

The sand and gravel resources of the country around Redgrave, Suffolk

Description of 1:25 000 sheet TM 07 and part of TM 08

C. A. Auton

Institute of Geological Sciences

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partings (up to 5 cm thick) of Glacial Silt and Boulder Clay within the sand and gravel.

River Terrace Deposits The mean grading of the River Terrace Deposits is fines 8 per cent, sand 87 per cent and gravel 5 per cent, which classifies them overall as pebbly sand. The deposits show little variation in grading and composition between the three mapped terrace levels (see Figure 6) which have therefore been assessed together in Block C.

The +8 -16 mm gravel fraction is composed mostly of angular flint; subordinate constituents include

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.

Any enquiries concerning this report may be addressed to Head, Industrial Minerals Assessment Unit, Institute of Geological Sciences, Keyworth, Nottingham NG12 5GG.

The asterisk on the cover indicates that a part of sheet adjacent to the one cited is described in this report.

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 sand and gravel resources of the country around Redgrave, Suffolk, shown on the accompanying 1:25 000 resource map TM 07 and parts of TM 08. The survey was conducted by Mr C. A. Auton and Mr M. R. Clarke. The work is based on geological surveys at the 1:10 560 scale carried out by Dr C. R. Bristow and Dr C. J. Wilcox in 1979-80.

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

G. M. Brown
Director

Institute of Geological Sciences
Exhibition Road
London SW7 2DE

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The sand and gravel resources of the country around Redgrave, Suffolk

Description of 1:25 000 sheet TM 07 and part of TM 08

C. A. Auton

SUMMARY

The geological maps of the Institute of Geological Sciences, pre-existing borehole information, and 118 boreholes drilled for the Industrial Minerals Assessment Unit form the basis of the assessment of the sand and gravel resources of the country around Redgrave, Suffolk.

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 six resource blocks, containing between 11.2 and 22.9 km² of sand and gravel. For each block the geology of the deposits is described, and the mineral-bearing area, the mean thickness of overburden and mineral and the mean gradings are stated. Detailed borehole data are also given. The geology, the position of the boreholes and the outlines of the resource blocks are shown on the accompanying map.

Notes

Each borehole registered with the Institute is identified by a four-element code (e.g. TM 08 SW 12). The first two elements define the 10-km square (of the National Grid) in which the borehole is situated; the third element defines a quadrant of that square, and the fourth is the accession number of the borehole. In the text of the report the borehole is normally referred to by the last three elements alone (e.g. 08 SW 12).

All National Grid references in this publication lie within the 100-km square TM unless otherwise stated. Grid references are given to eight figures, accurate to within 10 m, for borehole locations. (In the text, four- and six-figure grid references are used for more extensive locations, for example for farms).

Bibliographical reference

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Author

C. A. Auton, BSc
Institute of Geological Sciences
Nicker Hill, Keyworth
Nottingham NG12 5GG.

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' level "for which tonnage and grade 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" (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. As the assessment is at the indicated level, parts of such a deposit may not satisfy all the criteria.

Rocks, for example the Upper Chalk, 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 material, are placed at $\frac{1}{16}$ mm and 4 mm respectively (see Appendix C).

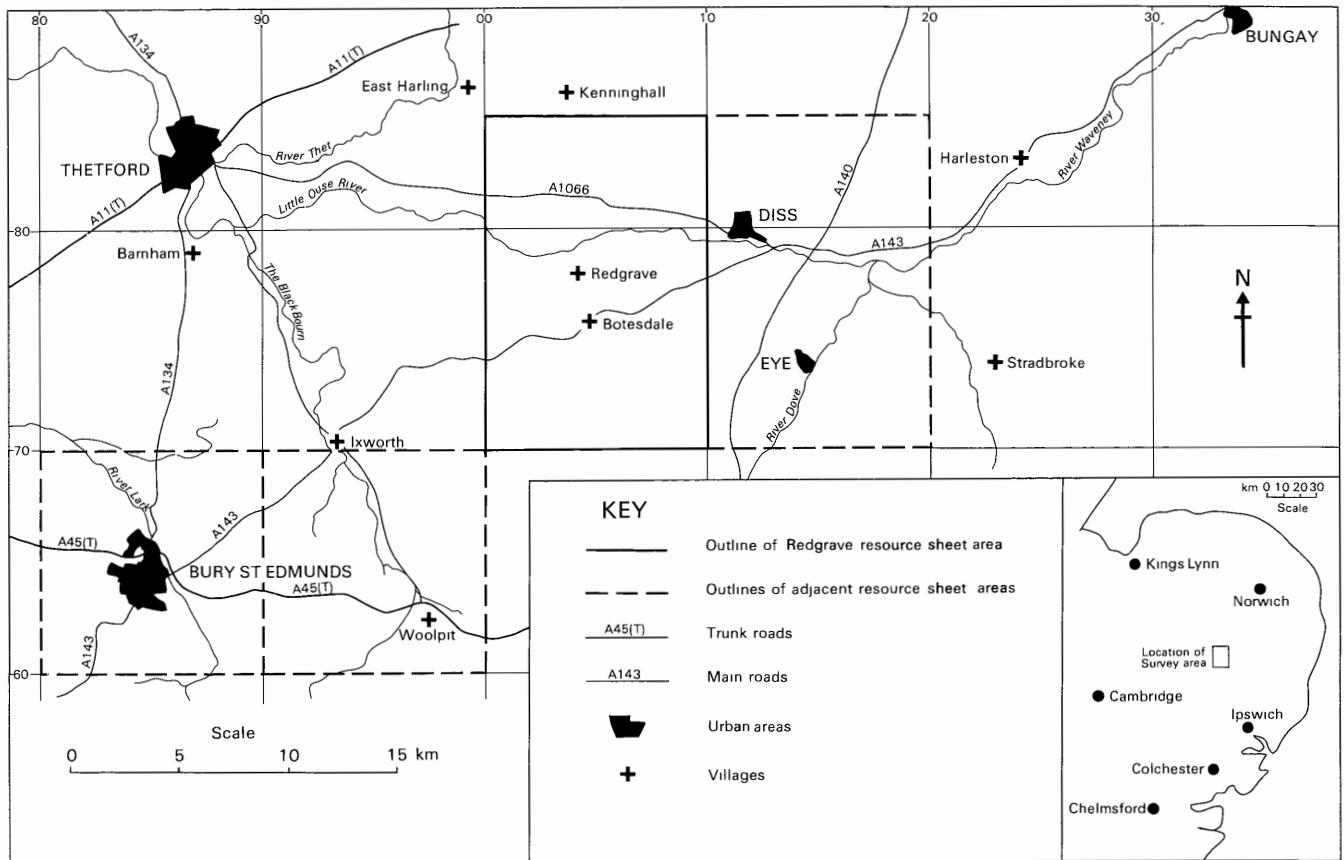


Figure 1 The location of the Redgrave resource sheet and its relationship to adjacent survey areas.

The volume and other characteristics are assessed within resource blocks, each of which, ideally, contains approximately 10 km² 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

This survey, which covers 150 km² of ground centred upon the village of Redgrave, Suffolk, is the first of a series of surveys, commissioned by the Department of the Environment, to assess the sand and gravel resources around the valley of the River Waveney. It follows earlier resource surveys undertaken in the Bury St. Edmunds and Woolpit areas (Hawkins, 1981; Clarke, *in press*) as shown in Figure 1. The area includes parts of the valleys of the rivers Waveney and Little Ouse, which form the boundary between the counties of Norfolk and Suffolk. The countryside is characterised by rich agricultural land, with areas of fen occupying much of the low-lying ground in the river valleys. There is no urban development in the surveyed area.

The major part (85.6 per cent) of the mineral resources consists principally of pre-glacial sands and gravels, with some Glacial Sand and Gravel. These cover 84.1 km² to the north and south of the Waveney Valley and are described in resource blocks A, C, D, E and F. The remaining resources are the River Terrace Deposits

and underlying Glacial Sand and Gravel found in the valleys and tributaries of the rivers Waveney and Little Ouse. These cover an area of 11.2 km² and are described in resource block B. The remaining 54.7 km² (36.5 per cent of the surveyed area) are regarded as containing no potentially workable resources of aggregate, due primarily to the presence of excessively thick overburden.

Topography

The survey area comprises a gently undulating plateau with a surface elevation of between +50 and +60 m OD (Figure 2). The principal topographic feature is the valley formed by the courses of the rivers Waveney and Little Ouse, which flow east and west respectively from a common source at Little Fen [039 790], 1 km north of Redgrave village.

North of the valley, the plateau is dissected by several unnamed southward-flowing streams, the largest of which flows through the village of Garboldisham to join the Little Ouse just to the west of the survey area. To the south of the Waveney valley, a network of streams converge near Bottesdale [048 758] and flow north-west to join the Little Ouse at Hinderclay Fen [030 788].

Near the villages of Rickingham Superior [045 753] and Wattisfield [010 742] the plateau falls gently both to the west and east where it is drained by minor streams flowing westwards through Walsham-le-Willows and eastward from the village of Gislingham [075 717] to join the River Dove near Standwell Park, 3 km to the east of survey area.

Geology

The country around Redgrave was first surveyed at the scale of one inch to one mile by F. J. Bennett (in 1879-81). This work was published as part of the Old Series

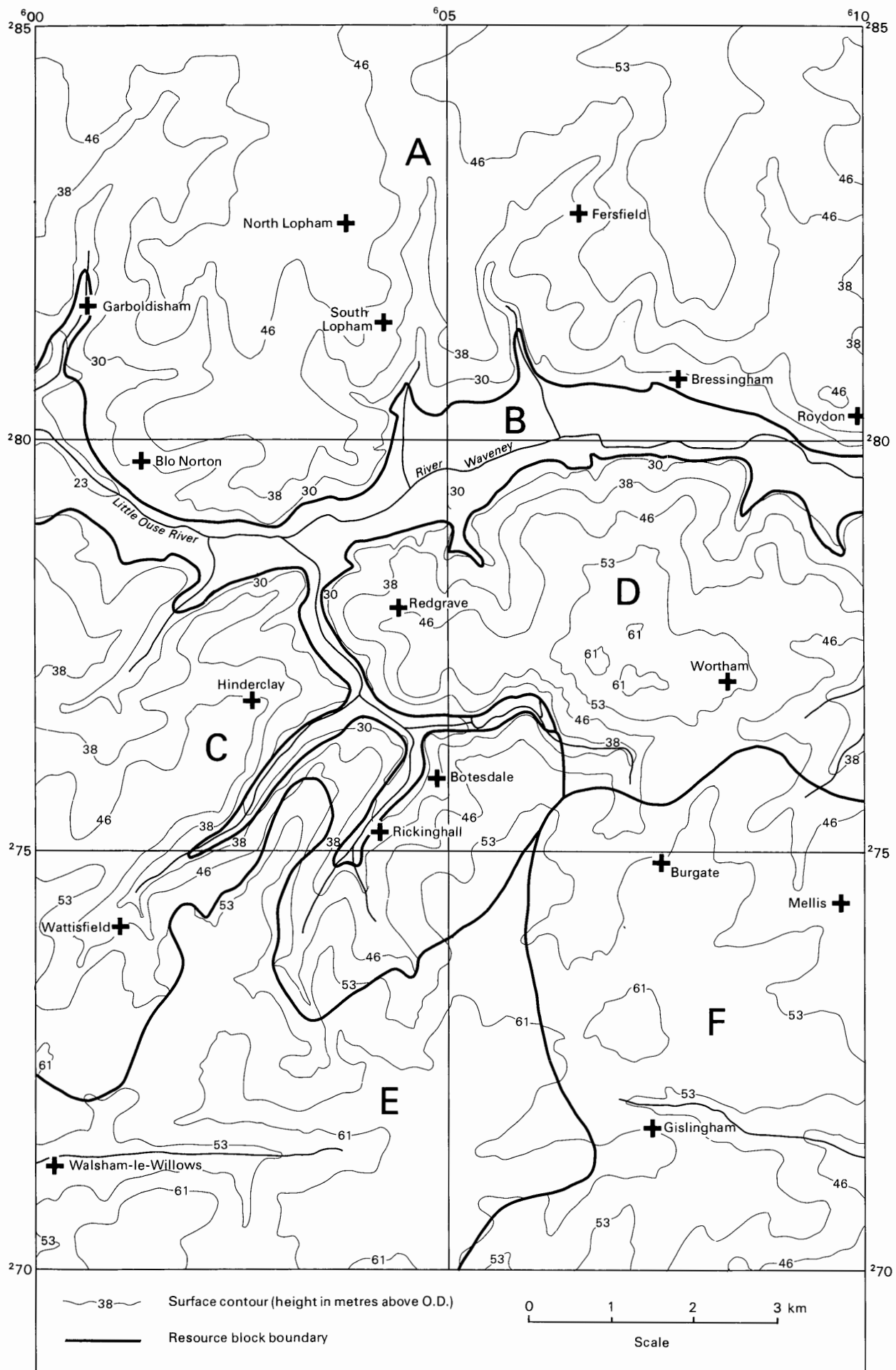


Figure 2 The topography of the resource sheet area and the position of the resource block boundaries.

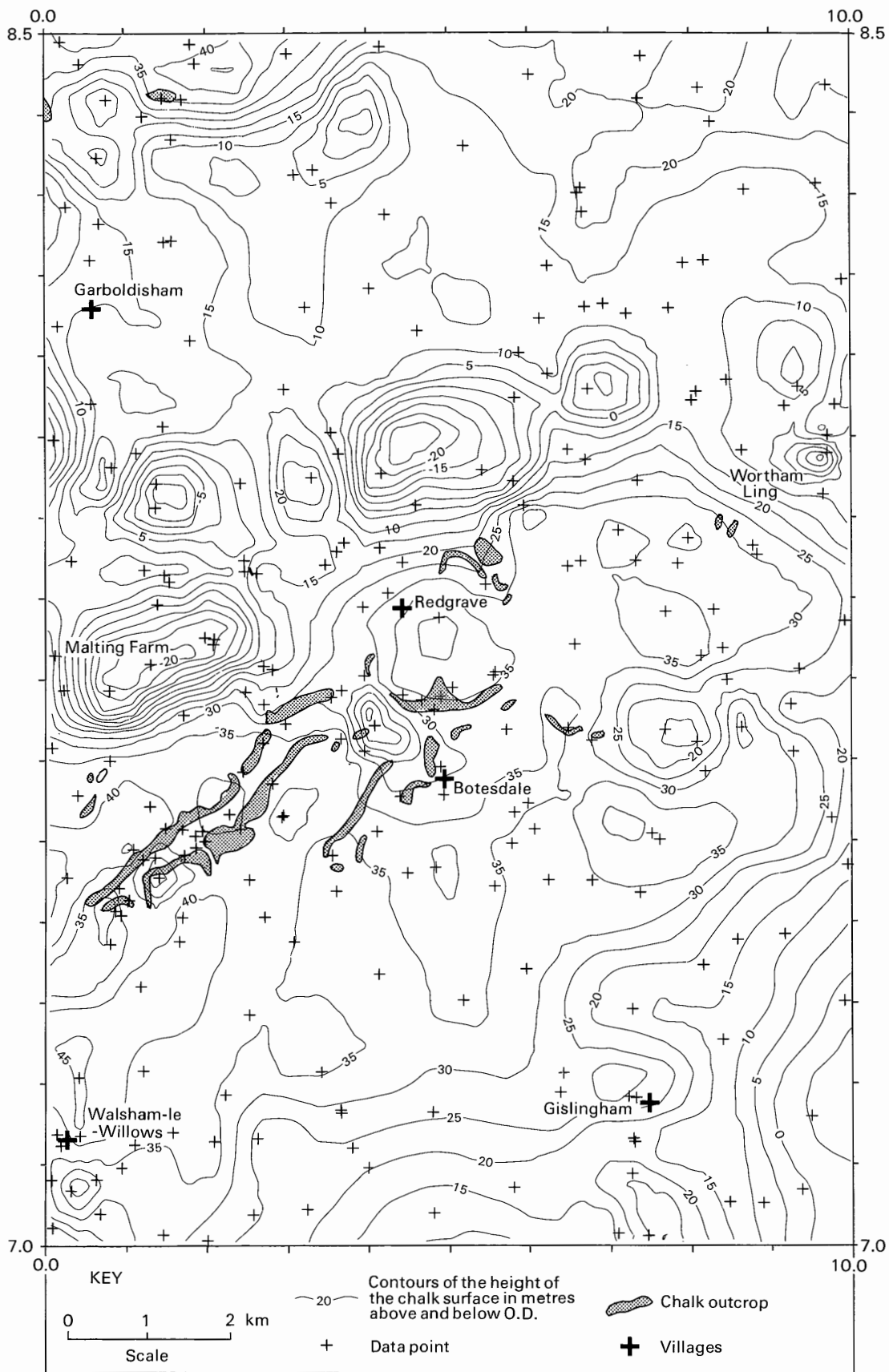


Figure 3 Computer generated contour map of the surface of the Chalk.

One-Inch Geological Sheet 50 NW in 1882 and in the descriptive memoir (Bennett, 1884). The area has recently been remapped, for the purpose of this assessment, at the six-inch scale by C. R. Bristow and C. J. Wilcox (in 1979-80) and the geological succession (shown in Table 1 below) is described, in part, in IGS open-file reports (Bristow, 1980 a and b; Wilcox, 1981).

Table 1 Geological classification of deposits.

DRIFT	
Recent and Pleistocene	Alluvium
	Peat
	River Terrace Deposits
	Head
	Cover Sand
	Glacial Sand and Gravel
	Glacial Silt
	Boulder Clay
	Kesgrave Sands and Gravels
	Ingham Sand and Gravel
SOLID	
Pleistocene	Crag
Cretaceous	Upper Chalk

SOLID

Upper Chalk The Upper Chalk, which consists of massively-bedded, soft white limestone with occasional bands of nodular flint, crops out on valley sides north and west of Bottesdale, forms two small inliers which protrude through the drift cover north of Garboldisham and has been worked in numerous small pits around the villages of Rickinghall Inferior [040 753] and Wattisfield.

In IMAU boreholes, the Upper Chalk is often of a soft putty-like consistency, having been weathered and remobilised to form a deposit of silt-grade chalk material classified as Chalk Silt in borehole logs. Evidence from assessment boreholes and water wells drilled in the survey area indicates that a deep drift-filled buried channel system is cut into the chalk surface (Figure 3). For example, a well sunk near Pond Farm [058 795] proved chalk at a depth of 36.6 m (-8.5 m OD). The largest of these channels trends west to east between Malting Farm, Thelnetham [002 774] and Wortham Ling [095 795] and appears to have controlled, in part, the location of present-day courses of the Little Ouse and River Waveney.

The sequence of solid strata concealed beneath the Upper Chalk has been established in a deep borehole at Four Ashes [023 719] near Walsham-le-Willows. This borehole proved 240 m of Chalk overlying 14 m of fossiliferous Gault (Cretaceous) mudstones resting unconformably on poorly cleaved mudstones which are thought to be of Middle Devonian age (Bristow, 1980b).

Crag South of the Waveney valley deposits of Crag sand have been proved in thirty-two assessment boreholes, where they are recognised as sands or 'clayey' sands with occasional thin beds of gravel (for nomenclature, see Appendix C). Crag sand has also been recognised in many water wells, where it is recorded as dark green or grey sand with shell fragments.

In wells near the south-eastern margin of the area (such as 07 SE 1) the Crag exceeds 20 m in thickness; it rests unconformably on the Upper Chalk and is overlain by Kesgrave Sands and Gravels or later drift deposits. The approximate limit of the Crag is shown on the resource map by a conjectural line which is based primarily on IMAU borehole data.

Above the water table (as in borehole 07 NW 45) the Crag characteristically comprises orange, medium- and fine-grained 'clayey' quartz sand with ironpan and occasional thin beds of pebbles. In most instances, however, the deposits lie entirely beneath the water table and vary in colour from moderate olive brown to greyish green or greenish black, due to the presence of unoxidized rounded sand-sized grains of glauconite. In some boreholes (such as 07 SE 15, 19 and 07 NE 46) these olive and green sands are micaceous and contain pebbles of well rounded flint and vein quartz towards the base of the deposit where they are associated with shell fragments.

DRIFT

Ingham Sand and Gravel Iron-stained gravels rich in well rounded 'liver coloured' (Bunter) quartzite pebbles are classified as Ingham Sand and Gravel (see Clarke and Auton, 1982). These gravels also contain pebbles of rounded vein-quartz and some angular flint, together with subangular quartz and flint sand. In assessment boreholes they are seen to rest directly upon the Upper Chalk between elevations of +8.4 m and +20.9 m OD and are overlain by glacial deposits, suggesting that they represent some of the earliest drift deposits in the area.

In this survey area, the Ingham Sand and Gravel has been recognised in nine assessment boreholes to the north of the Waveney Valley where it averages 5.1 m in thickness. The unit varies from gravel to pebbly sand (Figure 5) and has a maximum recorded thickness of 13.2 m in borehole 08 SE 29, west of the village of Roydon [096 804].

The stratigraphical relationships between the Ingham Sand and Gravel and other pre-glacial Pleistocene deposits in the area are uncertain, as both the Crag sand and Kesgrave Sands and Gravels have, with one exception, been proved only in boreholes sited south of the Waveney Valley. However, an assessment borehole (08 SW 12) drilled near Flint Hall [004 844] proved 4.9 m of sandy gravel (resting on the Upper Chalk at +37.8 m OD) of similar grading and composition to those of the Kesgrave Sands and Gravels found in the south of the area. The lower elevation of the base of the Ingham Sand and Gravel, relative to that of the Kesgrave Sands and Gravels (in borehole 08 SW 12 and south of the Waveney Valley), indicates that the Ingham Sand and Gravel may be the older of the two deposits.

Kesgrave Sands and Gravels Deposits rich in vein-quartz and pale grey quartzite pebbles have recently been recognised over a wide area of Essex, Suffolk and part of Norfolk (Rose and Allen, 1977; Hey, 1980) where they are considered to be part of an extensive spread known collectively as the Kesgrave Sands and Gravels. Similar deposits, also rich in well rounded vein quartz and quartzite pebbles, have been mapped at outcrop on the southern margin of the Waveney valley and on the sides of tributary valleys between Wattisfield and Botesdale.

In this area the Kesgrave Sands and Gravels form a distinct lithological unit, with an average thickness of 4.7 m. The deposit varies in general from 'very clayey' pebbly sand to light grey sandy gravel (Figure 5) and rests either on Crag sands or the Upper Chalk. To the south of Redgrave [045 779] the height of both the top and base of the Kesgrave Sands and Gravels proved in assessment boreholes is seen to fall towards the south-eastern margin of the sheet. For example, the base of the unit ranges from +45.3 m OD in borehole 07 SW 32 [0119 7320] to +29.8 m OD in borehole 07 SE 27 near Redhouse Farm [098 716].

In the south-eastern part of the survey area, near the villages of Burgate Little Green [076 750] and Gisingham [075 717], the upper part of the formation has a high clay content and is reddish orange to moderate red in colour. This rubification and clay

enrichment is interpreted as representing a pre-glacial soil horizon (palaeosol) which equates with the Valley Farm Rubified Sol Lessivé of Rose and Allen (1977). The palaeosol also appears to be developed occasionally on Crag sands; for example in boreholes 07 SE 22 [0728 7133] and 07 SE 26 [0992 7302], where the Kesgrave Sands and Gravels are absent.

Boulder Clay Boulder Clay covers much of the resource sheet area and was found in 96 of the 118 assessment boreholes. It forms the undulating plateau surface north and south of the Waveney valley where it is overlain by thin and impersistent deposits of Cover Sand, similar to those described from the adjacent Bury St Edmunds and Woolpit areas (Hawkins, 1981; Clarke, *in press*). The Boulder Clay generally consists of clay or silty clay with scattered pebbles and cobbles of chalk and flint, although pebbles of other rock types, notably vein-quartz, quartzite, limestone and black mudstone, are also present in trace amounts.

The greatest recorded thickness of Boulder Clay is in the north of the area where up to 35 m was proved in borehole 08 SW 21 [0310 8325]. At the surface the top few metres of the Boulder Clay are weathered to moderate yellowish brown and are commonly decalcified. This weathered zone passes transitionally downwards, through a characteristically mottled moderate brown and light grey zone into highly consolidated dark olive grey clay typical of unweathered Boulder Clay deposits in much of East Anglia (Perrin and others, 1979).

In many of the assessment boreholes (for example 07 SW 44, 07 SW 47 and 07 SE 24) the olive grey clay is underlain by yellowish brown, sandy silty clay with pebbles of angular flint, vein quartz and quartzite. This brown sandy clay averages 2.8 m in thickness in the resource sheet area. It contains occasional pebbles of various igneous and metamorphic rocks and comparatively few chalk pebbles and is thought to represent a separate till unit.

Boulder Clay was also proved to underlie the River Terrace Deposits and Glacial Sand and Gravel in the valleys of the Little Ouse and River Waveney, for example in boreholes 08 SE 25 and 07 NW 36. In these instances the Boulder Clay is part of the complex sequence of glacial deposits which fill in the buried channel system (see above).

Glacial Silt Glacial Silt is mapped at the surface only on the southern side of the Waveney valley between the village of Redgrave and Wortham Ling. However, thin beds of silt are often present within the Boulder Clay, as seen, for example, in boreholes 07 NW 52, 07 NE 30 and 08 SW 20.

Generally the Glacial Silt consists of bluish and olive grey silt and silty clay which is often finely laminated and weathers to moderate yellowish brown at the surface. The greatest thicknesses have been found in boreholes drilled in the valleys of the Little Ouse and River Waveney, where the margins of the buried channel system have been encountered. For example, boreholes 07 NE 23 [0542 7959] and 08 SE 18 [0583 0849] did not reach the base of the silts, which were in excess of 17.1 m and 16.6 m thick respectively.

Glacial Sand and Gravel The principal mapped spreads of Glacial Sand and Gravel occupy a belt of ground 2 km wide extending south-eastwards from Garboldisham, where sand and gravel crops out on the valley sides from beneath a Boulder Clay cover. The belt of sand and gravel continues through Redgrave village towards Palgrave, on the eastern margin of the resource sheet area, where the main spreads form discrete patches overlying the Boulder Clay forming the plateau. In boreholes 07 NW 52 and 53, drilled in the largest of these patches, the deposit comprised 6.2 m of sandy gravel and 2.3 m of 'clayey' sandy gravel respectively, while a

trench in the base of a small pit [0437 7842] west of Mill Lane, Redgrave proved 5.0 m of poorly stratified gravel overlying more than 2.8 m of sand.

Boreholes north of the Waveney valley (for example 08 SW 17, 19 and 25) have proved extensive spreads of Glacial Sand and Gravel both within the Boulder Clay and beneath it, but to the south of the valley the subsurface spreads appear to be less extensive. The greatest thicknesses in the south of the district were found in boreholes 07 NE 31, 36, 37, 44 and 45 which identify a minor buried channel trending east-north-east from New Waters Farm [066 764] towards the Rookery [093 772] south-east of Wortham. The upper part of both the exposed and the buried Glacial Sand and Gravel is characteristically decalcified, whereas deposits below the water table (for example in boreholes 07 NE 36 and 44) commonly contain a high proportion (72 per cent and 59 per cent respectively) of chalk pebbles.

Assessment boreholes (07 NW 31, 47 and 51) within the valleys of the Little Ouse and River Waveney show that Glacial Sand and Gravel is also present beneath the River Terrace Deposits and locally represents part of the infill of the buried channel system.

Cover Sand Discontinuous spreads of Cover Sand overlie Boulder Clay north and south of the Waveney valley, where they have been proved in ten assessment boreholes. The boreholes show the Cover Sand to average only 0.6 m in thickness and the deposit, which ranges in grading from 'very clayey' pebbly sand to 'clayey' sand, has not, therefore, been mapped or assessed.

Head Throughout the survey area, scattered deposits of Head have been mapped mantling the sides of the larger river valleys and covering the floors of minor streams. It has been proved in eight assessment boreholes, where it is seen to range in composition from sandy clay (in borehole 07 SE 19) to 'clayey' sandy gravel (in borehole 07 NE 45).

Where Head rests upon older deposits of sand and gravel, such as Glacial Sand and Gravel (in borehole 07 NE 31) or Kesgrave Sands and Gravels (in borehole 07 SW 40), its gravel component reflects that of the underlying deposit. However, where Head overlies Boulder Clay (for example, in boreholes 08 SW 19 and 07 NE 39) or the Upper Chalk (as in borehole 07 SW 31) its composition reflects that of nearby outcrops of sand and gravel, from which it has been derived by solifluxion, rather than that of the immediately subjacent strata.

Although boreholes drilled within the mapped areas of Head show the deposit to average 1.6 m in thickness, it is not considered to be a source of potentially workable sand and gravel due to its lateral impersistence and generally high clay content.

River Terrace Deposits Spreads of River Terrace Deposits have been mapped along the length of the valley of the Little Ouse and River Waveney, where three terrace levels have been recognised. Smaller spreads occur in the valleys of tributary streams north of Rickinghall Inferior, and isolated patches are also present in stream valleys near the eastern margin of the sheet.

River Terrace Deposits, proved in 17 assessment boreholes, range in thickness from 0.7 m in borehole 07 NW 49 near Butts Plantation, Redgrave [042 768] to 11.1 m in borehole 08 SE 22 [0673 8059] at Bressingham Fen. The mean thickness of the deposits is 4.4 m.

In six of the assessment boreholes, the River Terrace Deposits occur beneath Peat, while in borehole 07 NW 44, drilled near Hinderclay Wood [022 758], 2.0 m of River Terrace Deposits were concealed by Head deposits.

The deposits generally vary from sand to 'clayey' pebbly sand (Figure 6), with the gravel fraction being composed principally of angular flint: for example, up to

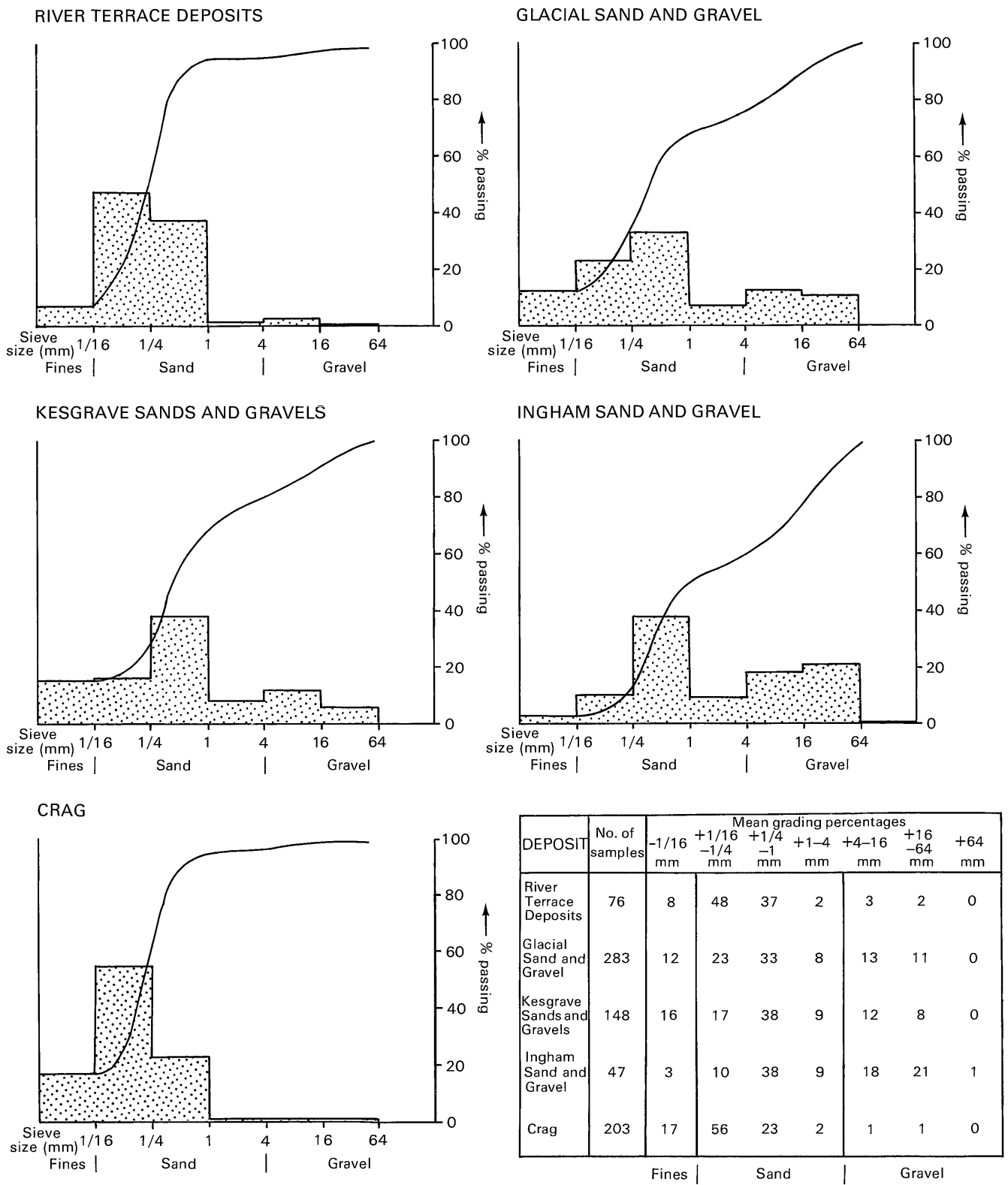


Figure 4 Mean grading characteristics of the mineral deposits shown as grading percentages, histograms and cumulative frequency curves.

Table 2 Mean composition of the +8-16 mm gravel fraction of the mineral deposits.

Deposit	No of Samples	Percentage by weight							
		Angular Flint	Rounded Flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous & Metamorphic	Others
River Terrace Deposits	76	78	8	3	10	trace	0	0	1
Glacial Sand and Gravel	283	48	10	6	16	15	1	1	3
Kesgrave Sands and Gravels	148	23	20	18	36	trace	0	1	2
Ingham Sand and Gravel	47	33	13	11	39	trace	0	1	3
Crag	203	13	32	19	26	0	0	trace	10*

* Dominantly iron pan, phosphate nodules and shell debris

Notes

1. No attempt has been made in this study to distinguish chert from flint.
2. The percentages have been calculated by weighting the borehole deposit means in respect of deposit thickness and percentage gravel.

95 per cent angular flint was recorded from samples in borehole 08 SE 18. In boreholes sited on the terraces of the Little Ouse - Waveney valley (eg 07 NW 47, NE 40 and NE 43) the terrace deposits commonly rest directly on Glacial Sand and Gravel.

Peat Deposits of peat have been proved in seven assessment boreholes in the valley bottoms of the rivers Little Ouse and Waveney and their tributaries. These boreholes (for example, 07 NW 51 and 07 NW 36) show that the peat is composed of dark brown, fibrous organic matter occasionally with shell debris. In most instances the peat deposits overlie River Terrace Deposits, but in borehole 08 SW 13 [0056 8218], drilled close to The Hall, Garboldisham, 0.8 m of silty peat was overlain by 1.1 m of Alluvium and underlain by 4.0 m of Glacial Sand and Gravel.

Alluvium Mottled brown and grey sandy silts typify the spreads of Alluvium mapped in the valley bottoms of tributary streams in the survey area, although these deposits are apparently absent in the valleys of the Little Ouse and River Waveney. Alluvium has been proved in eight assessment boreholes; it ranges in thickness from 0.4 m, in borehole 07 SW 38, to 2.2 m in borehole 08 SW 26 and in most cases it is seen to overlie deposits of Head or Boulder Clay.

Composition of the Sand and Gravel

Five potentially workable sand and gravel deposits occur within the survey area: Crag, Ingham Sand and Gravel, Kesgrave Sands and Gravels, Glacial Sand and Gravel and River Terrace Deposits. The mean grading characteristics of these deposits proved in assessment boreholes are shown in Figure 4 and the mean composition of part of the fine gravel fraction (+8 mm -16 mm) of each deposit is given in Table 2. The grading of individual deposits of sand and gravel from each assessment borehole is shown in Figures 5 and 6.

Crag Deposits of Crag sands, proved in 32 assessment boreholes, have a mean grading of fines 17 per cent, sand 81 per cent and gravel 2 per cent and are thus classified as 'clayey' sand, though the formation is generally more pebbly towards the south western margin of the resource sheet area (see Figure 5).

The +8-16 mm fraction of the fine gravel is composed largely of flint with quartzite and vein quartz (see Table 2). Other, minor, constituents include iron pan, ironstone, phosphatic nodules and shell fragments.

The sand fraction (81 per cent) is mainly composed of subrounded to well rounded quartz, with some mica and glauconite present below the water table; it has a mean grading of fine sand 56 per cent, medium sand 23 per cent and coarse sand 2 per cent. The fines content occurs mainly as thin partings (2-3 cm thick) of mica-ceous silty clay and clayey silt which generally occur in the upper part of the deposit.

Ingham Sand and Gravel The spreads of quartzite-rich Ingham Sand and Gravel found to the north of the Waveney valley have a mean grading of fines 3 per cent, sand 57 per cent and gravel 40 per cent. Generally the deposit is classified as sandy gravel, although in two boreholes (07 SE 17 and 21) drilled between the villages of South Lopham [042 814] and Bressingham [077 808] the proportion of gravel exceeds 50 per cent of the deposit.

The fine gravel fraction (Table 2) is composed mainly of flint and quartzite with vein quartz. Other clasts, mainly ironstone and sandstone but including some metamorphic and igneous rocks, account for less than 5 per cent of the +8-16 mm material.

The sand fraction (57 per cent) is composed of iron-stained angular quartz and flint. Its mean grading is medium sand 38 per cent, fine sand 10 per cent and coarse sand 9 per cent. The fines content is generally disseminated throughout the deposit.

Kesgrave Sands and Gravels The mean grading of the Kesgrave Sands and Gravels, which is fines 16 per cent, sand 64 per cent and gravel 20 per cent, classes the deposit as 'clayey' pebbly sand. This unit has been proved in 31 assessment boreholes and shows little consistent variation in grading or composition throughout the area (Figure 5).

The +8-16 mm gravel fraction is, again, composed mainly of flint (about half of which is rounded and patinated) and quartzite with vein quartz (Table 2).

The sand fraction is mainly composed of subrounded quartz with some angular flint and often contains thin (1 to 2 cm) beds of clayey sandy silt which gives the deposit its 'clayey' character. The mean grading of the

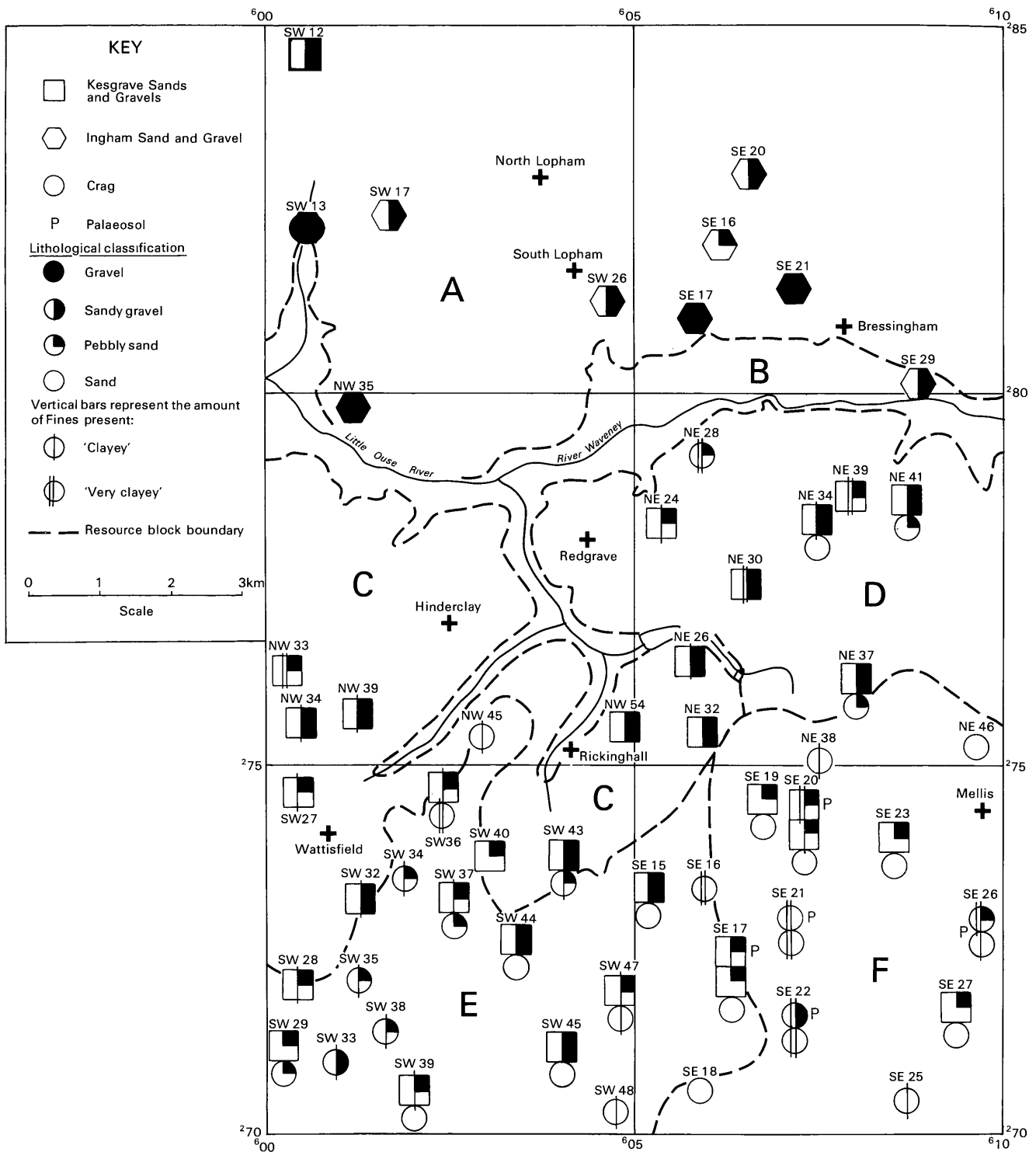


Figure 5 Grading characteristics of the pre-glacial mineral deposits. Where two or more mineral deposits are present the grading symbol arrays are centred on the position of the borehole to which they refer. Grading symbols in contact indicate that deposits directly overlie one another. Spaces between the symbols indicate the presence of waste partings.

sand fraction (64 per cent) is medium sand 38 per cent, fine sand 17 per cent and coarse sand 9 per cent. The fines are often concentrated in the upper part of the deposit where they occasionally form a zone of rubification and clay enrichment which is thought to represent a pre-glacial palaeosol. Thin beds of silty clay also occur throughout the unit.

Glacial Sand and Gravel The mean grading of the Glacial Sand and Gravel is fines 12 per cent, sand 64 per cent and gravel 24 per cent; it is classified as 'clayey'

sandy gravel. Since the stratigraphical relationships between deposits of Glacial Sand and Gravel are not always clear, upper and lower deposits have not been distinguished for the purpose of mean grading and composition calculations. The deposits are, however, split into three categories for assessment of mechanical and physical properties (Table 3) as follows: chalk-poor Glacial Sand and Gravel (<15 per cent by weight chalk pebbles), chalk-rich Glacial Sand and Gravel (>15 per cent by weight chalk pebbles) and channel-fill Glacial Sand and Gravel (sands and gravels occurring within the

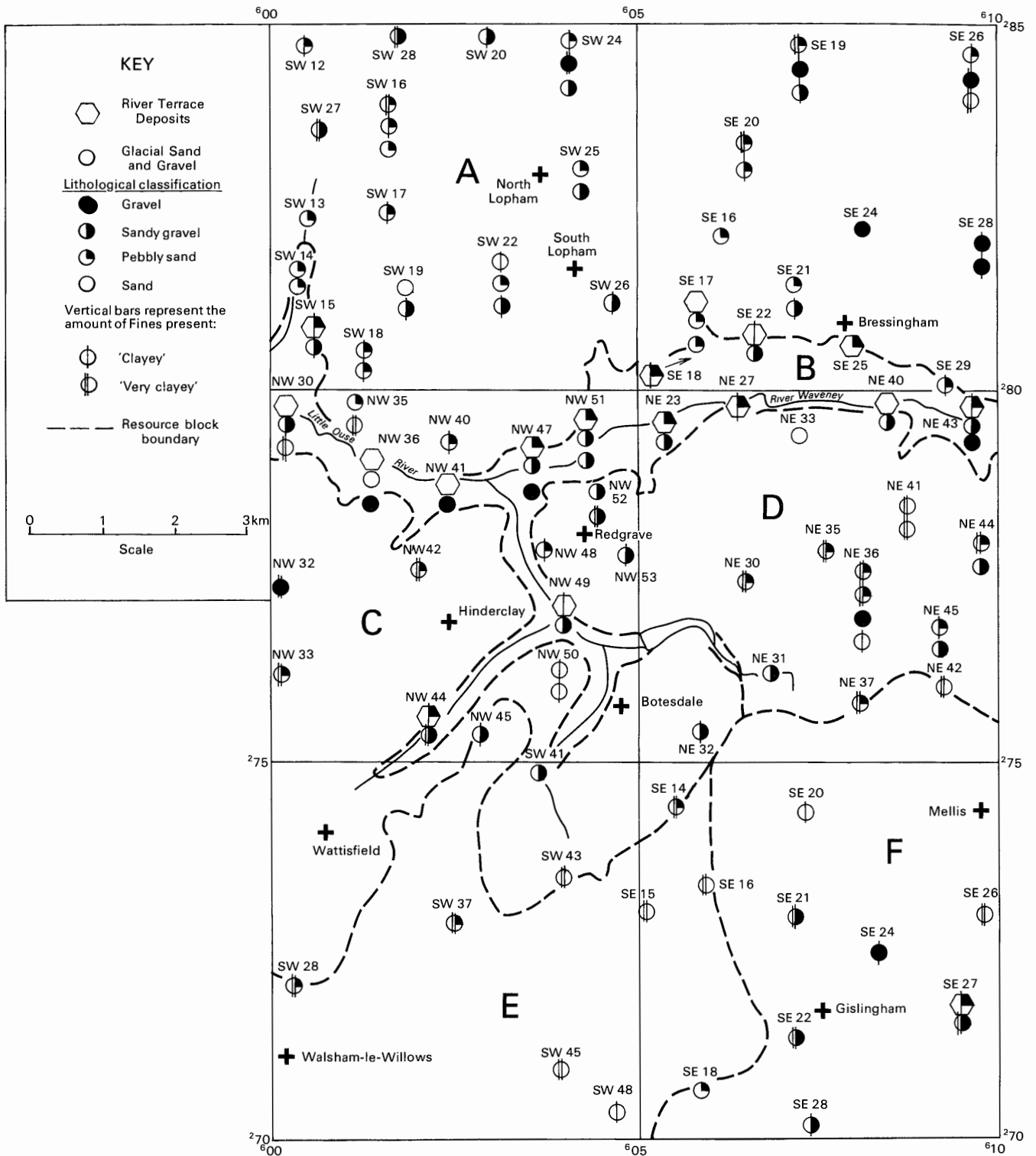


Figure 6 Grading characteristics of the Glacial Sand and Gravel and River Terrace Deposits (for explanation see Figure 5).

glacial infill of the buried channel system and beneath the spreads of River Terrace Deposits which are included together in resource block B, below).

The average composition of the +8-16 mm part of the fine gravel fraction of the Glacial Sand and Gravel is given in Table 2; the 'others' category is made up mainly of mudstone, sandstone and derived shell debris.

The mean grading of the sand fraction (64 per cent) is medium sand 33 per cent, fine sand 23 per cent and coarse sand 8 per cent.

The fines are commonly disseminated throughout the deposit, though in some instances they occur as thin

sandy gravel. Since the stratigraphical relationships between deposits of Glacial Sand and Gravel are not always clear, upper and lower deposits have not been distinguished for the purpose of mean grading and composition calculations. The deposits are, however, split into three categories for assessment of mechanical and physical properties (Table 3) as follows: chalk-poor Glacial Sand and Gravel (<15 per cent by weight chalk pebbles), chalk-rich Glacial Sand and Gravel (>15 per cent by weight chalk pebbles) and channel-fill Glacial Sand and Gravel (sands and gravels occurring within the

Table 3 Results of mechanical and physical testing.

The tests were conducted in accordance with BS 812 on oven-dried, bulked samples from assessment boreholes.

Deposit	Aggregate Impact Value	10 % Fines Value	Relative Density		Apparent Relative Density	Water Absorption (%)
			Oven-dried	Surface-dried		
River Terrace Deposits	*	*	2.49	2.53	2.61	1.90
Glacial Sand and Gravel (Chalk-poor)	23.3	280kN	2.51	2.55	2.61	1.56
Glacial Sand and Gravel (Chalk-rich)	41.6	*	2.18	2.36	2.64	8.13
Glacial Sand and Gravel (Channel-fill)	26.0	250kN	2.49	2.54	2.62	2.08
Kesgrave Sands and Gravels	26.5	300kN	2.55	2.58	2.62	1.05
Ingham Sand and Gravel	24.3	310kN	2.52	2.56	2.62	1.52
Crag	28.5	*	*	*	*	*

* Insufficient material available for test.

quartzite, rounded flint and vein quartz (Table 2).

The mean grading of the sand fraction (87 per cent) is fine sand 48 per cent, medium sand 37 per cent and coarse sand 2 per cent.

The fines are generally disseminated throughout the deposit.

Mechanical and Physical Properties of the Aggregate

A series of mechanical and physical tests have been conducted on oven-dried bulked samples of the +10 mm -14 mm gravel fraction of the mineral deposits proved in assessment boreholes, in accordance with BS 812 (British Standards Institution, 1975). Measurements of aggregate impact value (AIV), ten per cent fines value, relative density (on both an oven-dried and surface-dried basis), apparent relative density and water absorption have been made and the results are shown in Table 3.

The resistance of an aggregate to both sudden load (AIV) and slowly-applied compressive load (ten per cent fines value) affects its potential quality, particularly its suitability for use as roadstone or as concreting aggregate. For the chalk-rich (>15 per cent chalk pebbles) Glacial Sand and Gravel the AIV was 41.6, which is beyond the level of reliability specified for the test in BS 812, and this material could not be used before beneficiation. The AIV values for the five other deposits tested (chalk-poor Glacial Sand and Gravel, channel-fill Glacial Sand and Gravel, Kesgrave Sands and Gravels, Ingham Sand and Gravel and Crag) range from 23.3 to 28.5. For aggregate from the four deposits other than Crag which provided sufficient material to be tested, the ten per cent fines values ranged from 250 kN to 310 kN (Table 3).

The aggregate impact values are somewhat higher than might be expected, (especially for the quartzite-quartz rich Kesgrave and Ingham gravels) and are well above the average, calculated from Edwards (1970), for currently worked English gravels (AIV 17.5). In the case of the Crag, Kesgrave Sands and Gravels and Ingham Sand and Gravel the relative weakness of the aggregate may be partly due to its quartzite, sandstone and iron pan content (see Table 2), while in the case of the Glacial Sand and Gravel it is probably due to the

presence in the samples of chalk, limestone and mudstone pebbles.

An important factor determining the load-bearing capacity and weather-resistance of concrete is its drying shrinkage, which is a function of the amount of water which the aggregate can absorb. The water absorption values measured in the present study (which range from 1.05 for the Kesgrave Sands and Gravels to 8.13 for chalk-rich Glacial Sand and Gravel) are generally higher than the average for currently worked English gravels (1.12). The much higher water absorption value for chalk-rich Glacial Sand and Gravel, relative to that of the other deposits tested, is due to the larger proportion of porous chalk and limestone pebbles in this deposit.

The values for relative density show little variation between the deposits and cannot be correlated with the known compositional differences between each deposit.

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 map of this area, which was surveyed recently at the scale of 1:10 560. This information was obtained by detailed application of field mapping techniques by the field staff in the Institute's East Anglia and South-East England Unit.

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 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).

Table 4 Statistical assessment of the sand and gravel resources.

Resource block	Area		Mean Thickness		Volume of Mineral 10 ⁶ m ³	Limits at the 95 % probability level		Mean grading percentages							
	Block km ²	Mineral km ²	Overburden m	Mineral m		± volume		Fines		Sand				Gravel	
						± %	10 ⁶ m ³	-1/16	+1/16-1/4	+1/4-1	+1-4	+4-16	+16-64	+64 mm	
A (18)*	49.9	17.8	7.3	7.7	137	36	49	7	24	41	6	11	11	0	
B (17)	11.4	11.2	1.7	8.5	95	32	30	8	34	33	6	11	8	0	
C (15)	23.8	12.1	7.6	4.1	50	43	21	13	17	38	9	14	8	1	
D (19)	19.3	18.0	8.8	4.3	77	36	28	15	23	31	9	12	9	1	
E (13)	22.7	13.3	11.5	8.2	109	21	23	11	42	32	5	6	4	0	
F (16)	22.9	22.9	12.5	8.3	190	33	63	10	44	35	4	5	2	0	
A to F	150.0	95.3	8.1	6.8	658	14	92	10	33	35	6	9	7	0	
Crag (28)	-	38.2	11.8	5.6	214	20	43	10	56	30	2	1	1	0	

* Figures in parentheses show the total number of sample points used in the statistical assessment of resources.

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.

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 4. Fuller grading particulars are shown in Figures 4, 5, 6, and 7. Compositional details are given in Table 2. Aggregate testing results are shown in Table 3.

Accuracy of results For the six resource blocks, 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 21 per cent and 43 per cent (Appendix B). However, the true

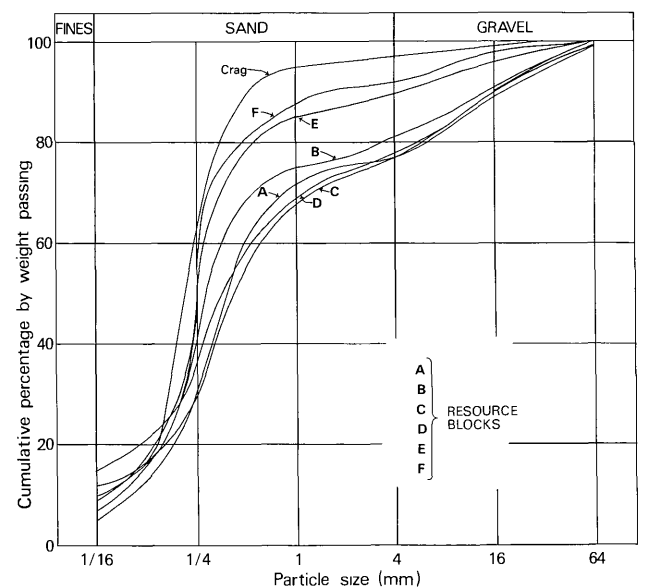


Figure 7 Particle size distribution for the assessed thicknesses of sand and gravel in resource blocks A to F.

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 F. The total volume (685 million m³) can be estimated to limits of ± 14 per cent at the 95 per cent probability level by a calculation based on the data from the 98 sample points spread across the six 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 Resource Blocks

The resource sheet has been subdivided into six resource blocks (A to F). The deposits of Crag sand (in blocks D, E and F) have been assessed both separately and together with other mineral deposits, whilst in the remaining blocks (A, B and C), the mineral is assessed as a whole, without subdivision. The separate assessment of the Crag shows that it represents 31 per cent by volume of the mineral in the survey area as a whole.

The mean grading for each mineral deposit (River Terrace Deposits, Glacial Sand and Gravel, Kesgrave Sands and Gravels, Ingham Sand and Gravel and Crag) is shown in Figure 4. The volume of mineral for each block and its mean grading is given in Table 4. The variation in grading between individual sand and gravel deposits proved in IMAU boreholes (within each resource block) is shown in Figures 5 and 6 and the variation in mean grading between individual blocks is shown in Figure 7.

Block A Block A covers an area of 49.9 km² north of the Waveney valley of which 17.8 km² are mineral-bearing. Much of the area is Boulder Clay plateau, part of which is barren; elsewhere the deposits of sand and gravel within and beneath the Boulder Clay are classified as not potentially workable because of the excessive overburden thickness. The main mineral deposits in this block are Glacial Sand and Gravel and Ingham Sand and Gravel, which become workable on the western and southern margins of the resource block where the Little Ouse, River Waveney and their tributaries have cut into and hence reduced the thickness of the Boulder Clay cover.

The assessment of the mineral-bearing ground is based on data from 13 IMAU boreholes and the records of 10 Hydrogeology Unit boreholes. Potentially workable sand and gravel is exposed around the village of Garboldisham, in the west, and is present beneath deposits of Head and Boulder Clay between South Lopham and Roydon. The mineral has a maximum recorded thickness of 17.7 m in borehole 08 SE 6; it was absent in three boreholes (08 SW 1, 07 NW 20 and NW 46). The mean thickness of mineral is 7.7 m, and its estimated volume 137 million m³ (\pm 36 per cent). Its mean grading is fines 7 per cent, sand 71 per cent and gravel 22 per cent, giving an overall classification of pebbly sand. However, the Ingham Sand and Gravel, which forms the basal mineral deposit in 11 boreholes, contains the highest proportion of gravel (ranging from 23 per cent to 78 per cent) of any of the drift deposits assessed in the whole of the survey area.

The overburden in this block comprises Boulder Clay with some Glacial Silt and has a mean thickness of 7.3 m; it ranges from only 0.2 m in borehole 07 NW 40, which was drilled within a patch of exposed Glacial Sand and Gravel, to 16.5 m in borehole 08 SE 16, drilled on the Boulder Clay plateau.

There are no active sand and gravel workings in the area, but there is a small disused gravel pit at Roydon on the south-eastern margin of the block.

Block B The main mineral deposits in this block are the River Terrace Deposits and the underlying Glacial Sand and Gravel found in the Waveney-Little Ouse valley. Glacial Sand and Gravel is also present in the buried channel system. The mineral covers 11.2 km² of the total block area (11.4 km²) which is bounded by the valleys of the Waveney and Little Ouse and their tributaries.

The assessment of resources is based on 17 IMAU boreholes and one Hydrogeology Unit borehole record. The mineral has a mean thickness of 8.5 m and ranges from 2.1 m thick in borehole 08 SE 25 (drilled on Peat

overlying deposits of the First Terrace of the River Waveney) near Bressingham Hall [078 817], to 18.2 m in borehole 07 NE 43 which was sited on River Terrace Deposits (Third Terrace) at Wortham Ling. The estimated total volume of mineral present within this block is 95 million m³ (\pm 32 per cent).

The mean grading of the mineral is fines 8 per cent, sand 73 per cent and gravel 19 per cent, giving it an overall classification of pebbly sand. The River Terrace deposits alone, however, contain only a small percentage of gravel (5 per cent on average) with the remainder of the resource residing in the underlying Glacial Sand and Gravel. Much of the mineral occurs beneath the water table and although the mean thickness of overburden is only 1.7 m there are no active or disused sand and gravel workings within the block.

Block C This block, which covers 23.8 km² of ground, is bounded to the north by the valley of the Little Ouse and to the east by the valley of a north-westward-flowing tributary stream. The southern boundary of the block coincides with the line showing the conjectural limit of Crag. Of the total block area, 12.1 km² are considered to be mineral-bearing, with most of the remaining 11.7 km² comprising either dissected Boulder Clay plateau (around the village of Hinderclay) or Upper Chalk bedrock exposed on the sides of the valleys. The main mineral deposits are the Kesgrave Sands and Gravels which crop out on the valley sides and are present beneath Boulder Clay where they are also associated with laterally impersistent spreads of Glacial Sand and Gravel.

The assessment is based on data from 12 IMAU boreholes and six Hydrogeology Unit boreholes. The mineral has a mean thickness of 4.1 m and figures ranging from 0.0 m in boreholes 07 SW 21 and 46 to 12.2 m in borehole 07 SW 1 have been included in the calculation. The estimated volume of the resource is 50 million m³ (\pm 43 per cent). The mean grading of the mineral is fines 13 per cent, sand 64 per cent and gravel 23 per cent, which gives a classification of 'clayey' pebbly sand.

The Kesgrave Sands and Gravels were proved in nine IMAU boreholes in which the deposit ranged in grading from 'very clayey' pebbly sand to sandy gravel. Glacial Sand and Gravel was proved in three IMAU boreholes (07 NE 32, NW 50 and SE 14) in which it ranged from 1.0 m to 5.0 m in thickness and from 'clayey' pebbly sand to sandy gravel in grading. The overburden has a mean thickness of 7.6 m; it is composed mainly of Boulder Clay with some thin Head deposits in the valley bottoms.

Block D This block covers 19.3 km² of ground, of which 18.0 km² are mineral-bearing. It is bounded to the north by the Waveney valley and to the south by the main conjectural limit of the Crag. Two small inliers of Crag are present near the northeastern margin of the block. In the west, the block boundary is formed by a stream flowing north-westward from New Waters Farm.

The mineral comprises Glacial Sand and Gravel, exposed on the surface of the Boulder Clay plateau, and Kesgrave Sands and Gravels, which occur beneath the Boulder Clay and crop out on the valley sides at the northern margin of the plateau. Small spreads of River Terrace Deposits occur in the south-eastern corner of the block where they are underlain by Glacial Sand and Gravel. The barren ground comprises outcrops of the bedrock of Upper Chalk, in places overlain by Head deposits, on the block margins.

The assessment is based on data from 17 IMAU boreholes, the records of six Hydrogeology Unit boreholes and a pit section (07 NW E1) at Mill Lane [0437 7842] near the village of Redgrave. The mineral has a mean thickness of 4.3 m and reaches a maximum of 10.3 m thick in borehole 07 NE 7 near the southern margin of the block. However, mineral is absent in 5 of

the boreholes (07 NE 10, 17, 29, 33 and 42) drilled on the Boulder Clay plateau. The estimated volume of mineral is 77 million m³ (\pm 36 per cent). Its mean grading is fines 15 per cent, sand 63 per cent and gravel 22 per cent, giving an overall classification of 'clayey' pebbly sand. The overburden has a mean thickness of 8.8 m.

There are no active sand and gravel workings in the block, but there are several small disused sand and gravel pits within the exposed Glacial Sand and Gravel around the village of Redgrave.

Block E This block covers an area of 22.7 km² south of the conjectural limit of Crag and west of the village of Gislingham. It contains 13.3 km² of mineral-bearing ground, but much of the remainder of the block is ground where the ratio of overburden (Boulder Clay) to sand and gravel exceeds 3 to 1. The principal mineral deposits are the Crag and Kesgrave Sands and Gravels, but some Glacial Sand and Gravel classified as mineral occurs within the Boulder Clay.

The data from 12 IMAU boreholes and the records of three Hydrogeology Unit boreholes have been used to assess the potentially workable sand and gravel. These show the mineral to range in thickness from 4.5 m in borehole 07 SW 34 [0171 7406] on the western margin of the block, to 13.7 m in borehole 07 SW 24 near Hartshall Farm [026 704] in the south of the area.

The mineral has a mean thickness of 8.2 m and an estimated volume of 109 million m³ (\pm 21 per cent). Its mean grading is fines 11 per cent, sand 79 per cent and gravel 10 per cent, which reflects the high proportion of predominantly sandy Crag included in the assessment.

Although the overall classification of the mineral is 'clayey' pebbly sand, it should be noted that the Kesgrave Sands and Gravels (proved in seven IMAU boreholes) ranged in grading from 'clayey' pebbly sand to sandy gravel. The overburden, which ranged in thickness from 4.9 m in borehole 07 SW 29 to 13.0 m in borehole 07 SW 44, has a mean thickness of 11.5 m.

Block F This block covers an area of 22.9 km², all of which is considered to be mineral-bearing. It comprises an area of gently undulating Boulder Clay plateau underlain by Kesgrave Sands and Gravels and extending southwards from the conjectural limit of Crag to the south-eastern margin of the resource sheet. Laterally impersistent beds of Glacial Sand and Gravel are also present within the drift sequence and small spreads of River Terrace Deposits occur in the valley of a small stream near Redhouse Farm at the south-eastern margin of the block.

The assessment of the mineral within the block is based on data from 15 IMAU boreholes and the records of eight Hydrogeology Unit boreholes. The mineral has a mean thickness of 8.3 m and reaches a recorded maximum of 19.8 m thick in borehole 07 SE 27 [0992 7302]. It is absent in boreholes 07 SE 12 and SE 28, near the southern edge of the block. The mineral has an estimated volume of 190 million m³ (\pm 33 per cent) and its mean grading is fines 10 per cent, sand 83 per cent and gravel 7 per cent, giving an overall classification of 'clayey' pebbly sand. Deposits of Crag have been proved in 12 of the IMAU boreholes and are seen to range in grading from 'very clayey' sand to sand; the Kesgrave Sands and Gravels, Glacial Sand and Gravel and River Terrace deposits, however, generally contain a higher proportion (up to 46 per cent) of gravel. The overburden, which averages 12.5 m in thickness, ranges from 2.7 m thick in borehole 07 SE 22 to 16.9 m in borehole 07 SE 8 and consists predominantly of Boulder Clay; thin deposits of Head are present in the valleys.

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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.

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.

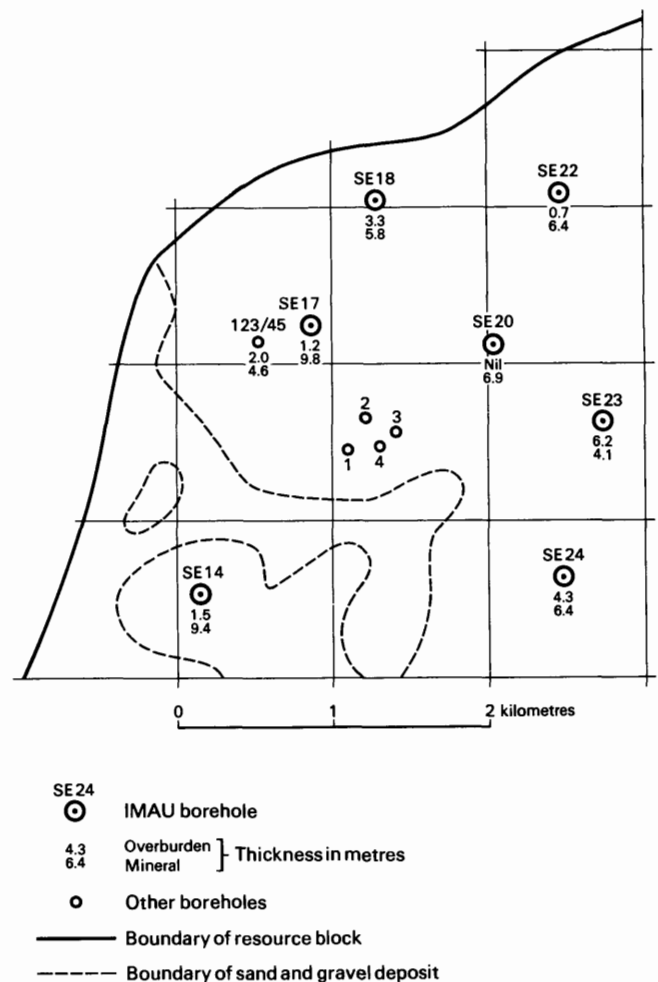
The drilling machine employed should be capable of providing a continuous sample representative of all unconsolidated deposits, so that the in-situ grading can be determined, if necessary, to a depth of 30 m (100 ft) at a diameter of about 200 mm (8 in), beneath different types of overburden. It should 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 depth. The samples, each weighing between 25 and 45 kg, 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 km², 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

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

4 The above relationship may be transposed such that

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

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 $l_{m1}, l_{m2}, \dots, l_{mn}$, then the best estimate of mean thickness, \bar{l}_m , is given by

$$\bar{l}_m = (l_{m1} + l_{m2} + \dots + l_{mn}) / n.$$

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

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

where l_m is any value in the series l_{m1} to l_{mn} .

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 $S_A / S_{\bar{l}_m} \leq 0.3$ is assumed in all cases. It follows from Equation [2] that

$$S_{\bar{l}_m} \leq S_V \leq 1.05 S_{\bar{l}_m} \quad [3]$$

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:

$$L_{\bar{l}_m} \leq L_V \leq 1.05 L_{\bar{l}_m}.$$

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

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

per cent,

and when n is greater than 20, as

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

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 km² and 2 km², 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 km².

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		Mineral		Remarks
		l_o	wl_o	l_m	wl_m	
SE 14	1	1.5	1.5	9.4	9.4	IMAU boreholes
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	
SE 23	1	6.2	6.2	4.1	4.1	
SE 24	1	4.3	4.3	6.4	6.4	
SE 17	$\frac{1}{2}$	1.2	1.6	9.8	7.2	Hydrogeology Unit record
123/45	$\frac{1}{2}$	2.0		4.6		
1	$\frac{1}{4}$	2.7	2.6	7.3	5.8	Close group of four boreholes (commercial)
2	$\frac{1}{4}$	4.5		3.2		
3	$\frac{1}{4}$	0.4		6.8		
4	$\frac{1}{4}$	2.8		5.9		
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	$ (wl_m - \overline{wl_m}) $	$(wl_m - \overline{wl_m})^2$
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

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

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

$$= 20.3$$

$$\approx 20 \text{ per cent.}$$

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 fine gravel (+4 - 16 mm) from larger pebbles. The boundary at 64 mm distinguishes pebbles from cobbles.

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 constituents 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, 1957), 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
64 mm	Cobble		
16 mm	Pebble	Coarse	Gravel
4 mm		Fine	
1 mm		Coarse	
$\frac{1}{4}$ mm	Sand	Medium	Sand
$\frac{1}{16}$ mm		Fine	
	Fines (silt and clay)		Fines

- I Gravel
- II 'Clayey' gravel
- III 'Very clayey' gravel
- IV Sandy gravel
- V 'Clayey' sandy gravel
- VI 'Very clayey' sandy gravel
- VII Pebbly sand
- VIII 'Clayey' pebbly sand
- IX 'Very clayey' pebbly sand
- X Sand
- XI 'Clayey' sand
- XII 'Very clayey' sand

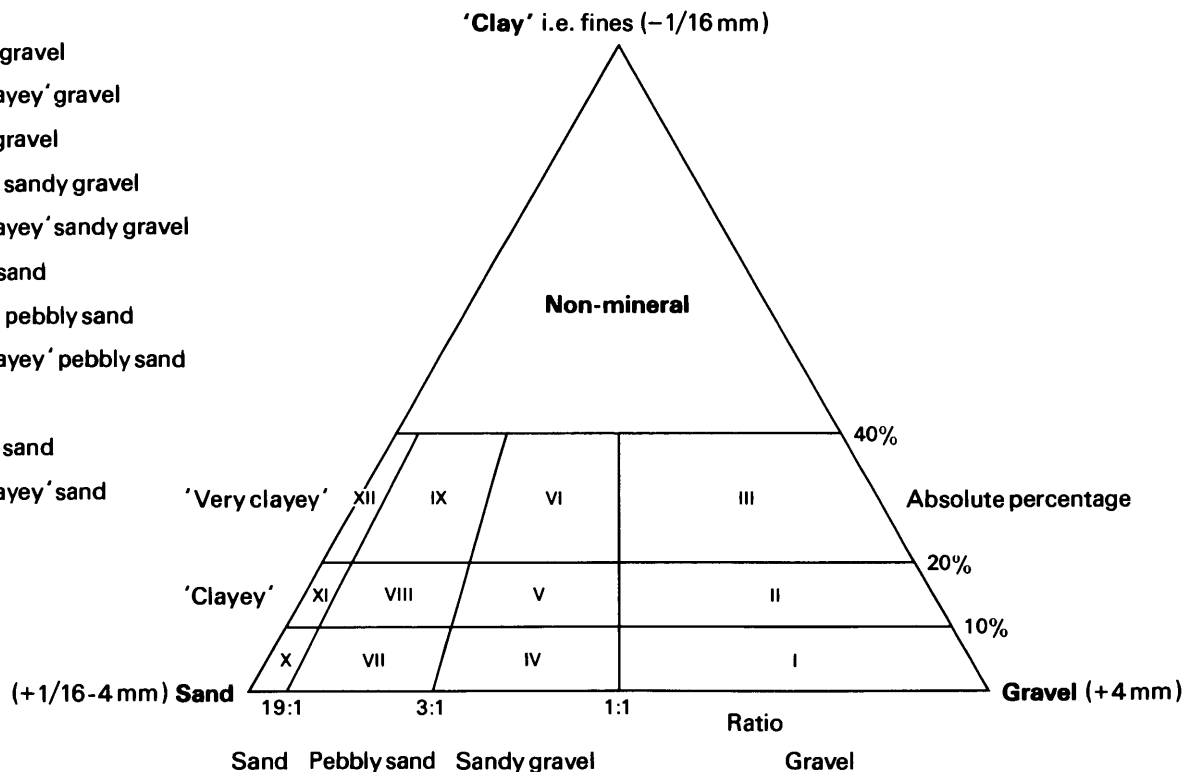


Diagram showing the descriptive categories used in the classification of sand and gravel

APPENDIX D

EXPLANATION OF THE BOREHOLE RECORDS

Annotated fictitious example

CK 66 NW 5¹ 6191 6962² Northfields³
 Surface level +49.7 m (+163 ft)⁴
 Water struck at +45.9 m⁵
 October 1972⁶

Block B
 Overburden⁷ 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

GRADING¹⁰

	Mean for deposit percentages			Depth below surface (m)	percentages						
	Fines	Sand	Gravel		Fines			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

COMPOSITION¹¹

Depth below surface (m)	percentages by weight in the +8-16 mm fraction					
	Flint	Quartz	Limestone	Chalk	Ironstone	Others
3.8-4.8	40	5	50	1	3	1
4.8-5.8	38	3	45	5	8	1
5.8-6.8	45	2	42	5	6	
6.8-8.2	18	6	61	3	11	1*
Mean	34	4	51	3	7	1

*ironpan

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 surface level at the borehole site is given in metres and feet above Ordnance Datum. All measurements were made in metres; approximate conversions to feet are given in brackets.

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

Unless otherwise stated, all boreholes were drilled by a shell and auger rig using 6-inch casing. The month and year of completion of the hole 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 deposit has been graded each is designated by a letter, e.g. **a**, **b**, etc. The description of other deposits is based on visual examination in the field.

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 and ($+16-64$ 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 calculating 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 selected samples or groups of samples may be given. Where appropriate the calculated weighted mean composition of grouped samples may be indicated. The eight specific categories indicate the dominant rock types in the gravel fraction of the assessed deposits. The category 'Others' includes rock types (eg mudstone and micaceous sandstone) which are present only as trace or minor components. An asterisk (*) in this category indicates that subordinate rock types which may characterise particular deposits (eg iron pan - characteristic of the Crag) are specified in a foot note.

APPENDIX E
INDUSTRIAL MINERALS ASSESSMENT UNIT BOREHOLE AND SECTION RECORDS

TM 07 NW 30	0011 7996	Raydon Common, Hopton	Block B	
Surface level +22.0 m (+72 ft)			Overburden	0.5 m
Water level struck at +20.5 m			Mineral	14.3 m
July 1980			Waste	2.0 m
			Mineral	2.4 m
			Waste	0.4 m
			Mineral	1.2 m
			Waste	4.8 m+
LOG				
Geological classification	Lithology		Thickness m	Depth m
	Soil, sand		0.5	0.5
River Terrace Deposits	a Sand, with occasional fine angular flint pebbles Sand: fine and medium rounded quartz, moderate yellowish brown		5.3	5.8
Glacial Sand and Gravel	b 'Clayey' sandy gravel, becoming less pebbly and more silty below 9.8 m Gravel: fine with coarse, angular flint, with some rounded quartzite, flint and vein quartz; traces of chalk, shell and micaceous sandstone Sand: fine with medium, subangular quartz and flint, with some chalk below 9.8 m, light olive grey		9.0	14.8
Glacial Silt	c Silt, sandy, greyish yellow		2.0	16.8
Glacial Sand and Gravel	d 'Very clayey' sand Sand: fine with some medium, chalk with some angular flint, greyish yellow		2.4	19.2
Glacial Silt	Silt, clayey, medium grey, with traces of lamination towards base		0.4	19.6
Glacial Sand and Gravel	e Sand, medium subrounded chalk, with some subangular quartz		1.2	20.8
Glacial Silt	Silt, clayey, medium grey, with occasional fine subrounded chalk pebbles		0.9	21.7
Chalk Silt	Silt, chalky, medium grey, with some fine chalk and quartz sand		3.9+	25.6

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
a	6	93	1	0.5-1.5	4	57	36	1	2	0	0
				1.5-2.5	4	53	41	1	1	0	0
				2.5-3.5	6	51	42	1	0	0	0
				3.5-4.5	5	45	50	0	0	0	0
				4.5-5.8	10	46	42	1	1	0	0
				Mean	6	50	42	1	1	0	0
b	13	59	28	5.8-6.8	1	13	24	9	24	29	0
				6.8-7.8	1	7	24	10	35	21	2
				7.8-8.8	1	8	28	10	28	25	0
				8.8-9.8	2	13	47	10	21	7	0
				9.8-10.8	21	38	24	6	10	1	0
				10.8-11.8	30	46	21	2	1	0	0
				11.8-12.8	16	21	12	4	17	24	6
				12.8-13.8	23	58	14	2	1	2	0
				13.8-14.8	26	63	9	1	1	0	0
				Mean	13	30	23	6	15	12	1
c	46	54	0	14.8-15.8	47	47	4	1	1	0	0
				15.8-16.8	44	40	16	0	0	0	0
				Mean	46	43	10	1	trace	0	0
d	31	69	0	16.8-17.8	30	56	14	0	0	0	0
				17.8-19.2	31	58	11	0	0	0	0
				Mean	31	57	12	0	0	0	0
e				19.6-20.8	No grading data available for this sample						
a+b	11	70	19	0.5-14.8	11	36	30	4	10	8	1

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.5-5.8	79	10	0	11	0	0	0	0
b	5.8-6.8	80	7	3	8	1	0	0	1
	6.8-7.8	76	9	2	10	1	0	1	1
	7.8-8.8	77	8	4	5	3	0	0	3
	8.8-9.8	75	14	1	6	2	0	0	2
	9.8-10.8	81	10	0	9	0	0	0	0
	11.8-12.8	79	8	2	9	1	0	1	trace
b	Mean	77	9	3	8	2	0	trace	1

TM 07 NW 31 0033 7846 Gipsy Lane, Theltenham Block C
 Surface level +32.9 m (+108 ft) Waste 22.7 m
 Water struck at +17.4 m Bedrock 1.3 m+
 July 1980

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Soil with brick rubble	0.4	0.4
Boulder Clay	Clay, silty and sandy, dark yellowish orange, with chalk and subangular flint pebbles, becoming less sandy, medium bluish grey, between 1.3 m and 1.6 m and medium dark grey below 2.9 m	4.2	4.6
	Clay, silty, dark bluish grey, with fine subangular chalk and angular flint, becoming dark grey below 6.1 m	10.3	14.9
	Clay, silty, sandy, moderate brown with fine subrounded chalk pellets, occasional rounded vein quartz and quartzite pebbles	7.8	22.7
Upper Chalk	Chalk, soft white	1.3+	24.0

TM 07 NW 32 0013 7730 Malting Farm, Theltenham Block C
 Surface level +40.2 m (+132 ft) Waste 19.4 m+
 Water struck at +37.3 m
 July 1980

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Silt, sandy with wood fragments	1.6	1.6
Boulder Clay	Clay, silty dark olive grey with fine subangular chalk and patinated flint pebbles, becoming bluish grey below 2.9 m and greyish black between 5.4 m and 6.2 m	4.8	6.4
Glacial Silt	Silt, soft, medium bluish grey	1.6	8.0
Boulder Clay	Clay, silty, greyish black with fine chalk, patinated flint and black mudstone pebbles; becoming medium grey between 10.0 m and 16.2 m, dark grey below 16.2 m, with occasional sandstone pebbles	10.3	19.3
Glacial Sand and Gravel	'Very clayey' gravel Gravel: coarse with fine, angular chalk with some subangular flint and black mudstone; traces of shell Sand: coarse with medium and fine, subangular quartz and chalk	0.1+	19.4

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	
22	15	63	19.3-19.4	22	4	4	7	22	41	0	

TM 07 NW 33 0008 7615 Blackhorse Wood, Theltenham Block C
 Surface level +43.4 m (+142 ft) Waste 10.1 m
 Water not struck Bedrock 2.0 m+
 September 1980

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, silty clay	0.3	0.3
Boulder Clay	Clay, silty, mottled moderate yellowish brown and light grey, with subrounded chalk and angular flint pebbles	3.9	4.2
	Clay, stiff, olive grey with fine well rounded chalk pebbles; becoming light olive grey below 6.3 m and light brown below 6.6 m, with chalk raft below 7.1 m	3.5	7.7
Glacial Sand and Gravel	a 'Very clayey' pebbly sand, with thin beds of silt Gravel: fine with some coarse, rounded quartzite with angular flint, some rounded vein quartz, flint, chalk, igneous and metamorphic Sand: medium with fine, subangular quartz, dark yellowish orange	1.0	8.7
Kesgrave Sands and Gravels	b 'Very clayey' pebbly sand, ironstained Gravel: fine and coarse, quartzite and subangular flint with some vein quartz and ironpan Sand: medium subangular quartz, dark orange	1.4	10.1
Upper Chalk	Chalk, soft white	2.0+	12.1

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	
a	20	61	19	7.7-8.7	20	18	37	6	16	3	0	
b	34	58	8	8.7-9.7 9.7-10.1 Mean	39 23 34	6 6 6	44 59 49	3 4 3	5 3 4	3 5 4	0 0 0	
a+b	28	60	12	7.7-10.1	28	11	44	5	9	3	0	

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	7.7-8.7	27	9	16	40	3	0	5	0
b	8.7-10.1	11	0	6	80	0	0	0	3

TM 07 NW 34 0041 7556 Sandfield Farm, TheInetham

Surface level +44.2(+145 ft)
Water not struck
September 1980

Block C

Overburden 3.8 m
Mineral 4.3 m
Bedrock 1.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand with vein quartz and flint pebbles	0.4	0.4
Kesgrave Sands and Gravels	a 'Very clayey' sandy gravel Gravel: coarse and fine, rounded quartzite with subangular flint, vein quartz and sandstone Sand: medium and fine with some coarse, subangular quartz, silty, light brown	0.4	0.8
	b Sandy silt and clay, with pebbles of rounded quartzite, flint and vein quartz, dark orange; becoming reddish orange below 2.8 m	3.0	3.8
	c 'Clayey' sandy gravel, with well rounded quartzite cobbles below 6.8 m Gravel: fine with coarse, well rounded quartzite with subangular flint; some rounded flint and vein quartz Sand: medium with some coarse, subangular quartz, dark yellowish orange	4.3	9.1
Upper Chalk	Chalk, soft white	1.9+	11.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	22	56	22	0.4-0.8	22	20	28	8	10	12	0
b	46	48	6	0.8-1.8	47	27	22	2	2	0	0
				1.8-2.8	46	25	20	2	5	2	0
				2.8-3.8	47	20	21	4	6	2	0
				Mean	46	24	21	3	4	2	0
c	14	55	31	3.8-4.8	18	6	14	16	30	16	0
				4.8-5.8	18	5	27	19	19	12	0
				5.8-6.8	14	4	36	19	20	7	0
				6.8-7.8	11	4	42	16	15	11	1
				7.8-9.1	12	7	46	8	14	11	2
				Mean	14	5	35	15	19	11	1
a+b	43	49	8	Mean	43	24	22	3	5	3	0
b+c	26	52	22	0.8-9.1	26	12	29	11	14	8	trace
a+c	15	54	51	Mean	15	6	33	15	19	11	1
a+b+c	26	52	22	Mean	26	12	29	11	14	8	trace

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.4-0.8	21	3	10	57	0	0	0	9*
b	0.8-1.8	7	0	30	54	0	0	0	9*
	1.8-2.8	0	15	0	58	0	0	27	0
	2.8-3.8	2	15	3	80	0	0	0	0
c	3.8-4.8	20	9	12	56	0	0	1	2
	4.8-5.8	32	7	9	49	0	0	0	3*
	5.8-6.8	20	4	8	67	0	0	0	1
	6.8-7.8	17	10	14	50	0	0	3	6
	7.8-9.1	30	11	11	37	0	0	2	9*
a-c	Mean	21	8	11	56	0	0	1	3

* Mainly sandstone and ironpan

TM 07 NW 35 0113 7980 Church Farm, Blo Norton

Surface level +32.9 m (+108 ft)
Water struck at +21.6 m and +19.4 m
June 1980

Block A

Overburden 5.3 m
Mineral 6.0 m
Waste 2.2 m
Mineral 6.8 m
Bedrock 2.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand	0.3	0.3
Cover Sand	a 'Very clayey' pebbly sand Gravel: fine with coarse, angular flint with some vein quartz and traces of chalk Sand: fine with medium subangular quartz, moderate yellowish brown	1.0	1.3
Boulder Clay	Clay, sandy, mottled dark yellowish orange and moderate yellowish brown, with ironstained chalk and patinated flint pebbles; becoming pale yellowish brown, with abundant chalk pebbles below 2.0 m	2.9	4.2
Glacial Silt	Silt, clayey and sandy, greyish orange	0.2	4.4
Boulder Clay	Clay, silty and sandy, soft, pale yellowish brown with fine chalk and flint pebbles	0.9	5.3
Glacial Sand and Gravel	b Pebbly sand Gravel: fine with some coarse, angular flint with rounded quartzite, chalk, flint, vein quartz and limestone Sand: medium with fine, subangular quartz and chalk, greyish orange	6.0	11.3
Boulder Clay	Clay, silty and sandy, moderate yellowish brown with occasional fine chalk, quartzite and vein quartz pebbles	2.2	13.5

Glacial Sand and Gravel	e 'Very clayey' sand Sand: fine with medium, subangular quartz, dark yellowish orange	3.0	16.5
Ingham Sand and Gravel	d Gravel Gravel: coarse and fine, subangular flint and well-rounded brown quartzite, with some rounded flint and vein quartz Sand: medium with coarse, subangular flint and quartz, light orange brown	3.8	20.3
Upper Chalk	Chalk, soft white, with occasional flints	2.7+	23.0

TM 07 NW 36 0137 7912 Near Blo Norton, Blo Norton

Surface level +22.1 m (+73 ft)
Water struck at +20.7 m
July 1980

Block B

Overburden 0.7 m
Mineral 7.9 m
Waste 1.3 m
Mineral 1.1 m
Waste 17.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, peat with sand	0.3	0.3
Peat	Peat, soft, fibrous, dark brown with gastropod shells	0.4	0.7
River Terrace Deposits	a Sand, with occasional angular flint pebbles Sand: medium and fine, subrounded quartz, dark yellowish orange	5.0	5.7
Glacial Sand and Gravel	b Sand Sand: medium and fine, subangular and subrounded quartz, greyish orange	2.9	8.6
Glacial Silt	Silt, clayey, soft, light brownish grey	1.3	9.9
Glacial Sand and Gravel	c Gravel Gravel: fine and coarse, angular flint with some rounded quartzite, flint, vein quartz and chalk; traces of shell Sand: fine and medium with some coarse, subangular quartz and flint, light olive grey	1.1	11.0
Glacial Silt	Silt, clayey, soft, laminated, light olive grey becoming orange at base	3.9	14.9
Boulder Clay	Clay, silty, firm, light grey with occasional fine subrounded chalk and patinated flint pebbles; becoming darker between 16.3 m and 25.9 m, brownish grey below 28.1 m	13.5+	28.4

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages							
	Fines	Sand	Gravel		Fines				Gravel			
					- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{8}$	+ $\frac{1}{8}$ -1	+1 -4	+4 -16	+16 -64	+64 mm	
a	36	58	6	0.3-1.3	36	34	22	2	4	2	0	
b	8	85	7	5.3-5.5	27	23	29	6	10	5	0	
				5.5-6.5	17	23	53	2	5	0	0	
				6.5-7.5	7	50	40	1	2	0	0	
				7.5-8.5	5	62	33	0	0	0	0	
				8.5-9.5	5	36	42	3	9	5	0	
				9.5-10.5	4	20	57	3	9	7	0	
				10.5-11.3	6	16	76	1	1	0	0	
Mean	8	35	48	2	5	2	0					
c	22	78	0	13.5-14.5	25	50	24	1	0	0	0	
				14.5-15.5	23	54	23	0	0	0	0	
				15.5-16.5	16	52	32	0	0	0	0	
				Mean	22	52	26	trace	0	0	0	
d	8	44	48	16.5-17.5	1	4	45	13	19	18	0	
				17.5-18.5	1	5	31	10	27	26	0	
				18.5-19.5	23	3	24	10	24	16	0	
				19.5-20.3	7	2	17	8	24	42	0	
				Mean	8	4	30	10	23	25	0	

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages							
	Fines	Sand	Gravel		Fines				Gravel			
					- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{8}$	+ $\frac{1}{8}$ -1	+1 -4	+4 -16	+16 -64	+64 mm	
a	3	94	3	0.7-1.7	5	42	50	2	1	0	0	
				1.7-2.7	1	45	50	2	2	0	0	
				2.7-3.7	2	34	49	5	10	0	0	
				3.7-4.7	3	44	49	1	3	0	0	
				4.7-5.7	2	47	49	1	1	0	0	
Mean	3	42	50	2	3	0	0					
b	3	97	0	5.7-6.7	3	46	51	0	0	0	0	
				6.7-7.7	3	40	57	0	0	0	0	
				7.7-8.6	3	43	54	0	0	0	0	
				Mean	3	43	54	0	0	0	0	
c	5	40	55	9.9-11.0	5	18	15	7	26	22	7	
a+b	3	95	2	0.7-8.6	3	43	51	1	2	0	0	
b+c	3	82	15	Mean	3	36	44	2	7	6	2	
a+c	3	85	12	Mean	3	38	44	3	7	4	1	
a+b+c	3	88	9	Mean	3	40	46	2	5	3	1	

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
b 5.3-11.3	36	6	10	19	17	9	0	3
d 16.5-17.5	39	36	5	10	0	0	0	10*
	17.5-18.5	40	19	14	20	trace	0	7*
	18.5-19.5	45	11	16	24	2	0	2*
	19.5-20.3	34	10	12	37	trace	0	5*
	Mean	39	17	13	28	1	0	trace

* Mainly sandstone

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	2.7-3.7	91	2	0	5	2	0	0	0
	3.7-5.7	62	0	0	38	0	0	0	0
a	Mean	86	2	0	10	2	0	0	0
c	9.9-11.0	74	7	3	11	1	0	0	4*

*Including shell

TM 07 NW 37 0155 7821 Lodge Farm, Theltenham Block C
 Surface level +34.6 m (+114 ft) Waste 18.6 m
 Water struck at +19.1 m Bedrock 1.8 m+
 September 1980

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand	0.3	0.3
Boulder Clay	Clay, silty, firm, mottled light olive brown and greyish olive, with abundant fine subangular chalk pebbles	1.4	1.7
Glacial Silt	Silt, sandy, soft, light olive brown, with occasional fine angular flint pebbles	0.6	2.3
Boulder Clay	Clay, stiff, olive grey with well rounded chalk and angular flint pebbles; becoming medium light grey with abundant chalk pebbles, between 4.1 m and 6.5 m	5.4	7.7
Glacial Silt	Silt, soft, micaceous, light olive grey	0.2	7.9
Boulder Clay	Clay, silty, stiff, olive grey with subangular chalk and black mudstone pebbles; becoming light grey below 15.5 m with a raft of hard chalk with flints below 16.9 m	9.7	17.6
Boulder Clay	Clay, silty, light grey with fine angular chalk pebbles; becoming light brownish grey, with chert and flint pebbles, below 18.0 m	1.0	18.6
Upper Chalk	Chalk, soft white	1.8+	20.4

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages					
Fines	Sand	Gravel		Fines	Sand			Gravel	
			- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
43	56	1	1.7-2.3	43	31	24	1	1	0

TM 07 NW 38 0132 7719 Thripskin Farm, Theltenham Block C
 Surface level +31.3 m (+103 ft) Waste 18.8 m+
 Water not struck
 August 1980

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Soil with brick rubble	0.5	0.5
Boulder Clay	Clay, silty, medium dark grey, with subrounded chalk, flint and black mudstone pebbles	14.5	14.9
	Clay, silty, medium light grey, with abundant rounded chalk and occasional subangular patinated flint pebbles	3.9+	18.8

TM 07 NW 39 0131 7543 Beech Tree Farm, Wattisfield Block C
 Surface level +51.1 m (+168 ft) Overburden 4.8 m
 Water not struck Mineral 6.2 m
 August 1980 Bedrock 2.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand	0.5	0.5
Cover Sand	'Clayey' sand with occasional patinated flint pebbles	0.1	0.6
Boulder Clay	Clay, sandy and silty, mottled medium dark grey and brown with occasional patinated flint pebbles; becoming medium dark grey, with chalk and flint pebbles below 0.9 m	4.2	4.8
Kesgrave Sands and Gravels	'Clayey' sandy gravel Gravel: fine with coarse, rounded quartzite with vein quartz and subangular flint, some well rounded flint Sand: medium with fine and some coarse, subangular quartz yellowish orange; traces of ironpan	6.2	11.0
Upper Chalk	Chalk, soft white	2.2+	13.2

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages					
Fines	Sand	Gravel		Fines	Sand			Gravel	
			- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
13	65	22	4.8-5.8	7	6	54	15	15	3
			5.8-6.8	6	3	27	17	27	20
			6.8-7.8	11	9	39	18	17	6
			7.8-8.8	12	9	44	16	12	7
			8.8-9.8	17	43	26	5	9	0
			9.8-11.0	21	40	22	3	4	6
			Mean	13	19	34	12	14	7

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
4.8-5.8	29	11	17	41	0	0	0	2
5.8-6.8	24	8	25	40	0	0	1	2
6.8-7.8	21	11	25	39	0	0	0	4
7.8-8.8	24	22	30	19	0	0	0	5
8.8-9.8	22	4	16	47	0	0	0	12*
9.8-11.0	62	21	17	0	0	0	0	0
Mean	30	13	22	31	0	0	trace	4

*Including ironpan

TM 07 NW 40 0243 7943 North West of The Banks, Blo Norton Block A

Surface level +40.1 m (+132 ft) Overburden 0.2 m
 Water not struck Mineral 2.0 m
 September 1980 Waste 18.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand with occasional angular flint pebbles	0.2	0.2
Glacial Sand and Gravel	'Clayey' pebbly sand Gravel: coarse and fine, angular flint with rounded quartzite and vein quartz Sand: medium and fine, subangular quartz, dark yellowish orange	2.0	2.2
Boulder Clay	Clay, stiff, mottled light olive brown and light olive grey with chalk and flint pebbles; becoming greyish olive, with black mudstone and chalk pebbles below 2.8 m	5.7	7.9
Glacial Silt	Silt, clayey, soft, micaceous, olive grey	0.4	8.3
Boulder Clay	Clay, stiff, olive grey with medium and fine rounded chalk and angular black mudstone pebbles; becoming slightly silty, dark olive brown with angular chalk and flint pebbles below 20.2 m	12.7+	21.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand	Gravel				
				- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
15	78	7	0.2-1.2	17	42	31	2	3	5	0
			1.2-2.2	13	33	47	2	2	3	0
			Mean	15	37	39	2	3	4	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
0.2-2.2	62	0	19	19	0	0	0	0

TM 07 NW 41 0248 7847 Grove Farm, Hinderclay Block B

Surface level +24.4 m (+80 ft) Overburden 0.4 m
 Water struck at +23.4 m Mineral 8.3 m
 July 1980 Waste 18.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, peat and sand	0.4	0.4
River Terrace Deposits	a Sand, with occasional fine angular flint pebbles Sand: fine with medium subrounded quartz, dark yellowish orange	6.0	6.4
Glacial Sand and Gravel	b Gravel, with flint cobbles near the base Gravel: fine and coarse, angular flint with some rounded quartzite, flint and vein quartz; traces of chalk Sand: medium with fine and coarse, subangular quartz and flint, dark yellowish orange	2.3	8.7
Boulder Clay	Clay, silty, firm, dark bluish grey with fine flint and chalk pebbles; becoming olive grey below 10.8 m and dark grey below 14.3 m	8.6	17.3
Glacial Silt	Silt, soft, laminated, olive grey	3.0	20.3
Boulder Clay	Clay, silty and sandy, medium dark grey with occasional subrounded chalk and patinated flint pebbles	0.6	20.9
Glacial Silt	Silt, clayey, interbedded with silty clay and fine chalk sand, olive grey	3.7	24.6
Boulder Clay	Clay, sandy and silty, medium dark grey with subangular chalk and patinated flint; becoming dark olive brown, with chalk, flint and well rounded quartzite pebbles, below 25.8 m	2.9+	27.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines	Sand	Gravel				
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	5	94	1	0.4-1.4	7	65	23	2	3	0	0
				1.4-2.4	4	67	26	1	2	0	0
				2.4-3.4	4	80	15	1	0	0	0
				3.4-4.4	4	70	23	2	1	0	0
				4.4-5.4	7	58	32	2	1	0	0
				5.4-6.4	7	60	32	0	1	0	0
				Mean	5	68	25	1	1	0	0
b	2	45	53	6.4-7.4	2	22	20	8	28	20	0
				7.4-8.4	1	8	24	10	30	25	2
				8.4-8.7	1	5	22	7	30	31	4
				Mean	2	14	22	9	28	24	1
a+b	4	80	16	0.4-8.7	4	53	24	3	9	7	trace

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
b	6.4-7.4	69	8	8	10	3	0	0	2
	7.4-8.4	68	11	4	13	1	0	1	2
	8.4-8.7	74	5	3	16	0	0	0	2
	Mean	69	10	5	12	2	0	trace	2

TM 07 NW 42 0210 7750 Thorpe Street, Hinderclay Block C
 Surface level +36.2 m (+119)
 Water not struck
 August 1980
 Waste 18.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand and clay	0.4	0.4
Glacial Sand and Gravel	'Very clayey' pebbly sand Gravel: fine, angular flint with rounded flint and vein quartz, some ironstone and chalk Sand: fine with medium, quartz and flint, mottled orange and dark brown	0.4	0.8
Boulder Clay	Clay, silty, mottled yellowish brown and light grey, with abundant fine subangular chalk and flint pebbles; becoming medium grey, with occasional chalk and flint pebbles below 3.4 m	17.8+	18.6

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		
30	62	8	0.4-0.8	30	38	20	4	7	1	0		

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
	0.4-0.8	45	24	13	0	8	0	0	10*

* ironstone

TM 07 NW 43 0282 7713 Cowfen Lane, Hinderclay Block C
 Surface level +41.9 m (+137 ft)
 Water not struck
 September 1980
 Waste 24.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, silty sand	0.4	0.4
Boulder Clay	Clay, silty, stiff, mottled light olive grey and light olive brown with subangular chalk and angular flint pebbles; becoming medium grey between 8.2 m and 10.9 m, olive grey with silt partings from 13.2 m to 20.5 m with a chalk raft below 20.5 m	20.3	20.7
Boulder Clay	Clay, stiff, waxy, olive black with subrounded chalk pebbles; becoming light olive grey, with abundant chalk pebbles below 23.8 m	3.3+	24.0

TM 07 NW 44 0229 7533 Hinderclay Wood, Hinderclay Block B
 Surface level +31.3 m (+102 ft)
 Water not struck
 August 1980
 Overburden 1.3 m
 Mineral 3.8 m
 Bedrock 0.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, clay, silty and sandy	0.2	0.2
Head	a 'Very clayey' pebbly sand Gravel: coarse and fine, rounded quartzite and angular flint with some rounded flint and vein quartz Sand: fine with medium, subangular quartz, brownish orange	1.1	1.3
River Terrace Deposits	b 'Clayey' pebbly sand, with occasional thin beds of silt Gravel: coarse and fine, rounded quartzite, vein quartz and angular flint Sand: fine and medium, well rounded quartz, pale yellow	2.0	3.3
Glacial Sand and Gravel	c 'Very clayey' sandy gravel, with thin beds of chalky silt Gravel: fine with coarse, angular flint with rounded quartzite, flint and vein quartz, some rounded chalk Sand: fine and medium with some coarse, subangular quartz, dusky yellow	1.8	5.1
Upper Chalk	Chalk, soft white	0.9+	6.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{2}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	24	61	15	0.2-1.3	24	35	23	3	7	8	0
b	12	79	9	1.3-2.3	9	47	29	2	4	9	0
				2.3-3.3	16	45	32	2	4	1	0
				Mean	12	46	31	2	4	5	0
c	31	50	19	3.3-4.3	33	26	23	4	10	4	0
				4.3-5.1	25	22	20	7	15	11	0
				Mean	31	24	21	5	12	7	0
a+b	17	72	11	0.2-3.3	17	42	28	2	5	6	0
b+c	21	65	14	1.3-5.1	21	36	26	3	8	6	0
a+c	28	54	18	Mean	28	28	22	4	10	8	0
a+b+c	22	63	15	0.2-5.1	22	35	25	3	8	7	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.2-1.3	39	2	12	47	0	0	0	0
b	1.3-2.3	35	0	47	18	0	0	0	0
	2.3-3.3	30	0	23	47	0	0	0	0
	Mean	32	0	32	36	0	0	0	0
c	3.3-4.3	36	10	20	28	5	0	0	1
	4.3-5.1	48	11	17	22	2	0	0	0
	Mean	42	11	18	25	4	0	0	trace

29

TM 07 NW 45

0296 7532

Snappe Farm, Rickinghall Inferior

Block E

Surface level +55.4 m (+182 ft)
Water not struck
August 1980

Overburden 0.3 m
Mineral 1.7 m
Waste 5.9 m
Mineral 3.7 m
Waste 0.1 m
Bedrock 2.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, clay with sand	0.3	0.3
Glacial Sand and Gravel	a 'Clayey' sandy gravel Gravel: fine with coarse, subrounded chalk with some angular flint, rounded quartzite and subrounded flint; traces of limestone and shell Sand: medium and fine with some coarse, rounded chalk and subrounded quartz	1.7	2.0
Boulder Clay	Clay, silty, orange brown, with occasional subangular flint pebbles; becoming dark bluish grey, with chalk and flint pebbles below 2.3 m	5.9	7.9
Crag	b 'Clayey' sand, with occasional well rounded flint and vein quartz pebbles, ironstained Sand: medium with fine, subrounded quartz, bright orange Clay, sandy, bright orange brown	3.7	11.6
Upper Chalk	Chalk, soft white	2.3+	14.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{2}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	19	56	25	0.3-1.3	19	32	33	7	7	2	0
				1.3-2.0	18	6	14	12	28	22	0
				Mean	19	21	26	9	15	10	0
b	16	81	3	7.9-8.9	12	25	59	2	2	0	0
				8.9-9.9	17	21	51	6	5	0	0
				9.9-10.7	13	16	65	4	2	0	0
				10.7-11.6	23	25	47	3	2	0	0
				Mean	16	22	55	4	3	0	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.3-2.0	23	3	0	5	67	1	0	1
b	7.9-11.6	15	21	25	28	0	0	0	11*

* Ironpan

TM 07 NW 46 0363 7979 Poplar Tree Farm, South Lopham

Surface level +38.7 m (+127 ft)
Water struck at +36.9 m
August 1980

Block A
Waste 20.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand with occasional flint pebbles	0.3	0.3
Boulder Clay	Clay, silty and sandy, stiff, mottled dark orange and light olive grey, with chalk pebbles and thin beds of fine quartz sand	1.6	1.9
	Clay, stiff, olive grey with medium and fine subrounded chalk pebbles and a bed of angular chalk gravel between 12.0 m and 12.3 m	18.1+	20.0

TM 07 NW 47 0362 7858 Near Gallows Hill, Redgrave

Surface level +26.4 m (+87 ft)
Water struck at +25.0 m
July 1980

Block B
Overburden 0.4 m
Mineral 8.8 m
Waste 3.3 m
Mineral 1.8 m
Waste 0.7 m
Bedrock 3.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand	0.4	0.4
River Terrace Deposits	a Pebbly sand Gravel: coarse and fine, angular flint with some rounded quartzite, flint and vein quartz Sand: fine and medium, subrounded quartz, greyish orange	6.0	6.4
Glacial Sand and Gravel	b Sandy gravel, with some flint cobbles Gravel: fine with coarse, angular flint, with some rounded quartzite, flint and vein quartz; traces of chalk Sand: medium with fine and coarse, subangular quartz and flint, with some rounded chalk, pale yellowish brown	2.8	9.2
Glacial Silt	Silt, clayey and sandy, mottled greyish orange and light grey	1.1	10.3
Boulder Clay	Clay, silty, firm, bluish grey with occasional patinated flint and chalk pebbles	2.2	12.5
Glacial Sand and Gravel	c Gravel, with some flint and sandstone cobbles Gravel: coarse and fine, angular flint with rounded quartzite, some rounded chalk, flint and vein quartz and traces of limestone and shell Sand: fine and coarse with medium, subangular quartz and flint	1.8	14.3
Glacial Silt	Silt, clayey and sandy, soft, light olive grey; becoming medium bluish grey below 14.4 m and orange at the base	0.7	15.0
Upper Chalk	Chalk, soft white	3.6+	18.6

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					-1/16	+1/16 - 1/8	+1/8 - 1/4	+1 - 4	+4 - 16	+16 - 64	+64 mm
a	2	89	9	0.4-1.4 1.4-2.4 2.4-3.4 3.4-4.4 4.4-5.4 5.4-6.4 Mean	3 2 1 1 1 2 2	57 38 46 51 36 49 45	38 56 49 39 34 41 43	1 1 1 1 1 1 1	1 1 2 4 11 2 4	0 2 1 4 17 5 5	0 0 0 0 0 0 0
b	3	57	40	6.4-7.4 7.4-8.4 8.4-9.2 Mean	2 2 4 3	20 15 10 15	31 22 34 29	5 10 25 13	18 27 25 23	21 18 2 14	3 6 0 3
c	7	44	49	12.5-13.4 13.4-14.3 Mean	8 6 7	5 8 7	20 27 23	14 13 14	23 21 22	28 25 26	2 0 1
a+b	2	79	19	0.4-9.2	2	37	37	5	10	8	1
b+c	4	52	44	Mean	4	12	27	13	23	19	2
a+b+c	3	73	24	Mean	3	31	36	6	12	11	1

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.4-6.4	76	6	4	14	0	0	0	trace
b	6.4-7.4	73	9	5	11	trace	0	0	2
	7.4-8.4	72	9	3	15	0	0	0	1
	8.4-9.2	83	8	1	6	trace	0	0	2
	Mean	74	9	3	12	trace	0	0	2
c	12.5-13.4	44	8	4	27	9	5	1	2
	13.4-14.3	42	10	8	25	10	1	0	4
	Mean	43	9	5	27	10	3	trace	3

TM 07 NW 48 0395 7791 Ivy House, Redgrave

Surface level +39.0 m (+128 ft)
Water not struck
August 1980

Block D

Overburden 0.2 m
Mineral 1.2 m
Waste 9.2 m
Bedrock 1.4 m+

TM 07 NW 49 0396 7705 Butts Plantation, Regrave

Surface level +26.9 m (+88 ft)
Water struck at +24.7 m
August 1980

Block B

Overburden 0.4 m
Mineral 2.6 m
Waste 3.0 m
Bedrock 2.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand with occasional angular flint pebbles	0.2	0.2
Glacial Sand and Gravel	'Clayey' pebbly sand Gravel: fine and coarse, angular flint and rounded quartzite, some sandstone Sand: fine with medium, subangular quartz, brownish orange	1.2	1.4
Boulder Clay	Clay, stiff, mottled greyish orange and light olive brown with well rounded chalk and angular flint pebbles; becoming olive grey below 3.0 m	3.8	5.2
Glacial Silt	Silt, clayey, soft, light olive grey, with thin beds of silty clay containing fine rounded chalk pebbles between 8.2 m and 8.8 m	3.8	9.0
Boulder Clay	Clay, stiff, olive grey with subangular chalk and occasional angular flint pebbles; becoming mottled with moderate olive brown clay below 10.4 m	1.6	10.6
Upper Chalk	Chalk, soft white	1.4+	12.0

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Soil, with flints and peat	0.4	0.4
River Terrace Deposits	a 'Clayey' sand, with some peat; angular and rounded flint pebbles Sand: medium with fine well rounded quartz, dusky yellow brown	0.7	1.1
Glacial Sand and Gravel	b Sandy gravel, with occasional flint cobbles Gravel: fine and coarse, angular flint with some rounded quartzite, flint and vein quartz; traces of chalk and limestone Sand: medium and fine with some coarse, subrounded quartz, light olive brown	1.9	3.0
Boulder Clay	Clay, moderate olive brown; with medium and fine well rounded chalk and angular flint pebbles; occasional coarse well rounded quartzite and vein quartz pebbles near the base	3.0	6.0
Upper Chalk	Chalk, soft white	2.0+	8.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
15	78	7	0.2-1.4	15	48	29	1	4	3	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
0.2-1.4	77	0	0	20	0	0	0	3

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages							
Fines	Sand	Gravel		Fines	Sand			Gravel			
				- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm	
a	12	84	4	0.4-1.1	12	32	50	2	3	1	0
b	7	62	31	1.1-2.2	0	18	28	13	24	15	2
				2.2-3.0	16	33	29	4	7	11	0
				Mean	7	25	28	9	17	13	1
a+b	8	68	24	0.4-3.0	8	27	34	7	13	10	1

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.4-1.1	86	14	0	0	0	0	0
b	1.1-2.2	84	5	4	5	1	trace	0
	2.2-3.0	66	3	9	14	8	0	0
	Mean	83	5	4	6	1	trace	0

TM 07 NW 50 0395 7611 Mill House, Rickingham Inferior

Surface level +40.3 m (+132 ft)
Water not struck
August 1980

Block C

Overburden 2.3 m
Mineral 2.6 m
Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, silty sand	0.6	0.6
Glacial Sand and Gravel	a 'Clayey' sand Sand: fine with medium, rounded quartz, dark yellowish orange	0.9	1.5
	b Very silty sand, mottled orange and light grey with thin beds of light grey silty clay at the base	0.8	2.3
	c 'Clayey' sand, becoming pebbly below 4.4 m Gravel: fine well rounded quartzite, flint and vein quartz, some ironpan Sand: fine with medium rounded quartz, dark yellowish orange	2.7	5.0
Upper Chalk	Chalk, soft white	1.5+	6.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Percentages						
					- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	13	86	1	0.6-1.5	13	52	33	1	1	0	0
b	40	60	0	1.5-2.3	40	43	17	trace	0	0	0
c	18	80	2	2.3-3.3	20	43	36	1	0	0	0
				3.4-4.4	19	51	29	1	0	0	0
				4.4-5.0	13	28	47	5	6	1	0
			Mean	18	42	36	2	2	trace	0	
a+b	24	75	1	0.6-2.1	24	47	27	1	1	0	0
b+c	22	77	1	Mean	22	43	32	2	1	trace	0
a+c	17	82	1	Mean	17	45	35	2	1	trace	0
a+b+c	20	79	1	Mean	20	45	33	1	1	trace	0

TM 07 NW 51 0418 7955 Little Fen, South Lopham

Surface level +24.5 m (+ 80 ft)
Water struck at +23.8 m
August 1980

Block B

Overburden 3.6 m
Mineral 6.1 m
Waste 6.3 m
Mineral 6.0 m
Waste 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sandy peat	0.2	0.2
Peat	Peat, fibrous, dusky yellow brown	1.6	1.8
Silt	Silt, soft, mottled pale yellowish brown and dusky brown with abundant bivalve and gastropod shells; becoming light olive grey below 2.9 m	1.8	3.6
River Terrace Deposits	a Pebbly sand Gravel: fine and coarse, angular flint Sand: fine with medium, subangular quartz and flint, light olive grey	3.0	6.6
Glacial Sand and Gravel	b Sandy gravel Gravel: fine with coarse, angular flint with some rounded quartzite, flint and vein quartz; traces of chalk and limestone Sand: medium with some fine and coarse, angular flint and quartz, with some well rounded quartz, light olive grey	3.1	9.7
Glacial Silt	Silt, olive grey, with thin beds of pebbly silt between 15.5 m and 16.0 m	6.3	16.0
Glacial Sand and Gravel	c Sandy gravel, with some well rounded chalk and quartzite cobbles above 19.0 m Gravel: fine and coarse, angular flint with rounded chalk and quartzite, some rounded flint and vein quartz; traces of igneous, metamorphic, limestone, black mudstone and shell Sand: medium with coarse and fine, angular chalk, flint and quartz	6.0	22.0
Boulder Clay	Clay, stiff, olive grey, with abundant fine subrounded chalk pebbles; occasional black mudstone and flint pebbles	1.0+	23.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages							
	Fines	Sand	Gravel		Fines		Sand		Gravel			
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm	
a	8	84	8	3.6-4.6	10	44	26	3	6	11	0	
				4.6-5.6	6	46	40	2	6	0	0	
				5.6-6.6	7	53	37	1	1	1	0	
				Mean	8	48	34	2	4	4	0	
b	3	66	31	6.6-7.6	5	23	45	3	13	11	0	
				7.6-8.6	1	18	48	10	18	5	0	
				8.6-9.7	2	11	29	11	33	14	0	
				Mean	3	17	41	8	21	10	0	
c	9	50	41	16.0-17.0	7	3	11	14	31	31	3	
				17.0-18.2	17	8	18	16	23	15	3	
				18.2-19.0	8	14	31	19	14	12	2	
				19.0-20.0	10	17	19	13	20	21	0	
				20.0-21.0	7	9	35	16	23	10	0	
				21.0-22.0	6	17	27	16	17	17	0	
				Mean	9	11	23	16	22	18	1	
a+b	5	75	20	3.6-9.7	5	32	38	5	13	7	0	
b+c	7	55	38	Mean	7	13	29	13	22	15	1	
a+b+c	7	62	31	Mean	7	22	30	10	17	13	1	

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
b	6.6-9.7	85	4	2	7	1	trace	0	1
c	16.0-22.0	45	6	3	13	23	3	1	6*

*Including shell and mudstone

TM 07 NW 52 0443 7845

Mill Lane, Redgrave

Block D

Surface level +46.4 m (+152 ft)
Water struck at +29.8 m
September 1980

Overburden 0.3 m
Mineral 5.2 m
Waste 0.3 m
Mineral 1.0 m
Waste 16.6 m
Bedrock 3.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand with abundant flint and quartzite pebbles	0.3	0.3
Glacial Sand and Gravel	a Sandy gravel, ironstained Gravel: fine with coarse, angular flint with rounded quartzite, flint and vein quartz; traces of chalk Sand: medium with fine and coarse, subrounded quartz, dark orange	5.2	5.5
Boulder Clay	Clay, stiff, mottled olive grey and dark olive brown with chalk and flint pebbles	0.3	5.8
Glacial Sand and Gravel	b 'Very clayey' sandy gravel Gravel: fine with coarse, angular flint with rounded quartzite, chalk, flint and some vein quartz Sand: medium with fine and some coarse, subangular quartz, dark orange	1.0	6.8
Boulder Clay	Clay, stiff, mottled olive grey and light olive brown with abundant ironstained chalk pebbles	1.0	7.8
Glacial Silt	c Silt, clayey, sandy and pebbly in part, soft, moderate yellowish brown	3.4	11.2
Boulder Clay	Clay, olive grey with subangular chalk and occasional flint pebbles; becoming silty, olive black, from 13.9 m to 14.6 m and sandy, moderate olive brown with angular flint pebbles below 18.4 m	7.5	18.7
Glacial Silt	Silt, clayey, soft, laminated, light olive grey	0.4	19.1
Boulder Clay	Clay, medium grey with abundant medium and fine subangular chalk pebbles; becoming olive black below 23.0 m	4.3	23.4
Upper Chalk	Chalk, hard rock, white	3.3+	26.7

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines		Sand		Gravel		
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	6	68	26	0.3-1.3	6	14	27	6	19	28	0
				1.3-2.3	9	29	32	3	11	16	0
				2.3-3.3	4	8	52	15	18	3	0
				3.3-4.3	4	9	65	10	9	3	0
				4.3-5.5	6	15	43	11	17	8	0
				Mean	6	15	44	9	15	11	0
b	31	43	26	5.8-6.8	31	15	21	7	15	11	0
c	52	33	15	7.8-9.3	60	14	10	6	8	2	0
				9.3-9.9	46	16	12	7	14	5	0
				9.9-11.2	45	16	12	8	12	7	0
				Mean	52	15	11	7	11	4	0
a+b	10	64	26	Mean	10	15	40	9	15	11	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.3-5.5	59	16	7	17	trace	0	trace	1
b	5.8-6.8	45	12	3	22	17	0	0	1
c	7.8-11.2	21	0	1	8	46	12	0	12*

* Mainly ironpan

TM 07 NW 53 0488 7776 Redgrave Green, Redgrave

Block D

Surface level +45.5 m (+149 ft)
Water not struck
September 1980

Overburden 0.3 m
Mineral 2.3 m
Waste 1.8 m
Bedrock 3.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand	0.3	0.3
Glacial Sand and Gravel	'Clayey' sandy gravel, becoming more pebbly with depth Gravel: coarse and fine, angular flint with rounded quartzite, flint and vein quartz Sand: fine and medium with some coarse, angular flint and quartz, dark orange	2.3	2.6
Boulder Clay	Clay, sandy, mottled dark orange and light olive brown, with occasional rounded chalk, vein quartz and angular flint pebbles; becoming dark yellowish brown below 3.6 m	1.8	4.4
Upper Chalk	Chalk, soft, greyish yellow, with flints	3.1+	7.5

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines			Gravel			
				- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
15	54	31	0.3-1.3	15	38	25	5	12	5	0
			1.3-2.3	14	20	19	7	18	22	0
			2.3-2.6	19	10	16	8	19	25	3
			Mean	15	26	21	7	15	16	trace

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
0.3-2.6	68	11	4	14	0	0	1	2

TM 07 NW 54 0494 7558 Bottesdale, Bottesdale

Block C

Surface level +40.9 m (+134 ft)
September 1980

Overburden 0.3 m
Mineral 8.0 m
Waste 1.2 m
Bedrock 1.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, silty sand with quartzite and vein quartz pebbles	0.3	0.3
Kesgrave Sands and Gravels	Sandy gravel, with occasional subrounded patinated flint cobbles below 5.3 m Gravel: fine with coarse, well rounded and subangular flint, quartzite and vein quartz Sand: medium with some fine and coarse, subangular quartz, silty, dark yellowish orange above 3.3 m and very pale orange below 3.3 m	8.0	8.3
Chalk Silt	Silt, soft, chalky, yellowish orange	1.2	9.5
Upper Chalk	Chalk, soft white, with hard angular chalk rock fragments	1.8+	11.3

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines			Gravel			
				- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
9	63	28	0.3-1.3	18	35	35	2	2	8	0
			1.3-2.3	23	37	36	2	2	0	0
			2.3-3.3	15	35	30	4	10	6	0
			3.3-4.3	4	11	42	11	19	13	0
			4.3-5.3	5	6	32	22	27	8	0
			5.3-6.3	3	3	34	14	21	21	4
			6.3-7.3	2	3	48	9	27	11	0
			7.3-8.3	2	9	31	8	23	24	3
			Mean	9	17	37	9	16	11	1

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
0.3-1.3	15	15	44	26	0	0	0	0
2.3-3.3	17	35	15	33	0	0	0	0
3.3-4.3	22	23	18	36	0	0	0	0
4.3-5.3	22	20	17	40	0	0	trace	1
5.3-6.3	23	25	22	26	0	0	0	4
6.3-7.3	24	33	20	22	0	0	0	1
7.3-8.3	26	30	22	19	0	0	0	3
Mean	23	28	20	27	0	0	0	2

TM 07 NW E1 0437 7842

Pit, West of Mill Lane, Redgrave

Block D

Surface level +46.1 m (+151 ft)
Water table not reached
Sampled October 1980

Overburden 0.3 m
Mineral 7.8 m+

LOG

Geological classification

Lithology

Thickness m Depth m

Exposed pit-face

Glacial Sand and Gravel

Soil, sand with subangular flint and rounded quartzite pebbles

0.3 0.3

a Sandy gravel, poorly stratified

Gravel: coarse with some fine, angular flint with some rounded quartzite, vein quartz and flint
Sand: medium with some fine and coarse subangular quartz; dark orange

0.7 1.0

Gravel, with occasional cobbles of angular flint

Gravel: fine with coarse, angular flint with some rounded quartzite vein quartz and flint, traces of shell debris and igneous rocks
Sand: coarse with medium angular quartz and flint; light brown

1.0 2.0

Gravel, poorly stratified, similar to above

1.0 3.0

Gravel, with cobbles of angular flint and quartzite

Gravel: fine and coarse angular flint with sub-rounded quartzite, flint and vein quartz
Sand: medium with coarse angular flint and quartz; light brown

1.0 4.0

Gravel, with thin beds of chalky silt below 4.4 m

Gravel: fine with coarse, angular flint with some rounded quartzite, flint, chalk and vein quartz
Sand: coarse and medium angular flint, chalk and quartz; pale yellowish brown

0.9 4.9

Ironpan with pebbly chalky silt above 4.95 m

0.1 5.0

Trench directly beneath face

b Sand, with low-angle cross-stratification

Sand: medium with fine, well rounded quartz; pale yellowish orange

0.7 5.7

Sand, laminated from 5.7 m to 6.1 m

Sand: fine with medium, well rounded quartz with occasional thin (1-2 cm) beds of chalk silt and chalk sand; pale yellowish brown becoming greyish orange below 6.0 m

1.3 7.0

Sand, similar to above

Sand: medium well rounded quartz with some chalk, greyish orange

1.1 8.1

GRADING

Mean for deposit percentages

Depth below surface (m)

Percentages

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					-½	+½ -¼	+¼ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	4	32	64	0.3-1.0	5	10	44	7	18	16	0
				1.0-2.0	3	1	11	14	41	28	2
				2.0-3.0	2	3	13	12	37	33	0
				3.0-4.0	3	1	12	9	32	31	12
				4.0-4.9	7	2	15	15	36	25	0
			Mean	4	3	17	12	34	27	3	
b	5	95	0	5.0-5.7	3	28	67	2	0	0	0
				5.7-7.0	7	53	39	1	0	0	
				7.0-8.1	4	8	88	0	0	0	
				Mean	5	32	62	1	0	0	
a+b	4	57	39	0.3-8.1	4	14	36	7	21	16	2

COMPOSITION

Depth below surface (m)

Percentages by weight in +8-16 mm fraction

	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.3-1.0	65	7	11	17	0	0	0
	1.0-2.0	62	4	4	28	0	0	trace
	2.0-3.0	67	7	3	21	0	0	2
	3.0-4.0	64	5	3	26	trace	0	2
	4.0-4.9	55	9	2	24	9	0	1
Mean	62	6	4	24	2	0	0	2

TM 07 NE 23 0542 7959

North West of Grove House, Redgrave

Block B

Surface level +24.2 m (+79 ft)
Water struck at +22.5 m
August 1980

Overburden 1.7 m
Mineral 7.2 m
Waste 17.1 m+

LOG

Geological classification

Lithology

Thickness m Depth m

	Soil, peat	0.2	0.2
Peat	Peat, fibrous, black, becoming dusky brown with shells below 0.7 m	1.5	1.7
River Terrace Deposits	a Pebbly sand Gravel: fine with coarse, angular flint with subrounded flint and quartzite, some vein quartz and chalk Sand: fine and medium, well rounded quartz with some angular flint, pale yellowish brown	3.0	4.7
Glacial Sand and Gravel	b Sandy gravel Gravel: fine and coarse, angular flint with rounded flint, quartzite and vein quartz; traces of chalk, igneous and metamorphic Sand: medium with some coarse and fine, subangular flint, greyish orange above 5.7 m, becoming pale yellowish brown	4.2	8.9
Glacial Silt	Silt, clayey, firm, olive grey with chalk pebbles below 16.0 m and occasional shell fragments below 17.5 m	17.1+	25.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{8}$	$+\frac{1}{8}$ - $\frac{1}{4}$	$+\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	3	90	7	1.7-2.7	5	49	38	4	2	2	0
				2.7-3.7	3	35	38	8	12	4	0
				3.7-4.7	2	43	50	1	3	1	0
				Mean	3	44	42	4	5	2	0
b	trace	50	50	4.7-5.7	1	11	31	10	27	20	0
				5.7-6.7	0	5	35	12	30	18	0
				6.7-7.7	1	5	36	15	25	18	0
				7.7-8.9	0	4	25	12	30	29	0
				Mean	trace	6	32	12	28	22	0
a+b	2	65	33	1.7-8.9	2	21	35	9	19	14	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	1.7-4.7	68	14	4	12	2	0	0	0
b	4.7-5.7	73	13	2	12	trace	0	0	trace
	5.7-6.7	74	10	2	13	0	0	0	1
	6.7-7.7	81	10	2	7	0	0	trace	0
	7.7-8.9	77	11	3	9	trace	0	trace	0
	Mean	76	11	2	10	trace	0	trace	trace

TM 07 NE 24 0546 7818 Hall Farm, Redgrave

Surface level +35.9 m (+118 ft)
Water not struck
July 1980

Block D

Overburden 0.2 m
Mineral 1.3 m
Waste 0.5 m
Mineral 5.2 m
Waste 1.5 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand with angular flint pebbles	0.2	0.2
Kesgrave Sands and Gravels	a 'Clayey' pebbly sand Gravel: coarse with fine, well rounded quartzite flint and vein quartz, some subangular flint Sand: fine and medium, rounded quartz, with thin beds of moderate brown silty clay	1.3	1.5
	b Sandy silt with occasional subangular flint pebbles, moderate brown	0.5	2.0

c 'Clayey' pebbly sand, becoming more pebbly below 5.1 m
Gravel: fine and coarse, well rounded quartzite with subangular flint, rounded flint and vein quartz; some chalk below 6.1 m
Sand: medium, with some fine and coarse, rounded quartz, with thin beds of silty clay and clayey silt throughout, brownish orange

5.2 7.2

Chalk Silt Silt, chalky, soft, greyish orange 1.5 8.7
Upper Chalk Chalk, soft white 1.0+ 9.7

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{8}$	$+\frac{1}{8}$ - $\frac{1}{4}$	$+\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	17	72	11	0.2-1.5	17	39	31	2	4	7	0
b	41	57	2	1.5-2.0	41	31	23	3	2	0	0
c	15	66	19	2.0-3.0	19	23	43	2	3	10	0
				3.0-4.0	12	19	51	3	4	11	0
				4.0-5.1	13	24	52	3	7	1	0
				5.1-6.1	7	5	36	18	24	10	0
				6.1-7.2	23	5	29	19	13	11	0
				Mean	15	15	42	9	10	9	0
a+b	24	67	0	0.2-2.0	24	37	28	2	4	5	0
b+c	17	66	17	1.5-7.2	17	16	42	8	9	8	0
a+c	15	68	17	Mean	15	20	40	8	9	8	0
a+b+c	17	67	16	0.2-7.2	17	21	39	7	8	8	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.2-1.5	13	25	18	33	0	0	3	8
c	4.0-5.1	21	2	8	67	0	0	0	3
	5.1-6.1	21	22	17	33	0	0	3	5
	6.1-7.2	22	13	26	26	11	0	0	2
c	Mean	21	18	19	34	3	0	3	2
a+c	Mean	21	19	19	33	3	0	2	3

TM 07 NE 25 0558 7709 Redgrave Hall, Redgrave Block D
 Surface level +44.1 m (+145 ft) Waste 7.0 m
 Water not struck Bedrock 1.0 m+
 July 1980

LOG	Geological classification	Lithology	Thickness m	Depth m
	Made Ground	Sandy clay soil, with brick debris	0.8	0.8
	Cover Sand	'Clayey' pebbly sand Gravel: fine, angular flint, with traces of vein quartz and ironstone Sand: fine with medium, well rounded quartz, moderate yellowish brown	0.5	1.3
	Boulder Clay	Clay, silty, firm, mottled moderate yellow and light olive brown, with medium subangular chalk pebbles	1.7	3.0
	Chalk Silt	Silt, chalky, soft, yellowish grey	4.0	7.0
	Upper Chalk	Chalk, soft white	1.0+	8.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand	Gravel				
			- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm	
18	74	8	0.8-1.3	18	44	30	0	7	1	0

TM 07 NE 26 0574 7368 The Warren, Botesdale Block C
 Surface level +45.1 m (+148 ft) Overburden 0.3 m
 Water not struck Mineral 2.0 m
 July 1980 Waste 2.1 m
 Mineral 4.0 m
 Waste 1.0 m
 Mineral 3.1 m
 Bedrock 2.0 m+

LOG	Geological classification	Lithology	Thickness m	Depth m
		Soil, sand and silt	0.3	0.3
	Kesgrave Sands and Gravels	a 'Very clayey' pebbly sand Gravel: fine with coarse, rounded chert and subangular flint, with rounded quartzite, vein quartz and some micaceous sandstone Sand: medium with fine, rounded quartz, moderate orange brown, with occasional thin beds of light olive grey clay	2.0	2.3
		b Silty sand and clay with occasional rounded flint, vein quartz and quartzite pebbles; bright orange becoming mottled with greenish grey silt below 3.3 m	2.1	4.4

c 'Clayey' pebbly sand 4.0 8.4
 Gravel: fine with coarse, rounded quartzite and flint with some vein quartz and subangular flint; traces of sandstone
 Sand: medium with fine, well rounded quartz, dark yellowish orange, with occasional thin beds of pale olive silt

d Silty sand and clay with pebbles of rounded quartzite, flint and vein quartz, some subangular flint, yellowish grey 1.0 9.4

e Sandy gravel, becoming coarser with depth 3.1 12.5
 Gravel: coarse and fine, rounded quartzite and subangular flint, with rounded flint and vein quartz, some subrounded flint cobbles below 11.4 m
 Sand: medium with some coarse and fine, well rounded vein quartz, white

Upper Chalk Chalk, soft, pale brown, becoming hard rock, white below 14.0 m 2.0+ 14.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines	Sand	Gravel				
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	21	72	7	0.3-1.3 1.3-2.3 Mean	24 19 21	33 28 31	33 43 38	3 3 3	4 5 5	3 2 2	0 0 0
b	43	55	2	2.3-3.3 3.3-4.4 Mean	44 42 43	27 29 28	24 25 25	2 1 2	3 2 2	0 1 trace	0 0 0
c	18	75	7	4.4-5.4 5.4-6.4 6.4-7.4 7.4-8.4 Mean	27 12 10 22 18	44 32 25 15 29	21 52 58 40 43	2 1 2 6 3	4 3 3 10 5	2 0 2 7 2	0 0 0 0 0
d	48	45	7	8.4-9.4	48	12	30	3	3	4	0
e	7	50	43	9.4-10.4 10.4-11.4 11.4-12.5 Mean	10 6 6 7	11 7 6 8	50 19 21 31	7 15 12 11	11 28 25 21	11 25 27 21	0 0 3 1
a+b	34	62	4	0.3-4.4	34	29	31	2	3	1	0
b+c	27	67	6	2.3-8.4	27	29	36	2	4	2	0
a+c	19	74	7	Mean	19	30	41	3	5	2	0
a-e	23	62	15	0.3-12.5	23	22	35	5	8	7	trace

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.3-2.3	22	21	17	32	1	0	1	6*
c	6.4-7.4	26	6	12	48	0	0	0	8*
	7.4-8.4	12	46	11	31	0	0	0	0
d	8.4-9.4	19	26	23	32	0	0	0	0
e	9.4-10.4	26	20	10	40	0	0	0	4
	10.4-11.4	35	26	12	26	0	0	1	trace
	11.4-12.5	44	18	10	27	trace	0	0	1
a-e	Mean	34	23	12	29	trace	0	trace	2

* Mainly sandstone

TM 07 NE 27 0648 7985 Dashes Farm, Wortham Block B

Surface level +23.9 m (+78 ft)
 Water struck at +23.6 m
 July 1980

Overburden 0.3 m
 Mineral 2.2 m
 Waste 4.7 m
 Bedrock 3.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, peat with sand, dusky brown	0.1	0.1
Peat	Peat, fibrous, soft, dusky yellow brown	0.2	0.3
River Terrace Deposits	'Clayey' pebbly sand Gravel: coarse with some fine, angular flint and subrounded flint, with some vein quartz and quartzite Sand: medium with coarse and fine, subangular quartz, moderate yellowish brown, with thin beds of yellowish grey silt below 1.3 m	2.2	2.5
Glacial Silt	Silt, clayey, soft, light olive grey	2.5	5.0
Boulder Clay	Clay, silty, soft, olive grey with angular chalk and flint pebbles	1.1	6.1
Chalk Silt	Silt, chalky, soft, light grey	1.1	7.2
Upper Chalk	Chalk, soft white, becoming hard rock below 9.6 m	3.0+	9.6

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	
16	74	10	0.3-1.3	8	48	27	2	2	13	0
			1.3-2.5	23	44	26	1	1	5	0
			Mean	16	46	26	2	2	8	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
	0.3-2.5	54	40	3	3	0	0	0	0

TM 07 NE 28 0594 7916 Pond Farm, Redgrave Block D

Surface level +39.9 m (+131 ft)
 Water not struck
 July 1980

Overburden 4.3 m
 Mineral 1.9 m
 Waste 1.1 m
 Bedrock 1.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Sand with flint and brick debris	0.8	0.8
Boulder Clay	Clay, stiff, olive grey with subangular chalk pebbles, becoming light grey with chalk and patinated flint pebbles from 2.0 m to 4.0 m, sandy and silty, dark orange brown below 4.0 m	3.5	4.3
Crag	'Very clayey' pebbly sand, ironstained with occasional beds of iron-cemented quartz sand with shell impressions Gravel: coarse and fine with cobbles, ironpan with well rounded flint and some subangular flint Sand: fine with medium, well rounded quartz dark orange	1.9	6.2
Chalk Silt	Silt, chalky, ironstained, pale orange	1.1	7.3
Upper Chalk	Chalk, soft white, with hard rock fragments	1.7+	9.0

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	
24	65	11	4.3-5.3	19	48	22	2	4	5	0
			5.3-6.2	30	42	14	2	2	3	7
			Mean	24	45	18	2	3	4	4

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
	4.3-6.2	15	34	0	0	0	0	0	51*

* Iron pan

TM 07 NE 29 0648 7840 Lopham Town Farm, Wortham

Block D

Surface level +52.2 m (+171 ft)
Water not struck
July 1980

Waste 18.3 m
Bedrock 2.7 m+

TM 07 NE 30 0656 7744

North of Carpenter's Grove, Redgrave

Surface level +58.9 m (+193 ft)
Water not struck
September 1980

Block D

Overburden 0.5 m
Mineral 1.0 m
Waste 13.1
Mineral 4.4 m
Waste 2.0 m
Mineral 3.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sandy clay	0.3	0.3
Boulder Clay	Clay, stiff, mottled greyish olive and light olive brown with chalk and mudstone pebbles; becoming olive grey with chalk, flint and gypsum pebbles below 2.0 m, occasional flint cobbles below 8.1 m	9.7	10.0
	Clay, silty, stiff, dark yellowish orange with subrounded chalk pebbles and occasional cementstone cobbles	1.0	11.0
? Kesgrave Sands and Gravels	Pebbly clay, silty and sandy, firm, dark yellowish orange, with coarse and fine subangular flint, rounded quartzite, vein quartz and subrounded flint pebbles; interbedded with fine and medium subangular quartz sand	6.5	17.5
	Clay, very stiff, waxy, olive grey; becoming silty and sandy, bright orange, below 17.8 m	0.8	18.3
Upper Chalk	Chalk, soft, very pale orange, becoming hard rock below 19.0 m	2.7+	21.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages									
Fines	Sand	Gravel		Fines			Sand			Gravel			
				- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm			
49	44	7	11.0-12.0	41	25	20	3	6	5	0			
			12.0-13.0	37	23	21	4	7	8	0			
			13.0-14.0	46	23	23	3	5	0	0			
			14.0-15.0	62	18	14	2	3	1	0			
			15.0-16.0	58	21	17	2	2	0	0			
			16.0-17.0	52	23	21	2	2	0	0			
			17.0-17.5	48	23	15	3	4	7	0			
			Mean	49	22	19	3	4	3	0			

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
11.0-17.5	27	7	23	38	0	0	3	2

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, clay and sand with flint and vein quartz pebbles	0.5	0.5
Glacial Sand and Gravel	a 'Very clayey' pebbly sand Gravel: fine and coarse, angular flint with subrounded flint and chalk Sand: fine with medium, subangular quartz, with traces of chalk, mottled yellowish grey and dark yellowish orange	1.0	1.5
Glacial Silt	b Silt, sandy, mottled light olive brown and yellowish grey	0.5	2.0
	Silt, soft, mottled yellowish grey and dusky yellow	0.8	2.8
Boulder Clay	Clay, moderate olive brown, with subrounded chalk pebbles	0.9	3.7
Glacial Silt	Silt, soft, light olive grey, micaceous	1.4	5.1
Boulder Clay	Clay, stiff, olive grey with subangular chalk and flint pebbles; occasional cementstone cobbles	9.5	14.6
Kesgrave Sands and Gravels	c 'Very clayey' pebbly sand Gravel: fine with coarse, well rounded quartzite and subangular flint, with rounded flint and vein quartz Sand: medium with fine and some coarse, subrounded quartz, moderate yellow, with thin beds of moderate olive brown clayey silt above 16.6 m	4.4	19.0
	d Sandy silt with pebbles of rounded quartzite and flint, dark grey, interbedded with dusky brown clay	2.0	21.0
	e 'Clayey' sandy gravel, becoming less clayey below 22.0 m Gravel: fine and coarse, rounded quartzite and subangular flint with rounded flint and vein quartz Sand: medium with some fine and coarse, subangular quartz and flint, dark yellowish orange	3.0+	24.0

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	32	63	5	0.5-1.5	32	37	24	2	3	2	0	
b	91	9	0	1.5-2.0	91	7	2	trace	0	0	0	
c	26	56	18	14.6-15.6	29	18	30	3	10	10	0	
				15.6-16.6	38	24	27	3	7	1	0	
				16.6-17.6	24	18	30	5	14	9	0	
				17.6-18.6	20	16	35	10	14	5	0	
				18.6-19.0	14	11	49	10	12	4	0	
	Mean	26	18	32	6	12	6	0				
d	77	19	4	19.0-20.0	62	7	20	4	5	2	0	
				20.0-21.0	93	3	2	1	1	0	0	
				Mean	77	5	11	3	3	1	0	
e	15	56	29	21.0-22.0	39	11	35	5	6	4	0	
				22.0-23.0	5	12	41	10	17	15	0	
				23.0-24.0	1	4	37	14	26	18	0	
				Mean	15	9	38	9	16	13	0	

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.5-1.5	59	26	0	0	15	0	0	0
c	14.6-15.6	41	20	12	25	0	0	2	trace
	15.6-16.6	21	32	4	43	0	0	0	0
	16.6-17.6	20	24	12	41	0	0	0	3
	17.6-18.6	28	29	13	30	0	0	0	0
	18.6-19.0	27	28	12	33	0	0	0	0
d	19.0-21.0	3	17	0	23	0	0	0	57*
e	21.0-22.0	26	28	0	36	0	0	0	10*
	22.0-23.0	21	21	20	37	0	0	0	1
	23.0-24.0	24	19	12	44	0	0	0	1
c-e	Mean	24	21	14	38	0	0	trace	3

* Ironpan

TM 07 NE 31 0678 7626 New Waters Farm, Wortham

Block D

Surface level +34.1 m (+112 ft)
Water struck at +32.5 m
July 1980

Overburden 1.6 m
Mineral 4.2 m
Bedrock 2.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand and clay	0.3	0.3
Alluvium	Clay, silty, soft, mottled light brown and light grey	0.7	1.0
Head	a 'Very clayey' sandy gravel Gravel: coarse with fine, angular flint with rounded flint, vein quartz and micaceous sandstone Sand: fine with medium, subangular quartz and some flint, medium light grey	0.6	1.6
Glacial Sand and Gravel	b Sandy gravel Gravel: fine and coarse, angular flint with some rounded quartzite, flint, vein quartz and chalk; traces of igneous, metamorphic, limestone and shell Sand: medium with some coarse and fine, subangular flint and quartz, moderate yellowish brown	4.2	5.8
Upper Chalk	Chalk, soft white	2.2+	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	22	56	22	1.0-1.6	22	36	18	2	6	16	0	
b	7	48	45	1.6-2.6	2	8	17	10	30	33	0	
				2.6-3.6	5	14	29	13	19	20	0	
				3.6-4.6	17	7	19	10	27	20	0	
				4.6-5.8	4	7	38	17	24	10	0	
				Mean	7	9	26	13	25	20	0	
a+b	9	48	43	1.0-5.8	9	12	25	11	23	20	0	

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	1.0-1.6	70	16	3	0	0	0	0	11
b	1.6-2.6	71	8	5	13	2	trace	trace	1
	2.6-3.6	63	10	6	14	3	2	0	2
	3.6-4.6	76	7	5	7	5	trace	0	0
	4.6-5.8	73	5	2	9	10	0	1	trace
	Mean	71	7	5	11	5	trace	trace	1

TM 07 NE 32 0599 7547 Lodge Farm, Botesdale

Surface level +54.7 m (+179 ft)
Water not struck
July 1980

Block C

Overburden 9.0 m
Mineral 8.1 m
Waste 6.3 m
Bedrock 1.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Sandy clay with brick debris	0.3	0.3
Boulder Clay	Clay, mottled yellowish brown and medium light grey, with subrounded chalk pebbles; becoming medium grey from 4.5 m to 6.0 m, stiff, waxy, olive black from 6.0 m to 8.7 m and silty orange brown below 8.7 m	8.7	9.0
Glacial Sand and Gravel	a 'Clayey' sandy gravel, with cobbles of flint and chalk from 11.0 m to 12.0 m Gravel: fine with coarse, angular flint with rounded quartzite, flint, chalk, limestone and vein quartz; traces of ironstone and shell Sand: medium with fine and coarse, subangular quartz, chalk and flint, moderate yellowish brown	5.0	15.0
Kesgrave Sands and Gravels	b Sandy gravel, with cobbles of angular flint and rounded quartzite below 16.6 m Gravel: fine with coarse, subangular flint and rounded quartzite, with rounded flint and vein quartz Sand: medium with coarse and some fine subrounded quartz, dark orange brown Clay, stiff, dark yellowish brown	3.1	17.1
	c 'Clayey' gravel Gravel: coarse with fine, subangular flint with rounded quartzite, flint and vein quartz; traces of ironpan Sand: medium with some coarse and fine, angular flint and quartz, dark orange brown	0.6	18.3
Chalk Silt	Silt, clayey, soft, very pale orange	5.0	22.3
Upper Chalk	Chalk, soft white	1.2+	23.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 m m
a	15	59	26	9.0-10.0	9	28	48	5	7	3	0
				10.0-11.0	13	18	37	11	16	5	0
				11.0-12.0	25	12	26	10	12	11	4
				12.0-13.0	19	12	22	11	22	14	0
				13.0-14.0	12	8	36	12	22	10	0
				Mean	15	16	33	10	16	9	1
b	7	49	44	14.0-14.6	9	10	25	11	25	20	0
				14.6-15.6	No grading available						
				15.6-16.6	7	5	34	17	27	10	0
				16.6-17.1	7	5	27	9	18	31	3
				Mean	7	6	30	13	25	18	1
c	15	39	46	17.8-18.3	15	6	24	9	18	28	0
a+b	13	56	31	10.0-17.1	13	13	32	11	19	11	1
b+c	9	47	44	Mean	9	6	28	13	23	20	1
a+b+c	13	55	32	Mean	13	12	32	11	19	12	1

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	9.0-10.0	54	14	2	6	16	6	2	0
	10.0-11.0	45	8	2	9	27	5	1	3
	11.0-12.0	44	21	4	11	7	9	trace	4
	12.0-13.0	43	6	5	25	10	7	1	3
	13.0-14.0	45	14	6	25	1	1	4	4
	Mean	45	13	5	17	10	6	1	3
b	14.0-14.6	37	5	11	42	0	0	2	3
	14.6-15.6	47	37	0	10	0	0	6	0
	15.6-16.6	33	17	18	30	0	0	1	1
	16.6-17.1	39	21	9	28	0	0	2	1
	Mean	36	16	13	32	0	0	2	1
c	17.8-1.3	36	21	12	28	0	0	trace	3

TM 07 NE 33 0734 7946 Slade Lane, Wortham

Block D

Surface level +35.9 m (+118 ft)
Water struck at +30.8 m
August 1980

Waste 10.2 m
Bedrock 2.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sandy silt	0.3	0.3
Boulder Clay	Clay, sandy and silty, with subrounded chalk and tabular flint pebbles; becoming mottled light olive brown and pale greyish olive, with abundant chalk pebbles, from 1.3 m to 3.8 m; dark yellowish brown and medium grey, with chalk and black mudstone pebbles, below 3.8 m	4.7	5.0
	Clay, silty, olive grey, with chalk and occasional angular flint pebbles; becoming silty and sandy below 6.0 m	3.0	8.0
Glacial Sand and Gravel	Sand, medium with coarse and fine, angular flint, quartz and chalk, medium grey	0.2	8.2
Glacial Silt	Silt, soft, olive grey	2.0	10.2
Upper Chalk	Chalk, soft white	2.0+	12.2

TM 07 NE 34 0711 7884 Great Wood, Wortham Block D
 Surface level +48.2 m (+158 ft) Overburden 6.2 m
 Water not struck Mineral 4.5 m
 September 1980 Waste 1.3 m
 Bedrock 1.8 m+

TM 07 NE 35 0770 7785 North of White House, Wortham Block D
 Surface level +56.1 m (+184 ft) Overburden 18.0 m
 Water not struck Mineral 1.6 m
 August 1980 Waste 1.4 m
 Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sandy silt with occasional angular flint pebbles	0.2	0.2
Made Ground	Silt and clay with roots and chalk debris	0.8	1.0
Boulder Clay	Clay, stiff, olive black with subangular chalk pebbles; becoming olive grey, with partings of light olive grey silt, between 4.0 m and 5.9 m, dark yellowish brown, with chalk and flint pebbles below 5.9 m	5.2	6.2
Kesgrave Sands and Gravels	a 'Clayey' sandy gravel, becoming less pebbly below 8.2 m Gravel: fine with coarse, rounded quartzite with subangular flint, rounded flint and vein quartz Sand: medium and fine with coarse, subrounded quartz and subangular flint, very pale orange; becoming micaceous, pale olive below 8.2 m	3.0	9.2
Crag	b Sand Sand: fine with some medium, well rounded quartz, micaceous, moderate greenish yellow; becoming dusky yellow below 10.2 m	1.5	10.7
Chalk Silt	Silt, laminated, chalky, soft, dark orange	1.3	12.0
Upper Chalk	Chalk, soft, very pale orange, becoming white with hard rock fragments below 13.0 m	1.8+	13.8

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sandy silt with occasional flint pebbles	0.3	0.3
Boulder Clay	Clay, sandy and silty, stiff, brownish orange with angular flint pebbles; becoming mottled orange and light olive grey, with subangular chalk pebbles, from 1.4 m to 2.9 m, olive grey, with chalk pebbles, flint pebbles and some cementstone cobbles, below 2.9 m	4.7	5.0
	Clay, stiff, olive grey, with subrounded chalk and patinated flint pebbles, some subrounded cementstone and patinated flint cobbles	13.0	18.0
Glacial Sand and Gravel	'Very clayey' pebbly sand Gravel: coarse and fine, rounded quartzite and vein quartz, with angular flint, rounded flint and some shell Sand: medium with fine, rounded quartz; interbedded with light grey chalky silt	1.6	19.6
Chalk Silt	Silt, chalky, soft, medium grey	1.4	21.0
Upper Chalk	Chalk, soft, white with hard rock fragments	1.0+	22.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Percentages						
					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	10	58	32	6.2-7.2	11	7	27	12	26	17	0
				7.2-8.2	10	9	20	25	26	10	0
				8.2-9.2	8	46	22	9	6	9	0
				Mean	10	21	22	15	20	12	0
b	9	91	0	9.2-10.2	9	87	4	0	0	0	0
				10.2-10.7	9	79	12	0	0	0	0
				Mean	9	84	7	trace	0	0	0
a+b	10	69	21	6.2-10.7	10	41	18	10	13	8	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	6.2-7.2	22	12	17	47	0	0	1	1
	7.3-8.2	16	13	23	48	0	0	0	0
	8.2-9.2	19	2	13	66	0	0	0	0
	Mean	20	12	1	50	0	0	trace	trace

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Percentages						
				Fines	Sand			Gravel		
				- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
30	62	8	18.0-19.6	30	25	35	2	4	4	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
18.0-19.6	24	16	28	29	0	0	0	3*

* Shell

TM 07 NE 36 0813 7730 Long Green, Wortham

Surface level +57.8 m (+190 ft)
Water struck at +56.2 m
August 1980

Block D

Overburden	0.2 m
Mineral	2.6 m
Waste	1.2 m
Mineral	1.1 m
Waste	2.7 m
Mineral	1.0 m
Waste	1.2 m
Mineral	3.2 m
Waste	5.1 m
Bedrock	2.0 m+

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					-½	+½ -¼	+¼ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	22	68	10	0.2-1.2	17	45	26	1	5	6	0
				1.2-2.8	26	38	24	3	7	2	0
				Mean	22	41	25	2	6	4	0
b	26	67	7	4.0-5.1	26	29	33	5	5	2	0
c	7	42	51	7.8-8.8	7	4	17	21	27	24	0
d	13	85	2	10.0-11.0	8	5	67	16	4	0	0
				11.0-11.5	5	4	65	20	6	0	0
				11.5-13.2	19	65	13	3	0	0	0
				Mean	13	36	39	10	2	0	0
a+b	23	68	9	Mean	23	38	27	3	6	3	0
b+c	17	55	28	Mean	17	17	25	13	15	13	0
c+d	12	74	14	Mean	12	28	33	13	8	6	0
a-d	17	71	12	Mean	17	33	30	8	7	5	0

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Glacial Sand and Gravel	a 'Very clayey' pebbly sand Gravel: fine with coarse, angular flint with some rounded quartzite, flint, vein quartz, ironstone and micaceous sandstone Sand: fine with medium, subangular quartz, with thin beds of light brown silt	2.6	2.8
Boulder Clay	Clay, silty, moderate brown with subangular chalk, flint and occasional rounded vein quartz pebbles	1.2	4.0
Glacial Sand and Gravel	b 'Very clayey' pebbly sand Gravel: fine with some coarse, angular flint and subrounded flint, with some quartzite and traces of igneous and metamorphic Sand: medium with fine, subangular quartz, moderate brown	1.1	5.1
Boulder Clay	Clay, stiff, dark grey with subrounded chalk and occasional subangular flint pebbles	2.7	7.8
Glacial Sand and Gravel	c Gravel Gravel: fine and coarse, well rounded chalk with angular flint, some rounded flint, limestone and black mudstone; traces of quartzite, red chalk and shell Sand: coarse with medium, subangular chalk and some subangular flint	1.0	8.8
Boulder Clay	Clay, silty, medium dark grey, with abundant subrounded chalk and occasional flint pebbles	1.2	10.0
Glacial Sand and Gravel	d 'Clayey' sand, with occasional pebbles of angular flint, shell and rounded chalk Sand: medium and fine with some coarse, subangular quartz, flint and some chalk, brownish grey	3.2	13.2
Boulder Clay	Clay, dusky brown, with subangular chalk and flint pebbles, occasional subangular flint cobbles	5.1	18.3
Upper Chalk	Chalk, soft white	2.0+	20.3

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.2-2.8	74	7	3	8	0	0	0	8
b	4.0-5.1	61	28	0	7	0	0	4	0
c	7.8-8.8	22	2	0	1	70	2	0	3
d	10.0-11.5	43	6	0	0	31	0	0	20*

* Mainly shell

TM 07 NE 37 0818 7587 Burgate Hall, Burgate Block F

Surface level +53.5 m (+175 ft)
Water struck at +45.1 m
August 1980

Overburden 0.2 m
Mineral 1.2 m
Waste 15.6 m
Mineral 7.2 m
Waste 1.5 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, silty sand with occasional angular flint pebbles	0.2	0.2
Glacial Sand and Gravel	a 'Very clayey' pebbly sand Gravel: coarse with fine, angular flint with rounded flint and quartzite, some rounded vein quartz Sand: fine with medium, subangular quartz, firm, dark orange	1.2	1.4
Boulder Clay	Clay, silty and sandy, soft, greyish orange with occasional well rounded chalk and vein quartz pebbles; becoming dark orange below 10.0 m Clay, silty, dark yellowish brown, with occasional fine rounded vein quartz and volcanic pebbles, with some coarse sand grade angular chalk and flint	11.1 4.5	12.5 17.0
Kesgrave Sands and Gravels	b Sandy gravel Gravel: fine with coarse, rounded quartzite with flint, vein quartz and some subangular flint Sand: medium with coarse and some fine, subangular quartz and flint, yellowish brown above 19.0 m, becoming yellowish grey	4.0	21.0
Crag	c Pebbly sand, ironstained Gravel: coarse with fine, well rounded flint with some ironpan, subangular flint and vein quartz Sand: fine with medium, well rounded quartz, micaceous, dark orange	3.2	24.2
Chalk Silt	Silt, chalky, soft, pale orange with some ironstained quartz sand partings; becoming very light grey below 25.0 m	1.5	25.7
Upper Chalk	Chalk, soft white, with hard rock fragments	1.0+	26.7

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{8}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	24	63	13	0.2-1.4	24	39	22	2	4	9	0
b	5	65	30	17.0-18.0	5	7	34	21	24	9	0
				18.0-19.0	4	6	33	19	24	14	0
				19.0-20.0	4	10	42	24	15	5	0
				20.0-21.0	5	7	38	22	16	12	0
				Mean	5	7	37	21	20	10	0
c	5	89	6	21.0-22.0	3	57	37	3	0	0	0
				22.0-23.0	3	51	37	3	3	3	0
				23.0-24.2	9	42	35	3	3	8	0
				Mean	5	50	36	3	2	4	0
				a+b	9	65	26	Mean	9	15	33
b+c	5	76	19	Mean	5	26	37	13	12	7	0
a+b+c	8	74	18	Mean	8	28	34	12	11	7	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.2-1.4	41	21	9	29	0	0	0	0
b	17.0-18.0	14	28	18	39	0	0	0	1
	18.0-19.0	13	18	18	49	0	0	0	2
	19.0-20.0	11	24	18	47	0	0	0	0
	20.0-21.0	9	22	15	52	0	0	2	trace
b	Mean	12	23	17	47	0	0	trace	1
c	22.0-24.2	21	60	4	0	0	0	0	15*

* Mainly ironpan

TM 07 NE 38 0762 7502 King's Head, Burgate Block F

Surface level +54.3 m (+178 ft)
Water struck at +39.5 m
July 1980

Overburden 12.9 m
Mineral 1.9 m
Waste 3.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, silty sand	0.4	0.4
Boulder Clay	Clay, silty and sandy, mottled dark yellowish orange and light olive grey, with chalk and flint pebbles; becoming less silty, stiff, dusky yellow, with abundant chalk pebbles, from 2.4 m to 3.8 m, olive grey below 3.8 m	4.6	5.0
Glacial Silt	Silt, sandy and clayey, firm, moderate yellowish brown	0.3	5.3
Boulder Clay	Clay, stiff, olive grey, with rounded chalk and occasional black mudstone and flint pebbles; becoming sandy, soft, dark yellowish brown, with rounded vein quartz and angular flint pebbles, below 8.5 m	7.6	12.9
Crag	'Clayey' sand Sand: fine with medium, well rounded quartz and glauconite, micaceous, greenish yellow	1.9	14.8
Chalk Silt	Silt, chalky, soft, pale olive	3.3+	18.1

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{8}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
	10	90	0	12.9-13.9	9	62	29	0	0	0	0
				13.9-14.8	10	53	37	0	0	0	0
				Mean	10	57	33	0	0	0	0

TM 07 NE 39 0797 7875 Low Farm, Wortham

Surface level +42.9 m (+141 ft)
Water not struck
August 1980

Block D

Overburden 4.0 m
Mineral 2.0 m
Bedrock 2.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, silty sand with angular flint pebbles	0.2	0.2
Head	a 'Clayey' sandy gravel, with angular patinated flint cobbles Gravel: coarse and fine, angular flint with some rounded quartzite, flint and vein quartz; traces of ironstone Sand: fine with medium and some coarse, subangular quartz and angular flint, firm, silty, moderate brown	1.3	1.5
Boulder Clay	Clay, stiff, mottled moderate brown and light olive brown with subangular chalk and angular flint pebbles	0.5	2.0
? Kesgrave Sands and Gravels	b Silty sand and clay with occasional pebbles and cobbles of well rounded flint, chert and vein quartz, dark orange brown	2.0	4.0
Kesgrave Sand and Gravels	c 'Very clayey' pebbly sand Gravel: coarse with fine, rounded quartzite with subangular flint and well rounded vein quartz Sand: medium and fine, subrounded quartz, moderate yellowish brown; interbedded with olive grey and brown silt and clay	2.0	6.0
Upper Chalk	Chalk, soft, very pale orange, becoming hard rock white below 7.0 m	2.0+	8.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines		Sand			Gravel	
					-1/16	+1/16 - 1/4	+1/4 - 1/2	+1/2 - 3/4	+3/4 - 1	+1 - 4	+4 - 16
a	11	46	43	0.2-1.5	11	23	18	5	18	21	4
b	47	47	6	2.0-3.0	45	28	23	1	3	0	0
				3.0-4.0	49	23	18	1	1	0	8
				Mean	47	25	21	1	2	0	4
c	29	61	10	4.0-5.0	33	26	30	2	3	6	0
				5.0-6.0	25	29	33	3	3	7	0
				Mean	29	27	32	2	3	7	0
a+b	33	47	20	Mean	33	25	20	2	8	8	4
b+c	39	54	7	2.0-6.0	39	26	26	2	2	3	2
a+c	22	56	22	Mean	22	26	27	3	9	12	1
a+b+c	32	52	16	Mean	32	26	24	2	6	8	2

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.2-1.5	75	6	4	15	0	0	0	trace
c	4.0-6.0	23	0	17	60	0	0	0	0

TM 07 NE 40 0864 7984 Ling Farm, Wortham

Surface level +26.1 m (+86 ft)
Water struck at +23.6 m
July 1980

Block B

Overburden 0.1 m
Mineral 8.9 m
Waste 8.4 m
Bedrock 2.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sandy peat	0.1	0.1
River Terrace Deposits	a Sand Sand: fine with medium, well rounded quartz, greyish brown above 1.5 m; very pale orange from 1.5 m to 3.5 m and light olive grey below 3.5 m	8.4	8.5
Glacial Sand and Gravel	b Sandy gravel Gravel: coarse with some fine, angular flint, with some rounded quartzite, flint and vein quartz; traces of igneous, metamorphic and ironstone Sand: medium with some fine and coarse, subrounded quartz, flint and traces of chalk, light olive grey	0.5	9.0
Glacial Silt	Silt, soft, olive grey	8.0	17.0
Glacial Sand and Gravel	c 'Very clayey' pebbly sand Gravel: coarse with some fine, angular flint with some rounded chalk Sand: medium with some fine and coarse, subangular quartz with some chalk, light olive grey	0.4	17.4
Upper Chalk	Chalk, soft, very pale orange; becoming white with hard rock fragments below 18.2 m	2.0+	19.4

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Percentages						
					- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	4	96	0	0.1-0.5	4	63	33	0	0	0	0
				0.5-1.5	1	64	35	0	0	0	0
				1.5-2.5	6	67	26	1	0	0	0
				2.5-3.5	5	49	45	1	0	0	0
				3.5-4.5	4	48	47	1	0	0	0
				4.5-5.5	2	52	46	0	0	0	0
				5.5-6.5	2	43	53	1	1	0	0
				6.5-7.5	2	43	54	1	0	0	0
				7.5-8.5	7	41	51	1	0	0	0
				Mean	4	51	44	1	trace	0	0
b	4	62	34	8.5-9.0	4	18	39	5	9	25	0
c	38	52	10	17.0-17.4	38	18	30	4	2	8	0
a+b	4	94	2	0.1-9.0	4	49	44	1	1	1	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
b	8.5-9.0	80	5	2	9	0	0	3	1
c	17.0-17.4	84	0	0	0	16	0	0	0

TM 07 NE 41 0883 7854 The Wigwam, Wortham

Surface level +49.1 m (+161 ft)
July 1980

Block D

Overburden 8.1 m
Mineral 1.0 m
Waste 0.9 m
Mineral 1.0 m
Waste 2.0 m
Mineral 2.0 m
Waste 0.3 m
Mineral 3.0 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, silty, mottled light brown and grey, with chalk and flint pebbles; becoming pale greyish brown from 2.2 m to 4.5 m and dark grey with pebbles of subrounded chalk, vein quartz and angular flint below 4.5 m	7.5	7.8
Glacial Silt	Silt, firm, dark yellowish orange	0.3	8.1
Glacial Sand and Gravel	a 'Very clayey' sand with occasional angular flint and rounded vein quartz pebbles Sand: fine with some medium, subangular quartz with some angular flint, dark yellowish orange; interbedded with light brown silt	1.0	9.1
Glacial Silt	Silt, sandy, mottled light olive brown and pale olive	0.9	10.0

Glacial Sand and Gravel	b 'Very clayey' sand with occasional angular flint, vein quartz and rounded quartzite pebbles Sand: medium and fine, subangular quartz with some angular flint, dark yellowish orange	1.0	11.0
Glacial Silt	c Sandy silt, with occasional pebbles of angular flint, rounded vein quartz and quartzite, moderate olive brown	2.0	13.0
Kesgrave Sands and Gravels	d 'Clayey' sandy gravel, less silty below 14.0 m Gravel: coarse and fine, rounded quartzite with subangular flint, vein quartz and rounded flint Sand: medium, with coarse and fine, subangular quartz with some flint, light grey	2.0	15.0
	Clay, stiff, waxy, brownish grey	0.3	15.3
	e Sandy gravel Gravel: fine and coarse, rounded quartzite with vein quartz; some subangular and rounded flint Sand: medium with coarse and some fine, rounded quartz with some subangular flint, light brownish grey	2.6	17.9
Crag	Pebbly sand Gravel: fine with coarse, ironpan with some rounded quartzite and subangular flint Sand: medium with fine and coarse, rounded quartz, dark orange; occasional thin beds of iron-cemented sand with shell impressions	0.4	18.3
Upper Chalk	Chalk, soft white	1.0+	19.3

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Percentages						
					- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	23	77	0	8.1-9.1	23	60	14	3	trace	0	0
b	37	61	2	10.0-11.0	37	28	31	2	2	0	0
c	43	55	2	11.0-13.0	43	28	25	2	2	0	0
d	12	53	35	13.0-14.0	18	18	40	5	8	11	0
				14.0-15.0	6	6	19	19	26	24	0
				Mean	12	12	29	12	17	18	0
e	3	65	32	15.3-16.0	4	4	34	19	21	18	0
				16.0-17.0	3	6	46	16	17	12	0
				17.0-17.9	2	7	39	20	16	16	0
				Mean	3	6	41	18	17	15	0
f	7	80	13	17.9-18.3	7	28	36	16	8	5	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
d	13.0-14.0	22	13	15	50	0	0	0	trace
	14.0-15.0	18	19	18	43	0	0	0	2
e	15.3-16.0	19	19	21	39	0	0	trace	2
	16.0-17.0	10	18	23	48	0	0	0	1
	17.0-17.9	10	13	25	52	0	0	0	0
d+e	Mean	17	18	20	44	0	0	0	1
f	17.9-18.3	20	0	0	27	0	0	0	53*

* Ironpan

TM 07 NE 42 0928 7611 North of Seethings Wood, Burgate

Surface level +45.8 m (+150 ft)
Water struck at +29.5 m
July 1980

Block D

Waste 16.4 m
Bedrock 1.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sandy clay	0.3	0.3
Boulder Clay	Clay, silty, mottled light grey and light brown with subangular flint and subrounded chalk pebbles; becoming stiff, dark grey with subrounded flint, chalk and occasional black mudstone pebbles below 3.2 m	7.2	7.5
	Clay, silty and sandy, moderate brown with some coarse chalk and sand and well rounded vein quartz pebbles; becoming pale yellowish brown between 9.5 m and 12.3 m	8.8	16.3
Glacial Sand and Gravel	'Very clayey' sand Sand: fine and medium, subangular quartz, greenish grey	0.1	16.4
Upper Chalk	Chalk, soft white	1.6+	18.0

TM 07 NE 43 0965 7929 Pollard Tree Farm, Wortham

Surface level +28.7 m (+94 ft)
Water struck at +25.4 m
July 1980

Block B

Overburden 0.3 m
Mineral 18.2 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand	0.3	0.3
River Terrace Deposits	a 'Clayey' pebbly sand, becoming less pebbly and more silty with depth Gravel: fine with coarse, angular flint with some subrounded flint Sand: fine with some medium, rounded quartz and some subangular flint, dark yellowish orange	6.0	6.3
Glacial Sand and Gravel	b Sandy gravel, with rounded flint cobbles from 8.3 m to 9.3 m Gravel: fine with coarse, angular flint with rounded quartzite, flint and vein quartz; traces of chalk, igneous, ironpan and micaceous sandstone Sand: medium with coarse and fine, subangular quartz and flint, brownish orange	6.0	12.3
	c Gravel Gravel: coarse and fine, angular flint with rounded quartzite, flint and chalk, some vein quartz, limestone and ironstone; traces of mudstone, shell and micaceous sandstone Sand: medium with coarse, angular flint with quartz and some chalk, moderate yellowish brown	6.2	18.5
Upper Chalk	Chalk, soft white	1.0+	19.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines Sand Gravel						
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	10	84	6	0.3-1.3	3	52	33	3	7	2	0
				1.3-2.3	5	66	20	3	6	0	0
				2.3-3.3	6	49	21	5	11	8	0
				3.3-4.3	10	64	24	1	1	0	0
				4.3-5.3	19	55	25	1	0	0	0
				5.3-6.3	19	56	24	1	0	0	0
				Mean	10	58	24	2	4	2	0
b	4	49	47	6.3-7.3	17	35	33	3	9	3	0
				7.3-8.3	2	10	31	15	30	12	0
				8.3-9.3	1	3	29	16	28	20	3
				9.3-10.3	0	3	17	12	38	30	0
				10.3-11.3	2	3	19	16	36	24	0
				11.3-12.3	1	6	30	15	32	16	0
				Mean	4	10	26	13	29	18	trace
c	3	39	58	12.3-13.3	2	2	26	17	23	30	0
				13.3-14.3	2	3	20	15	24	36	0
				14.3-15.3	3	2	20	14	25	36	0
				15.3-16.3	2	2	18	13	23	42	0
				16.3-17.3	3	3	24	18	25	27	0
				17.3-18.5	4	3	24	17	23	29	0
				Mean	3	2	22	15	24	34	0
a+b	7	66	27	0.3-12.3	7	33	25	8	17	10	trace
b+c	3	44	53	6.3-18.5	3	6	24	14	27	26	trace
a+b+c	5	58	37	0.3-18.5	5	23	25	10	19	18	trace

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.3-3.3	95	5	0	0	0	0	0	0
b	6.3-7.3	72	9	3	13	0	0	3	0
	7.3-8.3	74	15	4	6	trace	0	trace	1
	8.3-9.3	63	11	5	20	trace	0	0	1
	9.3-10.3	64	15	6	13	0	0	0	2
	10.3-11.3	69	12	3	14	0	0	0	2
	11.3-12.3	71	12	4	12	0	0	trace	1
	Mean	69	13	4	13	trace	0	trace	1
c	12.3-13.3	44	16	4	19	8	trace	0	9
	13.3-14.3	38	13	7	17	16	5	1	3
	14.3-15.3	36	12	5	16	17	7	0	7
	15.3-16.3	42	15	4	16	15	5	0	3
	16.3-17.3	36	24	8	11	12	3	0	6
	17.3-18.5	33	15	4	20	19	5	1	3
	Mean	38	16	6	16	15	4	trace	5

TM 07 NE 44 0992 7773 St. John's, Palgrave

Surface level +47.4 m (+156 ft)
Water struck at +45.6 m
July 1980

Block D

Overburden 0.2 m
Mineral 1.8 m
Waste 9.0 m
Mineral 4.7 m
Waste 5.6 m
Bedrock 1.8 m+

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.2-2.0	66	9	6	9	0	0	0	10*
b	11.0-15.7	31	4	1	3	57	2	0	2

* Ironpan

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand with angular flint pebbles	0.2	0.2
Glacial Sand and Gravel	a 'Very clayey' pebbly sand Gravel: fine, angular flint, with some ironpan, rounded flint, quartzite and vein quartz Sand: fine with medium, rounded quartz, dark brownish orange, very silty below 1.0 m	1.8	2.0
Boulder Clay	Clay, stiff, mottled light brown and light olive grey, with abundant subrounded chalk pebbles, becoming waxy olive grey below 4.5 m	5.4	7.4
Glacial Silt	Silt, sandy, soft, light olive grey	1.1	8.5
Boulder Clay	Clay, stiff, olive grey with subangular chalk pebbles	2.5	11.0
Glacial Sand and Gravel	b Sandy gravel, with rounded chalk cobbles below 13.0 m Gravel: fine with coarse, rounded chalk with angular flint, some rounded flint, quartzite, vein quartz and limestone; traces of ironpan and shell Sand: medium and coarse with some fine, subangular chalk, angular flint and quartz, greyish orange	4.7	15.7
Boulder Clay	Clay, stiff, olive grey, with occasional subrounded chalk pebbles and light olive grey silt partings	5.6	21.3
Upper Chalk	Chalk, hard rock, white	1.8+	23.1

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
a	23	72	5	0.2-1.2	13	47	30	2	8	0	0
				1.0-2.0	31	42	22	2	3	0	0
				Mean	23	44	26	2	5	0	0
b	7	55	38	11.0-12.0	6	15	24	18	28	9	0
				12.0-13.0	8	20	28	23	17	4	0
				13.0-14.0	6	8	19	21	25	17	4
				14.0-15.0	6	8	20	23	22	21	0
				15.0-15.7	9	9	15	18	19	17	13
			Mean	7	12	22	21	22	13	3	
a+b	11	59	30	Mean	11	21	23	15	18	10	2

TM 07 NE 45 0925 7670 Bean's Lane, Wortham Block D

Surface level +41.6 m (+136 ft)
Water struck at +32.6 m
August 1980

Overburden 9.0 m
Mineral 4.0 m
Waste 8.6 m
Mineral 3.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sandy silt with occasional angular flint pebbles	0.3	0.3
Alluvium	a 'Very clayey' pebbly sand Gravel: fine and coarse, angular flint Sand: fine with medium, subangular quartz, soft, mottled moderate brown and light brown	0.5	0.8
Head	b 'Clayey' sandy gravel Gravel: coarse and fine, angular flint with some subrounded flint, vein quartz and quartzite Sand: fine with medium and some coarse, angular quartz and some flint, firm, dark orange	0.7	1.5
Boulder Clay	Clay, silty, mottled dark orange and light olive grey, with abundant subrounded chalk and occasional angular flint pebbles; becoming stiff, olive grey, with occasional chalk pebbles below 3.2 m	7.5	9.0
Glacial Sand and Gravel	c 'Clayey' pebbly sand, with angular flint cobbles above 10.0 m Gravel: fine with some coarse, angular flint with subrounded flint, chalk and quartzite, some vein quartz and traces of limestone, shell and ironpan Sand: medium with fine and some coarse, subangular chalk and quartz, with some angular flint, dark yellowish orange	4.0	13.0
Glacial Silt	Silt, sandy, soft, light olive grey; becoming clayey, firm, olive grey below 20.0 m	8.6	21.6
Glacial Sand and Gravel	d Sandy gravel, with occasional subrounded flint cobbles Gravel: coarse and fine, subrounded flint with angular flint and rounded quartzite, some vein quartz and chalk with traces of limestone and shell Sand: medium with some coarse and fine, angular flint and quartz, with some chalk, light olive grey	3.4+	25.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages							
	Fines	Sand	Gravel		Fines		Sand			Gravel		
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm	
a	31	64	5	0.3-0.8	31	38	24	2	3	2	0	
b	19	54	27	0.8-1.5	19	28	20	6	13	14	0	
c	11	72	17	9.0-10.0	10	18	18	12	22	17	3	
				10.0-11.0	13	35	38	9	4	1	0	
				11.0-12.0	12	32	37	10	8	1	0	
				12.0-13.0	11	33	37	11	8	0	0	
				Mean	11	30	31	11	11	5	1	
d	5	66	29	21.6-22.6	9	13	23	13	20	19	3	
				22.6-23.6	5	11	36	18	17	13	0	
				23.6-25.0	3	6	61	9	6	13	2	
				Mean	5	9	44	13	13	14	2	

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
b	0.8-1.5	75	10	4	9	0	0	0	2
c	9.0-13.0	42	26	2	11	15	trace	1	3
d	21.6-22.6	22	42	7	24	2	1	0	2
	22.6-23.6	22	50	7	17	0	2	1	1
	23.6-25.0	28	40	2	26	1	0	0	3
	Mean	23	46	6	21	1	1	trace	2

TM 07 NE 46 0975 7530 Dam Lane, Mellis

Surface level +49.0 m (+161 ft)
Water struck at +34.6 m
August 1980

Block F

Overburden 15.4 m
Mineral 10.0 m
Waste 0.8 m
Bedrock 1.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand	0.3	0.3
Boulder Clay	Clay, mottled dark yellowish orange and light olive grey, with abundant well rounded chalk pebbles; becoming mottled olive grey and light olive brown, with chalk and black mudstone pebbles below 2.0 m	3.8	4.1
	Clay, stiff, olive grey with occasional chalk pebbles and light olive brown silt partings; becoming greyish olive, with subangular patinated flint cobbles and pebbles of chalk and black mudstone below 5.0 m	1.9	6.0
	Clay, silty and sandy, soft, dark yellowish brown, with coarse chalk sand, occasional pebbles of vein quartz and angular flint	4.1	10.1

Clay, silty and sandy, soft, pinkish grey and moderate brown with patinated flint and vein quartz pebbles, some coarse chalk sand; becoming yellowish brown below 14.0 m 5.3 15.4

Crag

a Sand, with pebbles of flint, vein quartz and quartzite below 22.4 m 10.0 25.4

Sand: fine, with some medium, well rounded quartz, micaceous, dusky yellow above 19.4 m; becoming olive grey and glauconitic from 19.4 m to 22.4 m, with shell fragments below 22.4 m

b Sandy gravel with occasional cobbles of well rounded flint 0.8 26.2

Gravel: coarse with some fine, rounded flint with some subangular flint, rounded vein quartz, quartzite and shell fragments
Sand: fine and medium, well rounded quartz and glauconite, micaceous, olive grey

Upper Chalk

Chalk, soft light grey 1.8+ 27.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages							
	Fines	Sand	Gravel		Fines		Sand			Gravel		
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm	
a	5	94	1	15.4-16.4	5	20	71	3	1	0	0	
				16.4-17.4	5	57	36	2	0	0	0	
				17.4-18.4	6	84	10	0	0	0	0	
				18.4-19.4	5	77	18	0	0	0	0	
				19.4-20.4	5	65	30	0	0	0	0	
				20.4-21.4	3	75	22	0	0	0	0	
				21.4-22.4	2	83	15	0	0	0	0	
				22.4-23.4	5	46	39	7	3	0	0	
				23.4-24.4	4	69	21	1	1	4	0	
				24.4-25.4	6	53	35	4	2	0	0	
				Mean	5	62	30	2	1	trace	0	
b	3	61	36	25.4-26.2	3	28	26	7	7	22	7	
a+b	4	92	4	15.4-26.2	4	61	29	2	1	2	1	

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
25.4-26.2	12	58	6	8	0	0	0	16*

* Mainly shell and ironpan

TM 07 SW 27 0027 7455 Upper Street Lane, Wattisfield

Surface level +58.8 m (+193 ft)
Water not struck
June 1980

Block C

Overburden 8.9 m
Mineral 4.2 m
Waste 1.7 m
Bedrock 2.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand	0.2	0.2
Boulder Clay	Clay, stiff, mottled dark orange and light olive grey with abundant fine subangular chalk pebbles; becoming olive grey, with pebbles and cobbles of chalk, flint and black mudstone, from 1.5 m to 8.5 m	8.7	8.9
Kesgrave Sands and Gravels	'Clayey' pebbly sand, ironstained Gravel: fine with coarse, well rounded quartzite, vein quartz and flint; some subangular flint Sand: medium with some coarse and fine, subrounded quartz, dark yellowish orange	4.2	13.1
Chalk Silt	Silt, chalky, soft, dark yellowish orange	1.7	14.8
Upper Chalk	Chalk, soft white	2.0+	16.8

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
				- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
10	71	19	8.9-9.9	10	20	65	3	2	0	0
			9.9-10.6	6	5	80	6	3	0	0
			10.6-11.6	7	6	45	16	20	6	0
			11.6-12.6	6	5	34	16	18	21	0
			12.6-13.1	33	5	20	14	18	10	0
			Mean	10	9	51	11	12	7	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
8.9-10.6	0	33	67	0	0	0	0	0
10.6-11.6	12	22	23	41	0	0	0	2
11.6-12.6	20	19	36	22	0	0	3	0
12.6-13.1	26	18	19	37	0	0	0	0
Mean	17	20	29	32	0	0	1	1

TM 07 SW 28 0042 7208 Fish Pond Barn, Walsham-le-Willows

Surface level +56.6 m (+186 ft)
Water not struck
July 1980

Block C

Overburden 8.5 m
Mineral 2.8 m
Bedrock 2.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Clay, with limestone and flint rubble	0.5	0.5
Boulder Clay	Clay, mottled moderate yellowish brown and dark yellowish orange, with subangular chalk pebbles	0.5	1.0
Glacial Sand and Gravel	a 'Very clayey' pebbly sand Gravel: fine, angular flint Sand: fine with medium, subangular quartz with angular flint and subangular chalk, moderate yellowish brown	0.7	1.7
Boulder Clay	Clay, silty, mottled moderate yellowish brown and olive grey, with medium and fine subangular chalk and angular flint pebbles; becoming olive grey below 3.0 m	6.8	8.5
Kesgrave Sand and Gravels	b 'Clayey' pebbly sand Gravel: fine with coarse, subangular flint, well-rounded vein quartz, flint and quartzite Sand: medium with fine, well rounded quartz and some subangular flint, greyish orange	2.8	11.3
Upper Chalk	Chalk, soft white	2.0+	13.3

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages							
Fines	Sand	Gravel		Fines		Sand		Gravel			
				- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm	
a	26	68	6	1.0-1.7	26	46	19	3	6	0	0
b	15	69	16	8.5-9.2	8	26	46	5	12	3	0
			9.2-10.2	17	20	31	9	19	4	0	0
			10.2-11.3	17	28	41	4	8	2	0	0
			Mean	15	25	38	6	13	3	0	0

TM 07 SW 29 0013 7137 Walsham, Walsham-le-Willows

Block E

Surface level +50.0 m (+164 ft)
Water struck at +44.3 m
July 1980

Overburden 4.9 m
Mineral 8.1 m
Waste 1.0 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, silty sand	0.6	0.6
?Palaeosol (Kesgrave Sands and Gravels)	a Clay, sandy and silty, mottled yellowish grey and dark orange, with occasional rounded quartzite, flint and vein quartz pebbles	4.3	4.9
Kesgrave Sands and Gravels	b Pebbly sand Gravel: fine with coarse, well rounded quartzite with flint and vein quartz, some subangular flint Sand: medium with some coarse and fine, subangular and well rounded quartz, with some subangular flint, greyish orange	2.0	6.9
Crag	c Pebbly sand, becoming more pebbly below 9.9 m Gravel: coarse and fine, well rounded vein quartz, flint and quartzite with some subangular flint Sand: fine with medium, subangular and well rounded quartz, dusky yellow becoming dark yellowish orange below 11.9 m	6.1	13.0
Chalk Silt	Silt, chalky, soft, pale yellowish orange	1.0	14.0
Upper Chalk	Chalk, soft white	1.0+	15.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	50	46	4	0.6-1.8	51	16	20	2	2	9	0
				1.8-2.8	50	24	24	1	1	0	0
				2.8-3.8	49	27	21	1	2	0	0
				3.8-4.9	45	27	24	1	1	2	0
				Mean	50	23	22	1	1	3	0
b	9	70	21	4.9-5.9	10	9	46	11	15	9	0
				5.9-6.9	9	4	55	13	13	6	0
				Mean	9	6	52	12	14	7	0
c	8	78	14	6.9-7.9	8	48	32	7	5	0	0
				7.9-8.9	8	50	30	7	3	2	0
				8.9-9.9	9	48	29	7	5	2	0
				9.9-10.9	6	46	21	7	9	11	0
				10.9-11.9	7	33	27	8	6	19	0
				11.9-13.0	11	27	25	16	7	14	0
				Mean	8	42	27	9	6	8	0
b+c	8	76	16	4.9-13.0	8	33	34	9	8	8	0
a+b+c	22	66	12	0.6-13.0	22	30	29	7	6	6	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.6-4.9	0	24	29	47	0	0	0	0
b	4.9-5.9	14	13	24	47	0	0	2	0
	5.9-6.9	18	21	34	27	0	0	0	0
	Mean	16	16	28	39	0	0	1	0
c	6.9-7.9	4	28	49	19	0	0	0	0
	7.9-8.9	0	31	38	31	0	0	0	0
	8.9-9.9	0	40	35	25	0	0	0	0
	9.9-10.9	7	34	39	20	0	0	0	0
	10.9-11.9	9	24	24	43	0	0	0	2
	11.9-13.0	3	37	40	20	0	0	0	0
	Mean	6	30	34	29	0	0	0	1

TM 07 SW 30 0008 7022 Elm Low Barn, Badwell Ash

Block E

Surface level +50.4 m (+165 ft)
Water not struck
July 1980

Waste 4.8 m
Bedrock 3.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Flint and quartzite gravel	0.4	0.4
	Soil, sand and silt	0.2	0.6
Boulder Clay	Clay, stiff, mottled light olive grey and moderate yellowish brown with medium and fine chalk pebbles; becoming soft, light olive brown with chalk, occasional angular flint and rounded quartzite pebbles below 2.3 m	2.7	3.2
Glacial Silt	a Silt, sandy, moderate yellowish brown with occasional fine angular and subrounded flint and chert pebbles	1.5	4.8
Upper Chalk	Chalk, soft, very pale orange, becoming white below 7.0 m	3.2+	8.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
	42	55	3	3.3-4.8	42	25	27	3	3	0	0

TM 07 SW 31 0092 7442 Bobby Hill, Wattisfield

Block C

Surface level +39.0 m (+128 ft)
Water not struck
June 1980

Waste 2.7 m
Bedrock 2.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, silty sand	0.4	0.4
Head	Pebbly sand Gravel: coarse with fine, angular flint with rounded vein quartz, flint and quartzite Sand: fine with medium and some coarse, angular quartz, dark yellowish orange	2.3	2.7
Upper Chalk	Chalk, soft white	2.3+	5.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
				- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm
9	71	20	0.4-1.2	20	30	22	5	8	15	0
			1.2-2.7	3	41	28	10	17	1	0
			Mean	9	37	26	8	14	6	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
0.4-2.7	47	10	21	7	0	0	0	15*

* Mainly ironpan

52

TM 07 SW 32 0119 7320 Pear Tree Farm, Wattisfield

Block C

Surface level +52.5 m (+172 ft)
Water not struck
June 1980

Overburden 5.0 m
Mineral 2.4 m
Waste 0.6 m
Bedrock 3.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground		0.5	0.5
Boulder Clay	Clay, mottled dark grey and dark orange with chalk and flint pebbles; becoming mottled medium grey and moderate olive brown below 2.8 m	2.8	3.3
Kesgrave Sands and Gravels	a Sandy gravel Gravel: fine with some coarse, well rounded quartzite, vein quartz and flint, with some subangular flint Sand: medium with coarse and fine, subangular and well rounded quartz, moderate yellow	0.7	4.0
	Silt, sandy, stiff, light brownish grey with occasional well rounded vein quartz pebbles	1.0	5.0
	b 'Clayey' sandy gravel, becoming more pebbly with depth Gravel: fine with coarse, well rounded quartzite vein quartz and flint, with some subangular flint Sand: medium with some fine and coarse, subangular quartz, pale yellow	2.4	7.4
	Clay, stiff, light brown with pebbles of quartzite, vein quartz and subangular flint,	0.6	8.0
Upper Chalk	Chalk, soft, light yellow, becoming white below 10.0 m	3.3+	11.3

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines		Sand		Gravel		
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm
a	7	63	30	3.3-4.0	7	12	37	14	23	7	0
b	16	58	26	5.0-6.1	26	18	46	4	5	1	0
				6.1-7.4	7	5	31	14	29	14	0
				Mean	16	11	38	9	18	8	0
a+b	14	59	27	Mean	14	11	38	10	19	8	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	3.3-4.0	16	16	27	35	0	0	0	6
b	5.0-6.1	0	37	63	0	0	0	0	0
	6.1-7.4	14	22	26	37	0	0	0	1
a+b	Mean	14	23	26	35	0	0	0	2

TM 07 SW 33 0094 7096 Clay Street, Walsham-le-Willows

Block E

Surface level +53.6 m (+176 ft)
Water struck at +48.3 m
July 1980

Waste 20.7 m
Bedrock 1.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sandy silt with occasional angular flint pebbles	0.3	0.3
Boulder Clay	Clay, stiff, mottled light olive brown and light olive grey with fine subangular chalk pebbles; becoming olive grey below 3.5 m	5.0	5.3
Glacial Silt	Silt, clayey, soft, olive grey with occasional brown mudstone pebbles	0.7	6.0
Boulder Clay	Clay, waxy, olive grey with occasional medium and fine subrounded chalk pebbles	2.3	8.3
	Clay, silty and sandy, dark yellowish brown with occasional subangular flint and well rounded quartzite pebbles; some chalk sand	3.2	11.5
Glacial Silt	Silt, sandy, light olive grey, becoming clayey greenish grey, with fine quartz and flint sand, from 11.7 m to 12.2 m and olive grey, with occasional flint pebbles below 14.0 m	4.5	16.0
Crag	'Clayey' sandy gravel, with thin beds of clayey micaceous silt above 17.0 m; more pebbly towards the base Gravel: coarse and fine, well rounded flint, quartzite and vein quartz with some subangular flint; traces of ironpan and phosphate Sands: medium with some coarse and fine, subangular and well rounded quartz, olive black	3.1	19.1
Chalk Silt	Silt, chalky, medium grey	1.6	20.7
Upper Chalk	Chalk, hard rock, white	1.3+	22.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
10	61	29	16.0-17.0	28	8	44	7	9	4	0
			17.0-18.0	2	6	48	12	12	20	0
			18.0-19.1	2	6	40	11	17	21	3
			Mean	10	7	44	10	13	15	1

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
16.0-17.0	6	76	9	9	0	0	0	0
17.0-18.0	9	45	22	22	0	0	0	2
18.0-19.1	5	46	20	21	0	0	0	9*
Mean	6	48	20	21	0	0	0	5

* Mainly ironpan

TM 07 SW 34 0171 7406 Honey Pot Hall, Wattisfield

Block E

Surface level +59.0 m (+194 ft)
Water struck at +57.3 m
June 1980

Overburden 10.9 m
Mineral 4.5 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand	0.3	0.3
Boulder Clay	Clay, soft, mottled dark yellowish orange and greyish orange with abundant chalk pebbles and thin beds of fine quartz sand; becoming silty olive grey, with chalk and occasional angular flint pebbles below 1.9 m	2.7	3.0
	Clay, stiff, waxy, olive black with occasional angular chalk and flint pebbles	6.9	10.9
Crag	'Clayey' pebbly sand, ironstained above 12.5 m Gravel: fine with coarse, well rounded vein quartz, flint and quartzite, with some subangular flint Sand: fine with medium, well rounded quartz dark orange; becoming moderate yellow below 12.5 m	4.5	15.4
Upper Chalk	Chalk, soft white	1.0+	16.4

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
11	84	5	10.9-11.2	11	11	75	1	2	0	0
			11.2-12.5	17	9	43	19	12	0	0
			12.5-13.5	6	92	2	0	0	0	0
			13.5-14.5	7	90	3	0	0	0	0
			14.5-15.2	8	59	32	0	1	0	0
			15.2-15.4	15	33	16	5	17	14	0
			Mean	11	54	24	6	4	1	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
10.9-15.4	16	23	38	21	2	0	0	0

TM 07 SW 35 0122 7216 Elm Pollard, Wattisfield

Surface level +55.4 m (+182 ft)
Water struck at +51.4 m
July 1980

Block E

Overburden 9.1 m
Mineral 2.0 m
Waste 2.0 m
Mineral 3.9 m
Waste 1.3 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, silty sand and clay	0.3	0.3
Boulder Clay	Clay, silty, mottled light olive brown and light olive grey with subangular chalk and angular flint pebbles, becoming dusky yellowish brown below 2.0 m	3.6	3.9
Glacial Silt	Silt, soft, olive grey	0.5	4.4
Boulder Clay	Clay, waxy, olive grey with medium and fine chalk pebbles	2.1	6.5
Glacial Silt	Silt, soft, olive grey	0.9	7.4
Boulder Clay	Clay, waxy, olive grey with chalk pebbles	1.3	8.7
Glacial Silt	Silt, sandy and clayey in part, soft, light brown	0.4	9.1
Crag	a 'Very clayey' sand, with occasional pebbles Sand: fine with medium, subangular quartz, micaceous, mottled pale olive and dark orange	2.0	11.1
	b Sandy silt and clay, mottled yellowish grey and dark orange	2.0	13.1
	c 'Clayey' pebbly sand, with subrounded flint cobbles below 16.1 m Gravel: coarse with some fine, rounded flint and and quartzite with vein quartz, subangular flint, ironpan and traces of phosphate Sand: fine with some medium, well rounded quartz, micaceous, olive brown	3.9	17.0
Chalk Silt	Silt, chalky, yellowish grey	1.3	18.3
Upper Chalk	Chalk, soft white	1.0+	19.3

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines Sand Gravel						
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	27	71	2	9.1-11.1 10.1-11.1 Mean	20 35 27	42 49 47	31 15 23	2 0 1	2 1 1	3 0 1	0 0 0
b	44	56	0	11.1-12.1 12.1-13.1 Mean	40 49 44	53 40 46	7 10 9	0 1 1	0 0 0	0 0 0	0 0 0
c	13	80	7	13.1-14.1 14.1-15.1 15.1-16.1 16.1-17.0 Mean	13 21 10 6 13	70 58 73 49 62	16 20 14 15 16	1 1 2 4 2	0 0 1 2 1	0 0 0 12 3	0 0 0 12 3
a+b	36	62	2	9.1-13.1	36	45	16	1	1	1	0
b+c	23	73	4	11.1-17.0	23	58	14	1	trace	2	2
a+c	18	77	5	Mean	18	58	18	1	1	2	2
a+b+c	24	72	4	9.1-17.0	24	55	16	1	1	2	1

TM 07 SW 36 0253 7452 Calkwood Lane, Rickinghall Inferior

Surface level +56.8 m (+186 ft)
June 1980

Block E

Overburden 8.0 m
Mineral 8.8 m
Waste 2.2 m
Bedrock 0.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, silty clay with flint pebbles	0.3	0.3
Boulder Clay	Clay, stiff, mottled olive grey and dark orange with subangular chalk and angular flint pebbles; becoming olive grey with abundant chalk and flint pebbles below 1.1 m	2.4	2.7
	Clay, silty, medium light grey with abundant chalk and occasional flint pebbles; becoming mottled yellowish brown and medium grey, with occasional chalk and flint pebbles, below 7.6 m	5.3	8.0
Kesgrave Sands and Gravels	a 'Clayey' pebbly sand Gravel: fine with some coarse, rounded quartzite with subangular flint, rounded flint and vein quartz Sand: medium with some fine and coarse, angular quartz, silty, dark orange	1.0	9.0
Crag	b 'Very clayey' sand Sand: medium with fine, subrounded quartz, with thin beds of reddish brown laminated silty clay	7.8	16.8
Chalk Silt	Silt, clayey, soft, brownish orange	2.2	19.0
Upper Chalk	Chalk, soft white	0.4+	19.4

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Percentages						
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	15	71	14	8.0-9.0	15	10	52	9	12	2	0
b				9.0-10.0	17	12	61	7	3	0	0
				10.0-11.0	29	16	50	4	1	0	0
				11.0-12.0	23	38	38	1	0	0	0
				12.0-13.0	23	33	42	1	1	0	0
				13.0-14.0	23	33	41	1	2	0	0
				14.0-15.0	17	25	55	2	1	0	0
				15.0-16.0	15	19	58	6	2	0	0
				16.0-16.8	5	62	19	2	2	0	0
			Mean	20	29	47	3	1	0	0	
a+b	20	77	3	8.0-16.8	20	27	46	4	3	trace	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	8.0-9.0	21	20	13	34	0	0	0	12*

* Mainly ironpan

Crag	c Pebbly sand Gravel: coarse with some fine, well rounded black flint Sand: fine, well rounded vein quartz, micaceous, dark greenish grey	0.8	24.5
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Upper Chalk	Chalk, soft white	2.0+	26.5
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GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Percentages						
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	20	63	17	15.6-16.6	20	23	36	4	10	7	0
b				16.6-17.6	31	23	44	1	1	0	0
				17.6-18.6	13	18	58	4	6	1	0
				18.6-19.6	14	20	45	5	12	2	2
				19.6-20.6	8	17	42	7	12	14	0
				20.6-21.6	4	12	35	17	21	11	0
				21.6-22.6	3	12	33	16	19	17	0
				22.6-23.7	3	12	33	14	18	20	0
				Mean	10	16	43	9	13	9	trace
c	6	82	12	23.7-24.5	6	74	6	2	2	10	0
a+b	12	67	21	15.6-23.7	12	17	41	9	12	9	trace
b+c	10	69	21	16.6-24.5	10	22	38	9	12	9	trace
a+b+c	11	69	20	15.6-24.5	11	22	39	8	11	9	trace

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	15.6-16.6	27	30	5	34	1	0	0	3
b	17.6-18.6	12	38	33	5	0	0	0	12*
	18.6-19.6	12	54	14	17	0	0	1	2
	19.6-20.6	11	47	25	13	0	0	0	4
	20.6-21.6	10	42	27	20	0	0	0	1
	21.6-22.6	21	30	18	22	0	0	0	9*
	22.6-23.7	15	32	19	26	1	0	0	7*
		Mean	15	36	21	21	trace	0	7
	c	23.7-24.5	0	100	0	0	0	0	0

* Mainly ironpan

55

TM 07 SW 37	0253 7285	Kepper's House, Rickingham Inferior	Block E	
Surface level +60.0 m (+197 ft)			Overburden	15.6 m
Water struck at +38.5 m			Mineral	8.9 m
June 1980			Bedrock	2.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Soil with flint gravel	0.4	0.4
Boulder Clay	Clay, stiff, mottled olive grey and moderate olive brown with chalk and flint pebbles; becoming olive grey below 1.8 m	11.3	11.7
Glacial Silt	Silt, medium grey	0.3	12.0
Boulder Clay	Clay, silty, yellowish brown with medium angular flint and well rounded vein quartz pebbles; some coarse chalk sand	3.6	15.6
Glacial Sand and Gravel	a 'Very clayey' pebbly sand Gravel: fine with coarse, rounded quartzite and flint with angular flint; some vein quartz and chalk Sand: medium with fine, subrounded and angular quartz, angular flint and chalk, light olive grey	1.0	16.6
Kesgrave Sands and Gravels	b 'Clayey' pebbly sand, becoming less clayey and more pebbly with depth Gravel: fine with coarse, rounded flint, quartzite and vein quartz, with some subangular flint Sand: medium with some fine and coarse, subrounded quartz, olive grey	7.1	23.7

TM 07 SW 38 0159 7140 Cranmer Farm, Walsham-le-Willows

Surface level +48.5 m (+159 ft)
Water struck at +41.5 m
July 1980

Block E

Overburden 6.9 m
Mineral 6.5 m
Waste 2.4 m
Bedrock 0.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Sandy, clayey silt with brick rubble	0.2	0.2
Alluvium	Silt, sandy, soft, light grey with faint orange mottling	0.4	0.6
Boulder Clay	Clay, stiff, waxy, mottled olive grey and light olive brown with occasional subangular chalk pebbles; becoming olive grey between 3.0 m and 3.5 m olive black below 3.5 m	4.4	5.0
Glacial Silt	Silt, soft, olive grey	1.7	6.7
Boulder Clay	Clay, silty and sandy, moderate brown, with occasional angular flint and well rounded vein quartz pebbles	0.2	6.9
Crag	'Clayey' pebbly sand, becoming less clayey with depth Gravel: fine and coarse, rounded quartzite, vein quartz and flint, with some subangular flint, ironpan and phosphate Sand: medium with fine, well rounded quartz, slightly micaceous, olive grey	6.5	13.4
Chalk Silt	Silt, chalk, soft, medium grey, becoming white below 14.1 m	2.4	15.8
Upper Chalk	Chalk, soft white, with hard rock fragments	0.2+	16.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
			- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm	
17	78	5	6.9-7.9	36	25	30	4	5	0	0
			7.9-8.9	26	29	37	5	3	0	0
			8.9-9.9	20	31	43	5	1	0	0
			9.9-10.9	15	19	52	8	5	1	0
			10.9-11.9	4	23	59	7	2	5	0
			11.9-12.9	9	23	65	3	0	0	0
			12.9-13.4	3	24	55	4	3	11	0
			Mean	17	25	48	5	3	2	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
6.9-7.9	6	20	36	38	0	0	0	0
7.9-8.9	27	0	13	60	0	0	0	0
9.9-10.9	0	12	17	63	0	0	0	8
10.9-11.9	36	0	32	32	0	0	0	0
12.9-13.4	6	38	11	27	0	0	0	17*
Mean	11	16	20	46	0	0	0	7

* Ironpan

TM 07 SW 39 0201 7006

Surface level +54.7 m (+179 ft)
Water struck at +44.7 m
July 1980

Crowland, Walsham-le-Willows

Block E

Overburden 10.5 m
Mineral 14.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, silty sand	0.3	0.3
Boulder Clay	Clay, silty, stiff, mottled light olive brown and medium light grey, with abundant chalk and occasional patinated flint pebbles; becoming olive black from 3.9 m to 4.8 m and olive grey below 4.9 m, with a thin bed of sandy silt at 4.9 m	9.0	9.3
	Clay, silty and sandy, dark yellowish brown, with occasional angular flint pebbles and coarse chalk sand	1.2	10.5
Kesgrave Sands and Gravels	a 'Clayey' pebbly sand Gravel: fine and coarse, subangular flint and well rounded quartzite, with some rounded flint and vein quartz Sand: medium with some fine well rounded quartz, with traces of chalk, light olive grey	3.0	13.5
Crag	b Sand Sand: fine with some medium, well rounded quartz and glauconite, micaceous, greenish grey above 18.5 m, greyish olive green to 25.0 m	11.5+	25.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines		Sand		Gravel		
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	14	80	6	10.5-11.5	22	18	51	3	4	2	0
				11.5-12.5	13	25	55	3	1	3	0
				12.5-13.5	7	11	59	15	4	4	0
				Mean	14	18	55	7	3	3	0
b	4	96	0	13.5-14.5	8	36	45	9	2	0	0
				14.5-15.5	6	79	15	0	0	0	0
				15.5-16.5	6	80	14	0	0	0	0
				16.5-17.5	5	67	28	0	0	0	0
				17.5-18.5	5	60	35	0	0	0	0
				18.5-19.5	5	65	30	0	0	0	0
				19.5-20.5	3	89	8	0	0	0	0
				20.5-21.5	4	85	11	0	0	0	0
				21.5-22.5	5	89	6	0	0	0	0
				22.5-23.5	2	95	3	0	0	0	0
				23.5-25.0	3	92	5	0	0	0	0
				Mean	4	77	18	1	trace	0	0
a+b	6	92	2	10.5-25.0	6	64	26	2	1	1	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction								
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others	
a	10.5-13.5	45	10	6	36	1	0	0	2

TM 07 SW 40 0309 7376 Westhall, Rickinghall Inferior

Block C

Surface level +40.7 m (+134 ft)
Water struck at +36.3 m
June 1980

Overburden 2.4 m
Mineral 3.2 m
Bedrock 2.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, silty sand	0.4	0.4
Head	a Pebbly sand Gravel: fine and coarse, angular flint with subrounded flint, vein quartz and quartzite Sand: medium and fine, subangular quartz and flint, mottled pale yellowish brown and dark yellowish orange	2.0	2.4
Kesgrave Sands and Gravels	b Pebbly sand Gravel: fine with coarse, well rounded flint, quartzite and vein quartz; some subangular flint Sand: medium with some fine and coarse, subrounded quartz and some angular flint, greyish orange	3.2	5.6
Upper Chalk	Chalk, soft white	2.4+	8.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Percentages						
					-1/16	+1/16 - 1/4	+1/4 - 1/2	+1/2 - 3/4	+3/4 - 1	+4 - 16	+16 - 64
a	9	84	7	0.4-1.4	15	41	34	4	5	1	0
				1.4-2.4	3	38	49	2	3	5	0
				Mean	9	39	42	3	4	3	0
b	4	81	15	2.4-3.4	9	27	44	5	11	4	0
				3.4-4.4	2	5	70	9	12	2	0
				4.4-5.6	2	8	66	7	7	10	0
				Mean	4	13	61	7	10	5	0
a+b	6	82	12	0.4-5.6	6	23	54	5	7	5	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.4-1.4	68	11	11	10	0	0	0	0
	1.4-2.4	87	10	3	0	0	0	0	0
	Mean	78	10	7	5	0	0	0	0
b	2.4-3.4	10	44	29	17	0	0	0	0
	3.4-4.4	7	47	18	27	0	0	0	1
	4.4-5.6	5	44	26	25	0	0	0	0
	Mean	7	45	23	24	0	0	0	1

TM 07 SW 41 0356 7482 The Cottage, Rickinghall Inferior

Block B

Surface level +36.5 m (+120 ft)
Water struck at +34.5 m
June 1980

Overburden 0.8 m
Mineral 4.3 m
Bedrock 1.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand	0.2	0.2
Alluvium	Silt, sandy, stiff, dark yellowish brown with occasional fine angular flint pebbles	0.6	0.8
Glacial Sand and Gravel	Sandy gravel Gravel: fine with coarse, angular flint with rounded quartzite, flint and vein quartz; some chalk, with traces of limestone, shell, ironpan and micaceous sandstone Sand: medium and fine with coarse, angular flint, quartz and chalk, moderate yellowish brown	4.3	5.1
Upper Chalk	Chalk, soft white	1.9+	7.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Percentages						
					-1/16	+1/16 - 1/4	+1/4 - 1/2	+1/2 - 3/4	+3/4 - 1	+4 - 16	+16 - 64
	6	55	39	0.8-2.0	9	26	24	7	20	14	0
				2.0-3.0	2	12	19	14	33	20	0
				3.0-4.0	5	20	24	15	23	13	0
				4.0-5.1	6	23	24	12	16	19	0
				Mean	6	20	23	12	23	16	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
0.8-2.0	51	20	8	15	4	0	0	2
2.0-3.0	56	14	5	13	8	2	0	2
3.0-4.0	57	16	10	11	5	0	0	1
4.0-5.1	64	18	4	9	5	0	0	0
Mean	52	18	7	14	7	1	0	1

TM 07 SW 42 0361 7439 Brick Kiln Farm, Rickingham Superior Block C
 Surface level +46.5 m (+152 ft) Waste 13.9 m
 Water not struck Bedrock 1.1 m+
 June 1980

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand with flint, quartzite and vein quartz pebbles	0.2	0.2
Cover Sand	'Clayey' sand, with occasional fine subangular flint pebbles Sand: medium with fine, subangular quartz, moderate yellowish brown	0.7	0.9
?Glacial Silt	Silt, clayey with race, mottled moderate yellow brown and pale olive, becoming stiff, olive grey below 2.4 m	2.3	3.2
	Clay, silty, stiff, dusky yellow brown; interbedded with dark orange fine quartz sand and pale yellowish brown silt, laminated below 4.5 m	2.2	5.4
	Clay, medium grey with thin sandy silt partings	2.3	7.7
	Silt, clayey, light olive grey; becoming sandy, mottled greyish orange and dark yellowish orange, below 11.8 m	6.2	13.9
Upper Chalk	Chalk, soft white	1.1+	15.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
				-#	+# -#	+# -1	+1 -4	+4 -16	+16 -64	+64 mm
13	85	2	0.2-0.9	13	28	54	3	2	0	0

TM 07 SW 43 0413 7336 Falcon's Hall, Rickingham Superior Block E
 Surface level +55.8 m (+183 ft) Overburden 11.4 m
 Water struck at +45.7 m Mineral 1.6 m
 June 1980 Waste 1.4 m
 Mineral 8.9 m
 Waste 1.7 m
 Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand	0.3	0.3
Boulder Clay	Clay, stiff, mottled olive grey and dark orange brown with chalk pebbles; becoming medium dark grey, with chalk and patinated flint pebbles, below 5.2 m	9.8	10.1
Glacial Silt	Silt, olive grey	0.7	10.8
Boulder Clay	Clay, silty, medium dark grey with occasional chalk pebbles and silty fine quartz sand partings	0.6	11.4
Glacial Sand and Gravel	a 'Very clayey' sand Sand: medium with fine, well rounded quartz, olive grey	1.6	13.0
Silt	Shelly silt, light olive grey, with abundant shells of <i>Sphaerium</i> sp.	0.1	13.1
	Silt, clayey, laminated, olive grey with peaty debris; becoming brownish grey below 14.0 m	1.3	14.4
Kesgrave Sands and Gravels	b Sandy gravel Gravel: medium with coarse, well rounded quartzite with flint; some vein quartz and subangular flint Sand: medium with coarse and fine, well rounded and subangular quartz, with traces of flint, pale yellowish brown	6.4	20.8
Crag	c 'Clayey' pebbly sand, with well rounded flint cobbles above 22.0 m Gravel: coarse with fine, well rounded flint and quartzite, with vein quartz, ironpan, phosphate and subangular flint Sand: fine with medium and some coarse, well rounded quartz with some glauconite, micaceous, dusky yellow green, becoming greenish grey below 22.0 m	2.5	23.3
Chalk Silt	Silt, chalky, pale yellowish orange	1.7	23.3
Upper Chalk	Chalk, soft white, with hard rock fragments	1.5+	26.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					-½	+½ -½	+¾ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	20	80	0	11.4-12.4 12.4-13.0 Mean	17 26 20	15 14 15	68 59 65	0 1 trace	0 0 0	0 0 0	0 0 0
b	6	62	32	14.4-15.4 15.4-16.4 16.4-17.4 17.4-18.4 18.4-19.6 19.6-20.8 Mean	15 4 5 8 2 1 6	20 7 8 15 9 22 14	34 50 33 32 18 43 34	10 17 20 12 8 17 14	13 8 32 31 25 10 21	8 4 2 2 38 7 11	0 0 0 0 0 0 0
c	16	69	15	20.8-22.0 22.0-23.3 Mean	4 27 16	48 43 45	15 19 17	6 7 7	5 2 3	12 2 7	10 0 5
a+b	9	65	26	Mean	9	14	40	11	17	9	0
b+c	9	64	27	14.4-23.3	9	23	29	12	16	10	1
a+b+c	10	67	23	Mean	10	21	36	10	14	8	1

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
b	14.5-15.4	33	16	15	32	0	0	4
	15.4-16.4	22	17	16	40	0	0	5
	16.4-17.4	24	18	18	37	0	0	3
	17.4-18.4	26	24	17	28	0	0	2
	18.4-19.6	12	28	13	41	0	0	4
	19.6-20.8	15	25	14	44	0	0	2
	Mean	20	24	15	37	0	0	3
c	20.8-23.3	7	21	12	25	0	0	35*

* Ironpan

TM 07 SW 44 0343 7215

North of Priory Farm, Rickingham Superior

Block E

Surface level +57.5 m (+189 ft)
Water struck at +41.5 m
June 1980

Overburden 13.0 m
Mineral 9.0 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand and silt	0.3	0.3
Boulder Clay	Clay, mottled olive grey and dark orange with chalk and flint pebbles, occasional well rounded chalk cobbles; becoming stiff, olive grey, with abundant fine subangular chalk pebbles below 3.5 m	11.8	12.1
	Clay, silty and sandy, soft, yellowish brown with medium angular flint and well rounded vein quartz pebbles; some coarse chalk sand and fine quartz sand partings	0.9	13.0
Kesgrave Sands and Gravels	a Sandy gravel Gravel: fine with coarse, rounded quartzite and flint, with vein quartz and subangular flint Sand: medium with fine and coarse, subrounded quartz with some flint, yellowish grey	1.9	14.9
Crag	b Sand Sand: fine with medium, well rounded quartz and glauconite, with shell fragments below 19.9 m, greenish grey; becoming greenish black below 20.9 m	7.1	22.0
Upper Chalk	Chalk, soft white	1.0+	23.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					-½	+½ -½	+¾ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	4	64	32	13.0-14.0 14.0-14.9 Mean	5 4 4	12 16 14	50 29 41	8 10 9	17 22 19	8 19 13	0 0 0
b	5	93	2	14.9-15.9 15.9-16.9 16.9-17.9 17.9-18.9 18.9-19.9 19.9-20.9 20.9-22.0 Mean	9 6 5 3 4 5 6 5	84 92 83 65 62 47 37 66	5 2 12 32 0 43 52 26	1 0 0 0 0 1 3 1	0 0 0 0 0 1 2 1	1 0 0 0 3 0 0 1	0 0 0 0 0 0 0 0
a+b	5	88	7	13.0-22.0	5	57	29	2	4	3	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	13.0-14.0	28	30	19	23	0	0	0
	14.0-14.9	23	25	17	33	0	0	1
	Mean	25	27	18	28	0	0	1

TM 07 SW 45 0401 7096 Town Farm, Walsham-le-Willows

Surface level +61.6 m (+202 ft)
Water struck at +42.4 m
June 1980

Block E

Waste 30.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, silty, sand with occasional angular flint pebbles	0.2	0.2
Boulder Clay	Clay, silty, stiff, mottled light olive grey and light olive brown with fine subangular chalk pebbles; becoming olive grey, with abundant chalk, black mudstone pebbles and occasional flint cobbles below 2.4 m	12.3	12.5
Glacial Silt	Silt, medium light grey	0.2	12.7
Boulder Clay	Clay, silty, stiff, olive grey with subangular chalk pebbles	2.3	15.0
	Clay, silty and sandy, dark yellowish brown with angular brown flint and well rounded vein quartz pebbles; some coarse angular chalk sand	2.6	17.6
Glacial Sand and Gravel	a 'Very clayey' sand, with occasional pebbles of angular flint, rounded flint and chalk Sand: fine with medium, subangular quartz and some chalk; with occasional thin beds of silt, light olive grey	1.4	19.0
Boulder Clay	Clay, silty and sandy, soft, pinkish grey with fine subangular chalk and flint pebbles	3.9	22.9
Kesgrave Sands and Gravels	b Sandy gravel Gravel: fine with coarse, quartzite, well rounded flint, vein quartz and subangular flint Sand: fine with medium and some coarse, subrounded quartz with some flint, light olive grey	1.1	24.0
Crag	e Sand Sand: fine well rounded quartz, micaceous greenish grey	1.0	25.0
	d Sand Sand: fine well rounded quartz, micaceous dusky yellow green	5.5+	30.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines						
					-1/16	+1/16 - 1/8	+1/8 - 1/4	+1/4 - 1/2	+1/2 - 3/4	+3/4 - 1	+1 - 1.5
a	36	61	3	17.6-19.0	36	37	21	3	2	1	0
b	9	65	26	22.9-24.0	9	34	20	11	15	11	0
c	7	93	0	24.0-25.0	7	81	10	2	0	0	0
d	4	96	0	25.0-26.0	4	91	4	1	0	0	0
				26.0-27.0	4	92	3	1	0	0	0
				27.0-28.0	3	95	2	0	0	0	0
				28.0-29.0	5	92	2	0	1	0	0
				29.0-30.5	5	94	1	0	0	0	0
				Mean	4	94	2	trace	trace	0	0
a+b+c	19	71	10	Mean	19	49	17	5	6	4	0
a-d	10	86	4	Mean	10	76	8	2	2	2	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	17.6-19.0	60	28	0	0	6	0	0	6
b	22.9-24.0	22	27	19	32	0	0	0	0

TM 07 SW 46 0484 7468 Suggen Hall Farm, Rickingham Superior

Surface level +53.4 m (+175 ft)
Water struck at +51.4 m
June 1980

Block C

Waste 12.8 m
Bedrock 2.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Soil, with flint gravel and brick debris	0.3	0.3
Boulder Clay	Clay, silty, mottled light olive brown and medium grey, with subangular chalk and flint pebbles, some thin sand partings; becoming olive grey, with abundant chalk and flint, below 4.4 m and olive brown, with rare pebbles of gypsum, below 9.8 m	9.9	10.2
	Clay, silty and sandy, dark yellowish brown with angular flint and well rounded vein quartz pebbles; occasional fine well rounded chalk pebbles	0.8	11.0
Chalk Silt	Silt, chalky, soft, dark orange	1.8	12.8
Upper Chalk	Chalk, soft white, with angular hard rock fragments	2.0+	14.8

TM 07 SW 47 0481 7165 Mill Farm, Gislingham

Surface level +64.3 m (+211 ft)
Water struck at +39.5 m
June 1980

Block E

Waste 31.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Brick and flint debris	0.5	0.5
Boulder Clay	Clay, silty and sandy, mottled light olive grey and olive grey with subrounded chalk pebbles; becoming olive grey with abundant chalk below 1.9 m and medium dark grey, with chalk and flint pebbles below 16.0 m	17.8	18.3
	Clay, silty and sandy, dark yellowish brown with well-rounded vein quartz and angular flint pebbles; occasional fine subangular chalk and green volcanic pebbles	2.7	21.0

Kesgrave Sands and Gravel	a 'Clayey' pebbly sand Gravel: fine with some coarse, well rounded quartzite, flint and vein quartz, with some subangular flint Sand: medium with some fine, subangular quartz with some flint, pale yellowish brown	1.8	22.8
Crag	b 'Clayey' sand Sand: fine, well rounded quartz, micaceous, light greenish grey	3.0	25.8
	c 'Clayey' sand Sand: fine, well rounded quartz and glauconite, micaceous, dusky yellowish green	5.2+	31.0

TM 07 SW 48 0482 7041 Finningham Lodge, Finningham Block E
 Surface level +64.4 m (+211 ft)
 Water struck at +40.3 m
 September 1980 Waste 30.2 m+

LOG		Thickness m	Depth m
Geological classification	Lithology		
	Soil, sandy and silty	0.2	0.2
Boulder Clay	Clay, stiff, mottled dark orange and dark yellowish brown with subangular chalk and occasional volcanic pebbles	0.7	0.9
Glacial Sand and Gravel	a 'Clayey' sand Sand: fine with some medium, well rounded quartz, dark yellowish orange	0.1	1.0
Boulder Clay	Clay, silty, very light grey with abundant chalk pebbles; becoming stiff, mottled olive grey and moderate olive brown, with chalk and angular flint pebbles below 2.0 m	4.0	5.0
	Clay, stiff, light grey with medium to fine subangular white chalk and occasional red chalk pebbles	4.6	9.6
	Clay, stiff, olive black with chalk, flint and black mudstone pebbles; becoming olive grey below 11.9 m	3.4	13.0
	Clay, silty, soft, yellowish grey with fine well rounded chalk pebbles; becoming dark yellowish brown, with some coarse chalk sand below 18.0 m	6.2	19.2
Crag	b 'Very clayey' sand, becoming less silty below 24.2 m Sand: fine with medium, well rounded quartz, micaceous, moderate yellowish brown, with thin beds of greyish olive green silt above 21.9 m; becoming dark yellowish orange, with occasional glauconite from 21.9 m to 25.2 m	6.0	25.2
	c Sand Sand: fine with medium, well rounded quartz and glauconite, micaceous, greenish yellow	5.0+	30.2

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines		Sand			Gravel	
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	14	75	11	21.0-21.6 21.6-22.8 Mean	14 14 14	10 21 17	35 60 53	12 2 5	22 1 8	7 2 3	0 0 0
b	11	89	0	22.8-23.8 23.8-24.8 24.8-25.8 Mean	14 13 7 11	81 81 90 84	5 6 3 5	0 0 0 0	0 0 0 0	0 0 0 0	0 0 0 0
c	10	90	0	25.8-26.8 26.8-27.8 27.8-28.8 28.8-29.8 29.8-31.0 Mean	6 29 5 6 6 10	92 69 93 91 91 88	2 2 2 3 3 2	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0	0 0 0 0 0 0
a+b	12	84	4	21.0-25.8	12	60	22	2	3	1	0
a+b+c	11	87	2	21.0-31.0	11	74	12	1	1	1	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	21.0-21.6	20	24	25	28	0	0	0	3

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines		Sand			Gravel	
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	17	82	1	0.9-1.0	17	61	21	trace	1	0	0
b	24	76	0	19.2-20.2	33	34	29	2	2	0	0
				20.2-21.2	30	43	26	1	0	0	0
				21.2-21.9	27	68	5	0	0	0	
				21.9-23.2	15	76	9	0	0	0	
				23.2-24.2	33	26	41	0	0	0	
				24.2-25.2	9	70	21	0	0	0	
				Mean	24	54	22	trace	trace	0	0
c	6	94	0	25.2-26.2	6	66	28	0	0	0	0
				26.2-27.2	8	61	31	0	0	0	
				27.2-28.2	6	58	36	0	0	0	
				28.2-29.2	5	62	33	0	0	0	
				29.2-30.2	6	63	31	0	0	0	
				Mean	6	62	32	0	0	0	
a+b	24	76	0	Mean	24	54	22	trace	trace	0	0
a+b+c	16	84	0	Mean	16	58	26	trace	trace	0	0

TM 07 SE 14 0556 7444 Near Botesdale Green, Botesdale

Surface level +59.1 m (+194 ft)
Water struck at +57.7 m
October 1980

Block C

Overburden 18.4 m
Mineral 1.0 m
Waste 1.6 m+

TM 07 SE 15 0519 7303 Abbot's Hall, Botesdale

Surface level +61.5 m (+202 ft)
Water struck at +41.9 m
September 1980

Block E

Overburden 16.6 m
Mineral 8.8 m
Bedrock 1.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, clay and sand	0.3	0.3
Boulder Clay	Clay, sandy, mottled orange and yellow with occasional patinated flint pebbles	1.1	1.4
Glacial Sand and Gravel	Silty chalk sand, yellowish orange	0.3	1.7
Boulder Clay	Clay, silty, mottled medium grey and yellow with chalk and flint pebbles; becoming firm, dark bluish grey with occasional chalk and flint pebbles; below 2.8 m	15.9	17.6
	Clay, sandy and silty, brownish grey with quartzite and vein quartz pebbles; some coarse chalk sand	0.8	18.4
Glacial Sand and Gravel	a 'Very clayey' pebbly sand Gravel: coarse with fine, angular flint with rounded flint and some vein quartz Sand: fine and medium, subangular quartz, light brownish grey	1.0	19.4
Glacial Silt	b Sandy silt with pebbles of angular flint, rounded quartzite and chalk, brownish grey; becoming more clayey with depth	1.6+	21.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Percentages						
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	33	57	10	18.4-19.4	33	30	25	2	3	7	0
b	44	46	10	19.4-21.0	44	13	30	3	7	3	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	18.4-19.4	61	30	9	0	0	0	0	0

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, silty sandy clay with occasional angular flint pebbles	0.2	0.2
Boulder Clay	Clay, stiff, mottled dark orange and light olive grey with subrounded chalk pebbles	0.5	0.7
Glacial Sand and Gravel	a 'Very clayey' sand Sand: fine and medium, well rounded quartz, with thin beds of silty clay, dark orange	0.2	0.9
Boulder Clay	Clay, stiff, mottled olive grey and moderate olive brown with well rounded chalk, angular and flint occasional black mudstone pebbles; becoming waxy, olive grey with occasional chalk pebbles below 4.6 m	11.1	12.0
	Clay, silty, light olive grey with abundant subangular chalk pebbles; becoming pale brown, with occasional flint, vein quartz and chalk pebbles below 16.4 m	4.6	16.6
Kesgrave Sands and Gravels	b Sandy gravel, with occasional well rounded quartzite cobbles below 19.6 m Gravel: fine and coarse, well rounded quartzite, flint and vein quartz, with subangular flint Sand: medium with fine and coarse, angular and well rounded quartz, yellowish grey	3.9	20.5
Crag	c Sand, with occasional well rounded flint pebbles below 24.4 m Sand: fine with some medium, well rounded quartz and glauconite, micaceous, greyish olive; becoming dark greyish green below 22.5 m	4.9	25.4
Upper Chalk	Chalk, hard rock, white	1.1+	26.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Percentages						
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	23	76	1	0.7-0.9	23	51	25	trace	1	0	0
b	5	64	31	16.6-17.6	16	17	46	6	10	5	0
				17.6-18.6	4	10	48	16	15	7	0
				18.6-19.6	0	6	35	14	24	21	0
				19.6-20.5	2	25	22	9	19	20	3
				Mean	5	14	39	11	17	13	1
c	4	94	2	20.5-21.5	3	87	10	0	0	0	0
				21.5-22.5	3	88	9	0	0	0	0
				22.5-23.5	3	86	11	0	0	0	0
				23.5-24.4	4	69	27	0	0	0	0
				24.4-25.4	6	48	33	1	1	11	0
Mean	4	76	18	trace	trace	2	0				
b+c	5	80	15	16.6-25.4	5	48	27	5	8	7	trace

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
b	16.6-17.6	44	11	20	15	0	0	6	4
	17.6-18.6	35	30	15	18	0	0	0	2
	18.6-19.6	16	18	18	47	0	0	0	1
	19.6-20.5	18	9	22	47	0	0	0	4
	Mean	21	17	19	41	0	0	trace	2
c	24.4-25.4	44	27	0	0	0	0	0	29*

* Ironpan

TM 07 SE 16 0596 7342 Burfields, Burgate Block E

Surface level +57.7 m (+189 ft)	Overburden 17.2 m
Water struck at +36.6 m	Mineral 1.0 m
September 1980	Waste 2.8 m
	Mineral 4.7 m
	Waste 1.4 m
	Bedrock 0.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, silty clay, with subangular flint and quartzite cobbles	0.2	0.2
Glacial Sand and Gravel	a 'Very clayey' sand, with occasional angular flint pebbles Sand: fine with medium, subangular quartz, mottled dark orange and light olive grey	0.6	0.8
Boulder Clay	Clay, stiff, mottled olive grey and moderate olive brown, with medium and fine subrounded chalk pebbles; becoming olive grey with abundant chalk below 5.0 m and olive black with chalk and flint pebbles below 14.0 m	13.7	14.5
	Clay, silty, and sandy, soft, moderate yellowish brown, with occasional angular flint pebbles and coarse chalk sand	0.7	15.2
Crag	Clay and silt, laminated, stiff, sandy and micaceous, mottled olive and pale purple; becoming dusky brown with carbonaceous matter from 16.0 m to 16.2 m and light brownish grey with occasional rounded flint and vein quartz pebbles below 16.2 m	2.0	17.2
	b 'Very clayey' pebbly sand Gravel: fine with some coarse, rounded quartzite with subangular flint, some rounded flint and vein quartz Sand: medium with fine, subrounded quartz, silty, light brownish grey	1.0	18.2
	c Sandy silt and clay, firm, purple and yellowish green; becoming soft, micaceous, dusky yellow green below 19.2 m	2.8	21.0
	d 'Clayey' sand Sand: fine with some medium, well rounded quartz, micaceous, olive grey with thin beds of olive clay; becoming glauconitic, greenish grey below 23.0 m	4.7	25.7
Chalk Silt	Silt, soft, chalky, very light grey	1.4	27.1
Upper Chalk	Chalk, hard rock with flints, white	0.9+	28.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines Sand Gravel						
					- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{8}$	+ $\frac{1}{8}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	34	65	1	0.2-0.8	34	42	22	1	1	0	0
b	38	55	7	17.2-18.2	38	22	30	3	5	2	0
c	44	56	0	18.2-19.2	46	43	9	1	1	0	0
				19.2-20.2	42	57	1	0	0	0	0
				20.2-21.0	45	54	1	0	0	0	0
				Mean	44	52	4	trace	trace	0	0
d	18	82	0	21.0-22.0	34	65	1	0	0	0	0
				22.0-23.0	27	73	0	0	0	0	0
				23.0-24.0	15	79	6	0	0	0	0
				24.0-25.0	4	92	4	0	0	0	0
				25.0-25.7	8	64	26	1	1	0	0
Mean	18	76	6	trace	trace	trace	0				

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
b	17.2-18.2	21	13	23	40	0	0	3	0

TM 07 SE 17 0641 7214 Little Green, Gislingham Block F

Surface level +58.5 m (+192 ft)	Overburden 12.9 m
Water struck (level not recorded)	Mineral 12.4 m+
September 1980	

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, silty clay	0.2	0.2
Boulder Clay	Clay, silty, mottled olive grey and dark orange, with fine subangular chalk and occasional coarse angular flint pebbles; becoming olive grey, with abundant chalk below 3.5 m, waxy dark olive grey with chalk and black mudstone pebbles below 11.0 m	11.7	11.9
	Clay, silty and sandy, moderate brown, with occasional angular flint pebbles and coarse subangular chalk sand	1.0	12.9
Palaeosol (Kesgrave Sands and Gravels)	a 'Clayey' pebbly sand Gravel: fine with coarse, well rounded quartzite, vein quartz and flint, with some subangular flint Sand: medium with fine and coarse, subrounded quartz and flint, firm, clayey, mottled dark orange; moderate reddish brown and light olive grey above 13.9 m, dark pinkish orange, reddish brown and greyish yellow green below, moderately stiff	2.0	14.9

Kesgrave Sands and Gravels	b Pebbly sand	2.0	16.9
	Gravel: coarse and fine, rounded quartzite with subangular flint, vein quartz and rounded flint Sand: medium with fine and some coarse, subrounded quartz; slightly silty and micaceous below 15.9 m, pinkish orange		
Crag	c Sand	8.4+	25.3
	Sand: fine with medium, well rounded quartz, with glauconite below 18.9 m; micaceous light olive brown above 23.4 m, greyish olive below		

TM 07 SE 18 0581 7072 West of Lodge Farm, Gislingham Block F

Surface level +56.8 m (+186 ft)
Water struck at +40.1 m
September 1980

Overburden 13.8 m
Mineral 11.9 m
Waste 3.0 m+

LOG		Thickness m	Depth m
Geological classification	Lithology		
	Soil, sand and silt with occasional angular flint pebbles	0.3	0.3
Boulder Clay	Clay, sandy and silty, stiff, mottled moderate brown and moderate yellow brown, with occasional angular flint pebbles; becoming less silty, mottled yellowish grey and light olive brown, with chalk and flint pebbles below 0.6 m	3.6	3.9
	Clay, stiff, medium light grey with subrounded chalk pebbles and occasional cementstone cobbles; becoming waxy, olive grey with chalk, flint and black mudstone pebbles from 6.5 m to 7.4 m and greyish brown with chalk, flint and quartzite pebbles below 7.4 m	4.1	8.0
Glacial Sand and Gravel	a Silty pebbly sand, with thin beds of greyish brown pebbly clay	0.4	8.4
Boulder Clay	Clay, stiff, waxy, brownish grey with occasional subangular chalk and flint pebbles; becoming silty, soft, dark yellowish brown, with occasional chalk and flint pebbles below 8.6 m	5.4	13.8
Glacial Sand and Gravel	b Pebbly sand Gravel: fine and coarse, angular flint with some rounded quartzite, flint, chalk and vein quartz; traces of shell, igneous, ironstone and micaceous sandstone Sand: medium with fine and some coarse, subrounded quartz, some chalk and angular flint, pale yellowish brown	3.9	17.7
Crag	c Sand, with occasional flint pebbles above 18.7 m Sand: fine and medium, well rounded quartz and glauconite, micaceous, greyish yellow green above 19.7 m; dark orange and moderate olive brown from 19.7 m to 26.7 m, greyish olive below 26.7 m	8.0	25.7
	d Sand, with well rounded flint pebbles and shells below 27.7 m Sand: fine and medium, well rounded quartz and glauconite, micaceous, greyish olive green	3.0+	28.7

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	15	70	15	12.9-13.9 13.9-14.9 Mean	21 10 15	7 19 13	42 49 46	12 9 11	11 8 9	7 5 6	0 0 0
b	9	84	7	14.9-15.9 15.9-16.9 Mean	3 14 9	4 36 20	64 42 53	17 5 11	6 1 3	6 2 4	0 0 0
c	8	92	0	16.9-17.9 17.9-18.9 18.9-19.9 19.9-20.9 20.9-21.9 21.9-22.9 22.9-23.9 23.9-25.3 Mean	10 3 8 6 10 8 10 6 8	71 63 87 91 80 76 58 53 71	19 34 5 3 10 16 32 41 21	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0	0 0 0 0 0 0 0 0 0
a+b	12	77	11	12.9-16.9	12	16	50	11	6	5	0
b+c	8	90	2	14.9-25.3	6	61	27	2	1	1	0
a+b+c	9	87	4	12.9-25.3	9	53	30	4	2	2	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	12.9-13.9 13.9-14.9 Mean	17 22 20	19 7 13	19 25 22	43 46 44	0 0 0	0 0 0	0 0 0	2 0 1
b	14.9-15.9	22	10	17	51	0	0	0	0
a+b	Mean	20	12	21	46	0	0	0	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	
a	47	51	2	8.0-8.4	47	29	18	4	2	0	0	
b	8	76	16	13.8-14.8	11	16	50	7	9	7	0	
				14.8-15.8	8	30	54	3	4	1	0	
				15.8-16.7	8	24	54	6	6	2	0	
				16.7-17.7	5	14	34	12	19	16	0	
				Mean	8	21	48	7	9	7	0	
c	6	94	0	17.7-18.7	5	75	16	3	1	0	0	
				18.7-19.7	7	41	51	1	0	0	0	
				19.7-20.7	9	52	39	0	0	0	0	
				20.7-21.7	6	58	36	0	0	0	0	
				21.7-22.7	7	49	44	0	0	0	0	
				22.7-23.7	5	42	52	1	0	0	0	
				23.7-24.7	5	46	48	1	0	0	0	
				24.7-25.7	5	38	56	1	0	0	0	
Mean	6	50	43	1	trace	0	0					
d	3	94	3	25.7-26.7	3	39	57	1	0	0	0	
				26.7-27.7	3	58	38	1	0	0	0	
				27.7-28.7	4	32	49	5	6	4	0	
				Mean	3	43	49	2	2	1	0	

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
b	13.8-14.8	56	12	7	22	3	0	0	0
	14.8-15.8	65	6	13	0	11	0	0	5
	15.8-16.7	38	27	7	10	13	0	0	5
	16.7-17.7	58	11	5	15	4	0	3	4
	Mean	56	12	6	15	5	0	2	4
d	27.7-28.7	26	53	4	0	0	0	0	17*

* Ironpan and phosphate

TM 07 SE 19 0678 7452 North East of Stubbings Entry, Burgate

Block F

Surface level +46.0 m (+151 ft)
Water struck at +41.9 m
September 1980

Overburden 2.8 m
Mineral 8.5 m
Bedrock 1.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, silt and sand with occasional angular flint pebbles	0.3	0.3
Alluvium	Clay, silty, firm, mottled dark orange and moderate orange brown	0.5	0.8
Head	a Silty sandy clay, firm, laminated, moderate orange brown and light olive grey, with fine and coarse angular flint and rounded vein quartz pebbles	1.0	1.8
Palaeosol (Kesgrave Sands and Gravels)	b Silty clayey sand, mottled dark orange, orange brown and greyish olive, with well rounded flint, quartzite, and vein quartz pebbles; some subangular flint pebbles	1.0	2.8
Kesgrave Sands and Gravels	c Pebbly sand Gravel: fine with some coarse, subangular flint and well rounded quartzite, with well rounded flint and vein quartz Sand: medium with fine, well rounded quartz, very pale orange	3.3	6.1
Crag	d Sand, with well rounded flint and quartzite pebbles below 10.1 m Sand: fine and medium, well rounded quartz and glauconite, micaceous, moderate olive brown	5.2	11.3
Upper Chalk	Chalk, hard rock, white	1.1+	12.4

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
a	47	43	10	0.8-1.8	47	27	14	2	5	2	3
b	41	55	4	1.8-2.8	41	29	24	2	3	1	0
					Mean	41	29	24	2	3	1
c	6	82	12	2.8-3.8	4	24	36	6	21	9	0
				3.8-5.0	7	28	61	3	1	0	0
				5.0-6.1	8	37	40	5	8	2	0
				Mean	6	30	47	5	9	3	0
d	7	90	3	6.1-7.1	7	89	3	1	0	0	0
				7.1-8.1	9	55	35	1	0	0	0
				8.1-9.1	10	47	42	1	0	0	0
				9.1-10.1	6	32	60	1	1	0	0
				10.1-11.3	4	27	58	1	3	3	4
				Mean	7	49	40	1	1	1	1

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.8-1.8	89	0	11	0	0	0	0	0
b	1.8-2.8	15	40	8	37	0	0	0	0
c	2.8-3.8	42	18	12	26	0	0	2	0
	5.0-6.1	43	3	22	32	0	0	0	0
	Mean	43	13	15	28	0	0	1	0
b+c	Mean	40	15	15	29	0	0	1	0

TM 07 SE 20 0737 7437 West of Big Wood, Burgate

Surface level +60.3 m (+198 ft)
Water struck at +41.1 m
September 1980

Block F

Overburden 14.4 m
Mineral 11.3 m
Waste 0.3 m
Bedrock 0.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sandy silty clay, with occasional flint and quartzite pebbles	0.2	0.2
Boulder Clay	Clay, silty and sandy, moderate orange brown with occasional angular flint pebbles; becoming mottled orange and moderate yellowish brown, with subangular chalk and tabular flint pebbles, below 0.7 m	0.9	1.1
Glacial Sand and Gravel	a 'Clayey' sand, with occasional angular flint pebbles Sand: fine with medium, rounded quartz, with thin beds of sandy silt, dark orange	0.3	1.4
Boulder Clay	Clay, silty, mottled light olive brown and light grey with chalk and flint pebbles; becoming olive grey from 3.0 m to 5.0 m and brownish grey below 5.0 m	4.9	6.3
	Clay, silty, soft, light pinkish orange with occasional chalk and quartzite pebbles; becoming light olive brown from 16.5 m to 10.8 m	4.7	11.0
	Clay, silty and sandy, soft, moderate brown with occasional angular flint pebbles	3.4	14.4
Palaeosol (Kesgrave Sands and Gravels)	b 'Very clayey' pebbly sand Gravel: coarse and fine, subangular flint well-rounded vein quartz and quartzite Sand: fine with medium, subangular quartz mottled dark orange, reddish orange and light olive grey	1.0	15.4
Kesgrave Sands and Gravels	c 'Clayey' pebbly sand Gravel: fine with coarse, well rounded quartzite, with subangular flint, well rounded flint and vein quartz Sand: medium with fine, well rounded quartz, micaceous below 19.2 m, moderate yellowish orange	4.6	20.0

Crag	d Sand, with occasional well rounded flint and quartzite pebbles below 24.0 m Sand: fine with medium, well rounded quartz and glauconite, micaceous, dusky yellow above 23.0 m, green with shells below 24.0 m	5.7	25.7
Chalk Silt	Silt, chalky, white with glauconite coated, patinated flint cobbles	0.3	26.0
Upper Chalk	Chalk, hard rock, white	0.7+	26.7

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{8}$	$+\frac{1}{8}$ - $\frac{1}{4}$	$+\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	14	85	1	1.1-1.4	14	50	34	1	1	0	0
b	28	65	7	14.4-15.4	28	36	26	3	3	4	0
c	12	79	9	15.4-16.4	20	17	49	7	7	0	0
				16.4-17.4	10	10	77	1	2	0	0
				17.4-18.2	12	25	61	1	1	0	0
				18.2-19.2	10	26	33	10	12	9	0
				19.2-20.0	6	44	28	6	10	6	0
				Mean	12	23	51	5	6	3	0
d	3	95	2	20.0-21.0	5	70	24	1	0	0	
b+c	15	76	9	21.0-22.0	2	89	9	0	0	0	0
				22.0-23.0	3	73	24	0	0	0	0
				23.0-24.0	3	45	51	1	0	0	0
				24.0-25.0	2	51	45	1	1	0	0
				25.0-25.7	3	51	29	3	4	8	2
				Mean	3	63	31	1	1	1	trace
				b+c	15	76	9	14.4-20.0	15	25	46

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
b	14.4-15.4	39	0	36	25	0	0	0	0
c	15.4-16.4	27	4	51	7	0	0	0	11
		78	0	0	22	0	0	0	0
		25	12	13	46	0	0	3	1
		25	10	20	44	0	0	0	1
	Mean	26	10	19	42	0	0	1	2
b+c	Mean	27	10	20	40	0	0	1	2
d	24.0-25.7	13	57	0	11	0	0	0	19*

* Ironpan

TM 07 SE 21 0728 7293 Proctor's Barn, Gislingham

Surface level +62.6 m (+205 ft)
Water struck at +57.7 m
September 1980

Block F

Overburden 3.5 m
Mineral 3.0 m
Waste 20.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand	0.2	0.2
Boulder Clay	Clay, sandy and silty, moderate brown with angular flint pebbles; becoming mottled moderate brown and light olive brown with fine subangular chalk pebbles below 0.6 m	3.3	3.5
Glacial Sand and Gravel	a 'Very clayey' sandy gravel Gravel: fine with some coarse, subrounded chalk with angular flint, some subrounded vein quartz and flint; traces of limestone and shell Sand: medium with fine and some coarse, subangular chalk with angular flint and quartz	3.0	6.5
Boulder Clay	Clay, silty, stiff, olive grey with chalk pebbles; becoming olive black, with chalk, flint and black mudstone pebbles from 10.9 m to 13.7 m and below 13.9 m	8.5	15.0
	Clay, sandy and silty, soft, dark yellowish brown with some coarse chalk and occasional dark green metamorphic pebbles	4.8	20.5
Palaeosol (Crag)	b 'Very clayey' sand, with occasional pebbles Sand: fine with medium, subangular quartz, silty, mottled bright red, orange, light olive grey and greyish yellow green	0.7	20.5
Crag	c 'Very clayey' sand, with occasional pebbles of rounded flint, quartzite and vein quartz Sand: fine with medium, well rounded quartz silty, micaceous, light brown	1.0	21.5
	d Sandy silt and clay, marly, laminated and micaceous, light olive brown and pale green; becoming mottled bright orange, pale green and light grey below 23.5 m	5.2+	26.7

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
a	30	42	28	3.5-4.9	29	17	18	7	24	5	0
				4.9-5.9	26	14	20	8	24	8	0
				5.9-6.5	35	19	19	8	13	6	0
				Mean	30	16	19	7	22	6	0
b	35	64	1	19.8-20.5	35	44	19	1	1	0	0
c	21	78	1	20.5-21.5	21	57	20	1	1	0	0
d	46	54	0	21.5-22.5	42	51	2	1	2	2	0
				22.5-23.5	48	52	0	0	0	0	0
				23.5-24.5	54	46	0	0	0	0	0
				24.5-25.5	43	56	1	0	0	0	0
				25.5-26.7	45	55	0	0	0	0	0
				Mean	46	53	1	trace	trace	trace	0
b+c	27	72	1	19.8-21.5	27	51	20	1	1	0	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	3.5-6.5	28	2	0	2	63	2	1	2
c	20.5-21.5	9	36	16	39	0	0	0	0

TM 07 SE 22 0728 7133 Rectory, Gislingham

Block F

Surface level +65.4 m (+215 ft)
Water struck at +38.3 m
October 1980

Overburden 2.7 m
Mineral 4.2 m
Waste 21.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Brick, chalk, coal and flint debris	2.7	2.7
Glacial Sand and Gravel	a 'Very clayey' sandy gravel, with subangular chalk and flint cobbles from 3.7 m to 5.7 m Gravel: fine and coarse, rounded chalk with angular flint, some rounded flint and quartzite; traces of shell, limestone and micaceous sandstone Sand: medium with coarse and fine, angular chalk and quartz, light olive brown above 4.7 m, dark yellow brown below	4.2	6.9
Boulder Clay	Clay, mottled orange brown and olive grey, with subrounded chalk and occasional angular flint pebbles; becoming silty, medium grey, with abundant chalk pebbles and occasional flint cobbles below 8.6 m	3.9	10.8
	Clay, silty, soft, medium light grey, with chalk pebbles and occasional well rounded cementstone cobbles; becoming stiff, waxy, olive black with occasional chalk and flint pebbles below 16.0 m	6.8	17.6
Glacial Silt	Silt, sandy, soft, olive grey, becoming clayey, laminated moderate brown and pale yellowish orange below 18.7 m	2.4	20.0
Boulder Clay	Clay, silty and sandy, firm, dark yellowish brown with occasional well rounded vein quartz and angular flint pebbles; some coarse chalk sand	1.1	21.1
Palaeosol (Crag)	b 'Very clayey' sandy gravel Gravel: fine with some coarse, well rounded quartzite with subangular flint, some rounded flint and vein quartz Sand: medium with coarse and fine, angular flint and quartz, clayey, stiff, mottled moderate red, reddish orange and moderate yellowish brown	3.0	24.1
Crag	c 'Very clayey' sand, with occasional flint pebbles Sand: medium with some fine, rounded quartz, silty dark orange	1.0	25.1
	d 'Very clayey' sand Sand: medium with some fine, rounded quartz, silty, laminated; micaceous below 27.3 m, dark yellowish orange	2.9+	28.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	25	39	36	2.7-3.7	28	20	21	11	18	2	0
				3.7-4.7	22	5	24	10	19	13	7
				4.7-5.7	21	3	16	11	21	24	4
				5.7-6.9	29	11	17	10	21	12	0
				Mean	25	10	19	10	20	13	3
b	23	56	21	21.1-22.1	29	10	28	13	18	2	0
				22.1-23.1	21	11	25	18	22	3	0
				23.1-24.1	20	12	35	15	14	4	0
				Mean	23	11	30	15	18	3	0
c	23	74	3	24.1-25.1	23	12	59	3	3	0	0
d	21	79	0	25.1-26.3	28	11	57	4	0	0	0
				26.3-27.3	14	42	43	1	0	0	0
				27.3-28.0	17	10	72	1	0	0	0
				Mean	21	21	56	2	0	0	0
a+b+c	24	50	26	Mean	24	10	29	11	17	8	1
a-d	23	57	20	Mean	23	13	35	9	13	6	1

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	2.7-6.9	30	1	1	3	62	1	trace	2
b	21.1-22.1	27	8	16	48	0	0	1	0
	22.1-23.1	20	3	21	55	0	0	1	0
	23.1-24.1	14	5	16	65	0	0	0	0
	Mean	22	6	18	53	0	0	1	0

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TM 07 SE 23 0858 7379

Potash Farm, Mellis

Block F

Surface level +55.2 m (+181 ft)
Water struck at +36.2 m
September 1980

Overburden 17.0 m
Mineral 8.0 m
Waste 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, clay, silty and sandy	0.4	0.4
Boulder Clay	Clay, silty and sandy, mottled moderate yellowish brown and light olive grey with chalk pebbles; becoming stiff, olive grey, with chalk and mudstone pebbles; from 3.0 m to 6.3 m and waxy, olive black below 6.3 m	8.1	8.5
Glacial Silt	Silt, soft, micaceous, olive grey	1.4	9.9
Boulder Clay	Clay, stiff, olive grey with chalk pebbles; becoming silty and sandy, light grey, with chalk and vein quartz pebbles below 10.3 m	3.8	13.7
	Clay, silty and sandy, moderate yellowish brown with occasional flint and vein quartz pebbles	3.3	17.0
Kesgrave Sands and Gravels	a Pebbly sand, with rounded black flint cobbles from 19.0 m to 20.0 m Gravel: fine with coarse, subangular flint, with rounded quartzite, flint and vein quartz Sand: medium with fine, subrounded quartz and some flint, yellowish grey	5.0	22.0
Crag	b Sand Sand: fine and medium, well rounded quartz and glauconite, micaceous, dusky yellow green	3.0	25.0
	c Sand: medium and fine, well rounded quartz and glauconite, micaceous, dusky yellow green	1.0+	26.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	6	85	9	17.0-18.0	12	33	43	4	5	3	0
				18.0-19.0	7	39	46	3	3	2	0
				19.0-20.0	7	33	46	4	3	3	4
				20.0-21.0	4	13	69	6	6	2	0
				21.0-22.0	2	18	54	14	9	3	0
				Mean	6	27	52	6	5	3	1
b	5	95	0	22.0-23.0	6	63	29	2	0	0	0
				23.0-24.0	4	58	38	0	0	0	0
				24.0-25.0	5	36	58	1	0	0	0
				Mean	5	52	42	1	0	0	0
c	2	98	0	25.0-26.0	2	44	54	trace	trace	0	0
a+b	6	89	5	17.0-25.0	6	37	48	4	3	2	trace
a+b+c	5	91	4	17.0-26.0	5	37	50	4	3	1	trace

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	17.0-18.0	50	21	13	16	0	0	0	0
	18.0-19.0	25	12	9	47	0	0	0	7*
	19.0-20.0	10	37	16	33	0	0	0	4
	20.0-21.0	36	17	9	38	0	0	0	0
	21.0-22.0	43	13	27	17	0	0	0	0
	Mean	36	18	15	29	0	0	0	2

* Sandstone

TM 07 SE 24 0840 7255 Parkway Lodge, Gissingham

Block F

Surface level +57.0 m (+187 ft)
Water not struck
September 1980

Overburden 6.8 m
Mineral 1.0 m
Waste 12.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sandy clay with occasional angular flint pebbles	0.3	0.3
Boulder Clay	Clay, stiff, mottled olive grey and moderate olive brown, with subangular chalk and occasional angular flint pebbles; becoming waxy, olive grey with chalk and black mudstone pebbles, below 2.0 m	5.9	6.2
Glacial Silt	Silt, soft, laminated, light olive grey	0.6	6.8
Glacial Sand and Gravel	'Clayey' gravel Gravel: fine with some coarse, rounded chalk with angular flint; some rounded flint, quartzite, limestone and shell with traces of mudstone Sand: coarse with medium and some fine, angular chalk, flint and some quartz, olive grey	1.0	7.8
Glacial Silt	Silt, soft, light olive grey	1.7	9.5
Boulder Clay	Clay, silty, light olive grey with abundant chalk pebbles; becoming waxy, olive grey with occasional chalk pebbles, below 13.5 m Clay, silty, soft, dark yellowish brown with occasional well rounded quartzite pebbles and some coarse chalk sand; becoming pinkish grey from 15.2 m to 18.5 m and greyish brown, with occasional flint pebbles below 18.5 m	5.5 5.0+	15.0 20.0

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	41	46	6.8-7.8	13	6	11	24	38	8	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
	6.8-7.8	25	trace	0	3	67	2	0	3

TM 07 SE 25 0890 7053 Clay Street, Thornham Magna

Block F

Surface level +51.6 m (+169 ft)
Water struck at +33.8 m
October 1980

Overburden 17.8 m
Mineral 7.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand	0.2	0.2
Boulder Clay	Clay, silty, mottled light grey and orange with subangular chalk pebbles; becoming dark grey with chalk, flint and black mudstone pebbles below 2.4 m Clay, silty and sandy, firm, dark olive grey with chalk and flint pebbles; becoming dark yellowish brown with subangular patinated flint, well rounded quartzite and vein quartz pebbles below 8.5 m	8.1 4.9	8.3 13.2
	Clay, silty and sandy, soft, pinkish grey with abundant coarse rounded chalk sand; becoming medium grey below 16.1 m	4.6	17.8
Crag	'Clayey' sand, becoming less clayey below 22.0 m Sand: fine with medium, well rounded quartz and glauconite, micaceous, light olive grey above 20.0 m; becoming light olive brown below	7.2+	25.0

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	90	0	17.8-19.0	18	55	25	1	1	0	0
			19.0-20.0	20	75	4	1	0	0	0
			20.0-21.0	9	54	37	0	0	0	0
			21.0-22.0	10	28	62	0	0	0	0
			22.0-23.0	5	69	26	0	0	0	0
			23.0-24.0	5	33	62	0	0	0	0
			24.0-25.0	3	82	14	1	0	0	0
			Mean	10	58	32	trace	trace	0	0

TM 07 SE 26 0992 7302 Chapel Farm, Thornham Parva

Surface level +52.8 m (+173 ft)
Water struck at +35.8 m
October 1980

Block F

Overburden 12.0 m
Mineral 1.2 m
Waste 1.3 m
Mineral 4.4 m
Waste 1.0 m
Mineral 4.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Silty, clay, with wood fragments and chalk pebbles	1.0	1.0
Boulder Clay	Clay, stiff, waxy, mottled moderate olive brown and olive grey with rounded chalk pebbles; becoming olive grey, with chalk, black mudstone and cementstone cobbles, below 3.8 m	10.4	11.4
Glacial Silt	Silt, soft, olive grey with pebbly sand partings	0.3	11.7
Boulder Clay	Clay, silty and sandy, greyish olive with occasional chalk and flint pebbles	0.3	12.0
Glacial Sand and Gravel	a 'Very clayey' sand Sand: fine with medium, subangular quartz and angular chalk, yellowish brown	1.2	13.2
Glacial Silt	Silt, clayey, soft, light olive grey	0.1	13.3
Boulder Clay	Clay, silty, soft, dark yellowish brown with occasional rounded vein quartz and angular flint pebbles; some subangular chalk sand	1.2	15.5
Palaeosol (Crag)	b 'Very clayey' pebbly sand Gravel: fine and coarse, rounded vein quartz with subangular flint and some quartzite Sand: medium with fine and some coarse, subangular quartz, firm, mottled reddish orange and light bluish grey	1.4	16.9
Crag	e 'Clayey' sand, with thin beds of pale olive silt Sand: fine and medium, well rounded quartz, micaceous below 18.9 m, light olive brown	3.0	19.9
	d Sandy silt, laminated, micaceous, bright orange, light olive and greenish grey	1.0	20.9
	e 'Clayey' sand, becoming less clayey with depth Sand: fine with medium, rounded quartz and glauconite, micaceous, light olive brown	4.8+	25.7

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					-½	+½ -¼	+¼ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	39	60	1	12.0-13.2	39	41	18	1	1	0	0
b	22	71	7	15.5-16.5	22	20	41	9	5	3	0
				16.5-16.9	23	39	27	6	5	0	0
				Mean	22	25	38	8	5	2	0
c	13	87	0	16.9-17.9	16	31	51	1	1	0	0
				17.9-18.9	15	48	37	0	0	0	0
				18.9-19.9	9	71	20	0	0	0	0
				Mean	13	51	36	trace	trace	0	0
d	63	37	0	19.9-20.9	63	33	4	trace	0	0	
e	14	86	0	20.9-21.7	39	59	2	0	0	0	0
				21.7-22.7	15	84	1	0	0	0	
				22.7-23.7	6	51	42	1	0	0	
				23.7-24.7	9	54	35	1	1	0	
				24.7-25.7	5	48	46	1	0	0	
Mean	14	59	26	1	trace	0	0				
b+c	16	81	3	15.5-19.9	16	42	36	3	2	1	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
b 15.5-16.5	27	18	13	29	0	0	0	13*
16.5-16.9	22	0	73	5	0	0	0	0
Mean	26	12	31	22	0	0	0	9

* Ironpan

TM 07 SE 27 0950 7163 Redhouse Farm, Thornham Magna

Surface level +43.2 m (+142 ft)
Water struck at +34.8 m
October 1980

Block F

Overburden 0.2 m
Mineral 2.8 m
Waste 5.4 m
Mineral 17.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sandy silt with occasional angular flint pebbles	0.2	0.2
River Terrace Deposits	a 'Clayey' pebbly sand Gravel: fine with some coarse, angular flint, with some quartzite and ironpan Sand: fine and medium with some coarse, subrounded quartz and some angular flint, dark yellowish orange	1.0	1.2
Glacial Sand and Gravel	b 'Very clayey' sandy gravel Gravel: fine with coarse, angular flint with some rounded chalk, flint and quartzite; traces of shell, limestone, mudstone, ironstone, vein quartz and sandstone Sand: medium and fine with some coarse, angular quartz and flint, with some chalk below 2.2 m, orange brown	1.8	3.0
Boulder Clay	Clay, silty and sandy, stiff, dusky yellow brown with well rounded ironstained chalk pebbles and occasional shell fragments; becoming dark brownish grey, with chalk flint and black mudstone pebbles below 3.7 m	1.4	4.4
	Clay, silty, soft, olive grey with subangular chalk and flint pebbles; becoming very sandy, brownish grey with occasional subrounded quartzite pebbles below 6.5 m	4.0	8.4
Kesgrave Sands and Gravels	c Pebbly sand Gravel: fine with some coarse, subangular flint with rounded flint, vein quartz and quartzite Sand: medium with coarse and fine, subrounded quartz, pale yellowish grey	5.0	13.4
Crag	d Sand, with occasional subangular flint and rounded quartzite pebbles above 15.4 m Sand: fine with medium, well rounded quartz, micaceous and glauconitic below 18.4 m, dark greenish grey, becoming greenish black below 19.4 m	12.0+	25.4

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					-1/2	+1/2 -1	+1 -4	+4 -16	+16 -64	+64 mm	
a	18	67	15	0.2-1.2	18	33	28	6	11	4	0
b	30	52	18	1.2-2.2	23	21	22	7	19	8	0
				2.2-3.0	37	26	24	5	6	2	0
				Mean	30	23	23	6	13	5	0
c	7	72	21	8.4-9.4	10	18	44	10	15	3	0
				9.4-10.4	3	9	38	14	26	10	0
				10.4-11.4	1	4	42	24	27	2	0
				11.4-12.4	6	11	41	24	18	0	0
				12.4-13.4	14	16	53	11	6	0	0
				Mean	7	12	43	17	18	3	0
d	7	93	0	13.4-14.4	8	21	62	6	3	0	0
				14.4-15.4	14	36	44	4	2	0	0
				15.4-16.4	8	76	15	1	0	0	0
				16.4-17.4	7	83	9	1	0	0	0
				17.4-18.4	11	84	5	0	0	0	0
				18.4-19.4	11	55	34	0	0	0	0
				19.4-20.4	6	68	26	0	0	0	0
				20.4-21.4	4	76	20	0	0	0	0
				21.4-22.4	4	73	23	0	0	0	0
				22.4-23.4	4	47	49	0	0	0	0
				23.4-24.4	4	53	43	0	0	0	0
				24.4-25.4	4	52	44	0	0	0	0
Mean	7	61	31	1	trace	0	0				
a+b	25	58	17	0.2-3.0	25	27	25	6	12	5	0
a-d	9	83	8	Mean	9	44	33	6	7	1	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.2-1.2	92	0	0	5	0	0	0	3
b	1.2-2.2	73	3	trace	8	8	2	0	6
	2.2-3.0	52	0	0	0	34	4	0	10
	Mean	71	3	trace	7	10	2	0	7
c	8.4-9.4	46	13	26	13	0	0	0	2
	9.4-10.4	38	27	14	18	0	0	0	3
	10.4-11.4	46	14	23	11	0	0	1	5
	11.4-12.4	44	24	3	29	0	0	0	0
	12.4-13.4	27	34	22	17	0	0	0	0
	Mean	42	21	17	17	0	0	0	3

TM 07 SE 28 0747 7012 Elm Pollard, Gislingham

Surface level +54.7 m (+179 ft)
Water struck at +52.7 m
September 1980

Block F

Waste 19.1 m+

TM 08 SW 12 0043 8462 Flint Hall, Garboldisham

Surface level +47.2 m (+155 ft)
Water not struck
May 1980

Block A

Overburden 3.5 m
Mineral 5.9 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand and silt	0.2	0.2
Boulder Clay	Clay, silty, mottled dusky yellow and light olive brown with subangular chalk pebbles; becoming mottled light olive brown and light olive grey below 0.6 m	1.8	2.0
Glacial Silt	Silt, soft, dark yellowish orange	0.6	2.6
Boulder Clay	Clay, silty, soft, light olive brown with chalk and flint pebbles	0.4	3.0
Glacial Sand and Gravel	'Clayey' sandy gravel Gravel: fine and coarse, subangular chalk with angular flint; some quartzite and limestone Sand: medium with coarse and some fine, subangular chalk, angular flint and some quartz, greyish orange	0.6	3.6
Boulder Clay	Clay, stiff, waxy, greyish brown with medium and fine rounded chalk pebbles; becoming olive grey, with occasional chalk, flint and sandstone pebbles, below 4.4 m	7.4	11.0
	Clay, silty and sandy, dark yellowish brown, with occasional subrounded flint pebbles and some coarse subangular chalk sand; becoming soft, moderate brown, with fine quartz sand partings below 16.5 m	8.1+	19.1

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				-½	+½ -¼	+¼ -1	+1 -4	+4 -16	+16 -64	+64 mm
12	48	40	3.0-3.6	12	7	27	14	24	16	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
3.0-3.6	21	0	0	2	75	2	0	trace

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Soil, with brick and concrete rubble	0.4	0.4
	Soil, sandy	0.6	1.0
Cover Sand	a 'Very clayey' sand, with occasional angular flint pebbles Sand: fine with medium, subangular quartz, silty, dark yellowish brown	1.0	2.0
Silt	b Silt, sandy, firm pale yellowish orange with occasional angular flint pebbles; becoming pinkish grey from 2.5 m to 2.7 m	1.5	3.5
Glacial Sand and Gravel	c 'Clayey' pebbly sand Gravel: fine with coarse, rounded quartzite and angular flint with vein quartz and igneous Sand: medium and fine, subangular quartz, silty, yellowish white	1.0	4.5
?Kesgrave Sands and Gravels	d Sandy gravel Gravel: fine with some coarse, well rounded quartzite with vein quartz and subangular flint, some rounded flint and igneous Sand: medium with coarse and fine, subangular quartz with some angular flint, pale yellowish orange	4.9	9.4
Upper Chalk	Chalk, soft white	1.0+	10.4

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				-½	+½ -¼	+¼ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	27	72	1	1.0-2.0	27	42	29	1	1	0
b	45	54	1	2.0-2.7	43	23	30	2	2	0
				2.7-3.5	46	23	29	1	1	0
				Mean	45	23	29	2	1	0
c	10	84	6	3.5-4.5	10	33	48	3	4	2
d	7	63	30	4.5-5.5	9	11	37	10	27	6
				5.5-6.5	9	12	33	8	26	12
				6.5-7.5	4	7	58	10	12	7
				7.5-8.5	6	6	63	9	12	4
				8.5-9.4	9	7	25	15	29	15
				Mean	7	9	44	10	21	9

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
c	3.5-4.5	30	0	27	32	0	0	11	0
d	4.5-5.5	22	9	25	34	0	2	5	3
	5.5-6.5	17	8	22	46	0	0	3	4
	6.5-7.5	12	3	21	58	0	0	4	2
	7.5-8.5	17	7	32	36	0	0	3	5
	8.5-9.4	17	6	21	45	trace	0	5	6
	Mean		18	7	23	43	0	1	4

TM 08 SW 13 0056 8218 The Hall, Garboldisham Block A

Surface level +24.4 m (+80 ft)
 Water Struck at +22.1 m
 June 1980
 Overburden 2.3 m
 Mineral 9.7 m
 Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Alluvium	Clay, silty greyish brown	1.1	1.5
Peat	Peat, Silty dusky brown	0.8	2.3
Glacial Sand and Gravel	a Pebbly sand Gravel: fine with coarse, angular flint with rounded quartzite, vein quartz; some rounded flint and igneous Sand: medium with some fine and coarse, angular quartz and some angular flint, dark yellowish orange	4.0	6.3
Ingham Sand and Gravel	b Gravel, with occasional angular flint cobbles Gravel: coarse with fine, brown quartzite with subangular flint; some rounded flint and vein quartz Sand: medium subangular quartz with some angular flint, dark orange	5.7	12.0
Upper Chalk	Chalk, soft white	1.0+	13.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	1	85	14	2.3-3.3	2	22	54	7	10	5	0
				3.3-4.3	1	15	53	11	14	6	0
				4.3-5.3	2	7	59	12	12	8	0
				5.3-6.3	1	6	79	12	2	0	0
				Mean	1	13	61	11	9	5	0
b	2	48	50	6.3-7.3	1	2	32	8	27	30	0
				7.3-8.3	1	3	49	5	23	19	0
				8.3-9.3	0	2	31	3	14	48	2
				9.3-10.3	2	3	34	5	22	34	0
				10.3-11.3	1	4	40	8	11	36	0
				11.3-12.0	7	7	52	11	7	14	2
				Mean	2	3	39	6	18	31	1
a+b	2	64	34	2.3-12.0	2	7	49	8	14	20	trace

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	2.3-3.3	57	6	6	24	0	0	5	2
	3.3-4.3	55	3	14	18	0	0	7	3
	4.3-5.3	40	7	15	36	0	0	1	1
	Mean	51	5	13	25	0	0	4	2
b	6.3-7.3	41	11	15	31	0	0	1	1
	7.3-8.3	40	18	9	29	0	0	2	2
	8.3-9.3	23	24	9	42	0	0	trace	2
	9.3-10.3	16	20	11	49	trace	0	2	2
	10.3-11.3	23	19	13	44	0	0	1	trace
	11.3-12.0	24	20	13	32	10	0	0	1
	Mean	29	18	12	38	trace	0	1	2

TM 08 SW 14 0016 8137 South of Garboldisham, Garboldisham Block A

Surface level +23.8 m (+78 ft)
 Water struck at +21.4 m
 May 1980
 Overburden 0.5 m
 Mineral 10.3 m
 Bedrock 1.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Glacial Sand and Gravel	a Pebbly sand Gravel: fine and coarse, angular flint with rounded quartzite, flint and vein quartz; traces of igneous, metamorphic and micaceous sandstone Sand: medium with fine, subangular quartz with some angular flint, yellowish orange	6.0	6.5
	b Pebbly sand, becoming less pebbly towards the base Gravel: coarse with some fine, angular flint and well rounded quartzite with vein quartz; traces of rounded flint and ironpan Sand: fine with medium; subangular quartz with some subangular flint, greyish orange	4.3	10.8
Upper Chalk	Chalk, hard rock, pale yellowish orange	1.2+	12.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages							
	Fines	Sand	Gravel		Percentages							
					Fines			Sand			Gravel	
				-½	+½ -½	+½ -1	+1 -4	+4 -16	+16 -64	+64 mm		
a	5	79	16	0.5-1.5	5	29	31	5	14	16	0	
				1.5-2.5	6	27	37	5	13	10	2	
				2.5-3.5	1	26	60	4	5	4	0	
				3.5-4.5	1	9	65	8	9	8	0	
				4.5-5.5	12	46	38	1	2	1	0	
				5.5-6.5	3	19	53	8	11	6	0	
				Mean	5	26	48	5	9	7	trace	
b	4	91	5	6.5-7.5	2	41	45	2	2	8	0	
				7.5-8.5	2	75	18	1	1	3	0	
				8.5-9.3	5	91	4	0	0	0	0	
				9.3-10.3	5	72	14	1	2	6	0	
				10.3-10.8	6	72	21	1	0	0	0	
								Mean	4	68	22	1
a+b	4	84	12	0.5-10.8	4	44	37	3	6	6	trace	

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.5-1.5	59	5	9	22	0	0	2	3
	1.5-2.5	59	6	8	22	0	0	4	1
	2.5-3.5	55	22	5	14	0	0	0	4
	3.5-4.5	60	10	15	12	0	0	2	1
	5.5-6.5	53	17	10	15	0	0	2	3
		Mean	58	10	9	19	0	0	2
b	6.5-7.5	37	5	26	23	0	0	0	9*
	9.3-10.3	77	0	5	7	0	0	11	0
		Mean	64	2	12	12	0	0	7
a+b	Mean	58	9	9	19	0	0	2	3

* Mainly ironstone

TM 08 SW 15 0058 8041
Surface level +24.7 m (+81 ft)
Water struck at +21.8 m
May 1980

Oak Plantation, Blo Norton

Block B

Overburden 0.1 m
Mineral 10.6 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, fine sand	0.1	0.1
River Terrace Deposits	a 'Clayey' pebbly sand, with occasional thin beds of silt Gravel: fine with some coarse, angular flint with traces of quartzite, vein quartz and subrounded flint Sand: fine with medium, well rounded quartz, pale yellowish orange	7.7	7.8
Glacial Sand and Gravel	b 'Clayey' sandy gravel Gravel: fine and coarse, angular flint with some well rounded quartzite, flint and vein quartz; traces of chalk, igneous and micaceous sandstone Sand: fine and medium with some coarse, subangular quartz and angular flint, greyish orange	2.9	10.7
Upper Chalk	Chalk, hard rock, white	1.0+	11.7

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages										
	Fines	Sand	Gravel		Percentages										
					Fines			Sand		Gravel					
				-½	+½ -½	+½ -1	+1 -4	+4 -16	+16 -64	+64 mm					
a	11	82	7	0.1-0.9	8	43	35	3	8	3	0				
				0.9-1.8	5	38	29	8	14	6	0				
				1.8-2.8	5	70	17	3	5	0	0				
				2.8-3.8	20	51	18	5	4	2	0				
				3.8-4.8	14	53	17	6	6	4	0				
				4.8-5.8	18	52	21	5	4	0	0				
				5.8-6.8	13	52	30	3	2	0	0				
				6.8-7.8	6	51	34	7	2	0	0				
								Mean	11	52	25	5	5	2	0
				b	11	51	38	7.8-8.8	11	23	16	8	31	11	0
								8.8-9.8	7	12	18	12	27	24	0
9.8-10.7	16	31	26					7	8	12	0				
	Mean	11	22					20	9	22	16	0			
a+b	11	73	16	0.1-10.7	11	43	24	6	10	3	0				

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							Others
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	
a	0.1-0.9	57	22	0	17	0	0	0	4*
	0.9-1.8	84	0	2	7	0	0	0	6*
	1.8-2.8	91	0	2	7	0	0	0	0
	2.8-3.8	82	0	12	6	0	0	0	0
	3.8-4.8	73	20	0	0	0	0	0	7*
	4.8-5.8	88	6	0	6	0	0	0	0
	5.8-7.8	100	0	0	0	0	0	0	0
Mean	83	4	2	7	0	0	0	4	
b	7.8-8.8	79	4	5	10	0	0	0	2
	8.8-9.8	75	5	7	12	0	0	0	1
	9.8-10.7	50	11	7	12	1	0	19	0
	Mean	75	5	7	11	trace	0	1	1

* Mainly sandstone

TM 08 SW 16 0157 8368 Uphall Farm, Garboldisham

Block A

Surface level +38.7 m (+127 ft)
Water Struck at +26.7 m
June 1980

Overburden 0.3 m
Mineral 1.4 m
Waste 10.3 m
Mineral 2.2 m
Waste 1.7 m
Mineral 9.9 m
Waste 3.6 m
Bedrock 2.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand with angular flint pebbles	0.3	0.3
Glacial Sand and Gravel	a 'Very clayey' pebbly sand Gravel: fine and coarse, angular flint with rounded flint, quartzite, vein quartz and chalk; traces of shell Sand: fine and medium, subangular quartz with some chalk, moderate brown	1.4	1.7
Boulder Clay	Clay, silty, firm moderate yellowish brown with abundant fine subangular chalk pebbles and occasional tabular black flint cobbles; becoming olive grey below 10.2 m and brown below 11.0 m	10.3	12.0
Glacial Sand and Gravel	b 'Clayey' pebbly sand, with thin silt beds Gravel: coarse with fine, angular flint with quartzite, some rounded flint and chalk Sand: fine and medium, subangular quartz and some angular flint, pale yellowish orange	2.2	14.2
Boulder Clay	Clay, silty dark yellowish brown with occasional fine chalk and medium patinated flint pebbles	1.7	15.9

Glacial Sand and Gravel

c Pebbly sand, becoming increasingly pebbly below 19.8 m
Gravel: fine and coarse, rounded quartzite and angular flint, with rounded flint, vein quartz and subrounded chalk; traces of shell, ironstone, igneous, metamorphic and micaceous sandstone
Sand: medium with fine and coarse, angular quartz and flint, with some well rounded quartz and subangular chalk, moderate yellowish brown

9.9 25.9

d Sandy gravel
Gravel: coarse with fine rounded quartzite and angular flint with rounded flint, vein quartz and chalk; traces of sandstone, shell and ironstone
Sand: medium with coarse and fine angular quartz, flint and subangular chalk, moderate yellowish brown

3.6 29.5

Upper Chalk

Chalk, hard rock, white

2.0+ 31.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Gravel						
					-½	+½ -½	+½ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	21	69	10	0.3-1.3	20	39	33	2	5	1	0
				1.3-1.7	24	25	29	3	6	10	3
				Mean	21	35	32	2	5	4	1
b	16	75	9	12.0-13.0	17	38	32	4	3	6	0
				13.0-14.2	14	46	28	3	3	6	0
				Mean	16	42	30	3	3	6	0
c	4	74	22	15.9-16.9	24	32	14	3	15	12	0
				16.9-17.9	4	28	50	8	8	2	0
				17.9-18.9	3	25	56	9	6	1	0
				18.9-19.8	2	23	58	7	6	4	0
				19.8-20.8	1	10	47	14	16	12	0
				20.8-21.8	1	5	51	15	17	11	0
				21.8-22.8	2	7	55	10	18	8	0
				22.8-23.8	2	13	51	16	16	2	0
				23.8-24.8	2	14	29	6	22	22	5
				24.8-25.8	1	6	61	10	13	9	0
				Mean	4	16	48	10	14	8	trace
d	2	70	28	25.8-26.8	2	9	51	14	17	7	0
				26.8-27.8	2	9	55	13	15	6	0
				27.8-28.8	2	9	51	4	5	29	0
				28.8-29.5	4	9	49	6	10	22	0
				Mean	2	9	51	10	12	16	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.3-1.7	62	19	4	10	3	0	0	2
b	12.0-14.2	65	10	0	20	5	0	0	0
c	15.9-16.9	64	6	5	21	0	0	0	4
	16.9-17.9	30	6	0	0	21	0	0	44*
	17.9-18.9	29	0	0	71	0	0	0	0
	18.9-19.8	60	0	40	0	0	0	0	0
	19.8-20.8	49	14	4	21	0	0	0	12*
	20.8-21.8	41	30	6	23	0	0	0	0
	21.8-22.8	30	23	9	29	0	0	2	7
	22.8-23.8	9	25	15	45	0	0	0	6*
	23.8-24.8	29	10	16	34	0	1	2	8*
	24.8-25.8	27	28	12	17	2	0	0	14*
	Mean	37	14	11	26	2	trace	trace	10
d	25.8-26.8	30	3	15	46	0	0	5	2*
	26.8-27.8	29	15	14	34	0	0	0	8*
	27.8-28.8	15	2	18	60	5	0	0	0
	28.8-29.5	31	14	5	21	19	0	6	4*
	Mean	26	9	13	40	6	0	3	3
c+d	Mean	31	13	12	33	2	trace	2	7

* Mainly sandstone

TM 08 SW 17 **0157 8243** **Ling Farm, Garboldisham** **Block A**

Surface level +44.2 m (+145 ft) Waste 27.0 m
 Water struck at +42.2 m Bedrock 1.0 m+
 May 1980

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand with angular flint pebbles	0.8	0.8
Boulder Clay	Clay, silty, mottled dark yellowish brown and yellowish grey, with abundant fine subangular chalk and occasional coarse angular flint pebbles; becoming mottled light olive brown and yellowish grey below 2.2 m, with a bed of silty fine quartz sand between 2.0 m and 2.2 m	3.2	4.0
	Clay, firm, olive black, with subangular chalk and occasional black mudstone pebbles; becoming light grey with abundant chalk pebbles below 11.0 m, olive grey with chalk and occasional red sandstone pebbles below 14.8 m	12.8	16.8
	Clay, silty, soft pinkish grey with occasional fine chalk and subrounded flint pebbles	1.8	18.6
Glacial Sand and Gravel	a 'Clayey' pebbly sand Gravel: fine and coarse, angular flint and rounded quartzite with some rounded flint and vein quartz; traces of micaceous sandstone and limestone Sand: fine with medium, subangular quartz and chalk, yellowish brown	1.4	20.0
Boulder Clay	Clay, silty, greyish brown with occasional angular flint and rounded vein quartz pebbles	1.4	21.4

Ingham Sand and Gravel b Sandy gravel, with flint cobbles above 23.4 m 4.0 25.4
 Gravel: fine and coarse, subangular flint and rounded brown quartzite with some rounded flint and vein quartz; traces of ironpan
 Sand: medium with some fine and coarse, angular flint and quartz, dark orange

c Sandy gravel 1.6 27.0
 Gravel: coarse with fine subangular flint and rounded brown quartzite with some rounded flint and vein quartz; traces of ironpan
 Sand: medium with fine and some coarse, angular flint and quartz, dark orange

Upper Chalk Chalk, soft white, with subrounded black flints 1.0+ 28.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Gravel						
					- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	11	81	8	18.6-19.0	13	37	49	1	0	0	0
				19.0-20.0	11	55	20	2	6	6	0
				Mean	11	52	28	1	4	4	0
b	5	54	41	21.4-22.4	18	11	10	6	27	26	2
				22.4-23.4	2	4	11	11	38	32	2
				23.4-24.4	1	10	61	8	11	9	0
				24.4-25.4	1	7	65	8	8	11	0
				Mean	5	8	38	21	19	1	0
c	1	66	33	25.4-26.4	1	8	61	11	9	10	0
				26.4-27.0	1	5	30	7	19	38	0
				Mean	1	7	49	10	13	20	0
a+b	7	60	33	Mean	7	19	34	7	17	15	1
a+b+c	6	61	33	Mean	6	16	38	7	16	16	1

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	19.0-20.0	38	12	10	34	0	trace	0	6
b	21.4-22.4	31	19	11	37	0	0	2	trace
	22.4-23.4	37	14	13	34	0	0	1	1
	23.4-24.4	30	23	12	29	0	0	3	3
	24.4-25.4	36	32	9	20	0	0	2	1
	Mean	34	21	10	30	0	0	2	3
c	25.4-26.4	37	32	7	20	0	0	0	4
	26.4-27.0	36	10	11	37	0	0	2	4
	Mean	36	15	9	35	0	0	1	4
b+c	Mean	35	16	11	34	0	0	2	2

TM 08 SW 18 0147 8013 Market Lane, Blo Norton

Block A

Surface level +42.7 m (+140 ft)
Water struck at +40.1 m
August 1980

Overburden 0.3 m
Mineral 1.1 m
Waste 0.6 m
Mineral 1.0 m
Waste 18.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand with occasional subangular flint pebbles	0.3	0.3
Glacial Sand and Gravel	a 'Clayey' pebbly sand Gravel: coarse and fine, sandstone with rounded quartzite and vein quartz; traces of angular flint Sand: fine and medium, well rounded vein quartz, moderate brown	1.1	1.4
Boulder Clay	Clay, silty, mottled orange and light olive grey, with occasional medium and fine angular flint pebbles	0.6	2.0
Glacial Sand and Gravel	b 'Clayey' pebbly sand Gravel: coarse and fine, angular flint with rounded flint and quartzite; traces of chalk Sand: fine with some medium subrounded quartz and angular flint, dark yellowish orange	1.0	3.0
Boulder Clay	Clay, stiff, mottled light olive brown and light olive grey, with abundant medium and fine subangular chalk pebbles; becoming olive grey with subrounded chalk, shaley black mudstone pebbles and occasional cementstone cobbles below 4.3 m	17.0+	20.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines Sand Gravel						
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	12	75	13	0.3-1.4	12	43	30	2	5	8	0
b	15	72	13	2.0-3.0	15	53	16	3	5	8	0
a+b	14	73	13	Mean	14	47	24	2	5	8	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
		a	0.3-1.4	4	0	15	26	0	0
b	2.0-3.0	55	20	0	23	2	0	0	0
a+b	Mean	41	14	4	24	2	0	0	15

* Mainly sandstone

TM 08 SW 19 0182 8119 Lower Barn, Garboldisham

Block A

Surface level +36.3 m (+119 ft)
Water struck at +25.6 m
May 1980

Overburden 10.7 m
Mineral 5.4 m
Waste 4.7 m
Bedrock 1.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, clay and sand with occasional flint pebbles	0.7	0.7
Head	a 'Clayey' pebbly sand Gravel: fine with some coarse, angular flint with some rounded quartzite, flint, chalk and vein quartz; traces of limestone and micaceous sandstone Sand: fine with medium, subangular quartz and some chalk, dark yellowish orange	0.7	1.4
Boulder Clay	Clay, mottled dark yellowish orange and greenish grey, with abundant medium and fine chalk, some patinated flint pebbles; becoming light olive grey between 2.0 m and 4.0 m and dark orange with silt and sand partings below 10.1 m	9.2	10.6
Glacial Silt	Silt, stiff, yellowish orange with occasional fine subrounded chalk pebbles	0.1	10.7
Glacial Sand and Gravel	b Sand, with occasional flint, chalk and vein quartz pebbles Sand: medium and fine, subangular quartz with some subangular chalk, yellowish orange	5.4	16.1
Boulder Clay	Clay, silty and sandy, soft, greyish brown with flint, vein quartz and occasional chalk pebbles	3.7	19.8
Glacial Sand and Gravel	c 'Clayey' sandy gravel, with occasional flint cobbles Gravel: coarse with some fine, angular flint, with rounded quartzite, flint and vein quartz; traces of chalk Sand: medium with some fine, subangular quartz with some chalk, dark yellowish brown	1.0	20.8
Upper Chalk	Chalk, hard rock, white	1.2+	22.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines Sand Gravel						
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	17	70	13	0.7-1.4	17	44	22	4	11	2	0
b	9	90	1	10.7-11.7	22	56	20	1	1	0	0
				11.7-12.7	11	59	30	0	0	0	0
				12.7-13.7	7	40	51	1	1	0	0
				13.7-14.7	3	31	64	1	1	0	0
				14.7-15.7	3	23	64	4	4	2	0
				15.7-16.1	4	40	54	1	1	0	0
	Mean	9	42	47	1	1	trace	0			
c	11	50	39	19.8-20.8	11	14	31	5	8	27	4

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.7-1.4	62	8	4	16	7	1	0	2
b	10.7-16.1	58	12	6	7	11	0	0	6*
c	19.8-20.8	48	11	17	21	2	0	0	1

* Mainly sandstone

TM 08 SW 20 0301 8475 Heath Farm, Kenninghall

Block A

Surface level +50.9 m (+167 ft)
Water struck at +49.7 m
May 1980

Waste 17.0 m
Bedrock 3.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Sand, with brick and concrete rubble	0.4	0.4
Boulder Clay	Clay, sandy and silty, dark yellowish orange, with abundant fine chalk and occasional flint pebbles	4.0	4.4
Glacial Silt	Silt, clayey, moderate yellowish brown	0.4	4.8
Boulder Clay	Clay, silty, light olive grey, with medium and fine chalk, some black mudstone pebbles, becoming darker between 8.0 m and 14.0 m, with occasional patinated flint cobbles	10.6	15.4
Glacial Silt	Silt, clayey, stiff, light brown	0.4	15.8
Glacial Sand and Gravel	a 'Clayey' sandy gravel, with occasional flint cobbles Gravel: fine with coarse, subangular patinated flint, with some well rounded vein quartz and quartzite Sand: medium with fine and coarse, subangular quartz with some flint, pale yellowish orange	0.7	16.5
Boulder Clay	Clay, silty, stiff dark orange, with medium and fine vein quartz and flint pebbles	0.5	17.0
Upper Chalk	Chalk, soft white	3.0+	20.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
			- $\frac{1}{4}$	+ $\frac{1}{4}$ - $\frac{1}{2}$	+ $\frac{1}{2}$ -1	+1-4	+4-16	+16-64	+64 mm	
16	54	30	16	11	33	10	19	9	2	

TM 08 SW 21 0310 8325 Pound Lane, North Lopham

Block A

Surface level +51.2 m (+168 ft)
Water struck at +45.0 m
May 1980

Waste 35.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sandy	0.2	0.2
Cover Sand	a 'Very clayey' pebbly sand Gravel: coarse with fine, angular flint Sand: fine and medium, subangular quartz, with thin beds of greyish orange sandy silt	0.7	0.9
Boulder Clay	Clay, silty and sandy, stiff, mottled pale yellowish orange and light grey, with subrounded chalk and subangular flint pebbles; becoming mottled light olive grey and light olive brown below 3.8 m	5.1	6.2
Glacial Silt	Silt, clayey, light olive grey	0.2	6.4
Boulder Clay	Clay, stiff, dark grey with chalk and flint pebbles	2.6	9.0
Glacial Silt	Silt, clayey, olive grey with fine chalk pebbles	0.2	9.2
Boulder Clay	Clay, stiff, dark grey with subangular chalk and occasional angular flint pebbles	6.9	16.1
	Clay, silty soft, light olive grey with abundant fine subrounded chalk pebbles and a bed of light olive grey sandy silt between 26.5 m and 26.9 m	15.9	32.0
	Clay, sandy, soft, brownish grey with occasional fine rounded chalk and flint pebbles	3.0+	35.0

GRADING

Mean for deposit percentages			Depth below surface (m)	Percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
			- $\frac{1}{4}$	+ $\frac{1}{4}$ - $\frac{1}{2}$	+ $\frac{1}{2}$ -1	+1-4	+4-16	+16-64	+64 mm	
22	68	10	22	37	28	3	3	7	0	

TM 08 SW 22 0322 8159 Fyson's Farm, North Lopham

Surface level +43.3 m (+142 ft)
Water struck at +27.7 m
June 1980

Block A

Waste 35.0 m
Bedrock 2.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand	0.3	0.3
Alluvium	Silt, sandy and clayey, mottled dark yellowish brown and orange	1.1	1.4
Boulder Clay	Clay, stiff, mottled medium light grey and moderate yellowish brown, with fine rounded chalk pebbles; becoming pale yellowish brown with abundant chalk pebbles between 4.0 m and 6.8 m, olive grey with angular patinated flint, chalk and occasional black mudstone pebbles below 6.8 m	11.6	130
	Clay, silty, soft, greyish orange with medium and fine chalk and coarse flint pebbles	1.6	14.6
Glacial Sand and Gravel	a 'Clayey' sand Sand: fine and medium, subrounded quartz with some subangular flint and chalk, pale yellowish orange	2.4	17.0
Glacial Silt	Silt, clayey, laminated, dusky yellowish brown	0.2	17.2
Glacial Sand and Gravel	b Pebbly sand Gravel: fine and coarse, rounded vein quartz and quartzite, with subangular and rounded flint Sand: medium with fine, subangular quartz, flint and some chalk, dark yellowish orange	2.1	19.3
Boulder Clay	Clay, silty and sandy, dark yellowish brown, with occasional medium angular flint and fine rounded vein quartz pebbles	2.0	21.3
Glacial Sand and Gravel	e Sandy gravel Gravel: coarse and fine, rounded quartzite and angular flint, with some rounded flint and vein quartz; traces of chalk, limestone, igneous and shell Sand: medium with some fine and coarse, angular quartz and flint with some chalk, moderate yellowish brown	4.0	25.3
	d 'Clayey' sandy gravel, with a chalk raft between 29.5 m and 30.0 m Gravel: coarse and fine, angular flint and rounded quartzite with rounded vein quartz, subrounded flint and sandstone, with chalk pebbles below 29.0 m Sand: medium with fine angular chalk and flint with angular quartz; becoming very silty below 31.0 m, yellowish grey	9.7	35.0
Upper Chalk	Chalk, soft white	2.0+	37.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines Sand Gravel						
					- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{8}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	12	88	0	14.6-15.6 15.6-17.0 Mean	10 13 12	46 46 47	43 40 41	1 1 trace	0 0 trace	0 0 0	0 0 0
b	8	85	7	17.2-18.2 18.2-19.3 Mean	15 2 8	38 18 28	46 58 52	0 9 5	1 6 4	0 7 3	0 0 0
c	3	63	34	21.3-22.3 22.3-23.3 23.3-24.3 24.3-25.3 Mean	4 1 2 5 3	5 4 8 28 11	31 26 57 65 45	6 15 5 2 7	23 30 6 0 15	31 24 22 0 19	0 0 0 0 0
d	13	61	26	25.3-26.3 26.3-27.3 27.3-29.0 29.0-29.5 30.0-31.0 31.0-32.0 32.0-33.0 33.0-34.0 34.0-35.0 Mean	4 2 1 9 21 18 20 25 24 13	23 18 10 20 13 16 15 14 11 15	39 38 16 47 33 44 47 40 33 36	10 10 10 12 10 8 9 12 10	16 10 22 10 13 8 7 9 11 12	8 22 39 2 10 6 2 3 9 14	0 0 0 0 0 0 0 0 0 trace
a+b+c	7	75	18	Mean	7	25	45	5	8	10	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
b	18.2-19.3	20	17	34	29	0	0	0	0
c	21.3-22.3 22.3-23.3 23.3-24.3 Mean	41 36 30 37	14 12 15 14	13 12 1 9	24 38 46 35	trace 0 0 0	1 0 0 trace	3 1 4 2	4 1 4* 3
d	25.3-26.3 26.3-27.3 27.3-29.0 29.0-29.5 30.0-31.0 Mean	30 36 30 19 5 24	13 11 17 4 3 11	5 10 9 5 19 10	39 38 39 18 24 33	0 0 trace 47 35 13	0 0 0 0 0 0	3 2 2 0 4 2	10* 3 3 7* 10* 7
c+d	Mean	33	14	10	35	2	0	2	4

* Mainly sandstone

TM 08 SW 23 0297 8059 Top Drag Way, South Lopham Block A
 Surface level +43.0 m (+141 ft) Waste 26.0 m+
 Water not struck
 June 1980

LOG

Geological classification	Lithology	Thickness m	Depth m
Made ground	Brick and concrete rubble	0.5	0.5
Cover Sand	'Clayey sand', with occasional angular flint pebbles Sand: medium and fine subrounded quartz, dark yellowish orange	0.8	1.3
Boulder Clay	Clay, stiff, mottled dark grey and moderate olive brown, with abundant subrounded chalk and occasional angular flint pebbles; becoming dark olive grey, with chalk, mudstone and flint pebbles below 3.0 m; cobbles of flint and oolitic limestone common below 12.0 m	18.7	20.0
	Clay, stiff, light olive grey, with abundant soft chalk pebbles	6.0+	26.0

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
14	83	3	0.5-1.3	14	39	43	1	3	0	0

TM 08 SW 24 0416 8484 Edge Lane, Kenninghall Block A
 Surface level +42.4 m (+139 ft) Overburden 0.8 m
 Water struck at +38.4 m, +29.6 m and +25.9 m Mineral 1.9 m
 May 1980 Waste 22.3 m
 Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made ground	Soil with concrete rubble	0.8	0.8
Glacial Sand and Gravel	a 'Clayey' pebbly sand, becoming more silty with depth Gravel: fine with coarse, angular flint with chalk and sandstone Sand: coarse and fine, subangular quartz and chalk, dark yellowish orange	1.9	2.7
Boulder Clay	Clay, stiff, mottled dusky yellow and light olive brown, with medium and fine subangular chalk pebbles; becoming dark bluish grey below 3.4 m	9.6	12.3
	Clay, silty, soft, light grey with abundant fine chalk pebbles	1.7	14.0
	Clay, silty, dark yellowish brown with occasional well-rounded flint pebbles and chalk pellets	2.5	16.5

Glacial Sand and Gravel	b 'Very clayey' gravel, with occasional thin beds of silt Gravel: fine and coarse, well rounded quartzite and vein quartz, with some angular flint Sand: medium with some coarse and fine, subangular chalk and quartz, greyish black	1.0	17.5
Glacial Silt	Silt, clayey, greyish black with traces of fine chalk sand	2.5	20.0
Boulder Clay	Clay, silty, greyish black, with well rounded quartzite, patinated flint and vein quartz pebbles; thin beds of gravel and silty clay with shell fragments below 21.0 m	2.1	22.1
Glacial Sand and Gravel	c Sandy gravel Gravel: coarse and fine, angular flint with rounded quartzite, vein quartz and angular chalk Sand: medium with fine and coarse, angular quartz and flint, with some subangular chalk, light olive grey	2.9	25.0
Upper Chalk	Chalk, soft white	1.0+	26.0

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	16	74	10	0.8-1.8 1.8-2.7 Mean	12 21 16	35 32 33	42 28 36	4 6 5	5 10 7	2 3 3	0 0 0
b	21	38	41	16.5-17.5	21	6	23	9	22	19	0
c	6	47	47	22.1-23.1 23.1-24.3 24.3-25.0 Mean	6 3 9 6	13 7 13 10	27 23 45 29	7 7 11 8	25 25 15 23	22 35 7 24	0 0 0 0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.8-1.8	78	0	0	0	14	0	0	8*

* Sandstone

TM 08 SW 25 0422 8276 Lodge Farm, North Lopham Block A

Surface level +45.1 m (+148 ft)
Water struck at +27.1 m
May 1980

Waste 30.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand with clay	0.3	0.3
Boulder Clay	Clay, silty, stiff, mottled moderate yellowish brown and olive grey, with abundant subangular chalk pebbles; becoming dark grey with pebbles and cobbles of chalk and flint below 12.0 m	14.7	15.0
	Clay, sandy, dark yellowish orange, with abundant fine subrounded chalk pebbles; becoming soft, greyish orange below 15.6 m and pinkish grey below 17.4 m	3.0	18.0
Glacial Sand and Gravel	a Pebbly sand, with occasional quartzite cobbles at base Gravel: coarse and fine, angular flint, with rounded flint, quartzite, vein quartz and chalk; traces of igneous, limestone and micaceous sandstone Sand: medium with fine, angular flint and subangular quartz, with some chalk, dark yellowish orange	3.8	21.8
Boulder Clay	Clay, silty and sandy, soft, dusky yellowish brown, with occasional angular flint pebbles and chalk pellets	1.2	23.0
Glacial Sand and Gravel	b Sandy gravel Gravel: fine and coarse, angular flint and rounded quartzite, with some rounded flint, vein quartz and chalk; traces of igneous, metamorphic, shell and limestone Sand: medium with fine and coarse, angular flint, quartz and chalk, pale yellowish brown	2.0	25.0
	c Sandy gravel Gravel: fine and coarse, angular flint and rounded quartzite, with some rounded flint, vein quartz and chalk; traces of igneous, shell and limestone Sand: medium with coarse and some fine, angular flint, quartz and chalk, yellowish brown	5.0+	30.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					-k	+k -1/4	+1/4 -1	+1 -4	+4 -16	+16 -64	+64 mm
a	4	83	13	18.0-19.0	8	23	66	1	0	2	0
				19.0-20.0	3	36	60	1	0	0	0
				20.0-21.0	2	27	44	7	9	11	0
				21.0-21.8	3	29	31	6	11	17	3
				Mean	4	29	51	3	5	7	1
b	7	62	31	23.0-24.0	3	12	47	6	16	16	0
				24.0-25.0	10	9	44	5	11	21	0
				Mean	7	11	45	6	13	18	0
c	1	61	38	25.0-26.0	2	6	52	9	13	18	0
				26.0-27.0	2	4	38	17	17	22	0
				27.0-28.0	1	6	44	14	20	15	0
				28.0-29.0	1	4	31	18	26	20	0
				29.0-30.0	2	4	33	18	31	12	0
				Mean	1	5	41	15	21	17	0
a+b	5	76	19	Mean	5	22	50	4	8	11	trace
a+b+c	3	69	28	Mean	3	14	46	9	14	14	trace

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	18.0-21.8	51	18	8	16	3	1	1	2
b	23.0-24.0	45	15	9	26	1	trace	0	4
	24.0-25.0	29	13	15	36	3	0	3	1
	Mean	37	14	12	31	2	trace	2	2
c	25.0-26.0	37	18	8	25	6	0	4	2
	26.0-27.0	33	15	9	31	5	0	1	6
	27.0-28.0	30	13	8	44	2	trace	2	1
	28.0-29.0	39	10	12	33	2	trace	3	1
	29.0-30.0	37	10	9	36	4	0	1	3
	Mean	35	12	9	36	4	trace	2	2
b+c	Mean	36	12	10	35	3	trace	2	2
a+b+c	Mean	38	13	10	32	3	trace	2	2

TM 08 SW 26 0462 8132 Bridge Farm, South Lopham Block A

Surface level +29.6 m (+97 ft)
Water struck at +27.4 m
June 1980

Overburden 7.4 m
Mineral 9.7 m
Bedrock 3.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, silty sandy clay	0.3	0.3
Alluvium	Silt, sandy, soft, mottled moderate brown and dark yellowish brown, with occasional fine angular flint pebbles	2.2	2.5
Boulder Clay	Clay, silty, mottled moderate brown and light olive grey, with fine subrounded chalk and angular flint pebbles	1.5	4.0
Glacial Sand and Gravel	a 'Clayey' sandy gravel Gravel: coarse with fine, angular flint with some rounded quartzite and vein quartz; traces of chalk and ironstone Sand: medium and fine, subangular quartz, with some angular flint, yellowish brown	0.7	4.7
Glacial Silt	Silt, moderate brown, with occasional angular flint and rounded quartzite pebbles	2.7	7.4
Ingham Sand and Gravel	b Sandy gravel, with thin beds of silt towards the top and occasional flint and brown quartzite cobbles towards the base Gravel: coarse with fine, well rounded brown quartzite and angular flint, with some rounded flint and vein quartz; traces of chalk and sandstone Sand: medium with fine and coarse, angular quartz and flint, some well rounded quartz between 10.4 m and 15.4 m; angular chalk below 16.5 m	9.7	17.1
Upper Chalk	Chalk, hard rock, white	3.1+	20.2

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages							
	Fines	Sand	Gravel		Fines			Gravel				
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm	
a	13	55	32	4.0-4.7	13	21	29	5	10	22	0	
b	5	51	44	7.4-8.4	7	13	28	7	21	24	0	
				8.4-9.4	7	27	43	6	11	6	0	
				9.4-10.4	6	23	39	7	12	13	0	
				10.4-11.4	13	13	34	4	11	17	8	
				11.4-12.4	3	9	37	8	15	28	0	
				12.4-13.4	1	4	29	13	23	30	0	
				13.4-14.4	2	4	32	8	17	37	0	
				14.4-15.4	3	4	33	7	14	33	6	
				15.4-16.5	2	6	34	9	13	33	3	
				16.5-17.1	6	2	12	6	15	59	0	
	Mean			5	11	32	8	15	27	2		
a+b	5	52	43	Mean	5	11	33	8	15	26	2	

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	4.0-4.7	52	10	8	24	3	0	1	2
b	7.4-8.4	22	14	16	41	0	0	1	6*
	8.4-9.4	30	13	14	36	0	0	3	4*
	9.4-10.4	23	24	18	30	0	0	0	5*
	10.4-11.4	25	16	17	36	0	0	1	5
	11.4-12.4	29	18	10	39	0	0	1	3
	12.4-13.4	26	12	14	44	0	0	3	1
	13.4-14.4	28	14	11	42	0	0	4	1
	14.4-15.4	25	15	13	44	0	0	0	3*
	15.4-16.5	24	19	15	40	0	0	trace	2*
	16.5-17.1	21	14	13	36	15	0	0	1
b	Mean	25	16	14	39	2	0	1	3

* Mainly sandstone

82

TM 08 SW 27 0065 8346

North of Pit's Belt, Garboldisham

Block A

Surface level +41.2 m (+135 ft)
Water not struck
August 1980

Overburden 0.5 m
Mineral 1.5 m
Waste 7.5 m
Bedrock 2.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, silty sand	0.5	0.5
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: fine with coarse, subangular chalk and angular flint, with some rounded flint and micaceous sandstone; traces of shell, limestone and vein quartz Sand: fine and medium, angular chalk and subangular quartz, light olive brown	1.5	2.0
Boulder Clay	Clay, mottled moderate brown and light olive grey, with ironstained fine subrounded chalk and occasional angular flint pebbles	7.5	9.5
Upper Chalk	Chalk, soft, very pale orange; becoming white below 11.0 m	2.5+	12.0

GRADING

Mean for deposit percentages	Depth below surface (m)	Percentages								
		Fines	Sand	Gravel	Fines			Gravel		
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64
32	49	19	0.5-1.5	31	23	23	8	12	3	0
	1.5-2.0	31	21	15	7	14	12	0		
	Mean	32	22	20	7	13	6	0		

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
0.5-1.5	33	6	1	0	55	0	0	5*
1.5-2.0	33	1	1	4	53	3	1	4*
Mean	33	4	1	2	55	1	trace	4

* Mainly sandstone with some shell

TM 08 SW 28 0181 8487 South of Grove Farm, Kenninghall Block A
 Surface level +46.9 m (+154 ft) Waste 11.8 m
 Water struck at +44.9 m Bedrock 2.0 m+
 August 1980

TM 08 SE 15 0520 8361 Park Farm, North Lopham Block A
 Surface level +46.4 m (+152 ft) Waste 26.7 m+
 Water not struck
 May 1980

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand with occasional angular flint pebbles	0.2	0.2
Cover Sand	a 'Very clayey' sand, with occasional angular flint pebbles Sand: fine with medium, subrounded quartz, dark yellowish brown	0.6	0.8
Boulder Clay	Clay, silty, dark orange, with occasional angular flint pebbles	0.7	1.5
Glacial Sand and Gravel	b 'Very clayey' sandy gravel Gravel: coarse with some fine, angular flint with subrounded chalk; traces of rounded flint and micaceous sandstone Sand: fine with some medium, subangular quartz, dusky yellow	0.8	2.3
Boulder Clay	Clay, stiff, mottled light olive brown and light grey, with fine subrounded chalk pebbles; becoming olive grey with black mudstone pebbles between 3.5 m and 7.9 m, moderate yellowish brown with well rounded chalk and quartzite pebbles below 8.6 m	9.5	11.8
Upper Chalk	Chalk, soft very pale orange	2.0+	13.8

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	25	72	3	0.2-0.8	25	38	32	2	2	1	0
b	34	49	17	1.5-2.3	34	33	13	3	4	13	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
b	1.5-2.3	76	1	0	0	22	0	0	1

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand and clay	0.4	0.4
Boulder Clay	Clay, sandy, mottled moderate yellowish brown and medium light grey, with chalk pebbles; becoming dark bluish grey with chalk and flint pebbles below 3.0 m	3.2	3.6
	Clay, silty and sandy, firm, light grey with pebbles of chalk and some flint; occasional flint cobbles	7.5	11.1
	Clay, silty, very firm dark grey with abundant chalk and some flint pebbles; becoming medium olive grey below 15.9 m and dark olive grey below 19.5 m	11.6+	26.7

TM 08 SE 16 0623 8212 Hill Farm, Bressingham Block A
 Surface level +43.8 m (+144 ft) Overburden 16.5 m
 Water struck at +26.2 m and +18.0 Mineral 7.1 m
 May 1980 Waste 6.5 m
 Bedrock 1.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, clay, sandy	0.4	0.4
Boulder Clay	Clay, silty, mottled light grey and dusky yellow, with pebbles of chalk and flint and a thin bed of clayey sand between 0.8 m and 0.9 m	0.5	0.9
	Clay, silty, dark bluish grey, with pebbles of chalk, flint and occasional chalk cobbles; becoming dark grey below 2.1 m	2.5	3.4
	Clay, sandy and silty, light olive grey and pale yellowish brown; becoming light grey at 4.6 m and medium grey below 5.0 m, with pebbles of chalk and patinated flint	12.4	14.9
	Clay, silty and sandy, soft, yellowish brown with chalk pebbles; becoming pinkish brown at 15.4 m and pinkish grey with pebbles of chalk and flint at 15.6 m	4.1	16.5
Glacial Sand and Gravel	a Pebbly sand Gravel: fine and coarse angular flint, with well-rounded quartzite and flint; traces of vein quartz and limestone Sand: medium and fine subangular quartz and flint, moderate yellowish brown	7.1	23.6
Boulder Clay	Clay, silty and sandy, firm, brownish grey with scattered pebbles of chalk, quartzite and some flint	2.2	25.8
Ingham Sand and Gravel	b Pebbly sand Gravel: fine and coarse, subangular flint with well rounded brown quartzite; some rounded flint and vein quartz Sand: medium with fine subangular quartz and flint	4.3	30.1
Upper Chalk	Chalk, soft, white	1.9+	32.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages										
	Fines	Sand	Gravel		Fines			Gravel							
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm				
a	6	86	8	16.5-17.6	12	56	32	0	0	0	0	0	0	0	0
				17.6-18.6	12	45	39	1	1	2	0	0	0	0	0
				18.6-19.8	3	9	65	8	10	5	0	0	0	0	0
				19.8-21.0	2	12	69	7	7	3	0	0	0	0	0
				21.0-22.0	3	28	53	5	8	3	0	0	0	0	0
				22.0-23.0	8	50	40	2	0	0	0	0	0	0	0
				23.0-23.6	2	38	34	5	8	13	0	0	0	0	0
				Mean	6	33	49	4	5	3	0	0	0	0	0
b	2	75	23	25.8-26.8	4	22	15	10	29	20	0	0	0	0	0
				26.8-27.8	3	19	54	4	10	10	0	0	0	0	0
				27.8-29.0	1	11	61	7	10	10	0	0	0	0	0
				29.0-30.1	1	13	74	5	6	1	0	0	0	0	0
				Mean	2	16	53	6	13	10	0	0	0	0	0
a+b	5	81	14	Mean	5	26	50	5	8	6	0	0	0	0	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	16.5-18.6	74	0	0	26	0	0	0	0
	18.6-22.0	74	8	2	11	0	1	3	1
	23.0-23.6	60	1	3	34	0	0	0	2
	Mean	70	5	2	18	0	1	2	2
b	25.8-26.8	43	9	11	34	1	trace	0	2
	26.8-27.8	50	7	5	34	0	0	0	4
	27.8-29.0	57	2	4	36	1	0	0	trace
	29.0-30.1	57	1	7	30	6	0	0	0
	Mean	47	7	9	34	1	trace	0	2

TM 08 SE 17 0587 8104

Brook Farm, South Lopham

Block B

Surface level +26.9 m (+88 ft)
Water struck at +25.7 m
June 1980

Overburden 1.2 m
Mineral 4.5 m
Waste 2.8 m
Mineral 3.6 m
Waste 0.8 m
Mineral 2.2 m
Bedrock 2.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand with peat	0.3	0.3
Peat	Peat, fibrous, mottled moderate brown and medium grey with thin beds of silty clay	0.9	1.2
River Terrace Deposits	a Sand, with occasional angular flint and chalk pebbles Sand: medium with fine subrounded quartz, some subangular flint, greyish orange	3.1	4.3
Glacial Sand and Gravel	b Pebbly sand Gravel: fine with coarse angular flint and rounded quartzite; some well rounded vein quartz Sand: medium with some coarse and fine, subangular quartz and flint, greyish orange	1.4	5.7
Boulder Clay	Clay, sandy, firm, mottled orange and light grey with occasional subangular patinated flint pebbles; some chalk pebbles below 6.0 m	2.8	8.5
Glacial Sand and Gravel	c Pebbly sand Gravel: fine with some coarse, angular flint and well rounded quartzite, with some vein quartz and rounded flint Sand: medium subangular quartz, with some coarse subangular flint, moderate yellowish brown	3.6	12.1
Boulder Clay	Clay, silty and sandy, greyish brown, with occasional subangular flint pebbles; becoming dusky yellow brown below 12.7 m	0.8	12.9
Ingham Sand and Gravel	d Gravel, with occasional subrounded flint cobbles Gravel: coarse and fine, well rounded brown quartzite with subangular flint; some vein quartz and rounded flint Sand: medium, subangular and subrounded quartz and flint, pale yellowish brown	2.2	15.1
Upper Chalk	Chalk, soft white	2.9+	18.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					-½	+½ - ¼	+¼ - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm
a	1	98	1	1.2-2.3	3	17	78	1	0	1	0
				2.3-3.3	1	16	82	0	0	1	0
				3.3-4.3	1	23	74	1	1	0	0
				Mean	1	19	78	1	trace	1	0
b	2	75	23	4.3-5.3	2	7	59	12	13	7	0
				5.3-5.7	2	11	47	1	20	10	0
				Mean	2	8	56	11	15	8	0
c	1	75	24	8.5-9.4	2	4	38	11	33	12	0
				9.4-10.5	2	6	66	8	12	6	0
				10.5-11.5	1	8	60	12	17	2	0
				11.5-12.1	2	12	66	7	11	2	0
				Mean	1	7	58	10	18	6	0
d	1	48	51	12.9-13.9	3	3	33	14	22	25	0
				13.9-15.1	0	2	24	18	28	28	0
				Mean	1	2	30	16	25	26	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	3.4-4.3	91	0	0	0	9	0	0	0
b	4.3-5.7	55	7	7	29	0	0	1	1
c	8.5-12.1	44	7	11	37	0	0	0	1
d	12.9-13.9	21	10	12	54	0	0	trace	3*
	13.9-15.1	25	7	12	55	0	0	1	2*
	Mean	23	8	12	55	0	0	trace	2

* Mainly ironpan

TM 08 SE 18 0583 8049 Langfen Farm, South Lopham Block B

Surface level +27.1 m (+89 ft) Overburden 0.4 m
 Water struck at +14.1 m Mineral 3.0 m
 September 1980 Waste 16.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sandy with peat	0.4	0.4
River Terrace Deposits	'Clayey' pebbly sand, becoming more clayey with depth Gravel: fine with coarse angular flint; some well rounded quartzite and traces of ironpan Sand: fine with medium well rounded quartz, dark orange	3.0	3.4
Glacial Silt	Clay and silt, mottled light olive grey and light olive brown, with sparse flint pebbles and well rounded chalk pellets	16.6+	20.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					-½	+½ - ¼	+¼ - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm
	10	82	8	0.4-1.4	9	45	38	2	4	2	0
				1.4-2.4	5	40	45	3	6	1	0
				2.4-3.4	17	50	19	2	6	6	0
				Mean	10	46	34	2	5	3	0

COMPOSITION

Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
	Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
0.4-3.4	95	0	0	4	0	0	0	1

TM 08 SE 19 0739 8472 Airfield, Kenninghall Block A

Surface level +54.4 m (+178 ft) Waste 28.2 m+
 Water struck at +44.5 m and +32.5 m
 June 1980

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sandy	0.3	0.3
Glacial Sand and Gravel	a 'Very clayey' pebbly sand Gravel: fine and coarse, angular and subrounded flint with some chalk and quartzite Sand: fine and medium subangular quartz with some subangular flint, moderate yellowish orange	0.8	1.1
Boulder Clay	Clay, silty and sandy, mottled light grey and orange brown with abundant chalk pebbles; becoming less sandy, medium dark grey to greyish black between 3.5 m and 4.5 m, with a bed of light grey silt from 3.0 m to 3.5 m	11.0	12.1
Glacial Sand and Gravel	b 'Clayey' gravel, with occasional rounded chalk cobbles Gravel: coarse with some fine, well rounded chalk and angular flint, with traces of quartzite limestone, shell, black mudstone and red chalk Sand: coarse, chalk, flint and some quartz	1.8	23.7
Boulder Clay	Clay, silty, very stiff, dark grey with chalk sand and occasional subangular chalk and flint pebbles; becoming sandy, moderate olive brown with occasional flint and chalk pebbles below 25.9 m	2.5	26.2
Glacial Sand and Gravel	c 'Clayey' sandy gravel Gravel: coarse with fine, rounded quartzite and subangular flint, with some chalk, limestone and vein quartz; traces of ironpan and black mudstone Sand: coarse and medium with fine, subangular quartz and flint	0.7	26.9
Boulder Clay	Clay, silty, soft, moderate olive brown with subrounded chalk and patinated flint pebbles	1.3+	28.2

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages								
	Fines	Sand	Gravel		Percentages								
					Fines			Sand			Gravel		
- $\frac{1}{4}$	+ $\frac{1}{4}$ - $\frac{1}{2}$	+ $\frac{1}{2}$ -1	+1-4	+4-16	+16-64	+64 mm							
a	16	81	3	0.3-1.1	16	41	38	2	2	1	0		
b	12	13	75	21.9-23.7	12	2	4	7	16	55	4		
c	12	58	30	26.2-26.9	12	14	21	23	11	19	0		

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.3-1.1	59	24	0	8	9	0	0	0
b	21.9-23.7	31	1	0	1	47	11	trace	9
c	26.2-26.9	31	0	8	35	14	11	0	1

TM 08 SE 20 0659 8302 Fersfield, Bressingham Block A
 Surface level +41.3 m (+136 ft) Waste 20.4 m
 Water struck at +37.2 m Bedrock 2.6 m+
 May 1980

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, clay with sand and occasional flint pebbles	0.3	0.3
Boulder Clay	Clay, sandy, mottled dark yellowish grey and moderate yellowish brown, with occasional subangular flints	0.3	0.6
Glacial Sand and Gravel	a 'Very clayey' pebbly sand Gravel: fine and coarse subangular flint Sand: fine and medium subangular quartz, with thin clay partings, mottled dusky yellow and dark grey	0.4	1.0
Boulder Clay	Clay, silty, firm, dark bluish grey with subangular chalk and flint pebbles; becoming dark olive grey between 1.2 m and 1.7 m, with a thin bed of silty fine sand at 5.1 m	8.8	9.8
Glacial Silt	Silt, firm, light olive grey with sparse subangular flint and chalk pebbles and occasional fine quartz sand partings	3.0	12.8
Boulder Clay	Clay, silty, firm, dark bluish grey with abundant chalk pebbles	1.7	14.5
	Clay, sandy, soft, light pinkish grey with abundant chalk and occasional patinated flint pebbles, becoming silty, dusky yellowish brown below 15.8 m	1.9	16.4
	Clay, silty and sandy, moderate yellowish brown with abundant subangular chalk and flint pebbles	1.4	17.8

Glacial Sand and Gravel	b 'Clayey' pebbly sand Gravel: coarse and medium flint and sandstone Sand: fine subrounded quartz, medium olive grey	1.5	19.3
Ingham Sand and Gravel	c Sandy gravel Gravel: fine with coarse, well rounded brown quartzite, with some angular and well rounded flint and vein quartz Sand: fine with medium and coarse, subangular quartz, moderate olive brown	1.1	20.4
Upper Chalk	Chalk, soft white	2.6+	23.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages								
	Fines	Sand	Gravel		Percentages								
					Fines			Sand			Gravel		
- $\frac{1}{4}$	+ $\frac{1}{4}$ - $\frac{1}{2}$	+ $\frac{1}{2}$ -1	+1-4	+4-16	+16-64	+64 mm							
a	23	72	5	0.6-1.0	23	35	34	3	3	2	0		
b	11	84	5	17.8-19.3	11	71	11	2	2	3	0		
c	5	48	47	19.3-20.4	5	27	11	10	30	17	0		

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
c	19.3-20.4	23	11	5	58	0	0	0	3

TM 08 SE 21 0721 8153 Valley Farm, Bressingham Block A
 Surface level +39.6 m (+130 ft) Waste 25.9 m
 Water struck at +24.6 m and +18.3 m Bedrock 3.1 m+
 June 1980

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, clay with sand	0.4	0.4
Boulder Clay	Clay, sandy, mottled moderate brown and light grey with abundant subrounded chalk pebbles and occasional flint cobbles	6.8	7.2
	Clay, silty, medium dark grey, with occasional subangular and subrounded chalk and patinated flint pebbles	7.8	15.0
Glacial Sand and Gravel	a Pebbly sand Gravel: fine with coarse, angular flint with some quartzite, vein quartz and rounded flint; traces of chalk and limestone Sand: medium subangular quartz and flint, light olive grey	3.6	18.6

Boulder Clay	Clay, silty and sandy, brownish grey with occasional subrounded chalk pellets and patinated flint pebbles	2.7	21.3
Glacial Sand and Gravel	b Silty sand, light olive grey, becoming less sandy with depth	1.0	22.3
	c 'Clayey' sandy gravel Gravel: coarse with fine, angular flint with some well rounded quartzite, vein quartz and flint; traces of chalk Sand: fine subrounded quartz, occasionally laminated; becoming silty and micaceous below 22.3 m, light olive grey	3.2	25.5
Ingham Sand and Gravel	d Gravel, with occasional quartzite and flint cobbles Gravel: coarse and fine, well rounded brown quartzite and angular flint, some rounded flint and vein quartz; traces of ironpan and chalk Sand: fine, medium and coarse, subangular quartz, light olive grey	0.4	25.9
Upper Chalk	Chalk, soft white, with occasional flints	3.1+	29.0

TM 08 SE 22 0673 8059 Bressingham Fen, Bressingham Block B
 Surface level +23.2 m (+76 ft)
 Water struck at +22.5 m
 August 1980
 Overburden 0.3 m
 Mineral 12.5 m
 Waste 7.2 m+

LOG	Geological classification	Lithology	Thickness m	Depth m
		Soil, peaty and sandy	0.3	0.3
	River Terrace Deposits	a 'Clayey' sand, pebbly at base Sand: fine with some medium, well rounded quartz, silty; with occasional flint pebbles and traces of vein quartz and quartzite, pale yellowish brown	11.1	11.4
	Glacial Sand and Gravel	b Sandy gravel, with occasional angular flint cobbles Gravel: fine with coarse, angular flint with some well rounded quartzite, vein quartz and flint; traces of chalk and shell Sand: medium and fine angular flint and quartz yellowish brown	1.4	12.8
	Glacial silt	Silt, olive grey with occasional thin beds of silty clay	7.2+	20.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines		Sand		Gravel		
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	3	78	19	15.0-16.0	5	6	53	9	12	15	0
				16.0-17.0	4	14	65	6	6	5	0
				17.0-18.0	2	10	65	5	15	3	0
				18.0-18.6	2	9	66	7	8	8	0
				Mean	3	10	61	7	11	8	0
b	46	54	0	21.3-22.3	46	52	2	trace	trace	0	0
c	18	59	23	22.3-23.3	30	53	5	1	1	10	0
				23.3-25.5	13	42	13	3	10	19	0
				Mean	18	47	10	2	7	16	0
d	2	20	78	25.5-25.9	2	7	7	6	31	44	3

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines		Sand		Gravel		
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	14	84	2	0.3-1.3	9	56	34	1	0	0	0
				1.3-2.3	10	47	41	1	1	0	0
				2.3-3.5	10	31	39	0	0	0	0
				3.5-4.3	16	41	43	0	0	0	0
				4.3-5.3	18	32	49	0	1	0	0
				5.3-6.3	23	43	32	1	1	0	0
				6.3-7.3	17	48	34	0	1	0	0
				7.3-8.4	14	45	39	1	1	0	0
				8.4-9.4	14	49	35	1	1	0	0
				9.4-10.4	25	39	28	3	5	0	0
				10.4-11.4	6	39	38	5	11	1	0
				Mean	14	46	37	1	2	trace	0
b	6	57	37	11.4-12.4	5	18	32	7	21	13	4
				12.4-12.8	7	20	27	9	17	18	2
				Mean	6	19	31	7	20	14	3
a+b	13	81	6	0.3-12.8	13	42	37	2	4	2	trace

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	15.0-18.6	60	6	6	24	1	1	trace	2
c	23.3-25.5	75	3	5	14	trace	0	0	3
d	25.5-25.9	41	8	8	40	trace	0	1	2

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	0.3-10.4	87	0	0	13	0	0	0	0
	10.4-11.4	76	14	0	10	0	0	0	0
	Mean	79	10	0	11	0	0	0	0
b	11.4-12.4	78	5	1	12	trace	0	0	4*
	12.4-12.8	83	3	2	10	2	0	0	0
	Mean	80	4	1	11	1	0	0	3

* Including shell

TM 08 SE 23 0825 8391 Stone Lane Farm, Bressingham **Block A**
 Surface level +57.0 m (+187 ft) Waste 22.0 m+
 Water not struck
 June 1980

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sandy clay	0.3	0.3
Made Ground	Clay, silty, orange brown	0.6	0.9
Boulder Clay	Clay, silty, mottled light bluish grey and dark yellowish orange with occasional fine subangular chalk pebbles; becoming firm dark bluish grey with depth, with chalk, some flint pebbles and occasional black shaley mudstone fragments	6.9	7.8
	Clay, silty, very firm, medium dark grey with chalk and flint pebbles	1.8	9.6
	Clay, sandy and silty, soft, light grey with abundant fine subrounded chalk and angular flint pebbles	12.4	18.0
	Clay, slightly sandy, medium grey with abundant chalk and patinated flint pebbles	4.0+	22.0

Glacial Sand and Gravel **b** Gravel, chalky
 Gravel: coarse with fine, chalk with some angular flint and traces of limestone, mudstone and shell
 Sand: coarse with some medium and fine, angular chalk and subangular quartz 0.3 26.7

Boulder Clay Clay, silty, firm, dark grey with rounded chalk and occasional patinated flint pebbles 1.8+ 28.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Gravel						
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	16	77	7	0.3-0.9	16	40	35	2	2	5	0
b	9	14	77	26.4-26.7	9	2	3	9	26	46	5

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
b	26.4-26.7	17	2	0	trace	69	6	trace	6

88

TM 08 SE 24 0817 8219 Folly Farm, Bressingham **Block A**
 Surface level +57.1 m (+187 ft) Waste 28.5 m+
 Water struck at +51.3 and +31.7 m
 June 1980

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sandy	0.3	0.3
Cover Sand	a 'Clayey' pebbly sand, with occasional subangular flint pebbles Sand: fine and medium rounded quartz, silty, moderate yellowish brown	0.6	0.9
Boulder Clay	Clay, sandy, mottled yellowish orange and light grey with occasional subangular patinated flint pebbles	0.7	1.6
	Clay, silty, mottled dark yellowish orange and medium light grey, with subrounded chalk and flint; becoming light olive grey below 3.1 m	3.3	4.9
	Clay, silty, firm, dark bluish grey with chalk and patinated flint; becoming medium grey below 5.8 m and dark grey with occasional subrounded flint cobbles below 7.4 m	9.8	14.7
	Clay, silty and sandy, soft, light grey with abundant rounded chalk pebbles; becoming light olive grey below 17.0 m, medium grey below 18.7 m, and dark grey, firm silty clay, with fine chalk and flint pebbles below 23.1 m	11.7	26.4

TM 08 SE 25 0802 8046 Bressingham Hall, Bressingham **Block B**
 Surface level +24.1 m (+79 ft) Overburden 0.4 m
 Water struck at +22.8 m Mineral 2.1 m
 June 1980 Waste 11.3 m
 Bedrock 0.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand with peat	0.2	0.2
Peat	Peat, sandy, dark brown	0.2	0.4
River Terrace Deposits	a Pebbly sand Gravel: fine and coarse, angular flint with some chalk and quartzite Sand: fine with some medium, rounded quartz, greyish orange and light grey	2.1	2.5
Boulder Clay	Clay, silty and sandy, firm, light olive brown with occasional subrounded chalk and patinated flint pebbles	1.1	3.6
Glacial Silt	b Silt, sandy and clayey, light olive grey	0.7	4.3
Boulder Clay	Clay, silty, medium dark grey with occasional chalk and flint pebbles	1.6	5.9
	Clay, silty, light grey with abundant chalk pebbles; becoming medium grey below 9.0 m and olive grey with occasional chalk and patinated flint pebbles below 13.5 m	7.9	13.8
Upper Chalk	Chalk, soft white	0.4+	14.2

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	7	77	16	0.4-1.3 1.3-2.5 Mean	7 7 7	75 38 53	16 15 16	1 14 8	1 13 8	0 13 8	0 0 0
b	46	53	1	3.6-4.3	46	34	18	1	1	0	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	1.3-2.5	90	3	0	1	6	0	0	0

TM 08 SE 26 0969 8436 Westhall Farm, Shelfanger

Block A

Surface level +43.6 m (+143 ft)
Water struck at +31.2 m
July 1980

Waste 18.7 m
Bedrock 1.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sandy clay	0.2	0.2
Boulder Clay	Clay, sandy, firm, medium grey with rounded chalk and flint; becoming light grey below 0.8 m, light olive grey below 2.6 m and medium dark grey, silty, with occasional chalk and patinated flint pebbles below 3.8 m	10.8	11.0
	Clay, sandy, soft, pinkish grey with occasional fine well rounded chalk pebbles; becoming brownish grey with subangular patinated flint pebbles below 11.2 m	1.4	12.4
Glacial Sand and Gravel	a 'Clayey' pebbly sand Gravel: coarse with some fine, angular flint Sand: medium with fine, subangular quartz and chalk, dark grey	0.2	12.6
Boulder Clay	Clay, silty and sandy, firm brownish grey with occasional subangular flint, well rounded quartzite and vein quartz pebbles	1.3	13.9
Glacial Sand and Gravel	b 'Very clayey' gravel Gravel: fine and coarse, rounded quartzite with angular flint; some rounded flint and vein quartz with traces of chalk Sand: medium with some fine and coarse, subangular quartz and flint, yellowish grey	1.9	15.8
Chalk	Chalk, hard rock	1.5	17.3
Glacial Silt	Silt, greyish olive, with occasional subangular flint pebbles and wood fragments	0.6	17.9

Glacial Sand	c 'Very clayey' sand Sand: medium with fine, subangular quartz, silty, greenish grey	0.6	18.5
Chalk Silt	Silt, chalky greyish olive	0.2	18.7
Upper Chalk	Chalk, soft white	1.8+	20.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	15	75	10	12.4-12.6	15	21	50	4	2	8	0
b	21	37	42	13.9-14.7 14.7-15.8 Mean	4 33 21	8 13 11	18 18 18	8 7 8	26 16 20	36 9 20	0 4 2
c	39	58	3	17.9-18.5	39	25	31	2	3	0	0

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
b	13.9-14.7 14.7-15.8 Mean	30 37 32	8 6 8	12 5 10	48 48 48	trace 0 trace	0 0 0	trace 0 trace	2 4 2

TM 08 SE 27 0957 8314 Near Osierbed Plantation, Shelfanger

Block A

Surface level +48.0 m (+157 ft)
Water level not recorded
July 1980

Waste 18.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, clay with sand	0.3	0.3
Boulder Clay	Clay, sandy, mottled light grey and orange with chalk and patinated flint pebbles	1.2	1.5
	Clay, silty, medium dark bluish grey with subangular chalk and occasional flint pebbles; becoming medium dark grey below 6.3 m and light olive grey, with abundant chalk pebbles below 8.2 m	12.4	13.9
	Clay, silty, firm, medium dark grey with fine chalk and occasional brown quartzite pebbles; becoming sandy, light grey, between 16.4 m and 17.4 m	4.6+	18.5

TM 08 SE 28 0989 8195 Darrow Farm, Bressingham

Surface level +36.6 m (+120 ft)
Water struck at +34.5 m
July 1980

Block A
Waste 20.4 m
Bedrock 3.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sand and clay	0.3	0.3
Boulder Clay	Clay, sandy, firm, mottled orange and light grey with chalk and patinated flint pebbles; becoming light grey, with abundant chalk, below 0.8 m	1.8	2.1
	Clay, silty, light olive grey with fine chalk and occasional flint pebbles; becoming light grey from 4.0 m to 5.7 m and from 9.1 m to 10.3 m, dark grey between 5.7 m and 9.1 m	8.2	10.3
Glacial Sand and Gravel	a 'Clayey' gravel, with occasional chalk and flint cobbles Gravel: coarse and fine, rounded chalk with some angular flint; traces of quartzite, vein quartz limestone, mudstone, shell and red chalk Sand: coarse with some medium, subangular quartz flint and chalk, clayey and silty	3.0	13.3
Boulder Clay	Clay, silty, stiff, dark grey with occasional fine chalk and flint pebbles	1.5	14.8
Glacial Sand and Gravel	b 'Clayey' gravel, with thin beds of silt Gravel: coarse with some fine, rounded chalk with some subangular flint and limestone, with traces of rounded flint, black mudstone and shell Sand: coarse with some medium and fine, subrounded chalk and some subangular quartz	1.0	15.8
Boulder Clay	Clay, silty, stiff, greyish black with fine chalk pebbles, becoming olive grey below 20.1 m with occasional patinated flints	4.6	20.4
Upper Chalk	Chalk, soft white	3.0+	23.4

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	12	23	65	10.3-11.3	13	2	7	18	32	28	0
				11.3-12.3	10	2	6	12	27	33	10
				12.3-13.3	14	4	8	14	27	30	3
				Mean	12	2	7	14	29	32	4
b	17	18	65	14.8-15.8	17	3	5	10	21	44	0
a+b	13	22	65	Mean	13	3	6	13	27	35	3

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
a	10.3-13.3	17	2	1	3	64	4	trace	9
b	14.8-15.8	15	2	trace	1	64	10	trace	8
a+b	Mean	16	2	1	3	64	5	trace	9

TM 08 SE 29 0917 8038 Fen Lane, Roydon

Surface level +35.4 m (+116 ft)
Water struck at +25.7 m
June 1980

Block A

Overburden 9.7 m
Mineral 3.2 m
Waste 0.9 m
Mineral 11.9 m
Waste 1.3 m
Bedrock 2.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil, sandy clay with flint pebbles	0.3	0.3
Cover Sand	a 'Very clayey' pebbly sand Gravel: coarse with some fine, angular flint with some rounded vein quartz and flint Sand: fine and medium subangular quartz, light brown	0.3	0.6
Boulder Clay	Clay, silty and sandy, light yellow orange with abundant fine subangular patinated flint and chalk, becoming less sandy between 1.1 m and 3.2 m; mottled light grey and greyish orange from 1.1 m to 2.5 m, medium dark grey with chalk cobbles from 2.5 m to 3.2 m and yellowish brown between 3.2 m and 4.2 m	3.6	4.2
Glacial Silt	b Silt, sandy and pebbly, becoming less pebbly and more clayey with depth, moderate olive brown; becoming dark medium grey below 4.8 m	1.4	5.6
	Silt, clayey, stiff, medium dark grey with indistinct lamination	2.2	7.8
Boulder Clay	Clay, silty, stiff, dark grey with occasional subangular chalk and black mudstone pebbles, becoming olive grey below 8.2 m and orange at base	1.9	9.7
Glacial Sand and Gravel	c 'Clayey' pebbly sand Gravel: fine with coarse, angular flint and rounded quartzite, with some rounded flint, vein quartz and chalk Sand: medium with fine, subangular quartz with some rounded chalk and angular flint, greyish orange	3.2	12.9
Boulder Clay	Clay, sandy, firm, orange brown with occasional fine subangular chalk and flint pebbles, becoming brownish grey, with flint and quartzite pebbles below 13.1 m	0.9	13.8

Ingham Sand and Gravel	d Sandy gravel, Gravel: fine and coarse, rounded brown quartzite and subangular flint, with some rounded vein quartz and flint; traces of ironpan and micaceous sandstone Sand: medium with some fine and coarse, subangular quartz and flint, olive brown, becoming light brown towards base	11.9	25.7
	e Pebbly sand, with occasion brown quartzite cobbles Gravel: coarse with fine, rounded brown quartzite and subangular flint with vein quartz, rounded flint and sandstone Sand: coarse and medium subangular quartz and flint, moderate, brown	1.3	27.0
Upper Chalk	Chalk, soft white	2.0+	29.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	Percentages						
	Fines	Sand	Gravel		Fines Sand Gravel						
					- $\frac{1}{8}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	22	60	18	0.3-0.6	22	34	24	2	4	14	0
b	67	24	9	4.2-4.8	49	24	4	1	3	0	19
				4.8-5.6	79	19	2	0	0	0	0
				Mean	67	21	2	1	1	0	8
c	13	77	10	9.7-11.0	22	35	33	5	4	1	0
				11.0-12.0	8	20	60	3	5	4	0
				12.0-12.9	6	16	56	4	10	8	0
				Mean	13	26	47	4	6	4	0
d	2	63	35	13.8-14.8	3	14	30	7	33	13	0
				14.8-15.8	2	17	51	6	13	11	0
				15.8-16.7	2	9	38	8	25	18	0
				16.7-17.7	2	6	34	11	29	18	0
				17.7-18.7	1	12	43	6	17	21	0
				18.7-19.7	2	15	35	7	23	18	0
				19.7-20.7	4	16	66	7	6	1	0
				20.7-21.7	2	9	41	14	22	12	0
				21.7-22.7	2	13	73	2	7	3	0
				22.7-23.7	1	26	32	3	12	24	2
				23.7-24.7	1	11	22	10	30	26	0
				24.7-25.7	0	9	37	23	18	13	0
				Mean	2	13	41	9	20	15	trace
e	1	78	21	25.7-27.0	1	3	34	41	8	11	2

COMPOSITION

	Depth below surface (m)	Percentages by weight in +8-16 mm fraction							
		Angular flint	Rounded flint	Vein Quartz	Quartzite	Chalk	Limestone	Igneous and Metamorphic	Others
e	9.7-12.9	33	18	5	30	5	0	1	8*
d	13.8-14.8	51	11	7	27	1	0	1	2
	14.8-15.8	44	10	7	38	0	1	0	0
	15.8-16.7	36	9	6	47	0	0	trace	2
	16.7-17.7	45	8	4	41	0	0	1	1
	17.7-18.7	39	2	11	45	0	0	1	2
	18.7-19.7	38	5	6	47	0	0	1	3
	19.7-20.7	46	0	14	40	0	0	0	0
	20.7-21.7	40	4	9	44	0	0	2	1
	21.7-22.7	49	3	14	34	0	0	0	0
	22.7-23.7	22	2	10	58	0	0	0	8
23.7-24.7	36	4	12	40	0	0	0	8	
24.7-25.7	38	7	9	42	0	0	1	3	
Mean	40	6	8	42	0	0	1	3	
e	25.7-27.0	31	5	9	51	0	0	0	4

* Mainly sandstone

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THE SAND AND GRAVEL RESOURCES OF THE COUNTRY AROUND REDGRAVE, SUFFOLK.

Scale 1:25 000 or about 2 1/2 Inches to 1 Mile

ORDNANCE SURVEY
TM07 & Pt 08
PROVISIONAL EDITION

117

EXPLANATION OF SYMBOLS AND ABBREVIATIONS

- DRIFT**
- Alluvium - soft silts and clays with occasional shells A-70
 - Peat - dark brown organic matter P-11
 - River Terrace Deposits - quartz sand with angular flint pebbles RT-26
 - Head - poorly sorted pebbly sandy clay and clayey sandy gravel, derived by solifluction H-48
 - Glacial Sand and Gravel - sand and gravel, often clayey and poorly sorted with pebbles of flint, quartzite, vein quartz, chalk and limestone
 - Glacial Silt - grey silt, often laminated GSI-10
 - Boulder Clay - brown and dark grey clay, with scattered pebbles of chalk and flint BC-45
 - Kesgrave Sands and Gravels - sandy gravel and pebbly quartz sand with subangular flint, rounded vein quartz and quartzite pebbles K-9
 - Ingham Sand and Gravel - gravel and pebbly sand, rich in brown quartzite pebbles, with some angular flint I-1
- SOLID**
- Crag - micaceous quartz sand, in part dark green (glaucous) and occasionally silty, some rounded flint and vein quartz pebbles
 - Upper Chalk - soft white limestone
- MADE GROUND**
- Made Ground MG-2
 - Worked-out Area WO-5

- BOUNDARY LINES**
- Geological boundary, Drift
 - Geological boundary, Solid
 - 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 - 07NW45
Borehole Site - 55.4 - 182
Geological Classification (Ca) - 113 - 113
(UCL) - 113 - 113
Grading Diagram - 113 - 113
- Note:
(i) Figures underlined denotes 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.

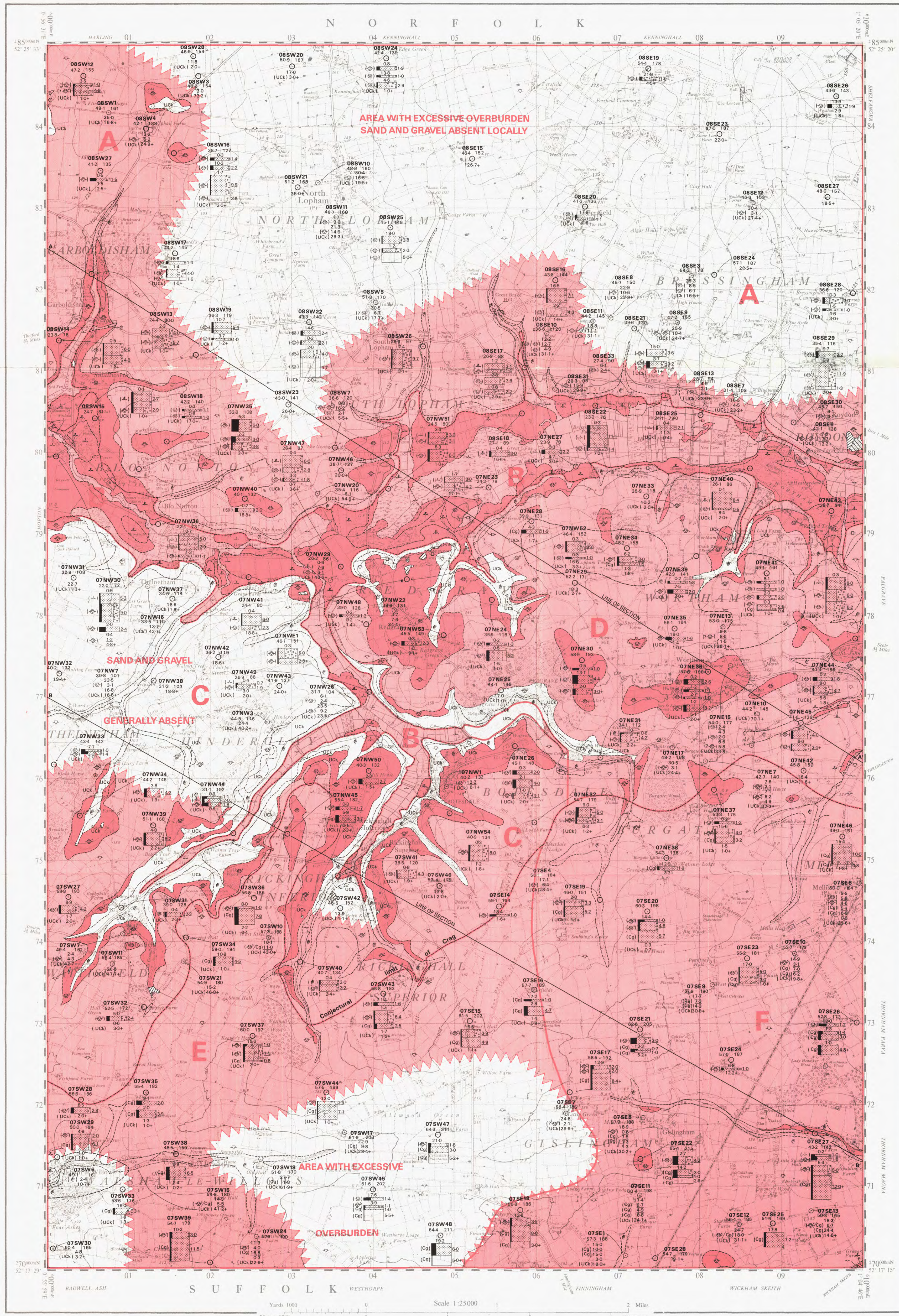
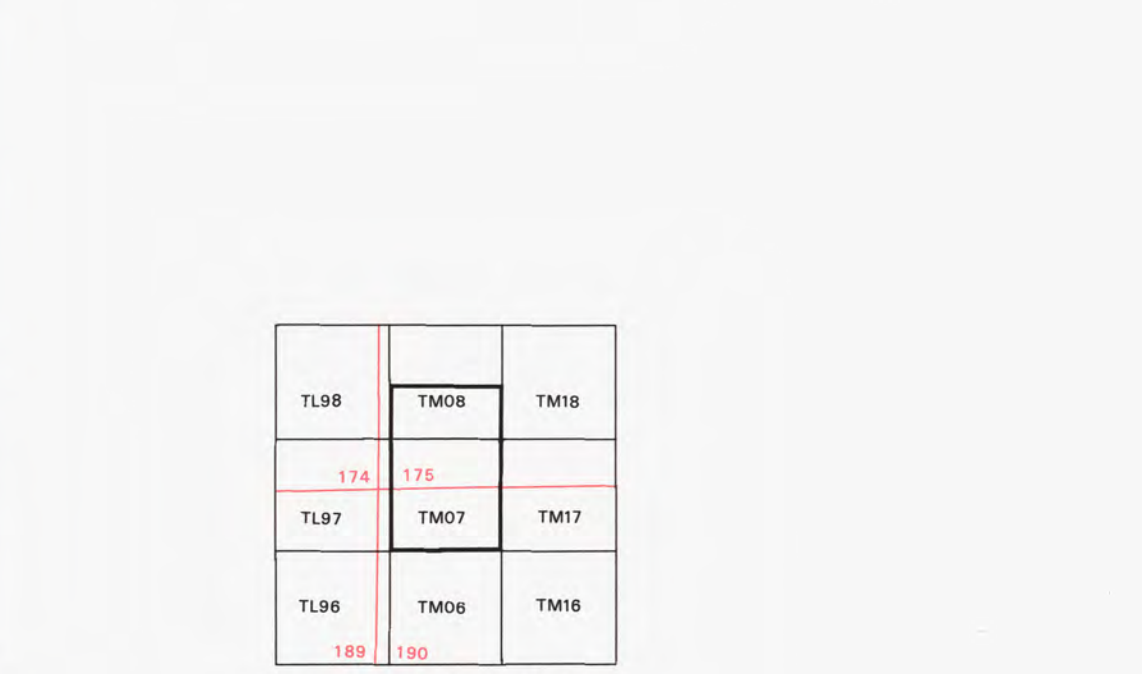
- Borehole Registration Number**
Each I.M.A.U. borehole is identified by a Registration Number, e.g. 07NW45. The first numbers and letters refer to the quarter sheet and the final figures to the U.S. serial numbers for that quarter. The unique designation for borehole 07NW45 is TM07NW45.
- Grading Diagrams**
Each grading diagram shows the mean particle size distribution of a distinct deposit of mineral.
- The height of the diagram is proportional to the mineral thickness.
The widths of the divisions show the proportions of Fines, Sand and Gravel but small amounts of gravel may be limited 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. If the position of the boundary between contiguous deposits of sand and gravel is uncertain, their geological classification symbols are brought together, e.g. (Ca) (Cg) and the thickness of the combined unit is given.
- EXPOSURE RECORDS**
Information from the inspection of exposures is shown in the same way as for boreholes but they are located by an asterisk, e.g. *113. Reference number and details of thickness are shown.

- CATEGORIES OF DEPOSITS**
- Exposed mineral (average thickness of overburden less than 1.0m) CAT-E1
 - Continuous or almost continuous spreads of mineral beneath overburden (average thickness of overburden greater than 1.0m) CAT-C3
 - Sand and Gravel either not potentially workable (see Report) or absent CAT-A2

RESOURCE BLOCKS
For the purpose of assessment the mineral bearing land is divided into Resource Blocks (see Report). Each is designated by a letter.
Schematic sections showing the general relationships of deposits along lines AA' and BB' are shown at the base of the map.
Detailed records may be consulted on application to the Head, Industrial Minerals Assessment Unit, Institute of Geological Sciences, Keyworth, Nottingham NG12 5GG.

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Austin W. Woodland, C.B.E., Director, Institute of Geological Sciences.
Conceptual limit of Crag by C.A. Aston in 1980.
Sand and Gravel survey by C.A. Aston and M.R. Clarke in 1980.
1:25,000 Sand and Gravel Resource Sheet published in 1982.
J.S. Thornell, Head, Industrial Minerals Assessment Unit.
G. Malcolm Brown, D.Sc., F.R.S., Director, Institute of Geological Sciences.

The Grid lines on this Sheet are at 1 Kilometre interval.
Heights are on the Ordnance Mean Sea Level at Newlyn.
Contours shown are in feet.
I reserve the right to amend this map representation.
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Other partial systematic revisions 1958-50 have been incorporated.
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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.

GENERALISED HORIZONTAL SECTIONS SHOWING RELATIONSHIPS OF DRIFT DEPOSITS

