

# PROPOSED ROPEWALK - CARHOLME ROAD LINK

## Archaeological Evaluation of Geotechnical Trial Pits

### A Report to Lincolnshire County Council

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## INTRODUCTION

As a response to recommendations contained in the archaeological and historical study document (CLAU Jan. 1992), the Highways and Planning Department of Lincolnshire County Council commissioned the City of Lincoln Archaeology Unit to carry out a programme of archaeological observation and recording in conjunction with the excavation of geotechnical trial pits along the planned route of the above road scheme.

The field investigation was carried out on the 12th and 29th of February 1992 in concert with LINCS LAB, the geotechnical investigation contractor under the direction of JMP CONSULTANTS LTD., consultant engineers to the County Council.

This document summarises the results of the investigation and proposes a strategy for further evaluation of archaeological remains in accordance with the recommendations outlined in DoE Planning Policy Guidance 16 (PPG 16) 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 Unit's Article of Association, the Code of Conduct of the Institute of Field Archaeologists and Management of Archaeology Projects (English Heritage, 1991).

## GENERAL INFORMATION

### *Location*

The proposed route and general location of trial pits are shown on JMP drawing No. 4400/GI/1 Rev A. However, it was necessary to relocate certain trial pits to suit surface conditions. (See also Fig. 1)

As part of the Lincoln highways improvement scheme, the proposed new road, which crosses an area of Flood Plain Terrace immediately south and west of the Brayford Pool, will provide an additional access route to the west of the city centre.

### *Topography and Geology*

From a junction at the Ropewalk the proposed route traverses a small area of scrub/woodland, between commercial/industrial premises and a narrow wet-land zone, before crossing the Lincoln - Nottingham/Doncaster railway, an area of disused railway sidings and the Foss Dyke navigation at Holmes Bridge. The link terminates at the north-west corner of the Brayford Pool, between commercial premises at the junction of Carholme Road and Brayford Wharf North on the former site of the Newland Gasworks.

Located south of the Jurassic limestone scarp slope, the geology of the area consists of alluvium, river terrace sand and gravel over lias clays.

Contour variation across the planned route is negligible, surface level being generally in the region of 5.5m OD. (See also Fig. 1)

### *Archaeological Background*

Whilst reclamation has taken place along the banks of the Witham, Brayford Pool and Foss Dyke since the Roman period, much of this lowlying area, if not permanently under water, was subject to seasonal flooding until it was drained and progressively reclaimed by works begun in the 17th century. Over much of the still marshy Holmes Common, south of the Foss Dyke, the ground was subsequently raised to present levels as industrial expansion followed the mid-19th century construction of the Midland Railway. (see Fig. 6)

It is believed that the Foss Dyke was formed during the period of Roman occupation by the canalisation of the pre-existing river Till. Yet the early course of the Till and its junction with Brayford Pool are uncertain and it is possible that groundwork for the proposed road may reveal evidence of the early channel.

Lying close to the south wall of the city during the Roman period, the waterfront along the north edge of the Brayford Pool was advanced between the 10th and 13th centuries to form the medieval suburb of Newland (ie newly reclaimed or developed land). The later recorded history of the area is most closely linked with post medieval and later efforts to re-open the often impassable Foss Dyke and the 18th/19th century development alongside the Brayford Pool from Newland to Carholme Road.

As no previous archaeological investigation has been carried out along the proposed route of the road the historical information for the area is largely based on map and documentary sources, a more detailed outline of which is contained in the desk-top study document (CLAU, January, 1992).

## ARCHAEOLOGICAL EVALUATION

### *Objectives*

As an element of the archaeological evaluation process, the Trial Pit observation and recording programme was designed to:

- i) assess the nature of flood plain deposits;
- ii) assess the survival and quality of preservation of peat/organic deposits which could contain evidence of early environmental conditions;
- iii) record depths of deposits with archaeological potential or significance including any evidence for occupation, land use and early river channels.
- iv) assess the probable impact of development on surviving remains in terms of proposed foundation design/groundwork methodology and recommend any modifications which would enhance the in-situ preservation of remains.
- v) assess the date and significance of any displaced artefactual material recovered from excavated spoil or ground surface in the vicinity of trial pits;
- vi) accurately plot the location of surface and buried remains of possible archaeological significance and assess their potential for further investigation;
- vii) secure any other 'field' information which would assist in the assessment of possible development impact on sensitive archaeological remains

### *Methodology*

#### *(i) Ropewalk to Foss Dyke Trial Pits 4,6,7,7A,9,10 & 11*

The location of trial pits and exposure of deposits was determined by the consultant engineer in relation to geotechnical investigation of sub-surface conditions for engineering design. With the exception of the wetland zone, which was not investigated, the disposition of trial pits provided a reasonable indication of deposit sequence along the proposed route of the road.

Each mechanically excavated trial pit was approximately 2.25m long x 0.70 - 0.80m wide with depths varying from 2.20m to 3.0m. The unstable nature of alluvial deposits and water seepage caused collapse of trench walls in most locations.

Detailed records and descriptions of the stratigraphic sequence of deposits and archaeological features were made, all dimensions being taken from present ground level. Samples of organic deposits were collected for analysis.

Although oblique angle colour transparencies were taken where possible at selected trial pits, the narrow trench width together with machine disturbance and frequent collapse of trench walls did not present ideal conditions for photography.

#### *(ii) Former site of Newland Gasworks Trial Pits 1A & 3*

In this area the principal investigation of strata was carried out by impact core drilling.

The two mechanically excavated trial pits on the site (TP1A to a depth of c.2.6m and TP3 to a depth of c.2.2m) were designed to investigate the nature of structural remains and underlying deposits and, at the same time, provide an opportunity to secure samples for residual contamination analysis.

Both trial pits were recorded in the manner described above.

## ARCHAEOLOGICAL RESULTS

In order to fulfill the archaeological objectives in the most cost effective manner, JMP Consultants Ltd. advised that duplication of the basic record of strata was unnecessary.

The archaeological results, therefore, primarily address the trial pit/bore hole strata logs produced by Lincs Lab and provide supporting data with respect to the archaeological significance of deposits as recorded by CLAU.

Archaeological features are described in detail, the results being augmented by a brief assessment of artefactual material recovered and comments regarding the suitability of deposits for environmental analysis.

### General Observations

#### (i) *Ropewalk to Foss Dyke Trial Pits 4,6,7,7A,9,10 & 11*

The underlying stratigraphic sequence of terrace sands appeared consistent with flood plain deposition from glacio-fluvial origins.

A well defined layer of sedimentary organic sandy silt was recorded in most trial pits, this layer, immediately overlying terrace sands, being generally sealed by reclamation landfill and industrial waste.

While occasional, very small, fragments of brick or tile were noted in the organic horizon, no other artefactual material or remains of archaeological significance were recorded in this area.

With the exception of the wetland/reedbed area south of the main railway, surface indications were negative. As no trial pits were excavated in the wetland zone this area merits further investigation (see Fig.6).

#### (ii) *Former site of Newland Gasworks Trial Pits 1A & 3*

It is believed that this area, once part of the Brayford Pool, was reclaimed and developed from the 17th century, with much of the reclamation probably being carried out in conjunction with re-working of the Foss Dyke channel following the 1740 lease of the navigation by Richard Ellison.

Both trial pits on this site revealed evidence of extensive disturbance resultant from the construction, operation and demolition of the former gasworks. There was no evidence of pre-gasworks reclamation. All deposits and structural remains

observed are believed to be directly associated either with the gasworks, or with the adjacent public wharf.

### Detailed examination

#### (i) *Ropewalk to Foss Dyke (Trial pits 4,6,7,7A,9,10 & 11)*

**Trial Pits 6,7,7A,9,10 & 11** Of particular importance in this area is the evidence for early environmental conditions which may be contained in the organic/silt horizon. The organic deposits were generally 150-400mm thick, but in Trial Pit 11 the thickness increased to 600mm, possibly indicating a ditch or channel associated with the delph shown on Padley's map of 1842 (Fig.6). Since no edge or cut was observed, the spatial extent and orientation remains uncertain (See also Fig.2).

**Trial Pit 4** - excavated on the projected line of the delph south of the Foss Dyke shown on Padley's map of 1842 (see Fig.6) produced evidence to support the delph channel in the form of a 500mm + thick layer of black, sandy, organic silt.

This material, consisting of partially decayed vegetation, probably results from reed growth in the delph. The organic deposit was sealed by a 600mm thick fill of angular/tabular small to medium sized limestone fragments overlain with redeposited clay and sandy clay, a dark brown organic soil and limestone cobbles forming a track bed to the railway sidings. The water-table at this location was approximately 1.2m below present ground surface. The heavily oil slicked surface of the water in trial pit No.4 indicates the possibility of extensive oil/petroleum contamination in this area (see Fig.3).

#### (ii) *Former site of Newland Gasworks (Trial Pits 1A & 3)*

**Trial Pit 1A** - The earliest deposit at 2.6m consisted of a c.600mm thick coke and clinker fill containing fragments of brick, limestone and slate. This was overlain with a purple ash/clinker/cinder/coke fill, partially sealed by narrow bands of tipped black and grey ash, sloping down to the north. Overlying the tipped ash was a grey/brown silty, sandy clay containing frequent ash, clinker and coke together with bricks and wood. This was in turn overlain with a 300mm thick layer of large irregular, and roughly squared limestone blocks which probably formed the foundation of a gasworks structure. The overlying dump/ground raising deposits, all of which contained material evidence of the gasworks operation, were

sealed by a 200mm thick concrete slab and the macadam surface of the car park. The water-table was recorded c.2.5m from present ground level, the presence of underlying gases (methane ?) being indicated by bubbles on the water surface (See Fig.4).

**Trial Pit 3** - The unstable nature of the loose granular fill exposed in TP3 caused excavation to be terminated approximately 0.2m below the water-table, at a depth of c.2.2m from the present ground surface. The earliest deposit recorded, at the limit of excavation, was similar to that encountered in TP1A. This was overlain with a 150-200mm thick layer of fragmented concrete. The overlying fill, a 1.4m thick layer of demolition debris contained the possible remains of retort linings and refractory bricks together with clinker, coke and iron. The fill was sealed by a layer of possible retort residue consisting of a grey/black ash containing cinder, coke and clinker. The overlying deposit, a light brown silty sand, was sealed by a 200mm thick concrete slab and the macadam surface of the car park.

The presence of residual contamination was indicated by patches of bright blue/green deposits recorded in the main demolition debris fill material. Lincs Lab obtained samples of this material and other deposits for contaminant analysis. (See Fig.5)

### *Environmental Study*

The potential for organic sediments across the development area presents a unique opportunity to investigate the history of the landscape in close proximity to the urban centre - there are at present only a few Iron Age results from the fens along the Witham east of the city, where a peat site at Fiskerton has been investigated.

Organic deposits were recorded in most trial pits between the Ropewalk and Foss Dyke, and while the time scale and method of excavation did not allow detailed investigation, samples, for preliminary analysis, were collected from the organic horizon in trial pits 4, 6, 9 & 11.

Dr James Greig (of the University of Birmingham), Environmental Consultant to CLAU, prepared the samples and carried out the preliminary pollen analysis and grain/spore count. His findings, which are described below, are summarised in the table shown in Fig.7.

#### *Forest woodland/Scrub*

The results show variations on a landscape with some forest shown by (*Quercus*) oak, (*Tilia*) lime and (*Ulmus*) elm and other vegetation including scrub.

### *Farming*

The presence of crops provides some indication of local human activity either growing or using them. Cereals are present in all samples and probable *Cannabis* in two. This shows that the deposits probably represent a period of human occupation, possibly Saxon or later, although no evidence of an artefactual nature to support dating was found. The presence of grassland includes dry land plants, showing the cultural landscape is represented.

### *Wetland and Swamp*

The wetland plants show the presence of swamp, as would be expected of peat.

### *Bore Holes*

Analysis of bore hole logs, kindly provided by LINC'S LAB, indicated the presence of organic silts/peat deposits in most locations along the planned route of the road.

## CONCLUSIONS

It is never envisaged that archaeological investigation via dispersed trial pits will produce conclusive evidence of ancient occupation or land use. However, the results, when correlated with the existing archaeological record and related archive research, can be used to develop an appropriate strategy for possible further evaluation.

In this case the results and existing records indicate that at least two areas merit further field investigation. These are:

1. The organic deposits between the Ropewalk and Foss Dyke, particularly the reedbed/wetland area immediately south of the main railway line. This area, which appears to be free of industrial waste, will probably produce the least contaminated organic samples. (See Figs.1 & 6)
2. The area immediately west of the Brayford Pool including the delph, as shown on Padley's Map of 1842, which may reveal evidence of an early channel of the river Till or Foss Dyke. (See Fig.6)

While the trial pits did not reveal artefactual evidence for utilisation of the area before the post-medieval period, the results from preliminary environmental analysis of organic deposits demonstrates that the possibility of pre-historic to medieval use of the area should not be overlooked.

## *Environmental*

Environmental studies are crucial to the understanding of past economic systems. The preliminary examination of samples shows that pollen is well preserved and demonstrates probable human occupation of the area. It is therefore important that any programme of further archaeological evaluation incorporates provision for a detailed study of the sedimentary deposits, together with biological sampling and analysis, so that a dated environmental sequence may be obtained.

The possible recovery of wood, both in its natural state and worked by man, and the need for dendrochronological study and 'radio carbon' dating, should not be overlooked.

### *Former Site of Newland Gasworks*

While the apparent absence of deposits or remains pre-dating the gasworks is disappointing it is clear from both trial pit and test bore results that further archaeological investigation on this site would be extremely difficult, costly and potentially dangerous.

Considering the nature of the deposits revealed in the course of geotechnical investigation and the probability of extensive disturbance caused by the construction/operation/demolition of the gasworks, together with the water-table level and presence of residual, and probably extensively leached, contamination, the value of any possible area of undisturbed deposits has probably been so degraded as to be of little archaeological or environmental value (see also desk-top study document CLAU, Jan. 1992)

## RECOMMENDATIONS

The following recommendations are based on;

- a) The results of this investigation and the existing archaeological record for the area.
- b) Our current understanding of the proposed route of the road and the probable extent of ground disturbance to be caused by the construction work and related activities. In this respect it should be noted that detailed engineering drawings and proposed groundwork methodology have not yet been studied.
- c) The principal assessment criteria contained in PPG 16 including the 'importance' of remains known or thought to exist, the policy of preservation 'in situ' and, the alternative of preservation by record (ie, excavation or watching brief)
- d) Our professional judgement on the merits of any possible remains, which should be seen as an aid to formulating strategy and not the only viable judgements that could be made.

### *Archaeological Assessment*

Although detailed engineering drawings are not yet available for comment, we understand that, with the exception of deep excavation of bridge abutment foundations at the crossings of the railway and Brayford Pool/Foss Dyke, all remaining areas of groundwork disturbance will be of a relatively shallow nature.

Subject to review of engineering drawings and groundwork methodology we recommend the following course of action;

- 1) That 4.5m square excavations be undertaken at selected locations along the proposed route of the road. Such excavations would enable controlled column sampling of organic deposits. The samples to be processed for environmental analysis, including possible C14 dating, with the results incorporated into an area study including the Birchwood Link project and Skewbridge development. It is preferable that this investigation be undertaken in advance of project groundwork.
- 2) That a record of any surviving archaeological remains or deposits, including the possible exposure of early river channels, be secured by means of an intensive watching brief carried out

in conjunction with the project groundworks

- 3) That provision is made within the contractor's work programme to allow adequate periods of access for the purpose of archaeological recording.
- 4) That consideration be given to an appropriate method of visually identifying the site of Lincoln's first gasworks, possibly by means of a feature design in the retaining wall at the Carholme junction, or, at the very least, a suitably worded commemorative plaque. It may be appropriate to invite British Gas to comment on this.

The City of Lincoln Archaeology Unit would be pleased to undertake the environmental study and watching brief, and in this regard we recommend further discussion to resolve questions relating to foundation design, depths of disturbance and groundwork methodology and to agree an appropriate archaeological specification, programme of work and cost.

J. Hockley

April 1992

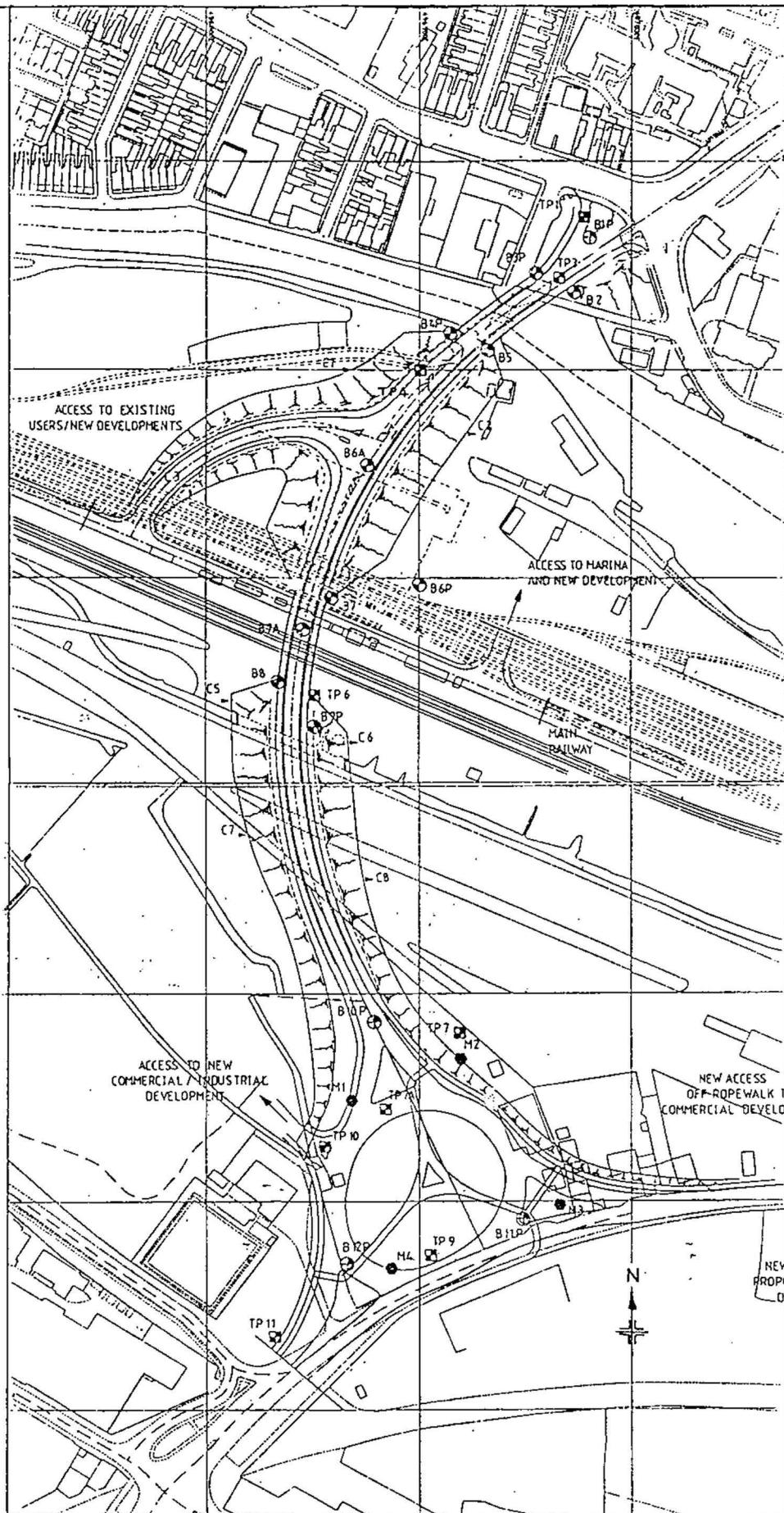
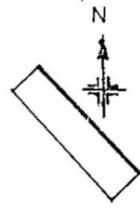
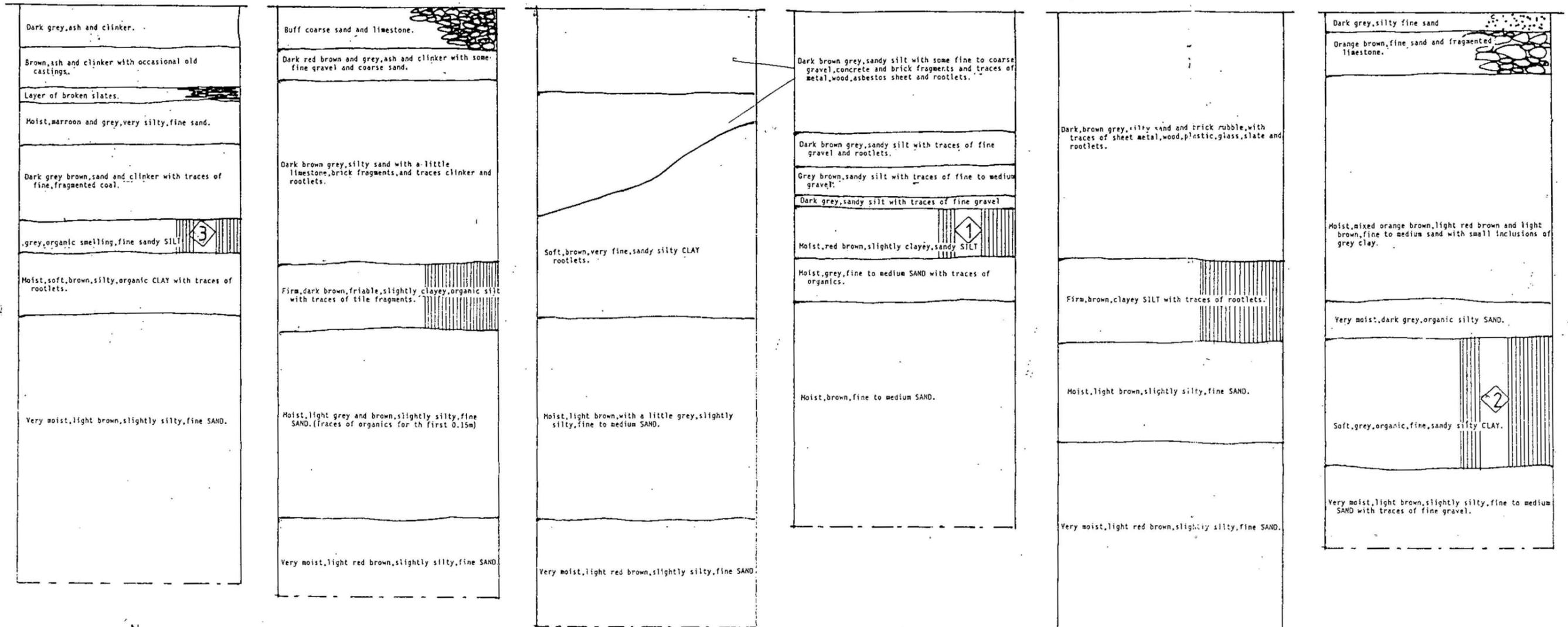
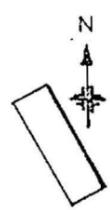


Fig.1 - Map showing proposed route of road and location of trial pits

Scale: 100m OS Grid



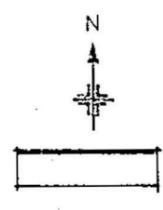
TP6



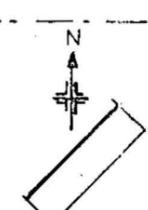
TP7



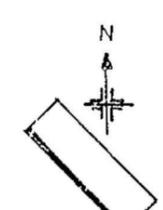
TP7A



TP9



TP10



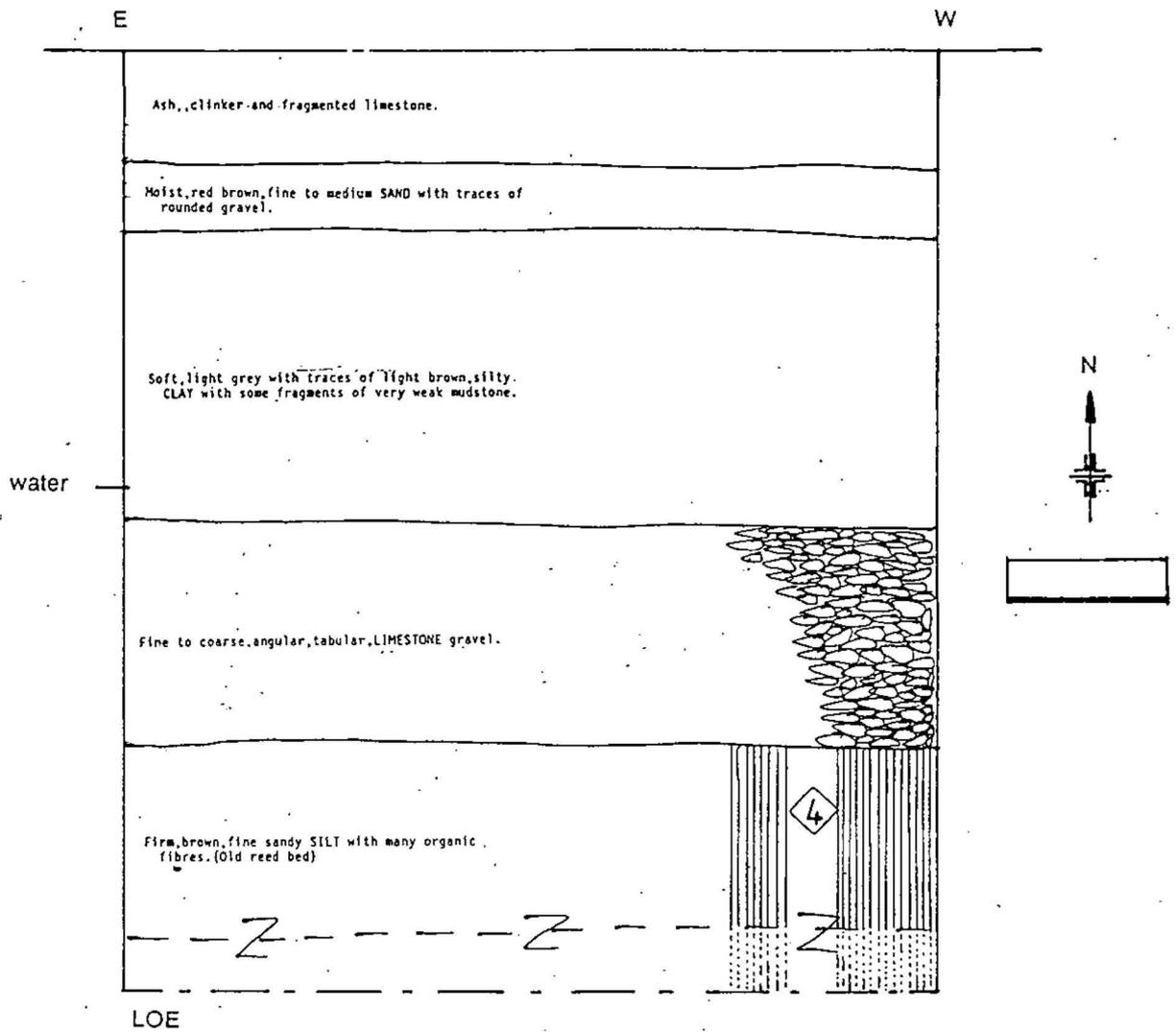
TP11

KEY

 organic

 sample No.

Fig.2 - Trial Pits 6,7,7A,9,10 & 11 Scale: 1:20



KEY

 organic

 sample No.

Fig.3 - Trial Pit 4

Scale: 1:20

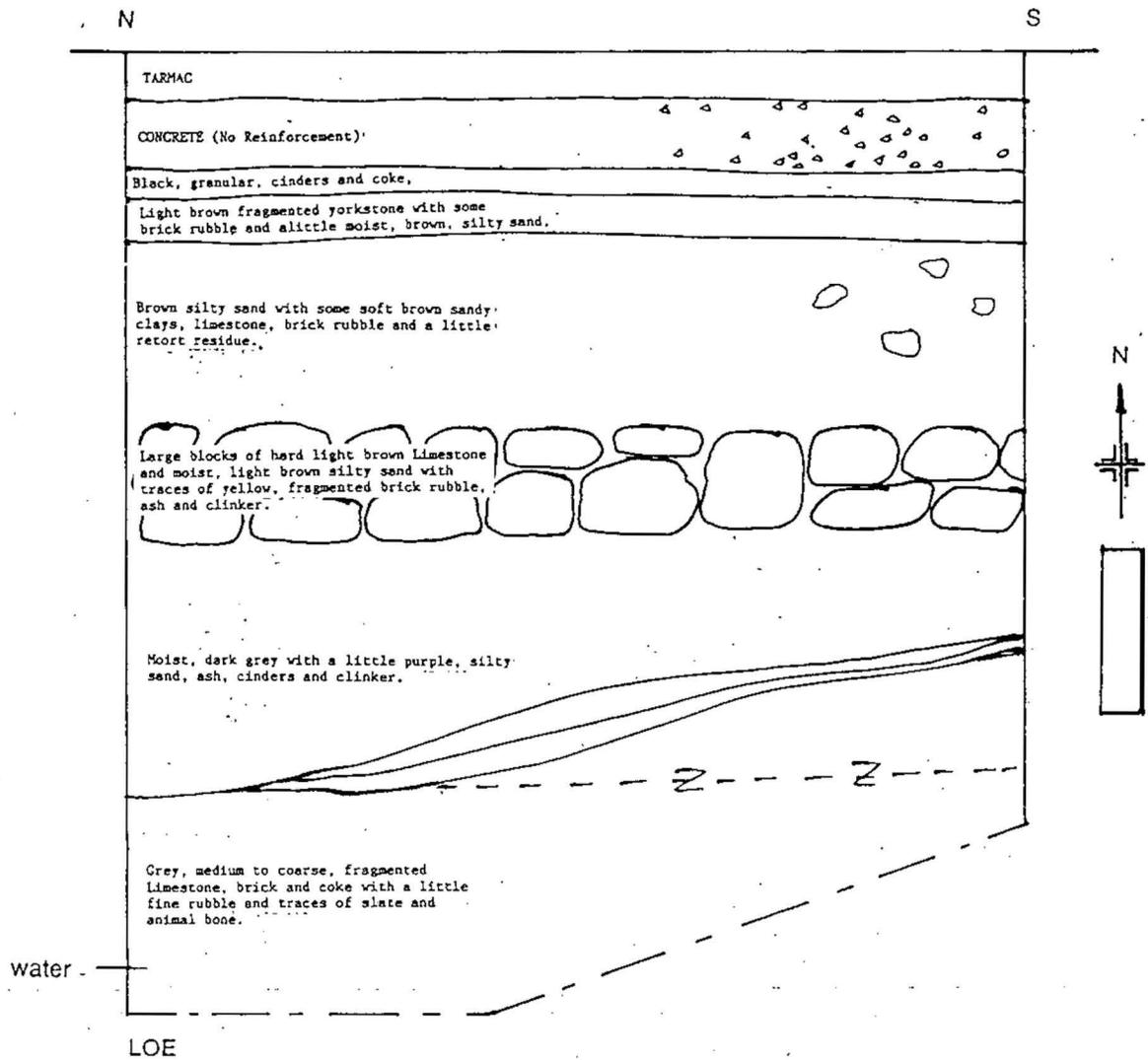


Fig.4 - Trial Pit 1A

Scale: 1:20

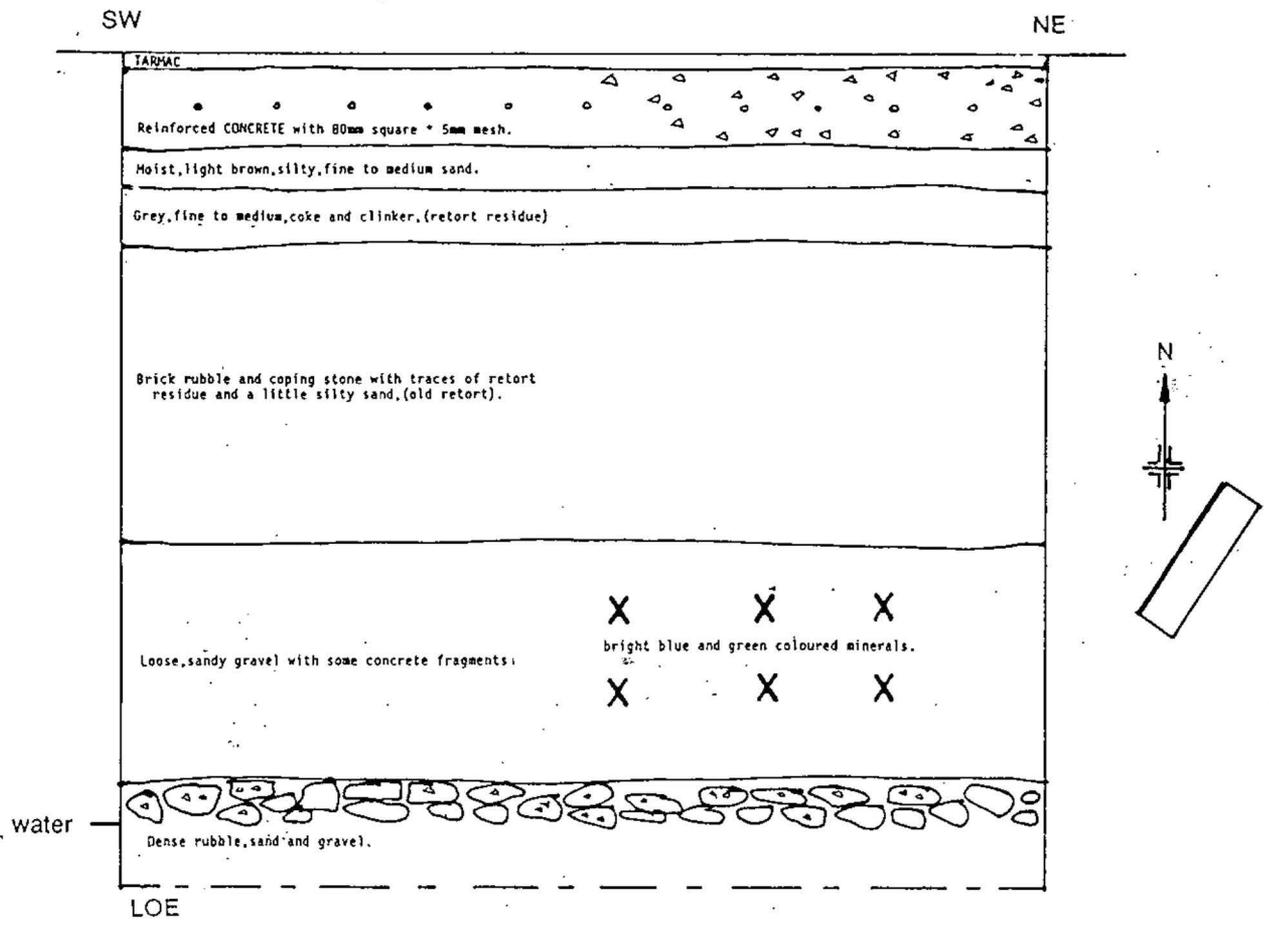


Fig.5 - Trial Pit 3

Scale: 1:20

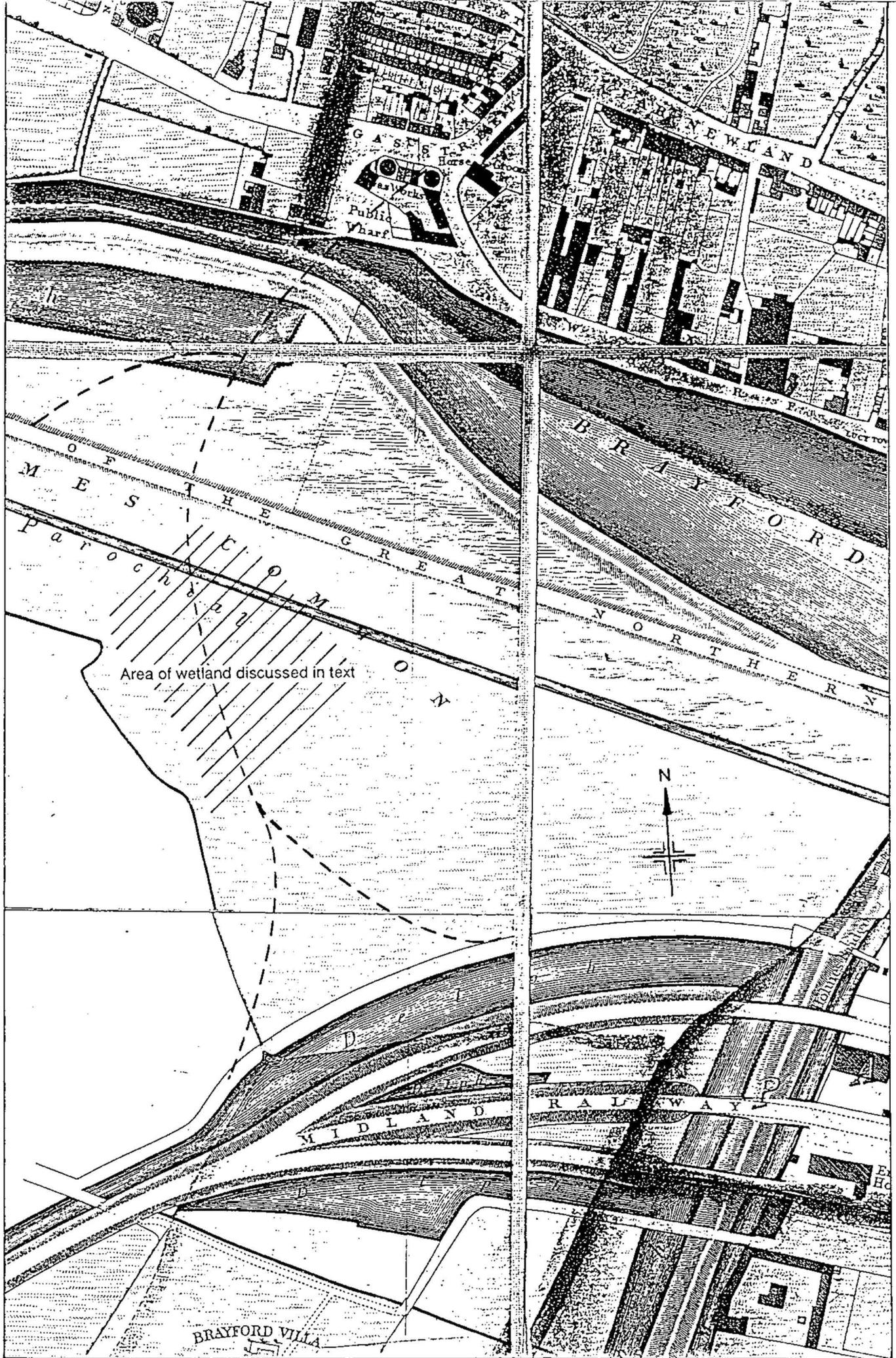


Fig.6 - Padley map of 1842 showing proposed route of road and area of undisturbed wetland

## Ropewalk-Carholme Road link

### Pollen Test Results from Organic Samples

Results of analysis carried out by Dr James Greig - University of Birmingham

Trial Pit	Forest	Scrub	Crops	Grassland	Wetland
4	Quercus ++ Tilia Ulmus +	Corylus Ericales	Cereal Cannabis	+	+ Alnus ++
6	Quercus ++ Tilia Ulmus	Corylus Ericales Rhamnus	Cereal ++	++	++ Cyperaceae ++ Alnus
9	Quercus ++ Tilia Ulmus	Corylus + Betula Hedera Ericales	Cereal ++ Cannabis ++	++	++ Cyperaceae ++ Alnus
11	Quercus ++	Corylus Hedera Ilex	Cereal Vicia faba?	+	+ Alnus

Approximate concentrations

+ = present

++ = moderate

+++ = abundant

Fig 7: Table of pollen test results