



Morpeth Branch Dock, Birkenhead, Merseyside

Survey Report



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SUMMARY

The study area is located at the eastern end of the former Morpeth Branch Dock, in Birkenhead on the Wirral (NGR SJ 32859 89426). A pumping station, built in the 1960s, is located towards the eastern end of Morpeth Branch Dock, east of which is an open area of the former dock. The pumping station is being decommissioned, which would include infilling of this remaining part of Morpeth Branch Dock. Axis commissioned Oxford Archaeology North to undertake a desk-based study and mitigative survey of the dock in advance of its being backfilled. It was recorded by means of a laser scan survey on 22nd January 2010, and the results are presented as 3D isometric models of the structure, as well as plans, cross-sections and elevations.

The Birkenhead docks were constructed on the Wallasey Pool, an area of deep water running inland for two miles, and thus well-suited for harbouring ships. The first docks to open were the Morpeth and Egerton Docks in 1847. In 1866-68 Morpeth Dock was extended to include the Morpeth Branch Dock, a relatively small dock accessed by a channel from the main Morpeth Dock to the north-west.

The construction of the docks was central to the development of Birkenhead during the nineteenth century, with industries such as flour-milling, tanning, the manufacture of glue, suet and gelatine, iron-founding, engineering and steam wagon and tramcar manufacture being established by the end of the nineteenth century.

The Birkenhead docks continued to thrive during the first part of the twentieth century, and were the major port for the transfer of American servicemen and various goods during the First World War. The docks were badly damaged in the Second World War, however, and required much reconstruction to keep them in business once the war was over. A number of factors appear to have resulted in the decline of the use of the Birkenhead docks in the second half of the twentieth century, including industrial disputes and the introduction of transport by container ships, which both contributed to ship owners finding alternative ports.

In the 1960s a pumping station was constructed at the eastern end of Morpeth Branch Dock, which was used for flood risk management. The remainder of Morpeth Dock was still in use until the 1990s, when it was largely reconstructed, with the railway hub and many of the warehouses which lined the wharves of the dock cleared. Whilst Morpeth Dock survives as an area of open water, the Morpeth Branch Dock was infilled and developed in the 1990s. The eastern end, east of the pumping station is, therefore, the only remaining area of exposed Branch Dock walls.

In 2000 the Birkenhead Waste Water Treatment Works (WWTW), located immediately upstream, was constructed, which has left the Morpeth Branch Dock pumping station redundant. The survey was undertaken as mitigation in advance of the backfilling of the dock as part of the decommissioning of the pumping station. The backfilling has been undertaken with loose aggregate and the dock wall masonry has been protected from contact with any fill material, such as tarmac, that could adhere to it.

ACKNOWLEDGEMENTS

Oxford Archaeology North (OA North) would like to thank Axis for commissioning the project and in particular Amanda Stobbs for her support throughout. OA North would like to thank Matthew Crook of Wirral Borough Council for his advice in the course of setting up the project. OA North would like to thank all at the Wirral Archives service for their help in accessing the pertinent documents.

Kathryn Blythe and Vicky Bullock undertook the desk-based research, assisted by Dana Campbell. The laser scan survey of the dock was undertaken by Allan Hoskings of Kiwi Surveys and Anne Stewardson produced the drawings. The survey report was written by Kathryn Blythe, Vicky Bullock, and Jamie Quartermaine; the latter also managed the project.

1. INTRODUCTION

1.1 CIRCUMSTANCES OF THE PROJECT

- 1.1.1 In the 1960s a pumping station was constructed at the eastern end of the nineteenth century Morpeth Branch Dock (NGR SJ 32859 89426; Fig 1). This received flows from the land drainage and surface water system, as connected to the river Birket and the Great Culvert (to the south of the dock), and provided for their discharge either by gravity, via tidal flaps, or, under tide-locked conditions, via the pumping station into the River Mersey. In 2000 the Birkenhead Waste Water Treatment Works (WWTW), located immediately upstream, was constructed. A proposal for decommissioning the Morpeth Dock pumping station has, therefore, been made, as the Birkenhead WWTW has left the pumping station redundant.
- 1.1.2 The decommissioning would eliminate the risks associated with the continued ownership and maintenance of the pumping station. The preferred option for decommissioning is for the demolition of the pumping station, electricity sub-station and double-garage, and the subsequent infilling of the pumping station area and the eastern end of the Morpeth Branch Dock (which is presently dry). The Great Culvert diversion, incorporating a tidal flap chamber with flap valves and culvert to the River Mersey, would remain *in situ* and continue to operate, so as to protect the Birkenhead WWTW from flooding.
- 1.1.3 Planning permission and Listed Building Consent was required for the demolition of the pumping station and infilling of the eastern tip of the Morpeth Branch Dock, which were both granted. There is currently no proposal for the redevelopment of the site. Axis commissioned Oxford Archaeology North (OA North) to undertake a programme of desk-based research in conjunction with a survey of the extant remains of the dock. A survey of the dock by laser scanning was undertaken on 22nd January 2010 and the report outlining the results is presented below.

1.2 LOCATION, TOPOGRAPHY AND GEOLOGY

- 1.2.1 Morpeth Dock is in Birkenhead, on the Wirral, in Merseyside. The proposed works area is at the eastern end of the former Morpeth Branch Dock, a relatively small dock, accessed by a channel from the main Morpeth Dock to the north-west. In the 1960s a pumping station was constructed towards the eastern end of Morpeth Branch Dock, east of which is an open area of the former dock. Whilst Morpeth Dock survives as an area of open water, the remainder of the Morpeth Branch Dock, to the west of the pumping station, was infilled and developed in the 1990s.
- 1.2.2 The dock was built in the Wallasey Pool, an area of deep water running inland for two miles, and therefore well suited to harbour ships (Ashmore 1982, 154-5). The solid geology of the Birkenhead area is sandstone of the Triassic age, which is overlain in places by till and alluvium (BGS 2007).

2. METHODOLOGY

2.1 PROJECT DESIGN

- 2.1.1 The survey of Morpeth Branch Dock was undertaken in accordance with a project design prepared by OA North (*Appendix 1*). The primary purpose of the project was to provide an accurate archaeological survey of the extant dock remains and to link this into an historical study, in anticipation of the backfilling of the dock.

2.2 DESK-BASED RESEARCH

- 2.2.1 The research has focused on the historical development of Morpeth Dock through consultation of secondary sources and historic maps (Figs 2-13). Sources that were consulted include:

- **OA North Library:** OA North has an extensive archive of historic maps, secondary sources, and unpublished client reports. These were consulted where necessary;
- **Promap** (<http://www.promap.co.uk/promap/index.jsp>): some of the historic Ordnance Survey (OS) mapping was obtained from Promap;
- **Cheshire Record Office website** (<http://maps.cheshire.gov.uk/tithemaps/Default.aspx>): historic mapping and aerial photographs of the study area were consulted on this website;
- **English Heritage** (<http://www.imagesofengland.org.uk/default.aspx>): the Images of England website run by English Heritage was consulted for details of Listed Buildings in the immediate vicinity of study area;
- **Wirral Archives Service (WAS):** a search has been made of the WAS, which revealed a number of documents and plans associated with Morpeth Dock, although most of these show the development of the area prior to the construction of the Branch Dock;

2.3 FABRIC SURVEY OF THE DOCK

- 2.3.1 A detailed survey of the exposed fabric of the Morpeth Branch Dock was undertaken by means of a laser scan survey, creating a 3D model; this was then used to provide plans, cross-sections and elevations of the structure (Figs 14-17).
- 2.3.2 **Laser Scanning:** laser scanning creates an accurate 3D record of a structure by scattering, literally, millions of 3D survey points over a structure, which were then viewed in Pointools software. The survey comprising multiple set ups with the scanner, sufficient to record the external and internal faces of the dock. The survey was undertaken using a Faro laser scanner to produce an internal point cloud with about 5mm spacing
- 2.3.3 The output of the survey is presented as isometric views of the model (Fig 14), as well as any 2D slice through the model as appropriate. In this instance, it was decided to extract two profiles, a plan of the eastern end of the dock, an elevation of the north section of the dock wall (Figs 15-17). As the raw data is

maintained by OA North any additional drawings can be generated from the model as required. The data was extracted from Pointools and manipulated within AutoCAD; in particular, the detail for the primary plan (Fig 15) was derived from multiple slices through the laser scan model which were then combined within AutoCAD, from which the manually draughted drawing (Fig 15) was produced.

2.4 ARCHIVE

- 2.4.1 A full professional archive has been compiled in accordance with the project design (*Appendix 1*), and in accordance with current IFA and English Heritage guidelines (English Heritage 1991). On completion of the project, the paper and digital archive will be deposited with the Wirral Archive Service and copies of the digital data and report will be deposited with the Merseyside Historic Environment Record.

3. HISTORICAL BACKGROUND

3.1 INTRODUCTION

- 3.1.1 The following section presents a summary of the historical background of the Birkenhead Docks, followed by an historic map regression of Morpeth Dock and Morpeth Branch Dock.

3.2 BIRKENHEAD

- 3.2.1 Birkenhead remained largely undeveloped until 1815 when land on the river front was sold by Francis Richard Price, the then lord of the manor, and houses and a new church were built there. New residents were encouraged to move to Birkenhead by the introduction of a paddle steamer service from Liverpool to Woodside (south of the study area), although this service was intermittent at first (Collard 2007, 9-10). In 1822 a more reliable steam ferry was introduced, which then allowed people to live in Birkenhead and work in Liverpool and the population doubled from *c* 200 in 1821 to *c* 400 in 1823.
- 3.2.2 In the 1820s William Laird, a business man from Greenock, who had originally come to Liverpool to build up orders for his father's rope works, realised the potential of Birkenhead as an undeveloped area (*op cit*, 10). Laird then started to buy land in Birkenhead, with various ideas for its development, including a canal across the Wirral, which did not come to fruition. Laird needed partners and investors, as he was not able to finance these ventures alone, and began talks with the Great Western Railway (GWR) and the London and North Western Railway (LNWR), who were interested in Laird's idea for docks on the Wirral (*op cit*, 10-11).
- 3.2.3 In 1826 Laird and Sir John Tobin purchased a large tract of land on the shore of Wallasey Pool and soon afterwards commissioned the engineers, Messrs Telford, Stephenson and Nimmo, to survey the area and report on the practicability of providing dock accommodation there (Liverpool Mercury, 1871; Issue 17855)
- 3.2.4 Laird's plans for a port did not develop at this time, due to lack of finances, but Laird went ahead with laying out the town; he retained architect Gillespie Graham to design Hamilton Square and the centre of the town (to the south of the study area), and this was built in the late 1820s (Collard 2007, 11).
- 3.2.5 In 1830 two separate proposals for a railway from Chester to connect with the Woodside to Liverpool ferry were made; however, due to lack of parliamentary approval and finances neither plan succeeded. Further plans were put forward in 1835 by the Woodside Ferry Co, and in 1838 work finally began on the Chester and Birkenhead Railway, with a single line being opened in 1840, which terminated at Grange Lane (*op cit*, 11-12). The railway company then acquired most of the shares in the Woodside Ferry Co. and had already purchased the Monks Ferry Co, one of its main competitors in 1840. In 1842 the Birkenhead Improvement Commissioners took over the Woodside Ferry Co. and the railway was extended northwards from Grange Lane to the recently constructed Bridge End Dock (later known as Egerton Dock to the immediate west of Morpeth Dock). This line was then connected with the Shrewsbury and

Chester Railway, and with Saltney, so that coal from the Wrexham area could be transported to Birkenhead (*op cit*, 12).

- 3.2.6 **Dock Development:** a new proposal for an expanded dock in the Wallasey Pool was made by the Birkenhead Improvement Commissioners in 1843, which received Royal Assent in 1844. The engineer was JM Rendel, and the foundation stone was laid by Sir Philip Egerton on 23rd October 1844. However, financial problems delayed the development of the docks until 1847, when Morpeth and Egerton Docks were finally opened by Lord Morpeth on the 5th April, having cost £2 million to construct (Ashmore 1982, 154-5; Collard 2007, 12-13) (Fig 4). At this date Morpeth Dock was a small rectangular structure with dock gates feeding into Low Water Basin (which had been constructed by 1844) to the north and Woodside Basin to the south-east. It had a series of four graving docks radiating north out from it.
- 3.2.7 Work on the Great Float, the inland area of docks, was begun after the construction of Morpeth and Egerton Docks and the Great Low Water Basin, a basin that was excavated to allow access for ships to a harbour at all times of the tide. In 1849, JM Rendel, the dock engineer, was criticised for mismanaging the docks scheme, and he, subsequently, resigned and was replaced by Thomas Brassey (*op cit*, 16). In 1850 a temporary dam separated the Low Water Basin from The Great Float, which was opened in 1851, but soon afterwards was closed, and deepened (Liverpool Mercury 1871; Issue 17855). In the 1850s the Morpeth Dock was expanded to the north, into the area of the former graving docks, and a second double-gated lock was constructed leading into the Woodside Basin. This basin, by 1858 (Fig 5), had contracted in size, with the loss of the beaching ground, and had been walled.
- 3.2.8 There were financial problems in the early 1850s, when some of the merchants using the port resented paying the high dues demanded for cargo passing through it. In particular, it seemed to the merchants that the money taken was spent on developing Liverpool rather than Birkenhead. As a result, a Royal Commission was established in 1853, who investigated the complaints and recommended that a new body should run the Birkenhead and Liverpool docks. In 1857 the Mersey Docks and Harbour Board was established, who assumed responsibility for the docks from 1858 onwards (*ibid*).
- 3.2.9 There had been ongoing problems with the docks, including difficulties for large ships entering the dock system, as the water was not deep enough at the dock entrances. In addition, the Morpeth and Egerton Docks' gates had quickly become warped, and were difficult to shut (*ibid*). The then surveyors of the docks, Jesse Hartley, famous as the engineer on the Liverpool Docks, and his son JB Hartley, brought these problems to the attention of the Mersey Docks and Harbour Board (Collard 2007, 19). The board saw to it that work on the Great Float, with its entrance through the new Alfred Dock which was to replace the Great Low Water Basin, was continued and they were finally opened in 1866. Morpeth Dock was extended at this time, which included the construction of the Morpeth Branch Dock in 1866-68 (Collard 2007, 19-20; Ashmore 1982, 154-5). Morpeth Branch Dock was connected to Morpeth Dock by means of a passage at its south-western extremity 85 feet in width; 'it contained a water area of 4 acres, 243 yards and a lineal quayside of 637 yards' (Kellys Directory of Liverpool 1894, 788). The size of the entrance of Morpeth

Branch Dock in 1911 was listed as 84 feet 9 inches wide and the linear quayage 637 yards (Kellys Directory of Liverpool 1911).

- 3.2.10 **Port Development:** in 1861 a passenger railway line to Birkenhead was opened, and a number of new goods lines were constructed, which were connected to the large LNWR depot and the GWR goods shed north of Morpeth Dock (*op cit*, 20). To the north-east of the railway houses was the Wallasey Landing Stage, which was used, from 1878 onwards, to bring cattle on shore from ships arriving from Ireland and America. The cattle then moved down an elevated walkway to the Woodside lairage, located south of Morpeth Dock. Birkenhead was then one of the major ports for UK livestock imports (Ashmore 1982, 155-6; Collard 2007, 27). The construction of the docks had been central to the development of Birkenhead, with industries such as flour-milling, tanning, the manufacture of glue, suet and gelatine, iron-founding, engineering and steam wagon and tramcar manufacture being carried out by the end of the nineteenth century (McNeil and Newman 2006, 171 and 189; Ashmore 1982, 153; Collard 2007, 19). By 1871 the total area of the Birkenhead Estate was 497 acres, of which 167 acres was water space, with nine miles of quayage, warehouses, sheds, business yards and roads (Liverpool Mercury 1871; Issue 17855).
- 3.2.11 Morpeth Dock had an hydraulic crane of three tons capacity and the dock was used by the Clan Line Steamers trading to South Africa and India, and by those belonging to Messrs Gellatly, Hankey and Co. trading to China (www.merseyside-gateway.org.uk).
- 3.2.12 During the First World War, the Mersey was the major arrival point for American servicemen, and weapons, food, clothes and locomotives were all brought through the docks. In 1914 the Birkenhead cattle trucks were used to transfer the troops (Collard 2007, 31).
- 3.2.13 The whole dock system sustained extensive damage in the Second World War, in particular during the blitz of May 1941, and a number of areas required urgent repair in order to carry on functioning (Collard 2001, 13). By the end of the war, the Mersey Docks and Harbour Board had to undertake a massive reconstruction programme, as well as assessing the impact of the changing market trends in cotton and other goods (*ibid*). Some rebuilding took place at the Birkenhead docks during the 1950s and 1960s and they continued to thrive, particularly due to the increase in oil-related traffic. However, there were a number of industrial disputes by the port workers in the mid 1960s, which led to days when the port could not function. Ships were diverted to other ports, and their owners, having found a more reliable service elsewhere, did not return to the Mersey ports when the disputes were over (*op cit*, 15).
- 3.2.14 Shipping of containers also took off in the 1960s, and other ports were quick to develop container handling systems, which again diverted trade away from the Mersey docks. The Merseyside Docks were also a victim of the decline of the empire, losing previously important trading markets, and with the entry of Britain into the EEC, trade was diverted to Europe which preferred south and eastern docks (*ibid*). The Mersey Docks and Harbour Board subsequently went into liquidation, but the government replaced it with the Mersey Docks and Harbour Co in 1971, as it recognised the economic importance of keeping the port open (*op cit*, 17). However, by the early 1980s the use of Birkenhead as a port had started to decline and the number of docks in use at Birkenhead

gradually reduced, which resulted in Morpeth and Morpeth Branch Docks becoming redundant (Collard 2007, 50 and 52).

- 3.2.15 ***Morpeth Branch Dock Pumping Station (Fig 11)***: in the early 1960s a pumping station was constructed at the eastern end of Morpeth Branch Dock; the proposal drawing is dated August 1959. This was used for flood risk management, and received flows from the land drainage and surface water system, as connected to the river Birket and the Great Culvert (to the south of the dock), and provided for their discharge either by gravity, via the tidal flaps, or, under tide-locked conditions, via the pumping station into the River Mersey.
- 3.2.16 The remainder of Morpeth Dock was still in use in the 1990s, but has since been largely redeveloped, and the railway hub, along with many of the warehouses which lined the wharves of the dock, were then cleared (Plates 1-4). Whilst Morpeth Dock survives as an area of open water, the Morpeth Branch Dock was infilled and developed in the 1990s. The eastern end, east of the pumping station, is therefore the only remaining area of exposed dock walls. In 2000 the Birkenhead WWTW, located immediately upstream, was constructed, which has left the Morpeth Branch Dock pumping station redundant.

3.3 MAP REGRESSION ANALYSIS

- 3.3.1 This map regression is intended to provide an outline of the main developments of Morpeth Dock from the late nineteenth century onwards.
- 3.3.2 ***Proposed Docks in Wallasey Pool as designed in 1837 by W Laird, published, 1843 (B808/1)***: the plans proposed by W Laird show shipwrights yards on the banks of the Mersey, on either side of an opening to two small basins, an outward and inward. These in turn led to the Half Tide Basin (later to be called the Low Water Basin). To the north were graving docks and to the south a narrow, roughly north/south aligned dock with warehouses and canal. The dock was connected by lock gates to both the Half Tide Basin and also a rectangular basin, to the south-west, which was to become the Woodside Basin. Two connecting passages led from the Half Tide Basin to a long, narrow dock in Wallasey Pool. On the north side of the proposed dock was a small works, of unknown function, and a lead works.
- 3.3.3 ***Plan of Floating Dock and other works at Wallasey Pool, 1843 (B/808/A1) (Fig 2)***: a new proposal for an expanded dock in the Wallasey Pool had been made by the Birkenhead Improvement Commissioners in 1843, which had received Royal Assent in 1844. This map was produced by JM Rendel, the engineer, and showed the whole of the Wallasey Pool area. The proposed docks included the Great Low Water Basin and 'intended dam'. An arm of the basin branched to the south-west towards Corporation Road, where a smaller dock was proposed to the east of a lime works, and was in the position of what was to be the Egerton Dock. To the north-west of the basin was a wharf and pier head adjacent to a 'small works'. The plan shows a proposal for a basin, adjacent to a ferry pier, in what was to become the Woodside Basin; however, the shape of the basin was slightly irregular and significantly larger than that depicted on the earlier proposal (B808/1).

- 3.3.4 ***Plan of the Docks and Warehouses proposed to be made at Birkenhead, 1844 (B/808/A3) (Fig 3):*** this plan was also produced by JM Rendel and outlined the site of a proposed dock immediately to the south-east of the Low Water Basin, which was also connected by lock gates to Woodside Basin to the south-east. The small proposed dock was ultimately to be the Morpeth Dock and the later Morpeth Branch Dock was to be on the site of the Woodside Basin. A ‘steam packet wharf’ and railway are marked adjacent to the proposed dock, with two additional wharves extending towards the river Mersey. To the west was a goods station for railway goods and general sample rooms and further to the west are Stanley Dock, Egerton Dock and Westminster Dock, all aligned north-east/south-west and opening up onto ‘The Great Float’. On the north side of the Great Float were the British Gum Works, Copper Rolling Mills, Varnish Works and an Iron Foundry.
- 3.3.5 ***Plan of the Docks and Warehouses to be visited during the opening ceremony, 1847 (B/808/4) (Fig 4):*** the drawing commemorates the opening by Lord Morpeth of two new docks on 5th April 1847. These were each annotated simply as ‘Dock’, but were subsequently called Morpeth Dock and Egerton Dock. They were to the north-west of the Woodside Basin, ferry slip and beaching ground, which was the site of the later Morpeth Branch Dock. The depiction of ‘Morpeth Dock’ corresponded to the ‘proposed dock’ shown on the previous plan and which was then connected to four graving docks and was adjacent to a steam packet wharf and railway extension. The dock was a much smaller version of what it was ultimately to become, and only the south-western dock wall corresponded with that of its later form. Less detail is shown to the west of the warehouse area, immediately to the south of The Great Float, which was shown simply as ‘Birkenhead Dock Company’s Property’. A series of interconnecting locks and bridges are shown around the Low Water Basin area and to the north was another wharf.
- 3.3.6 ***Plan showing the works authorised by the first and second Acts of the Birkenhead Dock Commissioners, 1847 (B/808/A10):*** the Great Low Water Basin was shown, as on previous maps, as comprising 37 acres. To the south-west was the ‘Crown Reserve’ basin, with an area on the south side annotated in a hand-written note as ‘Morpeth Docks. The four graving docks are also shown. To the west the Dock Company’s Warehouses were shown and there were further proposals marked for the area previously shown as The Great Float and series of interconnecting docks. On the north side of the Great Float channel, the gum, copper, varnish and iron works were shown.
- 3.3.7 ***Plan showing the docks and proposed works, 1858 (Fig 5):*** this plan shows Morpeth Dock and Egerton Dock adjacent to Woodside Basin. To the immediate west of Egerton Dock was the Mariners Church. To the north of Morpeth and Egerton docks were areas of proposed works, on either side of the Great Float Entrance. Morpeth Dock had been substantially enlarged since the previous map, with the loss of the four graving docks, and the addition of a further double gated lock leading to the dock from the adjacent Woodside Basin (double gate locks allow for movement into the dock at all stages of tide). The Woodside Basin had been reduced in extent, with loss of the beaching ground, by comparison with the 1847 plan (B/808/A10), and was by this stage edged on three sides with walls, but was still open to the Mersey. The area to the south-east of Morpeth and Egerton Docks had been developed and some of the

buildings included a customs shed, coal yard, timber yard and various depots, warehouses and sheds. The proposed landing stage for the Woodside Ferry is also shown, with an adjacent promenade.

- 3.3.8 **Ordnance Survey first edition 6"to 1 mile map, 1882 (Fig 6):** a lock with an hydraulic swing bridge at the western end forms the entrance to Morpeth Dock (Listed Building IoE 389256) from the river Mersey. This provided access into the main area of the dock, with a narrow channel leading to the smaller dock (named Morpeth Branch Dock) in the south-eastern area of Morpeth Dock, in which the present study area is located. Both Morpeth Dock and the Morpeth Branch Dock have by now taken on their most complete form. A channel at the western end of Morpeth Dock links it to Egerton Dock. Hydraulic swing bridges are marked across both of these channels, with that over the channel to Egerton Dock carrying a railway line. This line led to the 'Great Western Railway Company's Goods Station', located to the north of Morpeth Dock. A group of un-named buildings are located to the north-west of the goods station. Morpeth Dock has buildings on its south side, and buildings in the area north of the lock. A Time Gun is marked to the east of the northern area of the dock. The three wharves of Morpeth Branch Dock are shown as lined with buildings, the northern and south-western of these are unnamed on the map, but the south-eastern (Listed Building IoE 389268) is labelled 'China Steam Navigation Company's Goods Shed'. South of this are further buildings labelled 'Pacific Steam Navigation Company's Works'.
- 3.3.9 **Ordnance Survey 25"to 1 mile map, 1911 (Fig 7):** this map was produced at a larger scale and, therefore, shows more detail of the docks, as well as showing some changes since the 1882 OS map. A swing bridge is shown at the eastern end of the lock leading into Morpeth Dock, in addition to the hydraulic swing bridge at the western end. The area to the north of the dock now contains further railway lines, which lead to the GWR Goods Shed, and to the west of the un-named buildings is an area labelled 'Goods Yard (L & NWR)'. The wharves of Morpeth Dock are now all lined with buildings, although none of these is labelled. A hydraulic crane is marked on the north-western wharf of the dock, and mooring posts are marked along the dock walls. More detail is shown of the buildings on the wharves of Morpeth Branch Dock, which are divided into sheds: four on the south-east wharf, three on the south-west wharf and six on the northern wharf. Mooring posts are also shown along the dock walls, and the area to the south of the dock (on the south side of Pacific Road) has been further developed, and is labelled 'Woodside Lairage', indicating that it was now in use as a livestock holding area. The line of the Mersey railway tunnel is also depicted on this map.
- 3.3.10 **Ordnance Survey 6"to 1 mile map, 1928 (Fig 8):** there appear to have been no significant developments between the production of the 1911 OS map, and the production of this map aside from the construction of the ventilation station for the Mersey Tunnel at the eastern end of Morpeth Branch Dock (Listed Building IoE 389269).
- 3.3.11 **Ordnance Survey 6"to 1 mile map, 1938 (Fig 9):** this map is generally similar to that of the 1928 map. In Morpeth Dock, the buildings on the south side of the dock are labelled 'warehouses', and the bridge which links this dock to Egerton Dock is labelled as a bascule bridge. In addition to the Time Gun at the eastern

end of the dock, a 'Ball Signal Navigation Light (Green)' is marked. The line of the Mersey road tunnel is indicated on this map.

- 3.3.12 **Ordnance Survey 1:10,560 map, 1954-56 (Fig 10):** the bridges across the lock from the river Mersey into Morpeth Dock are depicted on this map, but not labelled. No other significant changes since the 1938 OS map were noted.
- 3.3.13 **Cheshire River Board Morpeth Branch Dock Pumping Station Proposal, 1959 (Fig 11):** this proposal drawing, dated August 1959, was produced by Sandford Fawcett and Partners Consulting Civil Engineers. It shows the station set into the easternmost tip of the Branch Dock, and provided for flood risk management. The plan shows large pipes from the 'Great Culvert' to the south of the dock leading to either a series of four pumps or into a tank containing tidal flap chambers. The latter had a pipe which fed back into the 'Great Culvert' and in effect provided a defence against high tide inundation of the culvert and River Birkett. The pumps provided flow, under tide-locked conditions, into the river Mersey. The layout of the pumping station was largely as it is now, with the tidal flow tank on the southern side of the dock closely matching its present form. The original steps at the eastern end of the dock are shown, as are the later steps leading from the tank; however, the concrete overhangs over the dock wall are not depicted.
- 3.3.14 **Ordnance Survey 1:10,560 map, 1966 (Fig 12):** the north-eastern part of Morpeth Dock is labelled 'Morpeth Tongue' on this mapping. The Time Gun and Ball Signal are not labelled on this mapping. The areas of Morpeth Dock and Morpeth Branch Dock appear much as they were depicted on the 1950s OS map. To the north-east of Morpeth Dock, the un-named building to the west of the goods shed is labelled as a stables, and the goods yard to the west of this is now shown as having been sub-divided and is labelled as allotment gardens. The map does not depict the Morpeth Branch Dock pumping station (Fig 11) even though that had been constructed in the early 1960s.
- 3.3.15 **Aerial Photos, c1971-3 (<http://maps.cheshire.gov.uk/tithemaps/Default.aspx>) (Plates 1 and 2):** black and white aerial photography from the 1970s shows the dock in use, and with much the same layout as depicted on the 1966 OS mapping. The most significant change is the development, at the eastern end of Morpeth Branch Dock, of the pumping station. This is marked on the current map and can be seen extending almost across the length of the eastern end of the dock, and there is an open area to the east of this. Three small square buildings (the switch room to the south of the pumping station and the two tidal flap chambers to the east) are shown along the southern portion of this area.
- 3.3.16 **Ordnance Survey 1:10,560 map, 1991 (Fig 13):** some clearance of the area around the dock had taken place by the time of this mapping. To the north of Morpeth Dock, the railway lines, goods shed, stables and allotment gardens all appear to have been cleared, and the area is blank. The buildings on the north side of the dock had also been cleared. The two bridges across the lock between the river Mersey and Morpeth Dock had been removed and replaced with one bridge, located more centrally across this channel. The bascule bridge across the channel into Egerton Dock was still marked; however. The study area is shown as having been developed and includes the pumping station, with an open area (tip of the Morpeth Branch Dock) on its eastern side. The rest of the dock to the west is still shown as an open, and has not, by this date been backfilled.

3.3.17 **Current mapping, c 2008 (Fig 1):** the current mapping shows that the warehouses on the south-western and northern sides of Morpeth Branch Dock have been removed since the 1991 OS map. The dock itself has also been infilled and developed, as has the area of the former lock linking the river Mersey into Morpeth Dock. The study area has a rectangular pumping station on its west side, a small square pumping house on its east side (immediately west of the ventilation station), three other small buildings on the south side, and an open area of former dock (now dry). Morpeth Dock remains an area of open water, however, and there is still access through to Egerton Dock. All of the former buildings flanking the dock have been removed, and there are some new developments.

3.4 LISTED BUILDINGS

3.4.1 There are three listed buildings in the area:

3.4.2 **Morpeth Dock (IoE 389256, at NGR SJ 3254 8959):** this listing includes Morpeth Dock and the dock walls, located to the north and north-west of the study area. The dock was originally constructed in 1847 by JM Rendel, and was reconstructed and expanded in 1868 by JB Hartley. The walls are granite faced, with some cast-iron dock furniture. The main basin, which was linked to the river Mersey by lock, was laid with interlocked stone, to provide rigidity. The raised surfaces of the wharves contain cast-iron hatches to provide access to the hydraulic power system, installed in the 1880s, which was used to open gates etc. There are flights of steps to the water.

3.4.3 Recent discussions between Axis and the Wirral Council Conservation Officer have indicated that this listing is interpreted to include the eastern end of Morpeth Branch Dock, where the dock walls are exposed.

3.4.4 **Transit Sheds to the south of Morpeth Branch Dock (IoE 389268, at NGR SJ 3281 8937):** these Grade II Listed Buildings are located to the immediate south and south-west of the study area. This listing covers four single-storey sheds, which have wide openings and sliding doors to the dockside. The sheds were constructed, under the supervision of GF Lyster, an engineer, in c 1872-73. These are the only stone transit sheds in Merseyside.

3.4.5 **Woodside Ventilation Station of the Mersey Road Tunnel (IoE 389269, at NGR SJ 3291 8943):** this Grade II Listed Building is located to the immediate east of the study area. It was constructed in 1925-34 by Sir Basil Mott and JA Brodie to the design of Herbert Rowse. The building houses giant fans for ventilation, and is the largest of a series of three towers on the Birkenhead side of the Mersey Tunnel.

4. SURVEY RESULTS

4.1 MORPETH BRANCH DOCK

- 4.1.1 The extant section of dock, is the curved easternmost tip of the Morpeth Branch Dock. It was a section cut off from the main dock in 1960 to allow for the construction of the Morpeth Dock Pumping Station, and is shown as such on the 1971-3 aerial photographs (Plates 1-2). The rest of the Branch Dock was subsequently backfilled and the site was redeveloped, leaving this small section as the only extant vestige of the dock. There are three sections of the dock that are distinct in their form; the northern section, the easternmost section which includes a rebate for steps and the southernmost section which is heavily obscured by tanks and infrastructure belonging to the pumping station. The exposed depth of the dock is only 3.8m, and much of the dock has been backfilled.
- 4.1.2 ***Northern Section (Figs 14, 15 and 16; Plates 5 and 6):*** the northern section is the best surviving section as it was not impacted by the works for the pumping station, and its easterly edge is marked by descending steps. The geology is distinct from that of the eastern and southern sections. It has a bright white, dressed limestone coping on top, which was also used for the upper surface of the steps. It has a pale, pink sandstone facing with cut ashlar blocks. While the masonry is well coursed there is a mixture of different sized and shape stones which disrupts the coarsing in places; as such this contrasts with the slightly more regular construction on the south and eastern sides. The masonry wall is generally in a very good condition, with few indicators of erosion scars or decay of the masonry joints.
- 4.1.3 The slightly irregular character of the northern side is reflected in plan, as it is evident that the coping stones are of irregular shape and size by comparison with those to the south. They have a slightly erratic, and essentially long and short quayside edge to the line of coping stones, whereas the southern ones have a straight edge, parallel to the dock edge. In between the coping stones are the bored holes for lead bonding of the ashlar joints; molten lead poured in after construction of the masonry would fill recesses in both stones so that when the lead goes solid it provides a permanent join between them. These holes are at a fairly uniform 0.5m separation out from the dock edge, but, because the stones are not regular, they are not necessarily in the middle of each stone. At the eastern end of the wall section is a mooring ring that is 0.3m in diameter and set 1m below the top of the dock wall.
- 4.1.4 ***Eastern Section (Figs 15 and 17; Plates 7 and 8):*** the eastern section includes the access steps and the eastern, curved end of the dock. The steps are an integral part of the original design, as they are set within a purpose built rebate into the dock wall. At the top of the dock wall, there is no rebate on the southern side, but at depths of 2.0m and 2.9m from the surface there are overhanging corbelled edges, such that at the present depth of the dock (3.8m below the top of the wall) the wall face is recessed by 0.3m in this area (Figs 15 and 17) and has an overhang above. The vertical curved corner of the rebate edge is visible at a distance, around the curve, of 13.2m from the top of the steps. Assuming that the angle of descent of the steps is constant, and allowing

for a 1m platform step at the base of the steps, it is possible to estimate how deep the steps descended before they came up against the vertical line of the rebate. The computation indicates that the base of the steps was 8.2m from the top of the wall, and the dock was evidently at least that depth. The steps would have gained access to the interior of the dock when it was empty of water, and it may be that the base of the steps corresponded with the floor of the dock, but it is also possible that there was some depth of water below the step base. A depth recorded for the adjacent Morpeth Dock in 1910 (Cunningham 1910, 33) was 9.6m from top of the coping stone, and may suggest that Morpeth Branch Dock sill was 1.4m below the depth of the steps. This minimum depth of the dock is more than twice the present depth of 3.8m, and would suggest that much of the depth of the dock had been backfilled.

- 4.1.5 The steps were of a similar dressed limestone as the northern coping (Plates 6 and 7). Covering the top eight steps is a layer of concrete which evidently reflects a later repair of damaged step surfaces. Set into this is a brick structure which was probably intended to block off the steps. Below this brick 'blocking' the steps are in good condition.
- 4.1.6 The facing stone behind the steps has a different character to that facing the steps and on the northern section of the wall. It is of a red sandstone, but the ashlar blocks are again irregularly sized, leading to slightly irregular coursing. The ashlar blocks for the overhanging 'steps' are large blocks divided by a course of small blocks.
- 4.1.7 ***Southern Section (Fig 15; Plates 9 and 10):*** the southern section is largely obscured by the construction of a large tidal flap tank in front of it in 1960; however, the eastern part of the wall is visible. The facing stone is again of red sandstone ashlar blocks, which are again of irregular size, but they are better coursed than those of the northern section. The particular characteristics of the coping stones, which again are of limestone construction, is that they are of a very regular size by comparison with those on the northern section, each being typically 1.1m x 0.77m in size. The quayside edge of all the coping stones is set along a line parallel to the dock edge and the adjacent warehouse. Between the edge of the coping stones and the warehouse is a narrow strip of cobbles. Between the coping stones are again the bored holes for lead bonding of the ashlar blocks.
- 4.1.8 ***Conclusions:*** there is a contrasting build between the northern and southern sides of the dock, defined by the differences in the regularity of the coping and the type of sandstone. Such differences could potentially reflect distinct phases of construction; however, the steps are of one build and the masonry of the rebate is of another. The rebate was specifically built to accommodate the steps, and therefore the steps can not be a later addition. The possibility exists that the distinct builds reflect different phases of construction, such that alternative stone quarries were sourced part way through construction, or that the different sides of the dock were built by different contractors.

5. DISCUSSION

5.1 MORPETH BRANCH DOCK

- 5.1.1 The map regression has demonstrated that the area of Woodside Basin was subject to many changes and developments between 1843 and the construction of the Morpeth Branch Dock in 1866-8. Subsequently, there was seemingly little change to the dock itself, for almost a hundred years until the construction of the pumping station in c 1960 (Plates 1-4). This appears to be confirmed by the fabric survey which shows two principal phases of construction, the first corresponding with the docks construction and the second with its adaptation for the pumping station. The build characteristics of the northern side of the dock are generally similar to those of the southern side, although the northern side was a bit more irregular in build. However, the principle difference is that the facing stones on either side used a different type of sandstone. The external face of the steps has the pale, pink sandstone, whereas the facing stones behind the steps, incorporating a rebate for the steps, have a red sandstone. While this could be perceived as a phase change, the steps had an integral construction with the rear face, and the corresponding step rebate, and were evidently not a later addition. While it is possible that the north side of the dock was refaced, it is perhaps significant that both sides had a roughly coursed ashlar build. It is, therefore, probable that the colour change reflects the switching of quarry sources in the course of the original build and perhaps also reflects different contractors rather than a different phase of construction.
- 5.1.2 The construction of the pumping station, as depicted in the 1959 proposal (Fig 11), corresponds closely with the Phase 2 features identified by the survey. The pumping station depiction at the west end correlates with the observed wall of the pump house. The plan of the Tidal Flap chambers matches closely with the observed remains, even down to the form and position of the metal steps. The southern concrete overhang is as depicted on the plan, but an eastern overhang, over part of the stone steps, was not depicted on the 1959 plan.
- 5.1.3 The survey suggests that the depth of the dock is at least 8.2m and could be as much 9.6m from the top of the dock wall; whereas the present depth is 3.8m. This confirms that the dock has been substantially backfilled and that there is likely to be largely intact walls, and the dock sill, beneath the present depth. The 1959 plan of the proposed pumping station shows large subterranean pipes feeding into the tidal flap chambers, and these are likely to be within the depth of the backfill. At two points these pipes are shown breaching the dock walls, and there will, therefore, be some damage to the walls; otherwise, the wall was found to be in good condition.

6. MITIGATION

6.1 MITIGATION STRATEGY

- 6.1.1 The survey has provided an historical account of the development of Morpeth Dock and the associated Morpeth Branch Dock, compiled from readily available sources including the OA North library, websites and historic mapping. This has been undertaken in conjunction with a detailed fabric survey of the dock by laser scanning which has provided a mitigative record of the structure in advance of its being backfilled (Figs 14-17). The survey has determined that the structure, barring the 1960 pumping station improvements, is in good condition.
- 6.1.2 The recent backfilling of the upper 3.8m of the dock has been undertaken with loose aggregate, which will not adhere to the masonry, and any blacktop surface was separated from the masonry by a membrane. In the area between the tidal flap chambers and the wall, where there is an overhang, a 600mm thickness of polystyrene was used to protect the wall, and the rest of the void was filled with a soft foamed concrete. The foamed concrete was a soft mix which can subsequently be removed if required. Given the previous good condition of the wall and the benign backfill strategy, the dock wall is preserved intact for the future.

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Promap - <http://www.promap.co.uk/promap/index.jsp> (for historic mapping)

English Heritage, Images of England - <http://www.imagesofengland.org.uk/default.aspx> (for details of Listed Buildings)

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APPENDIX 1 PROJECT DESIGN

1. INTRODUCTION

1.1 CONTRACT BACKGROUND

1.1.1 Oxford Archaeology North (OA North) has been invited by Axis to provide a project design for a fabric survey of the extant remains of Morpeth Branch Dock (NGR SJ 32859 89426). This is required in advance of the proposed decommissioning of the adjacent Morpeth Dock pumping station. The decommissioning has been proposed as it would eliminate the risks associated with the continued ownership and maintenance of the pumping station. The preferred option for decommissioning is for the demolition of the pumping station, electricity sub-station and double-garage, and the subsequent infilling of the pumping station area and the eastern end of the Morpeth Branch Dock (which is presently dry). The site has listed building status and there is an anticipated requirement for detailed recording of the dock element in advance of its backfilling.

1.1.2 A provisional historical background was provided to accompany the planning application for the development (OA North 2007), but this was only in outline and did not provide a sufficiently detailed assessment of the history and development of the site. As part of the mitigative stage of the programme there would need to be a full desk-based assessment of the dock.

1.2 HISTORICAL BACKGROUND

3.2.16.1 A proposal for an expanded dock in the Wallasey Pool in Birkenhead was made by the Birkenhead Improvement Commissioners in 1843, which received Royal Assent in 1844 and this provided the basis for the construction of what were to become the Morpeth and Egerton docks. The engineer was JM Rendel, and the foundation stone was laid by Sir Philip Egerton in the 1844. However financial problems delayed the development of the docks until 1847, when Morpeth and Egerton Docks were finally opened by Lord Morpeth on the 5th April, having cost £2 million to construct (Ashmore 1982, 154-5; Collard 2007, 12-13).

3.2.17 There had been ongoing problems with the docks, including difficulties for large ships entering the dock system, as the water was not deep enough at the dock entrances. In addition, the Morpeth and Egerton Docks' gates had quickly become warped, and were difficult to shut. The then surveyors of the docks, Jesse Hartley, famous as the engineer on the Liverpool Docks, and his son JB Hartley brought these problems to the attention of the Mersey Docks and Harbour Board. The board saw to it that work on the Great Float with its entrance through the new Alfred Dock, which was to replace the Great Low Water Basin, was continued and they were finally opened in 1866. Morpeth Dock was extended at this time, which included the construction of the Morpeth Branch Dock in 1866-68 (Collard 2007, 19-20; Ashmore 1982, 154-5).

3.2.18 In 1861 a passenger railway line to Birkenhead was opened, and a number of new goods lines were constructed, which were connected to the large LNWR depot and GWR goods shed north of Morpeth Dock (*op cit*, 20). To the north-east of the railway houses was the Wallasey Landing Stage, which was used, from 1878 onwards, to bring cattle on shore from ships arriving from Ireland and America.

3.2.19 The whole dock system sustained extensive damage in the Second World War, in particular during the blitz of May 1941, and a number of areas required urgent repair in order to carry on functioning (Collard 2001, 13). By the end of the war, the Mersey Docks and Harbour Board had to undertake a massive reconstruction programme, as well as assessing the impact of the changing market trends in cotton and other goods (*ibid*). Some rebuilding took place at the Birkenhead docks during the 1950s and 1960s and they continued to thrive, particularly due to the increase in oil-related traffic.

3.2.20 Shipping of containers took off in the 1960s, and other ports were quick to develop container handling systems, which diverted trade away from the Mersey docks. The Mersey Docks and Harbour Board subsequently went into liquidation, but the government replaced it with the

Mersey Docks and Harbour Co. in 1971, as it recognised the economic importance of keeping the port open (*op cit*, 17). However, by the early 1980s the use of Birkenhead as a port had started to decline and the number of docks in use at Birkenhead gradually reduced, which resulted in Morpeth Dock becoming redundant (Collard 2007, 50 and 52).

1.3 OXFORD ARCHAEOLOGY NORTH

1.3.1 Oxford Archaeology North (OA North) (formerly Lancaster University Archaeological Unit (LUAU)) has considerable experience of the archaeological survey and evaluation of sites and monuments of all periods, having undertaken a great number of small and large projects during the past 19 years. OA North has particular experience in the archaeological recording and analysis of standing ancient monuments, historic buildings and industrial landscapes. Projects have been undertaken to fulfil the different requirements of various clients and planning authorities, and to very rigorous timetables.

1.3.2 OA North has been undertaking detailed fabric survey of buildings since 1984, and is one of the foremost specialists in building recording. OA North has developed recording and analytical techniques over the years in order to improve the efficiency and quality of the surveys, and is a practitioner of all types of building survey technique. This culminates with the use of 3d Laser scanning, which provides accurate, very detailed 3d data by economic means, which can then be used for the creation of both a fully rendered 3D model or / and 2D drawings as required. OA North has recently undertaken a Laser Scan survey of nineteenth century warehouses and docks in Liverpool, and also the interior of a blast furnace and a steam engine at Backbarrow, Cumbria. The latter two jobs were undertaken in very confined spaces and demonstrated the effectiveness of the techniques in such circumstances.

1.3.3 OA North has considerable experience of the investigation of buildings of all types over the last twenty years. This includes the fabric survey of a number of castles, eg Bolton Castle, North Yorks, Brougham Castle, Cumbria, Peel Castle, Cumbria, Lancaster Castle, as well as a significant number of Abbeys, which include Calder Abbey, Furness Abbey (both Cumbria) and Jedbergh Abbey (North Yorks). OA North has also considerable experience of the recording of buildings of lesser status, particularly vernacular structures.

1.4.2 **Dock Experience:** OA North has enormous experience of the recording of docks on the opposite side of the Mersey. OA North has been involved in the archaeological investigations at Canning Place, Liverpool, since 2001, and has recently completed the field work of a further phase of evaluation/excavation on the Old Dock, Chavasse Park and Canning Dock areas. OA North has undertaken all the work on the Old Dock as part of the Paradise Street Development, as well as the Merseytram investigations. This has entailed a massive programme of open area excavation, and OA North is now compiling the exhibition material for the Old Dock Information Centre. In addition OA North has undertaken extensive building surveys of warehouses within the extent of the Paradise Street development.

1.4.3 OA North has undertaken the programme of archaeological evaluation in advance of the Liverpool Canal Link on behalf of British Waterways. The archaeological programme has exposed and recorded the docks for St Georges Basin, Chester Dock and the Manchester Dock (OA North 2006a). In addition to this a further programme of evaluation was undertaken by OA North on an adjacent area in advance of the proposed Mann Island retail development (OA North 2006b) which recorded the early Dry Dock (forerunner of Canning Dock).

1.3.4 OA North has the professional expertise and resources to undertake the project detailed below to a high level of quality and efficiency. OA North and all its members of staff operate subject to the Institute of Field Archaeologists' (IFA) Code of Conduct. OA North is a registered organisation of the IFA (No 17).

2. OBJECTIVES

2.1 The following programme has been designed in accordance with a brief by the Conservation Officer of Wirral Borough Council to provide a desk-based assessment of the dock and its development and also a fabric survey of the dock as mitigation for its backfilling.

3. METHOD STATEMENT

3.1 INTRODUCTION

- 3.1.1 There is a requirement for a desk based assessment of the dock, which would follow on from and augment the earlier outline historical study (OA North 2009). There is also a requirement for a fabric survey of the dock, which it is proposed be undertaken by laser scanning.

3.2 Desk Based Assessment

- 3.2.1 **Desk-based Assessment:** A detailed archaeological desk based assessment (DBA) should be undertaken in accordance with the relevant IFA and English Heritage guidelines (Institute of Field Archaeologists, 2001 *Standard and guidance for archaeological Desk-based Assessments*; English Heritage, 2006 *Management of Research Projects in the Historic Environment* (MoRPHE)). The desk based assessment, follows on from the earlier historical background, and will be enhanced by further documentary work. The data generated during the present study will serve as a guide to the archaeological and historic potential of the site. The DBA will review the existing documentary and all available cartographic sources and any available historic photographs of the study area. Particular emphasis will be upon the historic Ordnance Survey cartographic evidence which has the potential to allow an assessment of the development of the site. In particular, the DBA would make use of the following resources:

- **Wirral Archives Service (WAS):** a brief search has been made of the catalogue of the WAS, which revealed a number of documents and plans associated with Morpeth Dock. The DBA would make particular use of the plans, which may show nineteenth century developments to the dock. The WAS also holds historic mapping of Birkenhead and may hold photographs of the study area.
- **Merseyside Archaeological Service Historic Environment Record (HER):** consultation would be made with the curator of the HER, to check for any records of archaeological sites or previous archaeological work within the study area. Any photographic material lodged in the Merseyside Historic Environment Record will also be studied. Published documentary sources will also be examined and assessed.
- **Aerial Photos:** an initial search was made of historic aerial photos of Morpeth Dock with Cheshire Shared Services. It is likely that there are further aerial photos to those obtained for the preliminary desk-based work. A further search would therefore be made of Cheshire Shared Services and other possible sources of aerial photographs such as WAS and the NMR (National Monuments Record) aerial photograph collection.

3.3 Fabric Survey of the Dock

- 3.3.1 It is proposed to undertake a detailed survey of the exposed fabric of the Morpeth Branch Dock by means of laser scan survey. This would create a 3D model of the structure, which can then be edited to provide plans of the structure, cross sections and elevations of the dock walls.
- 3.3.2 **Laser Scanning:** laser Scanning is a modern technique which produces an accurate 3d record of a structure in a very short time. It entails the scattering of, quite literally, millions of 3d survey points over a structure which can then be viewed and manipulated in AutoCad (using Cloudworks software) or using Pointools software. The technique can produce a detailed survey of a structure such as the Morpeth Dock, both internally and the external quayside stones, in a short amount of time. The resultant point data can be used as a record in its own right, or can be enhanced by drawing around the salient features within AutoCad to produce 2d drawings, or by the draping of modelled surfaces over the point cloud to create a model. The advantage of the technique is that it provides more detail than can ever be reproduced within 2d drawings and the digital data can be reinterrogated at any stage to provide further information as required.
- 3.3.3 The survey will entail set ups of the scanner sufficient to record the external and internal faces of the dock. The survey will be undertaken using a Faro laser scanner to produce an internal point cloud with about 5mm spacing and will be undertaken by APR Services. A number of set-ups will be utilised to ensure that there are no shadows or gaps within the digital record.

- 3.3.4 **Drawing production:** the survey will provide a plan of the dock, two cross sections and the principal elevations. The plan will incorporate a horizontal slice through the dock model at a metre below the top of the dock and also will be merged with face on views of the quay stones at the top of the dock and the present ground surface at the base of the dock. The three views (slices) will be merged to create a composite plan of the dock and all associated elements. A drawing will be created within AutoCAD of all the principal elements and stonework, which can be superimposed with the detail from the laser scan slices.
- 3.3.5 Cross sections in east/west and north/south axes will be generated from the laser scan data and drawings will be produced by tracing over the principal features within AutoCAD.
- 3.3.6 Elevation slices will be extracted from the Laser scan data and inserted into an AutoCAD drawing. The main outline will be traced within AutoCAD but the individual stones will be represented by the detail from the laser scan slice.
- 3.3.7 **Photographic Archive:** an oblique photographic record will be produced for all elevations as well as general views of the interiors and exteriors of the dock. This photographic archive will be produced utilising a 35mm camera to produce both black and white contact prints as well as digital images throughout. The archive will comprise general shots of the building(both internal and external) and their surroundings and detailed coverage of architectural features.

3.4 SURVEY RESULTS

- 3.4.1 **Archive:** the results of Stages 3.1-3.3 above will form the basis of a full archive to professional standards, in accordance with current English Heritage guidelines (*Management of archaeological projects*, 2nd edition, 1991). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. The deposition of a properly quantified, ordered, and indexed project archive in an appropriate repository is considered an essential and integral element of all archaeological projects by the Institute of Field Archaeologists in that organisation's Code of Conduct. This archive will be provided in the English Heritage Central Archaeology Service format, as a printed document, and a synthesis (the evaluation report and index of the archive) will be submitted to the relevant Sites and Monuments Record.
- 3.4.2 The archive will be formed of all the primary documentation, including the following:
- Survey Information
 - Field drawings and digital copies of CAD data
 - Photographic negatives, prints and digital photographs
 - Administrative records
- 3.4.3 The survey will create a 2D plan of the dock. There will also be elevations / sections from all sides of the dock. There will also be two cross-sections through the dock.

3.5 REPORTING

- 3.5.1 The report will present, summarise, and interpret the results of the programme detailed above, and will include a full index of archaeological features identified in the course of the project. The reports will consist of an acknowledgements statement, lists of contents, summary, introduction summarising the brief and project design and any agreed departures from them. The report will identify the significance of the archaeological and architectural evidence and will include the following:
- An historical background of the dock, examining its origins and development
 - Description of the topographic context
 - Results of the archaeological survey, presented in conjunction with the survey mapping and documentary data.
 - An interpretative account of the development of the designed landscape from its inception to the present. The report will highlight those elements of the original design that have either been lost or severely degraded.

- A complete bibliography of sources from which the data has been derived, and a list of further sources identified during the programme of work.
- 3.5.2 The report will incorporate appropriate illustrations, including copies of the site plans, landscape survey mapping, all reduced to an appropriate scale. The site mapping will be based upon the CAD base and the laser scan slices. These will include the following:
- Site location map
 - Site plan
 - Cross section east/west and north/ south through the dock
 - Elevations
 - Plans of the site incorporating cartographic sources, presented as a map regression, and also all features identified by the desk based assessment.
 - Photographs of the site and aerial photographs if pertinent
- 3.5.3 **Editing and submission:** the report will be subject to the OA North's stringent editing procedure and two bound and one unbound copies of the report will be submitted to Axis, one to the Merseyside HER and one to Wirral Borough Council. In addition to the paper copies of the report digital copies of the report and drawings will be submitted in PDF format.
- 3.5.4 Primary archival material, such as negatives and historical mapping will be submitted to the National Museums Liverpool.
- 3.6 GENERAL CONDITIONS**
- 3.6.1 **Access:** it is understood that the client will ensure pedestrian and vehicular access to the site.
- 3.6.2 **Health and Safety:** full regard will, of course, be given to all constraints (services) during the survey, as well as to all Health and Safety considerations. The OA north Health and Safety Statement conforms to all the provisions of the SCAUM (Standing Conference of Unit Managers) Health and Safety manual. Risk assessments are undertaken as a matter of course for all projects. The Unit Safety Policy Statement will be provided to the client, if required. Survey will be excluded to any parts of the structure where there is no safe access available.
- 3.6.3 **Confidentiality:** the report is designed as a document for the specific use of the client,, for the particular purpose as defined in this project design, and should be treated as such. Any requirement to revise or reorder the material for submission or presentation to third parties or for any other explicit purpose can be fulfilled, but will require separate discussion and funding.
- 3.6.4 **Project Monitoring:** any proposed changes to this project design will be agreed with the client.
- 3.6.5 **Insurance:** the insurance in respect of claims for personal injury to or the death of any person under a contract of service with the unit and arising out of an in the course of such person's employment shall comply with the employers' liability (Compulsory Insurance) Act 1969 and any statutory orders made there under. For all other claims to cover the liability of OA North, in respect of personal injury or damage to property by negligence of OA North or any of its employees, there applies the insurance cover of £ 5m for any one occurrence or series of occurrences arising out of one event.

4. WORK TIMETABLE AND RESOURCES

4.1 TIMETABLE

- 4.1.1 It is envisaged that the various stages of the project outlined above would follow on consecutively, where appropriate. The phases of work would comprise:

- i* **Desk Based Assessment**
3 days
- ii* **Laser Scanning survey**

1 day (on site)

iii Production of model and drawings

3 weeks

iv Report Production

1 week

- 4.1.2 OA North can execute projects at very short notice once an agreement has been signed with the client. The survey report and drawing work will be undertaken concurrently and the project (field work, report and archive) is scheduled for completion within six weeks from the completion of the field work.

4.2 RESOURCES

- 4.2.1 The project will be under the project management of **Jamie Quartermaine, BA Surv Dip MIFA** (OAN Project Manager) to whom all correspondence should be addressed. Jamie Quartermaine has had considerable experience of fabric survey since 1984.
- 4.2.2 It is proposed that the survey be undertaken by **Chris Wild**. Chris is a very experienced building surveyor who has undertaken most of the OA North building surveys over the last five years.
- 4.2.2 The Laser Scanning Survey will be undertaken by APR Services.

ILLUSTRATIONS

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- Figure 2: Plan of Floating Dock and other works at Wallasey Pool, 1843 (B/808/A1)
- Figure 3: Plan of the Docks and Warehouses proposed to be made at Birkenhead, 1844 (B/808/A3)
- Figure 4: Plan of the Docks and Warehouses to be visited during the opening ceremony, 1847 (B/808/4)
- Figure 5: Plan showing the docks and proposed works, 1858
- Figure 6: Extract from the 1st edition 6" to 1 mile OS map, 1882
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- Figure 8: Extract from the 1:10,560 OS map, 1928
- Figure 9: Extract from the 1:10,560 OS map, 1938
- Figure 10: Extract from the 1:10,560 OS map, 1954-56
- Figure 11: Plan of proposed Morpeth Branch Dock Pumping Station, 1959
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- Figure 14: Isometric view of Morpeth Branch Dock, looking north
- Figure 15: Plan of Morpeth Branch Dock - Eastern end
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PLATES

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- Plate 2: Morpeth Branch Dock, *c* 1971-3
- Plate 3: Aerial view of Morpeth and Morpeth Branch Docks
- Plate 4: Ground view of Morpeth Branch Dock - looking east
- Plate 5: Morpeth Branch Dock looking east
- Plate 6: North side of the dock - corresponding with Elevation 1
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- Plate 8: Access steps at the eastern end of the dock
- Plate 9: South side of the dock
- Plate 10: Detail of Tidal Flap Chamber against the southern side of the dock

Plates 1 and 2 are from the 1971-3 Aerial Survey of Cheshire (Copyright 2006 Cheshire West and Chester Council and Cheshire East Council © All rights reserved. Flown and captured by Hunting Surveys Ltd 1971-3. Digitally converted by Genesys International Ltd & The Aerial Surveyor Ltd 2005/6).

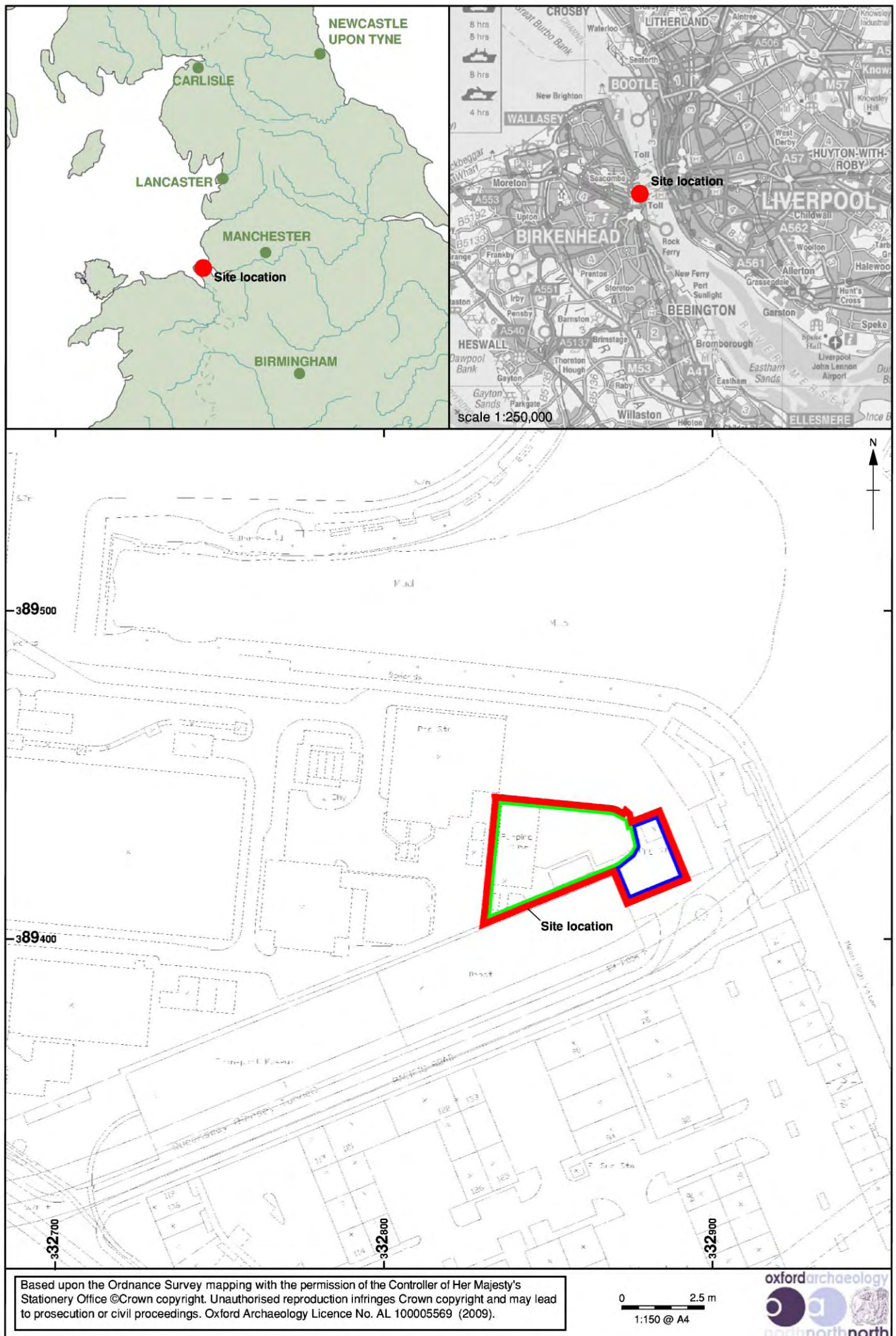
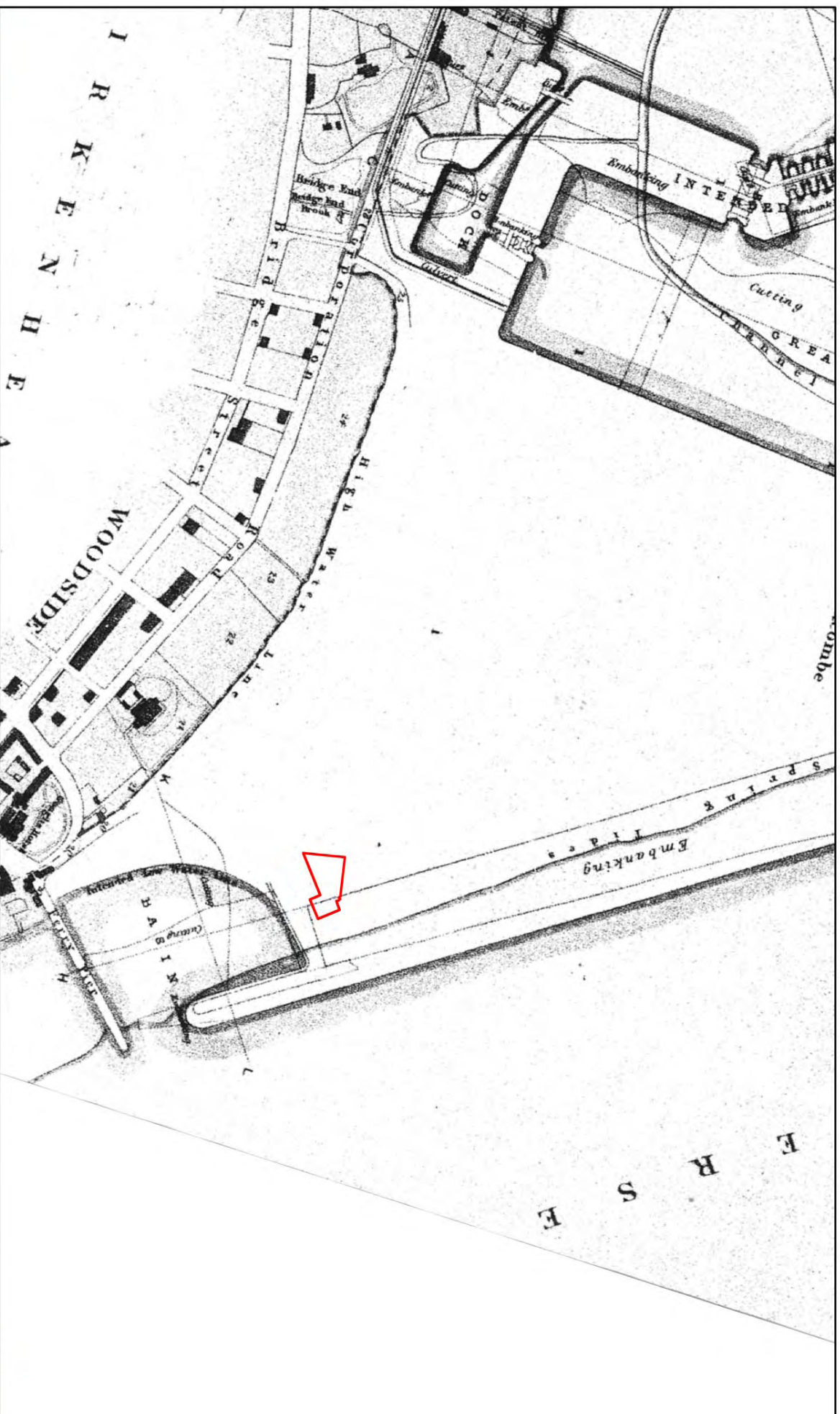


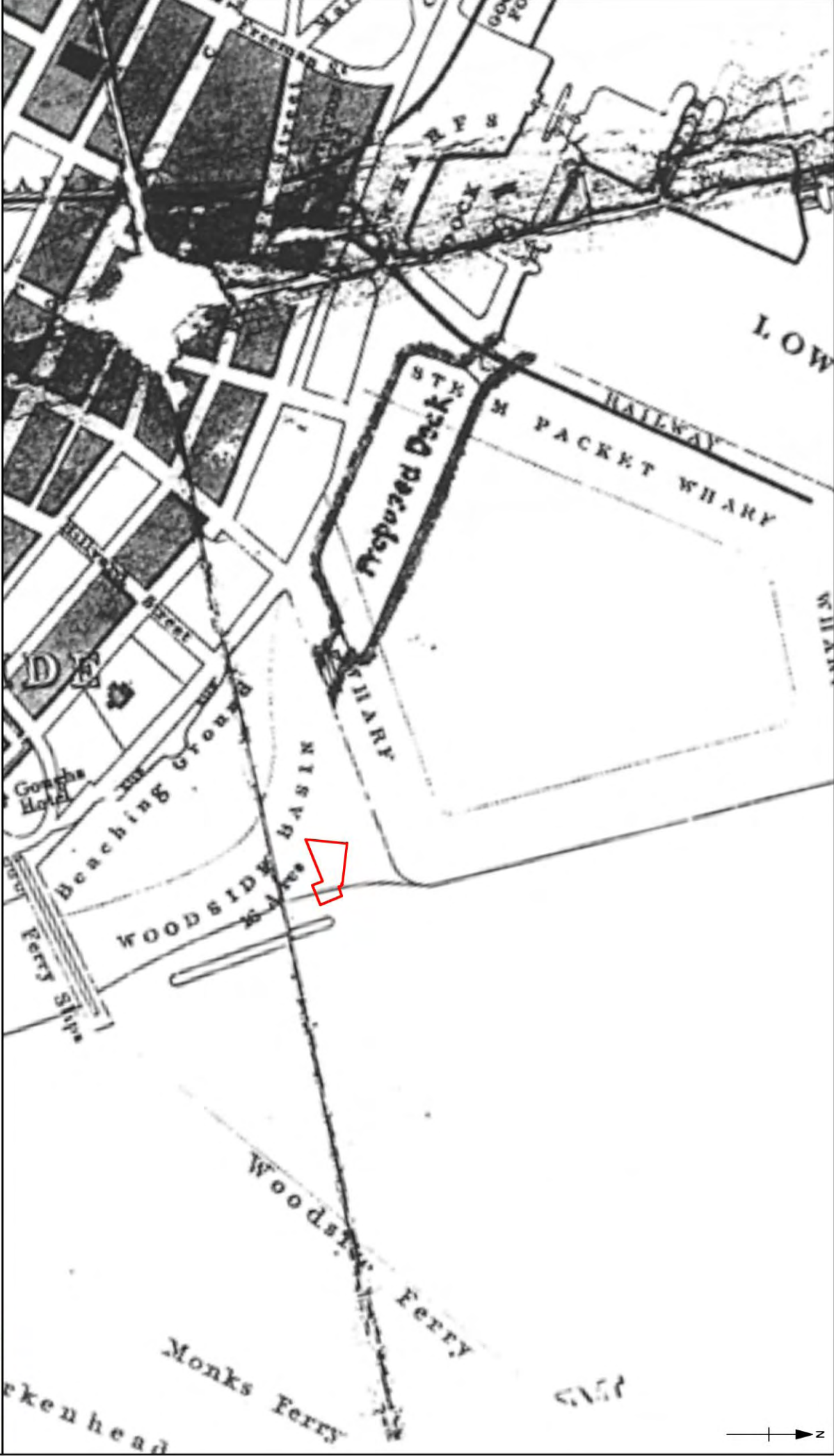
Figure 1: Site location



Site boundary

0 100 m
1:5000 @ A4

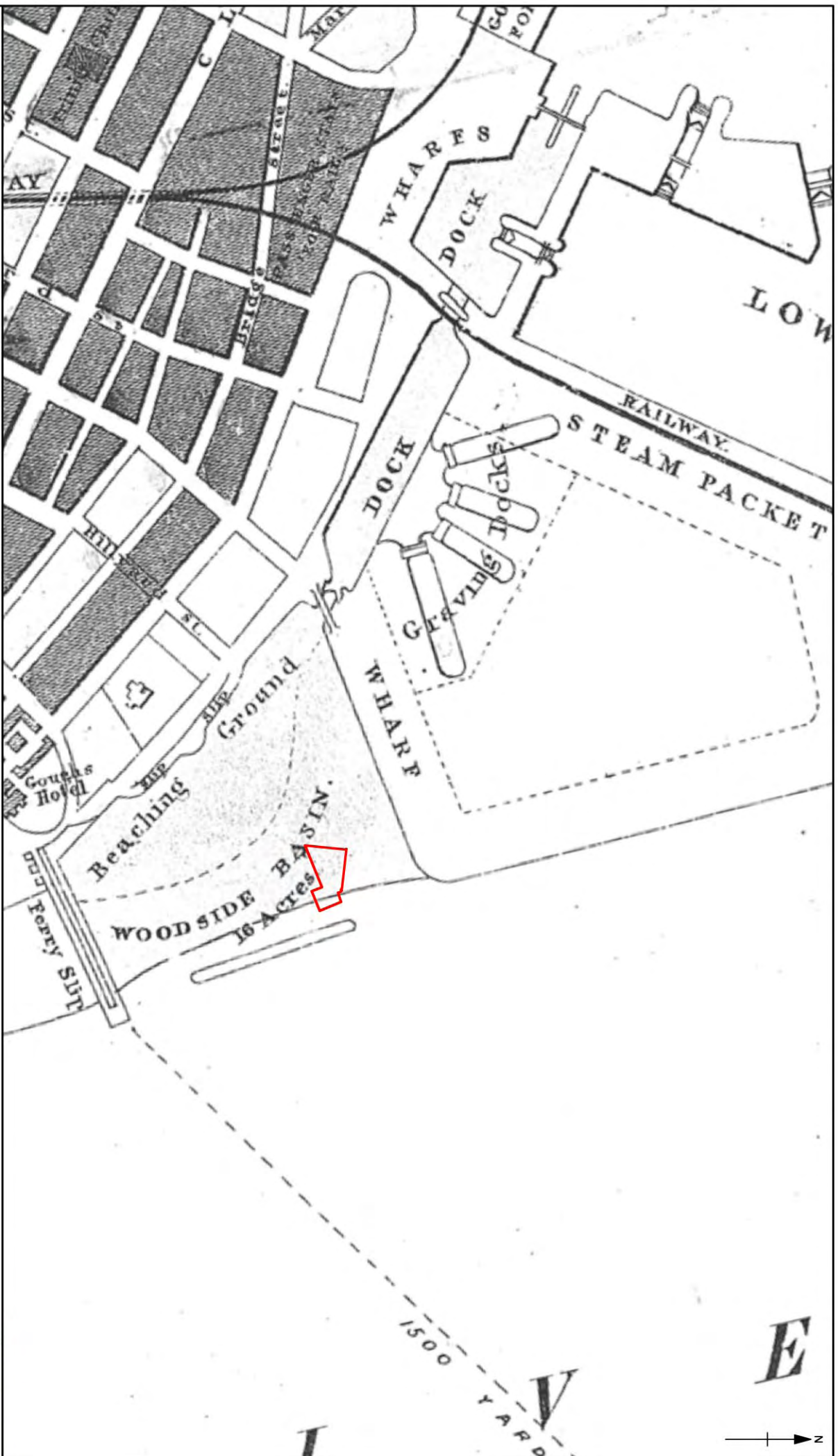
Figure 2: Plan of the floating dock and other works at Wallasey Pool, 1843 (B/808/A1)



Site boundary

0 100 m
1:5000 @ A4

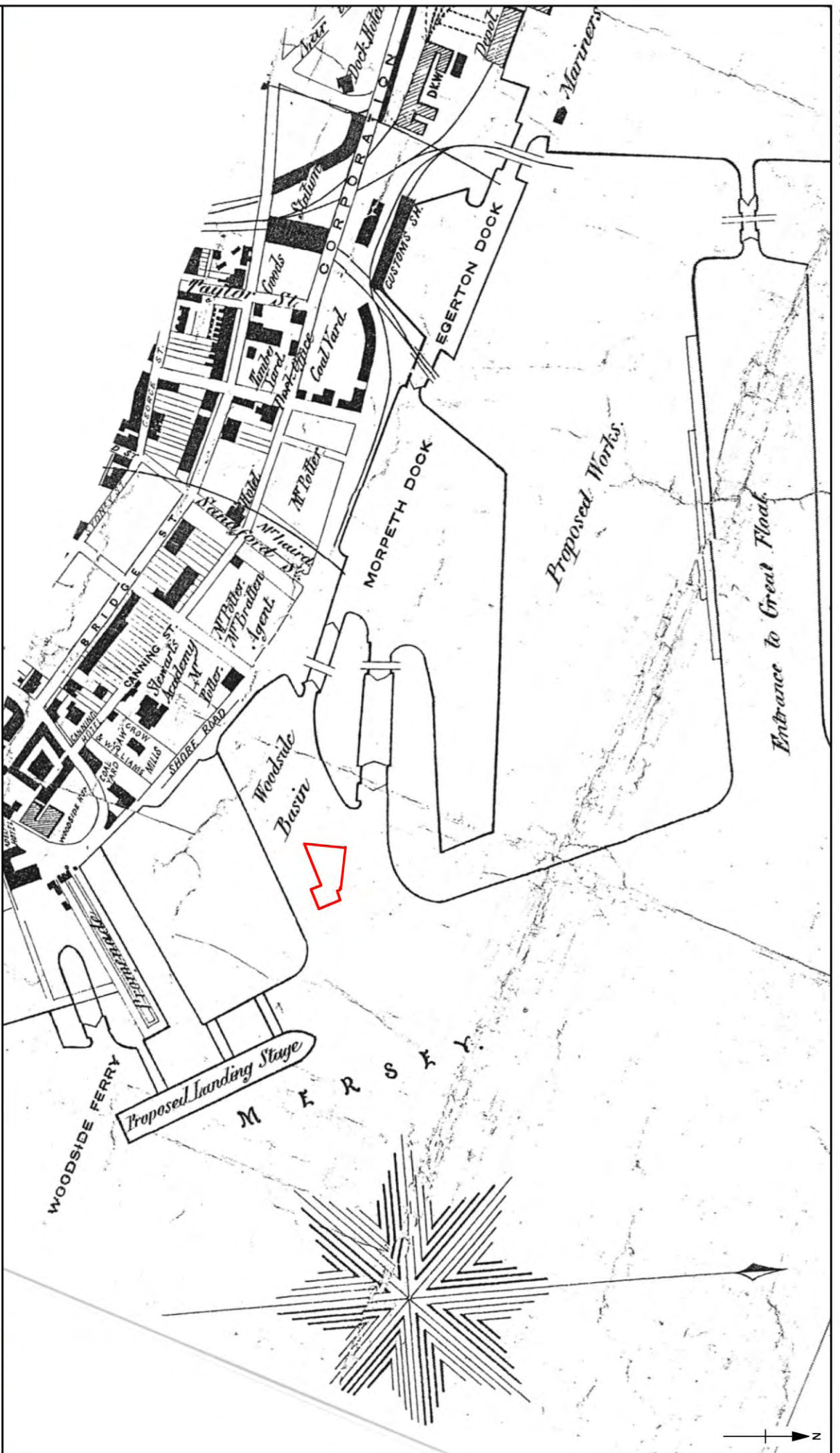
Figure 3: Plan of the docks and warehouses proposed to be made at Birkenhead, 1844 (B/808/A3)



Site boundary

0 100 m
1:5000 @ A4

Figure 4: Plan of the docks and warehouses to be visited during the opening ceremony, 1847 (B/808 /4)



Site boundary

Figure 5: Plan showing the docks and proposed works, 1858

0 100 m
1:5000 @ A4

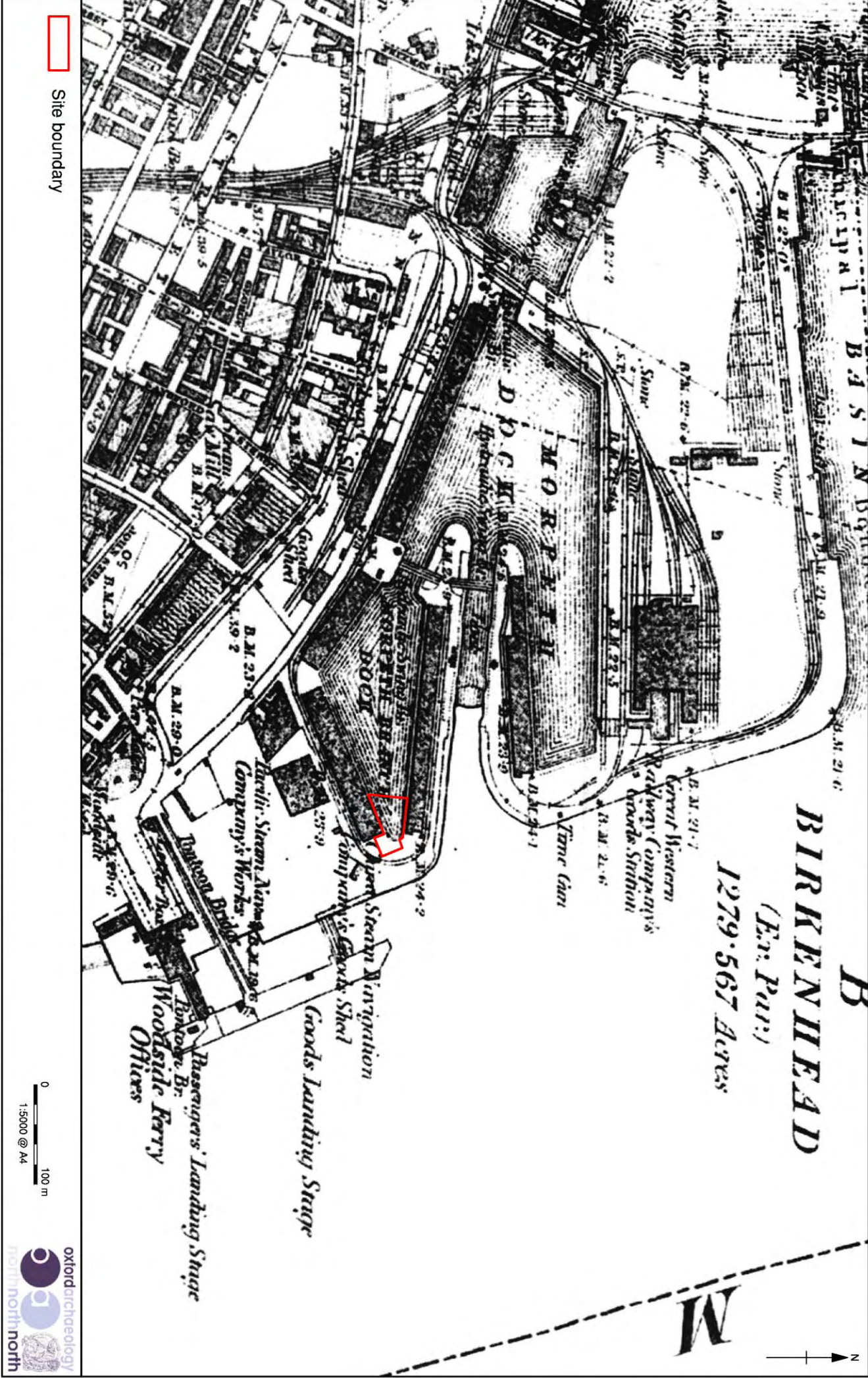
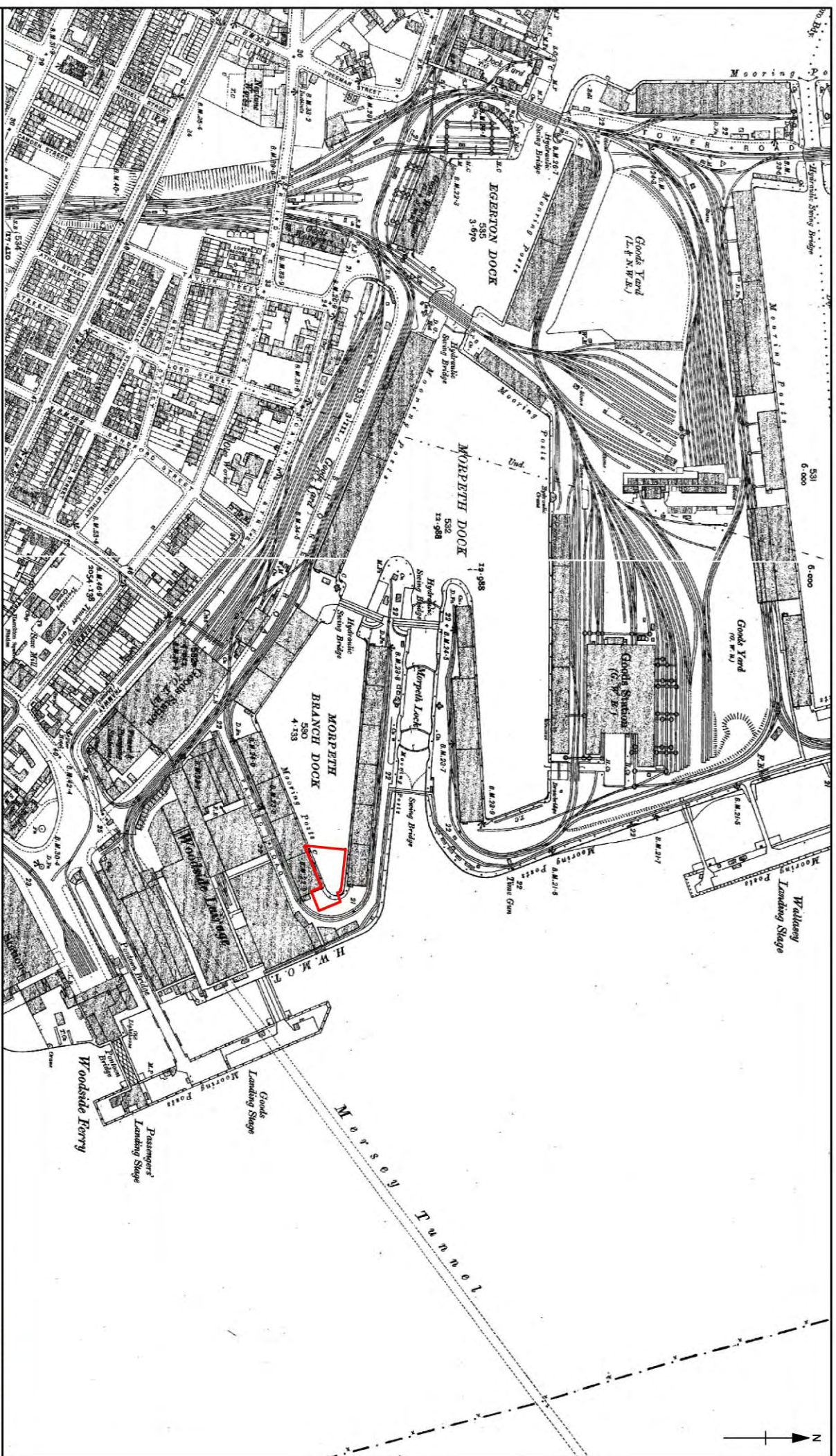


Figure 6: Extract from the 1st edition 6" to 1 mile OS map, 1882



Site boundary

Figure 7: Extract from the 25" to 1 mile OS map, 1911

0 100 m
1:5000 @ A4



0 50 m
1:2500 @ A4

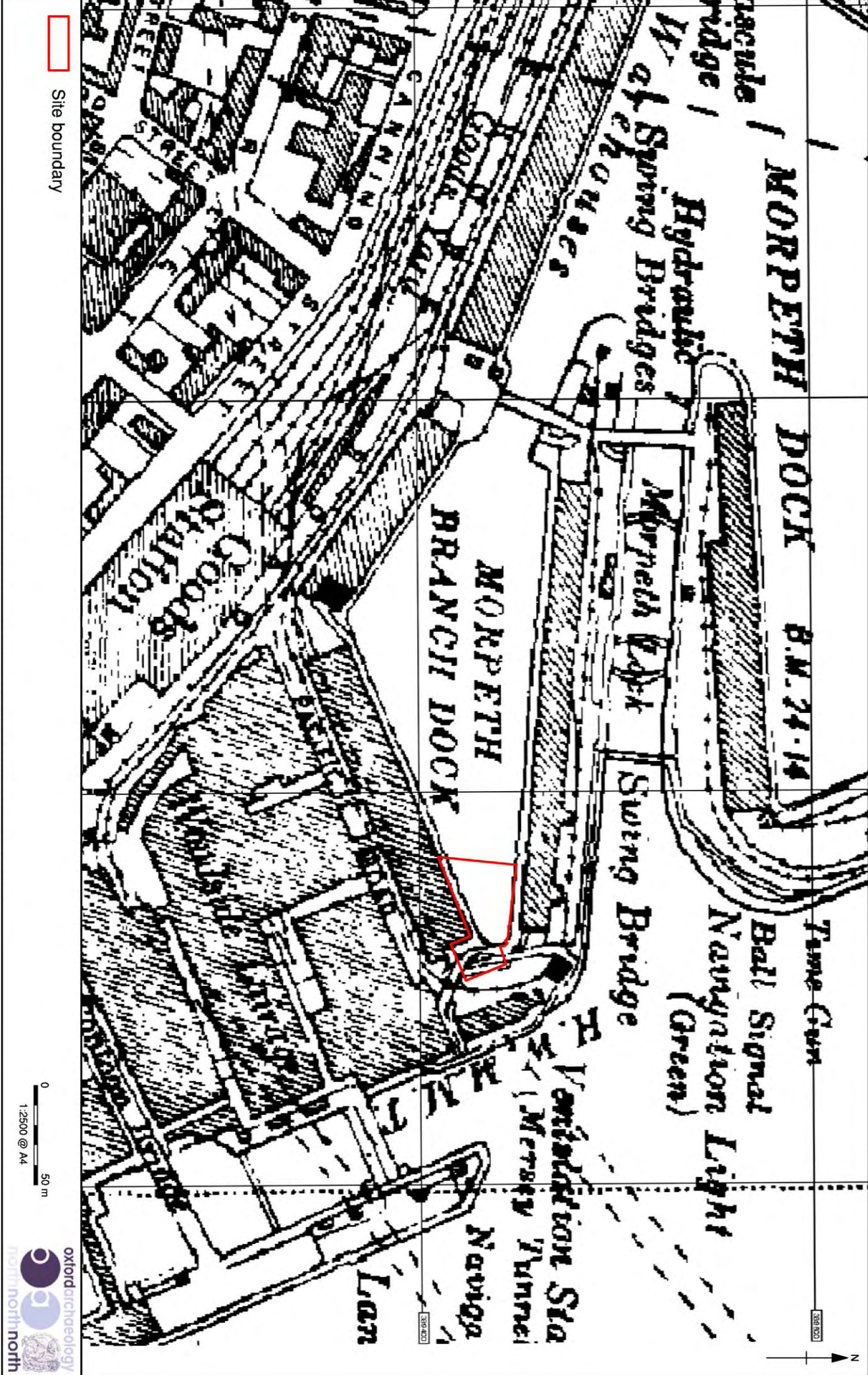


Figure 9: Extract from the 6" to 1 mile OS map, 1938



0 50 m
1:2500 @ A4

CHESHIRE RIVER BOARD
MORPETH BRANCH DOCK PUMPING STATION

CONTRACT No.1
 DRAWING No. 2A

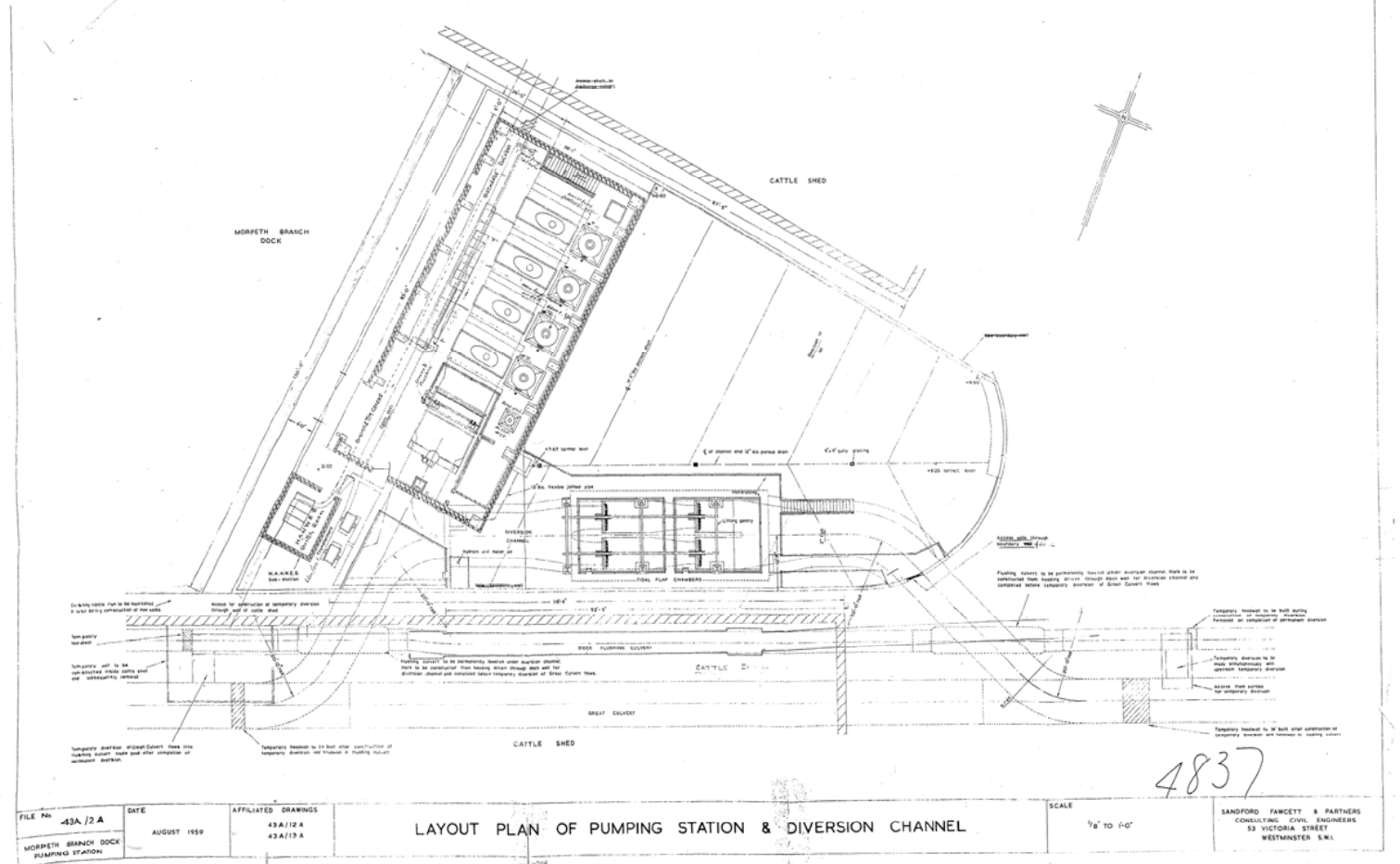


Figure 11: Plan of the Morpeth Branch Dock pumping station, 1959

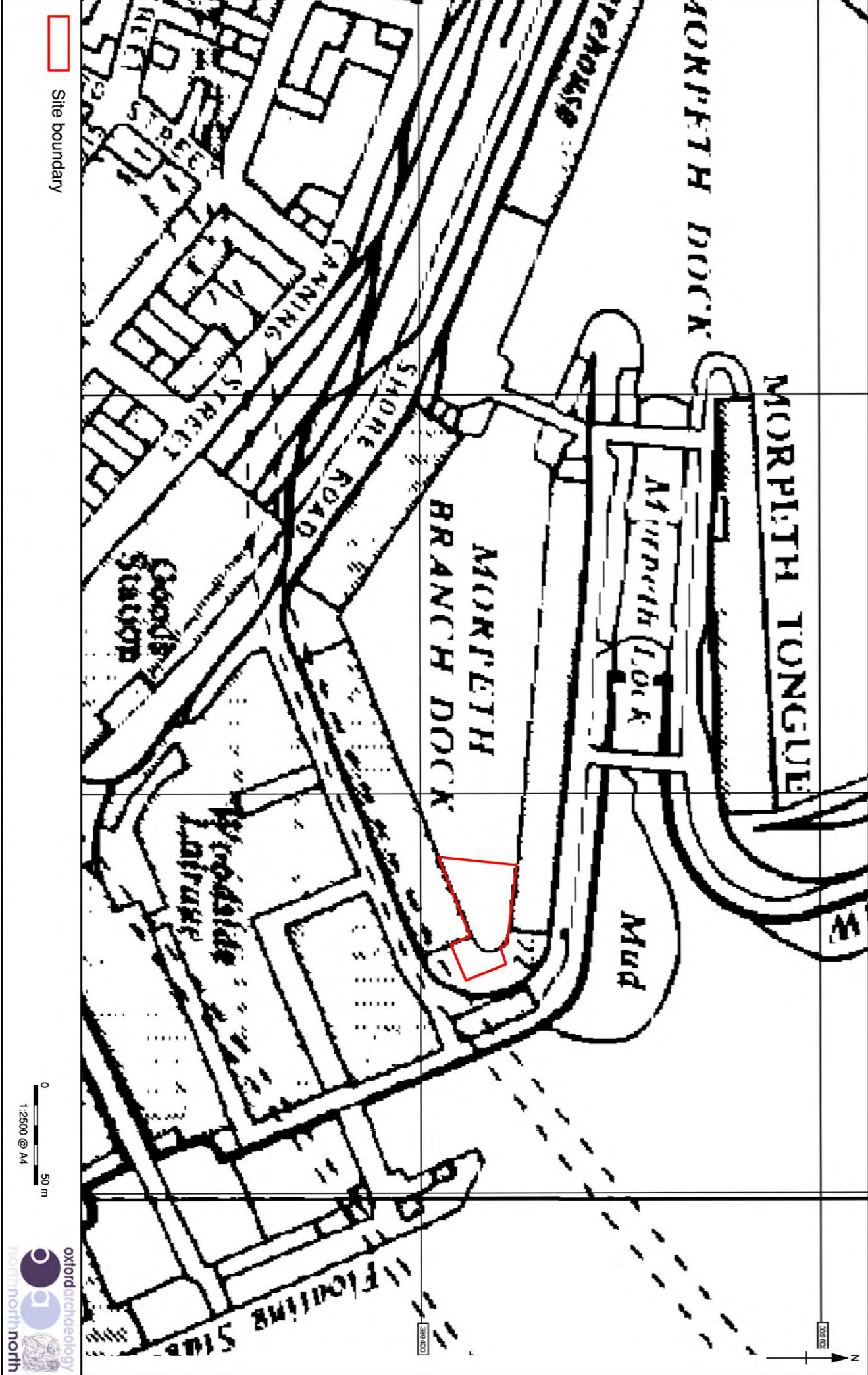


Figure 12: Extract from the 1:10,560 OS map, 1966

Figure 13: Extract from the 1:10,560 OS map, 1991

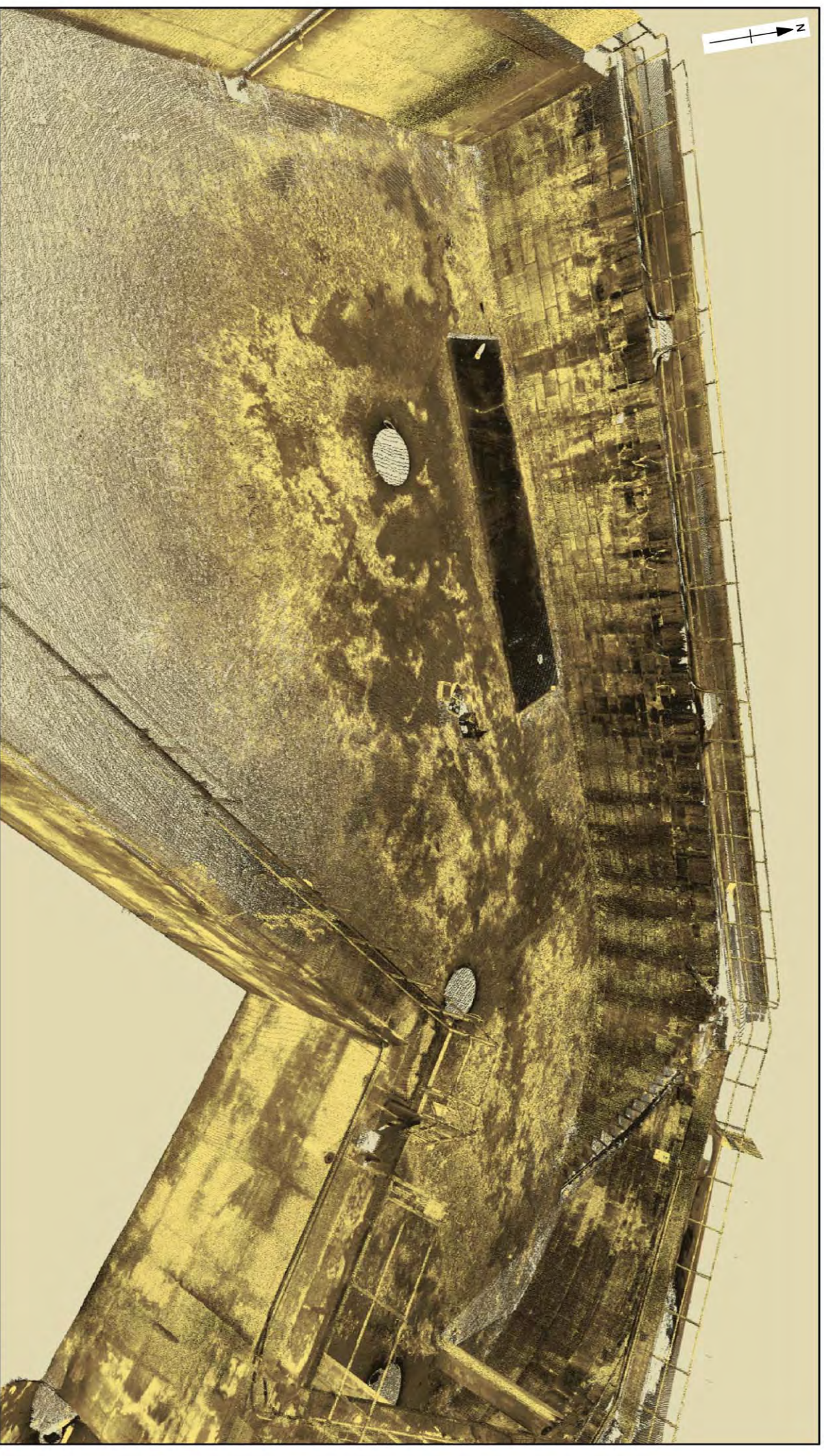


Figure 14: Isometric view of Morpeth Dock looking north

0 2.5 m
approx. 1:150 @ A4

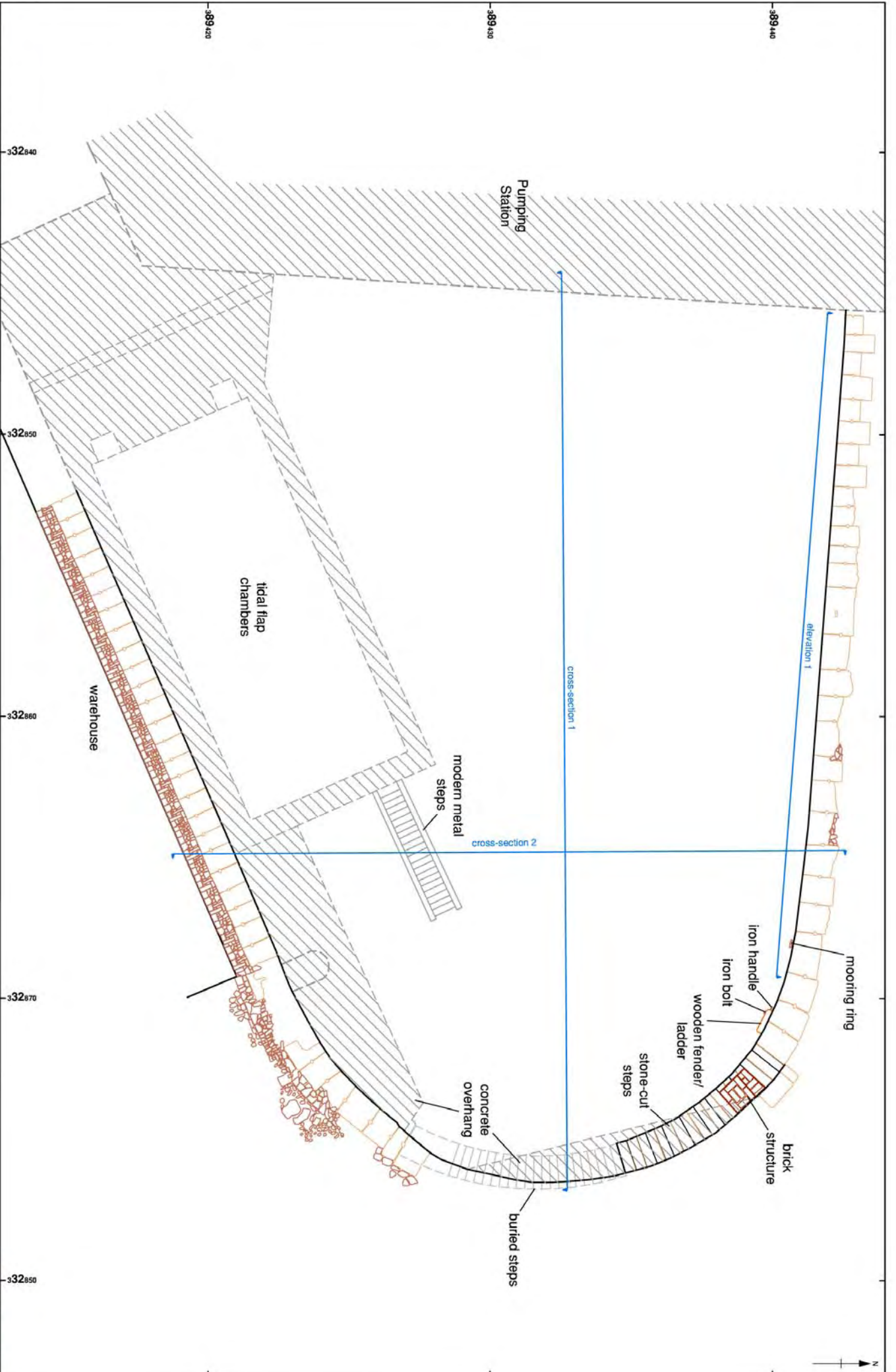


Figure 15: Plan of Morpeth Branch Dock - Eastern End

- Edge of dock
- Coping stone
- Modern structure



0 1/75 @ A3 2 m

Figure 16: Elevation of north side of Morpeth Branch Dock

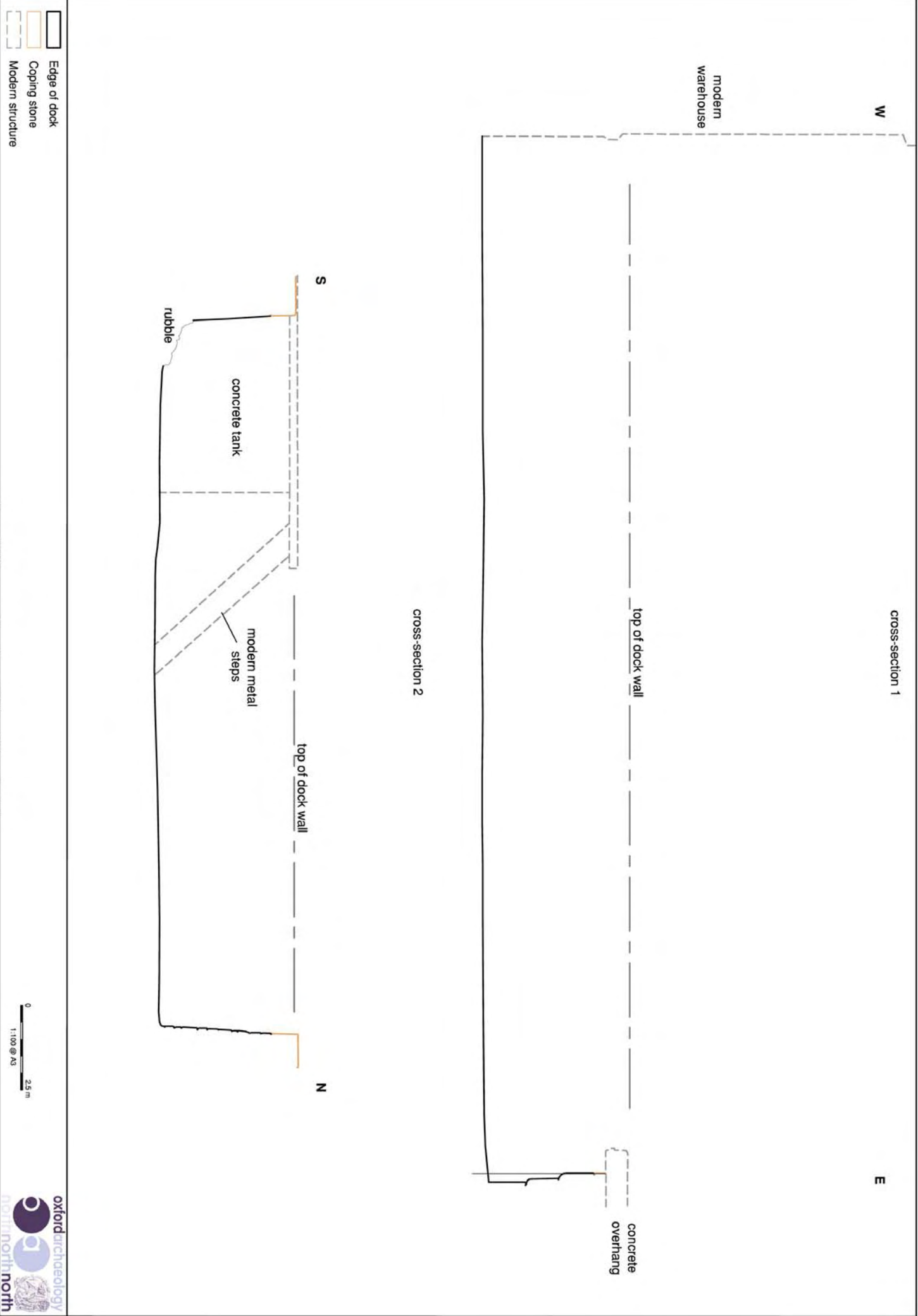


Figure 17: Cross-sections through Morpeth Branch Dock



Plate 1: Morpeth Dock and Morpeth Branch Dock, *c* 1971-3



Plate 2: Morpeth Branch Dock, *c* 1971-3

Plates 1 and 2 are from the 1971-3 Aerial Survey of Cheshire (Copyright 2006 Cheshire West and Council and Cheshire East Council © All rights reserved. Flown and captured by Hunting Surveys Ltd 1971-3. Digitally converted by Genesys International Ltd & The Aerial Surveyor Ltd 2005/6)

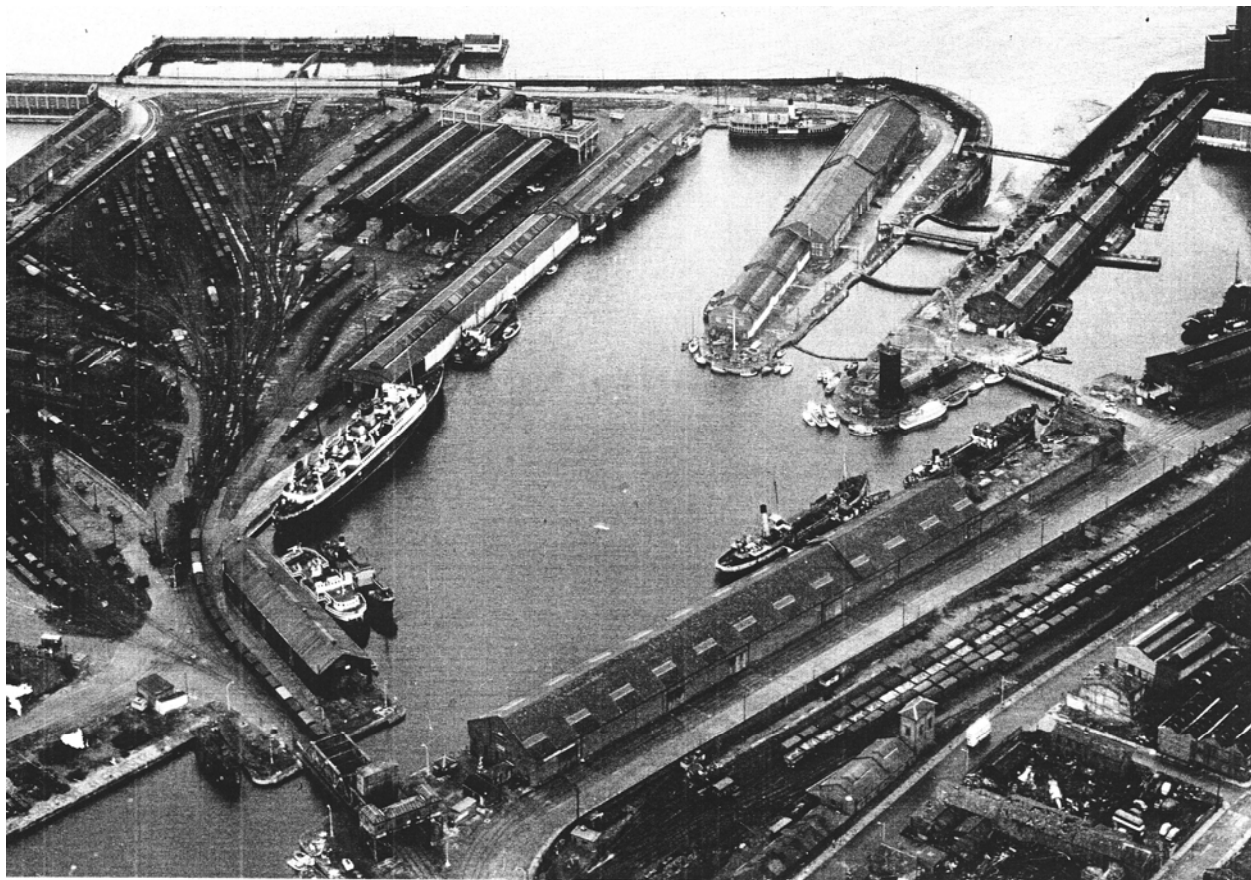


Plate 3: Aerial view of Morpeth and Morpeth Branch Docks



Plate 4: Ground view of Morpeth Branch Dock



Plate 5: Morpeth Branch Dock looking east



Plate 6: North side of the dock - corresponding with Elevation 1



Plate 7: Eastern end of Morpeth Branch Dock



Plate 8: Access steps at the eastern end of the dock



Plate 9: south side of the dock



Plate 10: Detail of tidal flap chamber against the southern side of the dock