CORPORATION STABLE YARD,

SMITHDOWN LANE, LIVERPOOL

Archaeological Watching Brief and Excavation Report

Oxford Archaeology North

RA Fisk Associates/Goldcrest Finance

September 2012

Issue No: 2011/1159
OA North Job No: L10259
NGR: SJ 36340 90140

Document Title: CORPORATION STABLE YARD, SMITHDOWN LANE, LIVERPOOL

Document Type: Watching Brief and Excavation Report

Client Name: RA Fisk Associates/Goldcrest Finance

Issue Number: 2011-12/1159
OA Job Number: L10259
National Grid Reference: SJ 36340 90140

Prepared by:	Alastair Vannan	Caroline Raynor
Position:	Project Officer	Project Officer
Date:	September 2012	September 2012
Checked by:	Jamie Quartermaine	Signed.....
Position:	Senior Project Manager	
Date:	November 2012	
Approved by:	Alan Lupton	Signed.....
Position:	Operations Manager	
Date:	November 2012	

Oxford Archaeology North
Mill 3, Moor Lane Mills
Moor Lane
Lancaster
LA1 1GF
t: (0044) 01524 541000
f: (0044) 01524 848606

w: www.oxfordarch.co.uk
e: info@oxfordarch.co.uk

Janus House
Osney Mead
Oxford
OX2 0EA
t: (0044) 01865 263800
f: (0044) 01865 793496

CONTENTS

SUMMARY

In Spring 2011, Oxford Archaeology North (OA North) was commissioned by Robert Hodgson (RA Fisk Associates) to undertake a programme of excavation and watching brief on the site of a redundant stable yard on Smithdown Lane, Liverpool (centred on NGR 336340 390140) in advance of the construction of university accommodation.

Liverpool, particularly the area around the stable yard, is famed for its association with Williamson's Tunnels, a network of post-medieval tunnels constructed within excavated quarry seams, that extend for an undetermined distance around the Edge Hill area. The tunnels are historically significant as a unique engineering work undertaken as a philanthropic venture by snuff and tobacco merchant, Joseph Williamson (1769 - 1840). A large amount of evidence for the tunnels survives and a section of this network has been preserved as a popular Heritage Centre, also on Smithdown Lane. The tunnels have been partially mapped and excavated as part of an ongoing research agenda, although their full extent is still unknown.

An earlier phase of watching brief during geotechnical investigations and a geophysical survey had established that there was potential for tunnels in this area, so it was agreed with the Merseyside Archaeologist that a programme of watching brief and excavation be undertaken in the course of ground works for the development, in accordance with a project design. During the watching brief, several brick tunnels were discovered, and these were subject to detailed excavation during January and February 2011.

Four areas were subject to watching brief or excavation and tunnels were identified within Areas A, B and D. Six tunnels were identified, or which five were previously unknown Williamson structures. All of the tunnels exhibited potentially unique features, including the form and material used in the vaulted ceilings, the combination and ratio of brick and sandstone, and also the junctions/interface between the newly discovered tunnels.

Area A was investigated as a large open area excavation and yielded the largest number of tunnels and associated features of archaeological interest. Tunnels 1, 2 and 3, as well as a well-constructed roadway, were identified within this area. The remains of the foundations for the western block of the former stable yard were also exposed and recorded, although these post-date all activity associated with Joseph Williamson, and have been well recorded by historic maps and by the City Engineers.

Area B was excavated in order to provide a mitigative record of Tunnels 4 and 5. Tunnel 4 had previously been identified and partially excavated by the Joseph Williamson Society; however, the present phase of construction work afforded an opportunity to mechanically excavate debris from within this area prior to backfilling and capping of the main tunnel. Tunnel 5 was previously unknown and was identified and recorded during this phase of work.

Area C did not contain any evidence for tunnels; however, bedrock was not reached in this area so it was not possible to confirm if tunnels exist at a deeper level. Within the south-eastern corner of Area C, a quarter circle of brickwork was exposed within the construction trenching for a crane base.

Area D was excavated to allow construction of footings for a large, light-weight bicycle storage facility. This shallow rectangular area provided limited evidence of a cutting of the bedrock on a north-east/south-west orientation, and it is probable that this was a cut for a further tunnel.

However, the shallow nature of the required footings meant that there was no requirement to fully explore this area.

ACKNOWLEDGEMENTS

Oxford Archaeology North (OA North) would like to thank RA Fisk & Associates and Goldcrest Finance Ltd for commissioning the project, with special thanks to Robert Hodgson for his continued interest, patience and support throughout the course of the excavations and survey. Thanks also to Gordon Armitage of RA Fisk & Associates. Thanks are also due to the staff of Richmond Bolton who were the lead contractors..

Oxford Archaeology North would like to extend special thanks to Dave Bridston and the dedicated volunteer staff at the Williamson Tunnel Heritage Centre for their continued support and enthusiasm throughout the course of the work. We would like to thank Dave Bridston for being an invaluable source of information with regards to all things Edge Hill and for access to the Heritage Centre Archive, much of which is referred to in the historic background and the discussion of this report. Thanks go also to all the members of the Joseph Williamson Society. Thanks also to the Friends of Williamson Tunnels including David Head, Claire Moorehead, Norma White and Steve Moran for providing supplementary documentary material and for their continued interest and enthusiasm for all things relating to Joseph Williamson.

Thanks go to Julia Carder, Curator of Collections, Liverpool City Council, and Pamela Raman of Liverpool Lord Mayors Office for their assistance in providing images and information in relation to the Lord Mayor's Coach.

Thanks are also due to the officers and security staff at Smithdown Lane Police Station who kindly allowed us access to the roof of their building in order to take aerial photographs of the site.

The excavation and watching brief was undertaken by Caroline Raynor with the assistance of Phil Cooke, Graham Mottershead and Alastair Vannan. The survey was undertaken by Graham Mottershead, Caroline Raynor and Alastair Vannan. The report was written by Caroline Raynor and the drawings were produced by Caroline Raynor and Anne Stewardson. The project was managed by Jamie Quartermaine, who also edited the report.

1. INTRODUCTION

1.1 CIRCUMSTANCES OF THE PROJECT

1.1.1 In accordance with planning conditions determined by the local planning authority (planning application no 98p/2867, date registered 11 January 2001), Oxford Archaeology North (OA North) was commissioned by RA Fisk and Associates, acting on behalf of Goldcrest Finance Ltd, to monitor groundworks during the construction a new student housing development at a former stable yard adjacent to Smithdown Lane, Liverpool (centred on NGR 336340 390140) (Fig 1). OA North were also commissioned to undertake a building survey of the extant buildings at the northern side of the stable yard, which is the subject of a separate report (OA North 2011). Edge Hill, and particularly the area around the stableyard (Plate 1), is well-known for its association with Williamson's Tunnels, which are a network of post-medieval tunnels that were constructed within excavated quarry cuttings. The tunnels are historically significant as a unique engineering work by snuff and tobacco merchant, Joseph Williamson (1769-1840) and, although partially mapped and excavated as part of an ongoing research agenda, their full extent remains unknown. The tunnels comprise linear cuttings, quarried through the sandstone bedrock, which were then covered using a variety of brick and sandstone vaulting.

1.1.2 The archaeological watching brief was initially undertaken during geo-technical investigations consisting of a programme of dynamic probing undertaken by LK Consult Ltd (LKC) in June 2010. A ground probing radar (GPR) survey (Archaeophysica 2010) had been undertaken in March 2010, which allowed a preliminary assessment of the potential for the presence of remains of archaeological interest at the site. Although both of the investigations identified voids, they were not able to confirm the presence of brick vaulted arches which were used to transform the quarry cuttings into tunnels.

1.1.3 The results obtained from the geotechnical watching brief and GPR survey were used to inform the requirement for further archaeological investigation of the site and a project design for a watching brief during pre-construction ground works was compiled by OA North (*Appendix 1*) and approved by the Merseyside Archaeologist. The watching brief was undertaken during piling works and the mechanical excavation of foundations for the proposed buildings at the northern end of the site during January 2011. Remains of archaeological interest were encountered during these works, including a vaulted arch typical of the construction style of some of Williamson's tunnels. In accordance with the project design (*Appendix 1*), a programme of archaeological excavation was undertaken to record the tunnel and associated structures within the development footprint. The excavation and building survey were undertaken during January and February 2011. This report presents a summary of the results of the watching brief, and excavation.

1.2 LOCATION AND GEOLOGY

1.2.1 The site is located adjacent to the eastern side of Smithdown Lane, which lies within the Edge Hill district of Liverpool, to the east of Liverpool City Centre. The site is bounded by a railway cutting and a business premises to the north, by Smithdown Lane to the

west, by a raised terrace used for light industry to the north-east, and by the Williamson Tunnel Heritage Centre to the south-east. The total area of the site is approximately 0.23 hectares. The geology of the local area comprises sandstone of the Chester Pebble Bed Formation (BGS 2011).

2. METHODOLOGY

2.1 WATCHING BRIEF

2.1.1 The archaeological watching brief was undertaken in association with three separate phases of pre-construction activity. The first of these comprised a programme of geotechnical investigations undertaken by LK Consult Ltd during June 2010. This consisted of a programme of dynamic probes and bore holes which was undertaken in order to ascertain the levels of bedrock within the application site. The results obtained from the geotechnical watching brief, and the earlier GPR survey by Archaeophysica (2010), were used to inform the requirement for further archaeological investigation of the site and the compilation of a project design for a watching brief during pre-construction ground works (*Appendix 1*), which was approved by the Merseyside Archaeologist.

2.1.2 In January 2011, the initial pre-construction ground works were initiated. These comprised the insertion of piles along the line of the proposed building foundations followed by the mechanical excavation of foundation trenches. In an additional phase of work, a watching brief was maintained during piling and trenching operations associated with the construction of a base to support the weight of an all terrain mobile crane (Fig 2). An archaeological presence was maintained throughout the duration of all works and programmes of field observation recorded the location, extent, and character of all surviving features and deposits of archaeological interest.

2.2 EXCAVATION

2.2.1 As a result of the discovery of remains of archaeological interest during the watching brief, including a vaulted arch typical of the construction style of some of Williamson's tunnels and associated buildings, a programme of archaeological excavation was undertaken in accordance with the project design (*Appendix 1*), which was adhered to in full. The primary aim of the excavation was to record the remains of the tunnel and the associated structural remains that lay within the development footprint. The excavation was undertaken during January and February 2011 within the southern part of the application site.

2.2.2 The overburden was removed using a 13 ton 360 mechanical excavator that alternately used a narrow-bladed bucket and a ditching bucket. The deposits were removed in a controlled manner, to allow the identification of any stratification of deposits and features. Where structural remains were encountered, machining was halted and the features were exposed by hand-digging and cleaned for recording. Where man-made features were not encountered, and where practicable to do so, the area was reduced to the level of the underlying bedrock.

2.3 ARCHAEOLOGICAL RECORDING

2.3.1 The 'preservation by record' of all features of archaeological interest was achieved by the generation of a comprehensive archive, in accordance with the standard and guidance for archaeological excavations produced by the Institute of Field Archaeologists (2001). All of the features identified during the watching brief were

recorded stratigraphically on OA North *pro-forma* sheets, using a system adapted from that used by the Centre for Archaeology Service of English Heritage, with accompanying graphic documentation (plans, sections, and digital photographs and black and white print photographs. Photography was undertaken of individual contexts and overall site shots from standard view points and included a visible, graduated metric scale. The film photography was undertaken with 35mm cameras on archivable black-and-white print film; the digital photography was used extensively throughout the course of the fieldwork for presentation purposes using an 8megapixel digital SLR. Photographic records were maintained on photographic *pro-forma* sheets.

2.4 FINDS

2.4.1 Finds recovery and sampling programmes were carried out in accordance with best practice, following the current Institute for Archaeologists guidelines. and subject to expert advice in order to minimise deterioration. All artefacts recovered from the evaluation trenches were retained for assessment. The finds were assessed as part of the post-excavation programme.

2.5 ARCHIVE

2.5.1 The results of all archaeological work carried out will form the basis for a full archive to professional standards, in accordance with current English Heritage guidelines (*Management of Research Projects in the Historic Environment* 2006). The original record archive of the project will be deposited with the Merseyside Record Office.

2.4.2 The Arts and Humanities Data Service (AHDS) online database *Online Access to index of Archaeological Investigations* (OASIS) will be completed as part of the archiving phase of the project.

3. ARCHAEOLOGICAL AND HISTORICAL BACKGROUND

3.1 INTRODUCTION

3.1.1 The following section presents a summary of the historical and archaeological background of the general area. This is presented by historical period, and has been compiled in order to place the study area into a wider archaeological context.

3.2 HISTORIC BACKGROUND

3.2.1 During Liverpool's development and expansion in the early eighteenth century, the area known as Edge Hill was essentially separate from the town centre and was regarded as a rural area, as is confirmed by the Yates and Perry Map of 1768 (Fig 3) which shows Edge Lane and Smithdown Lane as long streets surrounded by fields dotted with the occasional domestic dwelling or workshop. The map highlights the static nature of the land boundaries, and the orientation of the major roads, but does not indicate the presence of any quarry on Smithdown Lane.

3.2.2 James Wallace, writing in 1795, notes that Smithdown Lane demarcated the edge of one of the city '*liberties*' or boundaries, the limits of which were marked '*in the manner of ancient roman termini by stones, called by the inhabitants 'Meer Stones'...*' (Wallace 1795, 78). Despite his thorough description of the town and its environs, including the quarry at Mount Zion and a quarry near Dale Street, he makes no mention of quarrying activity at Edge Hill. Similarly Richard Brookes, writing in 1853, notes that from 1775 onwards, Smithdown Lane was a key landmark as it demarcated one of the eastern electoral boundaries for the town of Liverpool (Brookes 1853, 190). Once again, despite Brookes providing a detailed description of many noteworthy landmarks and significant industries in Liverpool between 1775 and 1800, he makes no mention of an active quarry in the area of Smithdown Lane.

3.2.3 Smithdown Lane was a fairly unremarkable area of the town with no large developments of noteworthy architecture; however, this was to change once the land had been leased to merchant, entrepreneur, and philanthropist, Joseph Williamson (Plate 2). Williamson was originally thought to have been born in Warrington on the 10th March 1769 but recent evidence has come to light to suggest that he was in fact from Yorkshire (D Bridston pers comm). He came to Liverpool in 1780 to work for Richard Tate, a tobacco manufacturer (Hand 1928, 106; Whittington-Egan 1952, 110). By 1802 he had acquitted himself well within the firm, gained a position of respect and was married to Elizabeth Tate, the daughter of his employer Richard Tate. His succeeding employer, Thomas Moss Tate, died in 1803, leaving him the business (Hand 1917, 2; Whittington-Egan 1952, 110).

3.2.4 By 1806 Williamson had begun to lease the land (Fig 4) around Mason Street (Head 1995, 4). Some sources state that Williamson bought the land (Hand 1917, 2; Whittington-Egan 1952, 109-10); however, it is also recorded that the leases ran out in 1858 when the land reverted to the West Derby Commission (Head 1995, 4; Stonehouse 1863, 185; Stonehouse 1879, 131), therefore he could not have owned it. Williamson retired from the tobacco business in 1818 (Hand 1917, 2) and concentrated on the construction of a complex of buildings and tunnels within and adjacent to the study area.

3.2.5 In 1810 Thomas Troughton published his book 'The history of Liverpool: from the earliest authenticated period down to the present day' where he comments that '*A most excellent and inexhaustible mine of free stone, in the vicinity of the town has hitherto afforded a supply for the construction of the docks and public buildings*' (Troughton 1810, 87). However, Troughton only mentions the presence of a quarry at St James Cemetery and a new quarry recently discovered in Toxteth Park. This suggests that any potential quarrying on Smithdown Lane was either unknown to contemporary writers, or of such a small scale that it was not deemed worthy of inclusion in publications regarding the history and development of the town.

3.2.6 In 1812, Thomas Kaye, author of 'The Stranger in Liverpool' describes Edge Hill as '*a favourite and rapidly improving residence and from this point seen to advantage. The well built houses starting from the summit of the hill and surrounded with trees, gardens and fields, have a rural and cheerful effect, but the foreground of the picture detracts from the whole. Stone wall, land barren even in summer and roads of sand are equally unexpected and unpleasing in the vicinity of so large and improved a town*' (Kaye 1812, 183). Although this description does not directly mention the presence of a quarry, the barren land and roads of sand are all suggestive of exposed and eroding sandstone bedrock.

3.2.7 Williamson's building works continued for many years. He employed large numbers of the poor at a time when the demobilisation of men from the Napoleonic Wars in 1815 had left many of the returning soldiers without work. Swire's Map of 1824 (Fig 5) includes Smithdown Lane and shows how the area was gradually becoming more populous with the construction of merchants houses on Mason Street, King Street and in the surrounding areas. Despite the burgeoning construction programme the map shows the future site of the stable yards as being still depicted as a field or open space with only one structure standing near the south-west corner of the plot. Again there was no indication that this site was being used for quarrying, nor was there any indication of the presence of Williamson's Tunnels which would have been present, if not always visible from this point onwards. The tunnels, caverns and passageways extended beneath Mason Street to Smithdown Lane and many of the houses were built on arches over the tunnels, and underground passageways that linked the buildings.

3.2.8 Popular myth remembers Williamson as being something of a troglodyte with historic sources such as 'Recollection of Old Liverpool' (Stonehouse 1863) stating that he lived in a cellar-style living room beneath his house with an additional cave carved to form a bedroom. There is no physical proof of this, although larger chambers within the tunnels, such as the larger area known as 'banqueting chamber', have been located and excavated within the Paddington Tunnel complex (located to the east of the site). The tunnels take various forms and extensive work has been done in and around the area of the stable yard to document their extent. The most notable of these tunnels is the 'triple-decker' tunnel, so called because it comprises three tunnels, one on top of the other. This tunnel more than any others highlights the fact that Williamson was not in fact digging tunnels, but was rather creating a tiered series of brick and stone-vaulted roofs from a series of pre-existing quarry cuttings. Williamson used the quarry and the construction of the tunnel complex as a way of keeping people employed and as a training ground for carpenters, stone masons and brick layers who were involved in the other aspects of his construction business on Mason Street. Ultimately, Williamson should be regarded as a skilled businessman and a generous, if eccentric, philanthropist.

3.2.9 The Liverpool Poor Rate Assessment of 1826/1827 provides an interesting insight into the tenancy and ownership of land and its function on Mason Street and Smithdown Lane (recorded in the assessment as Smeatham Lane). The Poor Rate was a tax levied locally in order to raise revenue for poor relief within the parish. The Liverpool Poor Rate Assessment for 1826 states that Joseph Williamson owned three houses on Mason Street (one of which he occupied, the other two were leased) and three properties on Smeatham Lane (Smithdown Lane) which were listed as the site of quarry with three houses located on the land (LRO Acc 2047, 1826). This is the only known record of a quarry on Smithdown Lane and suggests that quarrying was still being undertaken at the time Williamson was leasing the land.

3.2.10 Williamson's workforce built houses along Mason Street one of which, Number 44, he took for his own home (Hand 1928, 88), the partial remains of which are still visible today to the east of the site. A drawing produced by James Stonehouse (1863) (Plate 3) after Williamson's death shows the layout of gardens which were in existence at this time, and that the rear boundary of the gardens is the same as those shown on later maps (Figs 6-7), and an indication that the land had already been successfully terraced by this date.

3.2.11 Work began in 1832 on George Stephenson's railway tunnel, which was to connect Edge Hill station with Lime Street and extended through the area of Williamson's tunnels. The Williamson's workmen broke through into the railway tunnel from beneath, making them aware of each others presence, and Stephenson was given a conducted tour around Williamson's tunnels, with which he was very impressed (Hand 1917, 15).

3.2.12 Gage's Map of 1836 (Fig 6) clearly demarcates the plot of land owned by Williamson and a series of dotted lines bisecting the plot may be indicative of areas that were known to be quarry cuttings. A small rectangular structure is marked on the south-east side of the plot, although it is not clear exactly what this structure represents. Given the relatively rural location it may be a small dwelling (possibly associated with the quarry workings) or a small barn. Prior to the construction of the railway, Williamson's tunnels at the Smithdown Lane site were linked to further tunnels beyond the cutting to the north and east into the area known as Paddington where it is believed that the tunnels are at their most labyrinthine and extensive (Stonehouse 1863). These tunnels are currently being investigated by The Friends of Williamson Tunnels (FOWT).

3.2.13 Williamson died on the 1st of May 1840 aged 71 years and was buried with his wife and her family in the Tate family vault located within the graveyard of St Thomas church on Park Lane (OA North 2010). The surviving elements of the graveyard now sit within the St Thomas' Memorial Garden, which was landscaped as part of the final public realm work for the Paradise Street Project in 2010.

3.2.14 Newlands map of 1848 (Fig 7) shows the site as a large open space with no indication as to the presence of either open quarry cuttings or the added brick vaults which Williamson used to create the tunnels. An L-shaped line at the south-east side of the site may indicate a simple form of terracing which was recorded by WG Herdman in his etching in the 1830's (Plates 4 and 5). Additionally, a small rectangle indicates the presence of a building at south-west limit of the site. Bennison's Map of 1860 is similarly lacking in detail and shows the extent of the site but presents it only as an empty plot bisected by the Edge Hill cutting.

3.2.15 The tunnels remained exposed following Williamson's death; however, the lease on the land expired in 1858 (Stonehouse 1863, 185) and, subsequently, the land reverted back to the West Derby Waste Lands Commission. Ten years later the land was purchased by the Health Commission for the sum of 30 shillings per square yard in order to construct stables for about 50 horses which worked for the Scavenging Department.

3.2.16 The location and development of the corporation stables at Smithdown Lane, Liverpool can, in part, be attributed to the development of Public Health, which can be defined as 'the science and art of preventing disease, prolonging life and promoting health through the organised efforts and informed choices of society, organisations, public and private, communities and individuals' (Winslow 1920, 23).

3.2.17 Liverpool had already begun to address the issue of public health by playing a part in the Health of Towns Associations (Est. 1845) and with the passing of the cities first sanitary act in 1846. Dr William Duncan and Borough Engineer James Newlands also worked together to examine the links between inner city squalor and the rapid onset and spread of disease. Following the Typhus outbreaks of 1866, a health report was published by Dr WS Trench, providing a sizeable document which discussed the links between ill health in the city with the 'neglected homes of man' and suggesting that a squalid environment and the build up of waste was largely responsible for the spread of disease.

3.2.18 The proceedings of the Liverpool Health Committee show that on the 3rd of October 1866, it was resolved that '*3,922 square yards of land in Smithdown lane be purchased from Mr. Byford, for the purpose of erecting stabling thereon, at the sum of 30s per square yard*' (H352 COU, 1865/66, 345). By 1867 the Corporation Stable Yard was operating under the auspices of the council in order to remove organic waste and rubbish from the inner city streets.

3.2.19 William Miles, writing in 1864, a mere three years before the construction of the Corporation Stable Yard advocates that '*A stable is no fitting place for the great display of taste, or unmeaning ornament; it should be purely utilitarian in its character...*' (Miles 1864, 2). Miles was an authority on the care of horses and firmly believed that their value should be reflected in carefully thought out and well designed stable buildings. It was his opinion that '*although a stable offers no great field for the exercise of taste, it affords ample scope for ingenuity in adapting it to the requirements, essential to the safety, comfort and well being of the horse'* (*op cit* 3).

3.2.20 It is clear from the design of the stables that some of William Miles; opinions were part of a widely accepted school of thought. The stables were constructed in 1867 by Mr William Tomkinson and Messrs Richard and Norton after they successfully tendered for the contract to build and fit out the new stable yard on Smithdown Lane. William Tomkinson was contracted to erect the stables, workshops and cottages based on plans and specifications submitted by the Borough Engineer. The total cost of the building work was £4250 with an additional £119 for floor and loft, planks and beams (H352 COU 1866/67, 193). Messrs Richard and Norton were contracted to provide and install all the necessary fixtures and fittings which would turn the newly-constructed buildings into a functioning stable yard. This included the boilers, pipes, tanks, troughs and stable fittings at a cost of £440. These were also installed according to plans and specifications submitted by the Borough Engineer, who furnished the contractors with the overall design (*ibid*).

3.2.21 In 1868, the local paper, The Porcupine, documents the May Day procession and subsequent party, which included a large number of carters and cart horses from the Scavenging Department. The newspaper article describes the procession as '*the bands of clean washed nightmen, with their barrows and their dung forks, With their horses decked so gaily, Decked in trappings gay and gorgeous...*' (Porcupine 1868).

3.2.22 The article also goes on to state that 150 heavy horse were involved in the procession and provides a select list of the names of the horses working and residing at the corporation stable yard including '*Heenan, Bismarck, Turk, and Blucher, Actress, Hermit, Garibaldi, Owen Glendwr, the Welshman active, Tommahawk, Black Bobby, Nigger, Punch, and Judy, Sultan, Chloe, Madge Robertson, The Nun, and Moses.* The names of the horses provide a good indicator of the major political and cultural players of the period, as well as a stark reminder of the social issues and attitudes towards race within the city.

3.2.23 By 1870 the corporation stables were firmly established at Smithdown Lane and a number of businesses had sprung up alongside the stables which furnished the stable yard with provisions. The information below is taken from an abstract showing the expenditure of the established stable yard and includes a breakdown of costs, although it does not provide information on the number of horses or employees (H352 COU 1870).

3.2.24 In 1872 further expansion was required to the stable yard complex and again the council turned to William Tomkinson and Son to facilitate the construction of a store room under the cart sheds. The work was carried out for the sum of £42 (H352 COU/1872).

Expense	**£.**	**s.**	**d.**
Provender	1,111	17	0
Hay and Straw	498	3	4
Wages of Men	483	18	6
Rent &Taxes	29	3	6
Gas, water & Rent	43	4	1
Repairing Harnesses	47	14	10
Coals and Coke	34	17	8
Horse shoes, Irons and Nails	52	8	10
Oil and Tallow	41	14	1
Licences for Horses	44	8	0
Brooms and Brushes	15	19	10
Horse Physic	7	19	3
Repairs	16	6	8
Insurance	7	10	6
Cooking Stoves	10	7	9
Miscellaneous Charges	17	10	9
Total	2,463	4	7

3.2.25 By 1876 the further increase in the size of the stable yard and the number of scavengers employed there meant that a pay rise for the men in charge was warranted. The proceedings of the council note that on the 5th January, 1876 it was resolved '*that the salaries of the following officers in the Scavenging Dept. Be increased viz:*

1. Mr Edward Lancaster, Wharf Manager, from £2 to 2-4s per week.

2. Mr James Reynolds, Horse-Keeper and Store-Keeper, Smithdown Lane Stables from 39s to 46s per week.' (H352 COU 1875/76).

3.2.26 This entry into the council proceedings highlights the fact that although Smithdown Lane played a vital part in the management of waste and manure in the city, there were other posts relating to sanitation and waste management in other locations throughout the city.

3.2.27 This role would have been of particular significance at the docks where it was of vital importance that the quay side was kept clear if cargo was to be loaded and unloaded at maximum speed. Additionally, rotten refuse and manure on the docks would have encouraged the rats and other vermin which was a serious issue as they lived in the holds of ships, feasted on organic cargoes and also spread pestilence and disease.

3.2.28 The council records note that the stable yards were altered in 1881 with Mr H Tomkinson charging £28 for alterations relating to plumbing and slating (H352 COU 1881/82). This requirement for both plumbing and slating alterations is a clear indicator that another element or building had been added to the existed fabric of the stable. On 5th July 1882 the proceedings of the council note that it was resolved 'that the tender of Messrs. William Jones and Co for the alterations and repairs at Smithdown Lane Stables for the sum of £923 be accepted...' (H 352 COU 1881/82).

3.2.29 The OS Map of 1890 (Fig 8) shows the development of the stable yard with the Corporation Central Stables clearly marked to the south of the railway cutting. By this point the map indicates that the northern, eastern and southern stable blocks and associated domestic dwellings (69 and 73 Smithdown Lane) were present. The western block is incomplete but dotted lines between the cart sheds and the veterinarians house (No 73) suggest that plans were already in place to construct the final element of the western block. This map also shows the location of the Ramsbottom Chimney which was formerly located directly north of the stable block.

3.2.30 Further work was carried out at the stable yard in 1892 with Messrs WH Bleakley & Co (Birkenhead) being contracted to undertake the necessary alterations and additions to the Veterinary Superintendent's House (No 73), Smithdown Lane Stables. As usual, the work was carried out to specifications prepared by the City Engineer, and the work was completed for the sum of £398 (H352 COU 1893/1894).

3.2.31 The OS map of 1900 (Fig 9) shows the stable yard to have been completed with all four blocks now in place, including the additions made in 1892 to the north side of number 73 Smithdown Lane. The four blocks are arranged around an open central cobbled courtyard accessible via a single gateway at the north-west corner of the site opposite the entrance to Blanche Street.

3.2.32 By 1935, despite the increasing usage of motor vehicles, a census showed that there were still more than 5000 heavy horses working in and around Liverpool (Clarke 1989, 37). This is a testament to both the strength of tradition and the fact that many old cities like London and Liverpool had numerous roads and courts which were so narrow they could only be accessed by horse and cart.

3.2.33 By the mid 1940s the need to compete with motor vehicles for speed and efficiency in delivery and logistics was increasing. This competition led to an increasing number of businesses turning to motor vehicles and abandoning the traditional horse and cart which had stood them in good stead for so long. The displacement of the horse from the British town was further spurred on by local council regulations. It became policy that '*in order to obtain an 'A' licence (for a motor vehicle) they had to prove they had disposed of three horses*'. However, there was now no market for the unwanted horses. Clark states that '*it is a conservative estimate that nationally at least 100,000 horses were slaughtered in 1947 and the same amount in 1948* ' (Clarke 1989, 37).

3.2.34 This change, coupled with the effects of subsidence, resulted in the eastern block of stables being demolished in 1944. The eastern stable block was located above one of the tunnels constructed by Joseph Williamson which had caused the stable block to subside substantially. Photographs taken by the City Engineers in 1944 show the north-facing elevation of the block to be heavily propped and shored.

3.2.35 The 1950 Ordnance Survey map (Fig 10) (25" to 1 mile) shows the area of the stable yard to be almost identical in configuration to that shown on the map of 1900. There is only one small addition, namely a shed on the east-facing elevation of the western stable block. By this date, the complex was surrounded by terraced houses to the west and south; development to the north, however, had been limited by the presence of the railway cutting and the now redundant Ramsbottom Chimney.

3.2.36 More significant is the fact that by 1956, the Corporation horse population had dwindled to a mere 46 animals, all of which worked in the city cleansing department (refuse collection). They were not all stabled at Smithdown Lane stable yard but were spread across the city at various depots. Green Lane housed eleven horses, Smithdown Road housed six horses, Lavrock Bank housed nine, there were two stabled at Lark Lane, but Smithdown Lane still provided accommodation for eighteen horses (Clarke 1989, 39).

3.2.37 By 1957, the Lord Mayor's Coach and horses were also housed at the Corporation Stable Yard. At this time the stable yard was supervised by Richard Wilson who held the title of City Cleansing Superintendent. The yard had also been given over for use by the City Engineers as well and so was serving as a base for three very different groups of council employees. This mixed use also indicates why later modifications to the stable yard buildings were deemed to be necessary, including the subdivision of the northern block to accommodate a mixture of heavy horses and those horses used only during ceremonial occasions.

3.2.38 The Lord Mayor's Coach was housed at the Corporation Stable Yard, probably since it was opened, as this yard was the closest Corporation owned yard to the city centre. Designed and built in 1820 by Gorst and Co, the carriage makers on Great Charlotte Street; the carriage cost £380 to build and, apart from the addition of the coat of arms by heraldic artist WH Starkey in 1907 and renovations in 1927 including the addition of fresh gold leaf, it has remained largely unchanged since its original construction (Whittington-Egan 1957).

3.2.39 Walter Holden, the Lord Mayors Coachman was based at the stable yard at this time and was responsible for the six carriage horses kept there. Whittington-Egan states that '*These horses came from Holland and are specially selected for the job. They are all beautiful animals and stand seventeen hands high – an essential qualification this – and their stud names are Yorke, Yeoman, Yarrow, Walnut, Wanderer and Wellington, though they are known affectionately, if less grandly, as Bobby, Dick, Prince, Teddy, Laddie and*

Porky. Apparently, it is a convention of the stable never to address a horse by its stud name' (Whittington-Egan 1957).

3.2.40 The south-eastern limit of the eastern stable block (located north of the extant section relating to the Williamson Tunnels Heritage Centre) was demolished in 1968 (D Bridston pers comm) in order the facilitate the clearing of the land of redundant structures.

3.2.41 In 1984, under the Hatton regime, the role of Lord Mayor was abolished and the mayor's coach was moved to Croxteth Hall where it was placed on display to the general public. The western block was demolished at the end of 2000 in anticipation of further student developments. The basements of the Veterinarian's house remained *in-situ* and were simply in-filled using rubble generated by the demolition process.

3.2.42 Although the presence of cart horses and carters in the city has now been consigned to the past, the impact and services of the horses and men who once worked the streets and quays of Liverpool has recently been honoured by the unveiling of a plaque on Scotland Road 2003 and more recently in May 2010, with the unveiling of an eight foot statue of a cart horse on the quayside at the Albert Dock.

4. RESULTS

4.1 INTRODUCTION

4.1.1 Over 100 structures and deposits of archaeological interest were encountered within two main areas of excavation (Areas A) and an additional thirty deposits and structures were identified within other smaller areas (crane trenches and the excavation of foundations for the bicycle storage unit) which can be attributed to six phases of activity (Phases 1-6), all of which date to the post-medieval period and range between the late-eighteenth century and the early-twentieth century. Many of the structural remains comprised brick walls associated with number 73 Smithdown Lane (Building 1), which was first depicted within the stable yard in 1848 (Ordnance Survey first edition map 1848) and was demolished in 2001. Other features included remains of former quarrying levels, but the most significant were the discovery of new previously unidentified structures that form part of the Williamson Tunnels complex.

4.1.2 Initially, a process of watching brief was maintained during the ground works, but when significant structures were revealed these developed into open excavations, which provided a full record of the structures and their wider contexts.

4.2 WATCHING BRIEF

4.2.1 ***Introduction***: the watching brief described within this report took place intermittently between December 2010 and January to June 2011, with an archaeologist being present on site whenever intrusive excavation work was carried out.

4.2.2 ***Results:*** the watching brief was primarily concerned with the piling and excavation of foundation trenches for blocks one to nine within the footprint of the new building (with one being at the northern limit of the development and nine being at the southern limit of the site adjacent to the entrance to the Heritage Centre) and also the excavation of numerous drainage and man-hole trenches associated with the new build (Fig 2; Area A). The excavation of the building footings revealed several features of archaeological interest at the northern end of the site (Plate 6 and 7), and included several small sections of red brick wall. These all appeared to have post-dated the construction of the tunnels and correspond with demolished sections of the stable yard which fronted onto Smithdown Lane. At least two sections of stable yard wall on the north side of the tunnel comprised pink ashlar sandstone block footings with brick walls constructed on top of them. This pink sandstone probably represents material retrieved from the site and reused in the construction of the stable yard complex. The structures in this area are described as part of the watching brief (*Section 4.2.6;* Plate 7).

4.2.3 The mechanical excavation of the foundation trenches at the southern end of the site (within Trench 1A (Fig 2)) identified a brick arch (Plate 8 -12) which was constructed in the 'composite style' known to be used by Joseph Williamson when constructing his tunnels (also revealed was a series of buildings that related to the use of the site as a stable yard (Plate 8). The tunnel and adjacent stableyard buildings were subsequently recorded by excavation of Trenches 1A and 2A and are described in *Section 4.3*.

4.2.4 Further watching briefs were maintained during ground works in discrete areas within the site boundary, including the further excavation of a tunnel previously partly identified and excavated by the Joseph Williamson Society in Area B (Figs 2, 14 and 15), the excavation of foundation trenches for a permanent crane base in Area C (Fig 2 and 16), and the excavation of a large rectangular area for the installation of footings for a bicycle storage area in Area D (Figs 2 and 17).

4.2.5 ***Area A*** (Figs 2 and 11): measured 49m by 9m and the northern half was excavated as a series of narrow intersecting linear trenches with a generally uniform depth of 0.7m to allow the mass pour of concrete for the footings. Excavation commenced on the eastern side of Area A on a north/south alignment and the area was characterised by made ground deposits, and in the majority of the linear trenches this comprised crushed sandstone or fine sterile sand.

4.2.6 The earliest deposit encountered during the watching brief was ***016***, the natural pink sandstone geology, and was encountered at a depth of 0.9m and in these areas did not display evidence of having been modified for the construction of the Williamson Tunnels. The earliest structures identified were two sandstone walls, ***001*** and ***011***, constructed of roughly-hewn pink and yellow sandstone which was potentially sourced from the site quarry. Only sections of each structure were exposed at the north-eastern end of Area A, but it was evident that both walls were orientated east/west and were constructed of roughly-hewn ashlar masonry and sandstone rubble in an irregular arrangement with no mortar bond. Both structures measured 0.2m wide and 0.7m high, but the length of the walls was not determined beyond the extent of the 1m wide trench.

4.2.7 Overlying the bedrock, and deposited on both sides of the retaining walls (Plate 6), was a series of made ground deposits including ***002***, a 0.6m thick layer of crushed pink sandstone rubble located on the northern side of wall ***001***. This was in turn overlain by ***006***, a 0.3m thick fine pink sand layer. Directly above this was ***007*** and ***008***, both of which were made ground layers sloping downward towards the south and the rear of wall ***001***. Deposit ***007*** was a 0.25m thick layer of crushed orangey-yellow sandstone in a coarse sand matrix and was overlain by ***008***, a 0.3m thick layer of coarsely-crushed pink sandstone.

4.2.8 On the southern side of the wall, the made ground layers were seen to tip away from the face of the wall suggesting a new phase of land reclamation constructed after the completion of retaining wall ***001***. The land reclamation deposits comprised ***003***, a pinkish-brown sandy clay layer, overlain by ***004***, a brown silty clay layer, which was in turn overlain by ***005***, a brown-pink sandy clay layer with sandstone inclusions. Wall ***001***, and both sets of tipped deposits on the south and north sides of the wall, were sealed by two further made ground layers; ***009***, a 0.4m thick layer of friable crushed pink sandstone fragments and ***010***, a homogenous silty clay layer with inclusions of river rolled pebbles.

4.2.9 Along the western limit of the site within Area A, a number of handmade red brick walls were uncovered (***014***, ***015*** and ***018;*** Fig 11; Plate 7). The majority of these had pink sandstone footings and infrequent pink sandstone coping stones, but all had been to some extent truncated. The walls were constructed of handmade red brick with a buff coloured sandy lime mortar and were constructed in an English Garden Wall bond; pink sandstone footings were visible at the base of walls ***014*** and ***018***. Wall ***014*** was located at the western side of the trench and was orientated east/west, measuring

2.1m long by 0.26m wide and 0.5m tall. Wall ***015*** was located to the north of ***014*** and was orientated north/south measuring 1.6m long by 0.31m wide and 0.5m high. It included some large pink sandstone ashlar blocks, but their depth and the presence of mortar on the top of the blocks indicates that this was not a sill, but possibly some sort of foundation level string course. All brick walls were observed in section and were left *in-situ* to act as retaining walls during the course of the excavation for the footings.

4.2.10 The walls correspond to the former location of stable yard buildings dating from the 1860s onwards as shown on the OS first edition and second edition mapping. The proximity and orientation of walls ***014*** and ***015*** suggest that they were part of the same building. Wall ***018*** was located to the east of ***014*** and ***015*** but had been more heavily truncated by the presence of a relatively modern sewer pipe so only survived as a section of collapsing brickwork. Again it is likely that this wall represented part of the foundations of the eastern range of the Corporation Stable Block.

4.2.11 Excavation within the central and southern part of Area A led to the exposure of a section of arched brick work which was identified as a tunnel (Plates 9-12). Area A was then expanded to create Trench 1, within which Tunnels 1 and 2 were identified. At the same time the southern end of Area A (Figs 2 and 12) was stripped and recorded in order to locate any potential additional tunnels.

4.3 EXCAVATION OF TRENCH 1A

4.3.1 ***Introduction:*** following the discovery of a partially collapsed vaulted brick and sandstone arch during the watching brief within Area A, the pre-construction ground works were halted and the southern part of the development footprint was subject to stripping by a 13 ton 360 mechanical excavation under archaeological direction within Trenches 1 and 2 (Figs 2, 12 and 13). The northern extent of this area was defined by the remains of a brick and stone-vaulted tunnel ***125*** (Plates 8-12), which was immediately to the south of the southernmost line of piles. The trench measured 18m by 5m and was orientated north-west / south-east on its long axis (Figs 2 and 12; Plate 8).

4.3.2 The earliest deposit encountered within Trench 1 was the pink sandstone bedrock ***100***, which was encountered within the central portion of the excavation area (Fig 2 and 12). As a result of spatial constraints associated with later features, bedrock ***100*** was exposed only as a narrow L-shaped strip measuring approximately 6m and 5m long and up to 1.8m wide (Fig 12; Plate 8). The depth of the upper surface of the exposed bedrock varied and sloped gently from north-west to south-east. There was a dip in the bedrock at the southern end of the western extent, although this area had been disturbed by modern trial trenching. There was no visible evidence of tool marks on any of the exposed portions of sandstone and any stone that might have been removed appears to have been split from the remaining mass along natural fracture lines. In several areas there were also deposits of very firmly compacted pink sand in direct contact with the pink sandstone and it is likely that these were *in situ* geological deposits.

4.3.3 The sandstone had been cut by a vertical trench as part of the earlier quarrying activities, and this had then been capped by a brick arch to form a tunnel or concealed subterranean chamber, characteristic of those produced by Joseph Williamson's workers (Figs 2 and 12; Plates 8-12). Due to the presence of the later tunnel capping

125 it was not possible to examine the quarry cutting, although the geotechnical investigation, including the dynamic probes, did indicate cut lines in the bedrock in the environs of the tunnels.

4.3.4 The brick-capped tunnel ***125*** (Tunnel 1) was orientated east/west across the northern end of the Trench 1A, and at the interface between the piled and non-piled foundations. The tunnel section measured 11.2m in length and 3.8m wide and was built in the 'composite arch' style (Plate 9 and 10), which has been observed elsewhere in the Williamson Tunnel complex, comprising an alternating mixture of large pink sandstone blocks and handmade red bricks of an irregular bond with a buff coloured sandy-lime mortar. The similarity in style between the structure and areas of previously identified tunnels within the existing heritage and visitor centre to the south-east of site, strongly supports the premise that this was an element of the Williamson's tunnel network.

4.3.5 ***Tunnel 125:*** the western end of the tunnel had been truncated laterally and longitudinally by building works associated with the nineteenth-century stable buildings and most of the northern side of the tunnel had also been damaged by these works (Plate 9). A small amount of damage had also been caused by the geotechnical investigations and two dynamic probes, where holes (the equivalent size of one hand made brick) had been punched through the upper brick-vaulted roof of the tunnel. At the eastern end, however, a full profile of the structure had been revealed as a result of truncation (Plates 10 and 11), and it was evident that the tunnel had originally extended beyond the limit of excavation in both the eastern and western directions, although it was not clear if any of the structure survived beyond the western limit of excavation. The western end of Tunnel 1 appeared to have suffered damage on a number of occasions, and within the trench it had been dismantled in order to allow for the installation of a large ceramic drain associated with the later stables.

4.3.6 The truncation at the western end of the tunnel allowed a clear view of a cross-section of the arch and it was clear that the vaulting had not been constructed with the use of purposefully-shaped keystones, but instead used standard rectangular red handmade bricks and rectangular ashlar blocks of pink sandstone (Plates 9-11). The full depth of the structure was not exposed at the northern side, but excavation of the southern side revealed that the arch sprang directly from the sandstone bedrock (Plate 12).

4.3.7 The lines of sandstone blocks forming the arch had been laid on-edge and measured up to 1m long by 0.28m wide and 0.42m deep. It is likely that the sandstone blocks were quarried on site and the quarry may have been moderately active during the period it was owned by Joseph Williamson, if only to provide additional materials for tunnel construction.

4.3.8 The depth of the blocks equated to the maximum thickness of the arch and, in order to achieve this as a uniform dimension across the whole profile, up to three bricks laid on-edge were used to span the distance between the upper and lower surfaces of the arch (Plate 9). The bricks were hand-made and measured 235mm by 110mm by 70mm; the width of each band of brick work varied between four and five courses and measured between 0.37m and 0.4m in width. The bands that were four bricks wide utilised three courses laid edge-on and a single course laid flat, and those that were five bricks wide, for the most part comprised four courses laid flat and a single course laid edge-on. However, the bond style was not uniform across the whole of the structure and in some places bricks had been laid in irregular patterns of rowlocks,

shiners, headers and stretchers (Plates 8 -12). The quality of materials and of craftsmanship also varied and, in places, fragments of broken bricks had been used, although this might suggest later repair. There was also variability in the size, shape and finish of the sandstone blocks, although they had all been roughly squared and most were dressed. A buff coloured, sandy lime mortar, typical of the period, had been used as a bonding agent.

4.3.9 An aperture in the apex of the vaulted roof, at the eastern end of the excavation, allowed limited views inside the structure (Plate 13). A photographic inspection revealed that a second tunnel (***176*** Tunnel 2) with a vaulted roof of the same construction type, lay below the present made ground surface, just to the north of the eastern limit of excavation and that this second structure was orientated north/south and was keyed into tunnel ***125*** with a sharply pointed-arched junction (Plates 13 and 14). Limited access to this confined space meant that it was initially difficult to examine closely the chronological relationship between the two tunnels, although the elaborate interlocking brick interface is strongly indicative that the tunnels were contemporary. The second tunnel also incorporated the same composite technique of using both pink sandstone blocks and handmade brick; however, the portion of interfacing brickwork that was visible showed (Plate 13) that the north/south tunnel had been built on top of the vaulting of Tunnel ***125*** and was, therefore, a later addition. This does not, however, preclude the possibility that both structures were planned and constructed as part of a single, and uninterrupted project and that the additional course of bricks may simply indicate the need for strengthening of the tunnels at major junctions.

4.3.10 Substantial deposits of waste within both tunnels meant that it was not possible to gauge their depths. During the geo-technical investigations, however, Tunnel ***125*** had been pierced by a dynamic probe (13A), which met a refusal at a depth of 50.2m AOD (2.6m beneath the current ground surface). Making allowances for the depth of the roof of the tunnel below the ground level at the time of the probing, this suggests that solid bedrock is located approximately 2.2m below the vaulting. It is, therefore, possible that, prior to infilling, the tunnel might have been relatively shallow in comparison to other known structures within the complex.

4.3.11 Following the construction of the vaulted tunnel ***125***, there was evidence of subsequent phases of building work around the structure. One of the earliest activities appears to have been the careful construction of a structure to reduce the curvature between the extrados and the crown of the arch and, therefore, prepare the ground for later construction work or to facilitate the addition of make-up deposits to conceal the arch and allow the ground level to be raised and levelled. This consisted of the careful placement of appropriately sized sandstone rubble and hewn sandstone blocks along the edge of the tunnel to create a more level surface (Plate 15). This work, as well as the levelling and infilling of the northern side of Tunnel 1 with cobble setts to provide a level surface, seems to indicate that this tunnel was exposed during the construction of the stables or was exposed as a result of the preparatory works to build the stableyard foundations along the western limit of the site.

4.3.12 A different approach was employed against the northern side of the arch, where there a single sandstone retaining wall, ***124***, (Plate 13), was constructed, and there was no subsequent use of levelling blocks to fill the space between the wall and the extrados and crown of the arch ***125***. Some sandstone was present adjacent on the northern side of wall ***124***, creating a combined width of 1.2m, and it appears that the walling and

associated sandstone might have constituted the main portion of the structural levelling in this area and that any additional levelling would have been enabled by the deposition of other material. Following the construction of the retaining walls, the area to the south of the tunnel was levelled by the deposition of large volumes of crushed sandstone, ***118***, which was overlain by clay, ***114***.

4.3.13 During the construction of the stable yard buildings along the western side of site, the tunnel would have represented a substantial obstacle to be overcome. To this end, two brick walls ***122*** and ***145***, (Plate 16) were constructed on the southern and northern sides, respectively, of Tunnel 1. These handmade red brick structures were both aligned east/west but were slightly staggered and overlapped slightly towards the western end of the tunnel (Figs 12 and 13). Both of these walls were set upon the friable pink sandstone bedrock ***100***, directly against the edge of Tunnel 1 and they also acted as retaining walls for supporting some of the sandstone levelling material. This indicates that the levelling above the tunnel and the construction of the foundations for the stable yard took place at the same time.

4.3.14 Associated with these walls was a number of other red brick walls (Plate 17), forming rooms and yard / garden areas within the south-western part of the stable yard. Historic maps indicate that this area was largely occupied by the veterinarians' house which had been subject to a number of extensions and alterations and was surrounded by a small walled garden, that was separated from the yard itself.

4.3.15 ***Building 1 (Number 73 Smithdown Lane):*** the remains of foundation-level walls and a cellar were exposed within the southern portion of Trench 1A, which were associated with the building formerly known as 73 Smithdown Lane (Fig 12; Plate 17). These structural remains partly overlay the vaulting of the tunnel, ***125***, and also overlay the retaining walls ***122*** and ***145***, the levelling sandstone ***123*** at the southern side of the arch and levelling deposits ***118*** and ***114***, as well as the levelled bedrock ***100*** to the south of the tunnel. It is possible that the levelling was undertaken in anticipation of the construction of these walls, which were associated with the house that stood on the site until demolition in 2001. The house was not depicted on Bennison's map of 1860 but was shown on the Ordnance Survey map of 1890. The building comprised the remains of wall foundations associated with a cellar, an entranceway, most of the front and rear of the house, the rear yard and also an outhouse.

4.3.16 A cellared area within the north-westernmost room was identified and excavated during the investigation; however, for logistical reasons only the eastern side of this room was revealed (Plate 18). The exposed section was formed by two walls ***133*** and ***134 / 135***, the earliest of which was the northern wall ***133***, which was abutted by wall ***134***. In addition to forming the northern wall of the cellar, this wall would have extended to the east to form the northernmost wall of the entire building. This wall overlay the retaining walls (***122*** and ***145*** associated with Tunnel 1) and was also built directly onto the vaulted brick arch of Tunnel 1, ***125***. The demolition of this wall and subsequent removal, after 2001, might have been responsible for the damaged state of many of the sandstone blocks within levelling deposit ***123***.

4.3.17 There was no evidence of deposits of crushed sandstone or clays, between the brickwork of the northern wall, ***133***, of Building 1 and walls ***122*** and ***145*** and vaulted arch ***125***, which might indicate that that the tunnel arch was fully exposed at the time of the construction of Building 1. Conversely, it may indicate that the ground had been

cleared down to the level of the arch vault prior to construction, thereby ensuring that the foundations could be located so as to avoid the arch as much as possible.

4.3.18 It is likely that the general levelling overburden, ***144***, that was recorded across much of the site and the tunnel brickwork, was deposited following the construction of Building 1. This material comprised pinkish-grey silty sand containing 40% sandstone gravel and was observed overlying numerous features across all of the site. As this material was seen to overlay features of differing dates, ranging from the nineteenth to twenty-first centuries, it had clearly been subject to numerous episodes of disturbance and re-deposition, although the somewhat homogenous character of this deposit meant that the interface between each episode of re-deposition could not be identified. It was, however, likely to have been deposited initially so as to create a level area surrounding Building 1. This deposit contained several conspicuous concentrations of ceramics.

4.3.19 The depth of the cellar, as excavated, was 1.55m and it was floored with stone flags (Plate 18); four stone steps remained extant from a staircase that terminated at the southern end of the cellar. This staircase was supported by a narrow single course-thick, red brick wall and appears to have provided a point of access at the western side of the cellar. One of the exposed lower steps was triangular in plan and the acute angle of the step edge enabled the stairs to descend with a slight clockwise twist, therefore facing into the western side of the cellar. Although there was a gap at the lower end of the stairs that would, theoretically, have made it possible to step through to the eastern side of the cellar, it is likely that a balustrade would have run along this edge of the stairs and prevented access from this side.

4.3.20 Walls ***135*** and ***137*** formed a narrow rectilinear area adjacent to the southern side of the cellar (Fig 12; Plate 19) which has been interpreted as an entranceway or corridor extending from the Smithdown Lane side of the site. A short wall, ***136***, at the eastern end of this hall, is likely to have supported a threshold between the hallway and the central room in the northern part of the house (Plate 19); these interpretations are supported by photographs taken during the demolition of the building in 2001. The southern edge of wall ***137*** was slightly overlain by the remains of a series of sandstone blocks, ***141***, which appear to have been incorporated into the foundation levels of this wall and were not bonded with mortar. With the exception of the cellar walls, which are likely to have been built over bedrock, all of these walls had been built over an infilled clay levelling deposit, ***114***, which was found to under lie all of the building footprint, with the exception of the areas directly over tunnel ***125*** (Tunnel 1).

4.3.21 The majority of the internal partition walls, or associated foundations, that related to the southern and rear parts of the house were no longer extant (Fig 12; Plate 17); it was therefore difficult to assign the limit and function of individual rooms in these areas because of the limited archaeological evidence.

4.3.22 A sandstone wall foundation, ***112***, aligned east/west and constructed without a mortar bond, was overlain by the remains of a handmade red brick wall ***113*** to the south of the entranceway. This may represent part of the foundations of the southern pitched, gable-end of the house, which was visible on photographs of the building prior to demolition. A room or area was partly defined by walls ***137*** and ***112***, although the eastern and western extents were not able to be defined. Another wall with sandstone foundations lacking mortar and brick-built upper courses running east/west, ***102/103***, was located to the south of wall ***112*** and was the southernmost wall of the house (Plate 17).

4.3.23 An area of the building between walls ***112*** and ***102/103*** was identified from historic photographs and was shown to have had a flat roof and did not extend as far to the east as the other parts of the building. The eastward extension of wall ***102/103***, therefore, probably represented the remains of the wall which defined the southern extent of the rear yard (Plate 17). The foundations of this wall were partially overlain by a levelling deposit of sandy silt containing fragments of brick and stone, ***152***, which represents the backfill of the narrow foundation trench.

4.3.24 Walls ***105*** and ***106***, and the remains of walls ***133*** and ***104***, defined the rear of the building (Plate 20), and were all of brick construction, with no indications of sandstone foundation courses; the walls were built over levelling deposits ***118*** and ***114*** . Cartographic evidence confirms that the building did not extend further east than the line of wall ***104***. Extending south-east from wall ***104*** was a sandstone wall, ***101***, which may be part of an earlier structure. It, and walls ***104***, ***102/103***, and ***105*** enclose an L-shaped rear yard, which was depicted on the nineteenth-century maps, and corresponds exactly with the area defined by, and the extrapolated continuation of wall ***112*** (Fig 13; Plate 17).

4.3.25 The Ordnance Survey mapping of 1950 (Fig 10) indicates the presence of a narrow outhouse within the yard, which was extant at the time of the main demolition phase in 2001. This outhouse was represented by brick wall foundations ***107***, ***108***, and ***109*** (Plate 17) and formed a two-celled structure that was likely to have been used as a privy and a storage shed. These rooms had been partially filled and levelled with clay and demolition rubble, ***110*** and ***111***.

4.3.26 Between 1890 and 1900, a large two-storey redbrick building was constructed adjacent to the southern gable of Building 1, in an area that had previously been occupied by smaller structures, and was also associated with the Corporation Stable Yard (Fig 9; Plate 17). Evidence of the remains of the northern wall of this building was exposed within the southernmost section of the excavation area and consisted of two portions of foundation walling, ***151*** and ***149/150***, that slightly overlay, and were parallel to, the southern side of the foundation walling, ***102***/***103***, associated with the southern wall of Building 1. Walls ***151*** and ***149/150*** had cut, and overlay, the fill, ***152***, of the foundation cut for wall ***102/103*** of Building 1. As these features were only visible within the edge of the section, their extent was not visible in plan.

4.3.27 Both of the tunnels (Tunnel 1, ***125*** and Tunnel 2, ***176***) encountered within this area had been filled with deposits of waste, some of which, ***127***, were evident in areas where the structure had been previously damaged or had suffered a partial collapse. These deposits comprised a loose black fuel ash within a matrix of silty sand and clearly represented the disposal of waste from fireplaces or furnaces. It is not clear from which point of access the tunnels were filled, although at least one aperture, ***132***, had been cut through the brickwork of the tunnel arch, ***125***, to allow material to be dumped within the structure. This aperture lay beyond the extents of Building 1 and any buildings depicted on historic mapping and, therefore, appears to have provided access from the stable yard quadrangle. It is not, however, possible to closely date the cutting of the aperture and it is possible that it could pre-date the establishment of the stable yards. A lack of a sufficient number of apertures suggests that, in addition to material being poured in from the outside, the tunnel was also backfilled by individuals taking material into the tunnel. The cutting of such apertures is, therefore, likely to have occurred following the sealing of pedestrian access to the tunnels.

4.3.28 The excavation exposed evidence of several episodes of damage and subsequent consolidation of Tunnel ***125***. The northern edge and western end of the vault had been truncated by construction work associated with the stable yard buildings between 1890 and 1900 and by the establishment of a twentieth-century service pipe. A layer of concrete, ***126***, and a deposit of granite setts (Plate 9) had been used to fill some of the damaged areas at the eastern end of the exposed portion of tunnel ***125***, presumably in order to cover and infill exposed voids. The insertion of a service pipe running north/south at the eastern end of the tunnel had caused damage to a section of the vaulted arch (Plate 10) and this had been repaired by the insertion of a concrete slab, ***129***, and a large flagstone, ***130***.

4.3.29 The latest significant phase of activity relating to the structures exposed during the excavation within Trench 1A, was the demolition of Building 1. This was undertaken in 2001 and comprised the reduction of the buildings to foundation-level. Although demolition rubble constituted a high proportion of the levelling deposits forming the overburden, ***144/148***, most of the large fragments of building materials had been exported from the site following the demolition works and the overburden consisted primarily of roughly sorted silty sand, gravel, and rubble.

4.4 EXCAVATION OF TRENCH 2A

4.4.1 Trench 2A was also located within Area A (Figs 2 and 13), to the north of Trench 1A. This area was excavated following the infilling of Trench 1A, after the discovery of Tunnel 3 and associated structures which necessitated further archaeological excavation. Tunnel 3 was revealed as a 3.5m deep sinkhole within the southern-central section of the piled half of Area 1, following a night of very heavy rainfall. Exploratory excavation was undertaken by means of expanding the sinkhole using a 12 ton machine fitted with a narrow bladed bucket, which provided a limited view of the natural pink sandstone bedrock and a deep linear cut orientated west/east (Plate 21). The cut appeared to have been lined with bricks and a section of arched brick work was also visible. Excavation showed that piling had caused a piece of the bedrock to fracture and the heavy rain had exacerbated the situation leading to partial collapse of this small tunnel.

4.4.2 Further to this discovery, and in consultation with the architect and site engineer, it was decided that a further phase of investigation was needed to ensure that no other piles 'failed' within this area as a result of direct or indirect impact upon Tunnel 3 or other associated subterranean structures. As a result a large area (Trench 2A), measuring 11.7m by 8.80m, was opened to the north of Trench 1A within Area A, exposing further sections of Tunnel 3 and a well-constructed sandstone and cobblestone roadway (Plate 22).

4.4.3 The earliest deposit noted within this area was the natural pink sandstone bedrock ***100***, which was first identified at the base of the sink hole associated with Tunnel 3. As with all previous revealed sections of bedrock exposed during the excavation, it was evident that the rock face had been modified by quarrying and subsequent to that, at the hands of Williamson's workmen during the construction of a series of tunnels. The clearest modification was the narrow linear cut, for Tunnel 3, ***173***, which was orientated east/west.

4.4.4 Expanding the excavation within Area 2A revealed that Tunnel 3 extended for a distance in excess of 11.3m across the width of the excavation and extended beyond the limit of excavation to both the east and west. The tunnel was 1m wide within the footprint of the excavation and was lined with a skin of handmade red bricks which, at the upper level of the bedrock, formed a brick-vaulted roof. Only the springers for the arch were still *in situ* at the time of excavation, however without the structural support of the arch, these collapsed into the void at the centre of the tunnel. This tunnel had an unusual construction, by comparison with other Williamson's Tunnels, as it was not common practice for the vertical chambers to be brick-lined as in this case. Additionally, the tunnel appears to have had two roof structures, the first being the brick-vaulted roof, discussed above, but also a horizontal capping layer of carefully laid sandstone slabs creating a flat upper surface (Plate 23) to the south of cobbled roadway ***178***.

4.4.5 The cobbled roadway, ***178***, (Fig 13; Plate 24) bisected the trench on an east/west orientation, extending for a distance of 11m and sloping downwards from west to east, away from Smithdown Lane, towards the deepest, or most heavily used, section of the quarry within the study area. The eastern and western terminii of the road continued beyond the limit of excavation, with a small area of the road identified during trenching for drainage works, at the western limit of the study area (Fig 2). The road itself was 1.7m wide and was constructed directly on top of the exposed bedrock surface, but was augmented by more durable materials; it is likely that the pink sandstone would generally have been too soft to provide a durable haul road for activities such as quarrying. The northern and southern edges of the road were, therefore, constructed of a mixed variety of river-rolled granite and flint cobbles, which were probably locally obtained, with both cobbled strips measuring 0.55m wide. Between these two strips of cobbles was a central surface strip, measuring 0.6m wide, constructed of pieces of irregular sandstone paving. The largest of the cobbles measured up to 0.4m in diameter and were set as a clear visual marker along the edge of the road. These cobbles decreased in size towards the centre of the road surface and the interface with the dressed sandstone slabs, with smaller stones measuring up to 0.1m in diameter. The dressed sandstone within the centre of the roadway complimented and mirrors the sandstone slabs that were used to cap the nearby Tunnel 3, ***173***. Wheel ruts were noted within the south-eastern area of the road, specifically across the area of small cobble stones, suggesting that this road had been subject to frequent heavy traffic, most likely carrying heavy loads of material, either during the time that the area was used as a quarry or during the time that the quarried land was being reclaimed and converted into a part of Williamson's Tunnel network. Although it is not possible to provide a definitive date for the road, the aesthetic and practical elements of the structure combine in such a way as to suggest that there was an element of Williamson's attention to detail within its construction.

4.4.6 The northern side of the road was bounded by a piece of timber ***162***, measuring 2.4m long and approximately 0.4m in diameter (Plate 24). This timber beam appears to have been intentionally laid along the northern road boundary, although the purpose is unclear.

4.4.7 To the north of the roadway, cutting into bedrock ***100***, are two pronounced steps, which appear to have been intentionally cut suggesting that these may have afforded access to a lower level of quarrying or additional subterranean (and as yet unidentified) features to the north of the road within Area A.

4.4.8 During the excavation of Tunnel 3, ***173***, further brickwork and sandstone remains associated with the composite-style barrel-vaulted arch of Tunnel 1, ***125***, were revealed. This section of Tunnel 1, ***145*** (centre of Plate 25), was in a far greater state of collapse than the sections previously identified (Plates 8-12). The brickwork was still partially bonded and orientated indicating its relation to Tunnel 1 ***125***, however, the majority of the sandstone was missing or not *in situ*. This additional section suggests that the original span of Tunnel 1 would have been in excess of 4m.

4.4.9 The cobbled roadway ***178*** and Tunnel 3, ***173***, had both been damaged by the later installation of a subterranean drainage channel ***169*** and associated brick box culvert ***171*** (Plate 26). The subterranean drain cuts across both the road and the tunnel on a north-west/south-east orientation, and it also cuts through the collapsed remains of Tunnel 1 ***125*** within Trench 1A. Areas of patched repair including clinker bedding, ***127***, and concrete surface ***126*** are evident between sections of Tunnel 1, ***145*** and ***125*** (Fig 13). Drainage channel ***169*** meets the base of culvert ***171***, which was probably connected to the stableyard buildings at the modern ground level by a vertical pipe which is no longer *in situ.*

4.4.10 The overall phasing for the structures within Excavation Trenches 1A and 2a can be outlined as follows:

- ***Phase 1:*** quarrying of bedrock;
- ***Phase 2:*** construction of Tunnel ***125/145***; Tunnel ***176***; Roadway ***178***
- ***Phase 3:*** levelling over Tunnels ***125/145***, ***176*** and Roadway ***178***;
- ***Phase 4:*** construction of Building 1 and other surviving subterranean elements of the stables;
- ***Phase 5:*** infilling of Tunnel ***125***;
- ***Phase 6:*** damage to, and consolidation of, Tunnel ***125***
- ***Phase 7:*** demolition of the western stable block
- ***Phase 9:*** demolition of Building 1

4.5 WATCHING BRIEF AREA B

4.5.1 Area B (Figs 2 and 14) was located towards the eastern limit of the site, adjacent to the site compound and to the north of the site boundary between the Williamson's Tunnels Heritage Centre and the study area. The area measured 4.1m by 5.4m, and entailed the discrete excavation of a large trench containing Tunnels 4 and 5, which had previously come to light due to subsidence in the car park area. A precursor to the trench had been hand dug by volunteer members of the Joseph Williamson Society in order to confirm that the subsidence was caused by a tunnel, and to establish the form and fabric of the tunnel. When first encountered, the area was fenced off, and it had become extremely overgrown and had partially infilled due to the collapse of make-shift shoring.

4.5.2 The earliest structure identified within this area was the modified and terraced pink sandstone natural bedrock, ***302***, which was similar to that previously noted in Area A (Trenches 1A and 2A). The sandstone was noted at a very high level here, being less than 0.2m below the existing ground level at the eastern limit of Area B and 0.5m

below the present ground level at the northern limit of Area B (Plate 27). This corresponds with the images of quarry terracing shown in the watercolour prints of *c* 1837 produced by local artist, William Gawin Herdman (Plates 4 and 5), and also gives an indication of the nature of the levels for the upper terraces of bedrock. A vertical shaft, known to be Tunnel 4, ***300***, was observed within the centre of the area although upon inspection there was no obvious sign of any brick vaulting.

4.5.3 An additional shaft, ***305***, on a slightly different orientation was also observed and has been tentatively identified as being another potential tunnel (Tunnel 5); however, a lack of access to the base of the excavation area meant that only a limited view of this cut was possible and it is equally possible that it represents a change in direction or a widening out of Tunnel 4. A number of junctions and chambers are already know about within the tunnels system (as explored and identified by the Friends of Williamson Tunnels and the Joseph Williamson Society) and this may represent a previously unknown component of such a junction or chamber.

4.5.4 Extending north/south through the excavation area, was a dry stone retaining wall constructed of roughly-hewn square and rectangular pieces of pink sandstone. This sandstone wall, ***301*** measured 1.9m long by 0.3m wide with a maximum depth of 1.5m (Plate 28). This structure was situated level with the top of the bedrock on the eastern limit of the trench, although it may have once been considerably taller (as shown in the Herdman illustrations). The wall was one course wide, and 12 courses tall. There was no evidence of a mortar bond and all of the sandstone blocks were of irregular sizes. Because of this there was no real bond pattern, although the closest approximation would be a stretcher bond. The wall has been partially exposed for eight years and during this time has been subject to a level of erosion and collapse, with a number of stones missing from the basal levels closest to the top of Tunnel 4.

4.5.5 Located beneath wall ***301***, was a well-constructed and intact brick arch (Plate 29), ***300***, which is apparently all that remains of the roof of Tunnel 4 within Area B. However, a small number of bricks were observed springing from the edge of the bedrock, which were displaced during the process of mechanical excavation to clear the area of debris. The vaulted arch of Tunnel 4 was constructed of handmade red brick with a sandy lime mortar bond. In cross-section, the tunnel roof was clearly visible as being only two courses thick with bricks arranged in a ratio of one course of headers to one course of sailors (with the sailor course forming the intrados of the arch). The impression of a flat arch was given by the construction of a level brick platform, extending across the roof of the tunnel and abutting the north-facing bedrock outcrop on the southern side of Area B. This levelling platform was constructed of seven courses of handmade bricks set in a stretcher bond formation. No measurements or further observations could be made due to a lack of access to the base of the trench.

4.5.6 The undamaged cross-section of Tunnel 4 (Plate 29) and the survival of the arch beneath the dry stone retaining wall ***301***, supports the idea that Williamson constructed a number of his tunnels in sections, rather than as continuous brick structures. Sectional construction has been observed elsewhere within the tunnel network and it is likely that this method was also used here. There is no evidence of fracturing or broken brick work against the visible cross-section, which would indicate the presence of the now missing section of the tunnels' vaulted roof. This also suggests that it is likely that only one section has collapsed and further sections may also survive to the north-west, as well as the known section surviving to the south-east.

4.5.7 The majority of the extant roofing over Tunnel 4 was obscured beneath consolidated ground, that extends beneath the present car park, leading off in a south-easterly direction towards the Williamson Tunnel Heritage Centre and the lower section of the so called Triple Decker Tunnel. It was already known that there was an existing interface between the two tunnels and recent excavations within this area have provided limited access to the inside of Tunnel 4 in order to create a mitigative photographic record.

4.5.8 The interior view of Tunnel 4 (Plate 30) indicates a more complex vaulted connection than had previously been observed during the course of the excavation, although it is arguably not dissimilar to elements of brickwork leading into the larger chamber known as 'the banqueting hall' which is located on the 'house site' on Mason Street. The limited available access and the lack of a clear vantage point, partially caused by fill ***304***, meant that only a reduced view was visible; however the photographs would suggest a structure that was not dissimilar to an open-sided cloister vault, with the western side (?) being the open-sided component of the structure, leading off into a new tunnel.

4.5.9 At some point, following the construction of Tunnel 4 and 5, the exposed barrel-vaulted roofs were covered over and the ground levelled. There is no historic or cartographic evidence to indicate when this infilling and covering over of the tunnel structures took place. No finds were retrieved from the overburden, ***303***, within Area B, as it was largely a modern backfill, generated by infill and collapse following the preliminary investigations carried out by the Joseph Williamson Society within the last eight years.

4.6 AREA C: CRANE BASE FOUNDATION TRENCH

4.6.1 During the course of the construction process it was necessary to bring a large mobile crane onto site to lift concrete floor beams into place within Blocks 1-9 as well as other ancillary tasks. Similarly, a crane was required during the demolition of the existing northern block of the stable yard.

4.6.2 In advance of the use of this crane it was necessary for logistics and H&S reasons, to evaluate a small area of the site in order to establish a suitable tunnel-free location for a reinforced and piled crane base which would support the weight of the crane (in excess of 80 tons) during the lifting process. To identify a suitable location, the orientation, weight and circumference span of the boom of the crane at full extension needed to be taken into consideration. Area C met all the required criteria and so was investigated accordingly.

4.6.3 Six trenches were excavated within Area C. The first two trenches (1C and 2C; Fig 16) were excavated in order to ascertain whether Tunnel 4/5 and Tunnel 2 might continue within this area of site. A further four trenches (Trenches 3C-6C) were engineered trenches, and were specifically excavated so as to accommodate four piles and a concrete pad as part of the crane base construction.

4.6.4 ***Trench 1C*** (Figs 2 and 16; Plate 31): was located at the south-eastern extent of Area C and was orientated north-east by south-west on its long axis, measuring 2m by 1m. The trench was excavated using a toothed digging bucket and was excavated to the maximum safe reach achievable with a 12 ton excavator (*c*3m). The earliest deposit encountered within this area was a 2m thick band of mixed brown silty clay, ***403***, with

crushed sandstone, which was overlain by ***402***, a 0.4m deep deposit of crushed sandstone and sands. These deposits may have been the result of a single large episode of dumping as part of a levelling process. These deposits were overlain by a 0.2m silty sand bedding layer, ***401***, which was in turn overlain by the current ground surface, ***400***, comprising rectangular granite cobble setts which were laid down within the site as part of the central area of the stableyard.

4.6.5 Bedrock was not identified within this area and may indicate the presence of a tunnel at far greater depth or simply the previous intensive quarrying of a localised sandstone seam. No tunnels were identified within this area, although this does not rule out the presence of a section of terracing or tunnelling at depths greater than 3m below the present ground surface.

4.6.6 ***Trench 2C*** (Fig 2 and 16; Plate 32): the trench was located at the northern limit of Area C, north of Trench 1C and orientated north-east by south-west, measuring 3m by 1m. This trench was situated in order to determine whether or not there was any potential for an interface between Tunnel 2 and Tunnels 4/5 (identified within Areas A and B respectively). This trench was excavated using a toothed digging bucket and was excavated to the maximum reach achievable with a 12 ton excavator (*c* 4m), although the eastern and western limits of the trench were slightly shallower. As with Trench 1C, the earliest deposit encountered within this area was ***409***, a 2m thick band of mixed brown silty clay containing crushed pink and yellow sandstone, as well as rounded pebbles. This was overlain by ***408***, a 0.3m thick black clinker layer. This was in turn overlain by a 0.05m thick layer of mixed sand, sandstone and brick rubble, ***407***. Above this was a further made ground layer, ***406***, a 0.3m thick layer of crushed pink sandstone and sand (broadly equivalent to ***402***). These deposits all represent a phase of infilling and land reclamation. The levelling deposits were overlain by ***405***, a 0.4m thick layer of fine pinkish yellow sand which was used as a bedding layer for the cobble setts ***404*** (equivalent to ***400*** in Trench 1C) which represented the current ground surface, laid down within the site as part of the central area of the stable yard.

4.6.7 Bedrock was not identified within this area which may indicate the presence of a tunnel at a far greater depth or simply that there has been intensive quarrying of a localised sandstone seam in this area. Again, no tunnels or archaeological features were identified within this area, but this does not rule out the presence of a deeper section of terracing or tunnelling below the maximum depth of the excavation.

4.6.8 ***Trench 3-6C*** (Fig 2 and 16; Plates 33-35): following the excavation of evaluation Trenches 1C and 2C, the position of the crane base trenches was determined by the site engineer and a piling plan was designed, which entailed the establishment of 16 piles in four groups of four). This allowed the initiation of a series of trenches corresponding to each of the four pile nests. Crane trenches 3-6C were arranged as two parallel rows, each comprising two equally sized trenches of *c* 2m by 2m with a maximum depth of 1.2m, arranged to form a square base with four pile caps. At the centre of each trench was a cluster of four vertical metal piles which were driven into the ground prior to the excavation.

4.6.9 Of these four trenches, 3, 4 and 5C provided no evidence of any remains or deposits of archaeological significance, and instead all three indicated that this area largely comprises made ground of sandy clays and crushed pink sandstone bedrock ***410*** - ***418***; this was probably a by product of quarrying in other areas around the site (Plates 33-35). The sandstone bedrock, ***100***, was not encountered in any of these trenches. Trench

6C (Plate 36) provided evidence of structural remains, specifically, a quarter segment of a circular brick platform ***423***, located at the south-west limit of the trench. The earliest deposits encountered within Trench 6C were made ground layers; a 0.4m thick layer of sandy-brown clay, ***424***, overlain by a 0.3m thick layer of compacted crushed pink sandstone and coarse sand in a pinkish-brown clay matrix, ***425***. Constructed on top of the pink sandstone layer was a circular handmade red brick platform or base (Plate 36), ***423***, measuring 1.7m long (north/south) and 1.8m wide (east/west). Only a small section (approximately one quarter) of the platform was exposed but it is likely that this structure was circular with a conjectured diameter of around 3.4m. At the centre of the platform in the south-west corner of the trench was a slightly raised, square plinth, which was also constructed of handmade red brick. The platform was initially thought to be the top of a capped well; however, excavation beneath the brick surface revealed that the platform was only two brick course deep with no evidence for a well shaft. The platform was sealed by the bedding layer for the overlying granite cobble setts, ***404***, that are associated with the stable yard.

4.7 AREA D: BICYLE STORE TRENCH

4.7.1 The last phase of trenching (Fig 17) carried out within the study area was the excavation of a shallow rectangular trench measuring 14.8m by 3.6m, at the northern limit of the site. The area was stripped of the cobbled upper surface, associated with the stable yard, ***500***, and then was excavated using a ditching bucket to a depth of *c* 0.3m. The perimeter of the trench was excavated to a maximum depth of 1.2m (average depth of 0.8m) to accommodate the foundations for a light bicycle storage unit.

4.7.2 The earliest deposits encountered within this area was a pink sandstone bedrock, ***502***, which was identified at the northern limit of the trench, parallel to the north block of the Corporation Stable Yard. Bedrock was identified at a depth of 1.2m and there were two vertical cuts, ***503***, and ***504***, also identified, which are likely to be the edges of quarried seams. Vertical cut ***503*** was at least 0.6m wide, and extended the full width of the perimeter trench (0.6m wide); however, the cut continued beyond the limit of excavation to the north-east and the south-west and its full depth could not be ascertained due to the narrow confines of the trench. There was a further 0.4m deep step in the bedrock, ***504***, which may imply the presence of another vertical cut. No brick work or brick-vaulted arch was observed within either cut, however, it is entirely possible that these quarry seam edges (being not dissimilar in character and width to that of Tunnel 3) represent another unmapped section of the Williamson Tunnel complex.

4.7.3 The vertical cuts through the bedrock were infilled with a sterile pink sandstone quarry waste, ***505*** and ***506***, neither of which were fully excavated or explored during the course of this investigation. A further crushed pink sandstone layer, ***501***, with intermittent fragments of crushed brick, lenses of clay and clinker was identified above the level of the bedrock and this appears to have been a make-shift bedding for the granite cobble setts, ***500***, which was the uppermost surface within this area.

5. THE FINDS

5.1 FINDS ASSESSMENT

5.1.1 In all, 208 fragments of artefacts and ecofacts were recovered from three contexts, their composition and distribution is shown in Table 1. The finds are generally in good condition, with an unusual number of compete, or almost complete, vessels, most of them stoneware ink bottles or inkwell bottles.

Context	**Stoneware bottle**	**Other cerai vessels**	**Glass**	**Clay tobacco pipe**	**Bone**	**Shell**	*Totals*
117	11	0	0	0	0	0	11
144	104	6	3	6	1	1	121
179	0	75	1	0	0	0	76
Totals	***115***	***81***	***4***	***6***	***1***	***1***	***208***

5.1.2 Although not in themselves of special interest, the concentration of stoneware bottles in context ***144***, along with a small number in context ***117***, can provide some evidence for dating. Many of the larger ink bottles are stamped with the name of their producer, J Bourne, a pottery in production from the early nineteenth century. Variation in the exact wording, reflecting changes in ownership and location of the kilns, allows the vessels to be dated with some precision. Finds Plate 1 shows potentially the earliest stamp, naming the producer as J Bourne and Sons, of Denby and Codnor Park Pottery, near Derby, and can be dated 1852-1861 (Askey 1998). Finds Plate 2 shows a bottle stamped J Bourne and Sons, of Denby Pottery which is dated later, 1861-1916.

Finds Plate 1: Stamp of J Bourne and Son, 1852-1861

Finds Plate 2: Stamp of J Bourne and Sons, of Denby, dated 1861-1916

5.1.3 There is also a single bottle stamped [James] Calvert, of the North Shipley Pottery near Langley Mills, Nottingham, which can be dated between 1865 and 1883, the dates during which Calvert's pottery was in production (Finds Plate 3).

Finds Plate 3: Stamp of James Calvert dated 1865-1883

5.1.4 It is of note that many of the 57 complete, or almost complete, small ink bottles/inkwells seem to have been damaged in the same manner, with their necks broken off, and some have their extremely thin bases (some little more than 1.5mm in thickness) broken through, perhaps suggesting some systematic disposal rather than everyday loss. Several of the broken fragments of both inkwells and the larger ink bottles (the most frequently stamped vessels) show large bubbles and 'blow-outs' within the fabric, again suggesting the disposal of unserviceable examples amongst a consignment of bottles, perhaps brought to the site for filling.

5.1.5 The remainder of the pottery can be divided into kitchen and tablewares. The former are not well represented, with only a few fragments of (probably) locally-made black-glazed storage vessels, and two joining fragments of a better-quality stoneware baking dish. The remainder presents a limited range of late nineteenth and/or early twentieth-century tablewares, all in refined white earthenwares, and many of them underglaze transfer-printed in blue. Nothing is of particular significance, but fragments of 'flow blue' decorated pottery points to a date after 1830-40 (Neale 2004), and fragments bearing the 'Sea Leaf' pattern are most likely to be mid-later nineteenth-century Staffordshire products (Goodwin and Barker 2009).

5.1.6 There is little to be said of the clay tobacco pipe, all from context ***144***, which appears entirely contemporary with the stoneware and other pottery from the context. Glass from ***144*** is also likely to be of similar date, perhaps pointing to a date late in the range suggested for the stoneware bottles. The single animal bone and the oyster shell from this context are of no archaeological significance.

Context	OR number	Material	Category	No frags	Description	Period
117	1000	Ceramic	vessel	11	Brown stoneware bottles, all inkwells and ink bottles.	mid-late nineteenth century
144	1001	Ceramic	vessel	6	Brown stoneware bottles, all inkwells and ink bottles.	mid-late nineteenth century
144	1002	Ceramic	vessel	6	Four joining fragments white refined earthenware teacup, two fragments blue and white underglaze transfer-printed refined white earthenwares.	mid-late nineteenth century
144	1003	Ceramic	tobacco pipe	6	Two undiagnostic stem fragments; two joining fragments bowl with leaf-decorated seams; one plain bowl, one decorated bowl.	mid-late nineteenth century
144	1004	Bone	animal	1	Single unmodified bone.	not closely dated
144	1005	Mollusc	marine	1	Single valve, O edulis.	not closely dated
144	1006	Glass	vessel	3	Two joining fragments natural greenish machine-made bottle, oval base; one base fragment dark green machine-made bottle.	mid-late nineteenth century
144	1009	Ceramic	vessel	55	Brown stoneware bottles, 36 almost complete inkwells, 19 ink bottles, one mineral water bottle.	mid-late nineteenth century
179	1007	Ceramic	vessel	75	Two joining rim fragments Nottingham stoneware; 13 fragments black-glazed redwares; 14 fragments plain refined white earthenwares; one fragment late cream-coloured earthenware teapot spout; four fragments late industrial slipware; eight joining fragments sponged-ware jug; 27 fragments blue and white underglaze transfer-printed refined white earthenwares; four joining fragments green-printed refined white earthenware; one fragment fire damaged ceramic, no ID.	mid-late nineteenth century
179	1008	Glass	vessel	1	Base fragment, pale blue machine-blown bottle.	mid-late nineteenth century

6. DISCUSSION

6.1 INTRODUCTION

6.1.1 The archaeological watching brief and excavation within the study area brought to light a number of previously unidentified features, most of which appear to relate to the construction of tunnels within the site of a former quarry, at the instigation of leasee and local merchant, Joseph Williamson.

6.1.2 Of the four larger areas excavated (Fig 2; Areas A-D), tunnels were identified within Areas A, B and D, and no tunnel structures were identified within Area C. Five tunnels were identified in total, with four of the five being previously unknown examples of Williamson's subterranean network. All of the tunnel structures exhibited potentially unique features, including the form and material used in the vaulted ceilings, the combination and ratio of brick and sandstone and also the junctions/interface between the newly-discovered tunnels. A holistic overview of the tunnel network is not possible because, despite numerous excavations across three sites within the Edge Hill area, a complete structural and visual catalogue of known Williamson Tunnels is yet to be compiled. This is further complicated by the fact that Williamson himself left no documents or completed map or plan showing the extent of the network and its numerous unique architectural features.

6.1.3 Area A was investigated as a large open area excavation and yielded the largest number of tunnels and associated features of archaeological interest. Tunnels 1, 2 and 3, as well as a well-constructed roadway, were identified within this area. The remains of the foundations for the western block of the former stable yard were also exposed and recorded, although these post-date all activity associated with Joseph Williamson, and have been well recorded by historic maps and by the City Engineers.

6.1.4 Area B was excavated in order to provide a mitigative record of Tunnels 4 and 5. Tunnel 4 had previously been identified and partially excavated by the Joseph Williamson Society; however, the present phase of construction work afforded an opportunity to mechanically excavate debris from within this area prior to backfilling and capping of the main tunnel. Tunnel 5 was previously unknown and was identified and recorded during this phase of work.

6.1.5 Area C did not contain any evidence of tunnel structures; however, bedrock was not reached in this area so it was not possible to clarify if tunnels exist at a deeper level. Within the south-eastern corner of Area C, a quarter circle of brickwork was exposed as part of the construction trenching for a crane base.

6.1.6 Area D was excavated to allow construction of footings for a large, light-weight bicycle storage. This shallow rectangular area provided limited evidence of a cutting of the bedrock on a north-east/south-west orientation, and it is probable that this was a cut for a further tunnel. However, the shallow nature of the required footings meant that there was no requirement to fully explore this area at the time.

6.1.7 The place of this newly discovered group of tunnels within the chronological development of the tunnel complex as a whole is unclear. It is generally understood that Williamson undertook the construction of the tunnels as part of a process of land

reclamation and as an aesthetically pleasing way of infilling and covering the seams that had been quarried through the rock within the Edge Hill area.

6.2 AREA A

6.2.1 Within Area A, four distinct phases of excavation and watching brief were undertaken (Fig 2) and during this time, a large number of structures and deposits were uncovered. The earliest deposit uncovered within this area was natural pink sandstone bedrock ***100***. It was clear from the outset that the bedrock within this area of the site has been subjected to extensive alterations, as part of the earliest phases of quarrying and also as part of Joseph Williamson's alterations and augmentations to the site relating to land reclamation for construction purposes and for the creation of his tunnel network. Evidence for three tunnels; Tunnel 1, ***125***, Tunnel 2, ***176***, and Tunnel 3, ***173***, were uncovered within Area A and were examined as part of an ongoing archaeological excavation, augmented by further watching briefs. All of the tunnels comprised horizontal shafts cut into the upper face of the sandstone bedrock. These shafts had then been capped using a variety of techniques, all of which were different, and showed some unique approaches and construction methods depending upon the size and visibility of each tunnel. The largest of the tunnels within Area A was Tunnel 1, ***125***, which extended across the full width of the excavation and had a span of over 4m. This tunnel was also identified as being outwardly the most decorative with a visually pleasing arrangement of sandstone courses between wider areas of handmade red brick creating a striped effect with the composite materials.

6.2.2 The location of Tunnel 1, close to Smithdown Lane and level with the existing ground surface, coupled with the almost decorative appearance, would suggest that this tunnel was originally visible and could have been seen from certain vantage points along Smithdown Lane and Mason Street. Similarly, the north/south orientated adjoining Tunnel 2 was probably also originally visible so efforts had been made to present a visually pleasing, as well as structurally sound, interface between the two structures. The size of Tunnel 2 limited the type of materials which could have been used in the construction process; only brick was used, as sandstone blocks would have been too cumbersome.

6.2.3 Tunnel 3 is in marked contract, being located much deeper down, and sunken beneath the level of roadway ***178***. The requirement for a roadway within this location suggests it was one of the few areas of the site without wide quarry cuttings. Here the road and Tunnel 3 were constructed together in such a way that the upper level of the tunnel was level with the road surface and, therefore, there was no pronounced vaulted cap, sprung from the edges of the bedrock, as is evident elsewhere in the network and within Areas A and B. Tunnel 3 has also been afforded a brick vault with a brick-lined cut suggesting that perhaps the arched feature was a Williamson prerequisite, regardless of whether or not it would be seen. As such, this potentially further supports the idea that the tunnel constructions reflect a programme to generate work for apprentices and the unemployed.

6.2.4 The full extent of Tunnel 1 and Tunnel 3 was not identified and Tunnel 2 may have been a structure which provided a ground level entry point into the wider tunnel network, rather than a way of covering over a pre-existing shaft in the bedrock. Tunnel 2 appeared to be free standing without a vertical-sided quarry shaft beneath it.

6.2.5 The roadway may have originally been constructed towards the end of the quarrying works and prior to Williamson's main phase of tunnel construction; however, the pattern and arrangement of stones and the general quality and attention to detail with which this roadway has been constructed would tend to support the idea that it was either constructed, or augmented by, Williamson and his men.

6.2.6 All of the made ground and fill deposits indicate activity, post-dating the construction of the tunnels, although how much of this was attributable to Williamson is unclear. The made ground and levelling deposits directly above the tunnels are largely of sterile sands and crushed sandstone that was probably acquired and stockpiled during the quarrying process or was potentially generated during the construction of the Edge Hill cutting, which was built in 1836 by George Stephenson.

6.2.7 The fill of the tunnels does not relate to activity carried out by Williamson or his associates and for the most part dates to at least 30 years after Williamson's death in 1840. The infill material was generated as a result of the strategic dumping of waste material by the city council. This was done primarily as a way of cheaply disposing of inner city waste including, domestic and industrial waste, organic materials and household rubbish following the creation of organised sanitation and rubbish clearance in 1867. It has, however, also been indicated that the infill of the tunnels was desirable in order to prevent people from entering them because they had become dangerous.

6.3 AREA B

6.3.1 The excavation work within Area B was primarily undertaken in order to examine tunnels, that had already been identified by the Joseph Williamson Society and the Friends of Williamson Tunnels, and undertaken by volunteer members for each group. The four key archaeological features identified included modified, terraced natural sandstone bedrock, ***302***, a sandstone retaining wall, ***301***, and tunnels ***300*** and ***305***. The two tunnels within this area link into the known tunnel network, that is part of the 'Triple Decker' complex, currently under excavation and so could be investigated from both the interior and the exterior.

6.3.2 Both of the brick-vaulted arches were set within vertical-sided sandstone cuttings, assumed to be the result of earlier quarrying activity on the site. The modification of the sandstone bedrock at the level of the entrance to the tunnel supports the notion that, while the majority of the quarrying activity was carried out prior to Williamson acquiring the land, some modification of the bedrock was undertaken in order to create a more aesthetically appealing terrace which complimented the levels of the tunnel entrances where appropriate. The same can be said of the sandstone retaining wall which seems to serve an aesthetic rather that structural function. Furthermore, the existence of this wall, as depicted in the Herdman paintings of the site *c* 1837, indicates the accuracy of Herdman's illustrations and suggests that they may be a trustworthy source for identifying further tunnels and archaeological features within the development area. Both tunnels were constructed with red brick vaulting, rather than the composite brick and sandstone style that is seen elsewhere. The interior view of tunnel ***300*** would suggest that this structure was also where a number of tunnels converged.

6.4 AREAS C AND D

6.4.1 ***Area C:*** Area C was excavated in order to create a permanent crane base within the site. Excavation of this area provided a limited range of archaeological deposits, that were predominantly made ground deposits that were generated by the quarrying process and placed over the bedrock to raise the ground level within the development area. A large circular brick structure, with a square brick core, constructed within a cut in the made ground deposits was uncovered within trench 6C. This structure was not fully exposed during the course of the excavation work, so it is difficult to place it within the site phasing or to attribute a function to this feature.

6.4.2 It is possible that the feature represents a crane base associated with the final phase of the quarry and the construction of the Williamson's Tunnels. Alternatively, the fact that brick structure ***423*** was identified just beneath the cobble courtyard surface associated with the Corporation Stable Yard may suggest that this feature relates to a later phase within the development site.

6.4.3 ***Area D:*** the excavation of Area D to create a foundation for the bicycle storage area was a shallow trench which yielded a very limited view of the site. Bedrock was encountered at the northern limit of the trench and within this area it was clear that the bedrock had been modified with a stepped or terraced appearance. The vertical face of the bedrock may suggest the presence of further narrow tunnels, similar to Tunnel 3, within this area.

6.4.4 ***Conclusions:*** despite the extensive excavation within the study area, as well as independent research and community projects undertaken by the Joseph Williamson Society and Friends of Williamson's Tunnels, several key aspects of Williamson's tunnelling activities are still not fully understood. The orientation, relationship and phasing of the tunnels is unclear. Similarly, it has not yet been possible to establish the phasing or an analysis of the construction techniques within the three tunnel areas at Edge Hill, specifically the Heritage Centre, the House Site and Paddington.

7. BIBLIOGRAPHY

7.1 PRIMARY SOURCES (LIVERPOOL RECORD OFFICE (LRO))

Acc 2047 *Liverpool Poor Rate Assessment Book for 1826/27*

Hf 912 1817/53 A Plan of Liverpool with Environs, J Gore (publisher), 1817, Scale 1:200 yards

H 942 570 1/3 *A Brief Notice of the Excavations at Edge Hill near Liverpool*, James Stonehouse, 1846

H352 COU 1865/66 *Proceedings of the Health Committee* Borough of Liverpool LRO

H352 COU 1866/1867 *Borough of Liverpool – Proceedings of Council* LRO

H352 COU/1870 *An abstract of the expenditure on account of the General Rates. 1st January, 1870 to 31st December, 1870.* LRO

H352 COU/1872 *Borough of Liverpool – Proceedings of Council* LRO

H352 COU 1875/76 *Borough of Liverpool – Proceedings of Council* LRO

H352 COU 1881/1882 *Borough of Liverpool – Proceedings of Council* LRO

H352 COU 1892/1893 *Borough of Liverpool – Proceedings of Council* LRO

7.2 PUBLISHED CARTOGRAPHIC SOURCES

Bennison's Map 1860

Gage's Map 1836

George Perry's Map 1768

Mason's Map 1848

Newland's Map 1848

Ordnance Survey first edition map, 1848

Ordnance Survey second edition map, 1890

Ordnance Survey second edition map, 1900

Swire's Map 1824

7.3 SECONDARY SOURCES

Anon, 1766 *Gore's Directory of Liverpool and its environs*, Liverpool

Archaeophysica, 2010 *Smithdown Lane, Geophysical Survey Report*, unpubl rep

Askey, D, 1998 *Stoneware Bottles from Bellarmines to Ginger Beers, 1500-1949*, London

BGS 2011 *Geology of Britain*, http://maps.bgs.ac.uk/geologyviewer_google/googleviewer.html, accessed 31st January 2011

Brookes, R, 1853 *Liverpool as it was During the Last Quarter of the Eighteenth Century*, Liverpool

Clarke, EN, 1989 *Cart Horses on the Quay: The Story of the Liverpool Cart Horses*, Liverpool

English Heritage, 2006 *Management of Research Projects in the Historic Environment (MoRPHE)*, London

Godwin, J, and Barker, D, 2009 *Small Pieces of History, Archaeological Ceramics from Tunstall, Stoke on Trent*, Stoke-on-Trent Archaeology Service Monograph, 2, Stoke-on-Trent

Hand, CR, 1917 Joseph Williamson: The king of Edge Hill, *Trans Hist Soc Lancs Chesh*, **68**, 1-23

Hand, CR, 1928 Joseph Williamson, 'The king of Edge Hill', *Trans Hist Soc Lancs Chesh*, **79**, 86-111

Head, DJ, 1995 *Smithdown Lane Stables and Joseph Williamson Tunnels: A Brief Description and History*, unpubl rep

Institute of Field Archaeologists, 2001 *Standard and Guidance for the Collection, Documentation, Conservation and Research of Archaeological Materials*

Kaye, T, 1812 *The Stranger in Liverpool or An Historical and Descriptive view of the Town of Liverpool and its Environs*, Liverpool

Miles, W, 1864 *General Remarks on Stables and Examples of Stable Fitting*, London

Neale, G, 2004 *Collecting Blue and White Pottery*, London

OA North, 2005 *Archaeological Investigations into Williamson's Grave, St Thomas's Church, Liverpool*, unpubl rep

OA North, 2009 *The Corporation Stable Yard, Smithdown Lane, Liverpool: Interim Archaeological Watching Brief Report*, unpubl rep

OA North, 2010 *St Thomas' Churchyard, Park Lane, Liverpool: Archaeological Watching Brief*, unpubl rep

OA North, 2011 *Smithdown Lane, Corporation Stable Yards, Merseyside: Building Survey Report*, unpubl rep

Stonehouse, J, 1863 Recollections of Old Liverpool by a Nonagenarian, Liverpool

Stonehouse, J, 1879 *The Streets of Liverpool*, Liverpool

Troughton, T, 1810 *The History of Liverpool from the Earliest Authenticated Period down to the Present Day*, Liverpool

The Porcupine, Aug 31, 1867 *A Gigantic Nuisance*

The Porcupine, Nov 23, 1867 *The Edge-Hill Caverns*

The Porcupine, 1868 *The Procession, A Song of May Day 2nd May 1868*

Wallace, J, 1795 *A General and Descriptive History of the Ancient and Present State of the Town of Liverpool*, Liverpool

Whittington-Egan, R, 1952 Joseph Williamson - maker of catacombs, *Chamber's Journal*

Winslow, CEA, 1920 *The Untilled fields of Public Health*, NS 51

APPENDIX 1: PROJECT DESIGN

1. INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1 The proposed demolition of the existing house and stables and subsequent residential redevelopment at the Corporation Stable Yard, Smithdown Lane, Liverpool (centred on NGR 36340 90140) will potentially affect below-ground remains of archaeological significance, including, possibly, tunnels constructed by Joseph Williamson. A watching brief was maintained by Oxford Archaeology North during borehole investigations (OA North 2010), which highlighted that there were voids, possibly reflecting that the site was used for dumping waste, but these were not considered to be tunnels; however, it was highlighted that their form and function warranted clarification. A Ground Probing Radar survey (Archaeophysica 2010) was undertaken of the area to search for major sub-surface features and confirmed the existence of voids, but again, was not able to confirm the existence of extant tunnels. Subsequently a further programme of watching brief and excavation was undertaken in conjunction with the ground works for the new residential development adjacent to Smithdown Lane which exposed a series of tunnels (OA North 2011). This has highlighted that there is the potential for further tunnels under the present northern range of the stable yard, although it is also recognised that as the bedrock is relatively high under the northern range that could preclude tunnels.

1.1.2 The planning decision (application no 98p/2867, date registered 11th January 2001) stipulated the following conditions that are relevant to the recording and preservation of the archaeology, stable buildings and the tunnels in particular:

- Following receipt by the Merseyside Archaeologist and the local planning authority of the archaeological and geophysical reports on the development site required by the earlier phase scheme (planning permission 96P/0250), no development shall take place within the site until the applicant has implemented a watching brief and archaeological building survey to be carried out at the expense of the developer by an archaeologist through out the period of construction in accordance with a written brief by the county archaeologist and the local planning authority prior to any works commencing on site.
- All tunnels and archaeological features of significance identified by the watching brief shall be protected by a raft foundation with thickened reinforced beams or a similar scheme, to be submitted to and agreed in writing by the local planning authority (in consultation with the Merseyside Archaeologist).

1.1.3 Given the potential for the preservation within the development footprint of tunnels and other significant archaeological remains, and recognising the need for further clarification of the voids, RA Fisk and Associates, acting on behalf of Goldcrest Finance Ltd, requested that OA North submit a project design to maintain a further phase of watching brief, in accordance with the planning condition set by the Merseyside Archaeologist, during all ground works following the demolition of the northern range of the stable yard complex.. Specifically, the present phase of watching brief is concerned with monitoring the removal of ground-level floors, yard surfaces and any other features at a similar level (or below) during the demolition of the extant house and stable block, and preparatory clearance and ground reduction at the site. As required by the planning condition, the watching brief will identify, investigate appropriately and record sufficiently any archaeological structures, features or deposits revealed during the programme of development groundworks, and will also clarify the form of any voids and assist in securing the protection of significant features and tunnels within the development. The following document is a project design that outlines the proposed methodology to be used in order to implement the watching brief in the course of the demolition, levelling and preparatory earth-moving works.

1.1.4 ***Historical Background:*** a series of tunnels and buildings were constructed by Joseph Williamson in the early and mid-nineteenth century in the area of Edge Hill and which were centred on the site of the present development. He employed large numbers of the poor at a time when the demobilisation from the Napoleonic Wars had left many of the returning soldiers without work. His workforce built houses

along Mason Street, one of which, Number 44, he took for his own home (Hand 1928, 88), the remains of which are still visible today.

1.1.5 In addition to houses and other quarrying and construction works he was responsible for a complex of tunnels, caverns and passageways which extended beneath Mason Street to Smithdown Lane. Many of the houses were built on arches over the tunnels, and underground passageways linked the buildings. The tunnels take various forms and extensive work has been done in and around the area of the stable yard to document the extent of the tunnels. The most notable of the tunnels is the 'triple-decker' tunnel, so called because it comprises three tunnels, one inside the other. Williamson used the quarry and the construction of the tunnels as a way of keeping people employed and as a training ground for carpenters, stone masons and brick layers who were involved in the other aspects of his construction business on Mason Street.

1.1.6 Work began in 1832 on George Stephenson's railway tunnel, which was to connect Edge Hill station with Lime Street. Williamson's workmen broke through into the tunnel from beneath. Stephenson was given a conducted tour around Williamson's tunnels, with which he was very impressed (Hand 1917, 15). The railway tunnel, now a cutting, forms the northern boundary to the study area, although Williamson's tunnels extend beyond it to the north and east.

1.1.7 Williamson died on the 1st of May 1840 aged 71 years and was buried with his wife and her family in the Tate family vault located within the graveyard of St Thomas church on Park Lane. With the death of Williamson work on the tunnels ceased immediately and many of the tunnels had begun to be filled in with rubbish, even by 1845. The Liverpool Corporation then took over the land and a deliberate policy was adopted of using the tunnels to dump rubbish (Head 1995, 4; The Porcupine 1867, August 31st and November 23rd).

1.2 OXFORD ARCHAEOLOGY NORTH

1.2.1 Oxford Archaeology North (until 2001 the Lancaster University Archaeology Unit; LUAU) has considerable experience of sites of all periods, having undertaken a great number of small and large scale projects throughout Northern England during the past 24 years. OA North has considerable experience of undertaking building surveys across the region to fulfil the requirements of clients and planning authorities, and within very rigorous timetables. Significantly, OA North has been closely involved with the archaeological and historical investigation of Williamson's tunnels, and has undertaken a programme of documentary survey and archaeological watching brief, during an earlier phase of residential development at the site (LUAU 1996a, 1997 and 1999).

1.2.2 OA North has the professional expertise and resources to undertake the project detailed below to a high level of quality and efficiency. OA North is an Institute of Field Archaeologists **(IFA) registered organisation, registration number 17**, and all its members of staff operate subject to the IFA Code of Conduct (1994).

2. OBJECTIVES

2.1 The following programme has been designed to provide a suitable level of archaeological observation, recording, and response during ground works linked to the proposed development. Given the sensitivity of the archaeological remains within the area of the development, there is a planning condition stipulating the preservation *in situ* of all tunnels and archaeological features of significance via an engineering solution (Planning Application 98P/2867; Planning condition 16). In the event that a monument of such importance is discovered, such as a tunnel, then an agreement will need to be made between the Merseyside Archaeologist and the client as to the level and means of investigation, recording, and preservation. The required stages to achieve the archaeological works are as follows:

2.2 WATCHING BRIEF

2.2.1 To identify and record accurately any surviving archaeological features or deposits by means of close observation and hand investigation. To record the presence of buried features by appropriate recovery techniques, where applicable.

2.3 RAPID EXCAVATION

2.3.1 In the event of discovering significant features, a programme of investigation will be established in consultation with the Merseyside Archaeologist and with the Client. Following the guidance and any specific stipulation of the Merseyside Archaeologist, record the features within a wider context to allow an appropriate understanding of the remains.

2.4 ARCHIVE/REPORT

2.4.1 A full written report will present the findings of the fieldwork and will assess the significance of the data generated by the entire programme of work, in a local and regional context. The document will be suitable for deposition as a permanent archive of the work undertaken.

3. METHODS STATEMENT

3.1 WATCHING BRIEF

3.1.1 ***Methodology:*** a programme of field observation will be maintained during all negative ground works associated with the development (ie, all lifting of floor slabs, ground reduction, grubbing of foundations, cellars, etc) to identify and accurately record the location, extent, and character of any surviving archaeological features within the development area. This work will comprise the observation of the process of excavation for these works, the systematic examination and, where appropriate, investigation, of any subsoil horizons exposed during the course of works, and the accurate recording of all archaeological features and horizons, and any artefacts, identified during observation. It is assumed that OA North will have the authority to stop groundworks in the area of any find for a period that is sufficient to undertake investigation and recording, and, where appropriate, to inform the Client and the Merseyside Archaeologist, and to call in additional archaeological support to implement the necessary programme of archaeological work. Where significant remains, such as a tunnel, are identified, it would be necessary to undertake a more detailed investigation (*see Section 3.4*).

3.3.2 During this phase of work, recording will comprise a full description and preliminary classification of features or materials revealed, and their accurate location (either on plan and/or section, and as grid coordinates where appropriate). All archaeological information collected in the course of fieldwork will be recorded in standardised form, and will include accurate national grid references. Features will be planned accurately at appropriate scales. A photographic record will be undertaken simultaneously. The recording techniques and procedures employed by OA North for such detailed recording represent current best practice. All features and structures will be accurately planned using a survey grade differential GPS (Leica 1200) which is accurate to +- 0.02m, or a TST where GPS can't be used. . In normal circumstances, field recording will also include a continual process of analysis, evaluation, and interpretation of the data, in order to establish the necessity for any further more detailed recording that may prove essential.

3.3.3 ***Finds Processing:*** finds recovery and sampling programmes will be in accordance with best practice (current IfA guidelines for finds work). All typologically significant and closely datable finds will be contextually recorded. All artefacts and ecofacts will be handled and stored according to standard practice (following current Institute for Archaeologists' guidelines) in order to minimise deterioration. Finds storage during fieldwork and any post-excavation assessment and analysis (if appropriate) will follow professional guidelines (UKIC). All finds will be washed, marked and packaged as appropriate. Small finds will be individually packaged, in a manner appropriate to the find type.

3.3.4 The artefact assemblage will examined by OA North finds specialists, and the potential for further examination will be assessed. A summary report on the significance, character and date range of the assemblage will be generated.

3.4 EXCAVATION OF SIGNIFICANT ARCHAEOLOGICAL REMAINS

3.4.1 The following scheme of investigation is contingent on the discovery of significant archaeological features or deposits on the site during the watching brief, in particular if a tunnel is identified. Such features or deposits will need to be subject to a programme of excavation. It is essential that OA North will have the authority to stop groundworks in the area of any find for a period that is sufficient to inform the Client and the Merseyside Archaeologist, and to call in additional archaeological support to implement the necessary programme of archaeological work. The duration of this element is totally reliant on the number and nature of the features identified during the groundworks, but, should

extensive work be necessary, sufficient archaeological support will be provided to accommodate reasonable development deadlines. In the event that a tunnel is identified, it will be fully recorded beyond the anticipated maximum depth of the development ground works if necessary and also beyond the extent of the footprint of the development in order to provide an appropriate context for the tunnel remains.

3.4.2 Excavation of earth-fast and/or sensitive features will be by manual techniques. Pits and postholes will be subject to a 50% by volume controlled stratigraphic excavation, with the remainder of the feature, should it prove necessary to be removed in entirety, excavated quickly keeping only that dating evidence which is securely derived from the feature in question. Linear cut features, such as ditches and gullies, will be subject to up to a maximum of 20% by volume controlled stratigraphic excavation, with the excavation concentrating on any terminals and intersections with other features which would provide important stratigraphic information. As with pits and postholes, should it prove necessary to remove the remainder of the feature to expose underlying features and/or deposits, it will be excavated quickly keeping only that dating evidence which is securely derived from the feature in question.

3.4.3 Robust structural remains will be excavated by a combination of mechanical and manual techniques sufficient to define their extent, nature, form and, where possible, date. Mechanical excavation will be used to define carefully the extent of any surviving foundations, floors, and other remains. Thereafter, structural remains will be cleaned manually to define their extent, nature, form and, where possible, date. All mechanical excavation will be undertaken under archaeological supervision. Any deposits beneath the overburden will be subject to manual excavation, which will stratigraphically explore all features. The aim of this work will be to explore all features stratigraphically and to produce a clear plan of the remains.

3.4.4 The deposits encountered during the excavations will be sampled according to the appropriate professional standards to enable environmental analysis if required. Any internal features will be 100% sample excavated to provide information on their date and function, and the extent of any associated floor surfaces will be determined. It is anticipated that the tunnels will be preserved within the new build, and therefore no structural elements will be removed. If an intact vault is identified then the backfill deposits supporting the vault will be left unexcavated.

3.4.5 All information identified in the course of the site works will be recorded stratigraphically, using a system, adapted from that used by the Centre for Archaeology Service of English Heritage, with sufficient pictorial record (plans, sections and both black and white and colour photographs) to identify and illustrate individual features. Primary records will be available for inspection at all times.

3.4.6 ***Recording:*** all elements of the work will be recorded in accordance with current English Heritage guidelines (*MAP2*) and the best practices formulated by English Heritage's Centre for Archaeology. Results of all field investigations will be recorded on *pro-forma* context sheets, with specialist record sheets and supporting indices as appropriate. A full, detailed and indexed photographic record will be maintained of individual contexts, features, wider and general views and working shots of the ground works and of the site as a whole. Photography will be undertaken using digital photography using 8 megapixel cameras and 35mm cameras on archivably stable black and white print film. The site archive will include accurate large-scale plans and sections at an appropriate scale (1:50, 1:20 and 1:10).

3.4.7 The archaeological structures will be planned using a survey grade differential GPS (Leica 1200) which is accurate to +- 0.02m. All planning data will be digitally incorporated into a CAD system in the course of the evaluation and will be superimposed onto base survey mapping. This process will generate scaled plans which will also be subject to manual survey enhancement. The drawings will be generated at an accuracy appropriate for 1:20 scale but can be output at any scale required.

3.4.8 All artefacts and ecofacts will be recorded using the same system, and, following on-site processing, will be handled and stored according to standard practice (following current Institute for Archaeologists guidelines) in order to minimise deterioration.

4. ARCHIVE/REPORT

4.1.1 ***Report:*** one bound and one unbound copy of a written synthetic report will be submitted to the Client and within five weeks of completion of fieldwork, and further copies submitted to the Merseyside

Historic Environment Record and the Development Control, City of Liverpool following any comments from the Client. The report will include a copy of the agreed project design, and indications of any agreed departure from that design. It 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, with an assessment of the overall stratigraphy, together with appropriate illustrations, including detailed plans and sections indicating the locations of archaeological features. Any finds recovered from the watching brief will be assessed with reference to other local material and any particular or unusual features of the assemblage will be highlighted and the potential of the site for palaeoenvironmental analysis will be considered. The report will also include a complete bibliography of sources from which data has been derived.

4.1.2 This report will identify areas of defined archaeology. An assessment and statement of the actual and potential archaeological significance of the site within the broader context of regional and national archaeological priorities will be made. Illustrative material will include a location map, section drawings, and plans.

4.1.3 The report will include;

- a site location plan related to the national grid
- a front cover to include the planning application number and the NGR
- the dates on which the fieldwork was undertaken
- a concise, non-technical summary of the results
- an explanation to any agreed variations to the brief, including any justification for any analyses not undertaken
- a description of the methodology employed, work undertaken and results obtained
- plans and sections at an appropriate scale showing the location and position of deposits and finds located
- a list of and dates for any finds recovered and a description and interpretation of the deposits identified
- a description of any environmental or other specialist work undertaken and the results obtained
- a copy of this project design, and indications of any agreed departure from that design
- the report will also include a complete bibliography of sources from which data has been derived.

4.1.4 Initially, a pdf version of the draft report will be submitted to the client for approval within five weeks of completion. Upon client agreement, one bound and one unbound copy of the finalised report will be submitted to the client, and a further three copies submitted to the Merseyside HER. An additional copy will be sent to the Liverpool City Council Planning Case Officer. Any additional draft submissions and amendments may require recosting as a variation.

4.1.5 ***Archive:*** the results of all archaeological work carried out during fieldwork will form the basis for a full archive to professional standards, in accordance with current English Heritage guidelines (Management of Research Projects in the Historic Environment (MoRPHE) 2006). The project archive represents the collation and indexing of all the data and material gathered during the course of the project. It will include summary processing and analysis of all features, finds, or palaeoenvironmental data recovered during fieldwork to the appropriate level. OA North conforms to best practice in the preparation of project archives for long-term storage. This archive will be provided in the English Heritage Centre for Archaeology format and a synthesis will be submitted to the Merseyside Historic Environment Record (the index to the archive and a copy of the report). OA North practice is to deposit appropriate elements of the original record archive of projects (paper, magnetic and plastic media) with the appropriate County Record Office, and a full copy of the record archive (microform or microfiche) together with the material archive (artefacts, ecofacts, and samples) with National Museums Liverpool (NML). The actual details of the arrangements for the deposition/loan and long term storage of this material will be agreed with the landowner and NML. The archive will be compiled in accordance with the National Museums Liverpool (NML) 'Guidelines for the Transfer of Archaeological Archives to National Museums Liverpool V3' (revised 2010) and followed as part of the archaeological Contractor's Project Design preparation. The document is available from the 'Archive Curator':

Dr L. Stewart, Curator of Archaeology and the Historic Environment,

Tel: 0151 478 4443

E-mail: liz.stewart@liverpoolmuseums.org.uk

Address: Urban History Division, NML, DTO, Albert Dock, Liverpool L3 4AX.

5. OTHER MATTERS

5.1.1 ***Health and Safety:*** OA North conforms to all health and safety guidelines as contained in the OA Manual of Health and Safety and the safety manual compiled by the Standing Conference of Archaeological Unit Managers. The work will be in accordance with Health and Safety at Work Act (1974), the Council for British Archaeology Handbook No. 6, *Safety in Archaeological Fieldwork* (1989).

5.1.2 Full regard will, of course, be given to all constraints (services etc) during the evaluation, as well as to all Health and Safety considerations. OA North provides a Health and Safety Statement for all projects and maintains a Unit Safety policy. A risk assessment will be completed in advance of the project's commencement.

5.1.3 ***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. OA North has professional indemnity to a value of £2,000,000, employer's liability cover to a value of £10,000,000 and public liability to a value of £15,000,000. Written details of insurance cover can be provided if required.

5.1.4 ***Working Hours:*** normal OA North working hours are between 9.00 am and 5.00 pm, Monday to Friday, though adjustments to hours may be made to maximise daylight working time in winter and to meet travel requirements. It is not normal practice for OA North staff to be asked to work weekends or bank holidays and should the client require such time to be worked during the course of a project a contract variation to cover additional costs will be necessary.

5.1.5 ***Confidentiality:*** the report is designed as a document for the specific use of the Client, for the particular purpose as defined in the project design, and should be treated as such; it is not suitable for publication as an academic report, or otherwise, without amendment or revision. Any requirement to revise or reorder the material for submission or presentation to third parties beyond the project brief and project design, or for any other explicit purpose can be fulfilled, but will require separate discussion and funding.

5.1.6 ***Project Monitoring:*** OA North will consult with the client regarding access to the site. Any proposed changes to the project design will be agreed with the client).

6. WORK TIMETABLE

6.1 ***Watching Brief:*** the site work will be undertaken in accordance with the construction programme. The exact timescale is dependent upon site access and contractors work schedule.

6.2 ***Report Production:*** a report will be submitted within approximately five weeks of the completion of all elements of the fieldwork.

7. OTHER

7.1 ***Access:*** liaison for access to the buildings during the assessment will be arranged with the client, unless otherwise instructed prior to commencement of the archaeological investigation.

7.2 ***Project Monitoring:*** whilst the work is undertaken for the client, the Merseyside Archaeologist will be kept fully informed of the work and its results. Any proposed changes to the project design will be agreed with the Merseyside Archaeologist in consultation with the client.

8. STAFFING PROPOSALS

8.1 The project will be under the direct management of **Jamie Quartermaine BA Hons Surv Dip MIFA** (OA North senior project manager) to whom all correspondence should be addressed.

8.2 The project will be carried in the field by **Caroline Raynor BA Hons AIFA** (OA North project officer). Caroline has a great deal of experience in the archaeology of Merseyside.

APPENDIX 2: SUMMARY OF CONTEXTS

CXT	INTERPRETATION	DESCRIPTION
001	Retaining wall	East/west aligned retaining wall; roughly-hewn pink sandstone with no obvious bond type or mortar. 0.5m long by 0.2m wide and 0.7m in height. Limit of the structure to the east and west not observed within foundation trenches.
002	Made ground/ levelling	Coarsely crushed pink sandstone fragments tipped on a north/south orientation against the north facing elevation of ***001.*** Basal level of the deposit was not reached.
003	Made ground/ levelling	Pinkish brown sandy clay tipped on a north/south orientation against the south facing elevation of ***001*** beneath ***004.***
004	Made ground/ levelling	Brown silty clay over ***003***.
005	Made ground/ levelling	Brownish-pink silty clay over ***004***.
006	Made ground/ levelling	Fine pink sand on the north side of ***001***.
007	Made ground/ levelling	Crushed yellow-orange sandstone in sand matrix over ***006***
008	Made ground/ levelling	Crushed pink sandstone over ***007***.
009	Made ground/ levelling	Crushed pink sandstone and sand.
010	Made ground/ levelling	Brown/black silty clay with river rolled pebbles over ***009***.
011	Retaining wall	Pink sandstone retaining wall, with large roughly hewn slabs.
012	Packing layer	Pink crushed sandstone within ***011***
013	Modern spoil/ overburden layer	Modern spoil / overburden.
014	Wall	Red brick wall with pink sandstone capping stones orientated east/west
015	Wall	Red brick wall with pink sandstone capping stones orientated north/south
016	Bedrock	Pink sandstone natural at north end of watching brief

		(Block 9)
017	Made ground/ levelling	Pink friable sandy clay over ***016*** (good drainage).
100	Bedrock	Pink sandstone bedrock
101	Wall	Pink sandstone wall foundation orientated north/south
102	Wall	Pink sandstone wall foundation orientated east/west
103	Wall	Brick wall on top of ***102***, orientated east/west
104	Wall	Brick wall orientated north/south
105	Wall	Brick wall orientated east/west at 90 degrees to ***104***
106	Wall	Brick wall orientated north/south
107	Wall	Brick outhouse wall
108	Wall	Subsidiary outhouse wall
109	Wall	Outhouse wall orientated east/west
110	Make-up deposit	Fill of outhouse north room
111	Make-up deposit	Fill of outhouse south room
112	Wall	Sandstone wall fragment orientated east/west
113	Wall	Brick wall on top of ***102***
114	Make-up deposit	Pink/brown sandy clay fill in house yard
115	Cut	Modern cut on east side of ***104***
116	Fill	Fill of ***115***
117	Fill	Pot dump / infill outside of house / yard
118	Make-up deposit	Pink sandstone rubble quarry waste.
119	Structure	Modern road brick inspection chamber
120	Cut	Cut of modern drain
121	Fill	Fill of ***120***
122	Wall	Retaining wall against side of tunnel
123	Wall	Sandstone levelling blocks (south side of tunnel)
124	Wall	Sandstone levelling blocks (north side of tunnel)
125	Tunnel	Williamson Tunnel
126	Concrete slab	Isolated concrete slab over north side of tunnel
127	Fill	Black clinker tunnel infill, upper layer
128	Cobbles	Cobbles stacked against tunnel at north side
129	Concrete slab	Concrete slab over section of tunnel at the east
130	Floor	Stone flag covering in tunnel

131	Wall	Brick wall overlying tunnel at the east end orientated east/west
132	Cut	Cut into top of tunnel
133	Wall	North wall of house cellar
134	Wall	East wall of house cellar
135	Wall	South wall of house cellar
136	Wall	Blocking wall between 135 and 137
137	Wall	East/west orientated wall relating to north side of house
138	Wall	Brick wall of cellar
139	Floor surface	Pink sandstone covering at base of corridor
140	Fill	Bulk infill of corridor
141	Wall	Sandstone blocks, within the foundation levels of a wall, not bonded
142	Cut	Modern service cut
143	Fill	Fill of ***142***
144	Made ground/ levelling	General levelling overburden recorded across the site
145	Retaining wall	Brick wall of tunnel
146	Sett surface	Granite sett surface
147	Made ground/ levelling	Make up layer for ***146***
148	Made ground/ levelling	Levelling overburden containing much demolition rubble
149	Wall	Foundation wall, parallel to ***102***/***103***, same as 150
150	Wall	Foundation wall, parallel to ***102***/***103***, same as 149
151	Wall	Foundation wall, parallel to ***102***/***103***
152	Made ground/ levelling	Sandy silt containing fragments of brick and stone, backfill of foundation trench
153	Cut	Draw Cut
154	Fill	Fill of ***153***
155	Cobbles	Cobbled surface, part of ***178***
156	Made ground/ levelling	Sandstone blocks between cobbles, part of ***178***
157	Cobbles	Cobbled surface, part of ***178***
158	Base	Foundation of sandstone / brick structure

159	Wall	Sandstone block
160	Wall?	Large boulder set into the bedrock. It is coated with a green substance - probably cupric
161	Wall	Sandstone block
162	Wood	Timber beam measuring 2.4m long and 0.4m in diameter
163	Cut	Quarry cut through cobbled surface ***157***
164	Fill	Fill of ***163***
165	Cut	Cut into bedrock south of ***148***
166	Fill	Fill of ***165***
167	Cut	Cut into bedrock, Tunnel south of ***148***
168	Made ground/ levelling	Pink sandstone block
169	Cut	Subterranean drainage channel
170	Cut	Draw cut
171	Wall	Brick box culvert
172	Levelling deposit	Bedding material for the road
173	Tunnel	Williamson Tunnel, east/west oriented
174	Fill	Fill of ***173***
175	Modern spoil/ overburden layer	Overburden over ***145*** and road
176	Tunnel	Williamson Tunnel, north/south oriented
177	Fill	Fill of Tunnel ***176***
178	Cobbles	Cobbled Roadway, Group
179	Modern spoil/ overburden layer	Pottery dump at north-end of site
300	Tunnel	Williamson Tunnel
301	Wall	Retaining sandstone wall
302	Bedrock	Modified and terraced pink sandstone natural bedrock
303	Modern spoil/ overburden layer	Overburden within Area B, largely a modern backfill
304	Fill	Fill of ***300***
305	Tunnel	Williamson Tunnel
400	Setts	Rectangular granite cobble setts
401	Make-up deposit	Silty sand bedding layer

402	Make-up deposit	Deposit of crushed sandstone and sands (0.4m deep)
403	Make-up deposit	Layer of mixed brown silty clay (2m thick)
404	Setts	Granite cobble setts
405	Make-up deposit	Layer of fine pinkish-yellow sand which used as a bedding layer for ***404***
406	Make-up deposit	Layer of crushed pink sandstone and sand (0.3m thick)
407	Make-up deposit	Layer of mixed sand, sandstone and brick rubble (0.05m thick)
408	Make-up deposit	Black clinker layer (0.3m thick)
409	Make-up deposit	layer of mixed brown silty clay containing crushed pink and yellow sandstone as well as rounded pebbles (2m thick)
410	Made ground layer	Layer of crushed pink sandstone
411	Made ground layer	Layer of crushed pink sandstone
412	Made ground layer	Layer of sandy clay
413	Made ground layer	Layer of sandy clay
414	Made ground layer	Layer of sandy clay
415	Made ground layer	Layer of crushed pink sandstone
416	Made ground layer	Layer of sandy clay
417	Made ground layer	Layer of sandy clay
418	Made ground layer	Layer of sandy clay
423	Circular brick platform	Circular handmade red brick platform
424	Made ground/ levelling	Layer of sandy brown clay (0.4m thick)
425	Made ground/ levelling	Layer of compacted crushed pink sandstone and coarse sand in a pinkish brown clay matrix (0.3m thick)
500	Cobbles	Cobbled upper surface, associated with the stable yard
501	Levelling deposit	Crushed pink sandstone layer, bedding for ***500***

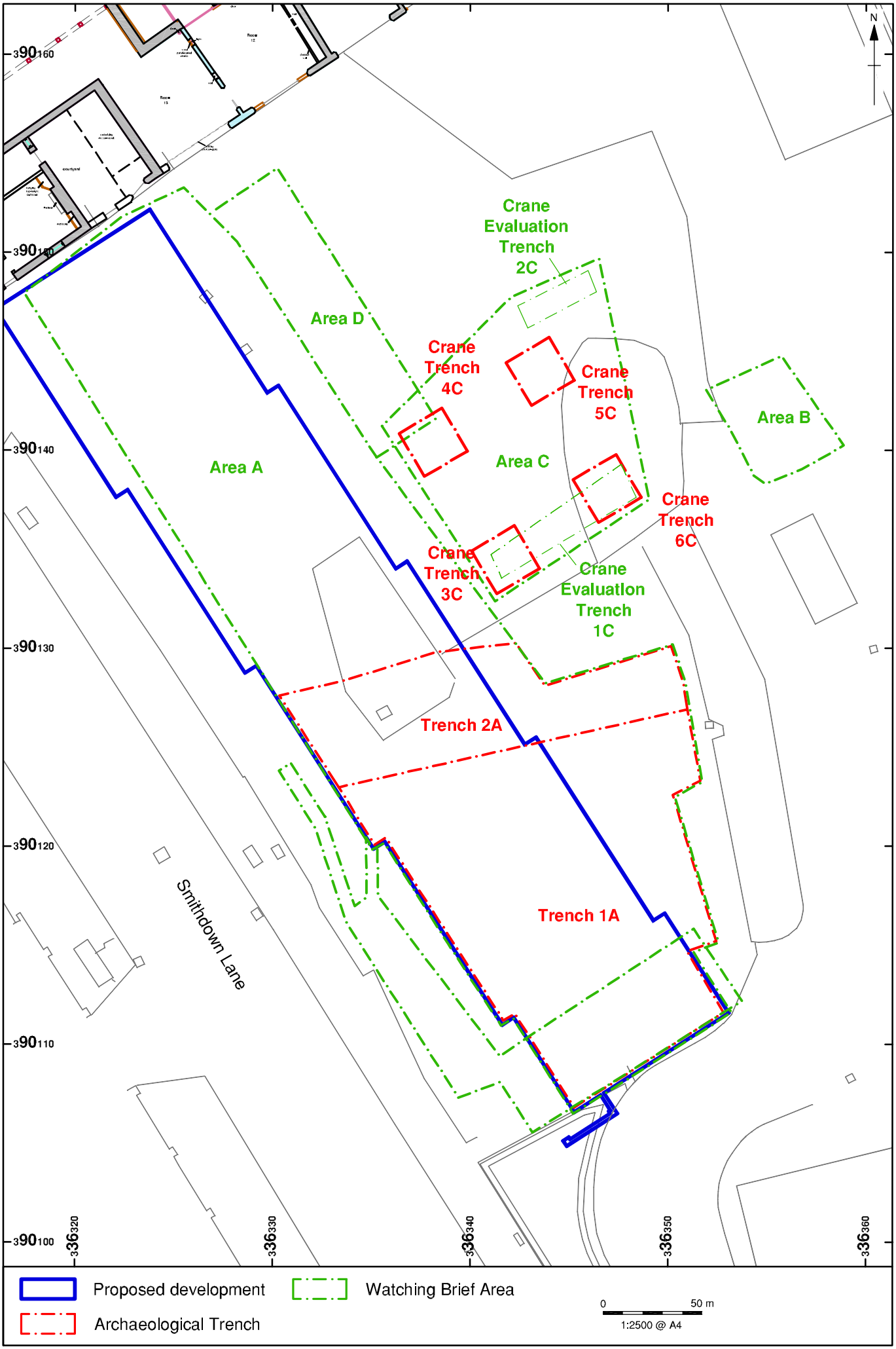
502	Bedrock	Pink sandstone bedrock
503	Cut	Vertical cut, edge of quarried seam
504	Cut	Vertical cut, edge of quarried seam
505	Fill	Fill of ***503***, sterile pink sandstone quarry waste
506	Fill	Fill of ***504***, sterile pink sandstone quarry waste

ILLUSTRATIONS

LIST OF FIGURES

LIST OF PLATES

Figure 1: Site location



JQ*L10259*AMS*090712

Figure 2: Location of Watching Brief Areas, and Trenches

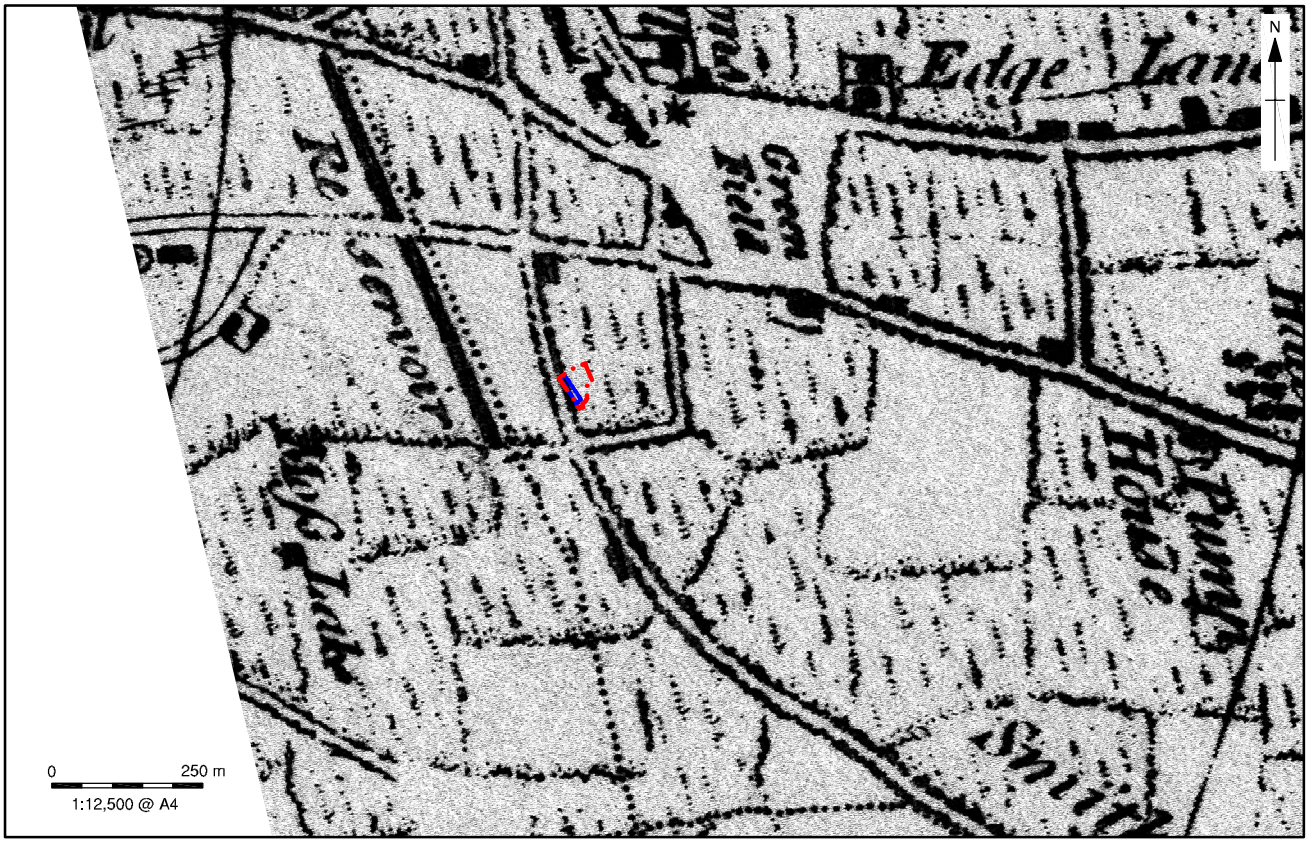


Figure 3: Yates and Perry Map of Lancashire, 1768

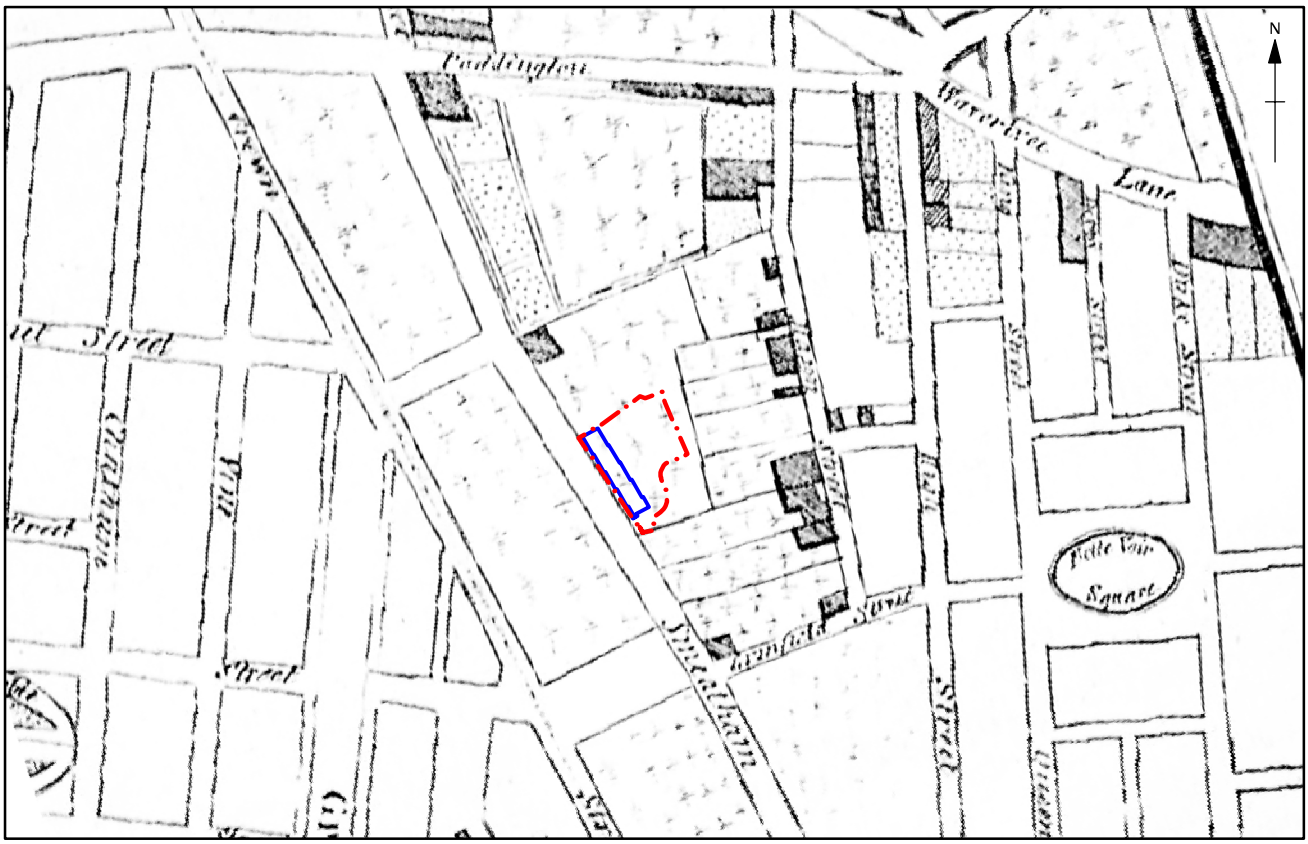


Figure 4: Gore's Map of Liverpool, 1806

Site Boundary

Proposed development

0 100 m

1:4000 @ A4

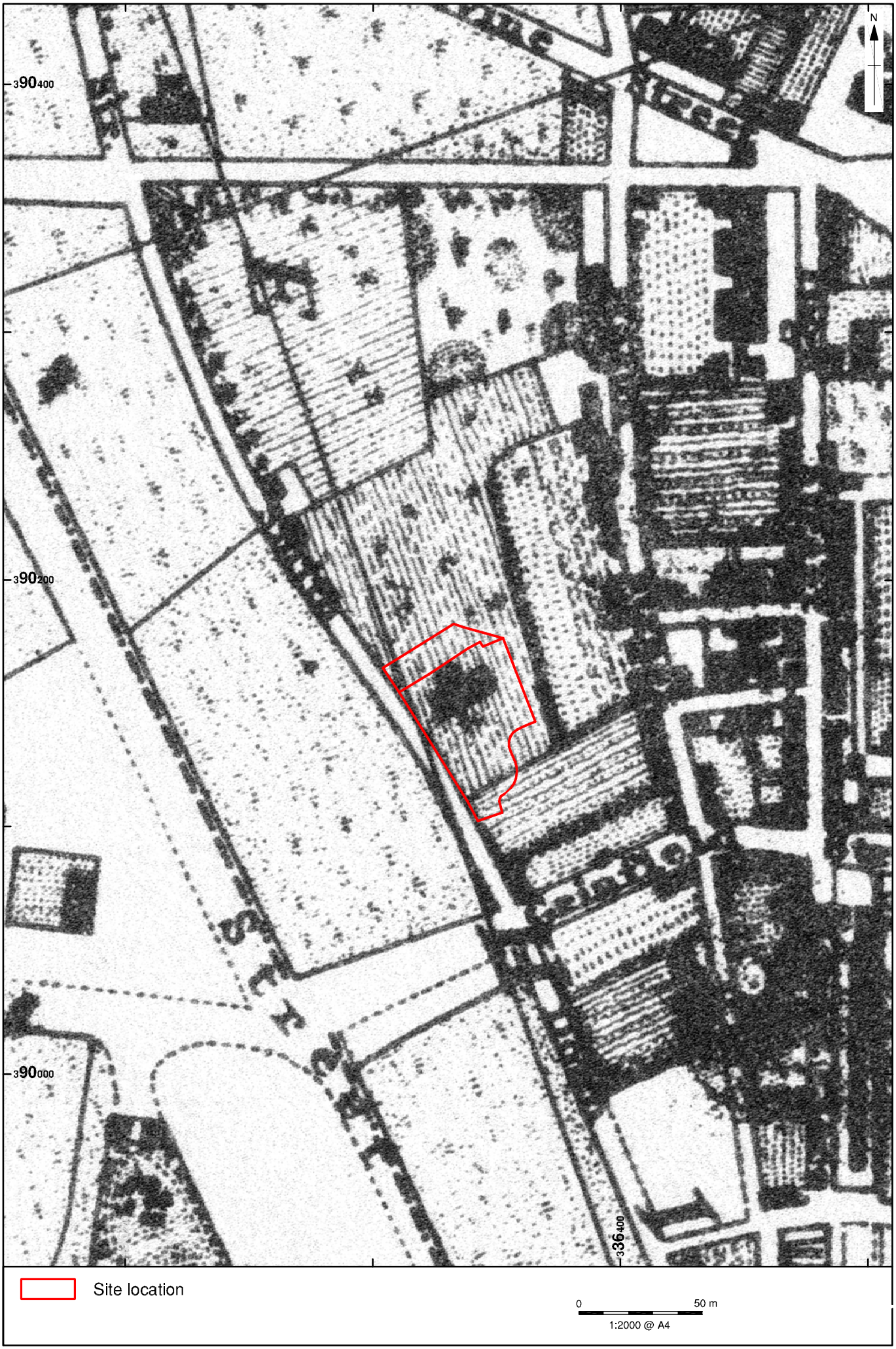


Figure 5: Swire's Map of Liverpool, 1824 (Liverpool Records Office)

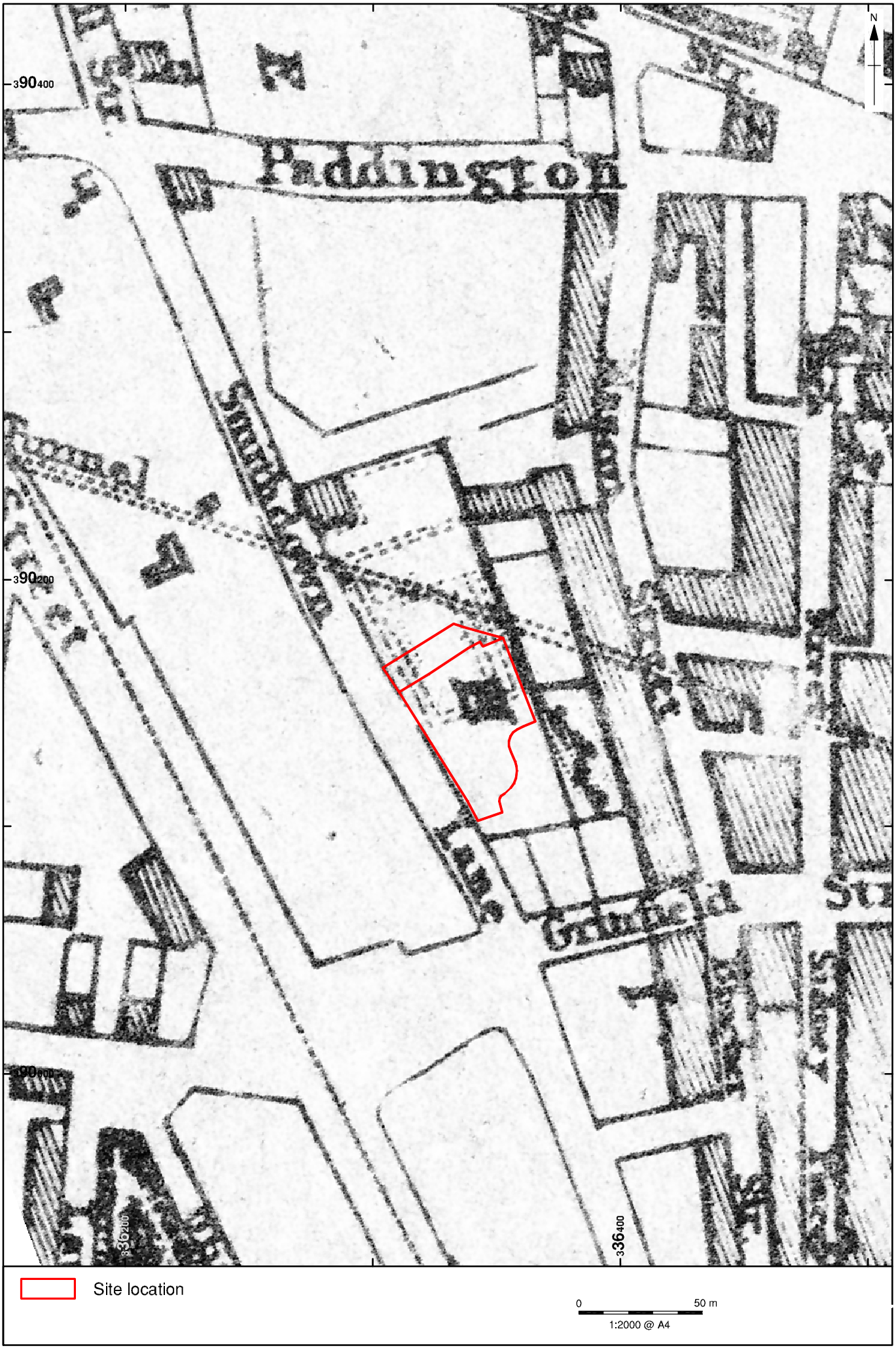


Figure 6: Gage's Map of Liverpool, 1836 (Liverpool Records Office)

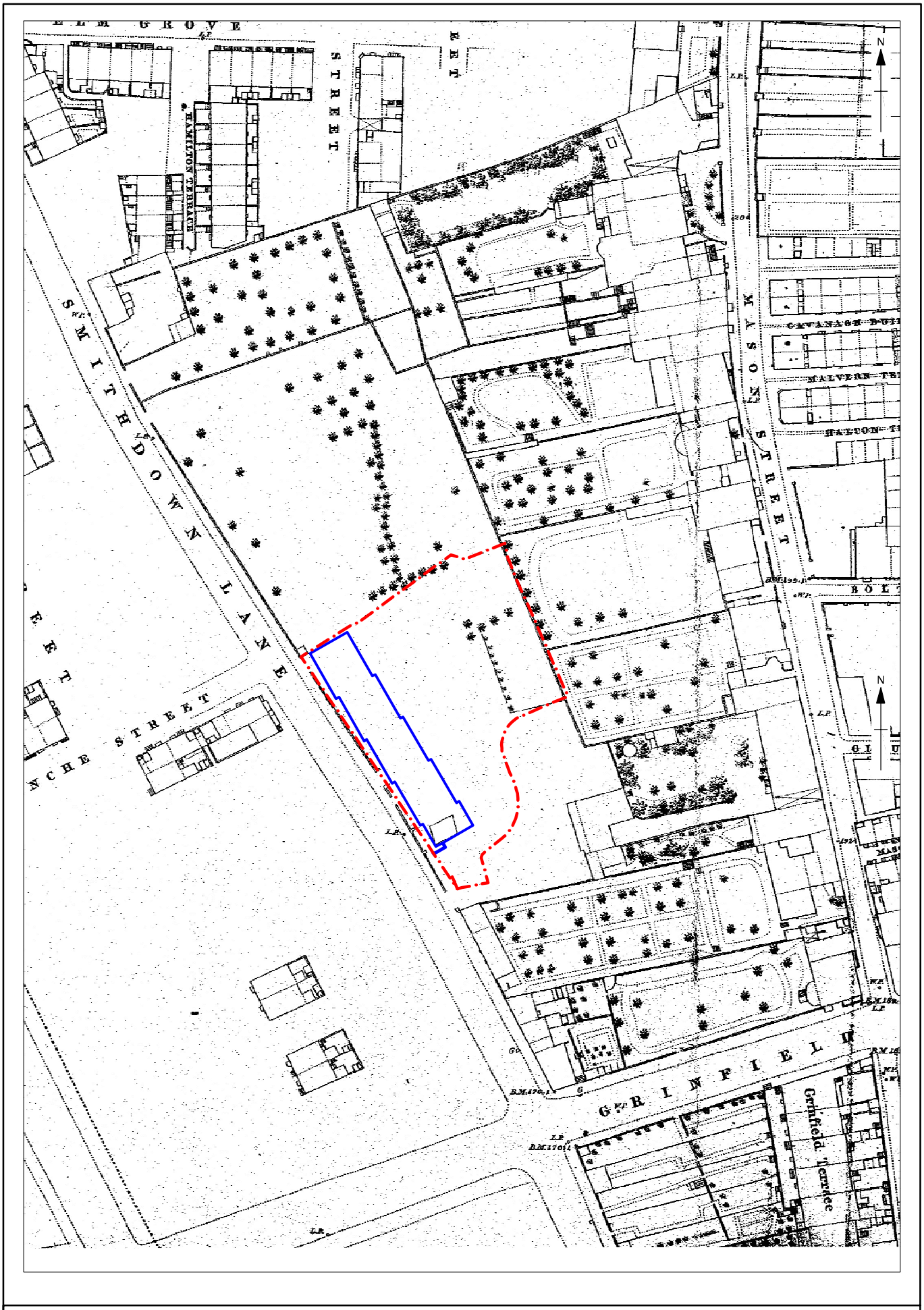


Figure 7: Newland's Map of Liverpool, 1848

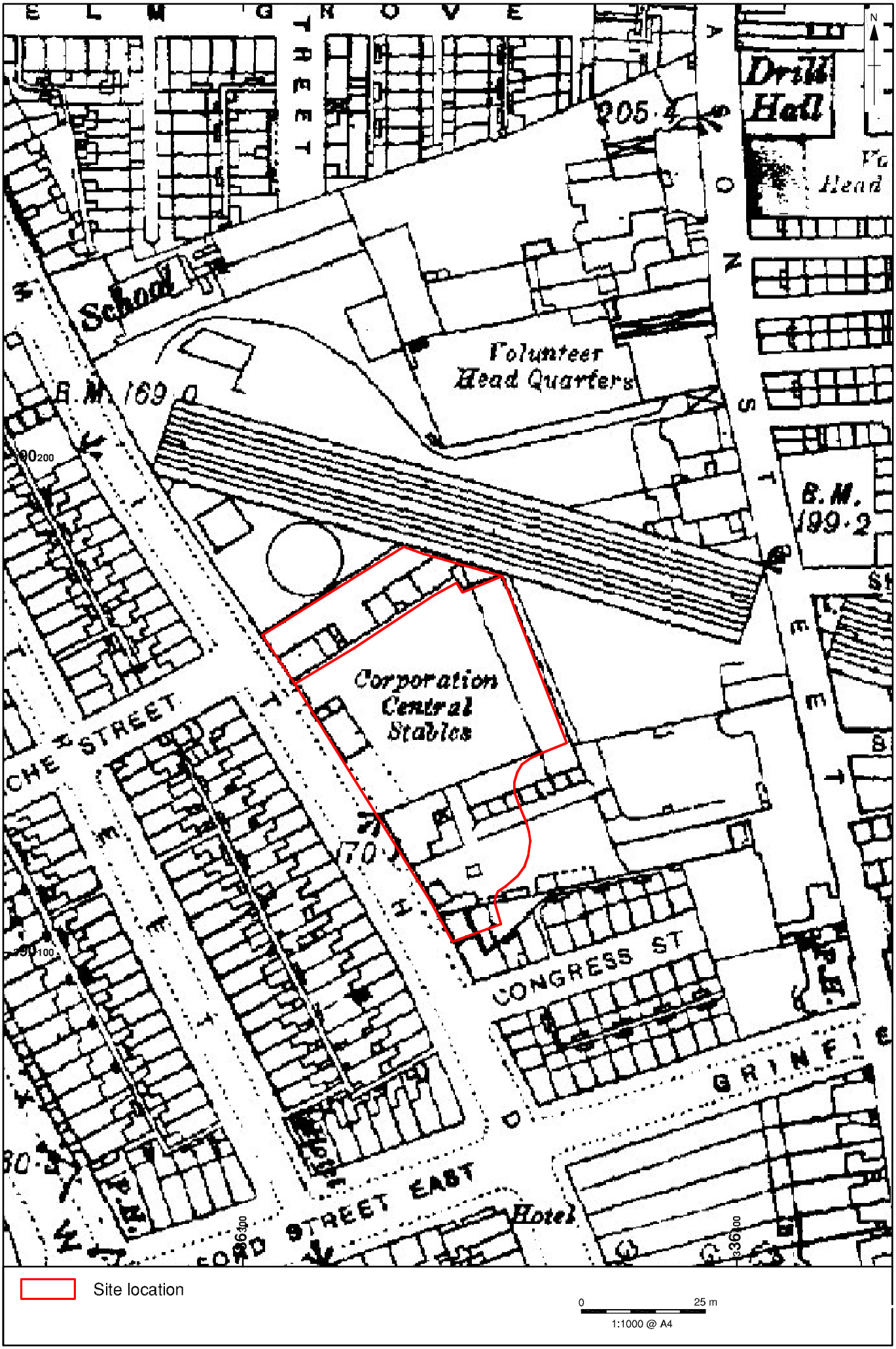


Figure 8: Ordnance Survey First edition, 25" to 1 mile, 1890

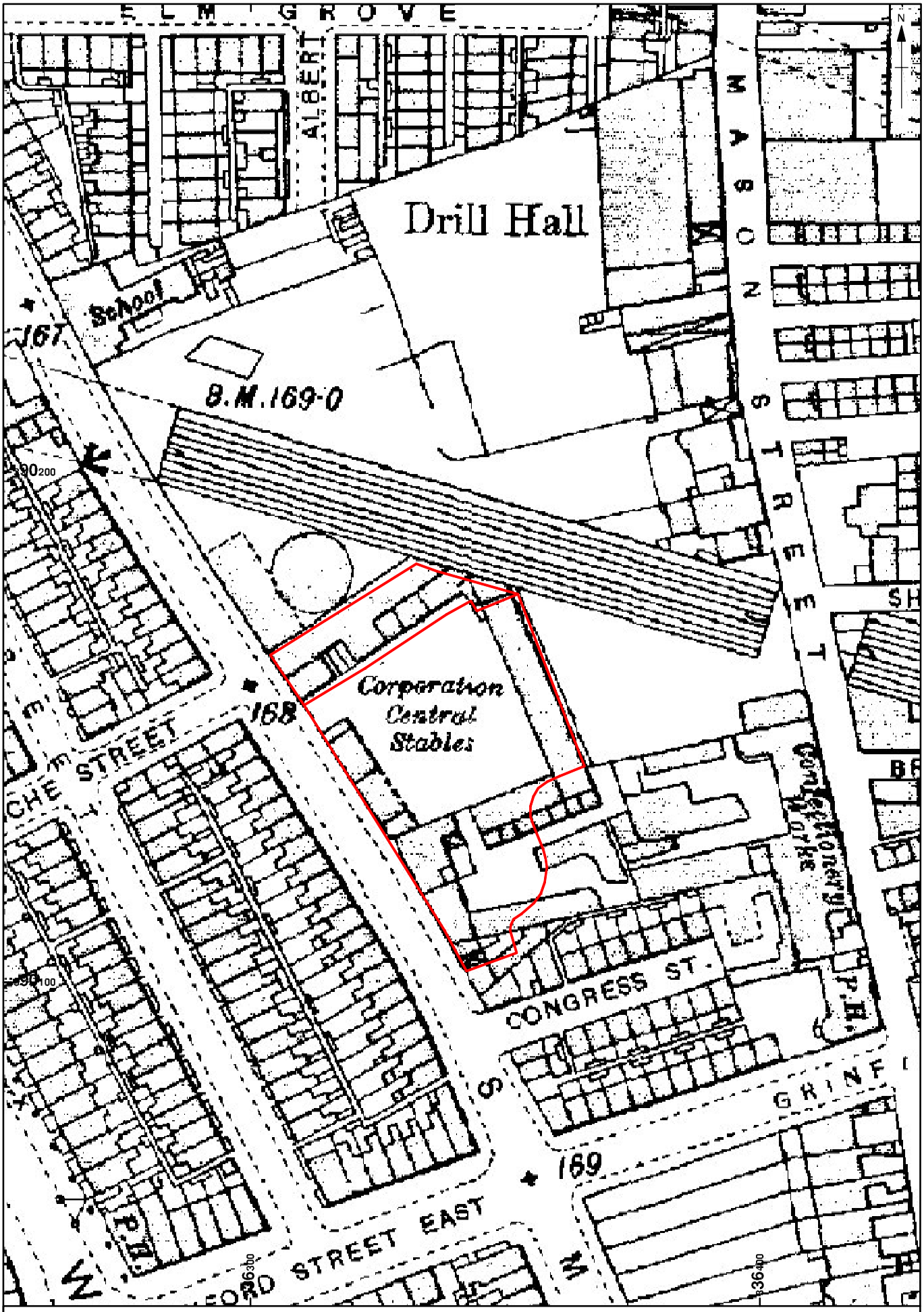


Figure 9: Ordnance Survey, 25" to 1 mile, 1908

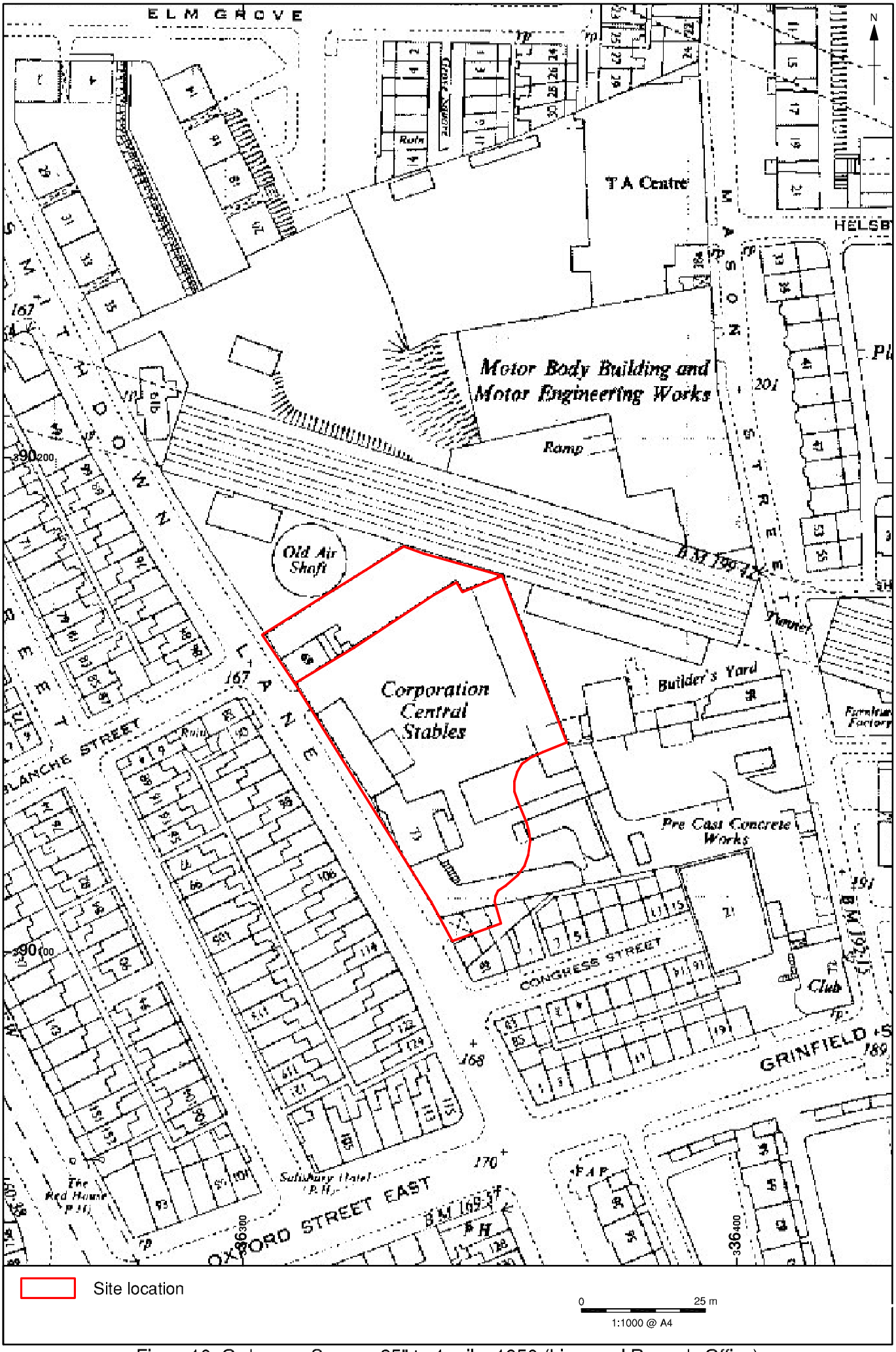
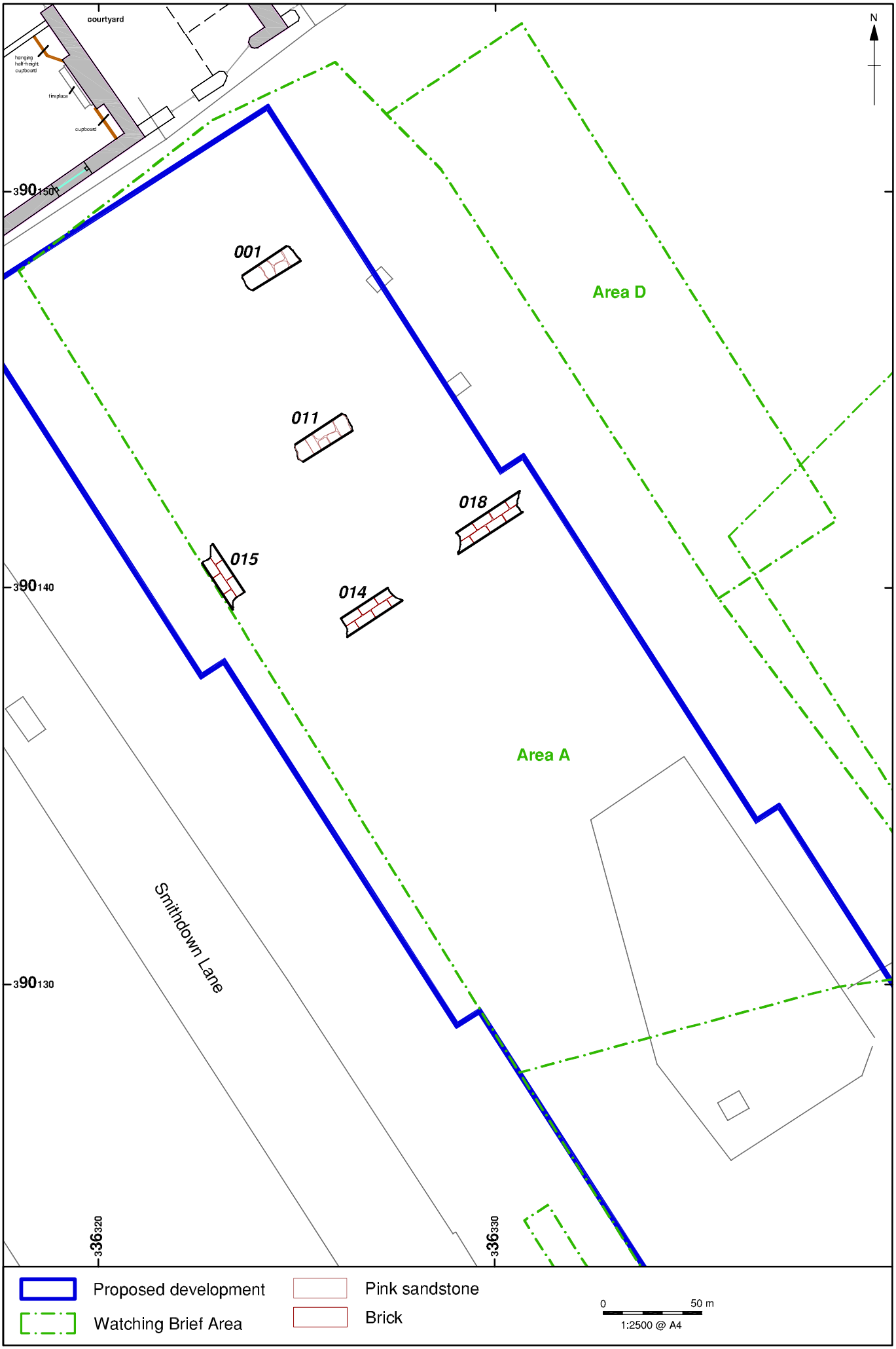


Figure10: Ordnance Survey, 25" to 1 mile, 1950 (Liverpool Records Office)



JQ*L10259*AMS*090712

Figure 11: Watching Brief Area A

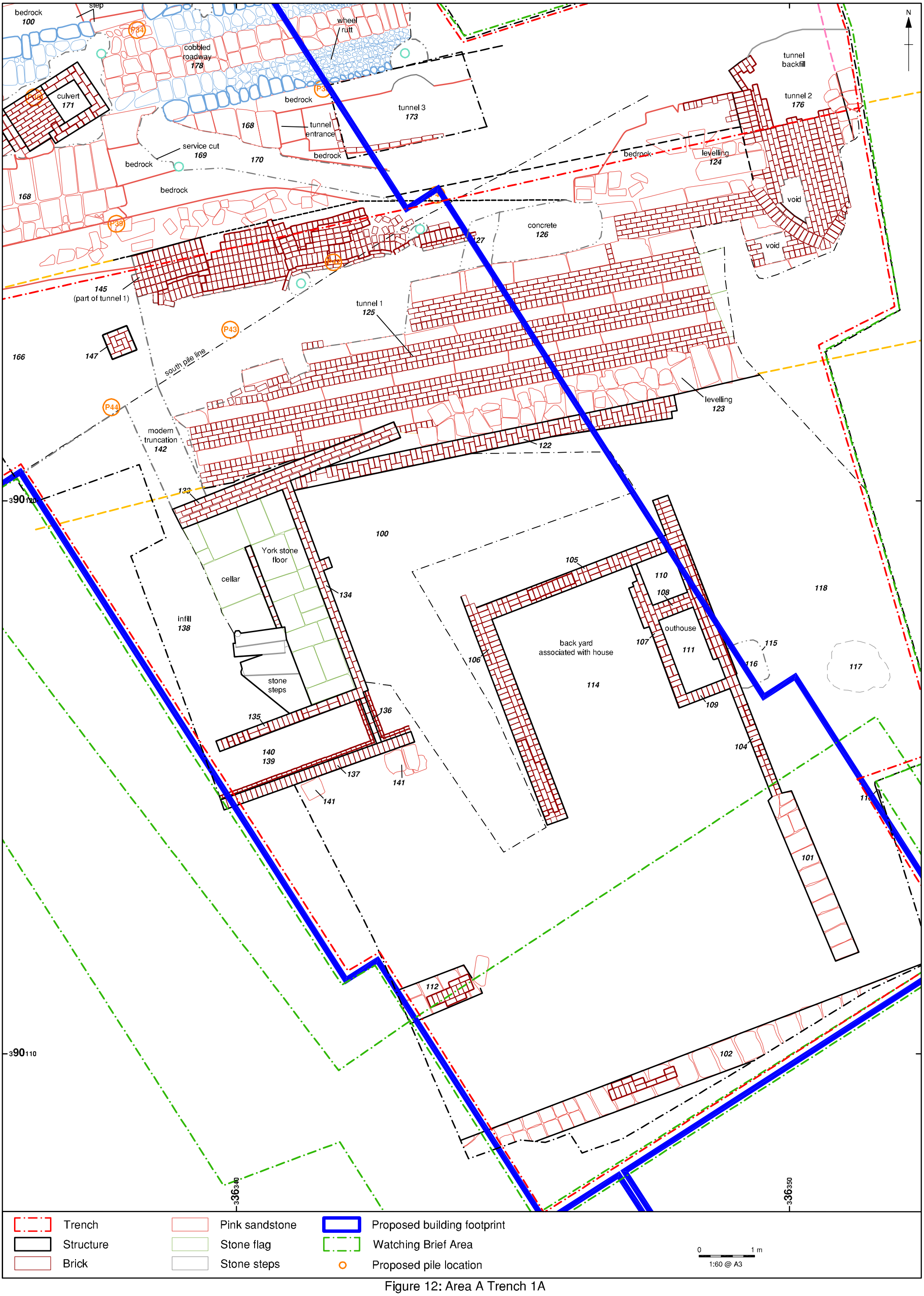
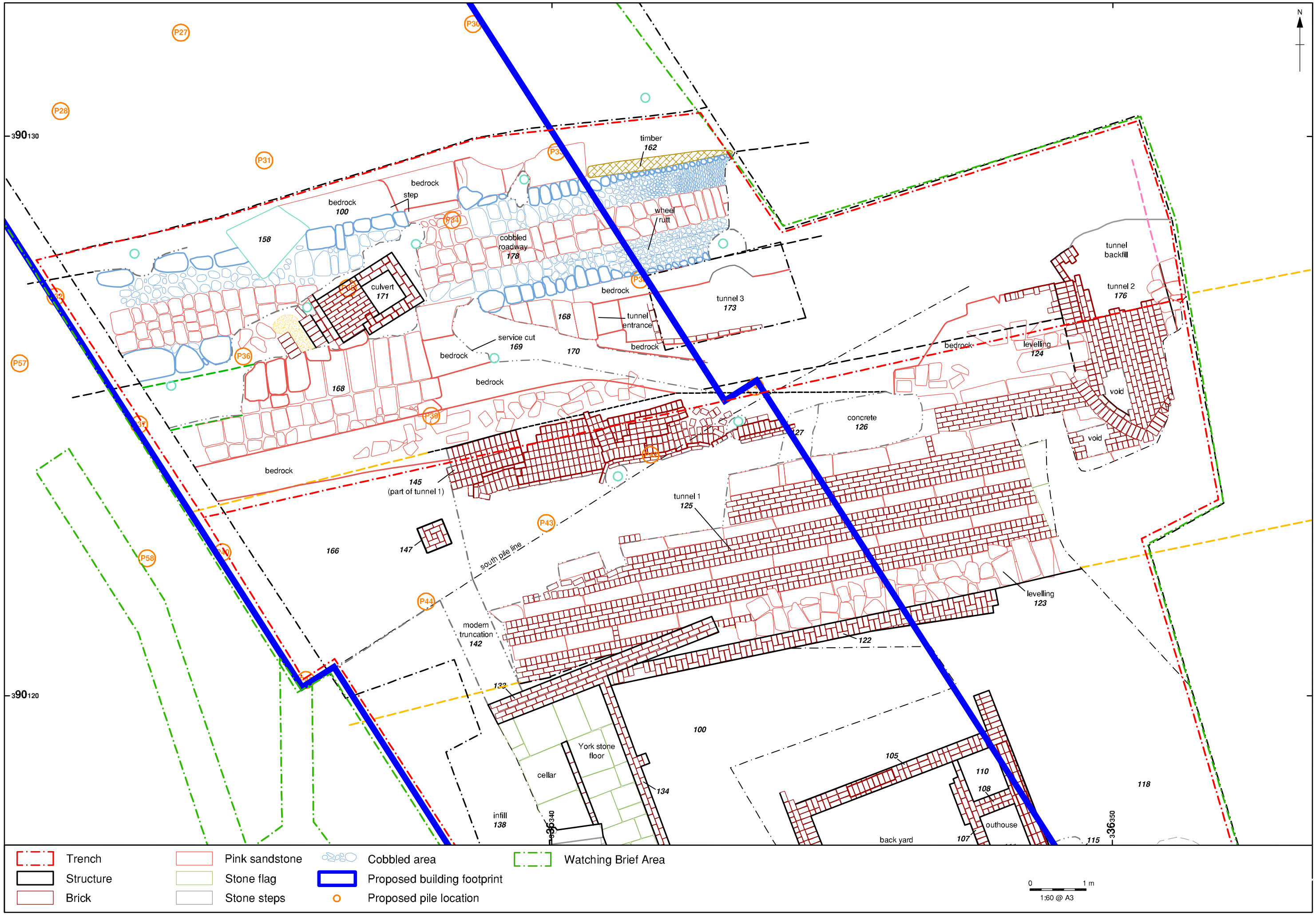


Figure 12: Area A Trench 1A



JQ*L10259*AMS*170311

Figure 13: Area A, Trench 2A

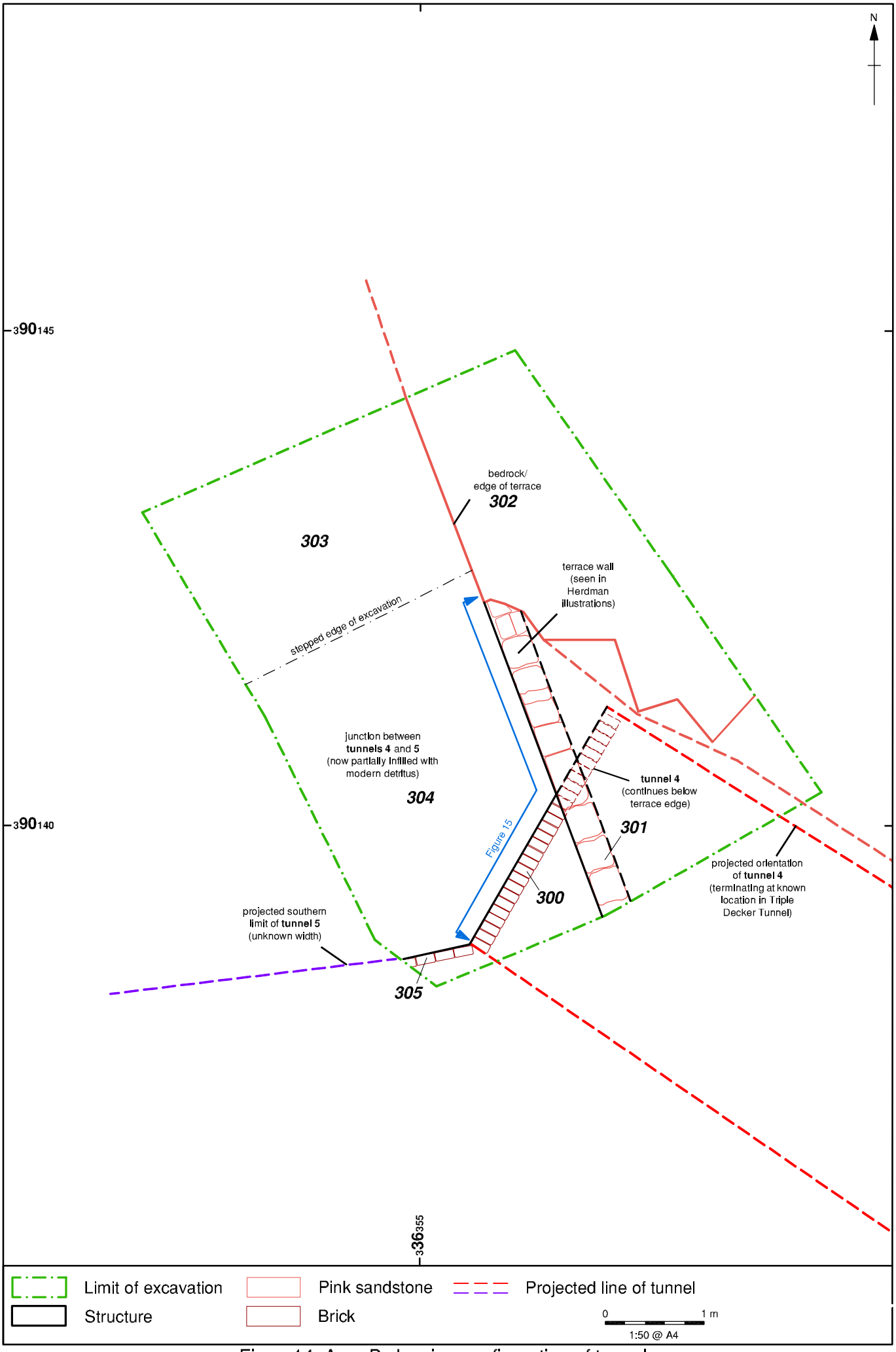


Figure14: Area B showing configuration of tunnels

JQ*L10259*AMS*100712

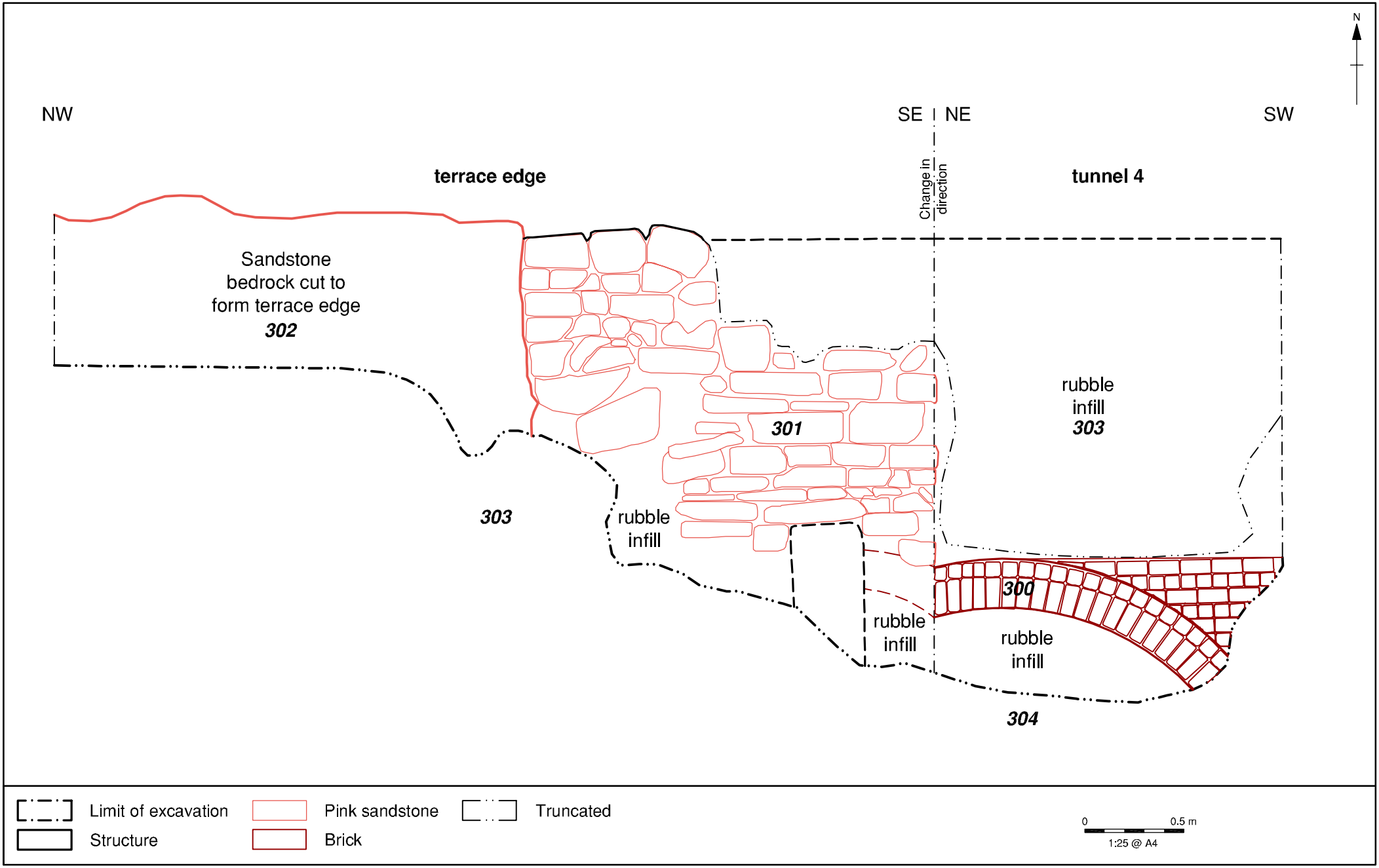


Figure 15: Elevation of terrace edge and **Tunnel 4** entrance in Area B

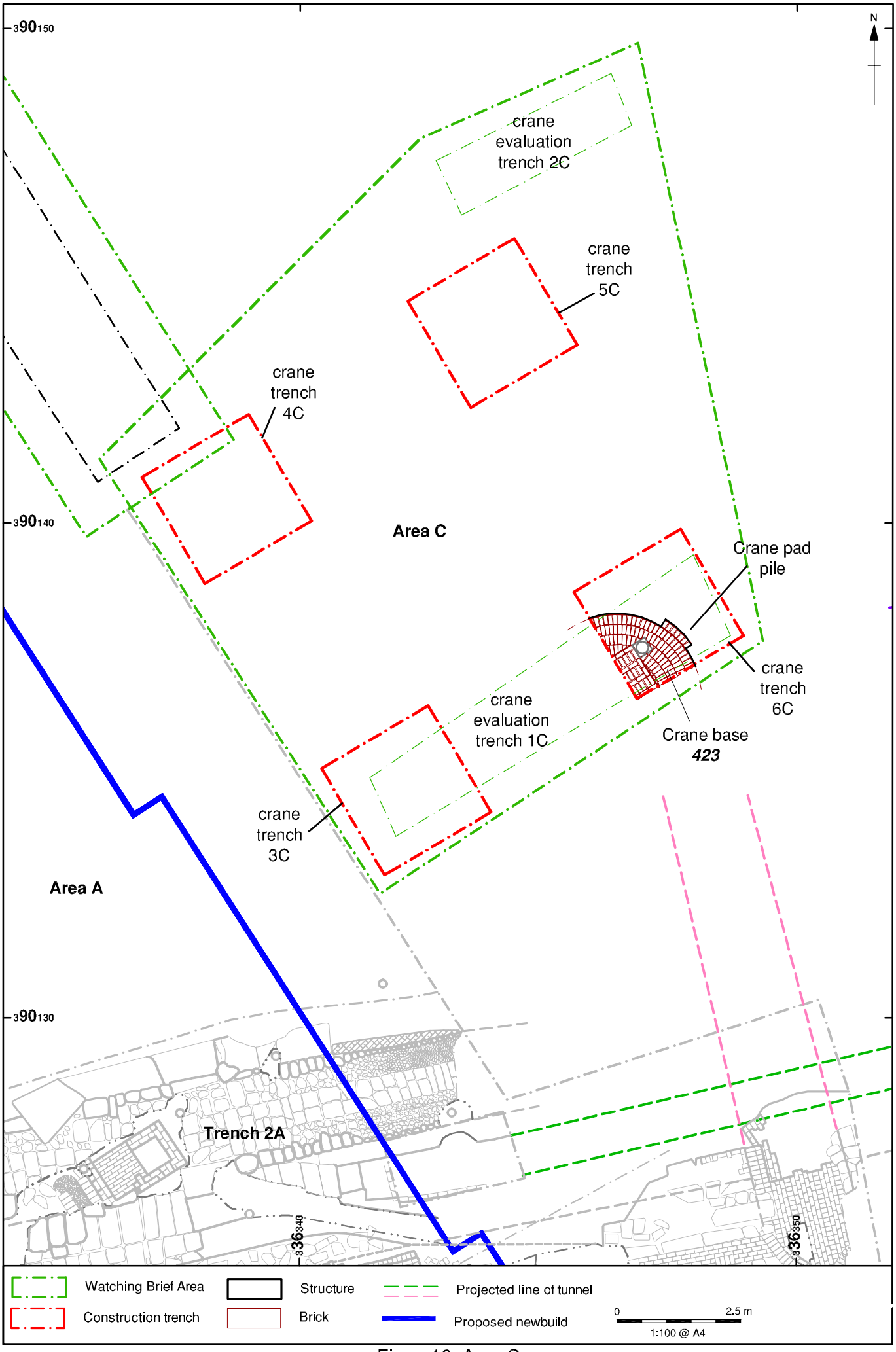


Figure16: Area C

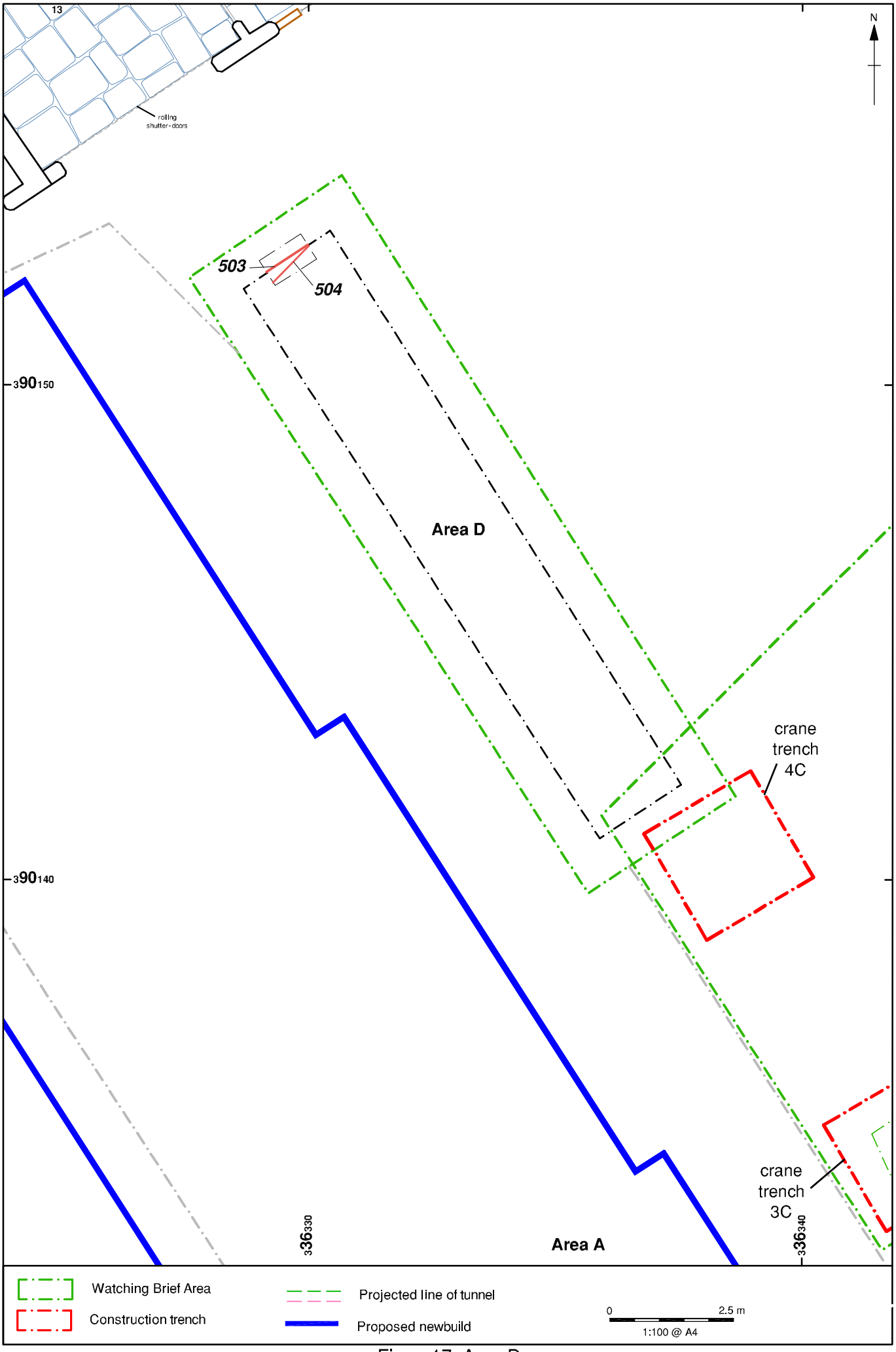


Figure17: Area D

PLATES

Plate 1: East-facing aerial view across the stable yard during the watching brief investigations

Plate 2: Hand drawn caricature of Joseph Williamson (Anonymous)

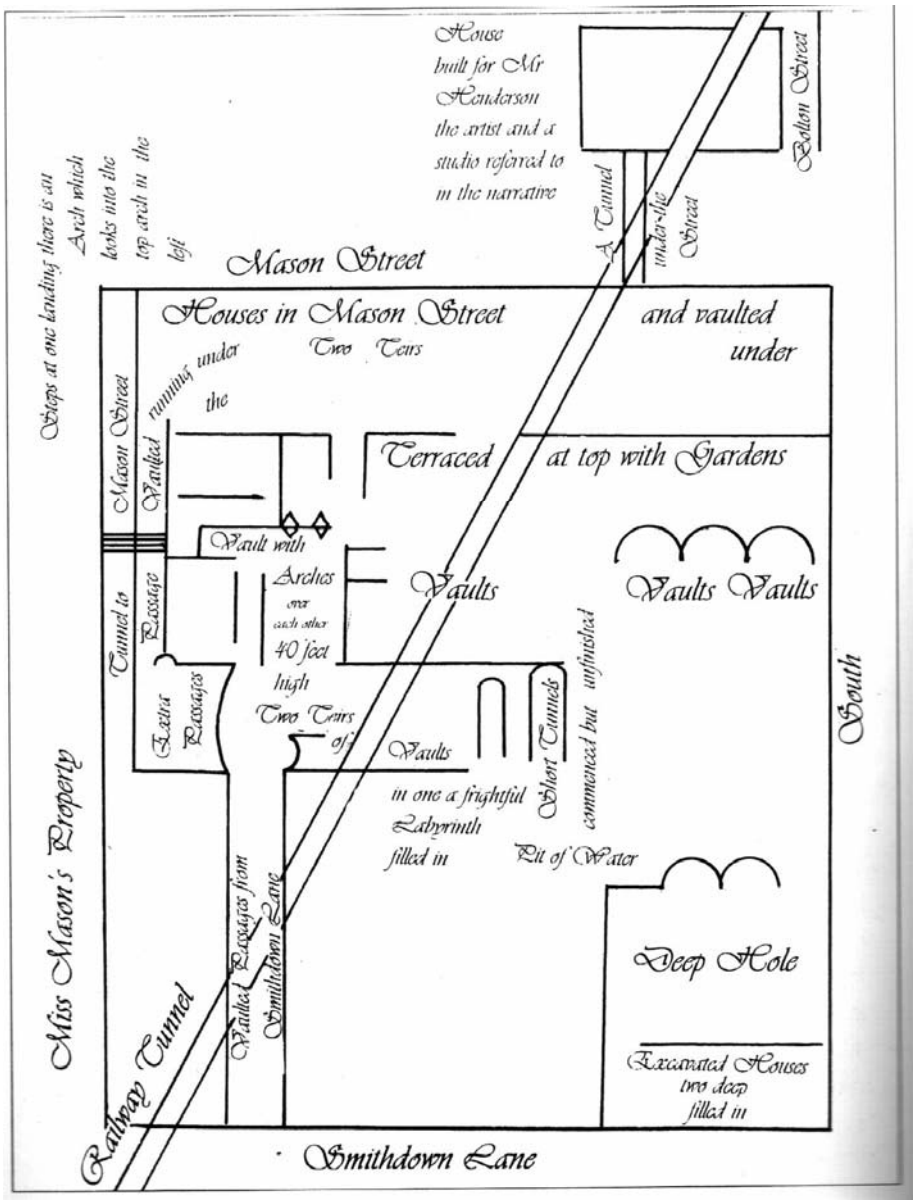


Plate 3: Illustration by James Stonehouse (1863) indicating the presence of vaults and tunnels beneath the houses on Mason Street and Smithdown Lane

Plate 4: Painting by William Gawin Herdman titled *Entrance to the Arches under Edge Hill made by Williamson*, 1837 (LRO)

Plate 5: Painting by William Gawin Herdman showing the gates to the Cooperage with the triple decker tunnel and Mason Street in the background *c* 1837 (LRO)

Plate 6: Sandstone retaining wall ***011*** at the north-eastern side of Area A

Plate 7: Red brick wall with pink sandstone coping stones ***014***

Plate 8: Aerial view of Trench 1A, within the southern half of Area A, showing Tunnel 1 (***125***) and the stable block foundations

Plate 9: East-facing view across the collapsed arch of Tunnel 1 (***125***) showing the 'composite style' of construction using brick and sandstone

Plate 10: West-facing view across the collapsed arch of Tunnel 1 (***125***) showing the 'composite style' of construction using brick and sandstone ***124***

Plate 11: East-facing view showing the interface between Tunnel 1 (***125***), sandstone blocks ***124***, red brick wall ***122*** and the natural sandstone bedrock ***100***

Plate 12: South-facing view showing historic truncation and make-up layers within the roof structure of collapsed Tunnel 1, ***125,*** and setts, ***127***

Plate 13: South-east facing view across the interface between Tunnel 1, ***125,*** and Tunnel 2, ***176***

Plate 14: East-facing shot inside Tunnel 1, ***125***, showing the interface with Tunnel 2, ***176,*** to the left of the picture

Plate 15: Sandstone levelling, ***123,*** placed along the extrados at the southern side of Tunnel 1, ***125***

Plate 16: Interface of walls ***122***, ***133*** and Tunnel 1 ***125***

Plate 17: Aerial view showing the foundations of stableyard buildings to the south of Tunnel 1, ***125***

Plate 18: North-east facing view of cellar south of Tunnel 1, ***125***

Plate 19: East-facing view across the cellar area showing walls ***135, 136*** and ***137***

Plate 20: North-facing view showing walls ***106***, ***105*** and bedrock ***100***

Plate 21: Tunnel 3, ***173***, partially exposed within sink hole

Plate 22: West-facing view across Trench 2A showing Tunnel 3, ***173***, roadway ***178*** and paved area (over tunnel) ***168***

Plate 23: Pink sandstone paved surface ***168***, over Tunnel 3, ***173***, at the south-western limit of Trench 2A

Plate 24: West-facing view across Trench 2A showing cobbled roadway, ***178*** and timber, ***162*** (to bottom right of road)

Plate 25: Aerial view showing Area A; Trenches 1A and 2A with Tunnel 1, ***125***¸ and ***145***, Tunnel 3, ***173***, and the cobbled roadway, ***178***

Plate 26: Red brick box culvert, ***171,*** cutting through roadway, ***178***

Plate 27: South-facing view across bedrock ***302*** and Tunnel 4, ***300***

Plate 28: Interface between terraced bedrock ***302*** and sandstone retaining wall, ***301***

Plate 29: Area B showing interface between sandstone retaining wall ***301*** and brick vaulted Tunnel 4 ***300***

Plate 30: Interior view of vaulted Tunnel 4, ***300,*** accessed via the Triple Decker section of Tunnel network

Plate 31: Area C Crane Trench 1C showing levelling deposits

Plate 32: Area C Crane Trench 2C

Plate 33: Area C, Crane Trench 3C showing levelling deposits in section

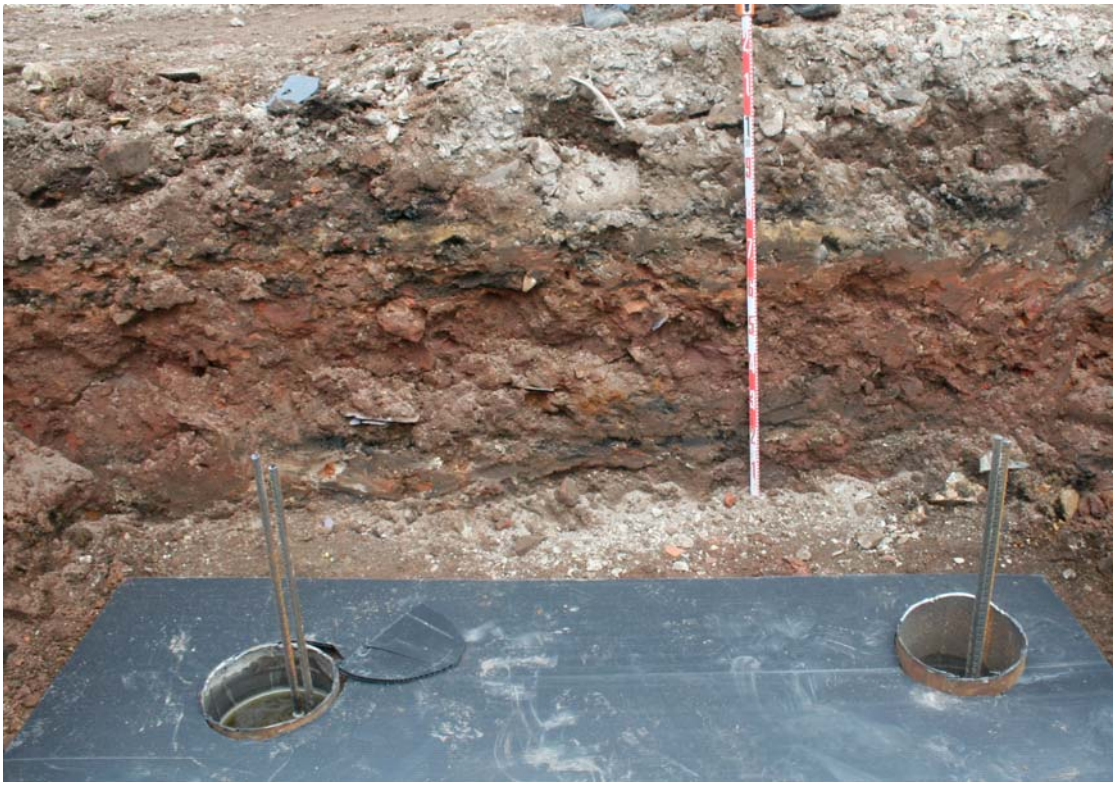


Plate 34: Area C Crane Trench 4C showing levelling deposits in section

Plate 35: Area C Crane Trench 5C showing levelling deposits in section

Plate 36: Area C Trench 6C showing circular brick platform ***423***

