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PROPOSED ROPEWALK TO CARHOLME ROAD LINK

ARCHAEOLOGY

A Report to Lincolnshire County Council

City of Lincoln Archaeology Unit

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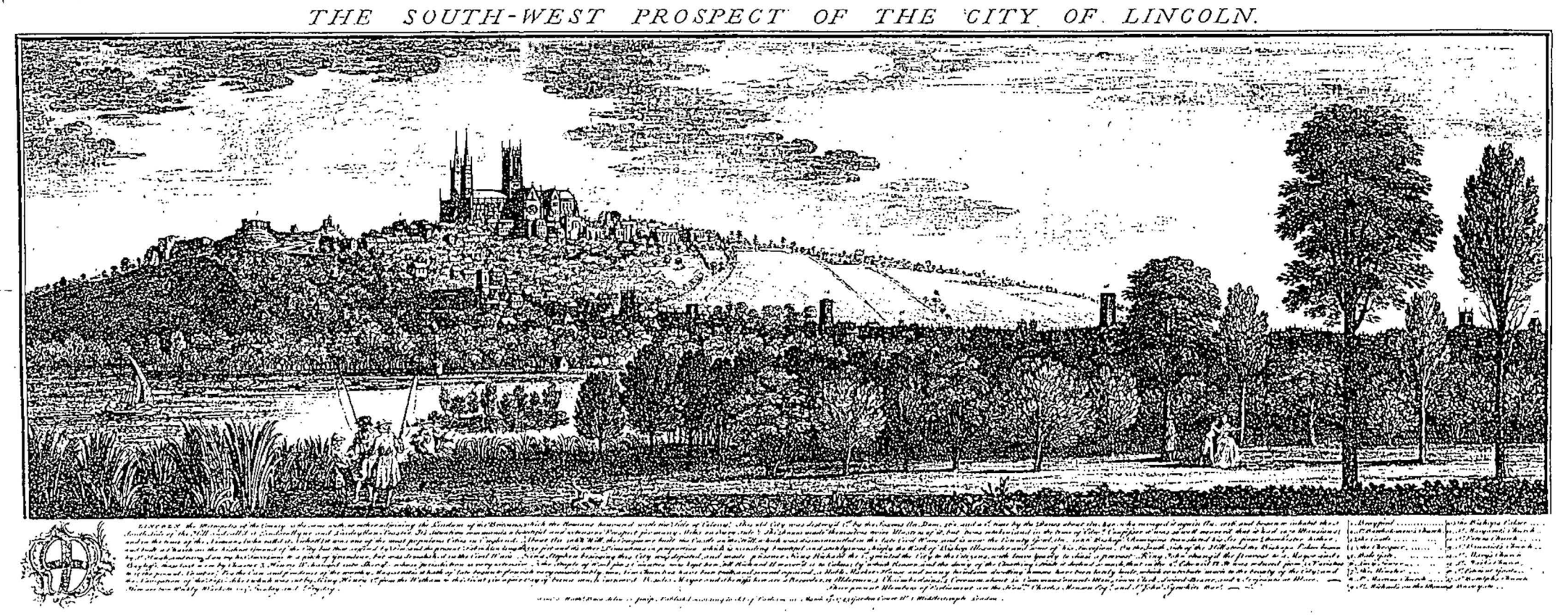

Frontispiece: The South-West Prospect of the City of Lincoln
(Samuel and Nathaniel Buck, March 1743)

PROPOSED ROPEWALK-CARHOLME ROAD LINK

ARCHAEOLOGICAL AND HISTORICAL STUDY

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PROPOSED ROPEWALK TO CARHOLME ROAD LINK

ARCHAEOLOGICAL AND HISTORICAL STUDY

INTRODUCTION:

This document has been prepared for Lincolnshire County Council(Department of Highways and Planning)by the City of Lincoln Archaeology Unit.The Unit was commissioned by Lincolnshire County Council to undertake a desk-top study of the archaeological implications of the proposed Ropewalk to Carholme Road link crossing the west end of the Brayford Pool.(See Fig.1)

The study document provides a synthesis of current archaeological and historical knowledge of the area concerned and proposes a strategy for further investigation of archaeological remains in accordance with the recommendations outlined in DoE Planning Policy Guidance 16 (PPG16), published in November 1990.

The information in this document is presented with the proviso that further data may yet emerge.The Unit,its members and employees cannot,therefore,be held responsible for any loss,delay or damage,material or otherwise,arising out of this report.The document has been prepared in accordance with the terms of the Unit's Articles of Association,the Code of Conduct of the Institute of Field Archaeologists and The Management of Archaeology Projects (English Heritage,1991)

SOURCES OF INFORMATION CONSULTED

Information has been collated from the following main sources;

Lincolnshire Sites and Monuments Records (SMR))
)
Lincolnshire County Archives Office)
) Lincolnshire Recreational Services
Central Library,Lincoln (local history collection))
)
Usher Gallery,Lincoln)

City of Lincoln Archaeology Unit - Archive

Lincoln City Council

British Gas Plc

SYNTHESIS OF ARCHAEOLOGICAL AND HISTORIC KNOWLEDGE

SK 970 712

Natural Topography and Geology

Lincoln is situated at a gap in the 'Lincoln Edge'; a Jurassic limestone ridge,the gap contains the course of the river Witham. A natural lake, the Brayford Pool, existed immediately to the west of the Witham Gap by the time of the Roman Conquest. The first syllable of the colloquial Roman name Lindum was derived from the Celtic word for 'lake', pool or marshy/water place.

The city lies over several well-defined geological zones. The higher levels of the scarp slope are of Jurassic limestone while lower down is clay with a spring line at the junction. Further south the clays are covered with a river terrace sand while the Witham valley contains a complex sequence of Pleistocene and Holocene gravels, silts and clays. Reclamation has taken place along the banks of the Witham, Fosse Dyke and Brayford Pool since the Roman period.

Pre-Roman

Although the earliest evidence for settlement dates to no earlier than the 1st century BC,the early prehistory of this area may be illuminated by study of environmental remains.

Excavations on the east side of Brayford Pool in 1972 have produced pottery identified as being of Late Iron Age or early Roman date; however the case for any substantial prehistoric settlement remains unproven,although traces traces of 1st Century B.C. activity have been identified.To the east of Lincoln,chance finds have indicated a rich Iron Age culture,and sevaral important objects were found in dredging operations along the river.

The Roman Period

On historical evidence, the Roman army may have reached Lincoln by c. AD50 but dating of the earliest Roman structures excavated indicates a date of c. AD60 or later. By c. AD96, Lincoln had the status of a *'colonia'*, utilizing the 'uphill' site of the Neronian fortress. In the late 1st or early 2nd century a grid of streets was laid out on the ground to the south of the fortress with both timber and masonry building erected.

Probably at the end of the 2nd Century, the *colonia* wall was extended almost down to the river front. Excavations have indicated that the south wall was probably close to the river/Brayford Pool. Land use outside the walls appear to have been primarily confined to the southern suburb lining Ermine Street requiring drainage and reclamation, and extensive cemeteries to the north and east.

A number of pottery kilns have been found in the immediate environs including discoveries at the racecourse and what was probably a major industry in the Swanpool/Boultham area in the 3rd and 4th centuries.

It is believed that the Foss Dyke canal connecting the Brayford Pool with the river Trent at Torksey was formed during the period of Roman occupation. The cutting of a channel for the first four miles from Lincoln was probably achieved by straightening the course of the river Till.The early course of the Foss Dyke and its junction with the Brayford Pool is unknown and it is hoped that the groundworks for the proposed road built may reveal evidence of the early channel.

Saxon/Anglo Scandinavian Lincoln

Abandonment of the Roman City seems to have started in the 4th Century with town life reduced to a small community between the 5th to 8th centuries. Following the Viking take-over of Lindsey in 874, Lincoln became a centre for a Viking army and, subsequently, a Viking town. Evidence for increasing urbanisation in the 10th and 11th centuries has emerged from all parts of the former Roman settlement.A new suburb of Newland occupied land to the north of Brayford Pool and the Foss Dyke beyond.There were probably several periods of reclamation as the waterfront was advanced,and these operations may have commenced before the Norman Conquest.

Many Lincoln place names are of Scandinavian origin. Of particular interest are Holms, or islands in the land near the river which flooded in winter. eg.'Carholme' (Old Norse-Kiarr-marshground) and 'Brayford' whose early form Braytheford and the associated Braedmere has origin in the Old English Brad or the Scandinavian Breit or Breior meaning broad (the broad ford or broad mere), the pool being much larger in the Middle Ages than now.

The Medieval City

The main post-Conquest change to be noted archaeologically is the introduction of stone building and terrace walls which started in the late 12th or early 13th century. The New Land (nova terra), probably reclaimed and occupied as the water receded, is first mentioned in the middle of the 12th Century. The pipe rolls of 1180-1 bringing into use its present name, referring to 'the waste of Newland.''

By the end of the 13th century the west wall of the city incorporating the Newland Gate had been extended southward beyond the earlier south wall to Brayford pool, terminating at a round stone tower on the

Brayford bank which became known as the Lucy Tower.

Excavations at three locations along Brayford North have revealed the Lucy tower and an adjacent stretch of North-South city wall with a N-S ditch immediately west of the wall. A boundary wall ran east from the tower along the edge of the Brayford pool. Trenches excavated to the east of Lucy Tower Street provided useful information about the reclamation and the line of the waterfront in medieval and late periods with substantial stone revetment walls occurring at 27.5m and 22.5m respectively north of the present edge of the pool. Evidence of timber revetments and stone structures was also recorded.

Post-Medieval

The later recorded history of the area is most closely linked with the efforts to reopen the Fossdyke and the further development of Brayford Pool from Newland along Carholme Road.The 14th to 17th centuries saw a period of decay in the city with some abandonment of previously occupied areas. Silting of the Fossdyke was probably one of the factors which had led to the city's decline from the middle ages.

Attempts to reopen the waterway being encouraged by Cardinal Wolsey led to the appointment, by Henry VIII, of a Commission of Sewers in 1518. Work on clearing the Fossdyke was started in 1520 but abandoned in 1521 due to lack of funds.

During the early 1500's a number of churches had fallen into disrepair and it is recorded that in 1535 many were condemned and demolished, much stone going towards the mending of roads and pavements, the chamber over Newland Gate, and the wall against the Brayford, although the precise location of this work is unknown.

By 1572 further efforts were being made to find ways and means of scouring the Fossdyke 'so that yearly sufficient water might be brought out from the Trent to the city,' but once again it is probable that little work was done.

A new scheme to clear the Fossdyke was initiated in 1625 to assist in restablishing the wool trade in the city--work being started, but ending in failure in 1635.

The civil war and its aftermath led to further neglect of the waterway and a downturn in trade with the city, a situation not reversed until 1671 when an act was passed for improving the navigation between the town of Boston and the river Trent which resulted in an increase in trade.

18th century

The evidence from archaeological excavations along the north edge of the Brayford is, in part, confirmed in the 1743 illustration by Samuel and Nathaniel Buck 'The South West Prospect of the City (see frontispiece) which depicts an east-west built-up frontage along the north edge of the Brayford extending each side of the Lucy Tower.

The stand of trees shown along the Brayford frontage indicates that this reclaimed area had been in existence for some time. Of particular significance in this view is the limit and probable orientation of the built-up frontage in the west. At this point the waterfront wall was probably aligned NW - SE, presumably running to a point on the lower slope of the rising ground. The orientation of the west end of this built-up, reclaimed area is probably confirmed in the modem alignment of the road at the west end of Brayford Wharf North at its junction with Carholme Road and the location of the Horse and Groom public house, constructed in the early part of the 18th Century, the roof of which is probably seen in the Buck view.

West of the reclaimed area the illustration appears to show an ,as yet unreclaimed, indentation of the Brayford Pool bounded by trees on the lower slopes of the steeply rising ground to the north. This would indicate that in 1743 at least a portion of site eventually to be occupied by the gas works was probably marshy, if not permanently under water.

The Fossdyke was recorded as being impassable in 1717, but navigable again by 1744. This was probably as a result of work started by Richard Ellison under a lease for the Foss Dyke navigation taken from Lincoln Corporation in 1740. In 1747 Ellison's son (also named Richard) made a new cut out of the old channel and 'erected a new wharf where the old river had silted up.' He also provided 'a way for keels from his wharf into Brayford.'

These works carried out under the Ellison lease probably established the present course and towpath structured edge on the north bank of the Foss Dyke immediately west of the Brayford Pool.This indicates that the northwest corner of the Brayford was reclaimed in the mid-eighteenth century. The few maps of the period in existence are clearly more artistic than accurate, although a map of Lincoln in 1779 (see Fig.2) enlarged from a map of Lincolnshire by Andrew Armstrong depicts a road and buildings on the north bank at the point where the Foss Dyke widens into the pool.

During the second half of the 18th century the Brayford Pool was rapidly turned into an inland port, and by 1817 substantial wharves, warehouses and

coalyards had been established on both north and east banks where gardens had earlier stood.

19th century and later

The 19th century saw further development of the wider area resultant from the raising of the south bank of the Foss Dyke, related drainage works, the mid-century introduction of a railway service, and further expansion of industry. Marrat's map of 1817 (Fig.3) shows the now well developed form of the land at the north-west corner of the Brayford including a tow-path along the north bank of the Foss Dyke and the Horse and Groom public house lying to the north-east of an unbounded area of land between the Newland/Carholme Road junction and the Foss Dyke/Brayford Pool.

Development in this location is also shown on a map based on J.S. Padley's survey of 1819 which depicts a small structure in the southeast corner of the area of open ground and a range of buildings to the northwest, fronting Carholme Road, which are annotated 'Gas House'. Extensive enquiries have failed to provide any other evidence for a Gas House predating the 1828 Gas Company, and it is believed that the map of Padley's 1819 survey had been altered at some time after 1828, as the layout of buildings is similar to those constructed post-1828.

Formed by an act passed on 9th May 1828, the Lincoln Gas-Light and Coke Company established the 'Newland' works on 'waste' ground acquired from the city council lying between the northwest corner of Brayford Pool and the turnpike road in the parish of St. Martin. The proximity to the Fossdyke/Brayford Pool was ideal for the transportation of coal, the subsequent distribution of by-products, and as a source of water for gas production and other process. It is also possible that effluent from the early works was discharged directly into the Brayford Pool.

It is recorded that the Council did not guarantee possession of the open ditch and boat house on the south of the site. The boat house may well have been the small structure shown on the map of Padley's 1819 survey,while the ditch probably lay along the edge of the rectangular parcel of land depicted on the same map.The ditch may well have formed the south boundary of the gasworks site as shown on Padley's map of 1842 and the Midland Railway Map of 1846 (Fig.4)

Although Marrat's map of 1817 shows a building on the rectangular parcel of land west of the gasworks site between Carholme road and the Foss Dyke with further properties constructed by 1842, much of the area west of the gas works was used for pasture up to 1860 after which time plots were sold by the city council as 'valuable building ground.' The triangular portion of land south of the gasworks was used as a public wharf until it was progessively acquired by the gas company between 1845 and 1883.

The use of this area as a gasworks and later distribution centre, which continued well into the 20th Century, is described in greater detail below.

South of Brayford Pool a low-lying area of land called the Holmes Common was probably waterlogged and marshy until the early 19th century drainage works, and the raising of the south bank of the Foss Dyke,which, together with associated drainage works, formed the Delph.

The most significant development in this area took place following the introduction of the Midland Railway to Lincoln in 1846, for which a low embankment was constructed across the Southwest corner of 'The Holmes.'

Maps of the period show the Delph formed by the south bank of the Foss Dyke and tracks or paths across the Holmes while farther south the land is divided by drainage ditches and crossed by roads or tracks. (See Fig.4) A contemporary print reproduced in the Railway History of Lincoln from Williams' MIDLAND RAILWAYS, shows the low embankment across the Holmes and is captioned 'which was then more waterlogged then now.' (See Fig.5)

Following mid-19th century acquisition by the Great Northern Railway, the Foss Dyke ceased to be Lincoln's commercial highway as waterborne trade gradualy gave way to the age of steam. The acceleration of industrial development in the late 19th century led to rapid expansion of the railways with sidings and goods yards being constructed on land progressively reclaimed across Holmes Common south of the Brayford Pool.

A drawbridge at the northwest corner of the Brayford forming a link to the expanding goods yard from the north bank was constructed in the 1880's,later 19th century development of the area being accurately depicted by the 1888 First Series 1:50 Ordnance Survey Map of Lincoln (part reproduced herein as Fig.6)

The south bank of the Brayford was pushed further north by reclamation with new railway wharves and a boat building yard being developed along the southwest bank early in the 20th century.

Changes in the use of this area of land up to the present day have been largely superficial,being principally allied to industrial/commerical development and the changing fortunes of railway services in the region. There are plans by British Rail to dispose of much of its land on the south side of the Pool

ARCHAEOLOGICAL DISCOVERIES

The archaeological record for the area traversed by the proposed road is sparse.Only the following three archaeological excavations have been carried out along Brayford North: (See Fig.7)

1972 - Lucy Tower Street (LT 72)
1975 - Brayford Wharf North (BWN 75)
1989 - Brayford North (BN 89)

Stratigraphic sequences have been recorded via machine excavated trial trenches to the west of St. Marks Station (ZW 89), and on the site of Morrison's Supermarket to the southwest of the junction of Tritton Road and Beevor Street (ON 361).

Other records are in the main confined to watching briefs/observations undertaken by CLAU and early records held by Lincoln City and County Museum.

The results from the above can be consulted in the CLAU archive.

'NEWLAND' GASWORKS

The original layout of the gas works can be seen in outline detail on the railway map of 1846 (Fig.4).Unfortunately, it has not been possible to trace original construction drawings; however, documentary sources and a partial outline shown on a plan for later structural modifications indicate that the initial primary plant consisted of a 19m long by 8.5m. wide retort house and two gasholders 11m. in diameter by 5m. deep fitting into stone tanks 11.2m wide by 5m. deep. Offices and meter rooms being located between the gasholders fronting onto Carholme Road, a portion of which was renamed Gas Street. The purpose of the range of buildings shown in the southeast corner of the site and the precise location of tarwells and other ancillary equipment remains uncertain.

It is believed that the works became fully operational in 1830. In 1845 the gas company acquired part of the public wharf on which a new 18m gasholder and tank was constructed and brought into operation in 1847. By 1883 the company had acquired the remainder of the public wharf, constructed a new retort house, purifying house, coal store offices, and ancillary structures as shown by the O.S. map of 1888.(Fig.6). The gas was also piped to new gasholders constructed on newly acquired land to the north and west of the original site.

During the First World War by-product recovery plant was installed for washing gas with creosote oil for the extraction of TOLUOL and BENZOL, two chemicals which formed the basis of high explosives.

Further structural changes were made in the 1920's, but during this time the new Bracebridge gasworks had been progressively expanded and in 1934 the decision was taken to stop production at the 'Newland' works. The gas production facilities were dismantled and the gasworks converted into a distribution centre.

During World War II the gas company was required to make provision for bomb and gas-proof shelters. It has not been possible to obtain information as to the location or structural details of such shelters on the 'Newland' site.

Various alterations to the existing structure were made both before and after nationalisation in 1949.A Housing Centre was constructed along the southwest boundary of the site in the early 60's. There was no subsequent development on the site up to the time of the recent demolition of structures and conversion to its present use as a car park.

The remaining visible structural elements of the gas works consist of:

(a) Portions of the 19th Century stone boundary wall including in the north-east corner elements of the earlier structure which were later convertedas a Gents public convenience.

(b) Fragments of stone wall and re-positioned entrance formed during the conversion to a distribution centre in 1934.

(c) Brick walls along the south, east and west boundaries of the site,which are believed to date from the mid to late 19thCentury.

(d) The east-west tow-path between the present Foss-Dyke and south brick boundary wall, the cobbled surface of which is believed to date at least in part from the 19th century. Sections of the surface show a well-defined linear pattern of wear/abrasion, probably indicative of the use of this area as a wharf.

(e) At least one north-south brick vaulted tunnel running into the Brayford Pool below the tow path/wharf edge. The exactpurpose of this structure is unknown but it probably formeda water inlet source or drainage outlet from the gas works.

THE ARCHAEOLOGICAL POTENTIAL OF THE PROPOSED ROAD SCHEME

From the forgoing it will be clear that the proposed road link primarily traverses an area reclaimed from the Brayford Pool and adjacent marsh/flood plain, with most reclamation in the area concerned taking place since the 17th century. The pre-reclamation deposits would be expected to provide environmental information,indications of the possible early course of the Foss Dyke and the changing structure of the Brayford Pool.

Post-reclamation deposits would provide information of the reclamation process, the later reworking of the Foss Dyke and, in the area most recently occupied by the gasworks, information of the post-17th century development at the northwest corner of the Brayford Pool.

PREVIOUS SURFACE INTERVENTION

Whilst recent development across all areas of the proposed route have disturbed the surface deposits, the Newland gasworks site is probably the area of deepest disturbance.

Archive sources have not revealed foundation details of the original (1928-30) structures; however,drawings of the modifications carried out in the 1880's indicate concrete foundation for walls at a depth of 1.5m,with 0.60m thick concrete raft foundations to a depth of 2.2m for the Purifying House and in other localised areas of the Retort House, etc. The same plans also indicate a series of underground ducts between the Meter/Govenor House and Purifying House.

It has not been possible to secure specific information on the substructure design of the various gasholders constructed on the Newland site. Reference to a late 19th Century Gas Engineer's Compendium and other sources indicates that gas tanks of the period were mainly confined to two types:(a) buried or partially buried tanks (b) tanks above ground. It is thought that the two 5m. high tanks constructed in 1828-29 were above ground with appropriate foundations; however, the larger gasholders constructed in the mid-to-late 19th Century were probably retained in partially buried tanks, the increase in size and capacity probably necessitating more substantial foundations. Tar and liquified ammonia wells, oxide pits together with ancillary equipment may also have been accomodated below gound level.

It is therefore evident that the higher levels of deposits over much of the area of the gasworks site have undergone extensive disturbance, at least to a depth of 1.5m and probably exceeding 2m in some locations.

It is assumed that all foundations, concrete slabs, underground by-product and other wells, together with lower courses of structural walls, remain beneath the now level surface.

GROUND CONTAMINATION

While the possibility of ground contamination exists over the whole area of the proposed road link, the process of gas production and its various by-products would indicate a high probability of potentially toxic ground contamination at the gasworks site.

In addition to the primary raw materials and end products of coal, coke and gas, our study has revealed the probable use or production of the following substances and residual products:

Tar
Liquified ammonia
Oxides of Iron Oxides of Lime
Toluol
Benzol/Benzene
High boiling petroleums/heavy oils
Colza oil
Naphtha
Sulphur
Retort Carbon

It is assumed that geotechnical investigation and further reference to the Scientific Services Department of British Gas would address this matter as part of the engineering/design process and environmental impact study.

The type and extent of any contamination at the gasworks site may itself limit archaeological investigation to the observation of machine excavated trial trenches.

DEVELOPMENT PROPOSALS: IMPACT ON BURIED DEPOSITS

We understand that ground intervention for the proposed development will consist of the following:

(a) Localised geotechnical investigation including machine excavated bore-holes and trial trenches.

(b) Construction works including piling and deep foundations for bridge abutments at crossings of railway and BrayfordPool/Foss Dyke.

With the exception of the above we understand that other ground works will be relatively shallow.It should,however,be noted that detailed engineering drawings for the proposed link have not been studied.

ARCHAEOLOGICAL RESPONSE

The following recommendations are based upon:

(a) The existing archive record of the area including the results from previous archaeological investigation in the Brayford North area.

(b) Our current understanding of the proposed route and probable extent of ground intervention caused by the construction works.

(c) The possibility of ground contamination within the development zone, in particular the 'gasworks' site.(Modification to our proposals may be required following results of ground contamination investigations).

(d) The principal assessment criteria contained in PPG16 including the 'importance' of remains known or thought to exist.

(e) Our professional judgement on the merits of any possible remains, which should be seen as an aid to formulating strategy and not necessarily as the only viable judgements that could bemade.

ARCHAEOLOGICAL ASSESSMENT

We recommend an initial evaluation via observation and recording of deposits and features exposed during the excavation of geotechnical trial pits.This might be supplemented by the archaeological excavations of larger trenches on the 'gas works' site. The scope and nature of any further investigation would be subject to the results from the geotechnical trial pit observations,the findings from ground contamination investigations and the location of active buried services.

The results from the foregoing and the Desk-Top Study would subsequently be synthesised and collated in a form suitable for incorporation into an Environmental Assessment report.

It should be noted that further work may be required prior to or during the road construction phase. The scope, nature and cost of such work could only be developed from the findings of the Desk-Top Study, Phase I and Phase II evaluation, the resultant Environmental Assessment and when finalised, details of construction methodology and programme.

In archaeological terms,the Ropewalk to Carholme Link comprises one element in the Lincoln Highways development schemes including the Birchwood link and dualling of part of Tritton Road. Archaeological investigation of these interlinked areas is of vital importance in extending our understanding of the use and development of land in close proximity to this major historic urban centre.

It is anticipated that the whole project will result in a final comprehensive publication, detailed computerised records in archive and acessioning to museum records,the scope and cost of which will be determined in due course.

J. Hockley

January 1992

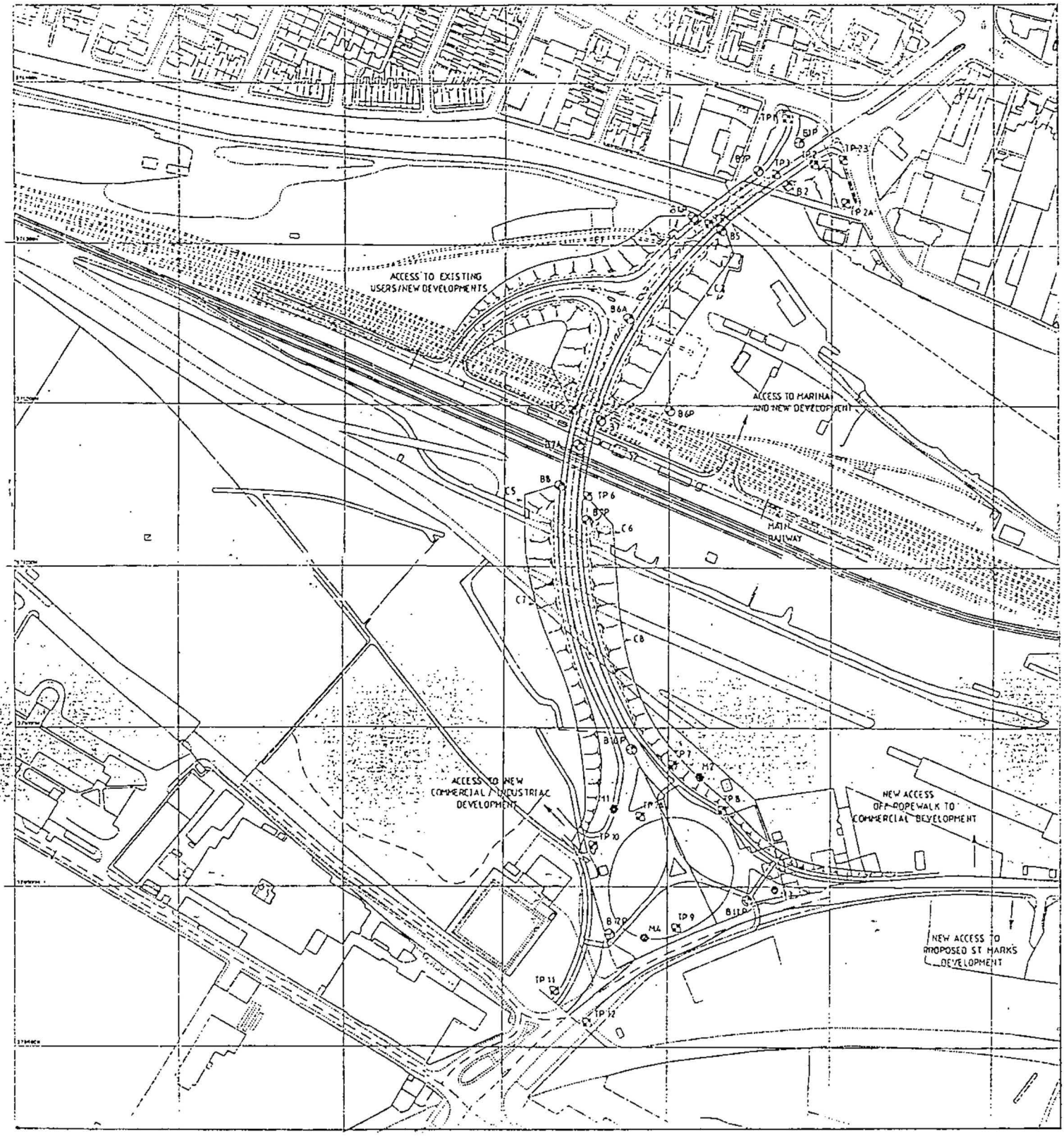

Fig. 1. Proposed Route of Ropewalk-Carholme Road Link

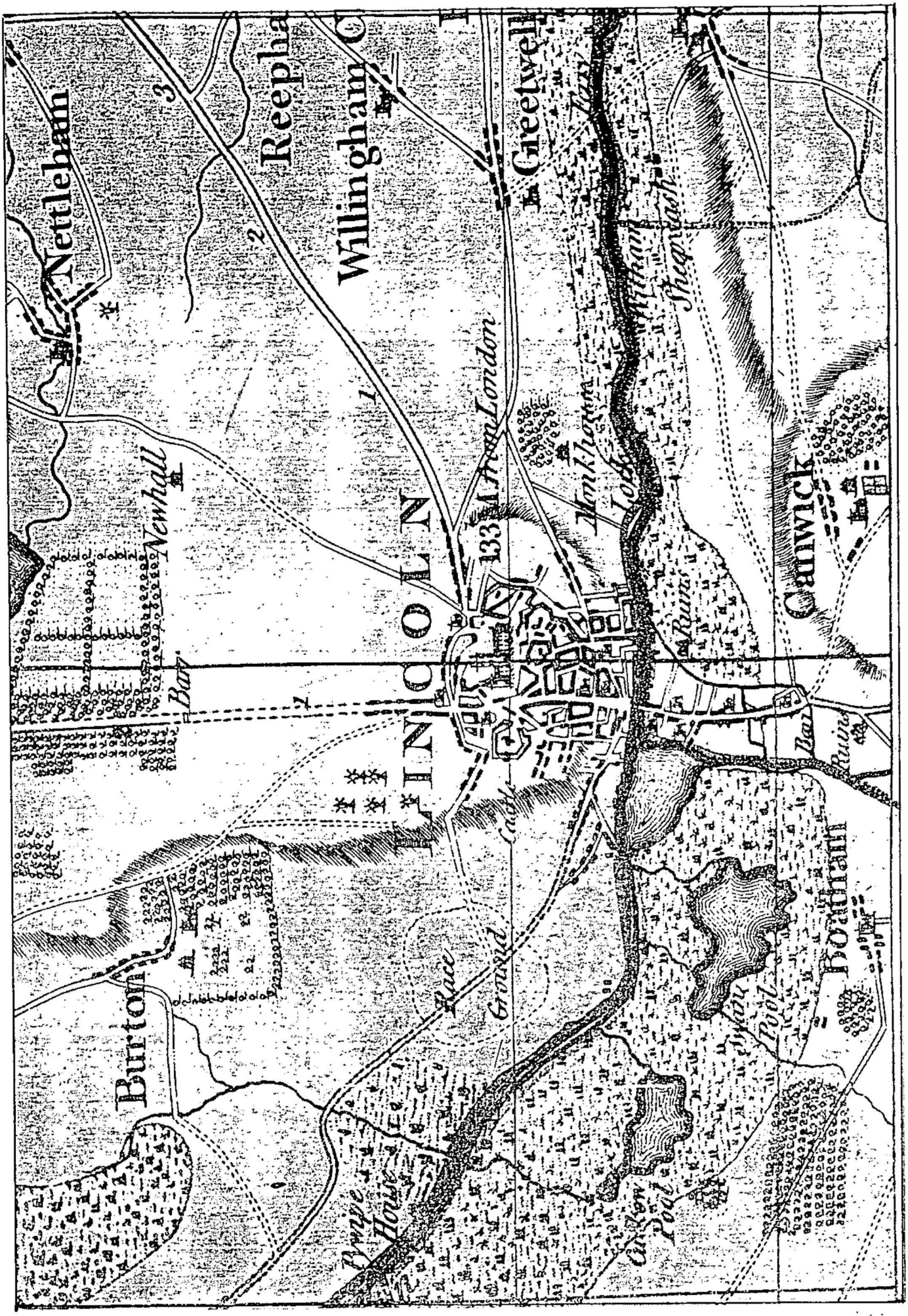

Fig. 2. Lincoln in 1779 - enlarged from a map of Lincolnshire (Andrew Armstrong)

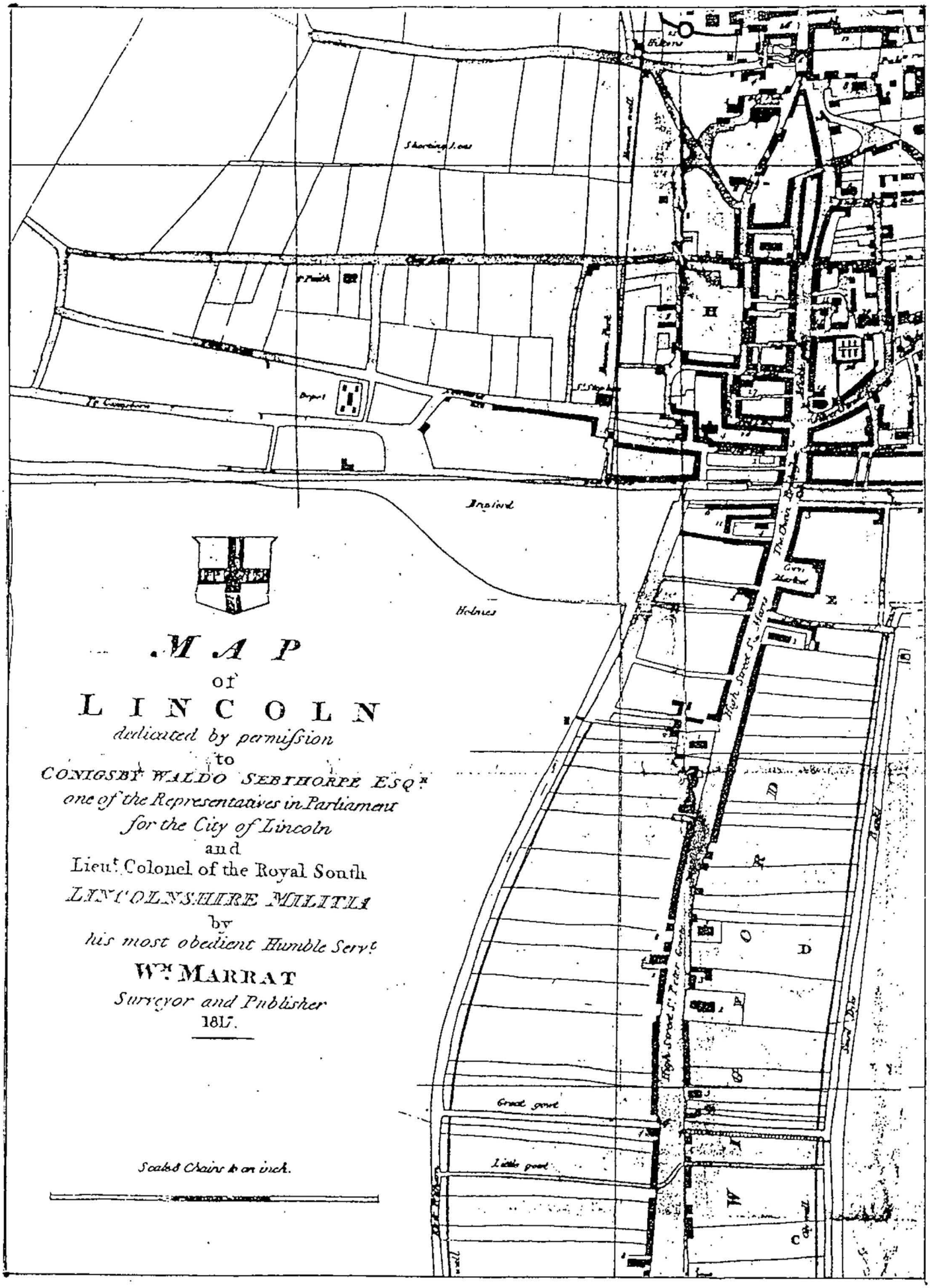

Fig. 3. Lincoln in 1817 - (part) enlarged from W. Marrat map

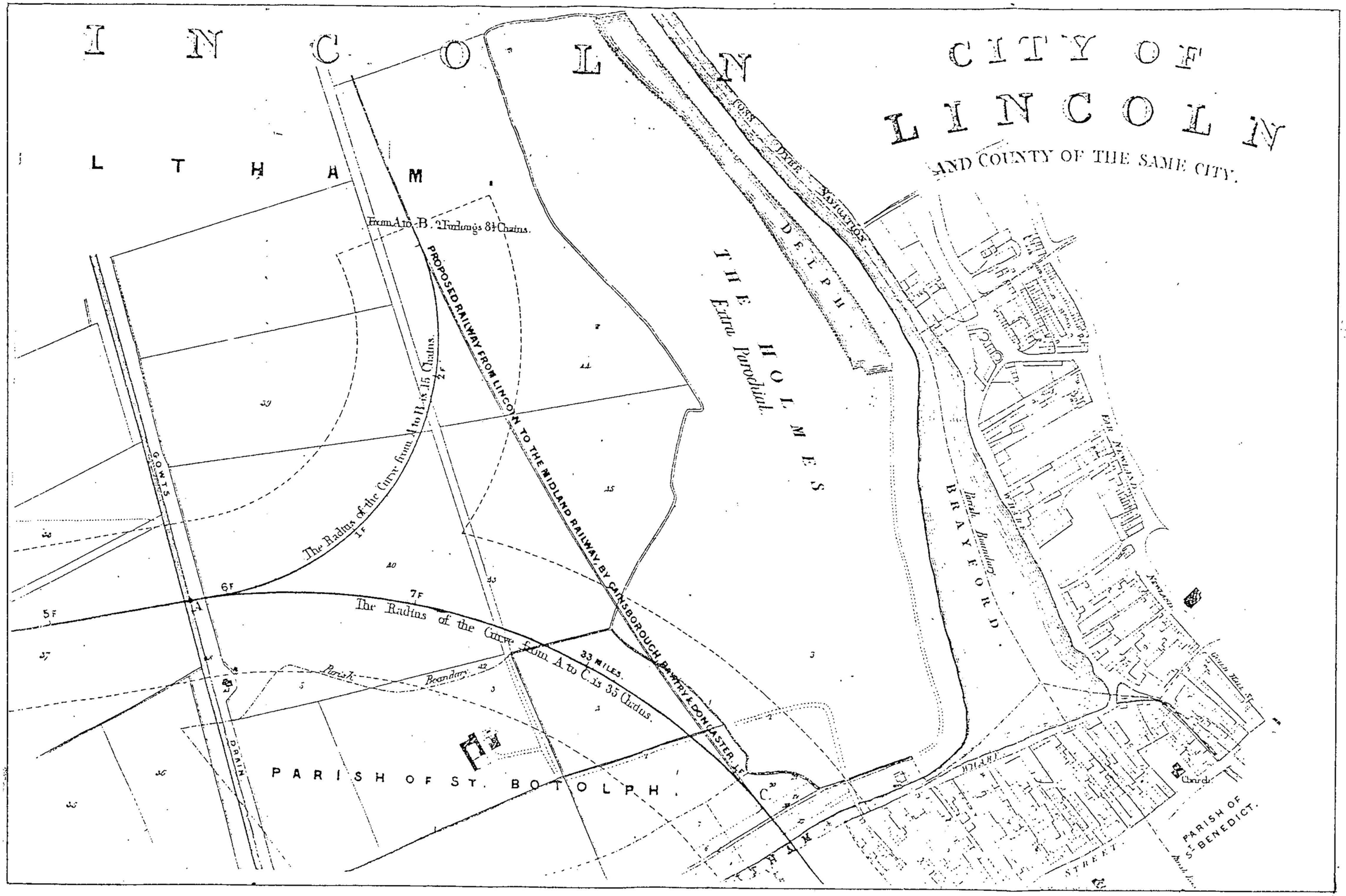

Fig. 4. Midland Railway Map of 1846 - (part)

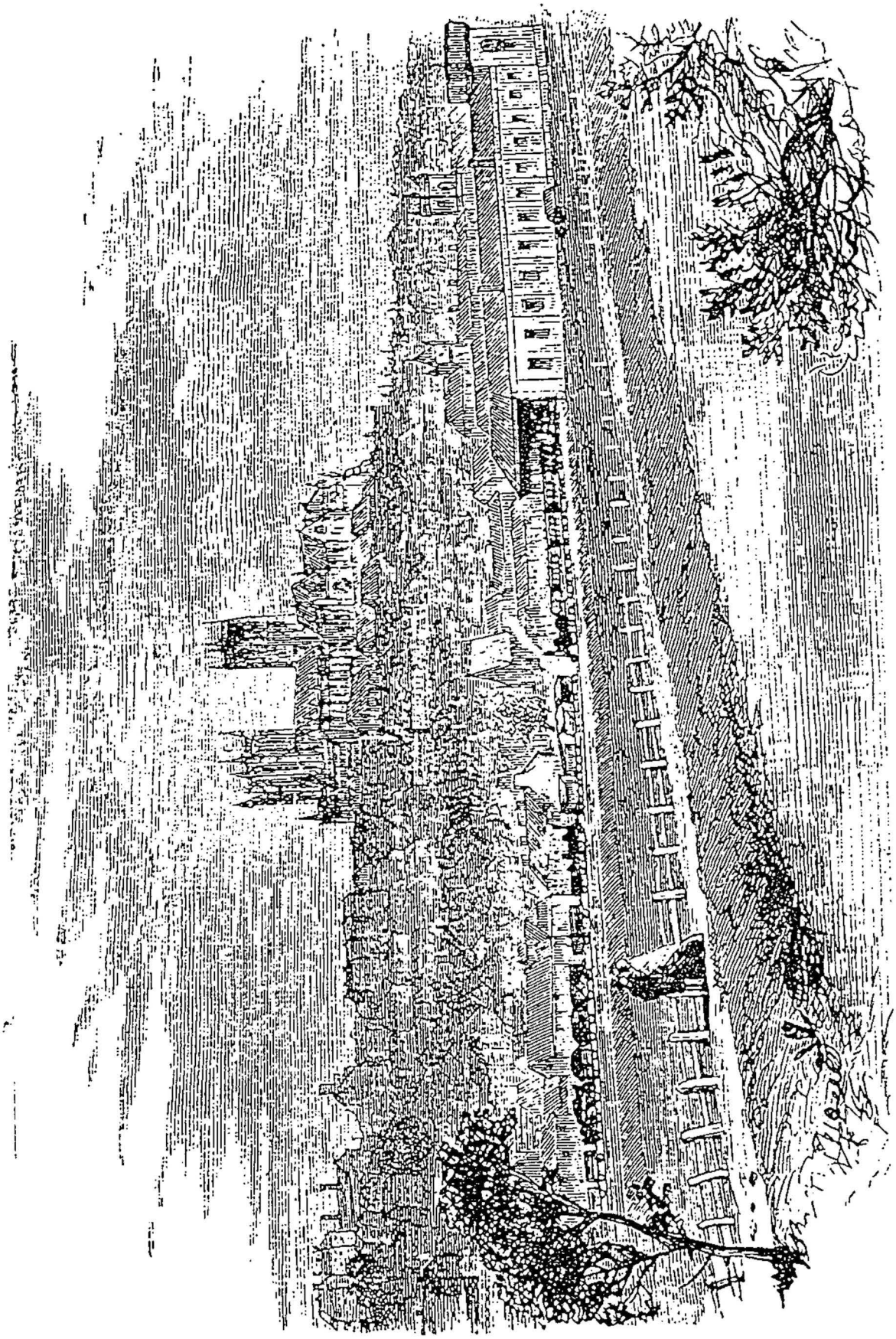

Fig. 5. Midland Station and the Low Embankment across the Holmes
(From Williams' Midland Railway)

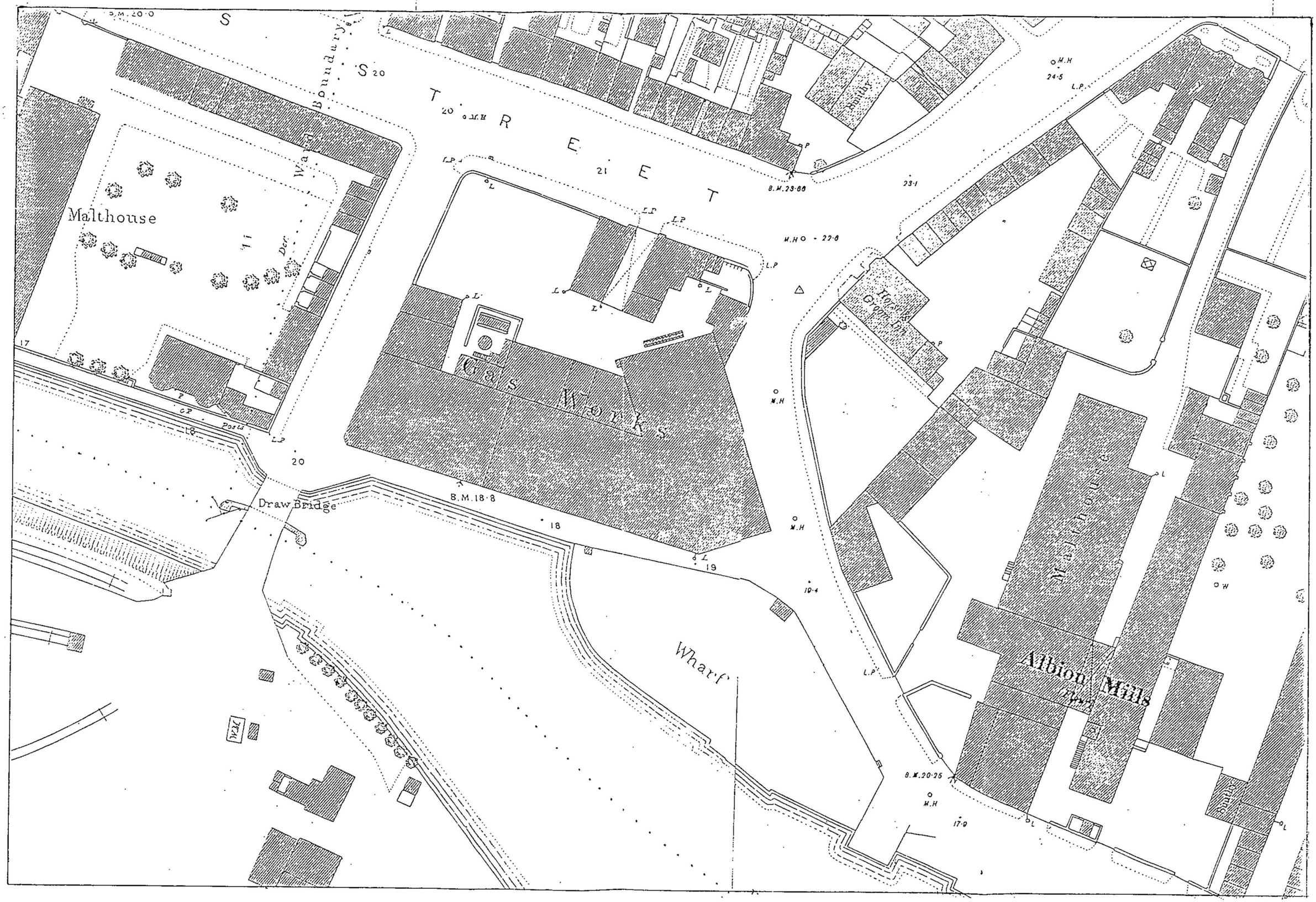

Fig. 6. 1:50 First Series Ordinance Survey - Lincoln 1888 (part)

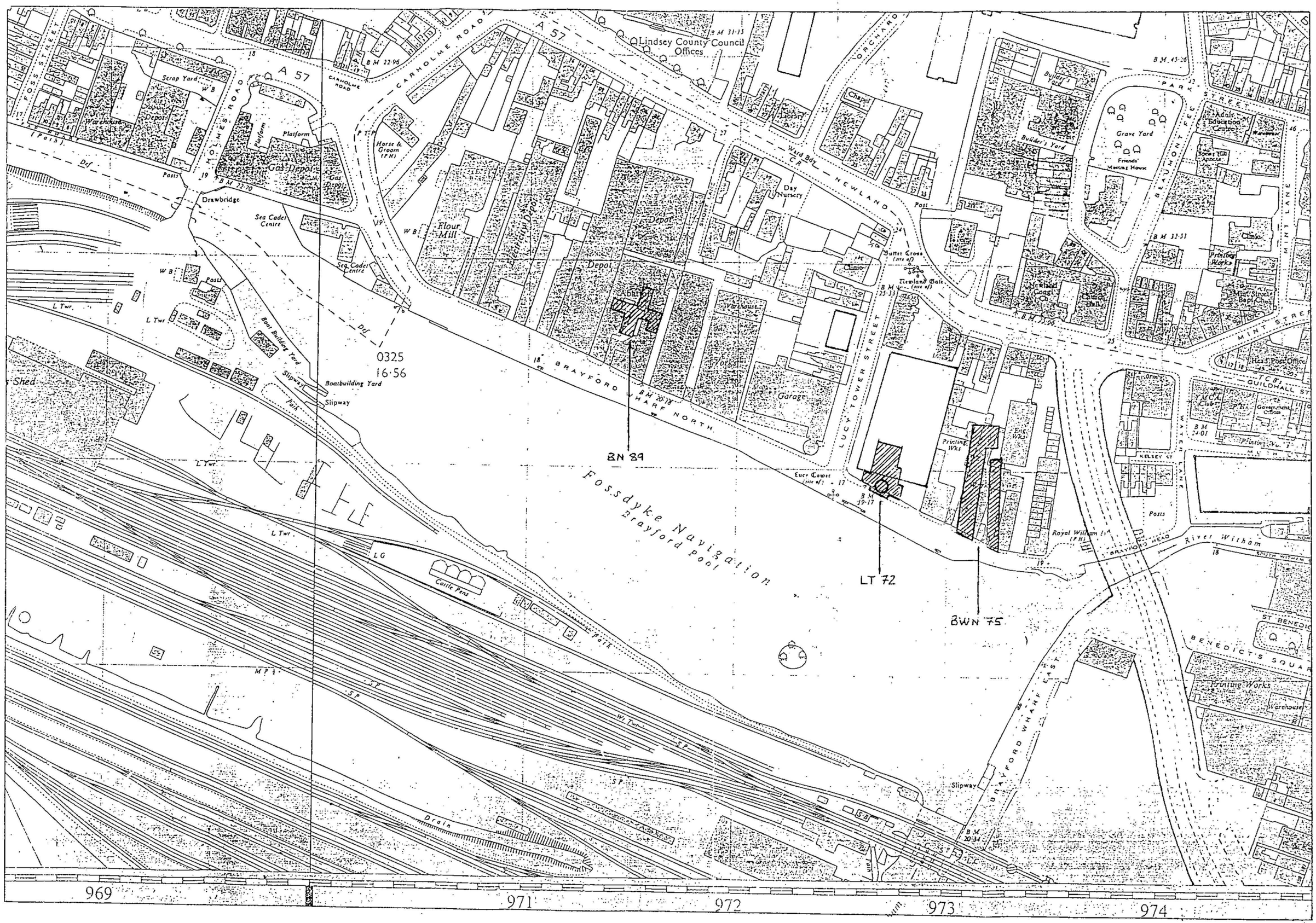

Fig. 7. Previous Archaeological Excavations - Brayford Wharf North