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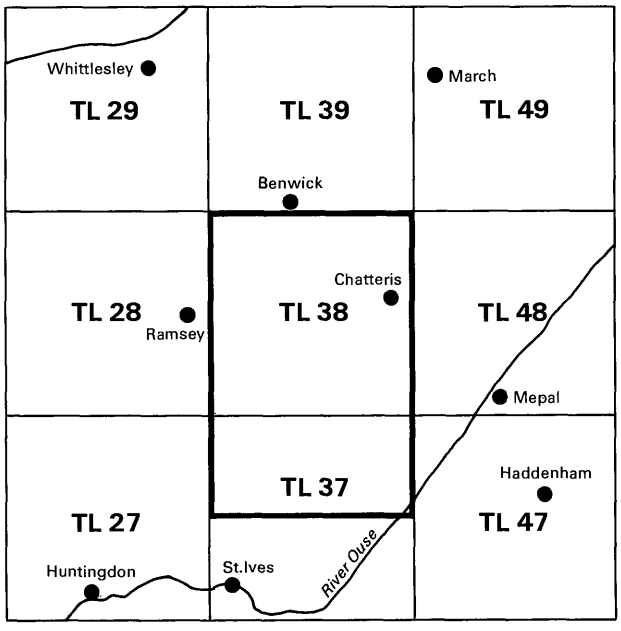

The sand and gravel resources of the country around Chatteris, Cambridgeshire

Description of 1:25 000 sheet TL 38 and part of 37

J. R. Gozzard

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PREFACE

National resources of many industrial minerals may seem so large that stocktaking appears unnecessary, but the demand for minerals and for land for all purposes is intensifying and it has become increasingly clear in recent years that regional assessments of the resources of these minerals should be undertaken. The publication of information about the quantity and quality of deposits over large areas is intended to provide a comprehensive factual background against which planning decisions can be made.

Sand and gravel, considered together as naturally occurring aggregate, was selected as the bulk mineral demanding the most urgent attention, initially in the south-east of England, where about half the national output is won and very few sources of alternative aggregates are available. Following a short feasibility project, initiated in 1966 by the Ministry of Land and Natural Resources, the Industrial Minerals Assessment Unit (formerly the Mineral Assessment Unit) began systematic surveys in 1968. The work is now being financed by the Department of the Environment and is being undertaken with the co-operation of the Sand and Gravel Association of Great Britain.

This report describes the resources of sand and gravel of 150 km^2 of country around Chatteris, Cambridgeshire, shown on the accompanying resource map. The survey was conducted by J. R. Gozzard, assisted in the drilling and sampling programme by C. A. Auton. The work is based on a geological interpretation of a six-inch soil survey published in 1974 and a six-inch geological survey published on New Series One-Inch Sheet 187 (Huntingdon) in 1950. The geological lines, now presented at the 1:25 000 scale, incorporate minor amendments resulting from the present survey.

J. D. Burnell, ISO and G. I. Coleman (Land Agents) were responsible for negotiating access to land for drilling. The ready co-operation of land owners and tenants in this work is gratefully acknowledged.

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24 August 1982.

The first twelve reports on the assessment of British sand and gravel resources appeared in the Report Series of the Institute of Geological Sciences as a subseries. Report No. 13 and subsequent reports appear as Mineral Assessment Reports of the Institute.

Details of published reports appear at the end of this Report.

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The asterisk on the front cover indicates that part of a sheet adjacent to that quoted is described in this Report.

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Description of 1:25 000 sheet TL 38 and part of 37

J. R. Gozzard

SUMMARY

The geological maps of the Institute of Geological Sciences, pre-existing borehole information, and 73 boreholes drilled for the Industrial Minerals Assessment Unit form the basis of the assessment of the sand and gravel resources of the country around Chatteris, Cambridgeshire.

All the deposits in the district that might be potentially workable for sand and gravel have been investigated and a simple statistical method has been used to estimate the volume. The reliability of the volume estimates is given at the symmetrical 95 per cent probability level.

The 1:25 000 map is divided into five resource blocks, containing between 1.8 and 19.1 km^2 of sand and gravel. For each block the geology of the deposits is described, and the mineral-bearing area, the mean thicknesses of overburden and mineral and the mean gradings are stated. Detailed borehole data are also given. The geology, the positions of the boreholes and the outlines of the resource blocks are shown on the accompanying map.

Bibliographical reference
Gozzard, J. R. 1983. The sand and gravel resources of the country around Chatteris, Cambridgeshire. Description of 1:25 000 sheet TL 38 and part of TL 37. **Miner. Assess. Rep. Inst. Geol. Sci.,** No. 124.

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INTRODUCTION

The survey is concerned with the estimation of resources, which include deposits that are not currently exploitable but have a foreseeable use, rather than reserves, which can only be assessed in the light of current, locally prevailing, economic considerations. Clearly, neither the economic nor the social factors used to decide whether a deposit may be workable in the future can be predicted; they are likely to change with time. Deposits not currently economically workable may be exploited as demand increases, as higher-grade or alternative materials become scarce, or as improved processing techniques are applied to them. The improved knowledge of the main physical properties of the resource and their variability, which this survey seeks to provide, will add significantly to the factual background against which planning policies can be decided (Archer, 1969; Thurrell, 1971, 1981; Harris and others, 1974).

The survey provides information at the 'indicated' and 'inferred' levels. Indicated assessments "are computed partly from specific measurements, samples or production data and partly from projection for a reasonable distance on geologic evidence. The sites available for inspection, measurement, and sampling are too widely or otherwise inappropriately spaced to permit the mineral bodies to be outlined completely or the grade established throughout". 'Inferred' assessments are those "based largely on broad knowledge of the geologic character of the deposit and for which there are few, if any, samples or measurements." (Bureau of Mines and Geological Survey, 1948, p 15).

It follows that the whereabouts of reserves must still be established and their size and quality proved by the customary detailed exploration and evaluation undertaken by the industry. However, the information provided by this survey should assist in the selection of the best targets for such further work. The following arbitrary physical criteria have been adopted:

a The deposit should average at least 1 m in thickness.
b The ratio of overburden to sand and gravel should be no more than 3:1.
c The proportion of fines (particles passing the No. 240-mesh B.S. sieve, about $\frac{1}{16}$ mm) should not exceed 40 per cent.
d The deposit should lie within 25 m of the surface, this being taken as the likely maximum working depth under most circumstances. It follows from the second criterion that boreholes are drilled no deeper than 18 m if no sand and gravel has been proved.

A deposit of sand and gravel that broadly meets these criteria is regarded as 'potentially workable' and is described and assessed as 'mineral' in this report.

Pre-Pleistocene rocks, which are usually consolidated and devoid of potentially workable sand and gravel, are referred to as 'bedrock'; 'waste' is any material other than bedrock or mineral; 'overburden' is waste that occurs between the surface and an underlying body of mineral.

For the particular needs of assessing sand and gravel resources, a grain-size classification based on the geometric scale $\frac{1}{16}$ mm, $\frac{1}{4}$ mm, 1 mm, 4 mm, 16 mm, 64 mm has been adopted. The boundaries between fines (that is, the clay and silt fractions) and sand, and between sand and gravel grade material, are placed at $\frac{1}{16}$ mm and 4 mm respectively (see Appendix C).

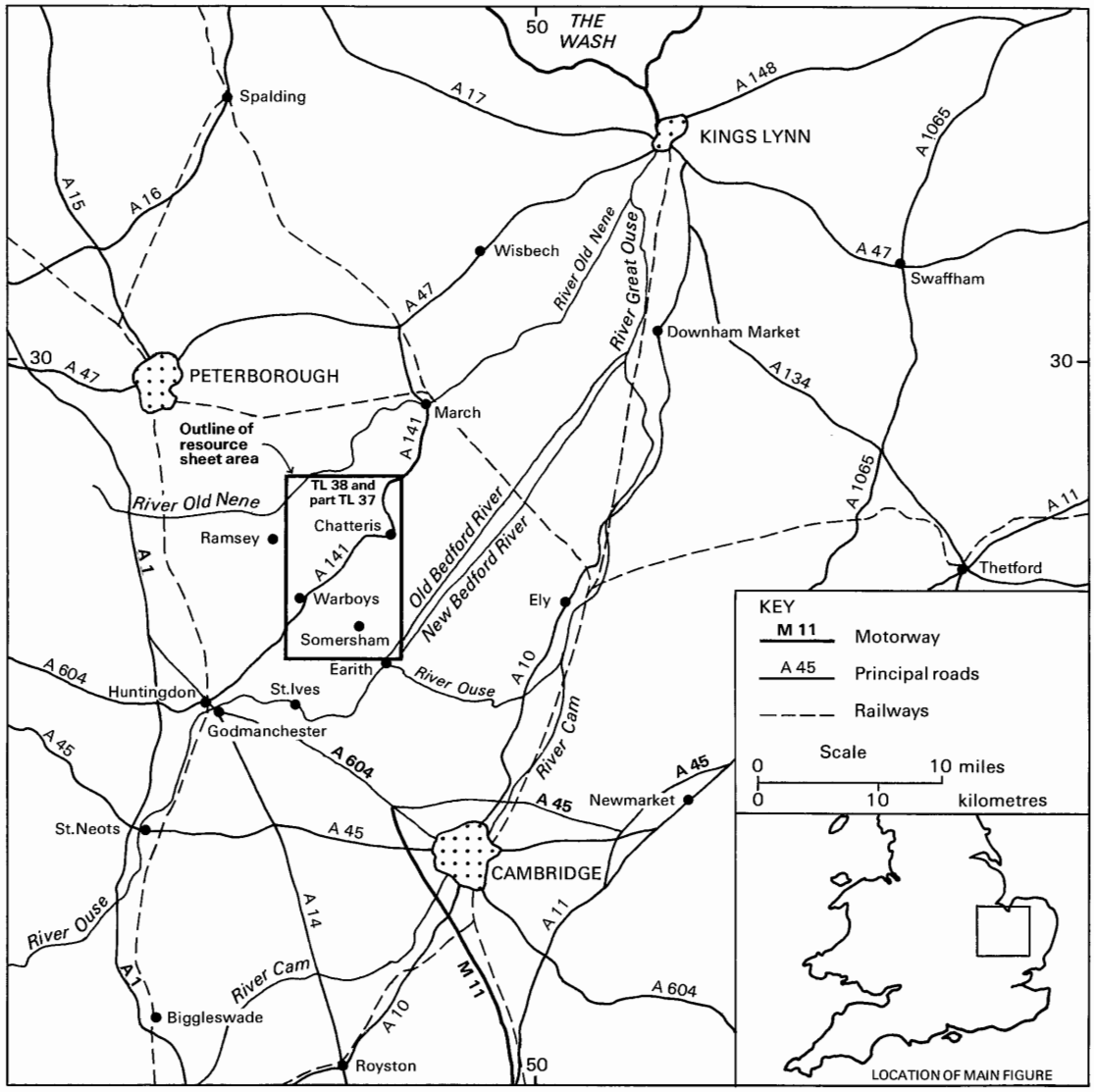


Figure 1 The location of the resource sheet area (TL 38 and part of TL 37)

The volume and other characteristics are assessed within resource blocks, each of which, ideally, contains approximately 10 km^2 of sand and gravel. No account is taken of any factors, for example roads, villages or land of high agricultural or landscape value, which might stand in the way of sand and gravel being exploited, although towns are excluded. The estimated total volume therefore bears no simple relationship to the amount that could be extracted in practice.

It must be emphasised that the assessment applies to the resource block as a whole; valid conclusions cannot be drawn about mineral in parts of a block, except in the immediate vicinity of the actual sample points.

DESCRIPTION OF THE DISTRICT

General

The district lies approximately 20 km north-north-west of Cambridge (Figure 1) and includes the villages of Chatteris, Warboys and Somersham. The land is almost entirely devoted to arable farming, particularly root crops, but there is an area of fruit orchards on the sandier soils south-east of Somersham. Sand and gravel is extracted near Somersham and clay is dug for brick making from a pit north of Warboys. There are a few small clay pits to the south of Warboys but they are now filled in or flooded. South of Chatteris and east of Somersham, there are many old gravel pits now largely levelled.

The objective of this survey was to assess the potentially workable sand and gravel content of the deposits. The borehole programme proved some 65 km^2 of sand and gravel, much of which is blanketed by peat, in a belt running from north-west to south-east across the middle of the district. The mineral has an average thickness of 3.3 m, lies below a mean 3.2 m of overburden and has an estimated volume of 215 million m^3 $\pm$ 12 per cent at the 95 per cent confidence level. The district has been divided into five resource blocks for assessment purposes.

Topography

Most of the area consists of low-lying flat fenland lying between 3 m and -1 m OD. The ground to the south of Warboys and south-west of Somersham rises to about 40 m and forms a low plateau underlain by boulder clay and clays of Upper Jurassic age. Chatteris is situated on an 'island' of sand and gravel surrounded by later peat and alluvium, rising to 11 m above the level of the fen; the Ramsey ridges on the western margin of the district are also formed of sand and gravel, seldom rising above +6 m OD in height. The fenland is prevented from flooding by a regional pumped drainage system. All the drains, apart from Hammond's Eau south of Chatteris, are artificial and the most important are the 'Old

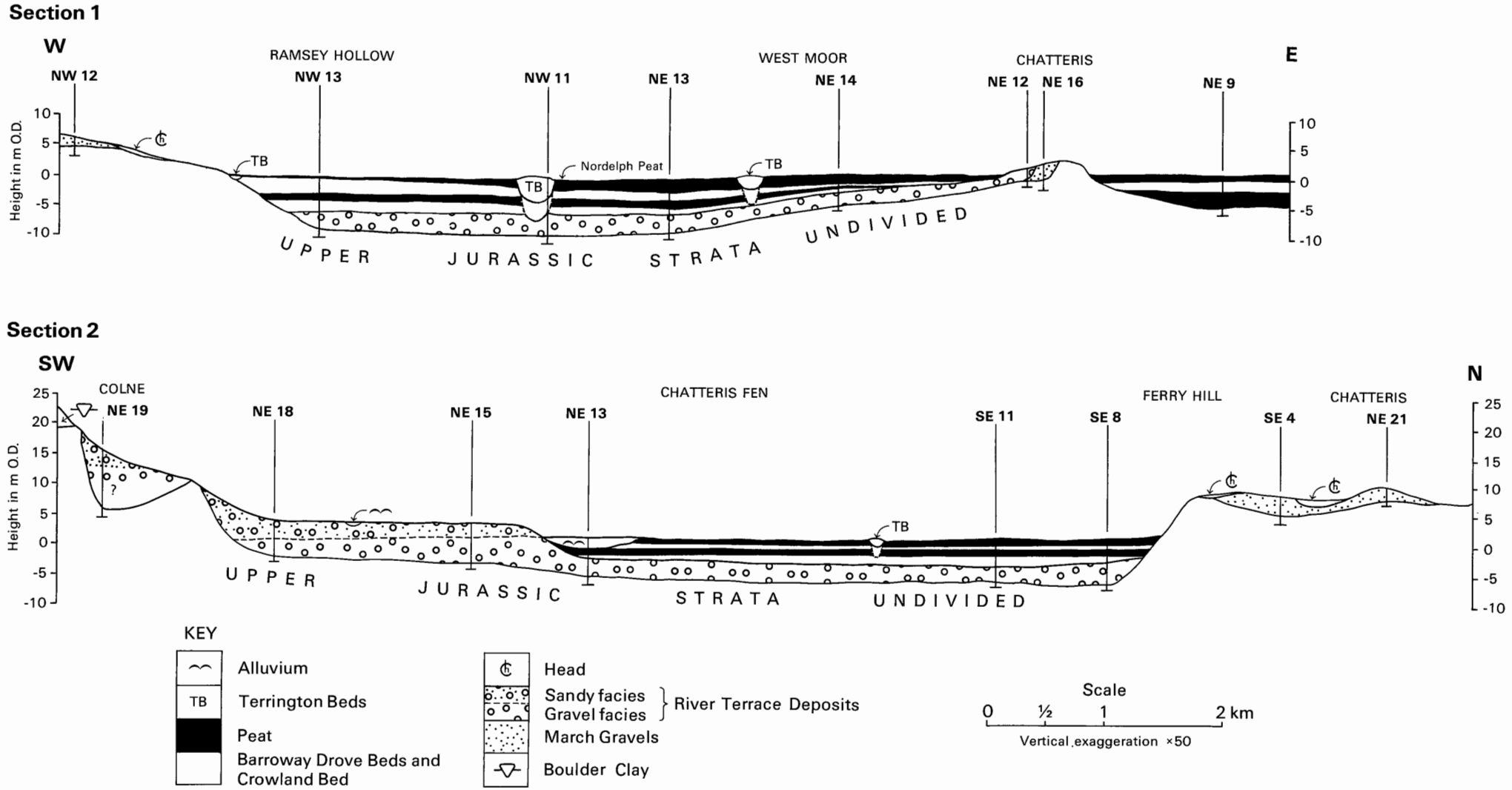


Figure 2 Schematic cross-sections illustrating the geology of the district.

Course' of the River Nene in the north-west part of the district, the Forty Foot or Vermuiden's Drain north of Chatteris and the Old and New Bedford Rivers in the extreme south-east.

Table 1 Geological sequence

	General lithology	Maximum recorded thickness (m)
DRIFT		
Recent		
Alluvium	soft grey clays and silts	3.3
Terrington beds	grey, thixotropic silts, and clays	8.9
Nordelph Peat	black silty peat	2.0
Barroway Drove Beds*	glutinous silts and clays	5.7 5.7
Lower Peat*	brown woody peat	3.2
Pleistocene		
Crowland Bed*	glutinous silts and clays	2.1
River Terrace Deposits	fluviatile sand and flint gravels	8.2
March Gravels	high-level 'clayey' gravels	2.8
Head	firm pebbly clay	0.5
Glacial Sand and Gravel	thin, patchy sand and gravel	†
Boulder Clay	firm stony clay	†
SOLID		
Jurassic		
Upper Jurassic (undivided)	dark and pale grey clays with cementstones	120

* not shown on map
† no data available

Geology
The geology of the northern part of the resource sheet area is based on an interpretation by R W Gallois of a six-inch soil survey by R S Seale (1974). The southern part is based on Old Series one-inch mapping in the area of New Series Sheet 172 (Ramsey), published in 1886, and on the New Series one-inch map for Sheet 187 (Huntingdon) published in 1950. Full details of the authors are given on the margin of the resource sheet. The geological sequence is summarised in Table 1, the deposits being listed as far as is possible in stratigraphical order, and their relationships are illustrated in the schematic cross-section (Figure 2).

SOLID
Upper Jurassic For the purposes of the assessment survey, solid deposits are undifferentiated; however, they include Oxford Clay, West Walton Beds (Gallois, 1979) and Ampthill Clay, all formations dominantly of clay lithology.

DRIFT
Pleistocene
Boulder Clay Most of the higher ground between Warboys [304 801] and Bluntisham [364 750] is covered by boulder clay, deposited as till during the Pleistocene. It is typically a grey, silty, sandy clay with pebbles of chalk, limestone, quartz, sandstone, siltstone and flint together with a little igneous and metamorphic material. In places masses of the Jurassic clays occur as rafts within the boulder clay.

Glacial Sand and Gravel Several patches of Glacial Sand and Gravel occur in the southern part of the district in the vicinities of Warboys, Woodhurst [317 760], Pidley [331 777] and Bluntisham [363 750], but they are not large enough to be considered as potentially workable in the context of this survey. These deposits,

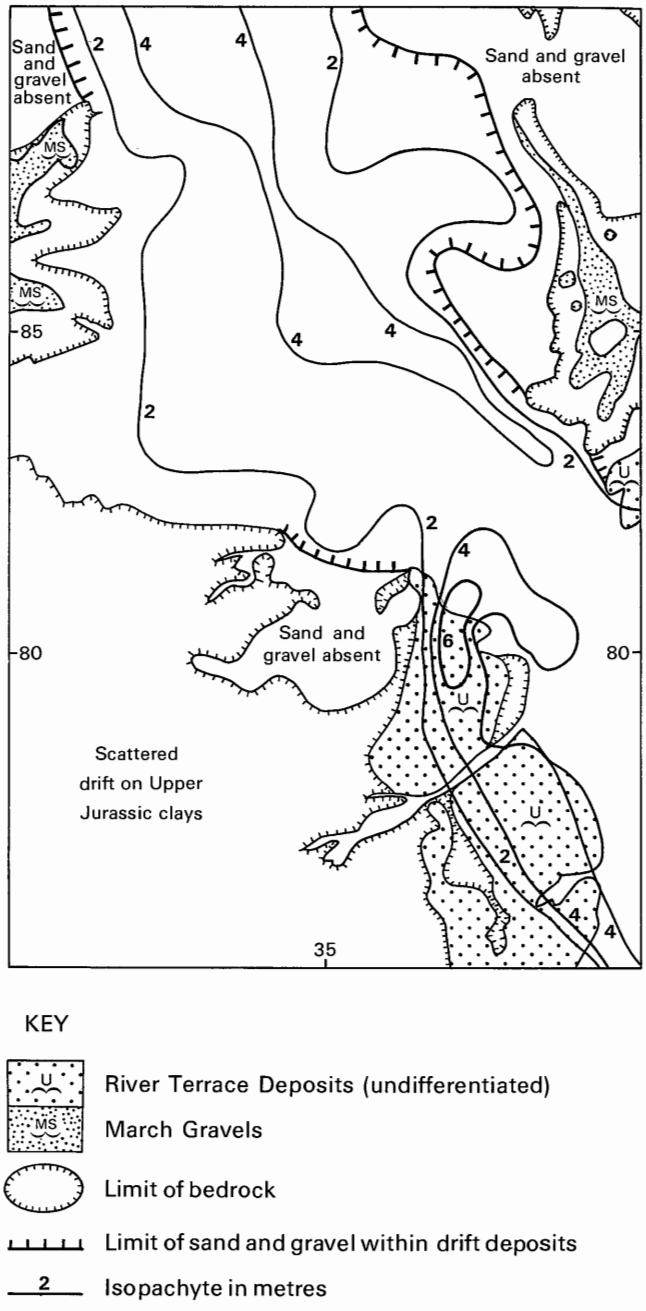


Figure 3 The extent and thickness of the sand and gravel deposits.

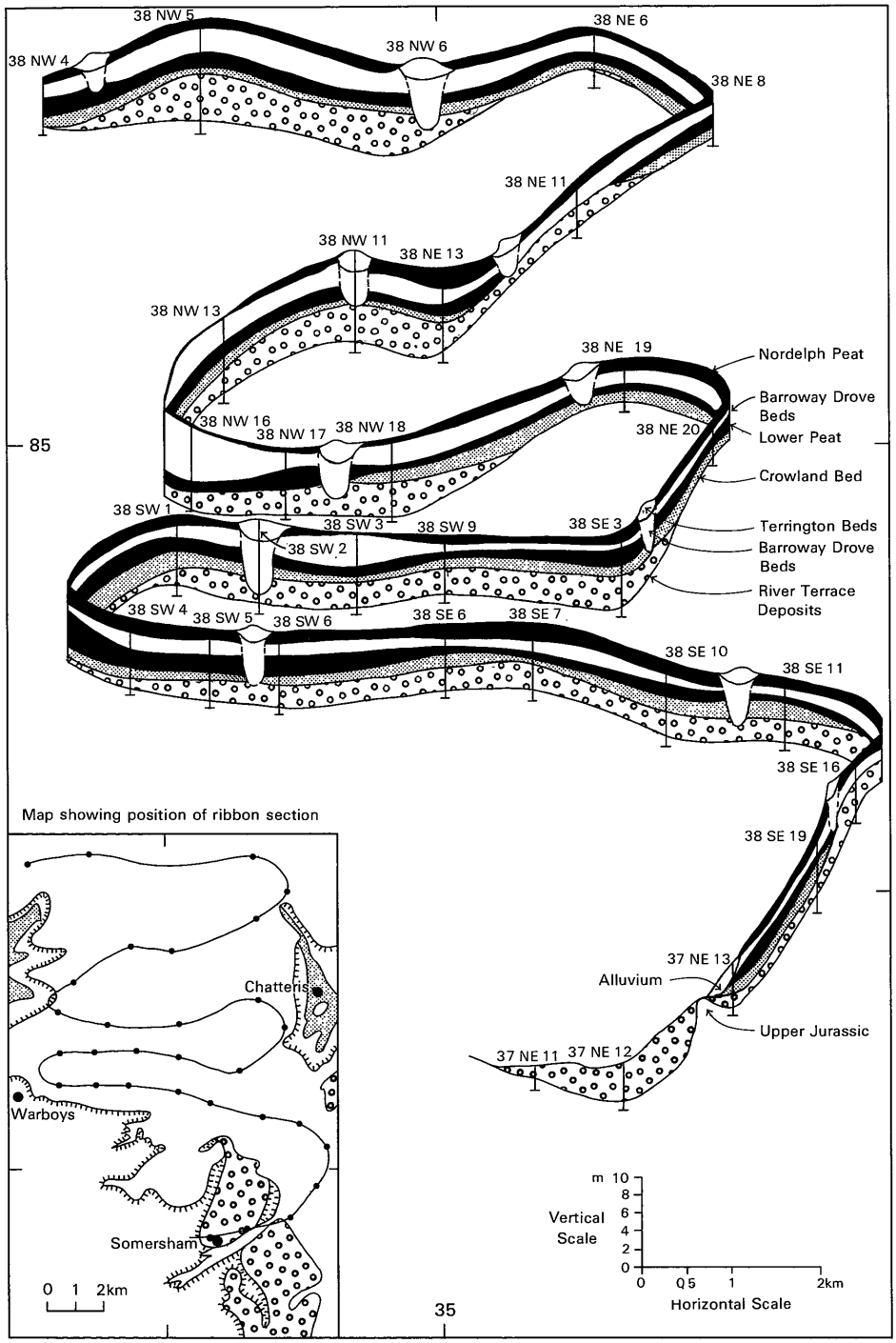


Figure 4 Vertical and lateral variations in some of the deposits of the fenland illustrated by a schematic ribbon diagram.

which are typically lenticular in form, occur above, within and beneath the boulder clay and are probably of fluvioglacial origin, the product of a melting ice-sheet.

Head Up to 0.5 m of pale grey silty clay with occasional angular flints is present on the higher ground of the Ramsey and Chatteris 'islands' and near Warboys. They are the product of periglacial conditions of freezing and thawing which mixed and mobilized the near-surface deposits and caused them to move by solifluxion and to accumulate mainly at the foot of gentle slopes.

March Gravels Spreads of fossiliferous sands and gravels, lying between about 3 m and 10 m OD, cap the Ramsey and Chatteris 'islands'. These marine and estuarine shelly flint gravels are known in this district from four boreholes at Chatteris and three eastward of Ramsey and are up to 2.8 m thick. They contain an abundant molluscan fauna (Baden Powell, 1934; Skertchly, 1877). The deposits generally grade as sandy gravel but they may, locally, be very clayey or gravel-free. Variations in thickness may be due to localised scour-channels. Similar gravels have been described and assessed in the Whittlesey area (Booth, 1982).

The deposits are thought to represent a period of aggradation when the sea transgressed over the fenland basin during an interglacial period, perhaps the Ipswichian (Stevens, 1960) when there was a relative change of sea level of the order of 12 m.

River Terrace Deposits Extensive spreads of fluvial sands and gravels are exposed immediately to the north-east of Somersham and south-eastward in the broad tract

to Earith [390 755] and Colne [370 760]. They extend north-westward and northward beneath the younger fen deposits over much of the fenland, filling in a broad shallow depression between the 'islands' of Ramsey and Chatteris, which has been proved as far north as Benwick [343 902], just beyond the northern limit of the resource sheet area.

This extensive terrace spread typically comprises units of fine and coarse, dominantly subangular, flint gravel and sandy gravel. Figure 3 shows the extent and thickness of the deposits, which may represent braided beds interpreted as cold-stage features produced by lateral planation (Castleden, 1976, 1977).

For the purpose of assessment, no attempt has been made to differentiate the terrace levels of the district; it is thought, however, that four levels may be represented, but further investigations would be needed to establish correlations with similar levels known from the rivers Cam and Great Ouse (Edmonds and Dinham, 1965; Gatliff, 1981).

Crowland Bed A bed of silt and clay, hitherto unrecorded in the present district, has been proved over extensive areas of the fenland between the subjacent river terrace deposits and the overlying Lower Peat. It is correlated with the Crowland Bed (Booth, 1982) which lies at the same stratigraphical horizon and represents the alluvium of some authors (Clayton, 1981), but is grouped with the First Terrace by Booth. This bed overlies the terrace deposits over most of the district, uniformly and without channeling. It is not shown on the resource map, but it is recognised in the borehole logs.

The Crowland Bed is commonly pale grey and pale olive grey in colour, thixotropic and composed of varying proportions of clay and silt; some medium-grained subangular quartz sand is, in places, disseminated throughout the bed. It is generally less than a metre thick although 2.1 m was recorded in borehole 38 SW 1. In places it is lithologically indistinguishable from the younger Barroway Drove Beds but the Lower Peat is in every case present between the two.

Recent

Lower Peat An extensive deposit of peat occurs in the fen basin between the Crowland Beds and Barroway Drove Beds. It is a brown silty peat containing much reed and woody material. Thicknesses up to 3.2 m have been recorded although it is typically less than a metre thick.

Barroway Drove Beds The Barroway Drove Beds (Gallois, 1979), also known as Fen Clays or Buttery Clay, overlie the Lower Peat and are typically silty clays, mostly non-calcareous. Ranging in recorded thickness from 0.2 m to 5.7 m, they are most commonly between 1.5 and 2.0 m thick. They contain many silt-filled stream channels, known as roddons. Where the overlying Nordelph Peat has wasted, the dendritic pattern of roddons can be seen at the surface as narrow, sinuous ridges slightly raised above the general level of the fenland and readily distinguished on aerial photographs. These features are not shown on the resource map.

Nordelph Peat Following the Barroway Drove Beds marine transgression, a sea-level oscillation restored freshwater conditions and the Nordelph Peat was formed. Over much of the fenland, peat continued to be formed until the reclamation works of the 17th to 19th centuries; it continues to form in a few small areas.

Terrington Beds Further sea-level changes in Romano-British times caused a limited marine transgression which extended southwards along the major streams, converting them into tidal rivers which eventually became blocked by marine silt and fine-grained sand. These deposits now form prominent roddons.

Alluvium Very recent fluvial clay and silt are found over a small area in the south-east of the district along the course of the extinct West Water. They have also been laid down by floodwater between the embankments of the modern rivers and in parts of the Bedford Washes. The Washes were formed in 1650 by the building of the New Bedford River.

Figure 4 represents a three-dimensional reconstruction of the fenland deposits to show their extent, thicknesss and interrelationships.

Composition of the Sand and Gravel Deposits

Within the district there are two potentially workable sand and gravel deposits, namely the river terrace deposits and the March Gravels. Pebble count analyses of samples from the gravel fractions of these deposits are given in Appendix E at the foot of the appropriate borehole records.

River Terrace Deposits These sediments constitute over 95 per cent by area of the mineral of the district. The gravel fraction, which amounts to 34 per cent by weight of the resource, consists dominantly of angular and subangular flint (usually in excess of 80 per cent of the constituents) together with generally more rounded quartz and quartzite (8 per cent), limestone (5 per cent) and small amounts of siltstone, sandstone and mudstone. The limestone is mainly Jurassic oolitic limestone together with some shell debris. Much of the calcareous material has been removed from the top metre or so of the sand and gravel by weathering.

The sand fraction (61 per cent by weight) is composed mainly of quartz with flint, the latter being concentrated in the coarse sand fraction (+1 -4 mm).

The fines range from as little as 1 per cent up to 38 per cent in particular beds (eg. the upper bed in borehole 37 NE 14), but are generally of the order of 5 per cent by weight for the mineral as a whole in the boreholes.

The composition of sand and gravel varies little throughout the area although the graphic displays show clearly that the fines content is higher in the exposed deposits between Somersham and Earith than elsewhere.

March Gravels The March Gravels are very similar in composition to the river terrace deposits. Their pebble content is almost indistinguishable from that of the terrace deposits except that rounded quartz and quartzite are absent.

The fines content of the March Gravels is, however, very much higher than that of the river terrace deposits (Block A in Table 2).

The Map

The sand and gravel resource map is folded into the pocket at the end of this report. The base map is the Ordnance Survey 1:25 000 Outline Edition in grey, on which the geological data are shown in black and the mineral resource information in shades of red.

Geological data The geological boundary lines, symbols, etc., shown are taken from the geological maps of this area, which result from survey at the scale of 1:10 560 by members of the Field Staff in the Institute's East Anglia and South-eastern England Unit (Sheet 187) or have been derived by the Field Staff from mapping by the Soil Survey of England and Wales (Sheet TL 38).

The geological boundaries are the best interpretation of the information available at the time of survey. However, it is inevitable that local irregularities and discrepancies will be revealed as new evidence from boreholes and excavations becomes available.

Borehole data, which include the stratigraphic relations, thicknesses and mean particle size distribution

Table 2 Sand and gravel resources of the Chatteris district: summary of statistical results

Block	Area		Mean thickness		Volume of mineral			Mean grading percentages		
	Block	Mineral	Overburden	Mineral		Limits at the 95% confidence level		Fines	Sand	Gravel
	km^2	km^2	m	m	Million m^3	±%	±Million m^3	$-\frac{1}{16}$ mm	$+\frac{1}{16}$–4 mm	+4 mm
A	6.3	1.8	0.6	1.7	3	Speculative		29	52	19
B	19.1	19.1	4.9	3.4	65	26	17	3	65	32
C	17.6	17.6	4.8	3.3	58	18	10	4	61	35
D	16.4	16.4	3.3	3.3	54	21	11	3	59	38
E	13.2	9.6	1.1	3.6	35	40	14	9	59	32
A to E	73.1	65.0	3.2	3.3	215	12	26	6	61	33

of the sand and gravel samples collected during the assessment survey, are also shown on the map.

Mineral resource information The mineral-bearing ground is divided into resource blocks (see Appendix A). Within a resource block the mineral is subdivided into areas where it is exposed, that is, where the overburden averages less than 1 m in thickness, and areas where it is present in continuous, or almost continuous, spreads beneath overburden. The recognition of these categories is dependent upon the importance attached to the proportion of boreholes which did not find potentially workable sand and gravel and the distribution of barren boreholes within a block. The mineral is described as 'almost continuous' if it is present in 75 per cent or more of the boreholes in a resource block.

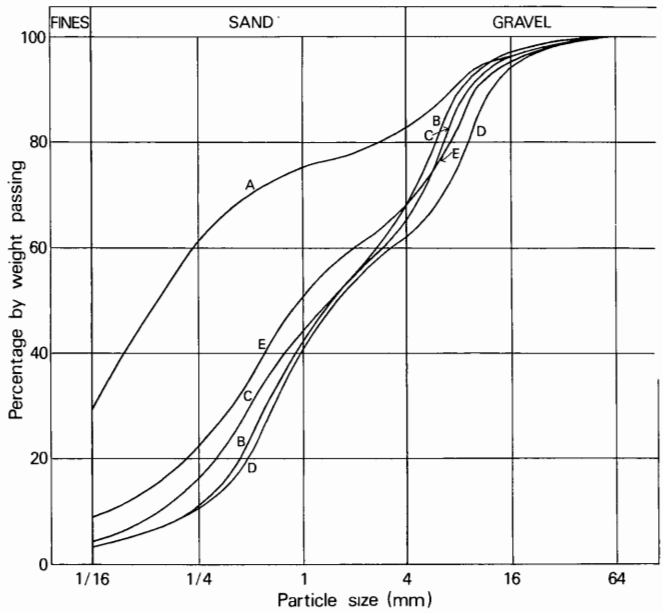
Areas where bedrock crops out, where boreholes indicate absence of sand and gravel beneath cover and where sand and gravel beneath cover is interpreted to be not potentially workable, are uncoloured on the map; where appropriate, the relevant criterion is noted. In such cases it has been assumed that mineral is absent except in infrequent and relatively minor patches that can neither be outlined nor assessed quantitatively in the context of this survey. Areas of unassessed sand and gravel, for example in built-up areas, are indicated by a red stipple.

The area of the mineral-bearing ground is measured, where possible, from the mapped geological boundary lines. The whole of this area is considered as mineral-bearing, even though it may include small areas where sand and gravel is not present or is not potentially workable. Inferred boundaries have been inserted to delimit areas where sand and gravel beneath cover is interpreted to be not potentially workable or absent. Such boundaries (for which a distinctive zigzag symbol is used) are drawn primarily for the purpose of volume estimation. The symbol is intended to indicate an approximate location within a likely zone of occurrence rather than to represent the breadth of the zone, its size being determined only by cartographic considerations. For the purpose of measuring areas the centre line of the symbol is used.

Results

The statistical results are summarised in Table 2. Mean particle-size distributions for the mineral in the resource blocks are shown in Figure 5.

Accuracy of results For the resource blocks for which a statistical assessment is offered (B, C, D, and E), the accuracy of the results at the 95 per cent probability level (that is, on average nineteen out of every twenty sets of limits constructed in this way contain the true value for the volume of mineral) varies between 18 per cent and 40 per cent (Appendix B). However, the true



Block	Percentage by weight passing					
	$\frac{1}{16}$ mm	$\frac{1}{4}$ mm	1 mm	4 mm	16 mm	64 mm
A	29	61	75	81	96	0
B	3	11	42	68	97	0
C	4	16	44	65	96	0
D	3	10	41	62	94	0
E	9	22	51	68	95	0

Figure 5 Particle size distribution of the mineral in blocks A to E.

volumes are more likely to be nearer the figure estimated than either of the limits. Moreover, it is probable that roughly the same percentage limits would apply for the statistical estimate of mineral volume within a very much smaller parcel of ground (say 100 hectares) containing similar sand and gravel deposits, if the results from the same number of sample points (as provided by, say, ten boreholes) were used in the calculation. Thus, if closer limits are needed for quotation of reserves, data from more sample points would be required, even if the area were quite small. This point can be illustrated by considering the whole of the potentially workable sand and gravel in Blocks A to E. The total volume (215

Table 3 Block A: data from IMAU boreholes

Borehole or section	Recorded thickness		Mean grading percentage					
	Over-burden	Mineral	Fines	Sand			Gravel	
				Fine	Medium	Coarse	Fine	Coarse
	m	m	$-\frac{1}{16}$ mm	$+\frac{1}{16}-\frac{1}{4}$ mm	$+\frac{1}{4}-1$ mm	$+1-4$ mm	$+4-16$ mm	$+16$ mm
38 NE 16	0.4	2.6	32	61	4	1	2	
38 NE 21	0.5	0.9	13	10	25	11	32	9
38 SE 4	0.7	2.1	33	21	17	8	18	2
38 SE 5	0.7	1.3	28	9	24	9	27	3

million m^3) can be estimated to limits of $\pm$ 12 per cent at the 95 per cent probability level by a calculation based on the data from the 54 sample points spread across the five resource blocks. However, it must be emphasised that the quoted volume of mineral has no simple relationship with the amount that could be extracted in practice, as no allowance has been made in the calculations for any restraints (such as existing buildings and roads) on the use of the land for mineral working.

Notes on the Resource Blocks

Five resource blocks have been outlines in the resource sheet area. Block A encompasses the deposit of March Gravels on the Chatteris 'island'; blocks B, C and D are defined by the extent of potentially workable sand and gravel beneath the fenland peats and silts; and the largely exposed mineral between Somersham and Earith forms Block E.

Block A (Tables 2 and 3, Figure 6)
This block occupies an area of 6.3 km^2 and surrounds the built-up area of Chatteris. Because of the limited extent of the March Gravels which constitute this block, only four IMAU boreholes were drilled. All proved that the sand and gravel is potentially workable but only an inferred assessment (Appendix B) has been possible. The deposit has an area of 1.8 km^2 and a mean grading of 29 per cent fines, 52 per cent sand and 19 per cent gravel.

The mean thickness of mineral is 1.7 m and the inferred volume of mineral is approximately 3 million m^3. That part of the deposit north-west of Chatteris is almost gravel-free (borehole 38 NE 16) but south of Chatteris the deposit comprises 'very clayey' sandy gravel. There are many small levelled gravel workings south of Chatteris which are not shown on the resource map.

Block B (Tables 2 and 4, Figure 7)
The mineral of this block occupies 19.1 km^2 and consists entirely of river terrace deposits; no barren ground has been identified. The assessment of the resources in this block is based on 12 IMAU boreholes.

Proved thicknesses of mineral range from 2.0 m to 5.7 m, with a mean of 3.4 m. The mineral shows little vertical variation of grade and only limited lateral variation, with gravel percentages usually ranging between 30 and 40 per cent. Borehole 38 NW 11 was exceptional in proving only 18 per cent gravel. The mean grading of the block is 3 per cent fines, 65 per cent sand and 32 per cent gravel.

Overburden, consisting of the Crowland Bed, Lower Peat, Barroway Drove Beds, Nordelph Peat and Terrington Beds, ranges in recorded thickness from 2.0 m to 6.9 m, with a mean of 4.9 m.

Both overburden and mineral are generally thinner north-west of Chatteris on West Moor [370 870] than elsewhere; they appear to overlie a bedrock shelf on the east side of the main fluvial deposits and may represent a distinct terrace level.

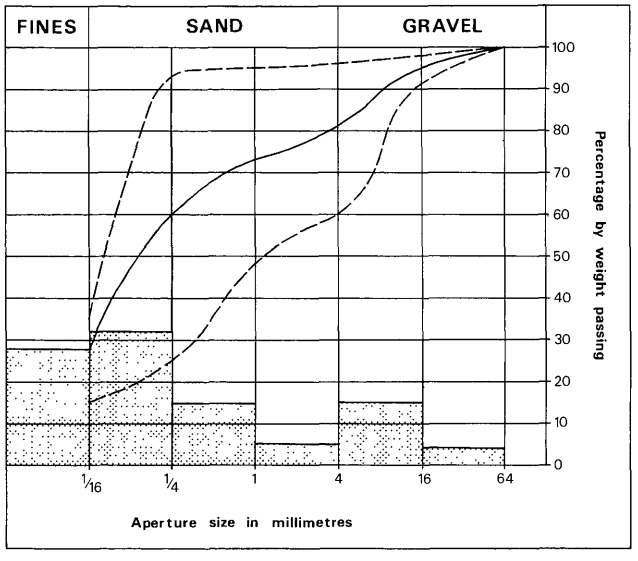


Figure 6 Grading characteristics of the mineral in block A:

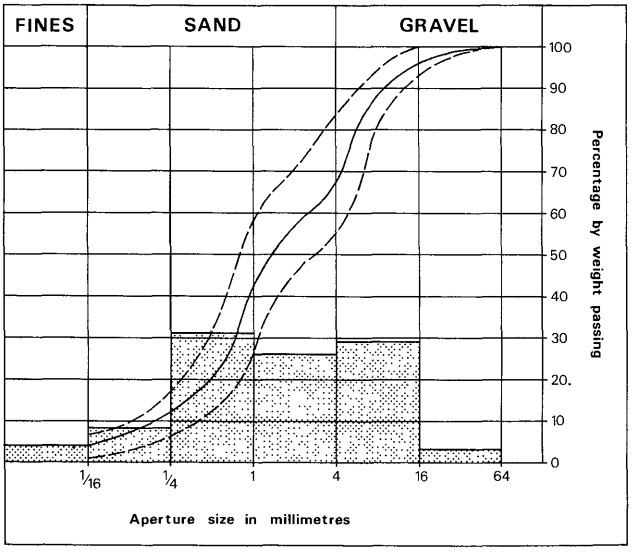


Figure 7 Grading characteristics of the mineral in block B (for explanation see figure 6).

The continuous line represents the weighted mean grading of the block; the broken lines denote the envelope within which the mean grading curves for individual boreholes fall. The mean grading of the block is also shown as a histogram.

Table 4 Block B: data from IMAU boreholes

Borehole	Recorded thickness		Mean grading percentage					
	Over-burden	Mineral	Fines	Sand			Gravel	
				Fine	Medium	Coarse	Fine	Coarse
	m	m	$-\frac{1}{16}$ mm	$+\frac{1}{16}-\frac{1}{4}$ mm	$+\frac{1}{4}$ -1 mm	+1 -4 mm	+4 -16 mm	+16 mm
38 NW 5	5.5	5.7	4	11	28	24	31	2
38 NW 7	6.7	3.7	2	7	28	39	24	trace
38 NW 10	5.5	3.9	1	10	29	23	31	6
38 NW 11	6.0	4.0	2	11	45	24	18	trace
38 NW 13	5.9	2.9	6	11	31	20	28	4
38 NW 14	6.9	2.6	3	6	33	24	30	4
38 NE 11	2.0	2.0	2	8	28	18	40	4
38 NE 13	6.0	3.2	1	10	38	26	23	2
38 NE 14	2.7	2.2	2	5	28	23	40	2
38 NE 15	2.0	2.3	3	7	32	28	29	1
38 NE 17	5.0	5.9	3	5	27	25	33	7
28 NE 18	4.2	2.1	3	4	21	36	32	4

Table 5 Block C: data from IMAU boreholes

Borehole	Recorded thickness		Mean grading percentage					
	Over-burden	Mineral	Fines	Sand			Gravel	
				Fine	Medium	Coarse	Fine	Coarse
	m	m	$-\frac{1}{16}$ mm	$+\frac{1}{16}-\frac{1}{4}$ mm	$+\frac{1}{4}$ -1 mm	+1 -4 mm	+4 -16 mm	+16 mm
38 NW 17	4.4	3.3	1	2	27	23	43	4
38 NW 18	5.4	4.4	3	9	28	18	35	7
38 SW 2	5.0	5.5	16	56	5	7	13	3
38 SW 3	5.0	2.4	2	7	33	21	35	2
38 SW 5	6.1	2.5	1	5	31	30	32	1
38 SW 6	6.0	2.5	4	4	18	31	40	3
38 SW 8	4.2	3.3	2	5	28	28	35	2
38 SW 9	3.8	3.8	4	6	28	20	36	6
38 SE 1	4.3	4.0	2	8	44	19	23	4
38 SE 2	4.1	4.0	1	5	32	24	32	6
38 SE 3	4.3	3.4	1	8	39	22	26	4
38 SE 6	4.5	2.5	2	7	32	24	32	3
38 SE 7	4.1	3.2	1	4	27	20	41	7
38 SE 9	5.5	1.8	2	3	28	25	37	5

Sand and gravel has not been worked in this block. The estimated volume of mineral is 65 million m^3 $\pm$ 26 per cent at the 95 per cent confidence level.

Block C (Tables 2 and 5, Figure 8)

Block C lies to the south of block B and extends over an area of 17.6 km^2. The mineral consists almost exclusively of river terrace deposits; borehole 38 SW 2, however, proved 4.0 m of Terrington Beds overlying 1.5 m of terrace deposits which, taken together, satisfy the definition of mineral (p.1).

The mean proved thickness of mineral, calculated from 14 IMAU boreholes, is 3.3 m. The weighted mean grading is 4 per cent fines, 61 per cent sand and 35 per cent gravel. Most of the IMAU boreholes found sandy gravel and, as in block B, the vertical and lateral variation in grade is not marked.

There are no mineral workings in this block. The estimated volume of mineral is 58 million m^3 $\pm$ 18 per cent at the 95 per cent confidence level, the relatively restricted confidence limits reflecting the small variation in recorded mineral thickness across the block.

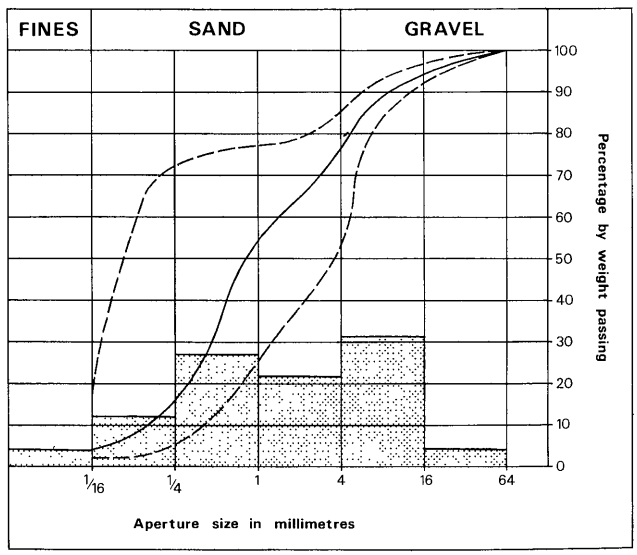


Figure 8 Grading characteristics of the mineral in block C (for explanation see figure 6).

Table 6 Block D: data from IMAU boreholes

Borehole	Recorded thickness		Mean grading percentage					
	Over-burden	Mineral	Fines	Sand			Gravel	
				Fine	Medium	Coarse	Fine	Coarse
	m	m	$-\frac{1}{16}$ mm	$+\frac{1}{16}-\frac{1}{4}$ mm	$+\frac{1}{4}-1$ mm	+1 -4 mm	+4 -16 mm	+16 mm
37 NE 10	3.9	2.2	1	2	19	30	40	8
37 NE 13	2.9	1.6	3	11	17	15	38	16
37 NE 16	3.1	3.0	2	5	27	28	35	3
37 NE 21	3.3	4.0	3	11	32	19	29	6
38 SE 8	3.5	4.1	2	6	30	22	35	5
38 SE 10	5.4	2.5	4	5	25	22	36	8
38 SE 11	2.6	4.4	10	13	32	15	26	4
38 SE 12	0.8	1.8	10	8	28	19	33	2
38 SE 14	4.8	4.6	3	5	43	21	26	2
38 SE 15	3.7	3.7	1	7	34	20	29	8
38 SE 16	2.0	3.2	3	3	22	15	46	11
38 SE 18	3.6	5.0	2	6	37	22	29	4
38 SE 19	3.4	2.8	2	6	29	24	34	5

Block D (Tables 2 and 6, Figure 9)
As in blocks B and C the potentially workable sand and gravel of this block comprises river terrace deposits, some of which are exposed between Horseley Fen Farm [395 827] and Cawthorne's Farm [398 821], some 2.5 km south of Chatteris. The remainder of the mineral is concealed beneath younger deposits. The block occupies 16.4 km^2.

The thickness of the mineral ranges from 1.6 m to 5.0 m with a mean of 3.3 m estimated from 13 IMAU boreholes. Again, as in blocks B and C, little variation in the grade of the mineral is apparent. The mean grading of the block is 3 per cent fines, 59 per cent sand and 38 per cent gravel.

Overburden, mostly fen peats and silts, has a mean thickness of 3.3 m with a recorded range of 0.8 m (where for the purposes of assessment the mineral is regarded as exposed) to 5.4 m in the north-central part of the block.

The estimate volume of mineral is 54 million m^3 $\pm$ 21 per cent at the 95 per cent confidence level.

Block E (Tables 2 and 7, Figure 10)
Block E encompasses the largely exposed terrace deposits in the Somersham-Earith area; 9.6 km^2 of the deposits are regarded as mineral, tracts to the north of Somersham and in the vicinity of Earith being too thin to be included. Information for this block comes from eleven boreholes (two of which proved non-mineral) and two collected sections in gravel workings.

The mineral ranges in thickness from 1.0 m to, exceptionally, 8.2 m in borehole 38 SE 17 at Parkhall; the weighted mean thickness is 3.6 m. As in the other blocks containing potentially workable river terrace deposits (blocks B, C and D), little vertical or lateral variation of grade has been found. The mean grading of the block is 9 per cent fines, 59 per cent sand and 32 per cent gravel.

Overburden, apart from the soil, comprises a pebbly clay or silt up to a maximum recorded thickness of 4.7 m but with a weighted mean for the block of 1.1 m.

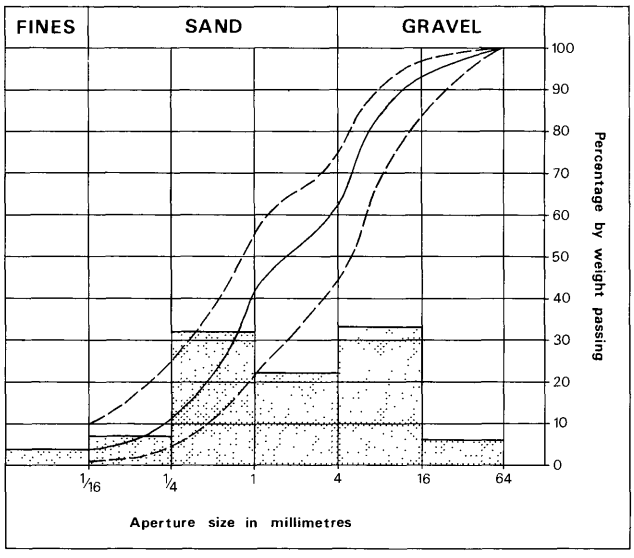


Figure 9 Grading characteristics of the mineral in block D (for explanation see figure 6).

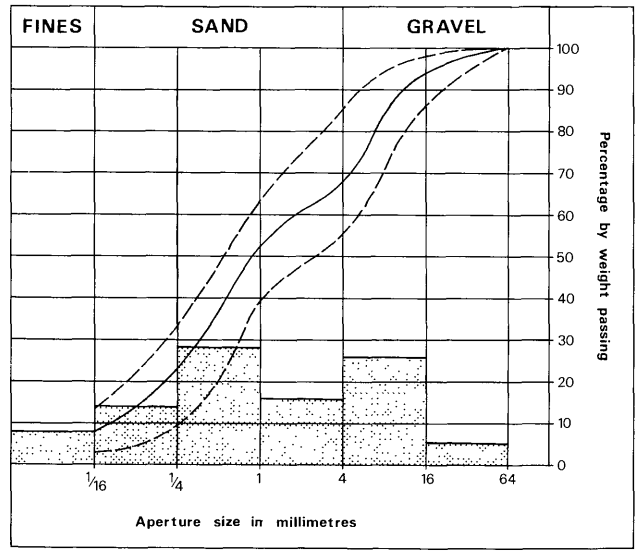


Figure 10 Grading characteristics of the mineral in block E (for explanation see figure 6).

Table 7 Block E: data from IMAU boreholes and sections

Borehole or section	Recorded thickness		Mean grading percentage					
	Overburden	Mineral	Fines	Sand			Gravel	
				Fine	Medium	Coarse	Fine	Coarse
	m	m	$-\frac{1}{16}$ mm	$+\frac{1}{16}-\frac{1}{4}$ mm	$+\frac{1}{4}$ -1 mm	+1 -4 mm	+4 -16 mm	+16 mm
37 NE 8		Absent						
37 NE 9	0.6	2.9	10	7	29	15	33	6
37 NE 11	0.6	1.0	13	6	35	10	32	4
37 NE 12	4.7	4.0	10	27	24	15	20	4
37 NE 14	0.3	3.9	14	8	24	22	29	3
37 NE 15	1.4	4.6	4	6	33	21	29	7
37 NE 17	1.4	1.0	12	6	28	18	29	7
37 NE 18	0.5	4.3*	11	13	23	15	32	6
37 NE 19	2.3	2.7	11	8	42	15	22	2
37 NE 20		Absent						
38 SE 17	0.3	8.2	7	20	30	16	24	3
37 NE E1	0.4	5.2	3	6	30	15	33	13
37 NE E2	0.4	1.6+	3	11	45	25	15	1

*Excluding 1.0 m waste parting

Waste was present in only one borehole, 37 NE 18, where 1.0 m of brown silt was proved in the mineral sequence.

This block includes two large areas of workings (Table 8), one of which is still actively producing sand and gravel. The estimated volume of mineral remaining is 35 million m^3 $\pm$ 40 per cent at the 95 per cent confidence level. The wide confidence limits reflect the large range in proved mineral thicknesses.

Notes on remaining areas

The remainder of the district contains three areas of sand and gravel which fall outside the definition of mineral. Two of these areas are adjacent to blocks B and C in the northern part of the resource sheet, respectively near to Households Farm [352 892] at Benwick Mere and extending southward from Frog Hall [321 852] to New Broad Pool [340 824], Warboys. The third occupies the rising ground in the south-west part of the sheet.

North of Chatteris Over most of the area north or north-west of Chatteris, the younger fenland peats and silts rest directly on the clay bedrock. The sand and gravel is impersistent, and is too thin to be considered as mineral. Boreholes 38 NW 6 and 38 NE 7 proved 1 metre or more of sand and gravel, but in both the thickness of overburden is excessive.

North of Warboys This area may be subdivided into two. The Ramsey ridges [which enter the sheet between 300 852 and 300 876] are capped by March Gravels which consist mainly of thin brown and orange pebbly clays and silts but without potentially workable sand and gravel. The sand and gravel proved beneath the fenland peats and silts further east and south-east is continuous with the mineral of blocks B and C but is regarded as non-mineral because the thickness of the overburden is generally more than three times that of the sand and gravel.

South of Warboys An extensive deposit of boulder clay and associated Glacial Sand and Gravel was not assessed during this survey because of the scattered nature of the deposits. Evidence from adjacent sheets suggests that the Glacial Sand and Gravel, where present, is likely to be thin and impersistent, and is unlikely to be potentially workable under the terms of this survey (p.1).

Table 8 List of workings

Location	Grid Reference	Deposit worked
Active (March 1918)		
Somersham	371 795	River Terrace Deposits
Abandoned		
Earith	390 762	River Terrace Deposits

REFERENCES

ALLEN, V. T. 1936. Terminology of medium-grained sediments. **Rep. Natl Res. Counc., Washington, 1935-1936,** App. 1, Rep. Comm. Sediment., 18-47.

ARCHER, A. A. 1969. Background and problems of an assessment of sand and gravel resources in the United Kingdom. **Proc. 9th Commonw. Min. & Metall. Congr., 1969,** Vol. 2: Mining and petroleum geology, 495-508.

— 1970a. Standardisation of the size classification of naturally occurring particles. **Geotechnique,** Vol. 20, 103-107.

— 1970b. Making the most of metrication. **Quarry Managers' J.,** Vol. 54, No. 6, 223-227.

ATTERBERG, A. 1905. Die rationelle Klassifikation der Sande und Kiese. **Chem. Z.,** Vol. 29, 195-198.

BADEN-POWELL, D. F. W. 1934. On the marine gravels at March, Cambridgeshire. **Geol. Mag.,** Vol. 71, 193-219.

BOOTH, S. J. 1982. The sand and gravel resources of the country around Whittlesey, Cambridgeshire: description of 1:25 000 sheets TF 20 and TL 29. **Miner. Assess. Rep. Inst. Geol. Sci.,** No. 93.

BRITISH STANDARDS INSTITUTION. 1967. **B.S.1377: Methods of testing soils for civil engineering purposes.** (London: British Standards Institution.)

BUREAU OF MINES AND GEOLOGICAL SURVEY. 1948. **Pp. 14-17** in **Mineral resources of the United States.** (Washington, DC: Public Affairs Press.)

CASTLEDEN, R. 1976. The floodplain gravels of the River Nene. **Mercian Geol.** Vol. 6, No. 1, 33-47

— 1977. Periglacial sediments in central and southern England. **Catena.** Vo. 4, 111-121

CLAYTON, A. R. 1981. The sand and gravel resources of the country between Ely and Cambridge, Cambridgeshire: description of 1:25 000 sheet TL 56 and 57. **Miner. Assess. Rep. Inst. Geol. Sci.**, No. 73.

EDMONDS, E. A. and DINHAM, C. M. 1965. The geology of the country around Huntingdon and Biggleswade. **Mem. Geol. Surv. G.B.**

GALLOIS, R. W. 1979. Geological investigations for the Wash water storage scheme. **Rep. Inst. Geol. Sci.**, No. 78/19

GATLIFF, R. W. 1981. The sand and gravel resources of the country around Huntingdon and St Ives, Cambridgeshire. Description of parts of 1:25 000 sheets TL 16, 17, 26, 27, 36 and 37. **Miner. Assess. Rep. Inst. Geol. Sci.**, No. 54

GODWIN, H. and WILLIS, E. H. 1964. Cambridge University natural radiocarbon measurements. **Radiocarbon**, Vol. 6, pp. 116-37

HARRIS, P. M., THURRELL, R. G., HEALING, R. A., and ARCHER, A. A. 1974. Aggregates in Britain. **Proc. R. Soc.**, Ser. A, Vol. 339, 329-353.

HULL, J. H. 1981. Methods of calculating the volume of resources of sand and gravel. Appendix (pp. 192-193) to THURRELL, R. G. 1981. Quarry resources and reserves: the identification of bulk mineral resources: the contribution of the Institute of Geological Sciences. **Quarry Management**, for March 1981, 181-193.

LANE, E. W., and others. 1947. Report of the sub-committee on sediment terminology. **Trans. Am. Geophys. Union**, Vol. 28, 936-938.

PETTIJOHN, F. J. 1975. **Sedimentary rocks.** 3rd edition. (London: Harper and Row.)

SEALE, R. S. 1974. Geology of the Ely District. **Bull. Geol. Soc. Norfolk.**, Vol. 25, 21-36.

— 1975 Soils of the Ely District. **Mem. Soil Surv. G.B.**

SKERTCHLY, S. B. J. 1877. The geology of the Fenland. **Mem. Geol. Surv. G.B.**

STEVENS, L. A. 1960. The interglacial of the Nar Valley, Norfolk. **Q. J. Geol. Soc. London**, Vol. 115, 291-315.

THURRELL, R. G. 1971. The assessment of mineral resources with particular reference to sand and gravel. **Quarry Managers' J.**, Vol. 55, 19-25.

— 1981. Quarry resources and reserves: the identification of bulk mineral resources: the contribution of the Institute of Geological Sciences. **Quarry Management**, for March 1981, 181-193.

TWENHOFEL, W. H. 1937. Terminology of the fine-grained mechanical sediments. **Rep. Natl Res. Counc., Washington, 1936-37**, App. 1, Rep. Comm. Sediment., 81-104.

UDDEN, J. A. 1914. Mechanical composition of clastic sediments. **Bull. Geol. Soc. Am.**, Vol. 25, 655-744.

WENTWORTH, C. K. 1922. A scale of grade and class terms for clastic sediments. **J. Geol.**, Vol. 30, 377-392.

— 1935. The terminology of coarse sediments. **Bull. Natl Res. Counc. Washington**, No. 98, 225-246.

WILLMAN, H. B. 1942. Geology and mineral resources of the Marseilles, Ottawa and Streator quadrangles. **Bull. Illinois State Geol. Surv.**, No. 66, 343-344.

APPENDIX A

FIELD AND LABORATORY PROCEDURES

Trial and error during initial studies of the complex and variable glacial deposits of East Anglia and Essex showed that an absolute minimum of five sample points evenly distributed across the sand and gravel are needed to provide a worthwhile statistical assessment, but that, where possible, there should be not less than ten. Sample points are any points for which adequate information exists about the nature and thickness of the deposit and may include boreholes other than those drilled during the survey and exposures. In particular, the cooperation of sand and gravel operators ensures that boreholes are not drilled where reliable information is already available; although this may be used in the calculations, it is held confidentially by the Institute and cannot be disclosed.

The mineral shown on each 1:25 000 sheet is divided into resource blocks. The arbitrary size selected is a compromise to meet the aims of the survey by providing sufficient sample points in each block. As far as possible the block boundaries are determined by geological boundaries so that, for example, glacial and river terrace gravels are separated. Otherwise division is by arbitrary lines, which may bear no relationship to the geology. The blocks are drawn provisionally before drilling begins.

A reconnaissance of the ground is carried out to record any exposures and inquiries are made to ascertain what borehole information is available. Borehole sites are then selected to provide an even pattern of sample points at a density of approximately one per square kilometre. However, because broad trends are independently overlain by smaller-scale characteristically random variations, it is unnecessary to adhere to a square grid pattern. Thus such factors as ease of access and the need to minimise disturbance to land and the public are taken into account in siting the holes; at the same time it is necessary to guard against the possibility that ease of access (that is, the positions of roads and farms) may reflect particular geological conditions, which may bias the drilling results.

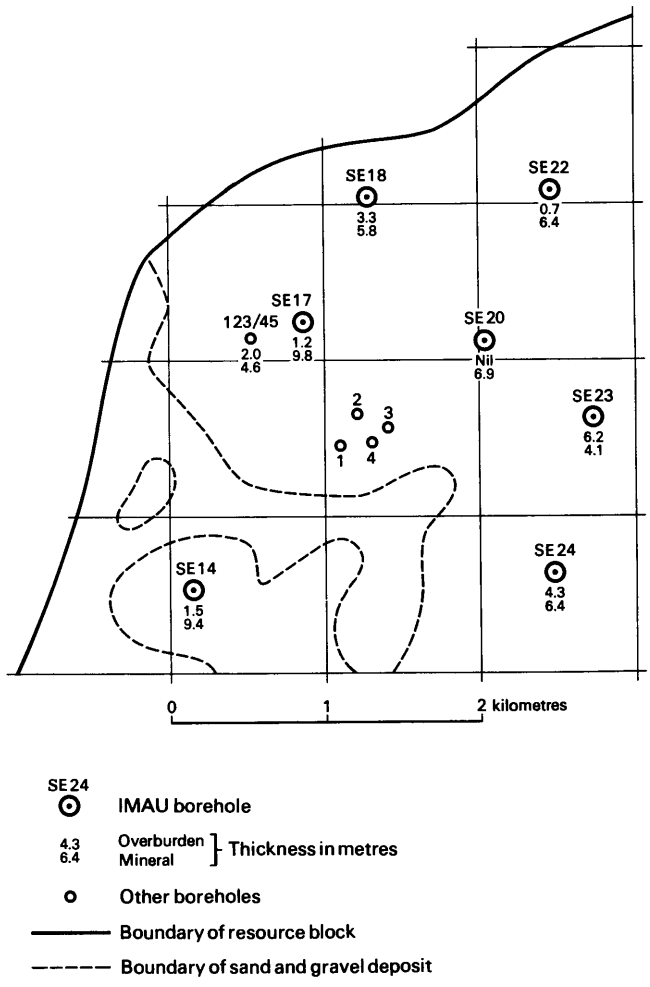
The drilling machine employed should be capable of providing a continuous sample representative of all unconsolidated deposits, so that the in-situ grading can be determined, if necessary, to a depth of 30 m (100 ft) at a diameter of about 200 mm (8 in), beneath different types of overburden. It should be reliable, quiet, mobile and relatively small (so that it can be moved to sites of difficult access). Shell and auger rigs have proved to be almost ideal.

The rigs are modified to enable deposits above the water table to be drilled 'dry', instead of with water added to facilitate the drilling, to minimise the amount of material drawn in from outside the limits of the hole. The samples thus obtained are representative of the in-situ grading, and satisfy one of the most important aims of the survey. Below the water table the rigs are used conventionally, although this may result in the loss of some of the fines fraction and the pumping action of the bailer tends to draw unwanted material into the hole from the sides or the bottom.

A continuous series of bulk samples is taken throughout the sand and gravel. Ideally samples are composed exclusively of the whole of the material encountered in the borehole between stated depths. However, care is taken to discard, as far as possible, material which has caved or has been pumped from the bottom of the hole. A new sample is commenced whenever there is an appreciable lithological change within the sand and gravel, or at every 1 m (3.3 ft) depth. The samples, each weighing between 25 and 45 kg (55 and 100 lb), are despatched in heavy-duty polythene bags to a laboratory for grading. The grading procedure is based on B.S. 1337 (British Standards Institution, 1967). Random checks of the accuracy of the grading are made in the Institute's laboratories.

All data, including mean grading analysis figures calculated for the total thickness of the mineral, are entered on standard record sheets, abbreviated copies of which are reproduced in Appendix E.

Detailed records may be consulted at the appropriate offices of the Institute, upon application to the Head, Industrial Minerals Assessment Unit.



Example of resource block assessment: map of a fictitious block

APPENDIX B

STATISTICAL PROCEDURE

Statistical assessment

1 A statistical assessment is made of an area of mineral greater than 2 km^2, if there are at least five evenly spaced boreholes in the resource block (for smaller areas, see Paragraph 12 below).

2 The simple methods used in the calculations are consistent with the amount of data provided by the survey (Hull, 1981). Conventional symmetrical confidence limits are calculated for the 95 per cent probability level, that is, on average nineteen out of every twenty sets of limits constructed in this way contain the true value for the volume of mineral.

3 The volume estimate (V) for the mineral in a given block is the product of two variables, the sampled areas (A) and the mean thickness ($\bar{l}_m$) calculated from the individual thicknesses at the sample points. The standard deviations for these variables are related such that

$$S_V = \sqrt{(S_A^2 + S_{\bar{l}_m}^2)} \qquad [1]$$

4 The above relationship may be transposed such that

$$S_V = S_{\bar{l}_m} \sqrt{(1 + S_A^2 / S_{\bar{l}_m}^2)} \qquad [2]$$

From this it can be seen that as $S_A^2 / S_{\bar{l}_m}^2$ tends to 0, S_V tends to $S_{\bar{l}_m}$.

If, therefore, the standard deviation for area is small with respect to that for thickness, the standard deviation for volume approximates to that for mean thickness.

5 Given that the number of approximately evenly spaced sample points in the sampled area is n with mineral thickness measurements $l_{m_1}, l_{m_2}, \ldots l_{m_n}$, then the best estimate of mean thickness, $\bar{l}_m$, is given by

$$\Sigma\ (l_{m_1} + l_{m_2} \ldots l_{m_n}) / n .$$

For groups of closely spaced boreholes a discretionary weighting factor may be applied to avoid bias (see note on weighting below). The standard deviation for mean thickness $S_{\bar{l}_m}$, expressed as a proportion of the mean thickness, is given by

$$S_{\bar{l}_m} = (1/\bar{l}_m) \sqrt{\ [\Sigma (l_m - \bar{l}_m)^2/(n-1)]}$$

where l_m is any value in the series l_{m_1} to l_{m_n}.

6 The sampled area in each resource block is coloured pink on the map. Wherever possible, calculations relate to the mineral within mapped geological boundaries (which may not necessarily correspond to the limits of a deposit). Where the area is not defined by a mapped boundary, that is, where the boundary is inferred, a distinctive symbol is used. Experience suggests that the errors in determining area are small relative to those in thickness. The relationship $S_A / S_{\bar{l}_m} \leqq 0.\dot{3}$ is assumed in all cases. It follows from Equation [2] that

$$S_{\bar{l}_m} \leqq S_V \leqq 1.05\ S_{\bar{l}_m} \qquad [3]$$

7 The limits on the estimate of mean thickness of mineral, $L_{\bar{l}_m}$, may be expressed in absolute units

$\pm (t/\sqrt{n}) \times S_{\bar{l}_m}$ or as a percentage

$\pm (t/\sqrt{n}) \times S_{\bar{l}_m} \times (100/\bar{l}_m)$ per cent, where t is Student's t at the 95 per cent probability level for $(n-1)$ degrees of freedom, evaluated by reference to statistical tables. (In applying Student's t it is assumed that the measurements are distributed normally).

8 Values of t at the 95 per cent probability level for values of n up to 20 are as follows:

n	t	n	t
1	infinity	11	2.228
2	12.706	12	2.201
3	4.303	13	2.179
4	3.182	14	2.160
5	2.776	15	2.145
6	2.571	16	2.131
7	2.447	17	2.120
8	2.365	18	2.110
9	2.306	19	2.101
10	2.262	20	2.093

(from Table 12 in *Biometrika Tables for Statisticians*, Volume 1, Second Edition, Cambridge University Press, 1962). When n is greater than 20, 1.96 is used (the value of t when n is infinity).

9 In calculating confidence limits for volume, L_V, the following inequality, corresponding to Equation [3], is applied:

$$L_{\bar{l}_m} \leqq L_V \leqq 1.05\, L_{\bar{l}_m}.$$

10 In summary, for values of n between 5 and 20, L_V is calculated as

$$[(1.05 \times t)/\bar{l}_m] \times [\sqrt{\Sigma (l_m - \bar{l}_m)^2}/n\ (n-1)] \times 100$$

per cent,

and when n is greater than 20, as

$$[(1.05 \times 1.96)/\bar{l}_m] \times [\sqrt{\Sigma (l_m - \bar{l}_m)^2}/n\ (n-1)] \times 100$$

per cent.

11 The application of this procedure to a fictitious area is illustrated in the accompanying Figure and example of a block calculation.

Inferred assessment

12 If the sampled area of mineral in a resource block is between 0.25 km^2 and 2 km^2, an assessment is inferred on the basis of geological and topographical information, usually supported by the data from one or two boreholes. The volume of mineral is calculated as the product of the area, measured from field data, and the estimated thickness. Confidence limits are not calculated.

13 In some cases a resource block may include an area left uncoloured on the map, within which mineral (as defined) is interpreted to be generally absent. If there is reason to believe that some mineral may be present, an inferred assessment may be made.

14 No assessment is attempted for an isolated area of mineral less than 0.25 km^2.

15 Note on weighting The thickness of a deposit at any point may be governed solely by the position of the point in relation to a broad trend. However, most sand and gravel deposits also exhibit a random pattern of local, and sometimes considerable, variation in thickness. Thus the distribution of sample points needs to be only approximately regular and in estimating the mean thickness only simple weighting is necessary. In practice, equal weighting can often be applied to thicknesses at all sample points. If, however, there is a distinctly unequal distribution of points, bias is avoided by dividing the sampled area into broad zones, to each of which a value roughly proportional to its area is assigned. This value is then shared between the data points with the zone as the weighting factor.

Block calculation

Scale: 1:25 000
Block: Fictitious

Area
Block: 11.08 km²
Mineral: 8.32 km²

Mean thickness
Overburden: 2.5 m
Mineral: 6.5 m

Volume
Overburden: 21 million m³
Mineral: 54 million m³

Confidence limits of the estimate of mineral volume at the 95 per cent probability level: ± 20 per cent
That is, the volume of mineral (with 95 per cent probability): 54 ± 11 million m³

Thickness estimate (measurements in metres)
l_o= overburden thickness l_m = mineral thickness

Sample point	Weighting w	Overburden l_o	Overburden wl_o	Mineral l_m	Mineral wl_m	Remarks
SE 14	1	1.5	1.5	9.4	9.4	
SE 18	1	3.3	3.3	5.8	5.8	
SE 20	1	nil	-	6.9	6.9	
SE 22	1	0.7	0.7	6.4	6.4	IMAU
SE 23	1	6.2	6.2	4.1	4.1	boreholes
SE 24	1	4.3	4.3	6.4	6.4	
SE 17	½	1.2	1.6	9.8	7.2	
123/45	½	2.0		4.6		Hydrogeology Unit record
1	¼	2.7	2.6	7.3	5.8	Close group
2	¼	4.5		3.2		of four
3	¼	0.4		6.8		boreholes
4	¼	2.8		5.9		(commercial)
Totals	$\Sigma w = 8$	$\Sigma wl_o = 20.2$		$\Sigma wl_m = 52.0$		
Means		$\overline{wl}_o = 2.5$		$\overline{wl}_m = 6.5$		

Calculation of confidence limits

wl_m	$\lvert(wl_m - \overline{wl}_m)\rvert$	$(wl_m - \overline{wl}_m)^2$
9.4	2.9	8.41
5.8	0.7	0.49
6.9	0.4	0.16
6.4	0.1	0.01
4.1	2.4	5.76
6.4	0.1	0.01
7.2	0.7	0.49
5.8	0.7	0.49

$\Sigma(wl_m - \overline{wl}_m)^2 = 15.82$

$n = 8$

$t = 2.365$

L_V is calculated as

$1.05\ (t/\overline{wl}_m)\ \sqrt{[\Sigma(wl_m - \overline{wl}_m)^2/\ n(n-1)]} \times 100$

$= 1.05 \times (2.365/6.5)\ \sqrt{[15.82/(8 \times 7)]} \times 100$

$= 20.3$

$\simeq 20$ per cent.

APPENDIX C

CLASSIFICATION AND DESCRIPTION OF SAND AND GRAVEL

For the purposes of assessing resources of sand and gravel a classification should take account of economically important characteristics of the deposit, in particular the absolute content of fines and the ratio of sand to gravel.

The terminology commonly used by geologists when describing sedimentary rocks (Wentworth, 1922) is not entirely satisfactory for this purpose. For example, Wentworth proposed that a deposit should be described as a 'gravelly sand' when it contains more sand than gravel and there is at least 10 per cent of gravel, provided that there is less than 10 per cent of material finer than sand (< $\frac{1}{16}$ mm) and coarser than pebbles (> 64 mm in diameter). Because deposits containing more than 10 per cent fines are not embraced by this system, a modified binary classification based on Willman (1942) has been adopted.

When the fines content exceeds 40 per cent the material is considered to be not potentially workable and falls outside the definition of mineral. Deposits which contain 40 per cent fines or less are classified primarily on the ratio of sand to gravel but qualified in the light of the fines content, as follows: less than 10 per cent fines - no qualification; 10 per cent or more but less than 20 per cent fines - 'clayey'; 20 to 40 per cent fines - 'very clayey'.

The term 'clay' (as written, with single quote marks) is used to describe all material passing $\frac{1}{16}$ mm. Thus it has no mineralogical significance and includes particles falling within the size range of silt. The normal meaning applies to the term clay where it does not appear in single quotation marks.

The ratio of sand to gravel defines the boundaries between sand, pebbly sand, sandy gravel and gravel (at 19:1, 3:1 and 1:1).

Thus it is possible to classify the mineral into one of twelve descriptive categories (see the accompanying Figure). The procedure is as follows:

1 Classify according to the ratio of sand to gravel.
2 Describe the fines.

For example, a deposit grading 11 per cent gravel, 70 per cent sand and 19 per cent fines is classified as 'clayey' pebbly sand. This short description is included in the borehole log (see Appendix D)

Many differing proposals have been made for the classification of the grain size of sediments (Atterberg, 1905; Udden, 1914; Wentworth, 1922; Wentworth, 1935; Allen, 1936; Twenhofel, 1937; Lane and others, 1947). As Archer (1970a, b) has emphasised, there is a pressing need for a simple metric scale acceptable to both scientific and engineering interests, for which the class limit sizes correspond closely with certain marked changes in the natural properties of mineral particles. For example, there is an important change in the degree of cohesion between particles at about the $\frac{1}{16}$-mm size, which approximates to the generally accepted boundary between silt and sand. These and other requirements are met by a system based on Udden's geometric scale and a simplified form of Wentworth's terminology (see the accompanying table), which is used in the Report.

The fairly wide intervals in the scale are consistent with the general level of accuracy of the qualitative assessments of the resource blocks. Three sizes of sand are recognised, fine (+$\frac{1}{16}$ -$\frac{1}{4}$ mm), medium (+$\frac{1}{4}$ -1 mm) and coarse (+1 -4 mm). The boundary at 16 mm distinguishes a range of finer gravel (+4 -16 mm), often characterised by abundance of worn tough pebbles of vein quartz, from larger pebbles, often of notably different materials. The boundary at 64 mm distinguishes pebbles from cobbles. The term 'gravel' is used loosely to denote both pebble-sized and cobble-sized material.

The size distribution of borehole samples is determined by sieve analysis, which is presented by the laboratory as logarithmic cumulative curves (see, for example, British Standards Institution, 1967). In this report the grading is tabulated on the borehole record sheets (Appendix E), the intercepts corresponding with the simple geometric scale $\frac{1}{16}$ mm, $\frac{1}{4}$ mm, 1 mm, 4 mm, 16 mm and so on as required. Original sample grading curves are available for reference at the appropriate office of the Institute.

Each bulk sample is described, subjectively, by a geologist at the borehole site. Being based on visual examination, the description of the grading is inexact, the accuracy depending on the experience of the observer. The descriptions recorded are modified, as necessary, when the laboratory results become available.

The relative proportions of the rock types present in the gravel fraction are indicated by the use of the words 'and' or 'with'. For example, 'flint and quartz' indicates roughly equal proportions with neither constituent accounting for less than about 25 per cent of the whole; 'flint with quartz' indicates that flint is dominant and quartz, the principal accessory rock type, comprises 5 to 25 per cent of the whole. Where the accessory material accounts for less than 5 per cent of the whole, but is still readily apparent, the phrase 'with some' has been used. Rare constitutents are referred to as 'trace'.

The terms used in the field to describe the degree of rounding of particles, which is concerned with the sharpness of the edges and corners of a clastic fragment and not the shape (after Pettijohn, 1975), are as follows.

Angular: showing little or no evidence of wear; sharp edges and corners.

Subangular: showing definite effects of wear. Fragments still have their original form but edges and corners begin to be rounded off.

Subrounded: showing considerable wear. The edges and corners are rounded off to smooth curves. Original grain shape is still distinct.

Rounded: original faces almost completely destroyed, but some comparatively flat surfaces may still remain. All original edges and corners have been smoothed off to rather broad curves. Original shape is still apparent.

Well rounded: no original faces, edges or corners left. The entire surface consists of broad curves; flat areas are absent. The original shape is suggested by the present form of the grain.

Classification of gravel, sand and fines

Size limits	Grain-size description	Qualification	Primary classification
	Cobble		
64 mm			
		Coarse	Gravel
16 mm	Pebble		
		Fine	
4 mm			
		Coarse	
1 mm			
	Sand	Medium	Sand
$\frac{1}{4}$ mm			
		Fine	
$\frac{1}{16}$ mm			
	Fines (silt and clay)		Fines

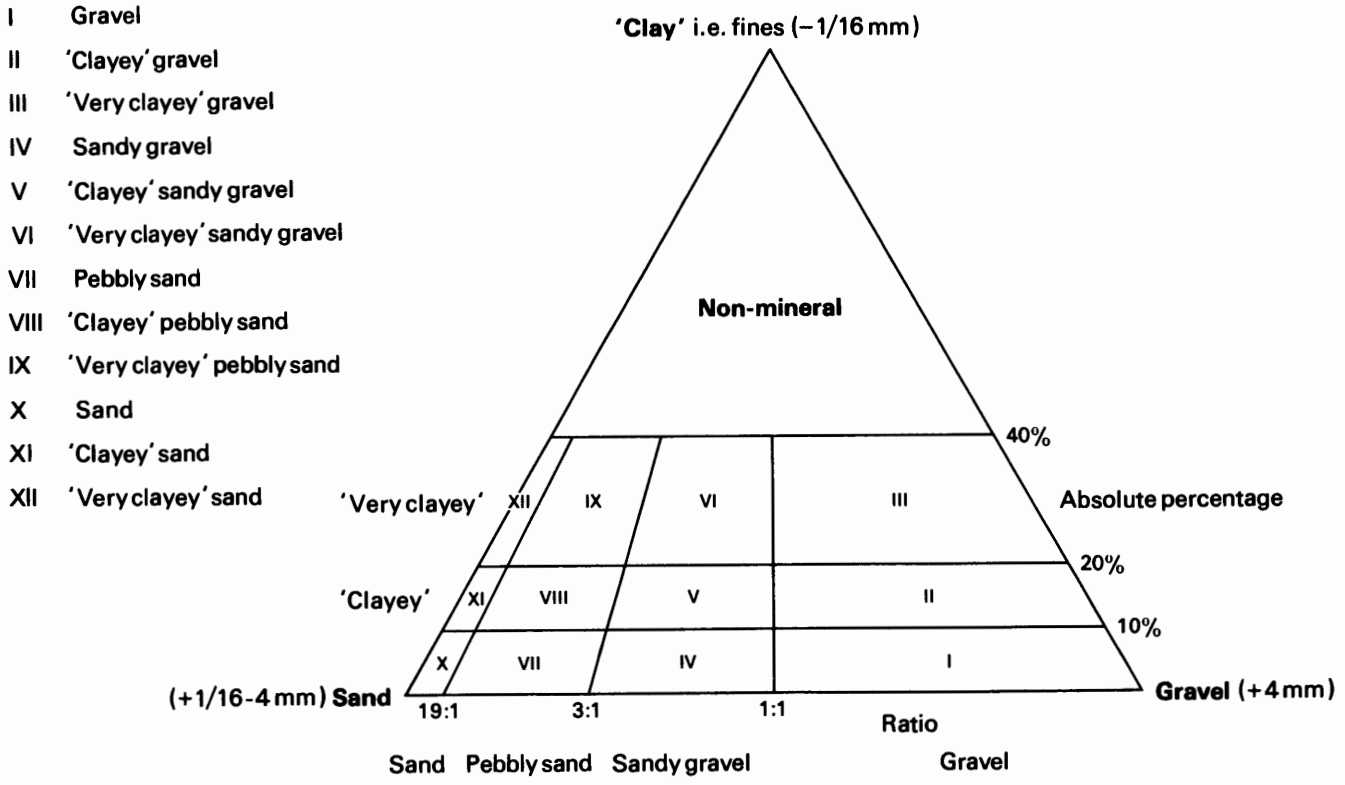


Diagram showing the descriptive categories used in the classification of sand and gravel

APPENDIX D

EXPLANATION OF THE BOREHOLE RECORDS

Annotated fictitious example

CK 66 NW 5[1] **6191 6962**[2] **Northfields**[3] **Block B**

Surface level c.+49.7 m[4]
Water struck at +45.9 m[5]
October 1972[6]

Overburden[7]	2.8 m
Mineral	5.4 m
Waste	1.1 m
Mineral	1.4 m
Bedrock	0.7 m+[8]

LOG

Geological classification	Lithology[9]	Thickness m	Depth m
	Soil	0.2	0.2
Alluvium	Clay, silty, dark brown	2.6	2.8
River Terrace Deposits	**a** Gravel Gravel: fine to coarse, with cobbles towards base, angular to rounded flint and limestone with ironstone and some quartz and chalk Sand: medium with coarse and some fine, quartz and limestone	5.4	8.2
Boulder Clay	Clay, sandy and pebbly, red-brown	1.1	9.3
Glacial Sand and Gravel	**b** Sand, 'clayey' in part: fine, subangular to rounded, quartz with some coal	1.4	10.7
Lias	Mudstone, blue-grey, fossiliferous	0.7+	11.4

GRADING[10]

	Mean for deposit percentages			Depth below surface (m)	percentages						
	Fines	Sand	Gravel		Fines	Sand			Gravel		
					$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
a	5	46	49	2.8-3.9	20	14	62	2	2	0	0
				3.8-4.8	2	2	12	18	42	24	0
				4.8-5.8	1	3	24	13	35	24	0
				5.8-6.8	0	4	21	20	26	29	0
				6.8-8.2	4	3	23	10	23	30	7
				Mean	**5**	**5**	**28**	**13**	**25**	**22**	**2**
b	5	95	0	9.3-10.3	3	73	23	1	0	0	0
				10.3-10.7	9	85	5	1	0	0	0
				Mean	**5**	**77**	**17**	**1**	**0**	**0**	**0**
a+b	**5**	**56**	**39**	**Mean**	**5**	**20**	**26**	**10**	**20**	**17**	**2**

COMPOSITION[11]

	Depth below surface (m)	percentages by weight in the +8-16 mm fraction				
		Flint	Quartz	Limestone	Chalk	Ironstone
	3.8-4.8	41	5	50	1	3
	4.8-5.8	39	3	45	5	8
	5.8-6.8	45	2	42	5	6
	6.8-8.2	19	6	61	3	11
	Mean	**35**	**4**	**51**	**3**	**7**

The numbered paragraphs below correspond with the annotations given on the specimen record opposite.

1 Borehole Registration Number
Each Industrial Minerals Assessment Unit (IMAU) borehole is identified by a Registration Number. This consists of two statements.

a The number of the 1:25 000 sheet on which the borehole lies, here CK 66.
b The quarter of the 1:25 000 sheet on which the borehole lies and the number of the borehole in a series for that quarter, here NW 5.

Thus the full Registration Number is CK 66 NW 5.

2 National Grid Reference
All National Grid References fall in the 100 km square identified by the first two letters of the Registration Number. Grid references are given to eight figures, accurate to within 10 m.

3 Location
The position of the borehole is generally referred to the nearest named locality on the 1:25 000 base map and the resource block in which the borehole lies is stated.

4 Surface level
The estimated surface level at the borehole site is given in metres relative to Ordnance Datum.

5 Groundwater conditions
If groundwater was present the level at which it was encountered is normally given (in metres relative to Ordnance Datum).

6 Type of drill and date of drilling
All the boreholes were drilled by a shell and auger rig using 152 mm diameter casing. The month and year of completion of drilling are stated.

7 Overburden, mineral, waste and bedrock
Mineral is sand and gravel which, as part of a deposit, falls within the arbitrary definition of potentially workable material (see p. 1). Bedrock is the 'formation', 'country rock' or 'rock head' below which potentially workable sand and gravel will not be found. Waste is any material other than bedrock or mineral. Where waste occurs between the surface and mineral it is classified as overburden.

8 The plus sign (+) indicated that the base of the deposit was not reached during drilling.

9 Lithological description
When sand and gravel is recorded a general description based on the grading characteristics (for details see Appendix C) is followed by more detailed particulars of the gravel and/or sand fraction. Where more than one bed of mineral is recognised each is designated by a letter, e.g. **a, b,** etc. The description of other deposits is based on visual examination in the field. Colours of deposits are recorded with reference to a Munsell colour chart.

10 Grading data
A continuous series of bulk samples is taken throughout the thickness of sand and gravel. A new sample is commenced whenever there is an appreciable lithological change or at every 1 m of depth.

For each bulk sample the percentages of fines ($-\frac{1}{16}$ mm), fine sand ($+\frac{1}{16}-\frac{1}{4}$ mm), medium sand ($+\frac{1}{4}-1$ mm), coarse sand (+1-4 mm), fine gravel (+4-16 mm), coarse gravel (+16 -64 mm) and cobble gravel (+64 mm) are stated.

The mean grading of groups of samples making up an identified bed of mineral are also given in detail and in summary. Where more than one bed is recognised the mean grading for the whole of the mineral in the borehole may be given. Where necessary, in calculating mean gradings, data for individual samples are weighted by the thickness represented. If,exceptionally, grading results are not available for a sample, an attempt may be made to estimate the grading by comparing the grading and field descriptions of adjacent samples with the sample in question. Such estimates are shown in square brackets. Alternatively, in claculating means, the sample may be allotted the mean grading of other samples in the deposit.

Fully representative sampling of sand and gravel is difficult to achieve, particularly where groundwater levels are high. Comparison between boreholes and adjacent exposures commonly suggests that in borehole samples the proportion of sand may be higher and the proportion of fines and coarse gravel may be lower.

11 Composition
Details of the composition of the gravel fractions from selected samples or groups of samples may be given.

APPENDIX E

INDUSTRIAL MINERALS ASSESSMENT UNIT BOREHOLE AND SECTION RECORDS

TL 37 NE E1 **3742 7925** **Knobb's Farm, Somersham** **Block E**

Surface level c.+3.0 m
Groundwater not encountered
December 1980

Overburden 0.4 m
Mineral 5.2 m
Bedrock 0.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.4	0.4
River Terrace Deposits	Sandy gravel Gravel: fine with coarse, subangular white and brown flint Sand: medium with coarse and some fine, subangular quartz with flint	5.2	5.6
Upper Jurassic (undivided)	Clay, medium dark grey (N4), firm, silty	0.2+	5.8

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
3	51	46	0.4-1.4	5	10	35	16	29	5	0
			1.4-2.4	2	6	34	20	36	2	0
			2.4-3.4	4	9	39	17	25	6	0
			3.4-4.4	3	3	21	11	39	23	0
			4.4-5.6	2	2	20	11	39	26	0
			Mean	**3**	**6**	**30**	**15**	**33**	**13**	**0**

TL 37 NE E2 **3860 7682** **The Holme, Colne** **Block E**

Surface level c.+3.0 m
Water level c.+1.0 m
December 1980

Overburden 0.4 m
Mineral 1.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.4	0.4
River Terrace Deposits	Pebbly sand Gravel: fine, subangular to rounded, white and brown flint Sand: medium with coarse and fine; quartz with flint	1.6+	2.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
3	81	16	0.4-1.4	3	10	40	27	19	1	0
			1.4-2.0	3	13	54	21	7	2	0
			Mean	**3**	**11**	**45**	**25**	**15**	**1**	**0**

TL 37 NE 8 **3631 7934** **Parkhall Road, Somersham** **Block E**

Surface level c.+7.0 m
Groundwater not encountered
November 1980

Waste 0.5m
Bedrock 2.5+m

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
River Terrace Deposits	Sandy silt, light brown (5YR 5/6) with some black carbonaceous streaks; fine to medium subangular quartz sand throughout and a trace of fine subangular white and brown flint pebbles	0.2	0.5
Upper Jurassic (undivided)	Clay, dark grey (N3), firm	2.5+	3.0

TL 37 NE 9 **3770 7934** **Long Drove, Somersham** **Block E**

Surface level c.+4.0 m
Water level c.+2.4 m
December 1980

Overburden 0.6 m
Mineral 2.9 m
Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.6	0.6
River Terrace Deposits	'Clayey' sandy gravel Gravel: fine with a trace of coarse, subangular to rounded white and brown with some black flint, occasional subrounded oolitic limestone and well rounded quartz Sand: medium with coarse and some fine subangular quartz with flint Fines: light brown (5YR 5/6) silt and clay	2.9	3.5
Upper Jurassic (undivided)	Clay, dark grey (N3), firm, silty	1.5+	5.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
10	51	39	0.6-1.6	17	8	36	10	25	4	0
			1.6-2.6	10	8	29	14	34	5	0
			2.6-3.5	2	4	22	22	42	8	0
			Mean	**10**	**7**	**29**	**15**	**33**	**6**	**0**

COMPOSITION

Depth below surface (m)	Percentages by weight in +8 -16 mm fraction					
	Flint					
	brown	white	black	Limestone	Quartz	Others
0.6-3.5	61	26	2	2	6	3

TL 37 NE 10 **3950 7956** **Chatteris Fen** **Block D**

Surface level c.+1.0 m
Water struck c.-2.9 m
November 1980

Overburden 3.9 m
Mineral 2.2 m
Bedrock 1.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brown, friable, silty	1.2	1.2
Barroway Drove Beds	Clay, medium grey (N5), glutinous	1.0	2.2
Lower Peat	Peat, dark brown, friable, fibrous	0.6	2.8
Crowland Bed	Silt, medium grey (N5), soft, pebbly at base	1.1	3.9
River Terrace Deposits	Sandy gravel Gravel: fine with some coarse, angular to subrounded, white and brown with some black flint, occasional subrounded oolitic limestone and well rounded quartz Sand: coarse with medium and a trace of fine, subangular to rounded quartz with flint	2.2	6.1
Upper Jurassic (undivided)	Clay, dark grey (N3), firm, silty	1.4+	7.5

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
1	51	48	3.9-4.9	0	2	18	28	45	7	0
			4.9-6.1	1	2	20	32	37	8	0
			Mean	**1**	**2**	**19**	**30**	**40**	**8**	**0**

TL 37 NE 11 **3626 7848** **· Somersham** **Block E**

Surface level c.+9.0 m
Groundwater not encountered
December 1980

Overburden 0.6 m
Mineral 1.0 m
Bedrock 1.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.6	0.6
River Terrace Deposits	'Clayey' sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional sub-rounded oolitic limestone and rounded quartz Sand: medium with some fine and coarse, sub-angular quartz with flint Fines: dark yellowish orange (10YR 6/6) clay	1.0	1.6
Upper Jurassic (undivided)	Clay, dark grey (N3), firm, silty	1.4+	3.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
13	51	36	0.6 - 1.6	13	6	35	10	32	4	0

TL 37 NE 12 **3708 7830** **Somersham** **Block E**

Surface level c.+4.0 m
Water struck at c.-0.7 m
December 1980

Overburden 4.7 m
Mineral 4.0 m
Bedrock 1.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.5	0.5
River Terrace Deposits	Silt, moderate yellowish brown (10YR 5/4), occasionally sandy and micaceous	4.2	4.7
	a 'Very clayey' sand, moderate yellowish brown (10YR 5/4), fine, subangular quartz with mica	1.3	6.0
	b Sandy gravel Gravel: fine with some coarse, angular to rounded white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium and coarse with fine, subangular quartz with flint	2.7	8.7
Upper Jurassic (undivided)	Clay, dark grey (N3), firm, silty	1.3+	10.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines	Sand			Gravel		
					$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
a	23	76	1	4.7-5.7	25	69	5	0	1	0	0
				5.7-6.0	20	51	22	5	2	0	0
				Mean	**23**	**65**	**9**	**2**	**1**	**0**	**0**
b	4	61	35	6.0-6.5	10	31	31	12	15	1	0
				6.5-7.5	3	5	37	22	27	6	0
				7.5-8.5	3	4	28	25	34	6	0
				8.5-8.7	3	2	19	23	47	6	0
				Mean	**4**	**9**	**31**	**21**	**29**	**6**	**0**
a+b	**10**	**66**	**24**	**4.7-8.7**	**10**	**27**	**24**	**15**	**20**	**4**	**0**

TL 37 NE 13 **3837 7895** **Holwood Farm, Sutton** **Block D**

Surface level c.+1.0 m
Water struck c.-1.9 m
November 1980

Overburden 2.9 m
Mineral 1.6 m
Waste 1.5 m
Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Alluvium	Peaty clay, dark brown, soft clay with much peaty material throughout	1.5	1.5
Lower Peat	Peat, dark brown, fibrous, friable	0.5	2.0
Crowland Bed	Clay, medium grey (N5), glutinous	0.9	2.9
River Terrace Deposits	Gravel Gravel: fine with coarse, angular to subrounded white and brown with black flint, occasional sub-rounded oolitic limestone and rounded quartz Sand: fine to coarse, subangular quartz with flint	1.6	4.5
	Pebbly silt, brownish grey (5YR 4/1), soft; common fine, subangular white and brown flint pebbles	1.5	6.0
Upper Jurassic (undivided)	Clay, medium dark grey (N4), firm, shaley in part	1.5+	7.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines	Sand			Gravel		
					$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
	3	43	54	2.9-4.5	3	11	17	15	38	16	0

TL 37 NE 14 **3709 7741** **Hale Fields, Colne** **Block E**

Surface level c.+9.0 m
Water not struck
November 1980

Overburden 0.3 m
Mineral 3.9 m
Bedrock 1.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
River Terrace Deposits	**a** 'Very clayey' sandy gravel Gravel: occasional fine, subangular white and brown flint Sand: fine and medium with trace of coarse, subangular quartz with some flint Fines: moderate yellowish brown (10YR 5/4)	0.7	1.0
	b Sandy gravel Gravel: fine with trace of coarse, subangular to rounded, white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint Fines: moderate brown (5YR 4/4) silt and clay	3.2	4.2
Upper Jurassic (undivided)	Clay, medium dark grey (N4), shaley in part	1.3+	5.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines	Sand			Gravel		
					$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
a	38	46	16	0.3-1.0	38	22	19	5	15	1	0
b	8	55	37	1.0-1.3	21	6	19	14	35	5	0
				1.3-2.3	15	9	27	21	26	2	0
				2.3-3.3	2	4	23	26	39	6	0
				3.3-4.2	3	2	29	31	32	3	0
				Mean	**8**	**5**	**25**	**25**	**33**	**4**	**0**
a+b	**14**	**54**	**32**	**0.3-4.2**	**14**	**8**	**24**	**22**	**29**	**3**	**0**

COMPOSITION

Depth below surface (m)	Percentages by weight in +8 -16 mm fraction					
	Flint					
	brown	white	black	Limestone	Quartz	Others
0.3-4.2	58	30	trace	2	5	5

TL 37 NE 15 **3821 7801** **Colnefen Farm, Colne** **Block E**

Surface level c.+3.0 m
Water struck at c.+1.6 m
December 1980

Overburden 1.4 m
Mineral 4.6 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.6	0.6
River Terrace Deposits	Pebbly silt, light olive brown (5Y 5/6) and dark yellowish orange (10YR 5/6); occasional fine, subangular white and brown flint	0.8	1.4
	Sandy gravel Gravel: fine with some coarse, subangular white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium and coarse with some fine, subangular quartz with flint	4.6	6.0
Upper Jurassic (undivided)	Clay, dark grey (N3), firm, silty	1.0+	7.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
4	60	36	1.4-2.4	9	7	32	22	27	3	0
			2.4-3.4	6	7	36	21	24	6	0
			3.4-4.4	1	5	37	20	31	6	0
			4.4-6.0	1	4	34	20	31	10	0
			Mean	**4**	**6**	**33**	**21**	**29**	**7**	**0**

TL 37 NE 16 **3950 7797** **Sutton Fen, Sutton** **Block D**

Surface level c.+1.0 m
Water struck at c.-2.1 m
December 1980

Overburden 3.1 m
Mineral 3.0 m
Bedrock 1.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, fibrous, silty	1.4	1.4
Barroway Drove Beds	Clay, light olive grey (5Y 6/1), glutinous	0.2	1.6
Lower Peat	Peat, dark brown, woody	1.5	3.1
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white, brown and black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium and coarse subangular quartz and flint	3.0	6.1
Upper Jurassic (undivided)	Clay, medium dark grey (N4), firm, silty	1.4+	7.5

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
2	60	38	3.1-4.1	2	7	28	24	35	4	0
			4.1-5.1	2	4	28	33	31	2	0
			5.1-6.1	1	4	25	34	34	2	0
			Mean	**2**	**5**	**27**	**28**	**35**	**3**	**0**

COMPOSITION

Depth below surface (m)	Percentages by weight in +8 -16 mm fraction					
	Flint					
	brown	white	black	Limestone	Quartz	Others
3.1-6.1	38	35	4	8	6	9

TL 37 NE 17 **3656 7677** **Colne Green, Colne** **Block E**

Surface level c.+13.0 m
Water struck at c.+11.6 m
December 1980

Overburden 1.4 m
Mineral 1.0 m
Bedrock 1.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.4	0.4
River Terrace Deposits	Pebbly sandy silt, light brown (5YR 5/6); occasional fine, subangular flint pebbles and medium subangular quartz sand	1.0	1.4
	'Clayey' sandy gravel Gravel: fine with some coarse, subangular to rounded, white and brown with black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium with coarse and some fine, subangular quartz with flint Fines: moderate brown (5YR 4/4)	1.0	2.4
Upper Jurassic (undivided)	Clay, dark grey (N3), firm, silty	1.6+	4.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
12	52	36	1.4-2.4	12	6	28	18	29	7	0

TL 37 NE 18 **3820 7634** **Holme Drove, Colne** **Block E**

Surface level c.+4.0 m
Water struck at c.+1.0 m
December 1980

Overburden 0.5 m
Mineral 1.5 m
Waste 1.0 m
Mineral 2.8 m
Bedrock 1.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.5	0.5
River Terrace Deposits	**a** 'Very clayey' pebbly sand Gravel: fine with some coarse, subangular white and brown with black flint Sand: medium and coarse, subangular quartz with flint Fines: light brown (5YR 5/6)	1.5	2.0
	Silt, moderate yellowish brown (10YR 5/4) and dark yellowish orange (10YR 6/6), firm	1.0	3.0
	b Gravel Gravel: fine with some coarse, subangular to rounded, white, brown and black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint	2.8	5.8
Upper Jurassic (undivided)	Clay, dark grey (N3), firm, silty	1.2+	7.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines	Sand			Gravel		
					$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
a	28	59	13	0.5-2.0	28	31	21	7	12	1	0
b	2	46	52	3.0-4.0	3	3	20	19	46	9	0
				4.0-5.8	2	3	26	20	41	8	0
				Mean	**2**	**3**	**24**	**19**	**44**	**8**	**0**
a+b	**11**	**51**	**38**	**Mean**	**11**	**13**	**23**	**15**	**32**	**6**	**0**

TL 37 NE 19 **3702 7532** **Colne** **Block E**

Surface level c.+15.0 m
Water struck at c.+10.0 m
December 1980

Overburden 2.3 m
Mineral 2.7 m
Waste 4.5 m
Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.4	0.4
River Terrace Deposits	Pebbly sandy silt, moderate brown (5YR 4/4) and light brown (5YR 5/6), firm; occasional fine, subangular white and brown flint pebbles and some medium and coarse, subangular quartz and flint sand	1.9	2.3

	'Clayey' sandy gravel Gravel: fine, subangular to rounded, white, brown with black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium with coarse subangular quartz with flint	2.7	5.0
	Silt, moderate yellowish brown (10YR 5/4), thixotropic	4.5	9.5
Upper Jurassic (undivided)	Clay, dark grey (N3), firm, silty	1.5+	11.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
11	65	24	2.3-3.3	10	8	40	17	21	4	0
			3.3-5.0	11	9	42	14	23	1	0
			Mean	**11**	**8**	**42**	**15**	**22**	**2**	**0**

TL 37 NE 20 3857 7539 **Earith** **Block E**

Surface level c.+5.0 m
Groundwater not encountered
November 1980

Waste 0.6 m
Bedrock 2.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.4	0.4
River Terrace Deposits	'Clayey' gravel Gravel: fine and coarse, subangular white and brown flint Sand: medium and coarse, subangular quartz with flint Fines: moderate yellowish brown (10YR 5/4) silt and clay	0.2	0.6
Upper Jurassic (undivided)	Clay, medium dark grey (N4), firm, silty	2.4+	3.0

TL 37 NE 21 3943 7572 **Old Toll House, Earith** **Block D**

Surface level c.+2.0 m
Water struck at c.-1.5 m
November 1980

Overburden 3.3 m
Mineral 4.0 m
Bedrock 1.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Alluvium	Silty clay, dusky brown (5YR 2/2), soft	0.9	1.2

	Sandy clayey silt, pale brown (5YR 5/2) mottled; some fine subangular quartz sand scattered throughout	2.1	3.3
River Terrace Deposits	Sandy gravel Gravel: fine with some coarse, angular to rounded white and brown with some black flint, occasional rounded oolitic limestone and well rounded quartz Sand: medium with fine and coarse, subangular quartz with flint	4.0	7.3
Upper Jurassic (undivided)	Clay, dark grey (N3), firm, partly laminated	1.2+	8.5

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
3	62	35	3.3-4.3	3	3	15	21	50	8	0
			4.3-5.7	2	5	26	28	34	5	0
			5.7-6.7	3	22	48	10	12	5	0
			6.7-7.3	4	18	47	13	13	5	0
			Mean	**3**	**11**	**32**	**19**	**29**	**6**	**0**

TL 38 NW 4 **3035 8931** **Ramsey Mere**

Surface level c.+1.0 m
Water not struck
January 1981

Waste 6.5 m
Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	0.7	0.7
Barroway Drove Beds	Clay, light olive grey (5Y 6/1), glutinous	2.1	2.8
Lower Peat	Peat, dark brown, fibrous, woody	1.9	4.7
Crowland Bed	Silty clay, medium grey (N5) and light olive grey (5Y 6/1), thixotropic	1.8	6.5
Upper Jurassic (undivided)	Clay, medium grey (N5), firm, silty	1.5+	8.0

TL 38 NW 5 **3238 8993** **Four Hundred Farm, Benwick** **Block B**

Surface level c.+1.0 m
Water struck at c.-4.5 m
January 1981

Overburden 5.5 m
Mineral 5.7 m
Bedrock 0.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	0.7	0.7
Barroway Drove Beds	Silt, moderate yellowish brown (10YR 5/4) and light olive grey (5Y 6/1), glutinous	3.2	3.9
Lower Peat	Peat, dark brown, fibrous, woody	1.5	5.4
Crowland Bed	Clayey silt, medium grey (N5) and light olive grey (5Y 6/1), thixotropic	0.1	5.5
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional rounded oolitic limestone and rounded quartz Sand: medium and coarse with fine, subangular quartz with flint	5.7	11.2
Upper Jurassic (undivided)	Clay, medium grey (N5), firm, silty	0.8+	12.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
4	63	33	5.5-6.5	5	11	21	19	43	1	0
			6.5-7.5	8	20	37	18	17	0	0
			7.5-8.5	5	19	25	20	30	1	0
			8.5-9.5	2	4	28	32	32	2	0
			9.5-10.5	1	6	28	26	34	5	0
			10.5-11.2	1	6	29	27	34	3	0
			Mean	**4**	**11**	**28**	**24**	**31**	**2**	**0**

TL 38 NW 6 **3482 8931** **Great Lots Road, Benwick**

Surface level c.+1.0 m
Water struck at c.-6.9 m
December 1980

Waste 10.2 m
Bedrock 0.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Made ground	0.3	0.3
Nordelph Peat	Peat, dark brown, friable, silty	1.4	1.7
Terrington Beds	Silt, olive grey (5Y 4/2), soft, thixotropic, micaceous, becoming sandy with depth	6.2	7.9
River Terrace Deposits	'Clayey' sandy gravel Gravel: fine with some coarse, subangular to rounded, white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: fine with medium and coarse, subangular quartz with flint and some mica	2.3	10.2
Upper Jurassic (undivided)	Clay, dark greenish olive grey, firm, silty	0.9+	11.1

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
13	49	38	7.9-9.6	13	29	6	13	30	9	0
			9.6-10.2	14	23	9	20	26	8	0
			Mean	**13**	**27**	**7**	**15**	**30**	**8**	**0**

TL 38 NW 7 **3188 8830** **Four Hundred Drove, Benwick** **Block B**

Surface level c.0.0 m
Water struck c.-6.7 m
January 1981

Overburden 6.7 m
Mineral 3.7 m
Bedrock 0.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brown, friable, silty	1.2	1.2
Barroway Drove Beds	Clay, light olive grey (5Y 6/1), glutinous	2.3	3.5
Lower Peat	Peat, dark brown, fibrous, woody	2.5	6.0
Crowland Bed	Clayey silt, medium grey (N5) and light olive grey (5Y 6/1), thixotropic	0.7	6.7
River Terrace Deposits	Pebbly sand Gravel: fine, subangular to rounded, white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium and coarse with some fine, subangular quartz with flint	3.7	10.4
Upper Jurassic (undivided)	Clay, medium grey (N5), firm, silty	0.6+	11.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
2	74	24	6.7-7.7	4	11	31	32	21	1	0
			7.7-8.7	2	7	25	44	22	0	0
			8.7-10.4	0	4	27	41	28	0	0
			Mean	**2**	**7**	**28**	**39**	**24**	**trace**	**0**

TL 38 NW 8 3031 8754 Wood Lane Farm

Surface level c.+5.0 m
Water not struck
December 1980

Waste 1.0 m
Bedrock 2.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
March Gravels	Sandy silt, dark yellowish orange (10 YR 6/6); some medium subangular quartz sand	0.3	0.6
	Sandy gravel Gravel: fine, subangular to rounded, white and brown flint with occasional subrounded oolitic limestone Sand: medium and coarse, subangular quartz with flint	0.4	1.0
Upper Jurasssic (undivided)	Clay, medium dark grey (N4), silty	2.0+	3.0

TL 38 NW 9 3262 8772 Long Drove, Ramsey

Surface level c.0.0 m
Water struck c.-7.2 m
December 1980

Waste 10.9 m
Bedrock 0.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.4	0.4
Terrington Beds	Silt, olive grey and dark olive grey, peat debris at top, micaceous	8.5	8.9
River Terrace Deposits	Sandy gravel Gravel: fine with some coarse, subangular white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium and coarse with fine, subangular quartz with flint	2.0	10.9
Upper Jurassic (undivided)	Clay, greenish olive grey, stiff	0.8+	11.7

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
2	50	48	8.9-9.8	3	10	16	23	42	6	0
			9.8-10.9	1	5	16	30	43	5	0
			Mean	**2**	**7**	**16**	**27**	**42**	**6**	**0**

TL 38 NW 10 **3348 8796** **Betty's Nose Farm, Benwick** **Block B**

Surface level c.0.0 m
Water struck c.-5.5 m
January 1981

Overburden 5.5 m
Mineral 3.9 m
Bedrock 0.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	0.6	0.6
Barroway Drove Beds	Clay, medium grey (N5), glutinous, silty	1.9	2.5
Lower Peat	Peat, dark brown, fibrous, woody	2.7	5.2
Crowland Bed	Clayey silt, medium grey (N5), thixotropic	0.3	5.5
River Terrace Deposits	Sandy gravel Gravel: fine with some coarse, subangular white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium and coarse with fine, subangular quartz with flint	3.9	9.4
Upper Jurassic (undivided)	Clay, medium light grey (N5), firm, silty	0.6+	10.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
1	62	37	5.5-6.5	1	19	20	18	31	11	0
			6.5-7.5	1	9	34	27	28	1	0
			7.5-8.5	0	5	32	25	29	9	0
			8.5-9.4	3	6	31	24	34	2	0
			Mean	**1**	**10**	**29**	**23**	**31**	**6**	**0**

COMPOSITION

Depth below surface (m)	Percentages by weight in +8 -16 mm fraction					
	Flint					
	brown	white	black	Limestone	Quartz	Others
5.5-9.4	64	12	11	3	10	trace

TL 38 NW 11 **3406 8731** **Dawson's Farm, Ramsey** **Block B**

Surface level c.0.0 m
Water struck c.-6.0 m
December 1980

Overburden 6.0 m
Mineral 4.0 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
Terrington Beds	Silt, dusky yellow (5Y 6/4) becoming medium grey at base, thixotropic	3.7	4.0
	Sandy silt, medium grey (N5); some fine, subangular quartz sand throughout	2.0	6.0
River Terrace Deposits	**a** Sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: coarse with medium and some fine, subangular quartz with flint	1.5	7.5
	b Pebbly sand Gravel: as above Sand: medium with fine and coarse, subangular quartz with flint	2.5	10.0
Upper Jurassic (undivided)	Clay, medium light grey (N6), firm, silty	1.0+	11.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines	Sand			Gravel		
					$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	$+1-4$	$+4-16$	$+16-64$	$+64$ mm
a	3	64	33	6.0-7.5	3	7	19	38	33	trace	0
b	1	91	8	7.5-8.5	2	25	67	4	2	0	0
				8.5-9.5	1	8	66	20	5	0	0
				9.5-10.0	0	3	37	32	27	1	0
				Mean	**1**	**14**	**61**	**16**	**8**	**trace**	**0**
a+b	**2**	**80**	**18**	**6.0-10.0**	**2**	**11**	**45**	**24**	**18**	**trace**	**0**

TL 38 NW 12 **3025 8646** **Park Farm, Ramsey**

Surface level c.+6.0 m
Water not struck
December 1980

Waste 1.5 m
Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
March Gravels	Pebbly sandy silty clay; moderate yellowish brown (10YR 5/4) silty clay with occasional fine, subangular white and brown flint and some medium, subangular quartz sand	1.2	1.5
Upper Jurassic (undivided)	Clay, medium dark grey (N4), firm, silty	1.5+	3.0

TL 38 NW 13 **3228 8641** **Toll Farm, Ramsey** **Block B**

Surface level c.0.0 m
Water struck at c.-4.8 m
December 1980

Overburden 5.9 m
Mineral 2.9 m
Bedrock 1.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Made ground	0.2	0.2
Barroway Drove Beds	Silt, light olive brown (5Y 5/6), laminated, micaceous at top	2.7	2.9
Lower Peat	Peat, dark brown, fibrous, woody	1.9	4.8
Crowland Bed	Silt, greyish olive (10Y 4/2), thixotropic, sandy at base	1.1	5.9
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown with black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium with fine and coarse, subangular quartz with flint	2.9	8.8
Upper Jurassic (undivided)	Clay, greenish olive grey, firm, silty	1.2+	10.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
6	62	32	5.9-6.8	16	21	32	12	13	6	0
			6.8-7.9	2	8	37	25	28	0	0
			7.9-8.8	0	4	25	23	43	5	0
			Mean	**6**	**11**	**31**	**20**	**28**	**4**	**0**

TL 38 NW 14 **3318 8606** **Fifty Barn, Ramsey** **Block B**

Surface level c.0.0 m
Water struck c.-6.9 m
December 1980

Overburden 6.9 m
Mineral 2.6 m
Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Made ground	0.3	0.3
Barroway Drove Beds	Silty clay, moderate yellowish brown (10YR 5/4), glutinous	2.4	2.7
	Silty clay, light olive grey (5Y 6/1)	3.1	5.8
Lower Peat	Peat, dark brown, fibrous, woody	0.4	6.2
Crowland Bed	Silty clay, light grey and light olive grey, thixotropic	0.7	6.9
River Terrace Deposits	Sandy gravel Gravel: fine, subangular, white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium with coarse and some fine, subangular quartz with flint	2.6	9.5
Upper Jurassic (undivided)	Clay, medium dark grey (N4), firm, silty	1.5+	11.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	$+1-4$	$+4-16$	$+16-64$	$+64$ mm
3	63	34	6.9-7.9	2	8	34	19	31	6	0
			7.9-9.5	4	5	32	27	29	3	0
			Mean	**3**	**6**	**33**	**24**	**30**	**4**	**0**

TL 38 NW 15 **3058 8531** **Hollow Heap, Ramsey**

Surface level c.+5.0 m
Water not struck
December 1980

Waste 2.5 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Made ground	0.4	0.4
March Gravels	Pebbly sandy silty clay, moderate yellowish brown (10YR 5/4) and dark yellowish orange (10YR 6/6), firm, with some fine, subangular white and brown flints and medium subangular quartz sand	1.6	2.0
	'Very clayey' sandy gravel Gravel: fine with coarse, subangular white and brown with occasional black flint and some sub-rounded oolitic limestone Sand: medium and coarse with fine, subangular quartz and flint Fines: dark yellowish orange (10YR 6/6)	0.5	2.5
Upper Jurassic (undivided)	Clay, medium dark grey (N4)	1.0+	3.5

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				-1/16	+1/16 -1/4	+1/4 -1	+1 -4	+4 -16	+16 -64	+64 mm
20	54	26	2.0-2.5	20	13	23	18	17	9	0

TL 38 NW 16 3220 8560 Frog Hall, Ramsey

Surface level c.+1.0 m
Water struck c.-6.6 m
January 1981

Waste 9.8 m
Bedrock 0.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.4	0.4
Terrington Beds	Peaty silt, dark brown, firm, with much organic debris	0.5	0.9
Barroway Drove Beds	Clayey silt, light olive grey (5Y 6/1), thixotropic, sandy in places	5.7	6.6
Lower Peat	Peat, dark brown, fibrous, woody	1.0	7.6
River Terrace Deposits	Gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint	2.2	9.8
Upper Jurassic (undivided)	Siltstone, greenish grey (5G 6/1), hard, calcareous	0.7+	10.5

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				-1/16	+1/16 -1/4	+1/4 -1	+1 -4	+4 -16	+16 -64	+64 mm
1	49	50	7.6-8.6	1	2	18	28	43	8	0
			8.6-9.8	1	2	19	28	48	2	0
			Mean	**1**	**2**	**19**	**28**	**46**	**4**	**0**

TL 38 NW 17 **3331 8516** **Mead's Farm, Ramsey** **Block C**

Surface level c.0.0 m
Water struck c.-4.4 m
December 1980

Overburden 4.4 m
Mineral 3.3 m
Bedrock 1.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	0.5	0.5
Barroway Drove Beds	Clay, light olive grey (5Y 6/1), glutinous	2.0	2.5
Lower Peat	Peat, dark brown, fibrous, woody	1.9	4.4
River Terrace Deposits	Sandy gravel Gravel: fine, subangular white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular, quartz with flint	3.3	7.7
Upper Jurassic (undivided)	Clay, medium grey (N5), firm, silty	1.3+	9.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
1	52	47	4.4-5.0	3	3	27	19	42	6	0
			5.0-6.0	1	2	31	23	39	4	0
			6.0-7.7	1	2	25	24	44	4	0
			Mean	**1**	**2**	**27**	**23**	**43**	**4**	**0**

TL 38 NW 18 **3450 8536** **Tick Fen Farm, Ramsey** **Block C**

Surface level c.+1.0 m
Water struck c.-4.4 m
December 1980

Overburden 5.4 m
Mineral 4.4 m
Bedrock 1.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.0	1.0
Barroway Drove Beds	Clay, light olive grey (5Y 6/1), glutinous	2.3	3.3
Lower Peat	Peat, dark brown, fibrous, woody	0.5	3.8
Crowland Bed	Sandy silt, light olive grey (5Y 6/1), thixotropic	1.6	5.4
River Terrace Deposits	Sandy gravel Gravel: fine with some coarse, subangular white and brown with some black flint, occasional sub-rounded oolitic limestone and rounded quartz Sand: medium and coarse with fine, subangular quartz and flint	4.4	9.8
Upper Jurassic (undivided)	Clay, medium grey (N5), firm, silty	1.2+	11.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
3	55	42	5.4-6.4	4	16	27	15	34	4	0
			6.4-7.4	1	12	28	13	37	9	0
			7.4-8.4	3	6	29	16	40	6	0
			8.4-9.8	2	5	29	24	32	8	0
			Mean	**3**	**9**	**28**	**18**	**35**	**7**	**0**

COMPOSITION

Depth below surface (m)	Percentages by weight in +8 -16 mm fraction					
	Flint					
	brown	white	black	Limestone	Quartz	Others
5.4-9.8	60	24	4	1	6	5

TL 38 NE 6 **3649 8971** **Dyke Moor, Doddington** **Block**

Surface level c.0.0 m
Water not struck
December 1980

Waste 5.6 m
Bedrock 0.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.1	1.1
Barroway Drove Beds	Silty clay, greenish grey (5G 6/1), glutinous	1.3	2.4
Lower Peat	Peat, dark brown, fibrous, woody	1.0	3.4
Crowland Bed	Silt, dark greyish brown, thixotropic	1.2	4.6
River Terrace Deposits	Sandy silt, light olive brown, some fine and medium subangular quartz sand and trace of fine angular white and brown flint pebbles	1.0	5.6
Upper Jurassic (undivided)	Clay, light olive brown and medium bluish grey, firm, silty	0.9+	6.5

TL 38 NE 7 **3692 8880** **Beezling Fen, Doddington**

Surface level c.0.0 m
Water struck at c.-4.0 m
January 1981

Waste 5.0 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable	1.5	1.5
Barroway Drove Beds	Clayey silt, light brown (5YR 5/6) becoming medium grey (N5) with depth	2.3	3.8
Lower Peat	Peat, dark brown, fibrous, woody	0.2	4.0
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional subrounded oolitic limestone and well rounded quartz Sand: medium and coarse, subangular quartz with flint	1.0	5.0
Upper Jurassic (undivided)	Clay, medium grey (N5), firm, silty	1.0+	6.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
3	53	44	4.0-5.0	3	2	20	31	42	2	0

TL 38 NE 8 **3825 8903** **Swingbrow, Doddington**

Surface level c.0.0 m
Water not struck
December 1980

Waste 4.9 m
Bedrock 1.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable	0.6	0.6
Barroway Drove Beds	Clay, medium grey (N5), firm, some roots	1.4	2.0
	Clayey silt, medium light grey (N6), soft, glutinous	0.5	2.5
Lower Peat	Peat, dark brown, fibrous, woody	1.3	3.8
Crowland Bed	Silty clay, medium light grey (N6) becoming very light grey (N8) at depth	1.1	4.9
Upper Jurassic (undivided)	Clay, medium dark grey (N4), firm, silty	1.1+	6.0

TL 38 NE 9 **3946 8849** **Aspen Farm, Chatteris**

Surface level c.+1.0 m
Water not struck
December 1980

Waste 5.1 m
Bedrock 1.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	0.8	0.8
Barroway Drove Beds	Clayey silt, light olive brown (5Y 5/6), slightly micaceous	2.3	3.1
Lower Peat	Peat, dark brown, fibrous, woody	2.0	5.1
Upper Jurassic (undivided)	Clay, medium bluish grey, firm, silty	1.7+	6.8

TL 38 NE 10 **3571 8817** **Forty Foot Drain, Doddington**

Surface level c.0.0 m
Water struck at c.-5.5 m
January 1981

Waste 6.1 m
Bedrock 0.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.0	1.0
Barroway Drove Beds	Silty clay, medium grey (N5), glutinous	2.3	3.3
Lower Peat	Peat, dark brown, fibrous, woody	1.5	4.8
Crowland Bed	Clayey silt, medium grey (N5), thixotropic	0.7	5.5
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium and coarse with fine, subangular quartz with flint	0.6	6.1
Upper Jurassic (undivided)	Clay, medium light grey (N6), firm, silty	0.9+	7.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
3	51	46	5.5-6.1	3	10	21	20	43	3	0

TL 38 NE 11 **3659 8792** **Beezling Farm, Chatteris** **Block B**

Surface level c.+1.0 m
Water struck at c.-1.0 m
December 1980

Overburden 2.0 m
Mineral 2.0 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	0.8	0.8
Barroway Drove Beds	Sandy silt, medium light grey (N6), glutinous	1.2	2.0
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium and coarse with fine, subangular quartz with flint	2.0	4.0
Upper Jurassic (undivided)	Clay, dark grey (N3), firm, silty	1.0+	5.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
2	54	44	2.0-3.0	3	8	22	14	50	3	0
			3.0-4.0	2	9	35	21	29	4	0
			Mean	**2**	**8**	**28**	**18**	**40**	**4**	**0**

TL 38 NE 12 3788 8796 Westmoor Drove, Chatteris

Surface level c.+2.0 m
Water not struck
December 1981

Waste 1.8 m
Bedrock 1.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.5	0.5
River Terrace Deposits	Pebbly clay, greyish brown (5YR 3/2), with occasional fine subangular white and brown flint pebbles	1.3	1.8
Upper Jurassic (undivided)	Clay, dark grey (N3), firm, silty	1.2+	3.0

TL 38 NE 13 3510 8705 Morley's Farm, Chatteris Block B

Surface level c.0.0 m
Water struck at c.-6.0 m
December 1980

Overburden 6.0 m
Mineral 3.2 m
Bedrock 0.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	2.0	2.0
Barroway Drove Beds	Clay, light grey and light olive grey (5Y 6/1), glutinous, silty	1.8	3.8
Lower Peat	Peat, dark brown, fibrous, woody	1.2	5.0
Crowland Bed	Clay, light olive grey (5Y 6/1), glutinous, silty	1.0	6.0
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium and coarse with fine, subangular quartz with flint	3.2	9.2
Upper Jurassic (undivided)	Clay, medium light grey (N6), firm, silty	0.8+	10.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
1	74	25	6.0-7.0	1	10	42	22	23	2	0
			7.0-8.0	1	10	30	28	26	5	0
			8.0-9.2	1	9	43	27	19	1	0
			Mean	**1**	**10**	**38**	**26**	**23**	**2**	**0**

TL 38 NE 14 **3654 8710** **Beezling Drove, Chatteris** **Block B**

Surface level c.+1.0 m
Water struck at c.-1.7 m
December 1980

Overburden 2.7 m
Mineral 2.2 m
Bedrock 1.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.4	1.4
Barroway Drove Beds	Clay, medium light grey (N6), glutinous, silty	0.2	1.6
Lower Peat	Peat, dark brown, fibrous, woody	0.2	1.8
Crowland Bed	Clayey silt, medium light grey (N6) and light olive grey (5Y 6/1), thixotropic	0.9	2.7
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional sub-rounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint	2.2	4.9
Upper Jurassic (undivided)	Clay, dark grey (N3), firm, silty	1.1+	6.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
2	56	42	2.7-3.7	3	5	25	22	44	1	0
			3.7-4.9	2	5	31	24	35	3	0
			Mean	**2**	**5**	**28**	**23**	**40**	**2**	**0**

COMPOSITION

Depth below surface (m)	Percentages by weight in +8 -16 mm fraction					
	Flint					
	brown	white	black	Limestone	Quartz	Others
2.7-4.9	59	17	8	4	5	7

TL 38 NE 15 **3755 8711** **Westmoor, Chatteris** **Block B**

Surface level c.0.0 m
Water struck at c.-2.0 m
December 1980

Overburden 2.0 m
Mineral 2.3 m
Bedrock 1.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.4	1.4
Barroway Drove Beds	Pebbly sandy silt, medium light grey (N6), with occasional fine subangular white and brown flint pebbles and some medium and coarse subangular quartz sand	0.6	2.0
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional sub-rounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint	2.3	4.3
Upper Jurassic (undivided)	Clay, dark grey (N3), firm, silty	1.2+	5.5

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
3	67	30	2.0-3.0	3	5	26	29	37	0	0
			3.0-4.3	2	8	39	27	23	1	0
			Mean	**3**	**7**	**32**	**28**	**29**	**1**	**0**

TL 38 NE 16 **3797 8801** **Westmoor Drove, Chatteris** **Block A**

Surface level c.+3.0 m
Water not struck
December 1981

Overburden 0.4 m
Mineral 2.6 m
Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.4	0.4
March Gravels	'Very clayey' sand, dark yellowish orange (10YR 6/6), fine, subangular quartz with flint	2.6	3.0
Upper Jurassic (undivided)	Clay, dark grey (N3), firm, silty	1.5+	4.5

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
32	66	2	0.4-3.0	32	61	4	1	2	0	0

TL 38 NE 17 **3515 8593** **Round House, Warboys** **Block B**

Surface level c.0.0 m
Water struck at c.-5.0 m
December 1980

Overburden 5.0 m
Mineral 5.9 m
Bedrock 1.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.6	1.6
Barroway Drove Beds	Clay, light olive grey (5Y 6/1), glutinous, silty	1.6	3.2
Lower Peat	Peat, dark brown, fibrous, woody	1.6	4.8
Crowland Bed	Sandy silt, light grey (5Y 6/1), thixotropic	0.2	5.0
River Terrace Deposits	Sandy gravel Gravel: fine with some coarse, subangular to rounded, white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint	5.9	10.9
Upper Jurassic (undivided)	Clay, medium dark grey (N4), firm, silty	1.1+	12.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
3	57	40	5.0-6.0	10	0	30	28	30	2	0
			6.0-7.0	1	6	29	26	31	7	0
			7.0-8.0	1	7	29	24	34	5	0
			8.0-9.0	1	10	35	23	27	4	0
			9.0-10.0	0	4	20	23	37	16	0
			10.0-10.9	3	4	18	28	38	9	0
			Mean	**3**	**5**	**27**	**25**	**33**	**7**	**0**

TL 38 NE 18 **3593 8610** **Highside Farm, Chatteris** **Block B**

Surface level c.+1.0 m
Water struck at c.-3.2 m
December 1980

Overburden 4.2 m
Mineral 2.1 m
Bedrock 0.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Made ground	0.2	0.2
Nordelph Peat	Peat, dark brownish black, friable, silty	0.8	1.0
Terrington Beds	Clayey silt, moderate yellowish brown (10YR 5/4) becoming olive grey with depth, micaceous, stiff, laminated	2.5	3.5
Barroway Drove Beds	Clayey silt, olive grey (5Y 3/2), glutinous	0.7	4.2

River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular, quartz with flint	2.1	6.3
Upper Jurassic (undivided)	Clay, medium bluish grey (5B 5/1), stiff, silty	0.7+	7.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
3	61	36	4.2-5.6	4	4	19	32	36	5	0
			5.6-6.3	2	3	26	43	23	3	0
			Mean	**3**	**4**	**21**	**36**	**32**	**4**	**0**

TL 38 NE 19 **3689 8578** **Hawthorn, Chatteris**

Surface level c.0.0 m
Water not struck
December 1980

Waste 4.9 m
Bedrock 1.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.4	1.4
Barroway Drove Beds	Clay, medium light grey (N6) and light olive grey (5Y 6/1), glutinous	1.7	3.1
Lower Peat	Peat, dark brown, fibrous, woody	0.6	3.7
Crowland Bed	Sandy silt, light olive grey (5Y 6/1), thixotropic, some medium and coarse subangular quartz sand	1.2	4.9
Upper Jurassic (undivided)	Clay, medium dark grey (N4), firm, silty	1.1+	6.0

TL 38 NE 20 **3797 8538** **Acre Fen, Chatteris**

Surface level c.0.0 m
Water not struck
December 1980

Waste 4.0 m
Bedrock 1.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.6	1.6
Barroway Drove Beds	Silt, brownish grey, glutinous	1.2	2.8
Lower Peat	Peat, dark brown, fibrous, woody	0.9	3.7
Crowland Bed	Silt, brownish grey (5YR 4/1), thixotropic	0.3	4.0
Upper Jurassic (undivided)	Clay, medium bluish grey, firm, silty	1.7+	5.7

TL 38 NE 21 **3950 8540** **Mill End, Chatteris** **Block A**

Surface level c.+10.0 m
Water struck at c.+8.6 m
November 1980

Overburden 0.5 m
Mineral 0.9 m
Bedrock 1.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Made ground	0.5	0.5
March Gravels	'Clayey' sandy gravel Gravel: fine with some coarse, subangular white and brown with black flint, occasional subrounded oolitic limestone Sand: medium with fine and coarse, subangular quartz with flint Fines: light brown (5YR 5/6) clay	0.9	1.4
Upper Jurassic (undivided)	Clay, light brown (5YR 5/6) and light grey (N7), firm, silty	0.4	1.8
	Clay, medium dark grey (N4), firm, silty	1.2+	3.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
13	46	41	0.5-1.4	13	10	25	11	32	9	0

TL 38 SW 1 **3194 8434** **Dovehouse Farm, Ramsey**

Surface level c.0.0 m
Water struck at c.-5.9 m
December 1980

Waste 7.7 m
Bedrock 1.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.2	1.2
Barroway Drove Beds	Clay, medium light grey (N6), glutinous, silty	0.6	1.8
Lower Peat	Peat, dark brown, fibrous, woody	2.0	3.8
Crowland Bed	Clayey silt, medium light grey (N6) and light olive grey (5Y 6/1), thixotropic	2.1	5.9
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to subrounded, white and brown with some black flint, occasional sub-rounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint	1.8	7.7
Upper Jurassic (undivided)	Clay, medium grey (N5), firm, silty	1.3+	9.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
1	61	38	5.9-7.7	1	5	34	22	36	2	0

TL 38 SW 2 **3276 8433** **Lants Farm, Warboys** **Block C**

Surface level c.+1.0 m
Water struck at c.-4.0 m
December 1980

Overburden 5.0 m
Mineral 5.5 m
Bedrock 1.5+ m

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	0.4	0.4
Terrington Beds	Silt, dusky yellow (5Y 6/4) and light olive brown (5Y 5/6), thixotropic	3.1	3.5
	Sandy silt, medium dark grey (N4)	1.5	5.0
	a 'Very clayey' sand Sand: coarse with medium and some fine, sub-angular quartz with occasional flint Fines: medium dark grey (N4) clay	4.0	9.0
River Terrace Deposits	**b** Gravel Gravel: fine with some coarse, subangular white and brown with some black flint, occasional sub-rounded oolitic limestone and rounded quartz Sand: coarse with medium and some fine, sub-angular quartz with flint	1.5	10.5
Upper Jurassic (undivided)	Clay, medium grey (N5), firm, silty	1.5+	12.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines	Sand			Gravel		
					$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
a	21	78	1	5.0-7.0	22	74	2	1	1	0	0
				7.0-9.0	20	75	3	1	1	0	0
				Mean	**21**	**75**	**2**	**1**	**1**	**0**	**0**
b	3	40	57	9.0-10.5	3	5	13	22	45	12	0
a+b	**16**	**68**	**16**	**5.0-10.5**	**16**	**56**	**5**	**7**	**13**	**3**	**0**

TL 38 SW 3 **3389 8406** **Red Tile Farm, Warboys** **Block C**

Surface level c.0.0 m
Water struck at c.-5.0 m
December 1980

Overburden 5.0 m
Mineral 2.4 m
Bedrock 1.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, silty	0.4	0.4
Barroway Drove Beds	Silt, dusky yellow (5Y 6/4) and light olive brown (5Y 5/6), firm	2.1	2.5
	Clay, light olive grey (5Y 6/1), glutinous	1.0	3.5
Lower Peat	Peat, dark brown, fibrous, woody	0.7	4.2
Crowland Bed	Sandy silt, medium grey (N5), thixotropic	0.8	5.0
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional sub-rounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint	2.4	7.4
Upper Jurassic (undivided)	Clay, medium grey (N5), firm, silty	1.6+	9.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines	Sand			Gravel		
					$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
	2	61	37	5.0-6.0	3	9	35	19	32	2	0
				6.0-7.4	2	6	31	22	37	2	0
				Mean	**2**	**7**	**33**	**21**	**35**	**2**	**0**

TL 38 SW 4 **3143 8311** **May Bush Farm, Warboys**

Surface level c.-1.0 m
Water struck at c.-7.3 m
December 1980

Waste 7.3 m
Bedrock 1.7+ m

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.5	1.5
Barroway Drove Beds	Clay, medium light grey (N6), glutinous	1.5	3.0
Lower Peat	Peat, dark brown, much wood debris	2.5	5.5
Crowland Bed	Silt, medium light grey (N6) and light olive grey (5Y 6/1), thixotropic	0.8	6.3
River Terrace Deposits	Gravel Gravel: fine, subangular, white and brown with some black flint, occasional oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint	1.0	7.3
Upper Jurassic (undivided)	Clay, medium grey (N5), firm, silty	1.7+	9.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	$+1-4$	$+4-16$	$+16-64$	$+64$ mm
1	43	56	6.3-7.3	1	3	16	24	54	2	0

TL 38 SW 5 **3229 8339** **Blue Dog, Warboys** **Block C**

Surface level c.0.0 m
Water struck at c.-6.1 m
December 1980

Overburden 6.1 m
Mineral 2.5 m
Bedrock 1.4+ m

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.5	1.5
Barroway Drove Beds	Clay, light olive grey (5Y 6/1), glutinous	1.9	3.4
Lower Peat	Peat, dark brown, fibrous, woody	2.1	5.5
Crowland Bed	Clayey silt, medium grey (N5), thixotropic	0.6	6.1
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional sub-rounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint	2.5	8.6
Upper Jurassic (undivided)	Clay, medium grey (N5), firm, silty	1.4+	10.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
1	66	33	6.1-7.1	1	7	26	22	43	1	0
			7.1-8.6	1	4	34	35	26	0	0
			Mean	**1**	**5**	**31**	**30**	**32**	**1**	**0**

COMPOSITION

Depth below surface (m)	Percentages by weight in +8 -16 mm fraction					
	Flint					
	brown	white	black	Limestone	Quartz	Others
6.1-8.6	39	42	2	6	6	5

TL 38 SW 6 **3341 8334** **New Barn Farm, Warboys** **Block C**

Surface level c.0.0 m
Water struck at c.-6.0 m
December 1980

Overburden 6.0 m
Mineral 2.5 m
Bedrock 1.5+ m

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.3	1.3
Barroway Drove Beds	Clay, medium light grey (N6), glutinous, silty	1.3	2.6
Lower Peat	Peat, dark brown, fibrous, woody	1.9	4.5
Crowland Bed	Silt, medium light grey (N6) and light olive grey (5Y 6/1), thixotropic	1.5	6.0
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: coarse with medium, subangular quartz with flint	2.5	8.5
Upper Jurassic (undivided)	Clay, medium dark grey (N4), firm, silty	1.5+	10.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
4	53	43	6.0-7.0	3	4	15	34	41	3	0
			7.0-8.5	4	4	20	29	40	3	0
			Mean	**4**	**4**	**18**	**31**	**40**	**3**	**0**

TL 38 SW 7 **3385 8217** **New Broad Pool, Warboys**

Surface level c.0.0 m
Water struck at c.-7.2 m
November 1980

Waste 8.1 m
Bedrock 1.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.3	1.3
Barroway Drove Beds	Clay, medium light grey (N6), glutinous	2.2	3.5
Lower Peat	Peat, dark brown, fibrous, woody	3.2	6.7
Crowland Bed	Clay, medium light grey (N6), thixotropic	0.5	7.2
River Terrace Deposits	Sandy gravel Gravel: fine, subangular white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: coarse with medium, subangular quartz with flint	0.9	8.1
Upper Jurassic (undivided)	Clay, medium light grey (N6) becoming medium grey (N5) with depth, firm, silty	1.9+	10.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
1	53	46	7.2-8.1	1	2	16	35	38	8	0

TL 38 SW 8 **3493 8181** **High Fen Bridge Farm, Warboys** **Block C**

Surface level c.+1.0 m
Water struck at c.-3.2 m
November 1980

Overburden 4.2 m
Mineral 3.3 m
Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.5	1.5
Barroway Drove Beds	Clay, medium grey (N5), glutinous	0.4	1.9
Lower Peat	Peat, dark brown, fibrous, woody	0.9	2.8
Crowland Bed	Sandy silt, medium grey (N5), some fine and medium subangular quartz sand	1.4	4.2
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint	3.3	7.5
Upper Jurassic (undivided)	Clay, medium grey (N5), firm, silty	1.5+	9.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
2	61	37	4.2-5.2	2	8	29	28	31	2	0
			5.2-6.2	2	2	30	26	38	2	0
			6.2-7.5	3	5	26	31	33	2	0
			Mean	**2**	**5**	**28**	**28**	**35**	**2**	**0**

TL 38 SW 9 **3486 8412** **Tick Fen, Warboys** **Block C**

Surface level c.0.0 m
Water struck at c.-3.8 m
December 1980

Overburden 3.8 m
Mineral 3.8 m
Bedrock 0.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.2	1.2
Barroway Drove Beds	Clayey silt, olive grey (5Y 3/2), glutinous	1.0	2.2
Lower Peat	Peat, dark brown, fibrous, woody	0.8	3.0
Crowland Bed	Silt, greyish brown (5YR 5/2), thixotropic	0.8	3.8
River Terrace Deposits	Sandy gravel Gravel: fine, subangular white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint	3.8	7.6
Upper Jurassic (undivided)	Clay, olive grey, firm, silty	0.8+	8.4

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
4	54	42	3.8-4.4	8	14	24	17	32	5	0
			4.4-5.8	2	5	26	24	38	5	0
			5.8-6.9	1	4	33	20	34	8	0
			6.9-7.6	11	3	28	16	32	10	0
			Mean	**4**	**6**	**28**	**20**	**36**	**6**	**0**

TL 38 SE 1 **3666 8491** **Gaunt Fen** **Block C**

Surface level c.0.0 m
Water struck at c.-4.3 m
December 1980

Overburden 4.3 m
Mineral 4.0 m
Bedrock 1.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.0	1.0
Barroway Drove Beds	Clay, light olive grey (5Y 6/1), glutinous	1.5	2.5
Lower Peat	Peat, dark brown, fibrous, woody	1.5	4.0
Crowland Bed	Silt, light olive grey (5Y 6/1), glutinous	0.3	4.3
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium with coarse, subangular quartz with flint	4.0	8.3
Upper Jurassic (undivided)	Clay, medium dark grey (N4), firm, silty	1.7+	10.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
2	71	27	4.3-5.3	3	10	38	18	25	6	0
			5.3-6.3	3	9	45	20	20	3	0
			6.3-7.3	2	8	47	17	24	2	0
			7.3-8.3	1	6	41	22	24	6	0
			Mean	**2**	**8**	**44**	**19**	**23**	**4**	**0**

TL 38 SE 2 **3560 8469** **Tick Fen, Warboys** **Block C**

Surface level c.0.0 m
Water struck at c.-4.1 m
December 1980

Overburden 4.1 m
Mineral 4.0 m
Bedrock 0.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	0.5	0.5
Barroway Drove Beds	Clay, light olive grey (5Y 6/1), glutinous, silty	2.4	2.9
Lower Peat	Peat, dark brown, fibrous, woody	0.2	3.1
Crowland Bed	Sandy silt, light olive grey (5Y 6/1), thixotropic	1.0	4.1
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional sub-rounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint	4.0	8.1
Upper Jurassic (undivided)	Clay, medium grey (N5), firm, silty	0.9+	9.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
1	61	38	4.1-5.1	2	6	30	24	33	5	0
			5.1-6.1	1	6	38	27	27	1	0
			6.1-7.1	1	3	27	21	34	14	0
			7.1-8.1	1	3	33	24	33	6	0
			Mean	**1**	**5**	**32**	**24**	**32**	**6**	**0**

TL 38 SE 3 **3670 8377** **Gray's Farm, Warboys** **Block C**

Surface level c.0.0 m
Water struck at c.-4.3 m
December 1980

Overburden 4.3 m
Mineral 3.4 m
Bedrock 1.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.0	1.0
Barroway Drove Beds	Clay, light olive grey (5Y 6/1), glutinous, silty	0.8	1.8
Lower Peat	Peat, dark brown, fibrous, woody	1.9	3.7
Crowland Bed	Sandy silt, light olive grey (5Y 6/1), glutinous	0.6	4.3
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional sub-rounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint	3.4	7.7
Upper Jurassic (undivided)	Clay, medium dark grey (N4), firm silty	1.3+	9.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
1	69	30	4.3-5.3	2	10	34	23	28	3	0
			5.3-6.3	2	9	35	23	29	2	0
			6.3-7.7	1	5	45	20	23	6	0
			Mean	**1**	**8**	**39**	**22**	**26**	**4**	**0**

TL 38 SE 4 **3910 8462** **Tithebarn Farm, Chatteris** **Block A**

Surface level c.9.0 m
Water not struck
November 1980

Overburden 0.7 m
Mineral 2.1 m
Bedrock 1.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.7	0.7
March Gravels	'Very clayey' sandy gravel Gravel: fine, subangular to rounded, brown and white flint Sand: fine and medium, subangular quartz with flint Fines: moderate brown (5YR 4/4) and light brown (5YR 5/6) silt	2.1	2.8
Upper Jurassic (undivided)	Clay, medium dark grey (N4), firm, silty	1.2+	4.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
33	46	21	0.7-1.7	35	21	19	7	16	1	1
			1.7-2.8	33	20	15	9	20	3	0
			Mean	**33**	**21**	**17**	**8**	**18**	**2**	**1**

TL 38 SE 5 **3963 8460** **Tithebarn Farm, Chatteris** **Block A**

Surface level c.8.0 m
Water not struck
November 1980

Overburden 0.7 m
Mineral 1.3 m
Waste 0.5 m
Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.7	0.7
March Gravels	'Very clayey' sandy gravel Gravel: fine, subangular to rounded, white and brown flint, with occasional subrounded oolitic limestone Sand: medium with some fine and coarse, subangular quartz with flint Fines: moderate brown (5YR 4/4) clay and silt	1.3	2.0
? Head	Clay, very light grey (N8), traces of fine subangular white flints	0.5	2.5
Upper Jurassic (undivided)	Clay, medium dark grey (N4), firm, silty	1.5+	4.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
28	42	30	0.7-1.6	26	11	25	8	26	4	0
			1.6-2.0	35	5	23	10	26	1	0
			Mean	**28**	**9**	**24**	**9**	**27**	**3**	**0**

TL 38 SE 6 **3503 8307** **Drop Farm, Chatteris** **Block C**

Surface level c.0.0 m
Water struck at c.-4.5 m
November 1980

Overburden 4.5 m
Mineral 2.5 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.6	1.6
Barroway Drove Beds	Clay, medium grey (N5), glutinous	1.1	2.7
Lower Peat	Peat, dark brown, fibrous, woody	0.7	3.4
Crowland Bed	Sandy silt, medium grey (N5), thixotropic	1.1	4.5
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional sub-rounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz and flint	2.5	7.0
Upper Jurassic (undivided)	Clay, medium grey (N5), firm, silty	1.0+	8.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
2	63	35	4.5-5.5	3	9	35	20	28	5	0
			5.5-6.5	1	6	29	28	35	1	0
			6.5-7.0	1	6	35	26	31	1	0
			Mean	**2**	**7**	**32**	**24**	**32**	**3**	**0**

TL 38 SE 7 **3597 8307** **Siding Drove, Somersham** **Block C**

Surface level c.0.0 m
Water struck at c.-4.1 m
November 1980

Overburden 4.1 m
Mineral 3.2 m
Bedrock 1.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.5	1.5
Barroway Drove Beds	Clay, medium grey (N5), glutinous, silty	1.7	3.2
Lower Peat	Peat, brown, fibrous, woody	0.9	4.1
River Terrace Deposits	Sandy gravel Gravel: fine, angular to subrounded, white and brown with some black flint, occasional sub-rounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint	3.2	7.3
Upper Jurassic (undivided)	Clay, medium light grey (N6), firm, silty	1.2+	8.5

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
1	51	48	4.1-5.1	2	4	18	17	51	8	0
			5.1-6.1	0	4	28	21	39	8	0
			6.1-7.3	1	5	34	20	35	5	0
			Mean	**1**	**4**	**27**	**20**	**41**	**7**	**0**

COMPOSITION

Depth below surface (m)	Percentages by weight in +8 -16 mm fraction					
	Flint					
	brown	white	black	Limestone	Quartz	Others
4.1 - 7.3	55	17	6	5	8	9

TL 38 SE 8 **3839 8326** **Pickle Fen, Chatteris** **Block D**

Surface level c.+1.0m
Water struck at c.-2.5m
November 1980

Overburden 3.5 m
Mineral 4.1 m
Bedrock 0.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.1	1.1
Barroway Drove Beds	Clay, medium grey (N5), glutinous, silty, peaty at base	0.6	1.7
Lower Peat	Peat, dark brown, fibrous, woody	1.1	2.8
Crowland Bed	Sandy clay, medium grey (N5), thixotropic	0.7	3.5
River Terrace Deposits	Sandy gravel Gravel: fine with coarse, subangular white and brown with some black flint, occasional sub-rounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint	4.1	7.6
Upper Jurassic (undivided)	Clay, medium dark grey (N4), firm, silty	0.9+	8.5

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
2	58	40	3.5 - 4.5	2	10	36	18	30	4	0
			4.5 - 5.5	0	6	26	21	40	7	0
			5.5 - 6.5	1	3	32	25	35	4	0
			6.5 - 7.6	3	6	27	22	35	7	0
			Mean	**2**	**6**	**30**	**22**	**35**	**5**	**0**

TL 38 SE 9 **3611 8199** **Mill Farm, Somersham** **Block C**

Surface level c.0.0 m
Water struck at c.-5.5 m
November 1980

Overburden 5.5 m
Mineral 1.8 m
Bedrock 1.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.0	1.0
Barroway Drove Beds	Clay, medium grey (N5), glutinous	1.4	2.4
Lower Peat	Peat, dark brown, fibrous, woody	1.7	4.1
Crowland Bed	Silty clay, medium grey (N5), thixotropic	1.4	5.5
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional sub-rounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint	1.8	7.3
Upper Jurassic (undivided)	Clay, medium light grey (N6), firm, silty	1.2+	8.5

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
2	56	42	5.5-6.5	2	3	30	23	36	6	0
			6.5-7.3	1	2	25	28	39	5	0
			Mean	**2**	**3**	**28**	**25**	**37**	**5**	**0**

TL 38 SE 10 **3762 8227** **Colne Fen Farm, Somersham** **Block D**

Surface level c.+1.0 m
Water struck at c.-4.4 m
November 1980

Overburden 5.4 m
Mineral 2.5 m
Bedrock 1.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.0	1.0
Barroway Drove Beds	Clay, medium grey (N5), glutinous	1.1	2.1
Lower Peat	Peat, dark brown, fibrous, woody	1.4	3.5
Crowland Bed	Silty clay, medium grey (N5), thixotropic	1.9	5.4
River Terrace Deposits	Sandy gravel Gravel: fine with some coarse, subangular to rounded, white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint	2.5	7.9
Upper Jurassic (undivided)	Clay, medium light grey (N6), firm, silty	1.1+	9.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
4	52	44	5.4-6.4	3	5	32	20	34	6	0
			6.4-7.9	5	5	20	22	39	9	0
			Mean	**4**	**5**	**25**	**22**	**36**	**8**	**0**

TL 38 SE 11 **3880 8240** **Ferry Burrows** **Block D**

Surface level c.+1.0 m
Water struck at c.-3.5 m
November 1980

Overburden 2.6 m
Mineral 4.4 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.2	1.2
Barroway Drove Beds	Clay, medium grey (N5), glutinous	0.8	2.0
Lower Peat	Peat, dark brown, fibrous, woody	0.6	2.6
Crowland Bed	**a** 'Very clayey' pebbly sand, thixotropic Gravel: fine, subangular white and brown flint Sand: fine and medium, subangular quartz with flint Fines: light brown (5YR 5/6)	1.9	4.5
River Terrace Deposits	**b** Sandy gravel Gravel: fine, subangular white and brown with occasional black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium with fine and coarse, subangular quartz with flint	2.5	7.0
Upper Jurassic (undivided)	Clay, medium dark grey (N4), firm, silty	1.0+	8.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines	Sand			Gravel		
					$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
a	21	65	14	2.6-3.6	19	23	35	7	16	0	0
				3.6-4.5	23	20	39	7	11	0	0
				Mean	**21**	**22**	**36**	**7**	**14**	**0**	**0**
b	2	55	43	4.5-5.5	3	9	23	19	44	2	0
				5.5-6.5	1	5	28	22	30	14	0
				6.5-7.0	2	6	34	20	32	6	0
				Mean	**2**	**7**	**27**	**21**	**35**	**8**	**0**
a+b	**10**	**60**	**30**	**2.6-7.0**	**10**	**13**	**32**	**15**	**26**	**4**	**0**

TL 38 SE 12 **3988 8286** **Horseley Fen Farm** **Block D**

Surface level c.+1.0 m
Water not struck
November 1980

Overburden 0.8 m
Mineral 1.8 m
Bedrock 1.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.8	0.8
River Terrace Deposits	'Clayey' sandy gravel Gravel: fine, subangular to rounded, white and brown flint Sand: medium and coarse, subangular quartz with flint Fines: light brown (5YR 5/6) silt	1.8	2.6
Upper Jurassic (undivided)	Clay, medium dark grey (N4), firm, silty	1.4+	4.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
10	55	35	0.8-1.8	12	11	33	16	27	1	0
			1.8-2.6	7	5	21	23	41	3	0
			Mean	**10**	**8**	**28**	**19**	**33**	**2**	**0**

TL 38 SE 13 **3551 8071** **Warners Drove, Somersham**

Surface level c.+1.0 m
Water not struck
November 1980

Waste 4.2 m
Bedrock 1.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.1	1.1
Barroway Drove Beds	Clay, medium grey (N5), soft, glutinous	1.1	2.2
Lower Peat	Peat, dark brown, fibrous, woody	0.8	3.0
Crowland Bed	Sandy silt, medium grey (N5), thixotropic	1.2	4.2
Upper Jurassic (undivided)	Clay, medium grey (N5), firm, silty	1.8+	6.0

TL 38 SE 14 **3696 8136** **Mill Farm, Somersham** **Block D**

Surface level c.+1.0 m
Water struck at c.-3.8 m
November 1980

Overburden 4.8 m
Mineral 4.6 m
Bedrock 1.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	0.9	0.9
Barroway Drove Beds	Clay, medium light grey (N6), glutinous	2.0	2.9
Lower Peat	Peat, dark brown, fibrous, woody	1.9	4.8
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium with coarse, subangular quartz with flint	4.6	9.4
Upper Jurassic (undivided)	Clay, medium light grey (N6), firm, silty	1.1+	10.5

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
3	69	28	4.8-5.8	3	6	36	21	30	4	0
			5.8-6.8	2	5	28	26	37	2	0
			6.8-7.8	2	6	45	20	27	0	0
			7.8-9.4	3	6	58	17	15	1	0
			Mean	**3**	**5**	**43**	**21**	**26**	**2**	**0**

TL 38 SE 15 **3811 8124** **Old Halves, Chatteris** **Block D**

Surface level c.+1.0 m
Water struck at c.-2.7 m
November 1980

Overburden 3.7 m
Mineral 3.7 m
Bedrock 1.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.6	1.6
Barroway Drove Beds	Clay, medium grey (N5), glutinous	0.5	2.1
Lower Peat	Peat, brown, fibrous, woody	0.6	2.7
Crowland Bed	Sandy silt, medium grey (N5), thixotropic	1.0	3.7
River Terrace Deposits	Sandy gravel Gravel: fine with some coarse, subangular white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint	3.7	7.4
Upper Jurassic (undivided)	Clay, medium light grey (N6), firm, silty	1.6+	9.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
1	61	38	3.7-4.7	2	8	35	24	28	3	0
			4.7-5.7	1	4	32	19	34	10	0
			5.7-6.7	0	8	30	19	29	12	2
			6.7-7.4	2	10	41	18	22	7	0
			Mean	**1**	**7**	**34**	**20**	**29**	**8**	**1**

COMPOSITION

Depth below surface (m)	Percentages by weight in +8 -16 mm fraction					
	Flint					
	brown	white	black	Limestone	Quartz	Others
3.7-7.4	52	16	5	6	9	12

TL 38 SE 16 **3966 8133** **Long North Fen Drove, Sutton** **Block D**

Surface level c.0.0 m
Water struck at c.-4.1 m
November 1980

Overburden 2.0 m
Mineral 3.2 m
Bedrock 1.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.3	1.3
Barroway Drove Beds	Clay, medium dark grey (N4), glutinous, silty	0.7	2.0
River Terrace Deposits	Gravel Gravel: fine with coarse, subangular to rounded, white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint	3.2	5.2
Upper Jurassic (undivided)	Clay, medium dark grey (N4), firm, silty	1.3+	6.5

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
3	40	57	2.0-3.0	8	7	22	17	40	6	0
			3.0-4.0	1	2	17	12	50	18	0
			4.0-5.2	1	2	26	16	46	9	0
			Mean	**3**	**3**	**22**	**15**	**46**	**11**	**0**

TL 38 SE 17 **3679 8022** **Parkhall, Somersham** **Block E**

Surface level c.+5.0 m
Water struck at c.+0.5 m
November 1980

Overburden 0.3 m
Mineral 8.2 m
Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Topsoil	0.3	0.3
River Terrace Deposits	**a** 'Clayey' pebbly sand Gravel: fine, subangular white and brown flint Sand: fine and medium with coarse, subangular quartz with flint	2.0	2.3
	b Sandy gravel Gravel: fine, subangular white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: fine and medium with coarse, subangular quartz with flint	6.2	8.5
Upper Jurassic (undivided)	Clay, medium grey (N5), firm, silty	1.5+	10.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines	Sand			Gravel		
					$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
a	11	71	18	0.3-1.3	21	49	22	5	3	0	0
				1.3-2.3	2	5	40	21	27	5	0
				Mean	**11**	**27**	**31**	**13**	**15**	**3**	**0**
b	5	65	30	2.3-3.3	4	19	23	18	35	1	0
				3.3-4.3	2	16	14	27	40	1	0
				4.3-5.3	3	5	32	28	31	1	0
				5.3-6.3	2	10	57	10	13	8	0
				6.3-7.3	19	57	18	3	3	0	0
				7.3-8.5	1	4	31	21	40	3	0
				Mean	**5**	**18**	**29**	**18**	**28**	**2**	**0**
a+b	**7**	**66**	**27**	**0.3-8.5**	**7**	**20**	**30**	**16**	**24**	**3**	**0**

TL 38 SE 18 **3798 8043** **Holwoods House, Somersham** **Block D**

Surface level c.+1.0 m
Water struck at c.-2.0 m
November 1980

Overburden 3.6 m
Mineral 5.0 m
Bedrock 1.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Alluvium	Clay, light grey (N7), thixotropic	0.6	0.6
Nordelph Peat	Peat, dark brown, fibrous	1.2	1.8
Barroway Drove Beds	Clay, medium grey (N5), glutinous	1.8	3.6
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional subrounded oolitic limestone and rounded quartz Sand: medium with coarse, subangular quartz with flint	5.0	8.6
Upper Jurassic (undivided)	Clay, medium light grey (N6), firm, silty	1.4+	10.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	$+1-4$	$+4-16$	$+16-64$	$+64$ mm
2	65	33	3.6-4.6	1	2	41	21	26	9	0
			4.6-5.6	2	6	35	25	29	3	0
			5.6-6.6	2	9	38	21	26	4	0
			6.6-7.6	2	5	37	24	29	3	0
			7.6-8.6	2	9	31	21	34	3	0
			Mean	**2**	**6**	**37**	**22**	**29**	**4**	**0**

TL 38 SE 19 **3927 8019** **Chatteris Fen** **Block D**

Surface level c.0.0 m
Water struck at c.-3.4 m
November 1980

Overburden 3.4 m
Mineral 2.8 m
Bedrock 1.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Nordelph Peat	Peat, dark brownish black, friable, silty	1.2	1.2
Barroway Drove Beds	Clay, medium grey (N5), glutinous, silty	0.7	1.9
Lower Peat	Peat, dark brown, fibrous, woody	0.5	2.4
Crowland Bed	Sandy silt, medium grey (N5), thixotropic	1.0	3.4
River Terrace Deposits	Sandy gravel Gravel: fine, subangular to rounded, white and brown with some black flint, occasional sub-rounded oolitic limestone and rounded quartz Sand: medium and coarse, subangular quartz with flint	2.8	6.2
Upper Jurassic (undivided)	Clay, medium dark grey (N4), firm, silty	1.3+	7.5

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				$-\frac{1}{16}$	$+\frac{1}{16}-\frac{1}{4}$	$+\frac{1}{4}-1$	+1 -4	+4 -16	+16 -64	+64 mm
2	59	39	3.4-4.4	2	8	28	19	35	8	0
			4.4-5.4	3	4	26	28	36	3	0
			5.4-6.2	1	6	32	27	29	5	0
			Mean	**2**	**6**	**29**	**24**	**34**	**5**	**0**

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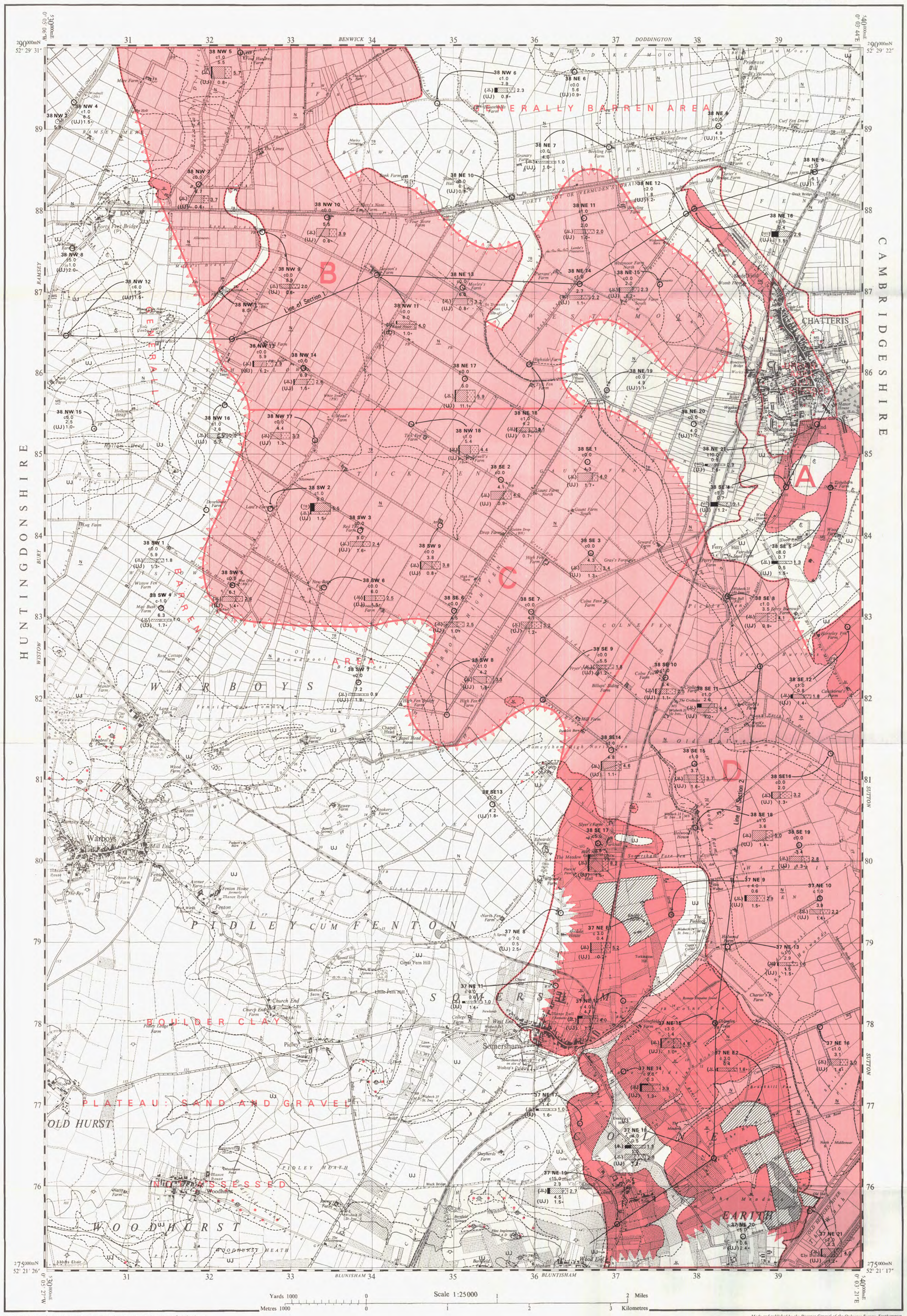
INSTITUTE OF GEOLOGICAL SCIENCES
INDUSTRIAL MINERALS ASSESSMENT UNIT

THE SAND AND GRAVEL RESOURCES OF THE COUNTRY AROUND CHATTERIS, CAMBRIDGESHIRE

Scale 1:25 000 or about 2½ Inches to 1 Mile

ORDNANCE SURVEY
SHEET TL 38 & Pt TL 37
PROVISIONAL EDITION



THE SAND AND GRAVEL RESOURCES OF THE COUNTRY AROUND CHATTERIS, CAMBRIDGESHIRE

124

This map should be read in conjunction with the accompanying Report which contains details of the assessment of the resources

EXPLANATION OF SYMBOLS AND ABBREVIATIONS

DRIFT

RECENT
- **Alluvium** — grey clays and silts A-26
- **Terrington Beds** — grey, thixotropic silts and clays TB-2
- **Nordelph Peat** — black silty peat NP-4

PLEISTOCENE
- **River Terrace Deposits (undifferentiated)** — fine and coarse flint gravels and sandy gravel RT-32
- **March Gravels** — 'clayey' sands and flint gravels MAG-2
- **Head** — grey clay with flint pebbles H-51
- **Glacial Sand and Gravel** — 'clayey', sandy, flint gravel GS-79
- **Boulder Clay** — stiff grey stony clay BC-48

SOLID

UPPER JURASSIC
- **Upper Jurassic (undivided)** — dark and pale grey clays with cementstones UJ

- **Worked out areas of sand and gravel** WO-9

BOUNDARY LINES

- Geological boundary, Drift
- Inferred boundary between recognised categories of deposits
- Resource Block boundary

BOREHOLE DATA

SITE LOCATIONS

- Industrial Minerals Assessment Unit (I.M.A.U.) Boreholes
- Other Boreholes

I.M.A.U. BOREHOLES

Borehole Registration Number → 37 NE 18
Borehole Site → ⊙ c4.0 ← Surface level in metres above O.D. (Newlyn)
0.5 ← Overburden
Geological Classification → (UJ) 1.5+ ← Mineral (sand and gravel)
1.0+ ← Waste
(UJ) 2.8+ ← Mineral (sand and gravel)
(UJ) 1.2+ ← Bedrock
Thickness in metres

Note:
(i) Figures underlined denote thicknesses used in the assessment of resources
(ii) The + sign indicates that the base of the deposit was not reached
(iii) The Geological Classification is given only for mineral and bedrock

Borehole Registration Number

Each I.M.A.U. borehole is identified by a Registration Number, eg. NE 18. The letters refer to the quarter sheet and the figures to the I.G.S. serial number for that quarter. The unique designation for borehole NE 18 is TL 37 NE 18.

Grading Diagrams

Each grading diagram shows the mean particle size distribution of a distinct deposit of mineral.

Sand (+ 1/16 -4mm)
Fines (-1/16 mm) Gravel (+ 4 mm)

The height of the diagram is proportional to the mineral thickness

The widths of the divisions shows the proportions of **Fines, Sand** and **Gravel,** but small amounts of gravel may be omitted or exaggerated.

OTHER BOREHOLES

The layout of information is the same as for I.M.A.U. boreholes although data available may not be as comprehensive. They are registered in the same series.

EXPOSURE RECORDS

Information from the inspection of river and quarry sections is shown in the same way as for boreholes but it is located by an asterisk thus*. They are registered in their own series and have prefix E.

CATEGORIES OF DEPOSITS

- **Exposed mineral** CAT-E6
- **Continuous or almost continuous spreads of mineral beneath overburden.** CAT-C1
- **Sand and gravel either not potentially workable (see Report) or absent.** CAT-A2
- **Sand and gravel not assessed.** CAT-N1

Where appropriate on other sheets a fifth category 'Discontinuous spreads of sand and gravel beneath overburden' is recognised.

RESOURCE BLOCKS

For the purpose of assessment, the mineral is divided into Resource Blocks (see Report). Each is designated by a letter.

Sections 1 and 2 form Figure 2 of the Report.

Detailed records may be consulted on application to the Head, Industrial Minerals Assessment Unit, Institute of Geological Sciences, Nicker Hill, Keyworth, Nottingham, NG12 5GG.

Diagram showing the relationship of this sheet with the National Grid 1 : 25,000 sheets and the One-inch Geological Sheets 172 and 187.

The representation on this map of a Road, Track, or Footpath, is no evidence of the existence of a right of way.

Made and published by the Director General of the Ordnance Survey, Southampton. Reprinted with minor corrections 1958.

Sand and Gravel survey by J.R. Gozzard in 1980 - 81.
R.G. Thurrell, Head, Industrial Minerals Assessment Unit.

1 : 25,000 Sand and Gravel Resource Sheet published 1983.
G.M. Brown, D.Sc., F.R.S., F.R.S.E., Director, Institute of Geological Sciences.

Drawn and printed for the Institute of Geological Sciences by Cook Hammond & Kell Ltd., Mitcham and Westminster.

The GRID lines on this sheet are at 1 Kilometre interval.
Heights are in feet above Mean Sea Level at Newlyn.

Contour values are in feet

1 square inch on this map represents 99 639 acres on the ground.

Data quoted for an individual borehole refer strictly to that site; reliable conclusions cannot be drawn about the thickness and grading elsewhere in the deposit, particularly in material as variable as sand and gravel. However, estimates of the volume and mean grading of the mineral as a whole in each Resource Block are given in the Report.

Compiled from 6" sheets last fully revised 1924-25.
Other partial systematic revision 1937-50 has been incorporated.

Derivation of geological lines

(a)	*(a) Geological interpretation by R.W. Gallois of a six-inch soil survey by R.S. Seale in 1974; K.E. Clare, Head of Soil Survey. R.A.B. Bazley, District Geologist, I.G.S.*
(b)	*(b) Original geological survey on one-inch scale, by W. Whitaker, H.B. Woodward, S.J. Burnett, A.C. Cameron, S.B.J. Skertchley, C.E. Hawkins, C. Reid, C. Barrow, published in 1886. W. Whitaker and H.W. Bristow, Supervisors.*
(c)	*(c) Geological survey on six-inch scale by E.E.L. Dixon, R.L. Sherlock and S.E. Hollingworth, 1930 - 1939; revised in the east by S.C.A. Holmes and A. Horton, 1970. C.H. Dinham, F.H. Edmunds and S.C.A. Holmes, District Geologists.*