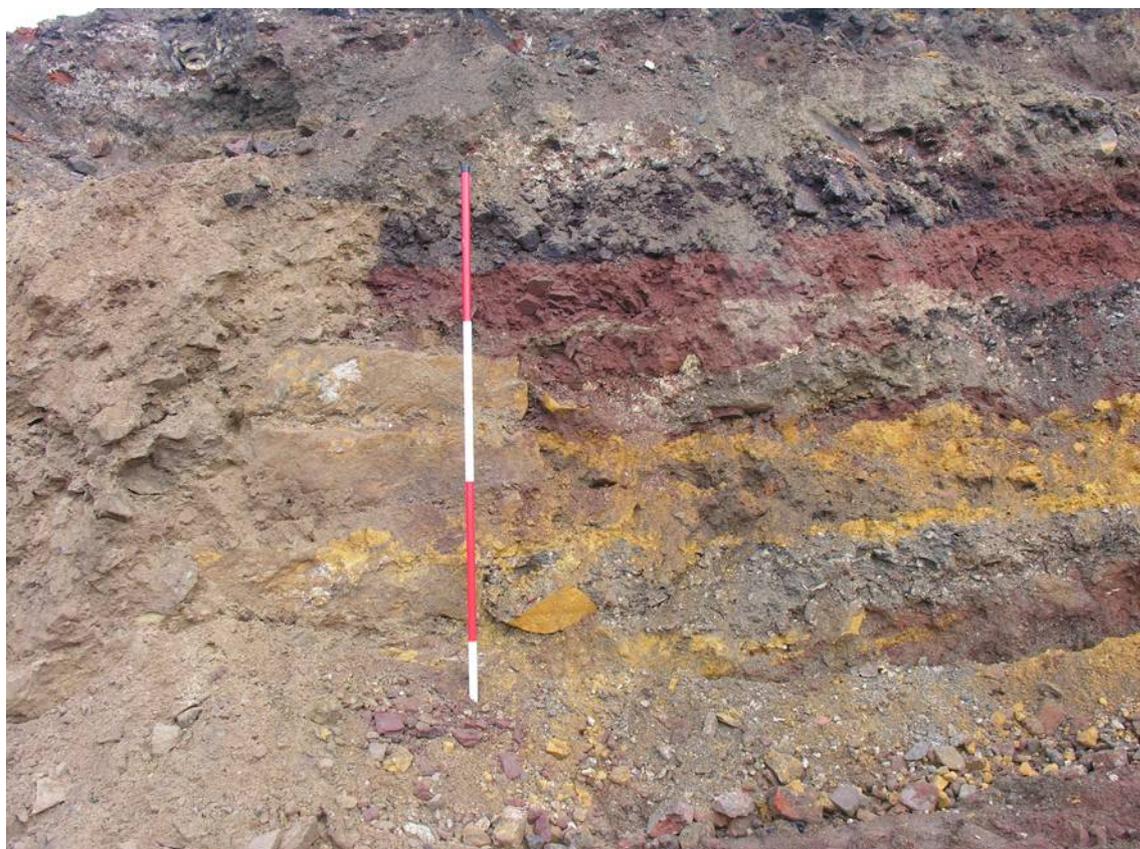


Plate 35. In fill to the west of wall 233 which is exposed in section behind the scale. Compare with Plate 6 which shows the fill to the east.



Plate 36. View of Manchester Dock quayside looking north



Plate 37. The engine house from the east.



Plate 38. Hydraulic chambers viewed from the west.

## **Appendix A: Manchester Dock, Liverpool (Mol 97): Clay Tobacco Pipe Assessment. Dr D. A. Higgins**

### **A1: Background**

1.1 This assessment considers the clay tobacco pipes recovered by NML Archaeology at the National Museums Liverpool from excavations on the site of the former Manchester Dock, Liverpool, which were carried out during 2007 (Site Code MOL 97).

1.2 In their *Research Priorities for Post-Medieval Archaeology* the *Society for Post-Medieval Archaeology* has identified the systematic collection of pipes as an area of particular importance where more work is needed (Anon 1988, 6).

1.3 The *Bibliography of Clay Pipe Studies* (Atkin 1989) lists only one Liverpool excavation from which pipes have been published, and that site was excavated some 30 years ago. The published site produced material that primarily relates to just one period and it is still the only group of excavated pipes to have been published from the city. Recent excavations elsewhere in the city have produced good assemblages of pipes, including kiln waste, but these have not yet been studied or published.

1.4 In his list of Liverpool pipemakers, Oswald lists some 206 manufacturers who are known to have worked from the seventeenth century onwards (Oswald 1975, 177-180). More recent work has increased this number to well over 300. By the time of the 1831 Census, 17.4% of all British pipemakers were recorded in Lancashire (which then included Liverpool), the highest county total for anywhere in Britain (Cessford 2004, 8-9).

1.5 A brief review of overseas publications has shown that marked pipes from Liverpool have been found all over the World, with examples having been recorded from places as diverse as Poland, Newfoundland, Canada, the United States, the Caribbean, Argentina, Africa and Australasia.

1.6 Although it is clear that Liverpool was a pipemaking centre of national and international significance, there has been no systematic survey of the pipes produced in the city and only one excavated group has ever been published – and that was recovered 30 years ago. Given the international significance of Liverpool as a pipe production and trading centre, this assemblage offers the potential to not only help interpret the archaeology of the site but also to establish a framework for one of the most important but least studied pipemaking centres in the whole of the British Isles.

### **A2: Quantification**

2.1 The excavations produced a total of approximately 17,500 fragments of pipe and kiln waste in total, comprising approximately 10,200 fragments of clay tobacco pipe and 7,300 fragments of tobacco pipe kiln debris from a number of discrete deposits. Almost all of these deposits occurred as closely dated fills of c. 1805 within the former Manchester Dock, and most of the fragments are from deposits of production waste that had clearly been dumped from nearby kiln sites. These comprise the largest groups of kiln waste ever to have been recovered from the city and, from the maker's marks on the pipes, they can be associated with named manufacturers operating at a time when Liverpool products were being exported all over the world.

### **A3: Methodology**

3.1 The pipes from this site were rapidly scanned and assessed during the spring of 2008. The contents of each of the finds bags were briefly examined and estimates made of the numbers of pipe and kiln waste fragments present. A preliminary note has also been made of the range of marked or decorated pieces present.

#### **A4: Evaluation**

4.1 Clay tobacco pipes had a very short life expectancy and no recyclable value once they were broken. They were also subject to rapid stylistic evolution and many of them were marked or decorated. These characteristics combine to make pipes one of the most sensitive and accurate means of dating archaeological deposits. These excavations were primarily dealing with deposits relating to the Post-Medieval development of Liverpool, and the pipe evidence will be of prime importance in providing a window not only onto the nature of pipe manufacturing in the city at this time but also onto the range of products that was being produced and marketed both regionally and internationally.

4.2 The excavations produced a total of some 17,500 fragments of clay tobacco pipe and kiln waste, almost all of which were recovered from stratified archaeological deposits. The majority of the material is in fresh and unabraded condition and it is of particular significance because of the close dating provided its context. The former Manchester Dock was backfilled and sealed within a year or two either side of 1805, thus providing a 'time capsule' for these finds, and placing them in importance alongside groups such as the 1692 earthquake horizon from Port Royal, Jamaica, or the Great Fire deposits of 1666 from the City of London.

4.3 By the end of the eighteenth century moulded decoration on pipe bowls had become extremely common and a wide variety of regional patterns and designs were produced. The excavations have produced large numbers of highly decorated pipe bowls, which can be accurately dated to c1805. Decorative motifs include a range of Masonic emblems as well as Liver birds, the symbol of Liverpool. There are also popular slogans of the day, such as 'Peace and Plenty' as well one design commemorating the Duke of York.

4.4 Specific styles of pipe were certainly made for the various export markets by manufacturers in the principal ports, such as London and Bristol. Given the importance of Liverpool as a trading centre, specific export styles ought to have been produced here as well and this assemblage includes a range of pipes that were clearly being made for the export markets. Many of designs represented here were specific to the Liverpool area and these examples will provide an important reference point for researchers around the world.

4.5 Several large deposits of tobacco pipe kiln waste were encountered during the excavations. These are not only closely datable but also include maker's marks relating them to specific workshops. These marks not only allow positive identification of the source of the waste but will in themselves also provide important reference material for the identification and dating of Liverpool products found elsewhere.

#### **A5: Potential**

5.1 The excavated contexts are exceptionally well dated and the assemblage as a whole is one of the largest to have ever been recovered from anywhere in the British Isles. Pipe fragments already offer one of the most accurate and reliable classes of artefact for dating deposits from the Post-Medieval period, but this excavation has provided key groups of material that can be used to check and refine existing typologies.

5.2 The majority of the excavated pipes also come from kiln groups that can be used to define the products of this major, but almost unstudied, pipe producing centre. This is one of only two or three good excavated groups of pipes to have ever been recovered from Liverpool and the first that will allow a comprehensive overview of the types of pipe that were being produced and used during this period.

5.3 The excavated material includes some outstanding groups that will provide important benchmarks in establishing the nature and range of pipes produced in and traded from Liverpool. It has been almost impossible, for example, to establish which bowl forms were being produced during the late eighteenth century because the pipes at this period had very long stems, with the result that the stem marks and bowls are almost always separated. The recovery of tightly dated deposits from these excavations will allow stem marks and bowl forms of this period from closed groups to be associated for the first time. Similarly, the recovery of kiln waste will allow the range of pipes that were being produced for the home and export markets to be established.

5.4 The wide range of decorative motifs represented on the excavated pipes are distinctive to Liverpool and this sample will establish an important reference point for other researchers both in this country and in the many overseas areas to which these pipes were traded.

5.5 Liverpool was one of the most important British ports during the Post-Medieval period and one that housed an internationally important pipemaking industry. Despite this, there has been a chronic lack of excavation within the city, with the result that the products of the hundreds of pipemakers who worked there are barely understood. This assemblage includes important groups containing marked and decorated pipes as well as kiln material with specific export patterns amongst the forms that were being produced. This excavated assemblage as a whole provides a sample of marked and decorated pipes that will form a reference point for researchers from around the world. There is no doubt that the key groups warrant full and detailed analysis and that a number of detailed illustrations will be needed to represent the range of bowl forms, makers' marks and decorative motifs recovered. The recovery of an assemblage of this quality and extent from Liverpool is long overdue. The proper analysis and publication of these pipes will not only provide a lasting benchmark for future researchers, but also one that will be of international significance.

#### **A6: Recommendations for Study**

6.1 A context summary should be prepared. This should identify the number of pieces from each context and assess their integrity and overall date range. This summary should also list any maker's marks present as well as the type and number of any decorated fragments. General comments should note any significant features of the group and the summary should also cross-refer to any illustrated pieces.

6.2 The bowls and stems in large and apparently tightly dated deposits with large fragments should be examined for joins and, if a number are found, an attempt should be made to reassemble complete pipes from these deposits. There are no known complete pipes of this period from Liverpool and only two or three examples where stem marks have been recovered with their associated bowl forms.

6.3 The most significant groups should be studied and described in detail. The quality and finish of the pipes should also be assessed to characterise the nature of the local products at this specific point in time.

6.4 Particular attention should be paid to the kiln deposits, which should be studied in detail. An attempt should be made to determine the number and range of mould types represented and the full range of types illustrated. The forms being produced in Liverpool should be described and discussed and compared with other evidence from elsewhere, both regionally and nationally.

6.5 The kiln waste should also be studied with a view to characterising the production and finishing methods in use at this time.

6.6 Illustrations for publication at 1:1 should be prepared of a representative range of bowl forms and decorative styles from the site. In particular, groups from consistent context groups and kiln dumps should be fully illustrated. Twice life size details of the makers' marks should also be drawn as a reference source for future researchers.

6.7 A publication report should be prepared. This should explain the work carried out and present a synthesis of the pipe evidence from this site. So far as is possible, it should describe the local pipe types represented and establish a benchmark for the pipes being produced in and traded from Liverpool at this period. Any evidence for trading connections with the city's hinterland should be presented and the pipes placed in both their regional and national context.

### ***A7: Estimate for Preparing a Specialist Report***

The works required to prepare a site archive and specialist report for publication are as follows: -

- \* Preparation of a context summary synthesising the pipe evidence for each context.
- \* Detailed study and analysis of the significant pipe groups.
- \* Selection and illustration of a type series, marked and decorated fragments, etc, together with descriptive catalogue for publication. Pipes to be illustrated at 1:1 with stamp details at 2:1 and publication quality images prepared.
- \* Consultation of published works and other reference material relevant to this study.
- \* Establishment, so far as is possible, of the range and nature of pipes being produced by the Liverpool manufacturers in c. 1800. This should act as a reference point for other researchers both nationally and internationally.
- \* Production of a publication text describing the work carried out and a description and discussion of the pipes in relation to the site as well as in their local and national context.

The cost for carrying out this research and preparing the publication text and drawings as listed above would currently be £7,900. This quote is valid for 12 months from the date of this assessment, after which it will be subject to revision.

## **Appendix B: Museum of Liverpool Site, Mann Island, Liverpool (Site 97) Finds Report**

**Jeff Speakman**

### ***Methodology***

This current report includes all finds (recorded to June 2008) recovered from the evaluation, excavation and watching brief on the site of the new Museum of Liverpool between 2005 and 2007.

The finds were collected and recorded on site to the context. Most were washed and bagged on-site by staff from National Museums Liverpool Field Archaeology Unit (NMLFAU) and by volunteers Kathie Jason, Anys Price and Chris O'Brien. The washing and processing were completed in the office. During the post-excavation phase they were loosely sorted and recorded (classified to material, type and class) onto an Access Database using the Field Archaeology Unit's recording system. All diagnostic pieces were recorded and bagged separately. Most of the material, except where large parts of individual vessels could be identified, and any body sherds, which could not be assigned to individual diagnostic pieces, were entered as bulk records. The majority of the fine Staffordshire or Liverpool ceramics have been loosely grouped together to aid future specialist examination.

No finds were marked during the recording process.

A number of very large dumps of ceramic material and glass were recovered from the site, including Staffordshire type whitewares, sugar manufacturing pottery and clay tobacco pipe. Whilst it was possible to recover the majority of this material, the sheer quantity of finds and time available to excavate, effectively necessitated sampling of the main Staffordshire type pottery dump, context (215), and its associated dump of sugar-refining pottery (context 242).

All the finds that were recovered from the excavations have been retained for initial evaluation.

### ***The Finds***

A total of 55327 objects were recorded, weighing over 1008.5kg. The largest groups were fragmentary sugar-refining pottery, Staffordshire type pottery, shells and glass, recovered from a number of large dumps. There were also a number of large shell dumps, many of which were sampled, and a sizeable quantity of bone, a number of which show probable butchery marks.

N.B. Only a very small number of fragments of clay tobacco pipe (25, weight 81.1g) have been included within these figures which in no way represents the quantities of clay pipe or pipe manufacturing waste recovered from the excavations. The assessment of this material by Dr David Higgins should be seen to be as being additional to any figures shown above.

The following contexts are listed as containing a significant number of fragments of clay tobacco pipe and pipe manufacturing waste:

Context	Context description
204	Light grey ash deposit with clay pipe fragments (Test Pit 2).
211	Dark brown sandy loam containing clay pipe fragments, south east of main ceramics dump, context 215.
217	Sub-circular dark stain containing clay pipes, south of context 216.
223	Irregular shaped dark brown patch containing clay pipe fragments, south of context 222.
225	Dark brown sandy silt loam containing large quantity of clay pipe fragments, north of

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	context 218.
231	Yellow sand deposit containing large quantity of clay pipe fragments, north of context 224, west edge of trench.
236	Dump of fine ceramics, oyster shells, clay pipes in a red sand and clinker deposit, west of revetment wall context 233.
238	Dark grey silty matrix containing dump of clay pipes, north east of context 233
266	Dump of clay pipes within dark clay silt deposit seen in west section, north area of trench.
267	Dump of clay pipes south east of context 211.
269	Mixed clay/silt deposit containing clay pipes.

There are also a number of larger items which are also not included in these figures as shown in the table below:

Object	Description	Context
Wooden Lock gate (north)	A portion of the eastern lock gates, down to a depth of approximately 3ms was removed.	6
Wooden Lock gate (south)	A portion of the eastern lock gates, down to a depth of approximately 3ms was removed.	7
Wooden object	Large timber post in corner of lock, south side, attached to [2].	158
Wooden object	Timber tidal gauge on south facing north lock wall [3].	159
Wooden sluice gate	From sandstone block-constructed housing for sluice operating mechanism.	259
Iron Ladder	Find SF102 from Manchester Dock wall	
Sandstone	A portion of the sandstone blocks from the lock wall were recovered from the demolished sections.	2

The finds were recovered from 54 contexts and unstratified deposits as shown in the following table:

Context	Context description	Total number of recorded objects	Total weight (Kg)	Finds Present
Not recorded		9	1.54	This includes the iron ladder and pottery.
Unstratified		329	28.60	Includes bone, ceramic drainpipe, electrical ceramic, ceramic tile, clay tobacco pipe, copper-alloy coin, other copper-alloy object, glass, iron object, leather, pottery, shell and sandstone.  Residual material:  There is also some tin-glazed tile. White salt-glazed stoneware. Mottled ware.
2	Sandstone block-constructed dock wall (south) running east-west	0 Plus sandstone blocks from the lock wall	0.00	Includes sandstone.
3	Sandstone block-constructed dock wall (north) running east-west	9	0.06	Includes clay tobacco pipe and pottery.  Includes Mottled ware.
6	Lock gate (north)	2 Plus dock	3.60	Includes part of a unweighed wooden lock gate.

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		gate.		
7	Lock gate (south)	0 Plus dock gate.	0.00	Includes part of a unweighed wooden lock gate
8	Sandstone block-constructed housing for lock gate mechanism (south-east)	0	0.00	Includes unweighed iron roller.
12	Sandstone rubble fill of Manchester Dock, contexts 2, 3, and mechanism housings contexts 8, 9, 10, 11.	1	0.22	Includes pottery.
25	Concreted area west of context 24, cutting/overlying context 26.	10	0.17	Includes pottery, bone and iron object.
29	Squarish area of flagstones west of context 11, cut by context 32.	15	0.64	Includes pottery, glass and leather
146	Cellar structure east of context 147 in south-west area of trench.	54	12.71	Includes pottery, glass and iron tool.
147	Western cellar structure north of context 149 in south-west area of trench.	15	5.19	Includes pottery, architectural ceramic and glass
158	Large timber post in corner of lock, south side, attached to context 2.	0 Plus? timber post.	0.00	Includes wood.
159	Timber depth gauge on south facing dock wall (3).	2 Plus tidal gauge.	0.25	The weight only includes the iron fixings. Context also includes unweighed part of the wooden tidal depth gauge.
166	Layer of sandstone, brick and concrete rubble between walls (106 and 109), on west side of trench (Test Pit 1).	5	0.11	Includes pottery and bone
175	Fine white sand below cinders (172), containing sugar mould fragments, west side of trench (Test Pit 1).	1150	130.19	Includes pottery, bone, clay tobacco pipe, copper-alloy button, shell and industrial waste.
178	Layer of black cinders containing sugar mould fragments below context 175, on west side of trench (Test Pit 1).	1338	223.22	Includes pottery, bone, clinker, glass, industrial waste, iron nail and wood.
179	Crushed red brick make-up layer for engine house in south-east corner of trench.	7	0.46	Includes pottery, bone and flint.
194	Fill of Test Pit 3.	129	11.29	Includes pottery, bone, glass and shell.  Residual material:  Includes one stoneware base probably an import.  And fragments of saggar.
195	Fill of Test Pit 2 (rubble layer).	69	5.02	Includes pottery, bone and glass.
204	Light grey ash deposit	1	0.02	Includes pottery.

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	with clay tobacco pipe fragments (Test Pit 2)	Plus clay tobacco pipe.		
210	Black clinker deposit containing sugar mould and syrup jar fragments, north-east of context 211, on west edge of trench.	39	5.47	Includes pottery and brick.  Residual material:  This context also includes a fragment of tin-glazed tile.
211	Dark brown sandy loam containing clay tobacco pipe fragments, south-east of Staffordshire type pottery dump (215).	78 Plus clay tobacco pipe.	6.04	Includes clay tobacco pipe, pottery, bone, brick, glass, industrial waste, kiln furniture and shell.  Glass bead in opaque white glass.
212	Black clinker deposit containing sugar mould fragments, east of context 210.	30	2.56	Includes pottery and bone.  Residual material:  This context also includes some tin-glazed tile. ceramic.
213	Black clinker deposit containing sugar mould fragments, east of context 212.	1	0.35	Includes pottery.
214	Dark grey silty loam containing sugar mould and syrup jar fragments, west of context 219.	5	0.17	Includes pottery.
215	Dark brown sandy silt loam containing large amount of fine ceramics fragments, north-west of context 211.	41040	316.15	Includes pottery, bone, horn, ceramic figurines, sanitary ceramics?, ceramic inkwells, ceramic marble, clay tobacco pipe, copper-alloy coin, copper-alloy button, copper-alloy nail copper ore?, flint, glass, industrial waste, iron nail, other corroded iron objects, kiln furniture, lithic?, shell, sandstone, stone, mortar and brick.  Residual material:  A fragment of medieval pottery. A lead musket ball, potentially 16th or 17th century in date. 17th century dark-glazed earthenware. North Devon smooth ware. Agate-bodied earthenware. Mottled ware. White salt-glazed stoneware. Tin-glazed earthenware and tile, some hand-painted and some printed. Biscuit ware. Slip-decorated wares. Slip-coated wares. Possibly imported self-coloured ware.  Plus fragments of kiln furniture.  These small numbers of objects contained within an otherwise relatively consistent group of pottery suggest that earlier soil deposits have been mixed into these dumped deposits behind the new sea wall.
216	Irregular linear patch of clinker containing sugar mould and syrup jar fragments, north of context 215.	128	20.16	Includes pottery.

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217		Plus clay tobacco pipe.			
218	Black clinker and yellow sand deposit containing oyster shells, north of dock wall (3).	127	3.12	Includes pottery, bone, clinker, glass and shell.	
221	Black clinker and yellow sand deposit containing sugar mould and syrup jar fragments, north-east of context 209.	82	10.07	Includes pottery and glass.	
222	Black clinker and yellow sand deposit containing sugar mould and syrup jar fragments, east of context 216.	28	4.96	Includes pottery.	
223	Irregular shaped dark brown patch containing clay tobacco pipe fragments, south of context 222.	31	0.34	Includes pottery, bone, ceramic, coal, glass, iron object and shell.  Residual material:  This context also includes tin-glazed tiles. Mottled ware.	
224	Layer of black clinker containing sugar mould and syrup jar fragments seen in section west of Test Pit 1.	97	18.59	Includes pottery, bone, glass, iron? and shell.	
225		Plus clay tobacco pipe.			
226	Black clinker and yellow sand deposit containing sugar mould and syrup jar fragments, east of context 222.	61	3.08	Includes pottery, and clinker.	
227	Orange/brown and fine white sand containing oyster shells, china and glass, east of Test Pit 1.	1167	34.77	Includes pottery, bone, copper-alloy?, glass, shell and slate.  Residual material:  Agate bodied earthenware. White salt-glazed stoneware.	
228	Firm grey sand with clinker below containing sugar mould fragments, east of Test Pit 1.	23	6.26	Includes pottery, brick and industrial waste.	
230	Dark brown semi-circular stain surrounded by buff sand, west of Staffordshire type pottery dump (215).	3	0.79	Includes pottery.	
231	Yellow sand deposit containing a large quantity of clay tobacco pipe fragments, north of context 224, west the edge of the trench.	6	0.45	Includes pottery and shell.	
232	Dump of brown clay north of Staffordshire type pottery dump (215).	10	1.02	Includes pottery and glass.  Includes Mottled ware.	
233	Large dressed yellow sandstone blocks north of earlier revetment wall	64	4.93	Includes pottery, bone, coal, glass and shell.	

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	(229).			Includes Mottled ware.
235	Large dump of Staffordshire type pottery fragments within dark brown silty loam and clinker deposit.	8780	61.55	Includes pottery, ceramic figurine, bone, ceramic, glass, horn and shell.  Residual material:  A fragment of rim from a 17th century (or possibly earlier) chafing dish.  This context also includes tin-glazed tiles, some hand-painted and some printed, and hand-painted figurines. White salt-glazed stoneware.
236	Dump of Staffordshire type pottery, oyster shells, clay pipes in a red sand and clinker deposit, west of revetment wall (233).	87 Plus clay tobacco pipe.	3.08	Includes pottery, bone, clay tobacco pipe and shell.
237	Layer of clinker and sand mix containing sugar moulds and syrup jar fragments, west of context 233.	121	33.60	Includes pottery, glass and industrial waste.
238		Plus clay tobacco pipe.		
239	Black clinker deposit underlying white sand and containing sugar mould fragments, north of context 227.	10	5.98	Includes pottery.
242	A black clinker deposit within context 243 containing sugar mould fragments; seen in the section through context 215,	14	3.92	Includes pottery.
250	Objects recovered from below contexts 215, 232 and 247 in section; a dark grey/yellow sand with copper slag inclusions.	10	2.35	Includes copper ore?.
252	Brown silty clay containing a dump of stoneware fragments, east of context 233, at the eastern edge of the trench.	22	2.75	Includes pottery, salt-glazed sewer pipe and glass.
253	Yellow sandstone blocks seen at surface level north-east of the Staffordshire type pottery dump (215) and aligned with the revetment wall (229).	13	0.44	Includes bone, clay tobacco pipe, copper-alloy nail, glass and shell.
254	Section 3 through context 211, bluish clay.	6	1.69	Includes pottery and coal.
255	Sand below context 254.	6	0.50	Includes pottery.
257	Sugar mould dump.	2	2.48	Includes pottery.
258	Sugar mould dump.	58	19.46	Includes pottery.
259	Sandstone block-constructed housing for sluice operating mechanism.	0 Plus sluice gate.	0.0	Includes the wooden sluice gate.
265	Sugar mould dump in south-east corner of	14	7.85	Includes pottery.

	trench.			
266	Dump of clay tobacco pipes within dark clay silt deposit seen in west section, in northern area of trench.	13 Plus clay tobacco pipe.	0.04	Includes clay tobacco pipe.
269	Mixed clay/silt deposit containing clay tobacco pipes.	6 Plus clay tobacco pipe.	0.26	Includes pottery, brick, coal and flint.

N.B. Despite there being very many similar types of pottery in 215 and 235, and indeed a number of cross-context joins, there are a number of possibly significant differences in the material within these contexts. There are a number of find types which are missing or largely missing from 235. These include the ceramic inkwells, agate-bodied earthenware, mottled wares, the late slip-decorated earthenwares and the debased scratch-blue stonewares.

The finds are classified by material in the following table:

Material	Description	Total numbers	Total weight (kg)
<b>Organics</b>			
Bone	The bone included many pieces with probable butchery marks.	188	3.35
Horn	One tiny horn and a second large one.	2	0.01
Leather	Two pieces of two shoes were recovered; one a complete flat sole, the other a heel.	2	0.14
Shell	A number of large dumps of shell were encountered during the excavations; only a small sample was retained.	235	9.24
Wood	Includes the two lock gates, the timber post, the tidal gauge and the sluice gate.		
Ceramic	The ceramic includes more modern electrical insulators, sanitary ware and drain/sewer pipe, brick (of which there were many uncounted fragments from context 215), ceramic inkwells and also a very small number of pieces of clay tobacco pipe.  The ceramic inkwells were recovered only from context 215 and include two complete examples. These may have been produced for export.  The main assessment of the clay tobacco pipe was undertaken separately by Dr David Higgins and the figures are not represented here.	186	7.29
Mortar	Mainly recovered from context 215. It is largely uncounted but exists as many fragments of what could be building mortar or plaster.	12	0.12
Slate	Mainly recovered from context 215. It is largely uncounted but exists as many fragments.	1	0.01
Sandstone	These figures do not include the large objects.	2	0.07
Other stone	These figures do not include the large objects.	2	0.05
Clinker		25	0.12
Coal		26	0.94

Industrial waste		25	3.18
Kiln furniture	Fragments of kiln furniture were recovered from context 215. Possibly residual finds from local manufacture.	14	1.52
<b>Metals</b>			
Copper-alloy	There were five copper coins, but also a number of large pieces of probable copper ore.	36	7.01
Iron		76	5.52
Lead	Three items were recovered; two fragments of window lead and a musket ball.	3	0.30
Flint	A number of flint nodules were recovered mainly from context 215.	37	0.47
Lithic	One small fragment of waterworn flint was recovered which may have been worked.	1	0.5g
Glass	There was one small glass bead but the glass mostly consisted of wine bottles and other vessel glass, but also some window glass.	411	35.98
Pottery	Large pottery dumps were encountered. Most of the pottery was recovered but context 215 was so large that only part of the total could be salvaged in the time available.	54043	934.70
Wood	These figures do not include the large objects.	1	0.03

### **Pottery**

There was a total of 54043 sherds, weighing 934.75kg, recovered from 45 contexts and unstratified as detailed in the table below. (N.B. The weight for the context is in kilograms but the weights for the individual pottery types are given in grams).

The unglazed pottery and dark-glazed earthenwares include figures for the sugar-refining pottery which are detailed below. Also the figures for the stonewares include all stoneware types which are detailed below.

Context	Total number	Total weight (kg)	Pottery type	Total of each type	Weight for each type (g)
unstratified	289	25.93	Biscuit ware	1	8.6
			Creamware	26	453.7
			Dark-glazed earthenware	111	14249.4
			Dipped earthenware	9	62.5
			Hand-painted earthenware	2	47.3
			Mottled ware	2	18.1
			Plain china	4	94.6
			Pearlware	16	164.8
			Porcelain	6	68.4
			Slip-coated earthenware	1	135.0
			Shell-edged pearlware	4	32.3
			Slip decorated earthenware	1	15.8
			Stoneware	39	4085.9
			Tin-glazed earthenware	1	8.0
			Transfer-printed earthenware	20	313.3
Unglazed earthenware	46	6161.8			
3	8	0.06	Creamware	5	28.3

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			Dark-glazed earthenware Mottled ware	2	17.2
				1	16.3
12	1	0.22	Stoneware	1	217.4
25	8	0.04	Dipped earthenware	7	33.2
			Stoneware	1	2.0
29	13	0.47	Plain china	3	20.6
			Stoneware	4	408.4
			Transfer-printed earthenware	6	43.5
146	12	0.90	Dark-glazed earthenware	2	178.0
			Stoneware	9	714.7
			Transfer-printed earthenware	1	5.0
147	4	2.24	Dark-glazed earthenware	1	1325.0
			Stoneware	3	917.3
166	4	0.08	China	1	1.7
			Plain china	1	1.7
			Plain pearlware	2	79.0
175	1120	129.91	Creamware	6	58.8
			Dark-glazed earthenware	7	246.0
			Dipped earthenware	1	7.2
			Self-coloured earthenware	1	5.1
			Stoneware	2	208.0
			Transfer-printed earthenware	11	54.1
			Unglazed earthenware	1092	129331.6
178	1326	220.65	Creamware	6	135.7
			Dark-glazed earthenware	119	18654.3
			Plain pearlware	2	11.8
			Shell-edged pearlware	1	6.5
			Transfer-printed earthenware	3	22.0
			Unglazed earthenware	1194	201813.0
			Uncertain	5	32.0
179	5	0.45	Dark-glazed earthenware	4	272.4
			Unglazed earthenware	1	176.4
194	99	9.61	Uncertain pottery	1	11.8
			Creamware	16	128.1
			Dark-glazed earthenware	12	889.9
			Dipped earthenware	2	9.3
			Hand-painted earthenware	1	0.7
			Plain pearlware	1	14.8
			Porcelain	1	3.2
			Shell-edged pearlware	4	21.9
			Slip-decorated earthenware	1	13.8
			Stoneware	14	1159.7
			Transfer-printed earthenware	2	40.5
			Unglazed earthenware	44	7316.0
195	67	4.90	Creamware	2	37.5
			Dark-glazed earthenware	10	972.0
			Dipped earthenware	2	9.3
			Porcelain	1	3.8
			Shell-edged pearlware	1	2.1
			Transfer-printed earthenware	5	33.9
			Unglazed earthenware	46	3837.8
204	1	0.02	Dark-glazed earthenware	1	15.6
210	37	5.37	Creamware	1	7.9
			Unglazed earthenware	36	5362.0
211	42	4.76	Creamware	9	99.8
			Dark-glazed earthenware	14	2575.3
			Dipped earthenware	1	0.9
			Hand-painted earthenware	1	2.3
			Shell-edged pearlware	1	15.4
			Transfer-printed earthenware	5	19.0
			Unglazed earthenware	11	2046.5

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212	27	2.50	Creamware	1	8.9
			Dark-glazed earthenware	5	365.6
			Shell-edged pearlware	1	9.6
			Unglazed earthenware	20	2112.4
213	1	0.35	Unglazed earthenware	1	348.2
214	5	0.17	Dark-glazed earthenware	5	168.4
215	40388	298.25	Biscuitware	3	5.9
			Basalt	30	247.9
			Creamware	20203	139538.6
			Dark-glazed earthenware	715	15802.0
			Dipped earthenware	1540	10385.6
			Uncertain earthenware	1	22.9
			Hand-painted earthenware	104	733.1
			Jasper ware	7	197.0
			Medieval?	1	14.8
			Mottled ware	42	81.7
			North Devon Smoothware	1	21.2
			Plain pearlware	6430	44241.6
			Porcelain	136	1483.6
			Self-coloured earthenware	92	893.6
			Shell-edged pearlware	4806	32201.3
			Slip-decorated earthenware	1824	14265.1
			Stoneware	2123	16295.1
			Tin-glazed earthenware	20	162.2
			Transfer-printed earthenware	2262	16260.0
			Unglazed earthenware	43	5386.3
216	128	20.16	Creamware	1	17.4
			Dark-glazed earthenware	73	9049.3
			Dipped earthenware	1	9.1
			Unglazed earthenware	53	11086.5
218	22	0.37	Creamware	8	24.0
			Dark-glazed earthenware	10	323.8
			Plain pearlware	1	0.3
			Transfer-printed earthenware	1	11.4
			Unglazed earthenware	2	8.3
221	80	9.90	Dark-glazed earthenware	67	7176.6
			Unglazed earthenware	13	2725.4
222	28	4.96	Dark-glazed earthenware	18	3025.7
			Stoneware	1	160.8
			Unglazed earthenware	9	1774.2
223	6	0.07	Creamware	1	11.5
			Dark-glazed earthenware	2	43.5
			Dipped earthenware	1	4.3
			Mottled ware	1	3.5
			Shell-edged pearlware	1	2.3
224	78	16.09	Dark-glazed earthenware	35	7037.0
			Unglazed earthenware	43	9055.2
226	38	3.00	Dark-glazed earthenware	14	1102.0
			Unglazed earthenware	24	1901.4
227	1085	21.87	Basalt	1	52.0
			Creamware	46	1836.2
			Dark-glazed earthenware	30	9434.3
			Dipped earthenware	3	36.3
			Hand-painted earthenware	6	76.5
			Plain pearlware	8	95.5
			Shell-edged pearlware	4	44.6
			Stoneware	9	214.1
			Transfer-printed earthenware	970	7645.0
			Unglazed earthenware	8	2432.2
228	20	5.36	Dark-glazed earthenware	5	1243.1
			Dipped earthenware	1	2.3

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			Unglazed earthenware	14	4111.0
230	3	0.79	Dark-glazed earthenware	3	792.2
231	3	0.08	Dark-glazed earthenware	2	80.8
			Shell-edged pearlware	1	2.4
232	5	0.30	Dark-glazed earthenware	2	28.1
			Mottled ware	1	34.4
			Transfer-printed earthenware	1	20.5
			Unglazed earthenware	1	220.9
233	46	4.41	Creamware	2	40.1
			Dark-glazed earthenware	14	1396.0
			Dipped earthenware	3	17.0
			Mottled ware	1	10.1
			Plain pearlware	2	148.4
			Porcelain	1	35.3
			Stoneware	4	217.8
			Transfer-printed earthenware	3	38.4
			Unglazed earthenware	16	2508.7
235	8721	60.50	Basalt	77	549.1
			Creamware	4638	32236.6
			Dark-glazed earthenware	87	1695.7
			Dipped earthenware	77	251.2
			Hand-painted earthenware	96	337.4
			Plain pearlware	757	5627.3
			Porcelain	297	1324.4
			Self-coloured earthenware	110	595.8
			Shell-edged pearlware	833	5840.5
			Stoneware	21	607.3
			Transfer-printed earthenware	1711	11174.6
			Unglazed earthenware	1	135.8
236	75	2.38	Basalt?	1	9.7
			Creamware	6	155.1
			Dark-glazed earthenware	9	1120.7
			Dipped earthenware?	1	7.8
			Plain pearlware	7	200.1
			Porcelain	3	72.8
			Self-coloured earthenware	1	145.2
			Shell-edged pearlware	12	257.0
			Stoneware	2	56
			Transfer-printed earthenware	33	349.2
237	117	33.27	Dark-glazed earthenware	53	15791.6
			Unglazed earthenware	64	17473.6
239	10	5.98	Dark-glazed earthenware	1	1104.1
			Unglazed earthenware	9	4876.4
242	14	3.92	Dark-glazed earthenware	6	2293.9
			Unglazed earthenware	8	1624.2
252	19	2.51	Stoneware	19	2505.6
254	5	1.58	Dark-glazed earthenware	1	730.4
			Stoneware	4	654.3
255	6	0.50	Creamware	2	5.4
			Dark-glazed earthenware	1	28.6
			Dipped earthenware	1	6.0
			Unglazed earthenware	2	459.4
257	2	2.48	Dark-glazed earthenware	1	2350.0
			Unglazed earthenware	1	13.6
258	58	19.46	Dark-glazed earthenware	10	2502.4
			Unglazed earthenware	48	16954.5
265	14	7.85	Dark-glazed earthenware	5	4987.1
			Unglazed earthenware	9	2860.6
269	3	0.10	Creamware	1	18.8
			Dark-glazed earthenware	1	54.3
			Mottled ware?	1	30.6

The pottery can be categorised into a number of general groupings:

	Total number	Total wt (kg)
1. Staffordshire type Whitewares	45354	316.07
Staffordshire fine earthenwares (Debased scratch blue stoneware)	634	8.56
	(2034)	(13.90)
2. Domestic earthenwares, including		
• Staffordshire finewares	635	8.68
• and locally produced fine and coarse earthenwares	472	50.09
3. Sugar-refining pottery	3202	514.25
4. Stonewares (of all types)	2256	28.63

### **Group 1 Staffordshire type whitewares**

The pottery was largely deposited in a number of dumped deposits which formed part of the generally infilling of the newly reclaimed land behind the sea wall.

#### **Staffordshire type whitewares and other pottery dumps**

<b>Context</b>	<b>Description of Finds</b>
215	<p>Dark brown sandy silt loam containing large amount of Staffordshire type whiteware fragments, north-west of (211). See also contexts (227) and (235).</p> <p>This was largely made up of creamware (plain, transfer-printed and slipped); as well as shell-edged earthenwares; other plain pearlwares; blue transfer printed earthenware and porcelain; blue painted earthenwares; 'peasant' decorated pearlwares (printed and painted).</p> <p>The context also contained fragments of coarse and fine earthenwares including a number of self-coloured tankards; debased scratch-blue stoneware chamber pots and tankards; clay tobacco pipe (used); fragments of brick and mortar/plaster; fragments of window and other bottle glass; fragments of window lead, various rusted fragments of ironwork (and much of the pottery was iron-stained) flint nodules, coal and clinker.</p>
227	<p>Orange/brown and fine white sand containing oyster shells, Staffordshire type whiteware and glass, east of Test Pit 1.</p> <p>Although present in much smaller numbers the pottery types from context (227) are identical to many of the types recovered from context (215), but they are larger pieces and include some near-complete vessels.</p>
235	<p>Large dump of Staffordshire type whiteware fragments within dark brown silty loam and clinker deposit.</p> <p>Despite there being very many similar types of pottery in 215 and 235, and indeed a number of cross context joins, there are a number of possibly significant differences in the finds found within these contexts. There are a number of find types which are missing or largely missing from 235. These include the ceramic inkwells, agate-bodied earthenware, mottled wares, the late slip-decorated earthenwares and the debased scratch blue stonewares.</p>
236	<p>Dump of Staffordshire type whiteware, oyster shells, clay pipes in a red sand and clinker</p>

deposit, west of revetment wall (233).
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## **Group 2 Domestic earthenwares and stonewares**

There are approximately 4124, weight 580.36kg, of largely locally produced coarse earthenwares and stonewares.

These include Medieval, Agate bodied earthenware, Early Dark-glazed fine earthenwares, Dark-glazed coarse earthenwares (none sugar), Dark-glazed coarse earthenwares, syrup jars, Mottled ware, Slip-coated earthenwares, Self-coloured earthenwares, Slip-decorated earthenwares, Local stonewares, Tin-glazed earthenware; pottery and tile, Unglazed earthenwares and Unglazed sugar moulds. The stonewares and sugar-refining pottery have been dealt with elsewhere and recommendations for further work are shown there.

## **Group 3 The Sugar-Refining Pottery**

There were a total of 3202 sherds of pottery relating to the sugar-refining industry recovered from the excavations weighing 514.25kg. Of these 2851 sherds (weight 443.89kg) were from sugar moulds and 351 (weight 70.35kg) from related dark-glazed earthenware syrup jars.

Amongst the remaining dark-glazed earthenwares were a number of unusual vessels which may have also been used as part of the sugar-refining processes. Other more domestic vessels, for example pancheons and storage vessels found within the same pottery dumps, may have also been used by the refiners.

The sugar-refining pottery was found in the following contexts:

<b>Context</b>	<b>Description of Finds</b>
175	Fine white sand below cinders (172) containing sugar mould fragments, west side of trench (Test Pit 1).
176	Dark brown grey sand below clay (170), above (173) + deposit of sugar moulds, west side of trench (Test Pit 1).
177	Lens of gravelly grey sand with slate and grey sandstone fragments above deposit of sugar moulds, west side of trench (Test Pit 1).
178	Layer of black cinders containing sugar mould fragments below (175), west side of trench (Test Pit 1).
203	Red sandstone rubble with some sugar mould fragments (Test Pit 2).
209	Black clinker deposit containing sugar mould and syrup jar fragments, west edge of trench.
210	Black clinker deposit containing sugar mould and syrup jar fragments, northeast of (211), west edge of trench.
212	Black clinker deposit containing sugar mould fragments, east of (210).
213	Black clinker deposit containing sugar mould fragments, east of (212).
214	Dark grey, silty, loam containing sugar mould and syrup jar fragments, west of (219).
215	A number of pieces of sugar manufacturing pottery were recovered during the early stages of excavation of the Staffordshire type whiteware dump (215). On later investigation it is likely that these finds came from a lower dump of sugar manufacturing pottery seen in section, context 242.
216	Irregular linear patch of clinker containing sugar mould and syrup jar fragments, north of Staffordshire type whiteware dump (215).
219	Black clinker and yellow sand deposit containing sugar mould and syrup jar fragments
220	Irregular linear dark brown stain running east-west containing clinker and sugar mould fragments, east of context (211).
221	Black clinker and yellow sand deposit containing sugar mould and syrup jar fragments, northeast of context (209).
222	Black clinker and yellow sand deposit containing sugar mould and syrup jar fragments, east of context (216).
224	Layer of black clinker containing sugar mould and syrup jar fragments seen in section west of Test Pit 1.

226	Black clinker and yellow sand deposit containing sugar mould and syrup jar fragments, east of context (222).
228	Firm grey sand with clinker below containing sugar mould fragments, east of Test Pit 1
237	Layer of clinker and sand mix containing sugar moulds and syrup jar fragments, west of context (233).
239	Black clinker deposit underlying white sand and containing sugar mould fragments, north of context (227).
240	Black clinker deposit containing sugar mould fragments, south-east of context (241).
241	Black clinker deposit containing sugar mould fragments, south-east of context (233).
242	Section containing context (215), black clinker deposit within context (243), containing sugar mould fragments. Note that many of the sugar moulds recovered from context (215) are likely to come from this context seen in section beneath context (215).
257	Sugar mould dump.
258	Sugar mould dump.
260	Small sugar mould dump.
261	Small sugar mould dump.
265	Sugar mould dump in south-east corner of trench.

**Quantities of sugar-refining pottery found in each context.**

Context	Total Sugar-Refining Pottery	Total weight	Sugar Mould Number of sherds	Sugar Mould Weight (kg)	Syrup Jar Number of sherds	Syrup Jar Weight (kg)
Unstratified	78	12.74	45	6.03	33	6.71
175	1097	129.56	1092	129.33	5	0.23
178	1269	213.86	1194	201.81	75	12.05
179	1	0.18	1	0.18	0	0
194	44	7.32	44	7.32	0	0
195	46	3.84	46	3.84	0	0
210	36	5.36	36	5.36	0	0
211	13	4.42	9	2.02	4	2.40
212	21	2.14	20	2.11	1	0.03
213	1	0.35	1	0.35	0	0
214	4	0.15	0	0	4	0.15
215	65	7.57	41	5.36	24	2.21
216	88	16.96	53	11.09	35	5.87
221	77	9.44	13	2.73	64	6.71
222	25	4.39	9	1.77	16	2.62
224	66	14.41	43	9.06	23	5.35
226	24	1.90	24	1.90	0	0
227	15	4.30	8	2.43	7	1.87
228	19	5.35	14	4.11	5	1.24
230	1	0.30	0	0	1	0.30
232	1	0.22	1	0.22	0	0
233	18	2.67	15	2.36	3	0.31
235	1	0.14	1	0.14	0	0
236	1	0.44	0	0	1	0.44
237	95	27.37	64	17.47	31	9.90
239	10	5.98	9	4.88	1	1.10
242	10	2.65	8	1.62	2	1.02
255	2	0.46	2	0.46	0	0
257	2	2.48	1	0.13	1	2.35
258	58	19.45	48	16.95	10	2.50
265	14	7.85	9	2.86	5	4.99
	3202	514.25	2851	443.89	351	70.35

## **Sugar-refining Vessels**

The techniques of sugar refining, once established, changed very little until the mid-19th century when new industrial processes were introduced.

The pottery consists mainly of two types as described by Brooks (1983a). The first is a conical vessel with straight sides, pierced by a hole in the pointed base. This is the mould in which a sugar loaf was formed. The second shape is a high-shouldered jar with a heavy rim and sturdy ring-footed base. The moulds containing the sugar were placed on these jars, so that the molasses mixed in with the sugar drained away through the hole at the base of the cone, and was collected in the jar for further use (Brooks 1983a, 1).

The pottery from the Manchester Dock excavations mirrors these descriptions:

The first, the 'sugar mould' or cone, is a conical vessel with a thickened rim and straight sides, pierced by a single hole in the pointed base, the size of the hole depending on the size of the vessel. There were 2851 sherds from sugar moulds weight 443.89kg. The moulds are unglazed, and the surfaces are carefully smoothed on both the interior and exterior surfaces.

The fabrics are compact and hard and range in colour from pale pink to pale orange, with fairly sparse small quartz sand inclusions, occasional red iron and white clay inclusions up to 4mm in size.

Although the moulds were made to a standard form it is apparent that individual potters would make minor alterations according to their own personal taste; however these idiosyncrasies did not alter the basic function of the vessels. The rims did not vary in their structure but the edges could be straight, bevelled, on one or both sides, or rounded. The base apertures as well as varying in size had deep, shallow or flattened collars, smaller ones being formed from the main body of the vessel, whilst the larger ones were created using an extra ring of clay attached around the opening.

The second form, the glazed 'syrup jar', is a high-shouldered jar with a heavy rim and sturdy ring-footed base, 351 sherds weight 70.35kg. The rim or mouth of the jar was designed to be just large enough for the pointed end of the mould to fit into and to enable the mould to stand upright, so that the molasses, mixed in with the sugar, drained away through the hole at the base of the mould to be collected in the jar for further use (Silliman 1833, 85-6; Porter 1843, 214; Scoffern 1849, 135). The thick, squared rims could occasionally be rounded and the depth of the shoulder joints varied, whilst the bases were straight or had a rounded protruding lip around the edge.

Evidence suggests that the moulds were made in a variety of sizes – linked to the quality of the sugar produced, and that the jars were made in comparative sizes appropriate to the moulds that fitted into them (Porter 1843, 209; Dodd 1843, 104; Brooks 1983a, 9).

It appears that much of the glazed pottery recovered from the excavations is likely to have come from one or more of the local Liverpool sugar manufactories used as either part of that industrial process or was pottery used in a 'domestic' sense in those factories rather than products from or evidence of the Liverpool potteries themselves.

## **Group 4 Stonewares**

There were a total of 2257 sherds of stoneware recovered from 15 contexts and unstratified deposits, weighing 28.67kg.

Context	Total number	Total weight	Pottery type	Total of each	Weight for each type
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		(kg)		type	(g)
Unstratified	39	4095.9	Unidentified stoneware	25	3241.9
			Brown salt-glazed stoneware	4	163.3
			Nottinghamshire/Derbyshire Stoneware?	7	504.2
			Other brown stoneware	2	174.8
			White salt-glazed stoneware	1	11.7
12	1	217.4	Unidentified	1	217.4
25	1	2.0	Unidentified	1	2.0
29	4	408.4	Unidentified	4	408.4
146	9	714.7	Unidentified	2	40.5
			Brown salt-glazed stoneware	6	201.7
			Other brown stoneware	1	472.5
147	3	917.3	Unidentified	2	465.9
			Other brown stoneware	1	451.4
175	2	208.0	Unidentified	1	96.6
			Brown salt-glazed stoneware	1	111.4
194	14	1159.7	Unidentified	3	75.8
			Brown salt-glazed stoneware	8	492.8
			German import	1	111.8
			Nottinghamshire/Derbyshire Stoneware?	1	6.0
			Other brown stoneware	1	473.3
215	212	16262.8	Unidentified	2	98.5
			Brown salt-glazed stoneware	15	724.9
			Debased Scratch-blue	2016	13562.6
			Nottinghamshire/Derbyshire Stoneware?	28	133.3
			Other brown stoneware	27	1247.5
			White salt-glazed stoneware	33	2010.1
222	1	160.8	Unidentified	1	160.8
227	9	214.1	Debased Scratch-blue??	6	151.3
			Other brown stoneware	2	18.6
			White salt-glazed stoneware	1	44.2
233	4	217.8	Brown salt-glazed stoneware	2	168.4
			Other brown stoneware	2	49.4
235	24	677.3	Unidentified	2	157.9
			Debased Scratch-blue	9	115.2
			Other brown stoneware	3	5.3
			Brown salt-glazed stoneware	2	255.4
			Nottinghamshire/Derbyshire Stoneware?	4	58.9
			White salt-glazed stoneware	1	14.6
236	2	56.0	Unidentified	1	32.1
			Brown salt-glazed stoneware	1	23.9
252	19	2505.6	Unidentified	18	2329.6
			Other brown stoneware	1	176.0
254	4	854.3	Brown salt-glazed stoneware	4	854.3

The stoneware is made up of bottles, large bottles/jugs, marmalade jars and large jars. Many are likely to be non-local. The debased scratch-blue stoneware is likely to be a Staffordshire product and other items will have come from Nottingham/Derbyshire. The more basic bottles and jars are likely to be the product of the industry of Prescot and St Helens.

### ***The Other Earthenware***

David Higgins and Jeff Speakman

Many of the glazed earthenwares found on the excavations are likely to have been produced by one or more of the many potteries operating in Liverpool or its hinterland.

A very small number of saggars and kiln furniture has been identified amongst some of the pottery dumps but not enough to suggest that the material was being dumped from a

production centre. It appears that much of the glazed pottery recovered is likely to have come from the sugar manufactories and is either part of that industrial process or was 'domestic' pottery used in those factories rather than products.

The stamped sugar mould shows that at least the sugar moulds were being produced outside the city and it is likely that production of such pottery was being phased out in Liverpool at this time and production was shifting out towards Prescot and the St Helens area which continued to produce earthenware and stoneware pottery into the latter half of the 20th century.

Whatever the source of the pottery dumps recovered, they form a very interesting and significant sample of the wares being produced in and/or traded through Liverpool around 1800.

### **Assessment of the Refined Ceramics**

Dr David Barker

This is an extremely important group of wares which requires serious analysis and publication.

After a cursory examination of the sherds, I am inclined to agree with the suggestion that this material may well have been discarded from a nearby warehouse, rather than being domestic waste from local households. There are a number of factors which suggest that this may be the case.

1. First, there seems to be a complete absence of any use wear marks which would indicate domestic use.
2. Second, there is a remarkable homogeneity amongst the types of ware represented, with numerous examples of the same pattern or moulded form.
3. Third, it seems very likely that a number, albeit perhaps a small number, of manufacturers are represented, including some from north Staffordshire who, I am certain, can be identified, and very possibly also the Herculaneum factory in Liverpool.
4. Finally, despite the apparent high quality of the wares, there are clearly a number which are far from perfect. We discussed those sherds whose over-glaze painted decoration was prone to wearing upon washing or rubbing; this is a definite flaw which would have rendered these wares unsaleable. There are also examples of under-glaze painted and slip-decorated wares whose colours have suffered during firing, perhaps appearing thin or running somewhat into the glaze, and other wares with noticeable glaze scars and other body defects. Taking these facts together, it is possible to conceive a situation in which wares from several sources were unpacked in a warehouse, sorted into batches for specific customers and then checked for quality before being re-packed for shipment, with sub-standard wares being discarded en masse. I emphasise that this is merely a working hypothesis, which only detailed examination of the material will confirm.

As for the group's importance, I think that I cannot overstate this. This is potentially a unique assemblage for this country, representing the physical manifestation of Liverpool's key role in the export of ceramics (and other goods) to the Caribbean colonies and North American market. While the documentary evidence for this is abundant, and will provide valuable background material, archaeological evidence for the ceramics trade is slight, and confined to material excavated in production centres with 'obvious' (for which read 'presumed') export traits. This trade impacted upon consumers throughout the whole of the New World and the evidence of both its scale and the types of material involved is clear in North American museums and amongst material excavated on domestic sites.

The tight dating of the Manchester Dock material is important, belonging to a period when the ceramics industry and the ceramics trade (especially to the USA) was undergoing a great

transformation. New wares, new styles and new manufacturing techniques were at that time beginning to alter the nature of ceramic use by consumers across the globe and to set trends that have lasted until the present day. The period also witnessed new methods of marketing, and more sophisticated arrangements for conveying the requirements of consumers to the manufacturer, in which merchants and dealers based in Liverpool played a key role – a situation examined in detail by Neil Ewins in his 1997 publication, ‘Supplying the Present Wants of Our Yankee Cousins...’: Staffordshire Ceramics and the American Market 1775-1880. This assemblage provides a direct link between production and consumption, and has an immediate relevance to the overseas markets.

In the study of marketing ceramics, we have in the UK lagged behind our North American colleagues. There archaeology is well-placed to examine the consumption of British-made wares, but only after they have been filtered through a range of middlemen and local retailers. Assemblages which relate directly to importers of British ceramics are few and far between, but are accepted as valuable indicators of the ceramics trade which can furnish the most minute details of customer preference in terms of vessel forms, types of decoration, and so forth, and these do seem to vary somewhat from British preferences at the same date. One such assemblage has been excavated on the Hudson waterfront at Albany in New York State and is, conveniently, of a very similar date to the Manchester Dock assemblage; in the types of ware present, the two groups appear to have a great deal in common. There is potential here for comparative study, and I am aware of other similar groups from excavations in Manhattan which might inform a discussion of the significance of the Liverpool material.

There would, of course, be a tremendous interest in the USA in the Manchester Dock assemblage and I think that any programme of publication should consider seriously the possibility of a publication of some sort aimed directly at an American ceramics and/or archaeological audience. The interest in the UK would be no less, and experience tells me that ceramic societies here would devour anything which had a dedicated, detailed ceramic content. Moreover, this is a period whose wares are collected and studied by hundreds of enthusiasts in the UK, and many more overseas. Do not underestimate the potential of high sales and a significant income from a publication devoted to the ceramics from this site.

## Conclusions

I think you have here an extremely important assemblage which has national and international significance. I strongly recommend that a full programme of post-excavation analysis and publication is pursued.

## **Glass**

A total of 409 fragments of glass were recovered, weighing 35.97kg, from 19 contexts and unstratified deposits. There were also two fragments of glass waste.

Context	Total number	Total weight (kg)
unstratified	22	2.59
29	1	0.07
146	41	11.65
147	2	0.46
178	1	0.30
194	13	1.46
195	1	0.06
211	6	0.20
215	212	6.37

218	1	0.02
221	2	0.16
223	8	0.04
224	12	2.43
227	42	8.24
232	5	0.71
233	4	0.22
235	32	0.74
237	1	0.08
252	2	0.09
253	1	0.07

These break down into the following categories.

Context	Total number	Total weight (kg)
Unidentified glass	56	1.24
Bottle glass	326	34.5
Vessel glass	6	0.18
Window glass	22	0.047
Glass bead	1	1g

The majority of the pieces of glass are from wine bottles. There appear to be two distinct groups. One relates to the last structures on the site prior to post-war clearance and the creation of what became the Museum car park. This includes two bottles with embossed bases, reading 'WOODFALL MANOR'. The second is a group of earlier bottles relating to the creation of the new sea wall and infilling of the reclaimed land behind it, and likely to date between 1803 and c. 1810.

Several contexts produced large numbers of bottles. The two main contexts consisted of large pieces from bottles mainly solid bases but also many rims; contexts 146 and 227. There was also a lot of more fragmentary glass recovered from the two main pottery dumps; contexts 215 and 235. As shown in the table below.

Context	Description of Finds	Total number	Total weight (kg)
146	Glass bottles in cellar structure.	41	11.65
215	Glass bottles in pottery dump.	144	5.90
227	Orange/brown and fine white sand containing oyster shells, Staffordshire type whiteware and glass, east of Test Pit 1.	38	8.17
235	Glass bottles in pottery dump.	32	0.74

### **Metal Finds: Coins**

Context	Description of Finds
Unstratified	Corroded large copper-alloy coin probably a half-penny, illegible.
215	George III halfpenny, 3rd issue, dated 1799, Seaby 3778
215	Halfpenny token of Lancaster, Obv. John of Gaunt. Rev. Shield and date [illegible], Dalton and Hamer 9-48; requires cleaning
215	Probable George III halfpenny, 3rd (1799) or 4th (1806-7) issue. Requires cleaning
215	Copper-alloy coin or token; illegible; concreted with mass of iron and other material. Requires cleaning

## **Shells and Organics**

### **Oyster and other shells**

<b>Context</b>	<b>Description of Finds</b>
215	Oyster and other shells, and bone.
218	Black clinker and yellow sand deposit containing oyster shells, north of dock wall (3).
227	Orange/brown and fine white sand containing oyster shells, Staffordshire type whiteware and glass, east of Test Pit 1.
236	Dump of Staffordshire type whiteware, oyster shells, clay pipes in a red sand and clinker deposit, west of revetment wall (233).

Two large deposits of oyster shells, 218 and 227, were present in the dumped material. The dumps of shells were probably derived from the town centre as 'hardcore' infill material, and may derive from deposits of waste shells from the sale and consumption of oysters in the town. Abundant oyster shells were deposited in the early 18th-century fish market in Liverpool before 1726 (Davey and McNeil 1985, 13; McMillan 1985).

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