

The sand and gravel resources of the country between Rugby and Northampton, Warwickshire and Northamptonshire

Description of 1:25 000 sheet SP 66 and parts of SP 56, 57, 65, 67, 75 and 76

M. R. Clarke and E. R. Moczarski

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

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

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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 cooperation of the Sand and Gravel Association of Great Britain.

This report describes the resources of sand and gravel of 372 km² of the country between Rugby and Northampton shown on the two accompanying 1:25 000 resource maps. The drilling survey was conducted by E. R. Moczarski in 1973-74, who also prepared a preliminary report. Mr M. R. Clarke has prepared this report with the help of Mr C. A. Auton, Mr I. Jackson and Mr R. Stanczyszyn.

The work is based upon 1:10 560 scale geological survey by staff of the Institute's Central and South Midlands Unit, mainly undertaken between 1939 and 1950, with some later revision, as published on One Inch New Series Sheet 202 (Towcester) (1969 edition) and 1:50 000 Sheet 185 (Northampton) (1980 edition).

Mr J. W. Gardner, CBE (Land Agent), has been responsible for negotiating access to land. The ready co-operation of land owners and tenants with this work is gratefully acknowledged.

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The sand and gravel resources of the country between Rugby and Northampton (Sheets 1 and 2) in pocket

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Plate 1 Milton Sand Deposits (Fluvioglacial Gravel).

This thick sequence (about 10 m) of fine- and medium-grained quartz sands known locally as Milton Sand, is currently being worked near Rothersthorpe [715 567]. The deposit is seen to comprise well bedded sands displaying current bedding, with thin stringers of locally-derived ironstone pebbles.

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M. R. CLARKE and E. R. MOCZARSKI

SUMMARY

The geological maps of the Institute of Geological Sciences, pre-existing borehole information, and 236 boreholes drilled for the Industrial Minerals Assessment Unit form the basis of the assessment of the sand and gravel resources of the country between Rugby and Northampton.

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 resource maps (Sheet 1 - north and Sheet 2 - south) are divided into six resource blocks, containing between 6.4 and 19.5 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 composite resource maps.

Notes

Each borehole registered with the Institute is identified by a four-element code (e.g. SP 56 NE 1). 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 this report the borehole is normally referred to by the last three elements alone (e.g. 56 NE 1).

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

Bibliographical reference

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INTRODUCTION

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

The survey provides information at the 'indicated' 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 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.

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

For the particular needs of assessing sand and gravel resources, a grain-size classification based on the geometric scale 1/16 mm, 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 1/16 mm and 4 mm respectively (see Appendix C).

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 RESOURCE SHEETS

GENERAL

The area shown on the two resource sheets enclosed with this report includes 372 km² of mainly agricultural land between the towns of Northampton, in the south-east and Rugby to the west of the survey area (Figure 1). The potentially workable sand and gravel is found principally in the spreads of Glacial Sand and Gravel which are distributed as irregular-shaped deposits throughout the survey area. However, significant resources of mineral are found within the River Terrace Deposits of the River Nene and its tributaries, and within the predominantly sandy, fluvioglacial deposits known as the Milton Sand.

Together, the mineral deposits cover 73.7 km² (20 per cent) of the survey area, which includes large areas of Jurassic rocks at outcrop.

No assessment has been made of the deposits underlying the urban area of Northampton (which extends over 33.6 km²), although deposits outside the present urban area, but within the scheduled development areas, are assessed together in Block F.

The total volume of mineral in the Drift deposits (295 million m³) is described in the six resource blocks A to F (Table 3); no assessment of sandy deposits within the bedrock formations has been attempted.

TOPOGRAPHY

The main physical feature of the area is the valley of the River Nene which follows (at a height of about +76 m OD) a west to east course across the southern part of the survey area. A tributary river, the Nenmore Brook, flows southward from the vicinity of Long Buckby [628 677] to join the River Nene at Road Weedon [632 598].

The ground rises rapidly from the flood-plain to the surrounding plateaux which are characterised by gently undulating clay hills rising to over +187.5 m (+550 ft) OD; they are occasionally capped by relatively flat, harder ground (Figure 2), such as that at Wootton [763 565].

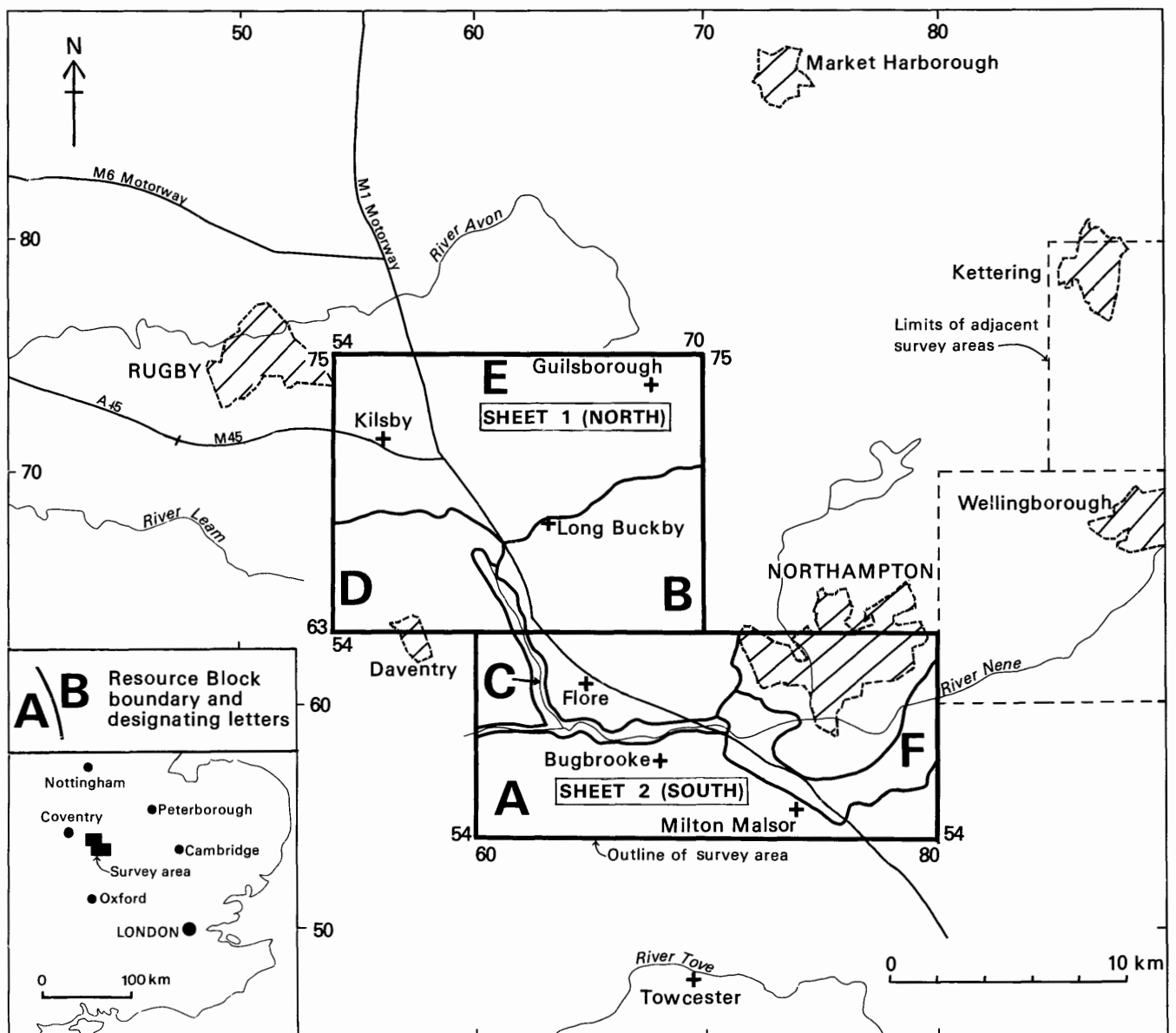


Figure 1 The location of the resource sheets and the outlines of the resource blocks (A to F).

In the Northampton area, boreholes have proved that a deep, buried-channel lies approximately beneath the present day valley of the River Nene; this buried-channel does not appear to continue upstream beyond Flore [645 600].

GEOLOGY

In this area a simple geological picture is portrayed; the solid rocks, which are entirely of Jurassic age, are covered by irregularly distributed spreads of glacial deposits, with well-defined spreads of River Terrace Deposits in the major valleys (Figure 3). A brief description of the geological succession of mapped deposits (shown as far as possible in order of increasing age, in Table 1), is given below.

The solid rocks show little structural disturbance; in general they are nearly horizontal or have a gentle regional dip towards the south-east. Minor faulting can be traced within the Jurassic sequence where displacements of up to 60 m are apparent.

A detailed account of similar strata is given in the geological survey memoir (Taylor, 1963) for the adjacent Kettering district.

Table 1 The geological succession of mapped deposits

DRIFT	
Recent and Pleistocene	
	Alluvium
	River Terrace Deposits
	Glacial Lake Deposits
	Boulder Clay
	Glacial Sand and Gravel
	Milton Sand (Fluvioglacial Gravel)
SOLID	
Jurassic	
Great Oolite Series	
	Great Oolite Clay (Blisworth Clay)
	Great Oolite Limestone (Blisworth Limestone)
	Upper Estuarine Series
Inferior Oolite Series	
	Lincolnshire Limestone
	Lower Estuarine Series
	Northampton Sand
Lias	
	Upper Lias
	Middle Lias (including the Marlstone Rock Bed)
	Lower Lias

Lias This formation, which forms bedrock over a large part of the survey area, is mapped in three main parts. The Upper and Lower Lias, up to 60 m and 170 m thick respectively, comprise firm bluish grey clays and mudstones with discontinuous limestone beds. Separating these two units is the Middle Lias which comprises up to 30 m of grey micaceous silts and silty clays capped by a shelly sideritic limestone (the Marlstone Rock Bed): it has a maximum proved thickness of about 3 m in this area and has been worked locally as a source of ironstone.

Inferior Oolite Series These beds, which unconformably overlie the Lias, are also subdivided into three main parts. The Northampton Sand which forms the basal member comprises up to 23 m of reddish brown (ferruginous) sandstone with thin iron-cemented veins and nodules. Locally, it has been particularly important as an ironstone resource and has been extensively worked in large opencast pits, for example, near Cotton

[745 588]. It is overlain by the Lower Estuarine Series, which comprises up to 5 m of variegated pale grey sand and grey to lilac-tinted silts and clays. The Lincolnshire Limestone forms the upper-most member (up to 3 m in thickness) and comprises ferruginous, siliceous, oolitic and pisolitic limestones; it is not well developed in this area.

Great Oolite Series This sequence of beds is represented by three lithological units: the lowest, the Upper Estuarine Series, comprises light to dark green and grey silts and clays, proved to be up to 9 m in thickness. These are overlain by the Great Oolite Limestone (Blisworth Limestone) characterised by cream-weathering calcitic mudstones, siltstones and shelly limestones (up to 7 m in thickness) which locally form the flat-topped plateaux of the area. At the top of the sequence is the Great Oolite Clay (Blisworth Clay), comprising up to 7.6 m of vividly-coloured dark grey, green and purple clays.

Milton Sand (Fluvioglacial Gravel) Deposits of fine and medium grained sand, previously mapped as Fluvio-glacial Gravel, in the area around Milton [735 555], appear to represent a deeply dissected, continuous spread of early Pleistocene fluvial material. They are known locally as the Milton Sand (first described by J. B. Thompson in 1930) comprising pale brown (iron-stained) quartz sands with thin gravel beds containing mainly locally-derived sandstone and ironstone pebbles, and shelly material from the Lias. Assessment boreholes show that sandy deposits rich in ironstone pebbles, similar to the Milton Sand extend beyond the mapped boundaries; they occur beneath later Drift deposits near to the valley of the Nenmore Brook upstream as far as Kilsby [560 710], for example, in borehole 56 NE 2. Although distant from other occurrences, boreholes 57 SE 10 and 57 SW 2 also proved sandy deposits which are very similar to the Milton Sand seen elsewhere in the survey area, and they are thought to represent the same early Pleistocene fluvial event.

For the purposes of this survey, it has been assumed that the Milton Sand deposits pre-date the main glacial events of the area. However, it has been suggested that these sands represent the overflow from Glacial Lake Harrison (Bishop, 1958). More recently Castleden (1980) has attributed their origin to Wolstonian periglacial stream aggradation and considered that they post-date an earlier (Anglian) till. The adoption of this interpretation would change the classification of deposits proved in some assessment boreholes; for example in borehole 75 NE 396, the lower part of the mineral deposits might be reclassified as Milton Sand with an underlying boulder clay.

Data from 18 assessment boreholes proved mineral in the Milton Sand to range in thickness from 0.9 to 12.9 m and to have a mean thickness of 5.3 m; the base of the Milton Sand lies at heights of between +72.3 m (in borehole 75 NW 175) near Milton and +144.4 m OD (in borehole 56 NE 2) near Kilsby.

Glacial Sand and Gravel The Glacial Sand and Gravel comprises poorly sorted clayey sands and gravels containing pebbles of flint, Bunter quartzite, shelly and oolitic limestone, ironstone and chalk. It may be found to lie beneath, within and upon the Boulder Clay with which it is intimately associated. The deposits of Glacial Sand and Gravel show extreme variation in both lateral and vertical extent, and, in assessment boreholes, range in thickness from 0.7 m (in borehole 75 NW 161) to 17.8 m in borehole 57 SE 19 with a mean (for the whole survey area) of 4.2 m. The sand and gravel deposits in this area would appear to be similar to the flint-rich Dunsmore Gravels of the nearby Wolstonian type area (Shotton, 1953).

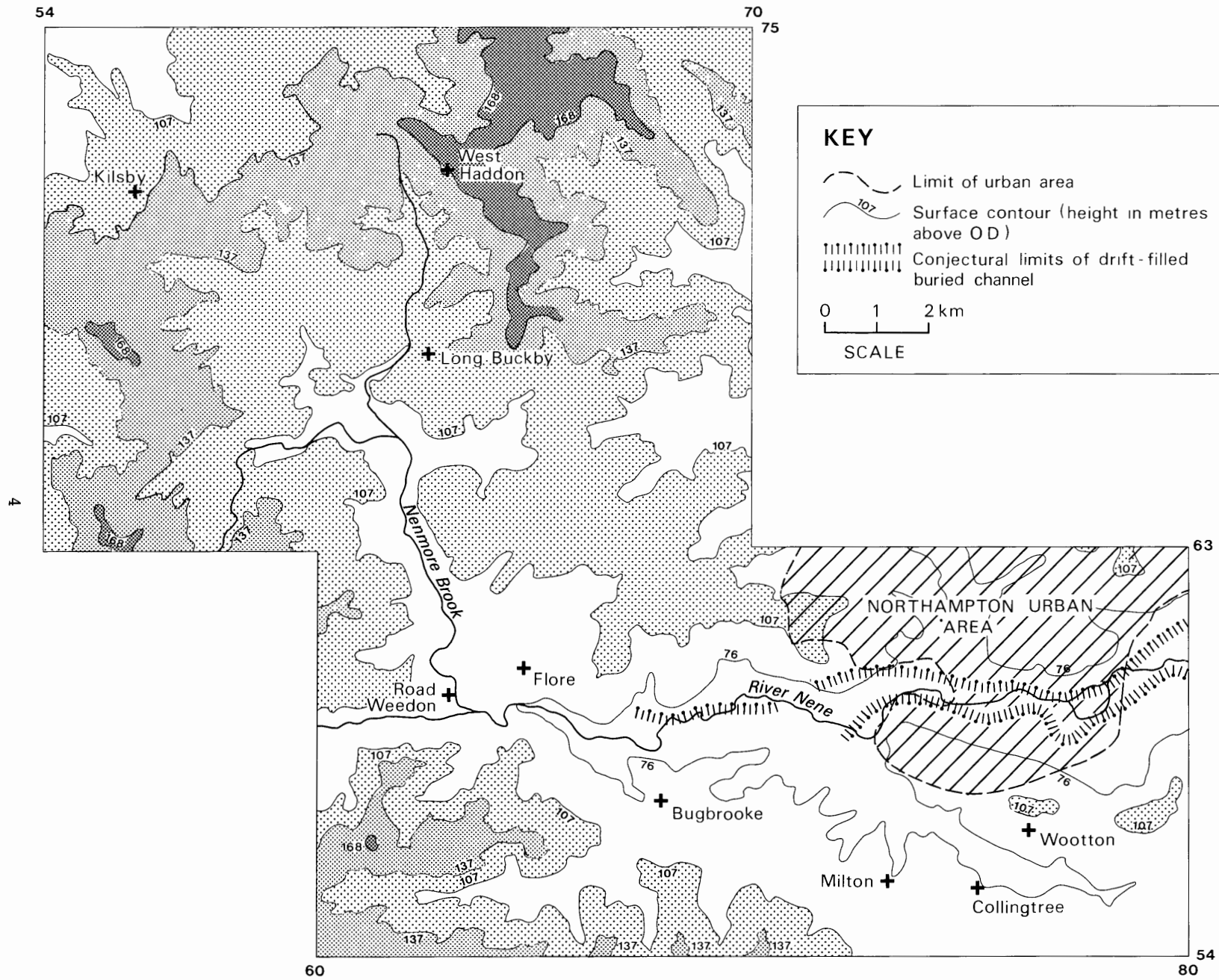


Figure 2 The topography of the survey area.

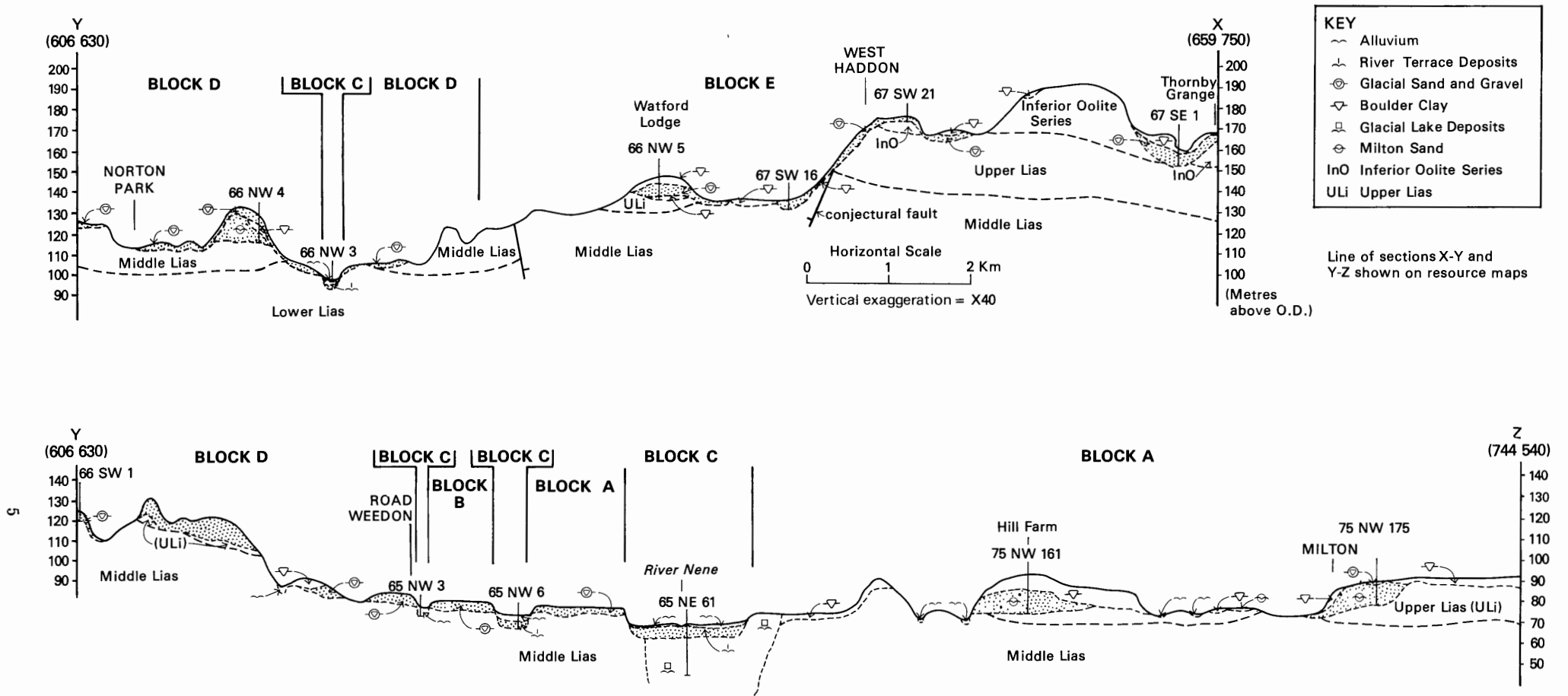


Figure 3 Geological cross sections of the resource sheets.

Boulder Clay There appear to be two types of till within this survey area. The most widespread is a stiff bluish and brownish grey clay with pebbles of chalk, flint, quartzite, vein-quartz, oolitic limestone and ironstone, as proved for example in boreholes 67 SW 4 and 67 SE 8. Its pebble composition suggests it is the lateral equivalent of the Upper Boulder Clay in the Kettering area (Hollingworth and Taylor, 1946). The other till was proved by assessment boreholes in the vicinity of Ashby St Ledgers [570 681] and Daventry [580 630], (for example in boreholes 56 NW 3, 56 NE 1 and 56 SW 1), to comprise a firm reddish brown clay containing pebbles of fine grained orange-brown siltstone. Where proved in boreholes, this till either underlies or interdigitates with the bluish grey till, as seen in boreholes 56 NE 1 and 56 SW 1 respectively.

Glacial Lake Deposits The sequence of laminated silts and clays beneath the Nene Valley (described by Earley, 1956 and Horton, 1970) have been proved in assessment boreholes to extend downstream of Flore [646 603], where borehole 75 NW 169 [7212 5928] proved that the silts have a thickness greater than 26.3 m. The origins of the channel and its sedimentary infill remain uncertain.

River Terrace Deposits Spreads of sand and gravel mapped as the River Terrace Deposits occur at three levels within the Nene Valley, where they cut into, and thus clearly post-date the earlier glacial deposits. The terrace deposits comprise flint, vein-quartz, quartzite and ironstone gravels and quartz sands. The mineral deposits range in thickness from 1.0 m in borehole 75 NW 173 to 4.6 m in borehole 65 NE 63 with a mean thickness of 2.2 m.

At Great Billing [617 826] just beyond this survey area, the lowest terrace deposits of the River Nene have been interpreted (Morgan, 1969) as the product of mid to late Devensian fluvio-glacial activity.

Alluvium Soft, silty clays are found in the present-day floodplains of the River Nene and its tributaries. They are generally too thin and clayey to be considered as mineral, and are thus classified as overburden.

COMPOSITION OF THE SAND AND GRAVEL DEPOSITS There are three main resources of potentially workable sand and gravel in the survey area. The most extensive is the Glacial Sand and Gravel which is distributed

across both resource sheets. However, the deposits of Milton Sand found mainly in resource block A (but also occurring in blocks D and E) and the River Terrace Deposits in blocks C and F, also form significant resources. The geographical variation in mean particle size distribution and composition of mineral proved in assessment boreholes is shown in Figures 4, 5, 7 and 8, and the chief characteristics of each mineral deposit are described below and shown in Figure 6.

Milton Sand This deposit is represented by a sequence of well-bedded, pale brown fine and medium-grained quartz sands, which in places are heavily iron-stained. The thin units of gravel interbedded with the sandy strata are characterised in the fine gravel (+4 -16 mm) fraction by a high percentage (often 100 per cent, for example in borehole 65 NE 68) of locally-derived subrounded ironstone pebbles. They also contain some limestone and sandstone pebbles (see Table 2).

The mean particle size distribution of the Milton Sand is distinctive because of the low proportion (5 per cent) of coarse sand, and the high proportions of fine and medium sand which together make up the bulk (76 per cent by weight) of the deposit (Figure 6). Thus the mean grading data may be used in the recognition and classification of Milton Sand deposits in assessment boreholes. No regional trends in variation of the mean grading can be observed in the data from 17 IMAU boreholes; all Milton Sand deposits approximate to the overall classification of 'clayey' sand, and the mean grading of fines: 12 per cent, sand 81 per cent and gravel 7 per cent.

Glacial Sand and Gravel Although deposits of Glacial Sand and Gravel are spread irregularly throughout the survey area, as a whole they show remarkable uniformity in their particle size distributions, and in the lithologies present in the fine gravel fraction (Table 2).

Most of the Glacial Sand and Gravel occurs in the northern part (Sheet 1) of the district where it comprises pale brown fine to coarse quartz sands and subangular to subrounded gravels. The fine gravel fraction is made up of flint, limestone and ironstone pebbles in roughly equal proportions (19 per cent, 24 per cent and 20 per cent respectively). Minor and almost equal amounts of vein-quartz/quartzite (10 per cent), sandstone (14 per cent) and chalk (10 per cent) with a small proportion (3 per cent) of other pebble types form the remainder of the material present.

Table 2 The composition of the mineral deposits.

Deposit	No. of boreholes	Mean Gravel thickness m	Mean Gravel percentage %	Percentage by weight						
				Flint	Quartz/Quartzite	Sandstone	Limestone	Chalk	Ironstone	Others
Milton Sand	11	6.1	8	trace	trace	1	5	1	92	1
River Terrace Deposits	10	2.5	44	18	8	7	7	1	58	1
Glacial Sand and Gravel (whole survey area)	81	5.3	29	20	9	13	24	10	21	3
Glacial Sand and Gravel (sheet 1 - North)	63	5.7	28	19	10	14	24	10	20	3
Glacial Sand and Gravel (sheet 2 - South)	18	3.7	33	23	6	8	23	10	28	2

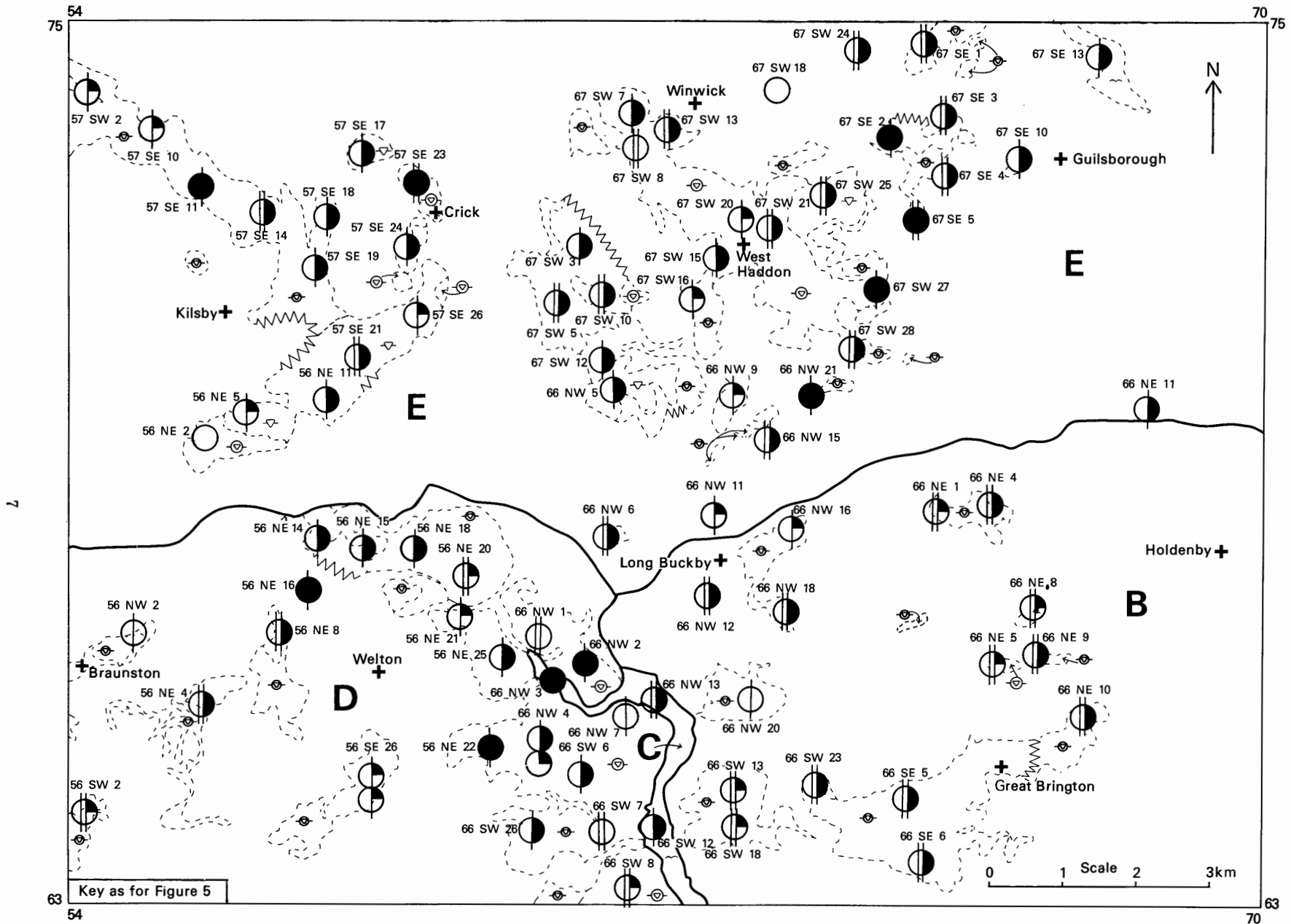


Figure 4 The mean grading of the mineral deposits proved in assessment boreholes (Sheet 1).

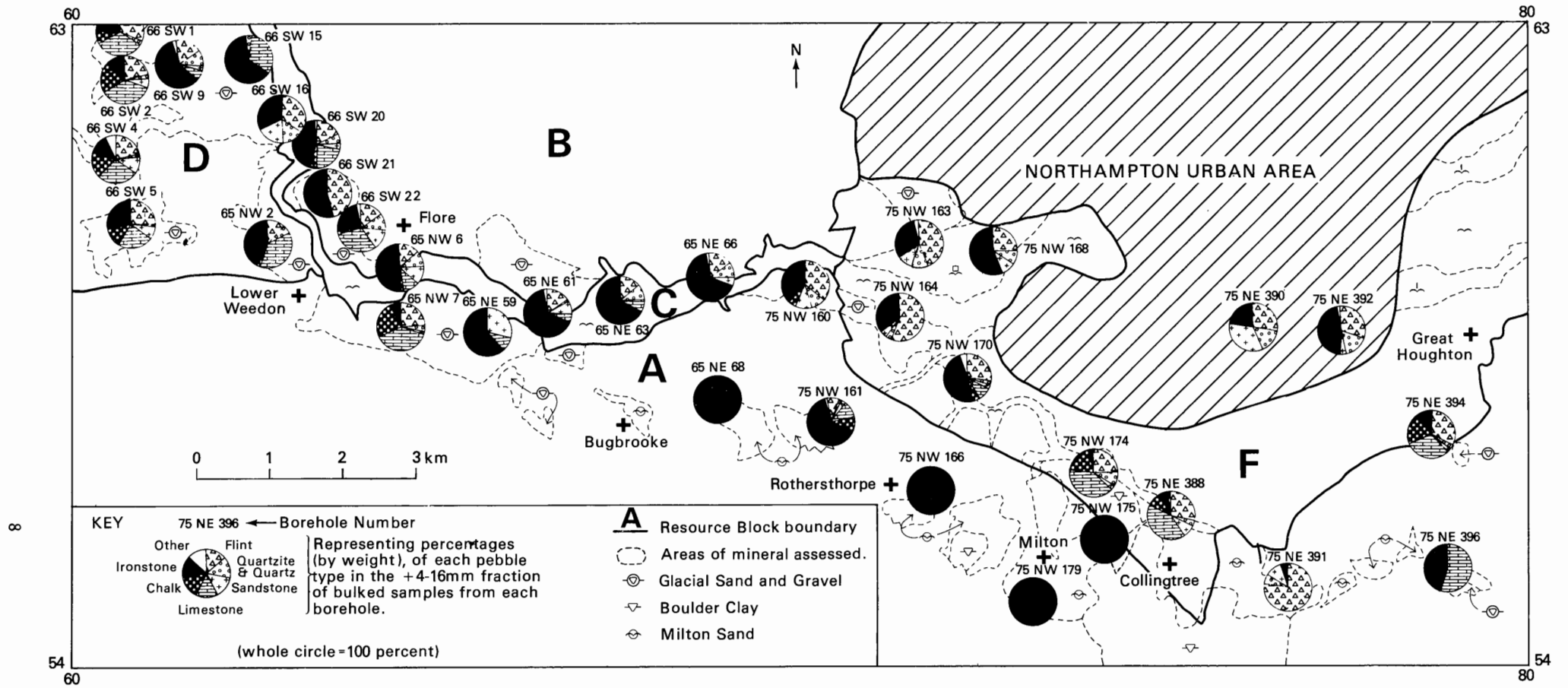
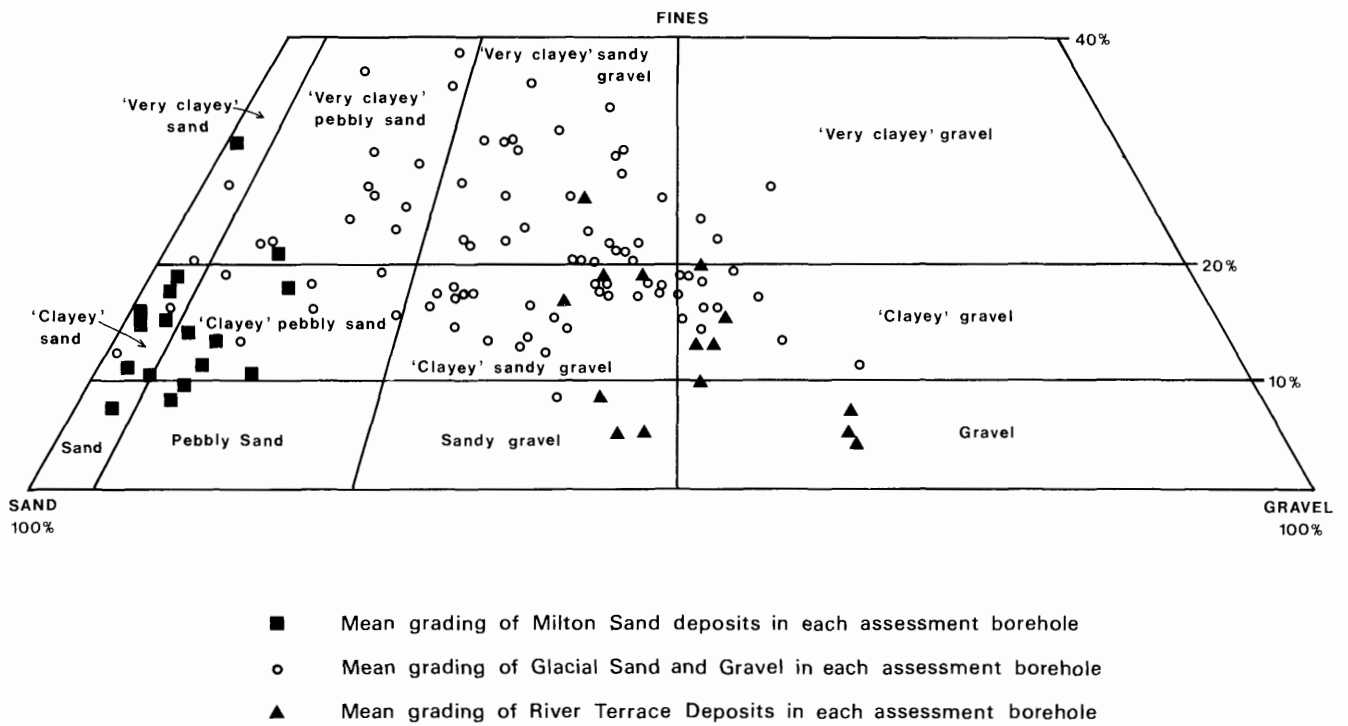
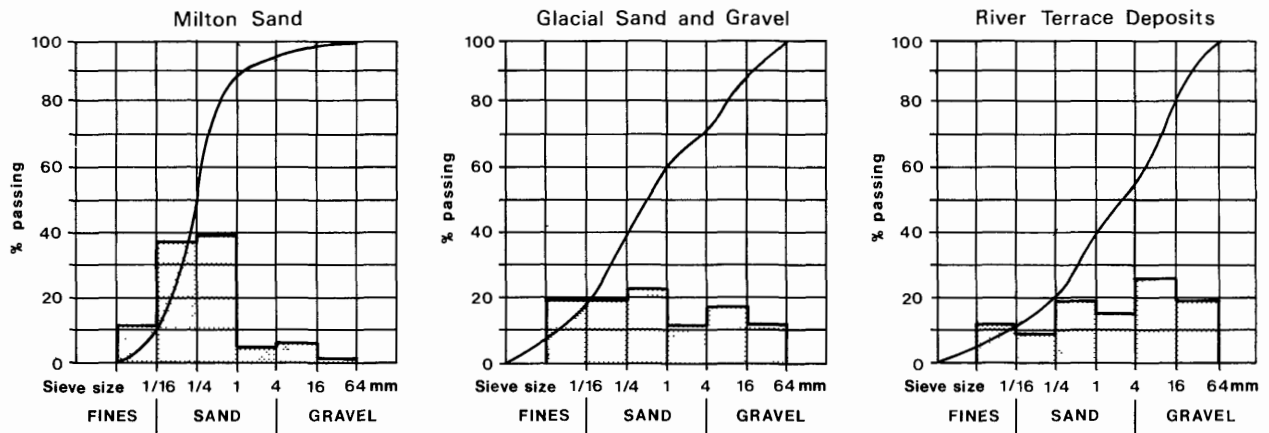


Figure 5 The mean grading of the mineral deposits proved in assessment boreholes (Sheet 2).

a) Range of mean grading of mineral deposits proved in assessment boreholes



b) The overall mean grading for each mineral deposit:



Note:-The shaded areas represent the percentages in each grade and the curve represents the cumulative particle size distribution for each deposit proved in the survey area.

DEPOSIT	NUMBER OF DATA POINTS	Mean grading percentages					
		FINES	SAND			GRAVEL	
		-1/16mm	+1/16 -1/4	+1/4 -1	+1 -4	+4 -16	+16 -64mm
Milton Sand	17	12	37	39	5	6	1
Glacial Sand and Gravel	83	19	19	22	11	17	12
River Terrace Deposits	15	12	9	19	15	26	19

Figure 6 The grading characteristics of the mineral deposits.

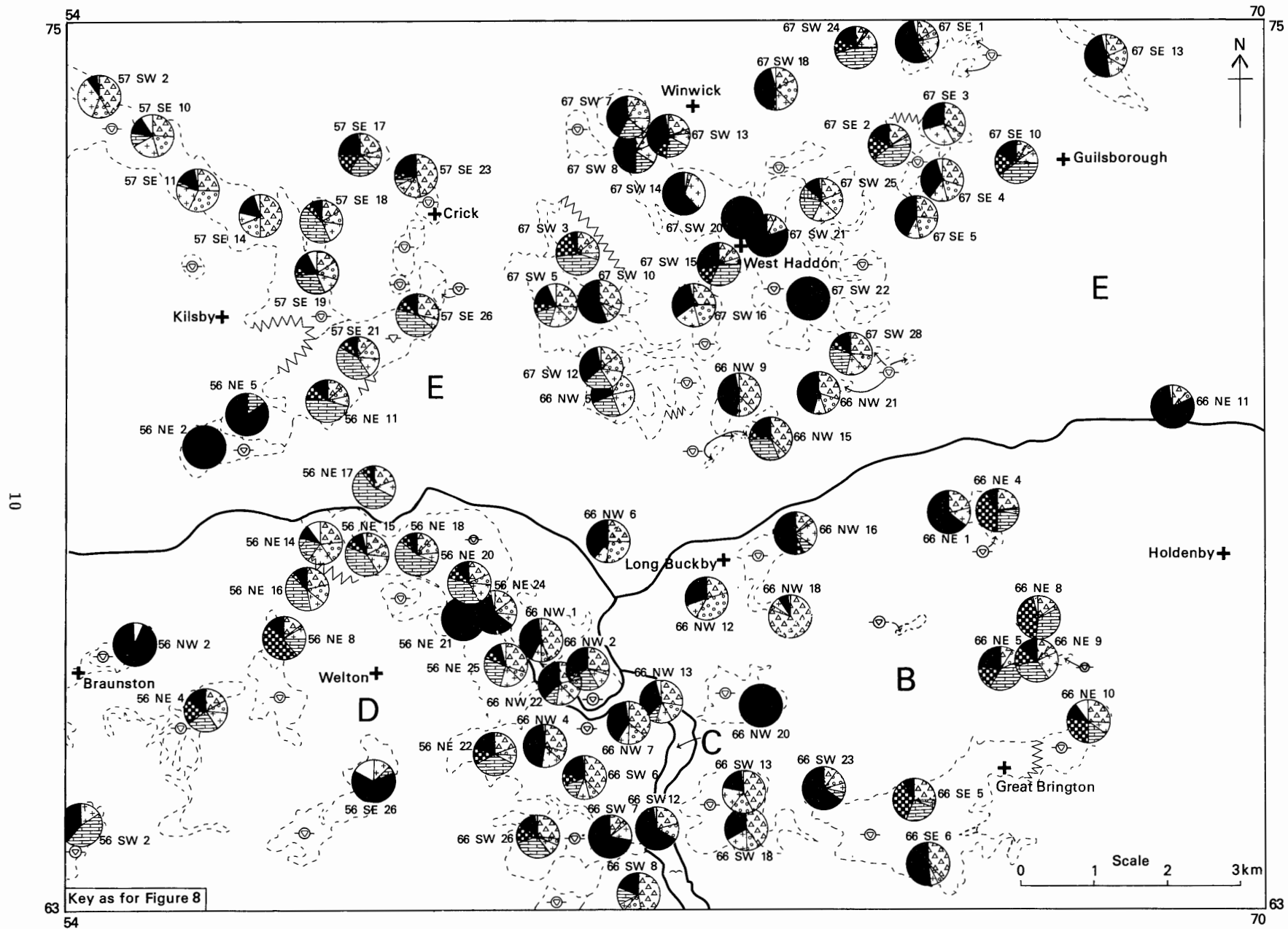


Figure 7 The relative composition of the mineral deposits proved in assessment boreholes (Sheet 1).

In the southern part of the survey area (Sheet 2) the composition of the Glacial Sand and Gravel is surprisingly similar. The main pebble constituents in the fine gravel fraction are again flint (23 per cent), limestone (23 per cent) and ironstone (28 per cent), but whereas limestone is the major component in the north, in the south, ironstone is more abundant.

The uniformity of the Glacial Sand and Gravel is also reflected in the mean grading data for the deposit. It is classified as 'clayey' sandy gravel, both in the north of the area (based upon the results of 63 assessment boreholes) and in the south of the area, where 22 assessment boreholes provided samples from this deposit. The mean grading of the Glacial Sand and Gravel on each of the two resource sheets is almost identical and the mean grading of the deposit in each borehole deviates little from the overall mean grading of fines 19 per cent, sand 52 per cent and gravel 29 per cent (see Figure 6). Medium and fine sand are predominant in the sand grades, but the significant amount of coarse sand (11 per cent) distinguishes the Glacial Sand and Gravel from the deposits of Milton Sand.

River Terrace Deposits Sand and gravel of fluvial origin is found beneath the Alluvium in the valleys of the River Nene and its tributary the Nenmore Brook. Small patches of terrace deposits are associated with minor streams in the north of the area, near Ravensthorpe [670 702] and north-east of Guilsborough [675 730].

In general, the River Terrace Deposits are classified as gravels and sandy gravels with variable amounts of fines. In the fine gravel fraction, ironstone is the most abundant pebble lithology present, but flint, vein-quartz/quartzite, sandstone and limestone are important components (Table 2). Chalk content is usually less than 3 per cent (by weight), but rises to a maximum of 6 per cent in borehole 75 NW 170 which is sited adjacent to an outcrop of Glacial Sand and Gravel.

The overall mean grading of fines 12 per cent, sand 43 per cent and gravel 45 per cent, shows that the River Terrace Deposits contain a substantially greater proportion of gravel than the other Drift deposits in the area. The fairly low fines content may be attributed to the fact that the terrace deposits generally lie below the local water-table, and that some of the fines may have been removed by the wet-drilling procedure.

Surprisingly, medium and coarse sand predominates in the sand grades of the River Terrace Deposits, contrasting strongly with the very high fine sand content of nearby Milton Sand deposits.

THE MAPS

The sand and gravel resource maps are folded into the pocket at the end of this report. They are based upon 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 boundaries shown are taken from the 1:10 560 scale maps which were surveyed in 1939-50 (see maps) but include amendments made by K. Ambrose, J. Brewster, and M. G. Sumbler between 1975 and 79. Borehole data, which include the stratigraphic relationship and mean particle-size distribution of sand and gravel samples collected during the assessment survey, are also shown.

The geological boundaries are regarded as the best interpretation of the information available at the time of survey. However, because of the difficulty of mapping glacial deposits which show rapid vertical and lateral variation, it is inevitable that local irregularities or discrepancies will be revealed by boreholes. These are taken into account in the assessment of resources (see below and Appendix B).

Mineral resource information The mineral-bearing ground is divided into resource blocks (see Appendix A).

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

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

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

RESULTS

The simple statistical procedure, explained in Appendix B, has been used to calculate the resource in the six resource blocks A, B, C, D, E and F; the results are given in Table 3. The block boundaries have been drawn so that where possible deposits of a similar nature are assessed together. Particle-size distributions for the assessed thicknesses of mineral in blocks A to F are shown in Figure 9.

Accuracy of results

For each of the six blocks A, B, C, D, E and F assessed statistically, the accuracy of the results at the symmetrical 95 per cent probability level (that is, it is probable that nineteen times out of twenty, the true volume of mineral present lies within the given limits) varies from 28 per cent to 52 per cent. However, the true values are more likely to be nearer the volume calculated 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 the quotation of reserves of part of a block, it can be expected that data from more than ten sample points would be required, even if the area is quite small. This point can be illustrated by considering the whole of the statistically assessed sand and gravel on the resource sheet. The total volume (295 million m³) can be estimated to limits of ± 16 per cent at the 95 per cent probability level by a calculation based on the data from the 145 sample points spread across the six resource blocks.

However, it must be emphasised that this quoted volume of mineral has no simple relationship with the

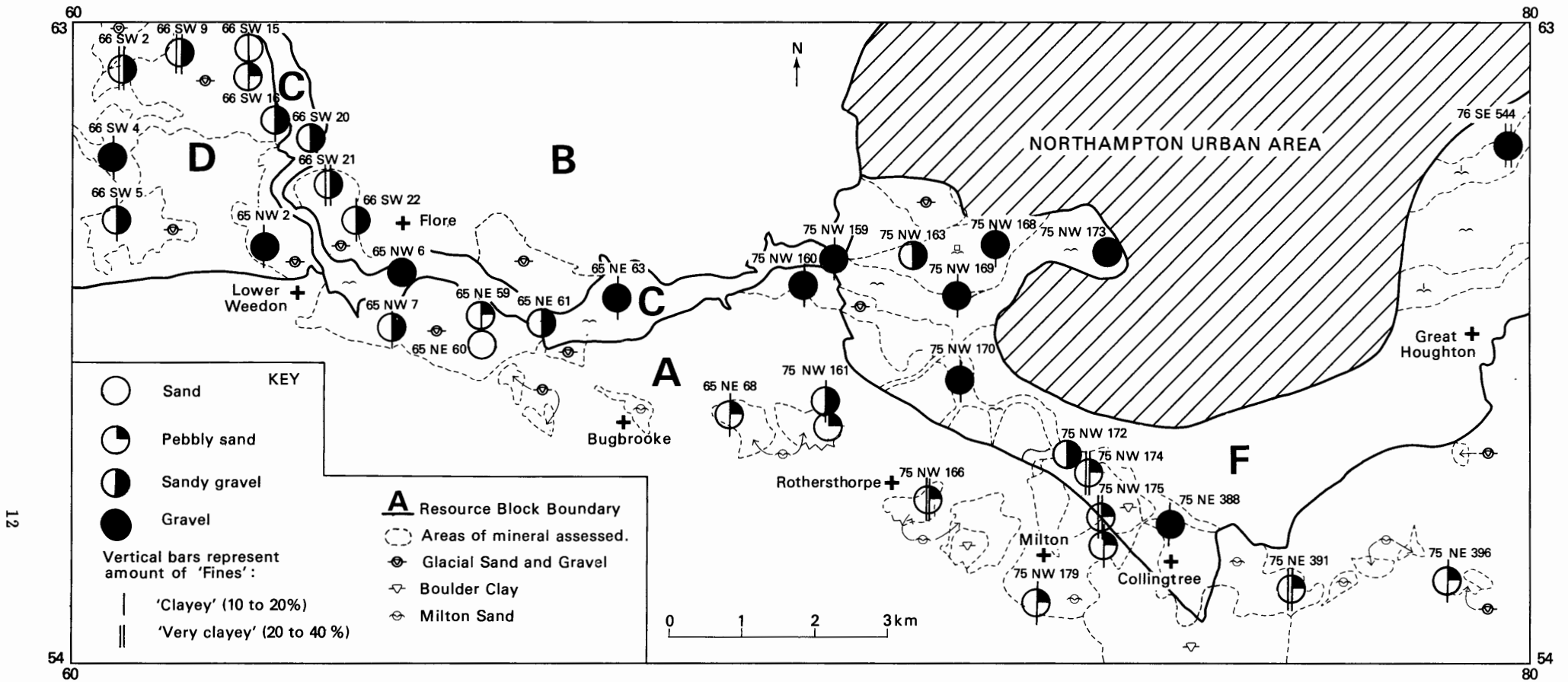


Figure 8 The relative composition of the mineral deposits proved in assessment boreholes (Sheet 2).

Table 3 The sand and gravel resources of the survey area.

Block	Area		Mean thickness		Volume of mineral million m ³	Limits at the 95% confidence level		Mean grading percentages		
	Block km ²	Mineral km ²	Mineral m	Over- burden m		±%	±million m ³	Fines - ¹ / ₁₆ mm	Sand + ¹ / ₁₆ -4 mm	Gravel +4-64 mm
A	81.7	10.0	4.8	1.4	48	47	23	13	75	12
B	73.8	8.8	3.3	2.7	29	41	12	24	56	20
C	6.4	6.4	2.4	2.1	15	52	8	10	43	47
D	50.3	18.3	5.3	2.2	97	29	28	17	58	25
E	102.5	19.5	4.4	2.3	86	28	24	18	53	29
F	23.7	10.7	1.4	3.0	15	46	7	13	44	43
Whole Survey										
Area	338.4	73.7	4.0	2.3	295	16	47			
Northampton Urban										
Area	33.6									

amount that could be extracted in practice, because, apart from the exclusion of the urban areas, 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

Block A

The boundaries of this block, which lies to the south of the River Nene on Resource Sheet 2, are defined in the north-east by the southern limit of the Northampton urban area, and in the north-west by the valley of the River Nene. Bedrock is exposed over much of the block area of 81.7 km² (Table 3), especially on the higher ground in the south-west. The two potentially workable deposits of sand and gravel, Glacial Sand and Gravel and Milton Sand, commonly crop out together to form dissected spread of mineral over a belt of land about 1 to 2 km wide and trending roughly WNW to ESE. Because of the difficulty in distinguishing between the two mineral deposits, both in boreholes, and during the course of field mapping, they have been assessed together as one mineral unit, which extends over 10.0 km² (12 per cent) of the block area. Mineral was proved in thirteen IMAU boreholes; five of them contained only Glacial Sand and Gravel (for example borehole 65 NW 7), five proved only Milton Sand (for example borehole 65 NE 68), and the remaining three boreholes (65 NE 59, 75 NW 161 and 75 NW 175) appear to have proved a thin spread of Glacial Sand and Gravel overlying Milton Sand. Data from all these boreholes, together with two other IGS records and numerous confidential borehole results, have been used to calculate the mean mineral thickness (4.8 m); thickness values range from 0.9 m to 12.9 m. Those boreholes which proved the greatest thicknesses of mineral, generally also proved Milton Sand, as seen in boreholes 75 NW 179 and 65 NE 68, or Milton Sand with a thin cover of Glacial Sand and Gravel, as seen in boreholes 65 NE 59, 75 NW 161 and 75 NW 175. The Glacial Sand and Gravel deposits are usually thin; assessment boreholes show them generally to be less than the mean mineral thickness, as seen by boreholes 65 NW 7, 75 NW 160 and 75 NE 391, but exceptionally borehole 75 NE 396 proved a thick deposit (8.2 m) of Glacial Sand and Gravel. Waste partings are often present within the mineral deposits (for example in boreholes 75 NW 161 and 65 NW 7).

Most of the mineral in this block is classified as 'clayey': the fines content exceeds 20 per cent in only two boreholes (21 per cent in 75 NW 166 and 27 per cent 75 NE 391). The sand fraction usually forms the bulk of the deposits in this block, and in boreholes, generally forms more than 70 per cent by weight of the mineral deposits, except at three sites where the Glacial Sand and Gravel contains a high proportion of gravel: 32 per cent in borehole 65 NW 7, 41 per cent in borehole 75 NW 160 and 13 per cent in borehole 75 NE 391. Elsewhere, gravel is present in amounts varying from 2 per cent to 12 per cent by weight of the mean grading of the deposits, which for the block as a whole is fines 13 per cent, sand 75 per cent and gravel 12 per cent.

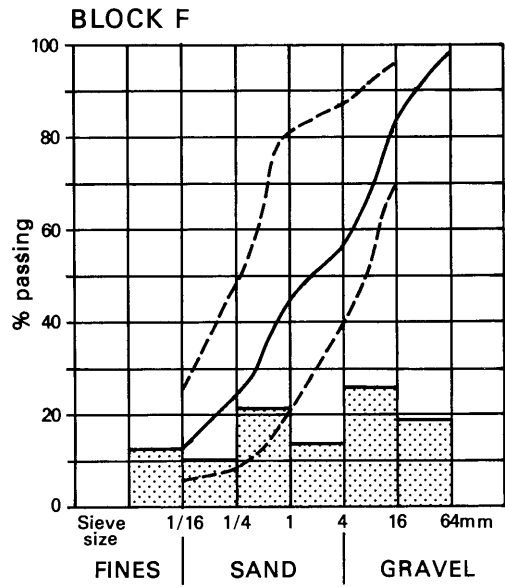
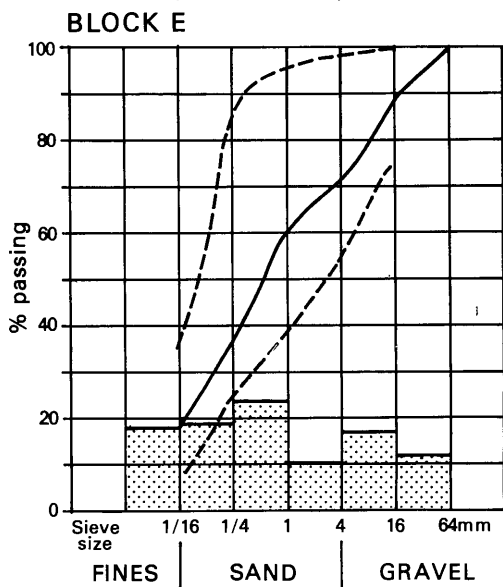
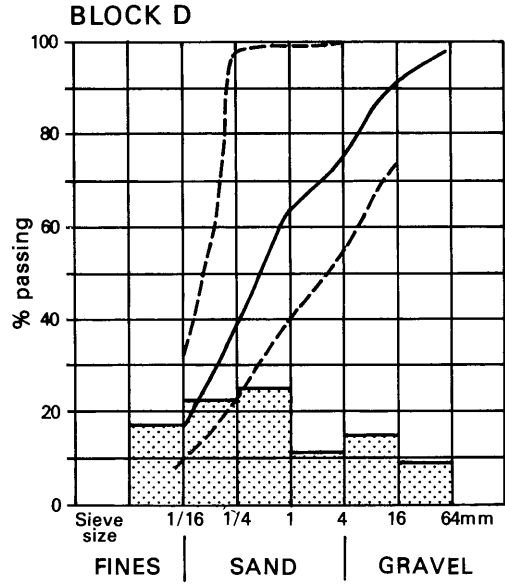
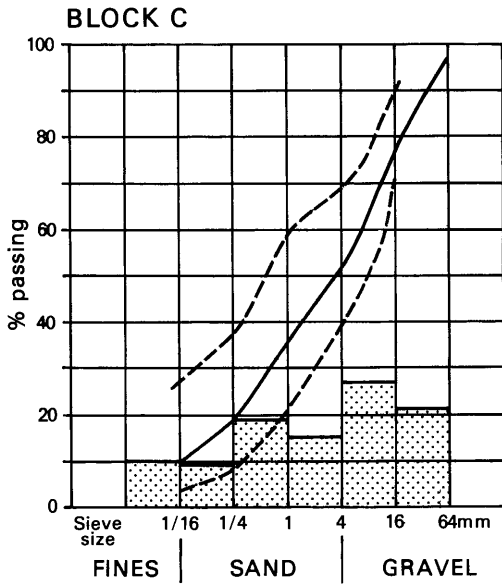
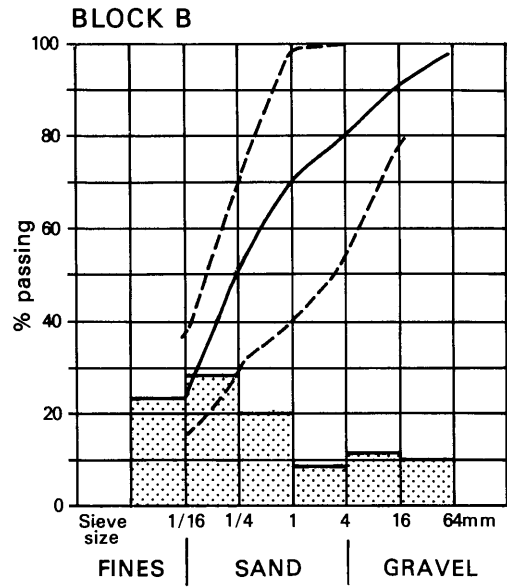
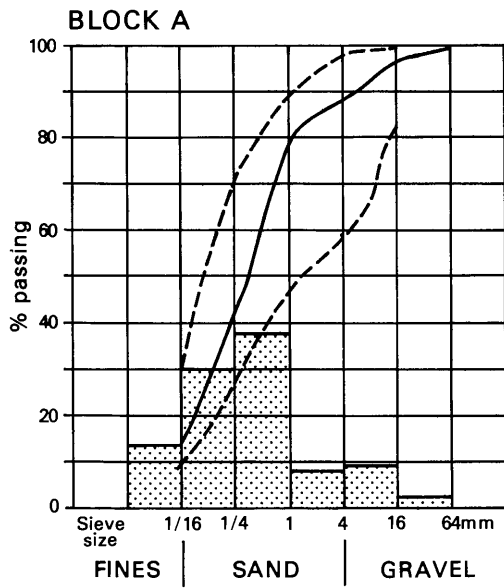
Overburden, comprising a generally thin cover of silts and clays, has a mean thickness of 1.4 m, but increases to as much as 8.2 m (in borehole 75 NW 161) where deposits of boulder clay become extensive. Where mineral is concealed it is thought to be continuous or almost continuous.

Large, abandoned workings in the Milton Sand deposits occur to the north-west and south-east of Milton (734 556). The estimated volume of the remaining potentially workable mineral in this block is 48.0 million m³ with confidence limits of ± 47 per cent (± 22.6 million m³).

Block B

This block contains 73.8 km² of ground bounded in the south (on sheet 1) by the valley of the River Nene and the Northampton urban area, and in the west by the valley of Nenmore Brook. The northern limits of the block (on sheet 2) coincide with the valleys of two minor streams which cross the area and form a convenient boundary. The irregular, and in places discontinuous spreads of Glacial Sand and Gravel which form the 8.8 km² of mineral assessed in this block, occur mainly on the upland areas near East Haddon [670 680] and Whilton [636 648]. However, two small patches of assessed sand and gravel occur in the extreme south of the block, to the east and west of Flore [645 603] adjacent to the floodplain deposits of the River Nene.

The mineral in this block is extremely variable both in thickness and lateral extent. For instance, borehole 66 NE 5 proved 14.4 m of exposed mineral, but less than 1 km away, borehole 66 NE 2 proved that this deposit does not extend far beneath the local deposits of boulder clay. A large area of discontinuous mineral is concealed beneath boulder clay to the south and east of Great



KEY Range of particle size distribution Mean particle size distribution
 Histograms (shaded) show percentages of material retained on each sieve.

Figure 9 The particle size distribution of mineral deposits in resource blocks A to F.

Brington [666 651]. Here, only two boreholes (66 SE 5 and 66 SE 6) out of five assessment boreholes proved mineral beneath a variable thickness of boulder clay. Inferred boundaries segregate this area of discontinuous mineral from the adjacent areas of exposed mineral proved by IMAU and commercial boreholes. Similarly, commercial data has been used to delineate an area of exposed mineral, in the area surrounding borehole 66 NW 20, which itself proved mineral to be locally concealed beneath boulder clay.

Taken as a whole, the mineral ranges in thickness from nil (in six IMAU boreholes) to 14.4 m in borehole 66 NE 5, and has a mean thickness of 3.3 m derived from 20 sample points. Overburden, comprising mainly boulder clay, ranges in thickness from 0.1 m in borehole 66 SW 13 to 16.9 m in borehole 66 SW 25, and has a mean of 2.7 m. In the east of the block, around Holdenby [695 678], assessment boreholes (such as 66 NE 13) showed that the thick spread of boulder clay in that area does not conceal any potentially workable sand and gravel.

The volume of mineral is calculated using data from 23 assessment boreholes and other commercial data, to be 29 million m³ ± 41 per cent at the 95 per cent confidence level. Milton Sand appears to be present in at least one assessment borehole (66 NW 20), and in part explains the rather gravel-poor overall mean grading of this block; fines 24 per cent, sand 56 per cent, gravel 20 per cent.

Block C

The potentially workable River Terrace Deposits found in the valleys of the River Nene (west of Northampton) and the Nenmore Brook extend over 6.4 km² of ground designated as resource block C which is represented on both resource sheets. The elevation of the deposits drops from nearly +100 m OD in Nenmore Brook, at the northernmost end of the block, to below +65 m OD near Kislingbury in the Nene Valley.

In general, the terrace deposits are assumed to be almost continuous beneath the mapped alluvium, but they are locally absent, for example in boreholes 65 NE 66 and 65 NW 4. In the Nene valley itself, they overlie a deep buried channel (as seen in boreholes 65 NE 61 and 65 NE 63) which is filled with a thick sequence of laminated silts and clays (classified as Glacial Lake Deposits).

The mineral ranges in thickness from nil in borehole 65 NW 3 to 6.6 m in borehole 65 NE 63; the mean thickness of 2.4 m is calculated from 12 sample points. However, the thickest deposits are usually to be found in the main river valley, where the mean mineral thickness proved in four assessment boreholes is 4.4 m. Alluvial silts and clays form the overburden which ranges in thickness from 0.1 m in borehole 75 NW 159 to 4.6 m in borehole 65 NW 3; it has a mean 2.1 m. The total mineral volume is calculated (using data from 11 assessment boreholes and four other boreholes), to be 15 million m³ ± 52 per cent at the 95 per cent confidence level.

There is little difference in the particle size distribution of the mineral proved in the assessment boreholes which show that compared with deposits seen in the other resource blocks, the River Terrace Deposits of this block are more gravelly. Their mean grading is fines 10 per cent, sand 43 per cent and gravel 47 per cent.

Block D

The 50.3 km² of ground in this block lies to the west of Nenmore Brook and spans both resource sheets, extending from Road Weedon [632 598] in the south to Ashby St Ledgers [570 681] in the north. The highest ground in the west of the block exceeds +152 m OD but falls to about +100 m OD near its eastern margin. Mineral deposits, which cover 18.3 km² of ground (36 per cent of the block area), occur principally as Glacial Sand and Gravel exposed in the valley-sides of Nenmore Brook

around Norton [605 636]. They also occur as concealed deposits in the north of the block as demonstrated in boreholes 56 NE 14, 15, 18 and 19), and in the area to the north of Dodford [615 606]. In the central part of the block, boreholes such as 56 NE 9 and 56 NE 32 show the mineral to be discontinuous beneath a variable thickness of boulder clay. Locally (for example in boreholes 56 NE 20, 66 SW 15) deposits of Milton Sand appear to be present beneath the glacial deposits, but their distribution is too uncertain to enable a separate evaluation of the sand deposits. An inferred boundary delimits the concealed mineral deposits to the south of Ashby St. Ledgers; elsewhere in the block, the mapped Drift boundaries are used.

For the block as a whole, mineral ranges in thickness from nil (for example in borehole 56 SE 24) to 18.3 m proved in borehole 56 NE 20, and has a mean thickness of 5.3 m based on data from 34 sample points; six boreholes proved over 10 metres of mineral. Overburden, generally comprising boulder clay, ranges from 0.1 m (in borehole 66 SW 1) to 7.3 m (in borehole 56 NE 15); the mean thickness is 2.2 m.

Data from 34 assessment boreholes have been used to calculate the total mineral resources of 97 million m³ ± 29 per cent at the 95 per cent confidence level. The mean grading for the deposits in this block is fines 17 per cent, sand 58 per cent and gravel 25 per cent.

Block E

This block extends over 102.5 km² of the northern-most part of the survey area (on Sheet 1) to within a few kilometres of the outskirts of Rugby which lies just to the west of the survey area. The mineral deposits, which cover only 19 per cent (19.5 km²) of the resource block area, occur as irregularly-shaped spreads of high level (generally over +120 m OD) Glacial Sand and Gravel (Figure 3). They are exposed at the surface or concealed beneath boulder clay, and generally form a capping to the higher ground of the block. The assessment of resources in this block includes small patches of River Terrace Deposits south-east of Ravensthorpe and north-east of Guilsborough, proved in boreholes 66 NE 11 and 67 SE 13 respectively. Because of the difficulty of defining their vertical and lateral distribution, deposits similar to Milton Sand, which occur locally (for example in boreholes 57 SW 2, 57 SE 10 and 56 NE 2) are evaluated with the Glacial Sand and Gravel and the River Terrace Deposits as a single mineral unit.

Alluvial deposits associated with the small streams in this block, are shown by boreholes 57 SE12, SE 13, SE 27 to contain no potentially workable sand and gravel.

The main area of exposed mineral is in the central part of the block, around West Haddon [630 720] where assessment boreholes proved at the surface, Glacial Sand and Gravel up to 9.1 m in thickness (in boreholes 67 SW 15 and 67 SW 27); a thin cover of boulder clay conceals the mineral proved in some boreholes (for example 67 SW 3). To the west of West Haddon the mineral is laterally impersistent or absent (as shown by boreholes 67 SW 9 and 67 SW 2) and an inferred boundary is drawn to delineate the limit of the potentially workable deposits.

In the western part of the block, near Kilsby [560 710] the mineral, which is generally concealed beneath boulder clay (as in boreholes 57 SE 19 and 21), thins (as in borehole 57 SE 15) and is not represented in boreholes 56 NW 1 and 56 NE 1. The concealed mineral deposits nearby, have a maximum thickness of 17.8 m proved in borehole 57 SE 19; they are locally exposed near Crick [590 725], and to the north-west where boreholes 57 SW 2, and 57 SE 10 show the deposits to be in part, Milton Sand.

For the block as a whole, the mineral ranges in thickness from nil, as shown for example by borehole 67 SW 11, to 24.0 m in borehole 57 SE 10; 49 sample points have been used to calculate the mean thickness of 4.5 m. Overburden, which generally comprises thin soil

and boulder clay, ranges in thickness from nil in borehole 185/198 to 15.8 m in borehole 57 SE 26 and has a mean of 2.1 m.

Using data from 48 assessment boreholes and 39 commercial records, the volume of mineral is calculated as $86 \text{ million m}^3 \pm 28 \text{ per cent}$ at the 95 per cent confidence level. The inclusion of grading data from boreholes which penetrated the Milton Sand and River Terrace Deposits has little effect on the overall mean grading of fines 18 per cent, sand 53 per cent, gravel 29 per cent for the block as a whole.

Deposits of concealed Glacial Sand and Gravel are currently worked in a pit near Grove Farm [570 695] to the south of Kilsby.

Block F

Most of the 23.7 km^2 of this block, situated on the southern outskirts of Northampton is designated for urban and industrial development. The potentially workable sand and gravel which covers 10.7 km^2 , comprises River Terrace Deposits and Glacial Sand and Gravel. Most of the mineral-bearing ground lies in or close to the Nene valley, to the south-west of Northampton, but an area of River Terrace Deposits to the east of the urban area is also included in the assessment of resources.

Mineral classified as River Terrace Deposits is generally concealed beneath the mapped Alluvium, which in places is also classified as mineral (for example in borehole 75 NW 169). Whereas the spreads of Glacial Sand and Gravel are usually concealed beneath boulder clay as shown by boreholes 75 NW 168 and 75 NE 388; locally they are exposed, as in borehole 75 NW 177.

The mineral ranges in thicknesses from 1.0 m (in borehole 75 NW 173) to 3.7 m (in a confidential record), and has a mean thickness of 1.4 m calculated from 15 sample points. The calculation of this figure has taken into account four thicknesses which are a result of either a barren borehole as at 75 NE 389 or where sand and gravel is proved to be less than 1 m thick for example at 76 SW 176. Overburden thicknesses range from 0.2 m (in borehole 75 NW 169) to 18.4 m (in borehole 75 NE 389) with a mean of 3.0 m.

The borehole mean gradings for the mineral in this block are reasonably consistent. The fines content is generally below 15 per cent with the lowest value of 5 per cent proved in the thin fluvial deposits in boreholes 75 NW 172 and 75 NW 173, and the highest value of 24 per cent fines in borehole 75 NW 174. The mean grading for the block as a whole is fines 13 per cent, sand 44 per cent and gravel 43 per cent.

The estimated volume of potentially workable mineral based upon 15 data points, is $15 \text{ million m}^3 \pm 46 \text{ per cent}$ at the 95 per cent confidence level. To the north of the River Nene near Duston [740 600], River Terrace Deposits are currently being worked.

LIST OF WORKINGS

In 1975 two sand and gravel quarries were known to be operational. A list of active and disused quarries is given below.

<u>Location</u>	<u>Grid reference</u>
Active pits	
Near Kilsby	564 695
Milton Malsor	720 558
Disused pits	
Milton Malsor	724 558
Milton Malsor	737 554
Nether Heyford	666 584
West of Dodford	605 602
North-east of Dodford	625 610
North of Dodford	604 612
Long Buckby Wharf	608 653
Long Buckby Wharf	612 646
Upton	719 603
West Northampton	733 601

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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. The blocks are drawn provisionally before drilling begins.

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

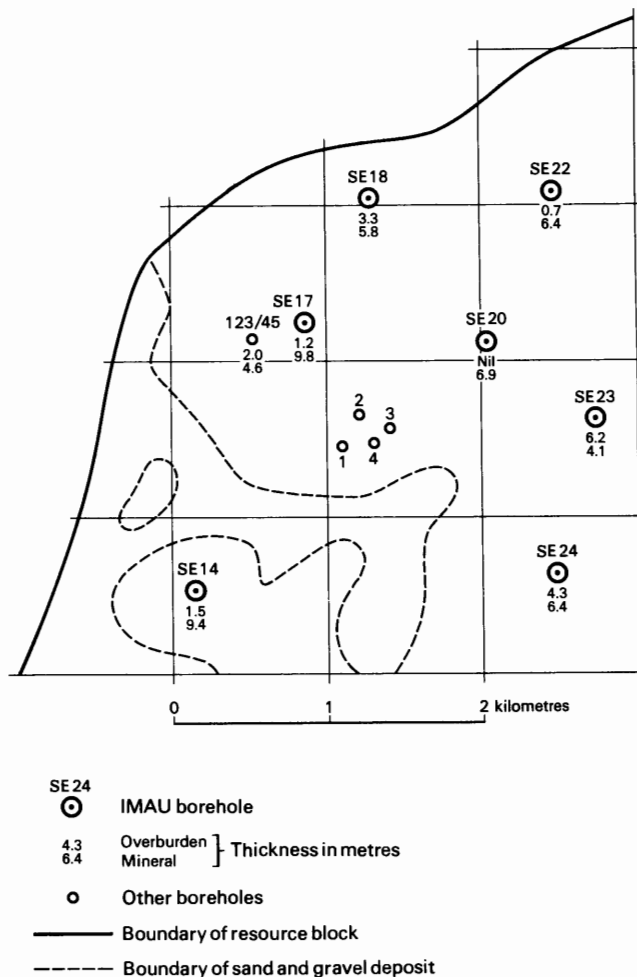
The drilling machine employed should be capable of providing a continuous sample representative of all unconsolidated deposits, so that the in-situ grading can be determined, if necessary, to a depth of 30 m (100 ft) at a diameter of about 200 mm (8 in), beneath different types of overburden. It should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

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

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

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

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



Example of resource block assessment: map of a fictitious block

APPENDIX B

STATISTICAL PROCEDURE

Statistical assessment

1 A statistical assessment is made of an area of mineral greater than 2 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

$$\Sigma (l_{m1} + l_{m2} \dots l_{mn}) / n.$$

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

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

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

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

$$\pm (t/\sqrt{n}) \times S_{\bar{l}_m} \times (100/\bar{l}_m) \text{ per cent, where } t \text{ is}$$

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:

<i>n</i>	<i>t</i>	<i>n</i>	<i>t</i>
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

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

and when *n* is greater than 20, as

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

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_y 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 finer gravel ($+4$ - 16 mm), often characterised by abundance of worn tough pebbles of vein quartz, from larger pebbles, often of notably different materials. The boundary at 64 mm distinguishes pebbles from cobbles. The term 'gravel' is used loosely to denote both pebble-sized and cobble-sized material.

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

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

The relative proportions of the rock types present in the gravel fraction are indicated by the use of the words 'and' or 'with'. For example, 'flint and quartz' indicates roughly equal proportions with neither constituent accounting for less than about 25 per cent of the whole; 'flint with quartz' indicates that flint is dominant and quartz, the principal accessory rock type, comprises 5 to 25 per cent of the whole. Where the accessory material accounts for less than 5 per cent of the whole, but is still readily apparent, the phrase 'with some' has been used. Rare 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: not 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

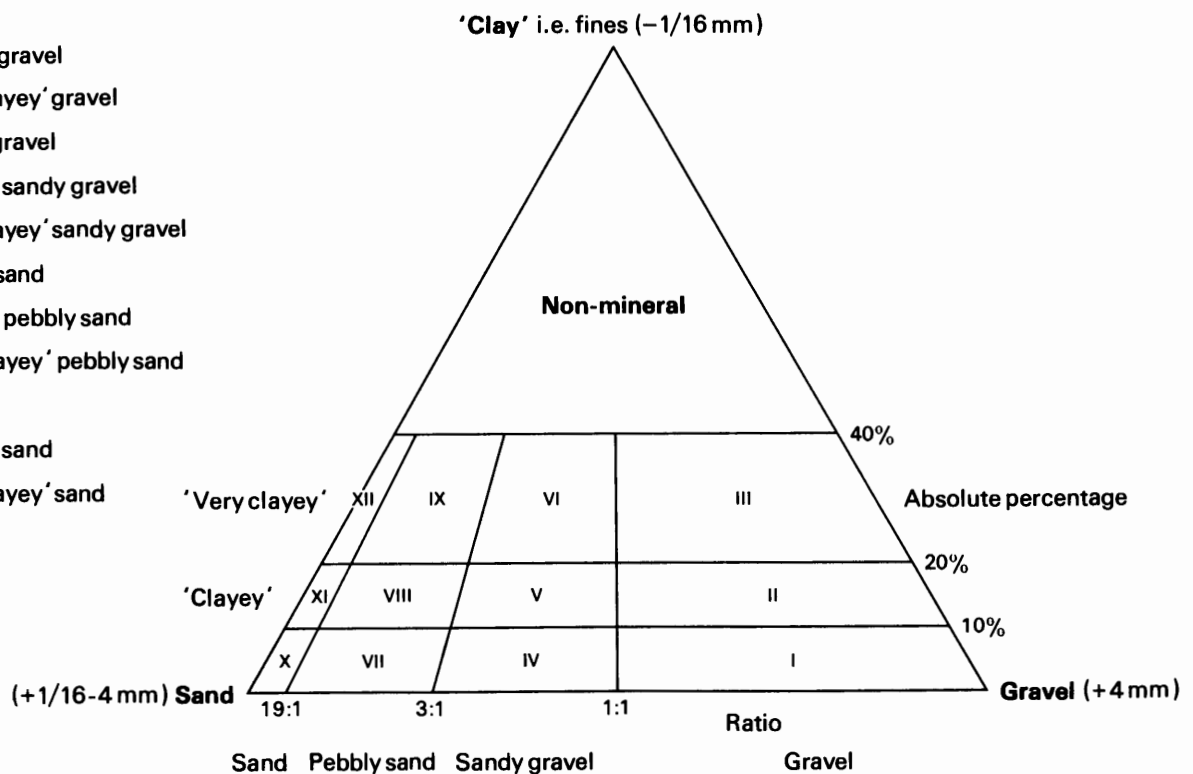


Diagram showing the descriptive categories used in the classification of sand and gravel

APPENDIX D

Explanation of the Borehole Records

Annotated example

SP 66 SW 6¹ 6098 6477² Near Whilton Lodge³

Surface level +122.8 m (+403 ft)⁴
 Water struck at +110.7 m⁵
 June 1974⁶

Block D

Overburden ⁷	0.3 m
Mineral	5.7 m
Waste	1.4 m
Mineral	1.1 m
Waste	3.7 m
Bedrock	0.5 m ⁸

LOG

Geological classification	Lithology ⁹	Thickness m	Depth m
	Soil	0.3	0.3
Glacial Sand and Gravel	a 'Clayey' sandy gravel Gravel: fine with coarse, angular flint with rounded ironstone, sandstone, quartzite, chalk and limestone Sand: medium	5.7	6.0
Boulder Clay	Clay, pale brown, sandy, silty with angular flint pebbles	1.4	7.4
Glacial Sand and Gravel	b 'Very clayey' sandy gravel Gravel: fine with coarse flint Sand: medium with fine	1.1	8.5
Boulder Clay	Silty clay, grey with some flint and chalk pebbles	3.7	12.2
Middle Lias	Silty clay, greyish blue, micaceous with shell fragments	0.5+	12.7

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	16	45	39	0.3-1.1	20	19	25	8	17	11	0
				1.1-2.1	18	7	16	13	23	16	7
				2.1-3.1	15	14	25	8	19	19	0
				3.1-4.1	13	11	27	12	24	13	0
				4.1-5.1	13	6	22	13	27	19	0
				5.1-6.0	16	7	21	15	25	16	0
				Mean	16	10	23	12	22	16	1
b	22	61	17	7.4-8.5	22	24	30	7	12	5	0
a+b	17	47	36	Mean	17	12	24	11	21	15	0

COMPOSITION¹¹

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	27	15	1	12	13	14	15	3
+4-16 mm	38	2	5	11	13	9	20	2

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 SP 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 SW 6.

Thus the full Registration Number is SP 66 SW 6. Usually this is abbreviated to 66 SW 6 in the text.

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 feet; approximate conversions to metres 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 assessment boreholes were drilled by a conventional Dando shell and auger rig using 152 mm diameter casing and modified sampling equipment. The month and year of completion of drilling are stated.

7 Overburden, mineral, waste and bedrock

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

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

9 Lithological description

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

10 Grading data

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

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

The mean grading of groups of samples making up an identified bed of mineral are also given in detail and in summary. Where more than one bed is recognised the mean grading for the whole of the mineral in the borehole may be given. Where necessary, in calculating mean gradings, data for individual samples are weighted by the thickness represented.

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

The composition given, represents the results of pebble count studies on the +4–16 mm and/or the +16–64 mm fractions of all the mineral samples from the borehole bulked together.

APPENDIX E

INDUSTRIAL MINERALS ASSESSMENT UNIT BOREHOLE RECORDS

SP 56 NW 1 5492 6920 Chapel Farm

Block E

Surface level +162.9 m (+534 ft)
Water not struck
September 1973

Waste 10.8 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, silty, greyish brown, pebbly; greyish blue below 4.5 m	10.5	10.8
Middle Lias	Clay, shaley, brown	0.5+	11.3

SP 56 NW 2 5486 6650 Near Braunston

Block D

Surface level +135.0 m (+443 ft)
Water not struck
September 1973

Overburden 1.2 m
Mineral 1.4 m
Bedrock 1.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Silty clay, brownish grey with fine flint and sandstone pebbles	0.9	1.2
Milton Sand	'Clayey' sand, pale brown; medium with fine; some ironstone pebbles	1.4	2.6
Lower Lias	Clay, pale brown, sandy, pebbly	0.6	3.2
	Clay, pale brown with grey streaks, silty, micaceous	0.8+	4.0

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	82	3	1.2-2.6	15	27	52	3	3	0	0		

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	0	0	0	0	0	0	0	0
+4-16 mm	0	0	0	0	7	0	93	0

SP 56 NW 3 5478 6535

North-west of Braunston Fields Farm

Block D

Surface level +145.1 m (+476 ft)
Water not struck
September 1973

Waste 14.0 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Brick and sandy clay	0.7	0.7
Boulder Clay	Silty clay, alternating reddish brown and greyish blue; chalk and flint pebbles frequent in grey clay, siltstone pebbles in reddish clay	11.1	11.8
Glacial Sand and Gravel	'Clayey' sand, fine and medium, orange-brown	0.8	12.6
Boulder Clay	Clay, sandy, silty, pale greyish brown with ironstone pebbles	1.4	14.0
Middle Lias	Clay, silty, greyish blue	0.5+	14.5

SP 56 NE 1 5560 6990

Arnalls Gate, Kilsby

Block E

Surface level +153.9 m (+505 ft)
Water not struck
September 1973

Waste 14.5 m
Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, pale brown, sandy, silty with pebbles of flint and chalk	4.3	4.5
	Clay, greyish blue silty with pebbles of flint, sandstone and chalk	6.7	11.2
Middle Lias	Clay, reddish brown, silty with pebbles and grains of chalk and pebbles of sandstone	3.3	14.5
	Clay, silty, reddish brown with pale brown and grey silt laminae	1.5+	16.0

SP 56 NE 2 5574 6926

South-east of Ashby Home Wood

Block E

Surface level +153.3 m (+503 ft)
Water struck at +151.5 m
August 1973

Overburden 1.6 m
Mineral 7.3 m
Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.4	0.4
Boulder Clay	Clay, greyish brown, silty with pebbles of chalk, flint and quartzite	1.2	1.6
Milton Sand	Sand, 'clayey' in first metre, pebbly at base Gravel: fine, ironstone Sand: medium with fine, pale brown	7.3	8.9
Middle Lias	Clay, silty, greyish brown	1.5+	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
7	90	3	1.6-2.6	18	27	52	1	2	0	0
			2.6-3.6	7	39	51	1	1	1	0
			3.6-4.6	6	46	47	1	0	0	0
			4.6-5.6	4	45	50	1	0	0	0
			5.6-6.6	4	34	55	3	3	1	0
			6.6-7.6	4	48	48	0	0	0	0
			7.6-8.4	4	22	54	9	9	2	1
			8.4-8.9	5	23	45	8	7	12	0
			Mean	7	37	50	3	2	1	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	0	0	0	0	0	0	100	0
+4-16 mm	0	0	0	0	0	0	100	0

SP 56 NE 3 5540 6863 East of Cleves Farm Block E
 Surface level +158.1 m (519 ft) Waste 10.1 m
 Water not struck Bedrock 0.4 m+
 September 1973

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, silty, reddish brown alternating with bluish grey; scattered pebbles of flint; siltstone and chalk	9.8	10.1
Middle Lias	Clay, greyish blue, silty, shaley	0.4+	10.5

SP 56 NE 4 5583 6572 Bragborough Farm Block D
 Surface level +142.6 m (+468 ft) Overburden 1.0 m
 Water not struck Mineral 4.4 m
 November 1973 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.4	0.4
Boulder Clay	Clay, pale brown, sandy with pebbles of flint and chalk	0.6	1.0
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: mainly fine, angular limestone and flint, subrounded chalk and rounded sandstone and quartzite Sand: medium	4.4	5.4
Middle Lias	Clay, silty, bluish grey	0.5+	5.9

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
20	43	37	1.0-2.0	18	17	20	11	20	14	0
			2.0-3.0	17	12	17	10	23	21	0
			3.0-4.0	19	13	18	13	27	10	0
			4.0-5.4	24	14	17	12	22	11	0
			Mean	20	14	18	11	23	14	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	15	13	1	23	28	14	6	0
+4-16 mm	16	4	3	9	29	25	14	0

SP 56 NE 5 5635 6970 East of Briccele Wood Block E
 Surface level +141.1 m (+463 ft) Overburden 8.1 m
 Water struck at +132.1 m Mineral 8.3 m
 September 1973 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, greyish brown, silty with pebbles of flint, sandstone and some chalk	4.2	4.5
	Clay, reddish brown, silty with pebbles of siltstone and flint	3.6	8.1
Glacial Sand and Gravel	a 'Clayey' pebbly sand, 'very clayey' in first metre Gravel: fine and coarse, flint Sand: medium with some fine	4.1	12.2
	b Sandy gravel, pale brown, gravel at top pebbly sand at base Gravel: fine with coarse, angular platy ironstone with shelly limestone and flint Sand: medium with some fine	4.2	16.4
Middle Lias	Clay, bluish grey, silty with ironstaining	0.5+	16.9

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	16	70	14	8.1-9.1	24	30	31	5	7	3	0
				9.1-10.1	12	23	38	8	9	10	0
				10.1-11.1	12	23	40	6	10	9	0
				11.1-12.2	15	26	43	7	6	3	0
				Mean	16	25	38	7	8	6	0
b	4	64	32	12.2-13.2	2	6	19	10	38	25	0
				13.2-14.2	4	13	36	11	23	13	0
				14.2-15.2	4	25	53	5	7	6	0
				15.2-16.4	5	20	56	4	9	6	0
				Mean	4	16	41	7	19	13	0
a+b	10	67	23	Mean	10	20	40	7	14	9	0

SP 56 NE 10 5681 6531 North of Middlemore Farm

Block D

Surface level +138.6 m (+455 ft)
Water not struck
November 1973

Waste 2.1 m
Bedrock 0.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, brownish grey, silty with pebbles of flint and sandstone	1.8	2.1
Middle Lias	Clay, bluish grey with traces of fine shell fragments	0.7+	2.8

SP 56 NE 11 5743 6987 West of Kilsby Tunnel

Block E

Surface level +134.2 m (+440 ft)
Water struck at +124.4 m
October 1973

Overburden 2.3 m
Mineral 7.1 m
Waste 0.4 m
Mineral 1.2 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, silty, brown with pebbles of angular flint and rounded to subrounded sandstone and quartzite	2.0	2.3
Glacial Sand and Gravel	a 'Clayey' sandy gravel, greyish brown Gravel: fine with coarse, limestone with chalk, quartzite, flint, sandstone and angular ironstone Sand: pale brown, medium; coarse fraction increases to base	7.1	9.4
	Clay, sandy, pebbly	0.4	9.8
	b 'Clayey' gravel Gravel: as above Sand: as above	1.2	11.0
Middle Lias	Clay, bluish grey with shell fragments	0.5+	11.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	percentages						
	Fines	Sand	Gravel		percentages						
					Fines		Sand			Gravel	
					-1/4	+1/4 - 1/2	+1/2 - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm
a	14	54	32	2.3-3.3	17	18	23	9	19	14	0
				3.3-4.3	14	18	28	8	19	13	0
				4.3-5.3	11	19	37	10	17	6	0
				5.3-6.3	14	11	23	18	25	9	0
				6.3-7.3	14	10	19	20	25	12	0
				7.3-8.3	14	10	22	20	26	8	0
				8.3-9.4	15	9	24	18	25	9	0
				Mean	14	14	25	15	22	10	0
b	13	35	52	9.8-11.0	13	5	14	16	21	31	0
a+b	14	51	35	Mean	14	12	24	15	22	13	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	7	16	7	6	40	10	8	6
+4-16 mm	12	3	4	12	47	12	10	0

SP 56 NE 12 5710 6947 Grove Farm

Block E

Surface level +136.6 m (+448 ft)
Water struck at +128.6 m
August 1973

Waste 12.0 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Boulder Clay	Clay, sandy, pebbly, pale brownish yellow	3.8	3.9
	Clay, greyish brown, silty, pebbly	4.5	8.4
Glacial Sand and Gravel	Sand, pale brown, silty with thin clay partings	1.1	9.5
Boulder Clay	Clay, silty, greyish brown, pebbly	2.5	12.0
Middle Lias	Clay, bluish grey, slightly silty with fine shell fragments	0.5+	12.5

SP 56 NE 13 5720 6893 North of Ashby St. Ledgers

Block E

Surface level +147.2 m (+483 ft)
Water not struck
August 1973

Waste 18.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, brownish grey, silty with pebbles of chalk ironstone, sandstone and some oolitic limestone	4.3	4.5
	Clay, bluish grey, silty with pebbles of fine chalk	13.8+	18.3

SP 56 NE 14 5740 6799 Ashby St. Ledgers

Block D

Surface level +132.1 m (+433 ft)
Water struck at +130.1 m
October 1973

Overburden 2.0 m
Mineral 3.8 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Silty clay, greyish blue	0.6	0.9
	Clay, pale brown, sandy, silty with angular sandstone and flint pebbles	1.1	2.0

Glacial Sand and Gravel	a 'Clayey' sandy gravel Gravel: fine, angular to rounded, flint, limestone and sandstone with quartzite and ironstone Sand: medium and coarse, pale brown	2.0	4.0
	b 'Very clayey' pebbly sand Gravel: mainly fine, flint, sandstone, quartzite and limestone Sand: medium with coarse, pale brown	1.8	5.8
Middle Lias	Silty clay, bluish grey	0.5+	6.3

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	10	50	40	2.0-3.0	12	16	27	16	22	7	0
				3.0-4.0	8	4	14	24	36	14	0
				Mean	10	10	20	20	30	10	0
b	26	65	9	4.0-5.0	23	3	36	22	13	3	0
				5.0-5.8	29	7	40	23	1	0	0
				Mean	26	5	38	22	7	2	0
a+b	18	58	24	Mean	18	7	29	22	18	6	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	24	14	15	19	23	0	5	0
+4-16 mm	24	10	7	20	20	0	8	11

SP 56 NE 15 5802 6787 East of Ashby St. Ledgers Block D

Surface level +136.7 m (+449 ft)
Water not struck
October 1973

Overburden 7.3 m
Mineral 9.3 m
Waste 4.8 m
Bedrock 0.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Silty clay, greyish blue with pebbles of flint and chalk with some sandstone	7.1	7.3
Glacial Sand and Gravel	'Clayey' sandy gravel, less 'clayey' and sandy at base Gravel: fine with coarse, limestone with flint and sandstone and some chalk, quartzite and ironstone Sand: medium and coarse	9.3	16.6
Boulder Clay	Silty clay, bluish grey with pebbles of ironstone and flint	4.8	21.4
Middle Lias	Silty clay greyish blue	0.3+	21.7

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
14	44	42	7.3-8.3	14	7	21	16	25	17	0
			8.3-9.3	17	8	16	17	26	16	0
			9.3-10.3	16	8	20	16	26	14	0
			10.3-11.3	17	7	20	17	26	13	0
			11.3-12.3	13	7	18	16	30	16	0
			12.3-13.3	17	5	13	17	33	15	0
			13.3-14.3	11	8	15	23	34	9	0
			14.3-15.3	13	10	28	20	21	8	0
			15.3-16.6	3	4	21	22	27	23	0
			Mean	14	7	19	18	28	14	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	25	8	1	21	33	10	1	1
+4-16 mm	14	4	4	12	43	10	8	5

SP 56 NE 16 5723 6729 North of Hobbermill Farm Block D

Surface level +158.3 m (+519 ft)
Water not struck
October 1973

Waste 19.8 m
Bedrock 0.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Silty clay, brownish grey with pebbles of flint and rounded chalk	5.6	5.8
	Silty clay greyish blue with pebbles of angular flint, rounded chalk and some shelly limestone	7.6	13.4
Glacial Sand and Gravel	'Clayey' gravel Gravel: fine and coarse, rounded limestone with angular flint and rounded quartzite, sandstone, ironstone, quartz and chalk Sand: medium with coarse	2.3	15.7
Boulder Clay	Silty clay, greyish blue becoming brownish grey-blue with flints	4.1	19.8
Middle Lias	Silty clay and siltstone, greyish blue	0.3+	20.1

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
13	35	52	13.4-14.4	10	5	15	13	28	29	0
			14.4-15.1	12	7	14	11	28	28	0
			15.1-15.7	18	9	17	14	24	18	0
			Mean	13	7	16	12	27	25	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	19	19	4	11	39	3	1	4
+4-16 mm	21	10	4	13	39	3	10	0

SP 56 NE 17 5816 6872 North-east of Ashby St. Ledgers Block E

Surface level +133.9 m (+439 ft) Waste 17.8 m
 Water struck at +126.6 m Bedrock 0.5 m+
 August 1973

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Silty clay, brownish grey to 5.3 m then greyish blue; pebbles of angular flint, subangular ironstone and rounded chalk and sandstone	7.1	7.3
Glacial Sand and Gravel	'Clayey' sand, with some pebbles of flint, sandstone and ironstone	0.3	7.6
Boulder Clay	Silty clay, greyish blue with rounded chalk pebbles	10.2	17.8
Middle Lias	Silty clay, bluish grey with thin shell fragments	0.5+	18.3

SP 56 NE 18 5869 6788 North-west of Welton Lodge Block D

Surface level +132.8 m (+436 ft) Overburden 6.0 m
 Water not struck Mineral 3.0 m
 August 1973 Waste 7.1 m
 Bedrock 0.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Boulder Clay	Clay, sandy, silty, pale brown with pebbles of flint, chalk, sandstone and ironstone	5.9	6.0
Glacial Sand and Gravel	'Clayey' sandy gravel Gravel: fine and coarse, angular to rounded, limestone with some flint, quartzite, chalk, sandstone and ironstone Sand: medium, orange-brown	3.0	9.0
Boulder Clay	Silty clay, dark greyish brown with pebbles of rounded chalk and ironstone and angular flint	5.7	14.7
Glacial Sand and Gravel	'Clayey' sand, fine to medium, with some pebbles of subrounded, platy ironstone	1.4	16.1
Middle Lias	Clay, bluish grey with fine shell fragments	0.2+	16.3

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	
17	43	40	6.0-7.0	16	12	17	11	22	22	0
			7.0-8.0	17	12	23	10	21	17	0
			8.0-9.0	17	11	21	12	20	19	0
			Mean	17	11	21	11	21	19	0
			14.7-16.1	No grading information available						

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	12	12	3	7	52	11	3	0
+4-16 mm	12	9	3	7	56	5	8	0

SP 56 NE 19 5933 6831 Foxholes Block D

Surface level +122.9 m (+403 ft) Overburden 0.3 m
 Water struck at +114.9 m Mineral 5.1 m
 August 1973 Waste 11.4 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Glacial Sand and Gravel	'Very clayey' pebbly sand Gravel: fine, angular flint and some rounded quartzite Sand: orange-brown, silty below 2.9 m	5.1	5.4
Boulder Clay	Silty clay, greyish blue with pebbles of rounded chalk, subangular flint and limestone with shell fragments	11.4	16.8
Middle Lias	Clay, dark bluish grey with fine shell fragments	0.5+	17.3

SP 56 NE 20 5939 6745 Welton Lodge Block D

Surface level +125.0 m (+410 ft) Overburden 4.2 m
 Water struck at +113.2 m Mineral 1.0 m
 October 1973 Waste 3.3 m
 Mineral 8.0 m
 Waste 1.0 m
 Mineral 9.3 m
 Bedrock 0.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, sandy, silty, pale brown with pebbles of rounded chalk and ironstone, subangular limestone and angular flint	3.9	4.2
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: fine and coarse, rounded chalk, and angular sandstone Sand: mainly medium	1.0	5.2

Boulder Clay	Clay, sandy, silty, greyish brown with fine and coarse pebbles of subrounded chalk and limestone and angular flint and sandstone	3.3	8.5
Glacial Sand and Gravel	b 'Clayey' sandy gravel, 'very clayey' at top less 'clayey' to base Gravel: fine, subrounded, limestone with some flint, chalk, sandstone and ironstone Sand: medium, pale brown	6.0	14.5
	c 'Clayey' sand, fine, pale brown	2.0	16.5
Milton Sand	Silt, sandy, pale brown	1.0	17.5
	d 'Very clayey' sand, fine, pale brown	9.3	26.8
Middle Lias	Clay, bluish grey	0.2+	27.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	percentages						
	Fines	Sand	Gravel		Gravel						
					-½	+½ -¼	+¼ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	30	39	31	4.2-5.2	30	11	16	12	16	15	0
b	14	57	29	8.5-9.5	21	9	19	15	21	15	0
				9.5-10.5	17	12	33	11	20	7	0
				10.5-11.5	19	10	26	13	18	14	0
				11.5-12.5	10	9	33	19	23	6	0
				12.5-13.5	9	9	30	21	23	8	0
				13.5-14.5	8	27	23	22	12	8	0
Mean	14	13	27	17	19	10	0				
c	18	80	2	14.5-15.5	19	64	14	3	0	0	0
				15.5-16.5	18	64	11	4	1	2	0
				Mean	18	64	13	3	1	1	0
d	29	70	1	17.5-18.5	21	76	1	0	2	0	0
				18.5-19.5	28	67	3	0	1	1	0
				19.5-20.5	30	68	2	0	0	0	0
				20.5-21.5	33	65	1	0	1	0	0
				21.5-26.8	30	60	9	1	0	0	0
				Mean	29	64	6	0	1	0	0
a+b c+d	23	65	12	Mean	23	44	14	7	8	4	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	15	10	6	15	39	12	3	0
+4-16 mm	18	3	4	16	39	9	11	0

SP 56 NE 21 5933 6694 North-west of Welton Grange Farm Block D
 Surface level +110.6 m (+363 ft)
 Water not struck
 October 1973
 Overburden 1.2 m
 Mineral 2.2 m
 Bedrock 0.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.4	0.4
Head	Sandy silt, pale brown	0.8	1.2
Milton Sand	'Clayey' pebbly sand, pale brown Gravel: fine, ironstone Sand: medium with fine, with clay partings	2.2	3.4
Lower Lias	Silty clay, greyish blue with an upper pale brown, weathered zone	0.6+	4.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	percentages						
	Fines	Sand	Gravel		Gravel						
					-½	+½ -¼	+¼ -1	+1 -4	+4 -16	+16 -64	+64 mm
	18	71	11	1.2-2.3	17	21	41	8	11	2	0
				2.3-3.4	19	26	42	5	8	0	0
				Mean	18	23	42	6	10	1	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	0	0	0	0	0	0	0	0
+4-16 mm	0	0	0	0	0	0	100	0

SP 56 NE 22 5975 6511 Thrupp Lodge Block D
 Surface level +126.1 m (+414 ft)
 Water not struck
 November 1973
 Overburden 1.6 m
 Mineral 6.2 m
 Waste 1.3 m
 Bedrock 0.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, sandy, silty, brown with pebbles of angular flint and subrounded sandstone	1.4	1.6
Glacial Sand and Gravel	'Clayey' gravel Gravel: fine with coarse, subangular to rounded, limestone with flint and some chalk, ironstone and sandstone Sand: medium and coarse	6.2	7.8
Boulder Clay	Silty clay, bluish grey with angular flint and rounded chalk pebbles	1.3	9.1
Middle Lias	Silty clay, micaceous, brownish grey	0.6+	9.7

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			
14	41	45	1.6-2.6	10	8	14	16	29	23	0			
			2.6-3.6	13	7	14	18	30	18	0			
			3.6-4.6	15	6	22	15	22	20	0			
			4.6-5.6	15	11	17	17	25	15	0			
			5.6-6.6	17	9	16	16	27	15	0			
			6.6-7.8	15	7	18	15	23	22	0			
			Mean	14	8	17	16	26	19	0			

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	29	3	1	7	47	4	6	3
+4-16 mm	19	4	3	6	37	11	20	0

SP 56 NE 23 5894 6869 West of Watford Locks

Surface level +113.6 m (+373 ft)
Water struck at 110.9 m
August 1973

Block D

Waste 5.0 m
Bedrock 0.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Alluvium	Silty clay, brown with pebbles of sandstone ironstone and flint	3.9	4.1
Boulder Clay	Silty clay, greyish blue with pebbles of rounded chalk, angular flint and sandstone	0.9	5.0
Lower Lias	Clay, bluish grey	0.3+	5.3

SP 56 NE 24 5979 6705 North-east of Welton Grange Farm

Surface level +104.1 m (+342 ft)
Water not struck
October 1973

Block D

Waste 3.3 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Alluvium	Silty clay, pale brown with some fine pebbles of of angular flint and subrounded sandstone	1.4	1.7
River Terrace Deposits	'Clayey' sandy gravel Gravel: fine, angular flint and subangular sandstone Sand: fine to medium	0.8	2.5
	Clay, greyish brown with some pebbles of angular flint and sandstone	0.8	3.3
Lower Lias	Silty clay, greyish blue	0.5+	3.8

SP 56 NE 25 5992 6637 Weltonfield Farm

Surface level +115.8 m (+380 ft)
Water struck at +108.4 m
October 1973

Block D

Overburden 0.2 m
Mineral 1.1 m
Waste 6.1 m
Mineral 3.7 m
Waste 6.5 m
Bedrock 0.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Glacial Sand and Gravel	a 'Clayey' sandy gravel Gravel: fine, angular to subrounded, flint with sandstone and ironstone Sand: fine and medium with some coarse	1.1	1.3
Boulder Clay	Silty clay, greyish brown with pebbles of chalk flint and sandstone and rare limestone and siltstone	6.1	7.4
Glacial Sand and Gravel	b 'Very clayey' sandy gravel Gravel: fine and coarse, angular flint with subrounded chalk and limestone Sand: mainly medium with clayey silt layers	1.0	8.4
	c Sandy gravel, pale brown Gravel: fine with coarse, angular flint with subrounded limestone and some rounded chalk and quartzite Sand: medium and coarse with some fine	2.7	11.1
Boulder Clay	Silty clay, greyish blue with angular flint subrounded chalk and some subangular oolitic limestone pebbles	6.5	17.6
Middle Lias	Clay, greyish blue	0.2+	17.8

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	19	48	33	0.2-1.3	19	15	21	12	22	11	0			
b	22	44	34	7.4-8.4	22	14	18	12	16	18	0			
c	7	59	34	8.4-9.2	9	6	29	20	19	17	0			
				9.2-10.2	6	7	34	34	20	9	0			
				10.2-11.1	7	7	31	20	20	15	0			
				Mean	7	7	31	21	20	14	0			
a+b+c	12	54	34	Mean	12	10	27	17	20	14	0			

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	41	5	3	15	27	7	2	0
+4-16 mm	23	1	3	18	27	14	8	6

SP 56 NE 26 **5917 6541** **South of Crockwell Farm** **Block D**
 Surface level +149.3 m (+490 ft)
 Water not struck
 October 1973
 Waste 1.6 m
 Bedrock 0.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Alluvium	Silty clay, brown with some angular flint and subangular sandstone pebbles	1.4	1.6
Lower Lias	Silty clay, greyish blue	0.4+	2.0

SP 56 NE 32 **5701 6567** **Near Welton Place Farm** **Block D**
 Surface level c+157.1 m (c+515 ft)
 Water not struck
 Minuteman power auger, 115 mm diameter
 Overburden 2.0 m
 Mineral 0.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, brown, sandy, grey-brown silty below 1.5 m; pebbles of flint, ironstone, sandstone and chalk	1.8	2.0
Glacial Sand and Gravel	Sand, reddish brown, silty with thin clay bands and fine pebbles of rounded quartz chalk and ironstone	0.4+	2.4

SP 56 SW 1 **5478 6466** **West of Braunston Fields Farm** **Block D**
 Surface level +145.6 m (+478 ft)
 Water not struck
 October 1973
 Waste 24.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Silty clay, brownish grey but reddish brown between 3.0 m-5.9 m; pebbles of flint, sandstone, chalk and some limestone	12.2	12.5
	Silty clay, reddish brown with flint, sandstone, chalk and siltstone pebbles. The siltstone pebbles increase in number to base	11.8+	24.3

SP 56 SW 2 **5420 6416** **South of Braunston Covert** **Block D**
 Surface level +126.1 m (+414 ft)
 Water struck at +118.8 m
 November 1973
 Overburden 1.1 m
 Mineral 11.4 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Boulder Clay	Sandy clay, pale brown with flint and platy ironstone pebbles	1.0	1.1
Glacial Sand and Gravel	'Clayey' sandy gravel, 'very clayey' in parts Gravel: fine, platy dark brown ironstone and limestone with sandstone Sand: medium and fine	11.4	12.5
Lower Lias	Clay, bluish grey with trace of shell fragments	0.5+	13.0

GRADING

Mean for deposit percentages			Depth below surface (m)	percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
				-#	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
18	56	26	1.1-2.1	12	24	25	13	23	3	0
			2.1-3.1	14	16	23	13	27	7	0
			3.1-4.1	16	12	21	17	27	7	0
			4.1-5.2	16	14	34	13	21	2	0
			5.2-6.2	18	43	28	4	6	1	0
			6.2-7.2	23	36	28	6	4	3	0
			7.2-8.2	23	28	20	11	15	3	0
			8.2-9.2	19	11	13	18	30	9	0
			9.2-10.2	11	6	15	25	34	9	0
			10.2-12.5	24	12	13	22	24	5	0
			Mean	18	20	22	14	21	5	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	0	0	0	33	19	0	48	0
+4-16 mm	0	0	0	16	44	0	40	0

SP 56 SE 19 5582 6461 East of Braunston Fields Farm Block D
 Surface level +157.4 m (+516 ft)
 Water struck at +149.4 m
 November 1973
 Waste 9.6 m
 Bedrock 1.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Silty clay, dark brownish red with pebbles of chalk and siltstone; clayey sand partings between 4.9 m and 5.2 m	5.0	5.2
Glacial Sand and Gravel	'Very clayey' pebbly sand, pale brown Gravel: fine and coarse, flint and sandstone Sand: fine	0.8	6.0
Boulder Clay	Clay, brownish grey with pebbles of flint sandstone ironstone to 7.4 m then bluish grey and oolitic limestone	3.6	5.6
Middle Lias	Silt yellowish brown becoming silty clay, bluish grey	1.4+	11.0

SP 56 SE 20 5535 6408 West of Drayton Fields Farm Block D
 Surface level +166.6 m (+547 ft)
 Water not struck
 November 1973
 Waste 2.0 m
 Bedrock 0.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Silty clay, pale brown with pebbles of flint, chalk and some shelly limestone	1.8	2.0
Marlstone Rock Bed (Middle Lias)	Siltstone, brown, micaceous, indurated, ferrous with shell fragments	0.1+	2.1

SP 56 SE 21 5573 6354 North of Drayton Grange Block D
 Surface level +167.1 m (+548 ft)
 Water not struck
 November 1973
 Waste 10.2 m
 Bedrock 0.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Silty clay, sandy between 2.5 m and 3.5 m brownish grey with pebbles of chalk, flint sandstone and siltstone	9.9	10.2
Marlstone Rock Bed (Middle Lias)	Siltstone, ironstained	0.2+	10.4

SP 56 SE 22 5667 6359 West of Dane Holme Block D
 Surface level +159.6 m (+524 ft)
 Water not struck
 November 1973
 Waste 1.0 m
 Bedrock 1.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Sandy clay, pale brown with some flint and sandstone pebbles	0.8	1.0
Marlstone Rock Bed (Middle Lias)	Siltstone, brown, micaceous with shelly bands and ironstained veins	1.2+	2.2

SP 56 SE 23 5700 6471 Drayton Reservoir Block D
 Surface level +136.9 m (+449 ft)
 Water not struck
 November 1973
 Waste 19.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, pale brown, becoming grey, sandy, silty with pebbles of chalk and rare flint, sandstone, quartz and quartzite	19.0+	19.2

SP 56 SE 24 5767 6437 East of Lang Farm Block D
 Surface level +125.0 m (+410 ft)
 Water struck at +123.8 m
 November 1973
 Waste 1.2 m
 Bedrock 4.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, orange-brown, sandy, silty	0.9	1.2
Middle Lias	Clayey silt, pale grey and bluish grey with orange brown partings, micaceous	4.9+	6.1

SP 56 SE 25 5698 6399 North of Dane Holme

Surface level +141.8 m (+465 ft)
Water struck at 138.8 m
November 1973

Block D

Waste 3.2 m
Bedrock 0.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.4	0.4
Boulder Clay	Silty clay, brownish grey with sandy partings and pebbles of ironstone, oolitic limestone, flint and sandstone	2.8	3.2
Middle Lias	Clayey silt, pale brownish yellow becoming silty clay, greyish blue below 3.9 m	0.9+	4.1

SP 56 SE 26 5812 6475 Monksmoor Farm

Surface level +115.1 m (+378 ft)
Water struck at +112.5 m
November 1973

Block D

Overburden 1.5 m
Mineral 12.6 m
Bedrock 0.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, pale brown, sandy, silty with some pebbles of ironstone and sandstone	1.2	1.5
Glacial Sand and Gravel	a Sand, 'clayey' and pebbly at top Gravel: fine angular flint limestone sandstone and ironstone Sand: medium and fine	7.8	9.3
	b 'Clayey' pebbly sand Gravel: fine ironstone with sandstone and limestone Sand: medium and fine with silty clay bands	4.8	14.1
Lower Lias	Clay, greyish blue	0.2+	14.3

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	9	88	3	1.5-2.3 2.3-3.3 3.3-4.3 4.3-5.3 5.3-6.3 6.3-7.3 7.3-8.3 8.3-9.3 Mean	18 6 8 9 8 7 8 11 9	26 29 36 43 47 49 50 46 41	44 60 45 45 43 42 41 39 45	5 2 3 2 1 1 0 2 2	6 3 6 1 1 1 1 2 2	1 0 2 0 0 0 0 0 1	0 0 0 0 0 0 0 0 0
b	12	72	16	9.3-10.3 10.3-11.3 11.3-12.3 12.3-13.3 13.3-14.1 Mean	11 11 9 13 15 12	41 29 26 30 27 30	37 30 29 31 35 33	6 10 10 11 12 9	5 17 22 13 10 14	0 3 4 2 1 2	0 0 0 0 0 0
a+b	10	82	8	Mean	10	37	40	5	7	1	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	0	0	0	14	29	0	39	15
+4-16 mm	0	0	0	13	7	0	63	17

SP 56 SE 27 5983 6448 North of Manor Farm

Surface level +132.0 m (+433 ft)
Water not struck
November 1973

Block D

Waste 7.7 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	silty clay, brownish grey with pebbles of chalk and flint and traces of siltstone	7.5	7.7
Middle Lias	Clay, greyish brown	0.5+	8.2

SP 56 SE 29 5728 6422 South-west of Lang Farm

Block D

Surface level +138.2 m (+453 ft)
Water not struck
Minuteman power auger, 115 mm diameter
October 1975

Overburden 1.0 m
Mineral 3.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Boulder Clay	Sandy clay, reddish brown with fine pebbles of angular flint and rounded quartz	0.9	1.0
Glacial Sand and Gravel	'Clayey' sand, pebbly in part Gravel: fine, rounded quartz, angular flint and subangular ironstone and sandstone Sand: fine to medium	1.7	2.7
	Sand, fine, reddish brown	1.4+	4.1

SP 57 SW 2 5446 7408 Normandy Farm

Block E

Surface level +110.6 m (+363 ft)
Water not struck
September 1973

Overburden 0.5 m
Mineral 10.8 m
Bedrock 0.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.5	0.5
Glacial Sand and Gravel	a 'Clayey' sand, pebbly in first metre Sand: fine and medium, silty, brownish orange	4.6	5.1
	b 'Clayey' pebbly sand Gravel: fine, angular flint with rounded quartzite and sandstone and some rounded ironstone Sand: medium	3.7	8.8
Milton Sand	c 'Clayey' sand Sand: fine, silty, brownish orange	2.5	11.3
Lower Lias	Clay, pale greyish blue	0.2+	11.5

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	13	84	3	0.5-1.5	14	14	64	3	4	1	0
				1.5-2.5	14	57	28	0	0	1	0
				2.5-3.5	13	51	35	1	0	0	0
				3.5-4.5	10	48	41	0	1	0	0
				4.5-5.1	13	54	32	0	1	0	0
				Mean	13	43	40	1	2	1	0
b	14	71	15	5.1-6.1	13	17	47	12	9	2	0
				6.1-7.1	14	16	53	9	7	1	0
				7.1-7.9	12	23	49	7	7	2	0
				7.9-8.8	16	12	29	13	23	7	0
				Mean	14	17	44	10	12	3	0
c	16	84	0	8.8-9.8	15	78	6	0	1	0	0
				9.8-10.8	14	81	5	0	0	0	0
				10.8-11.3	24	74	2	0	0	0	0
				Mean	16	79	5	0	0	0	0
a+b+c	14	80	6	Mean	14	42	34	4	5	1	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	50	21	5	21	0	0	1	2
+4-16 mm	41	8	6	35	0	0	8	2

SP 57 SE 10 5519 7351 Dollman Farm

Block E

Surface level +110.3 m (+362 ft)
Water struck at +99.4 m
September 1973

Overburden 0.7 m
Mineral 24.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground		0.3	0.3
Glacial Sand and Gravel	Clay, brown, sandy, with pebbles of sandstone and quartzite	0.4	0.7
	a 'Clayey' pebbly sand Gravel: fine, angular flint, subrounded quartzite, sandstone and some ironstone Sand: medium with fine	6.4	7.1
	b 'Clayey' gravel less 'clayey' at base Gravel: fine and coarse, angular flint, subrounded sandstone, quartzite limestone and ironstone Sand: medium, with clayey bands	8.0	15.1
Milton Sand	c 'Clayey' sand, pebbly in first 2 metres Sand: medium with fine	9.6+	24.7

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	19	70		11	0.7-1.3	19	27	36	3	5
				1.3-2.3	18	30	38	3	8	3	0
				2.3-3.2	26	20	31	9	9	5	0
				3.2-4.1	17	20	39	9	9	6	0
				4.1-5.2	15	32	45	3	4	1	0
				5.2-6.2	12	27	53	3	4	1	0
				6.2-7.1	19	16	48	4	9	4	0
				Mean	19	27	38	5	7	4	0
b	12	38	50	7.1-8.1	17	11	24	9	24	15	0
				8.1-9.1	15	11	25	9	16	24	0
				9.1-10.1	13	7	19	11	23	27	0
				10.1-11.1	11	5	13	11	23	37	0
				11.1-12.1	17	6	14	11	23	29	0
				12.1-13.1	14	2	15	12	30	27	0
				13.1-14.1	5	4	19	12	32	28	0
				14.1-15.1	4	5	33	13	20	25	0
				Mean	12	6	21	11	24	26	0
c	11	86	3	15.1-16.1	5	13	58	5	8	11	0
				16.1-17.1	6	19	63	5	4	3	0
				17.1-17.9	11	24	56	7	1	1	0
				17.9-18.9	29	57	14	0	0	0	0
				18.9-19.9	14	38	46	1	1	0	0
				19.9-20.9	7	18	72	2	1	0	0
				20.9-21.9	10	29	59	2	0	0	0
				21.9-22.9	9	22	66	3	0	0	0
				22.9-23.9	9	21	67	2	1	0	0
				23.9-24.7	10	32	55	2	1	0	0
				Mean	11	27	56	3	2	1	0
a+b+c	14	65	21	Mean	14	20	41	4	11	10	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	20	23	4	28	20	0	4	1
+4-16 mm	25	18	2	22	11	0	13	9

SP 57 SE 11

5579 7274

Barby Nortoft

Block E

Surface level +116.7 m (+383 ft)
Water struck at +107.9 m
September 1973

Overburden 0.5 m
Mineral 1.1 m
Waste 0.5 m
Mineral 12.7 m
Bedrock 0.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Glacial Sand and Gravel	Soil	0.1	0.1
	Clay, brown sandy with sandstone and flint pebbles	0.4	0.5
	'Very clayey' sandy gravel	1.1	1.6
	Gravel: fine with coarse, rounded quartzite and sandstone and angular flint and some ironstone		
	Sand: mainly medium and fine		
	Clay, brownish orange, pebbly	0.5	2.1

'Clayey' gravel

Gravel: fine with coarse rounded quartzite and sandstone, angular flint and fine platy ironstone
Sand: medium with coarse

12.7 14.8

Lower Lias

Silty clay, greyish blue, micaceous

0.6+ 15.4

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	23	55		22	0.5-1.6	23	22	29	4	9
b	17	39	44	2.1-3.1	15	9	25	10	19	22	0
				3.1-4.1	16	10	24	12	19	19	0
				4.1-5.1	19	7	26	12	21	15	0
				5.1-6.1	17	15	32	7	10	19	0
				6.1-7.1	19	9	23	10	18	21	0
				7.1-7.6	19	6	17	15	23	20	0
				7.6-8.6	15	6	24	18	27	10	0
				8.6-9.6	20	4	24	18	24	10	0
				9.6-10.6	18	4	12	15	30	21	0
				10.6-11.6	15	4	13	17	32	19	0
				11.6-12.6	9	3	10	15	39	24	0
				12.6-13.6	16	3	7	14	37	23	0
				13.6-14.8	18	4	10	15	29	24	0
				Mean	17	6	19	14	25	19	0
a+b	18	39	43	Mean	18	7	19	13	25	18	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	20	36	5	24	7	0	6	2
+4-16 mm	24	19	8	20	3	1	19	6

SP 57 SE 12

5604 7479

West of Shenley Farm

Block E

Surface level +97.0 m (+318 ft)
Water not struck
September 1973

Waste 2.9 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Alluvium	Clay, brown, sandy, silty with fine flint and sandstone pebbles	2.6	2.9
Lower Lias	Clay, silty, greyish blue	0.5+	3.4

SP 57 SE 13 5661 7373 North of Railway Hotel Block E
 Surface level +100.6 m (+330 ft) Waste 1.6 m
 Water not struck Bedrock 1.4 m+
 September 1973

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Alluvium	Clay, brown, silty, sandy	1.4	1.6
Lower Lias	Clay, greyish brown with yellowish brown streaks	1.2	2.8
	Clay, blue, silty, micaceous	0.2+	3.0

SP 57 SE 14 5661 7242 Near Kilsby and Crick Station Block E
 Surface level +122.2 m (+401 ft) Overburden 1.5 m
 Water struck at +119.0 m Mineral 2.6 m
 September 1973 Bedrock 0.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, pale brown, sandy, silty with flint pebbles	1.2	1.5
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: fine, flint with quartzite, sandstone, ironstone and quartz Sand: medium with thin grey clay partings	2.6	4.1
Lower Lias	Clay, pale greyish brown becoming micaceous and greyish blue below 4.3 m	0.4+	4.5

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		
21	44	35	1.5-2.5	21	14	19	12	23	11	0		
			2.5-3.5	23	14	19	12	24	8	0		
			3.5-4.1	19	8	12	19	28	14	0		
			Mean	21	13	18	13	24	11	0		

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	43	24	4	21	0	0	3	5
+4-16 mm	50	4	15	10	0	0	17	5

SP 57 SE 15 5636 7047 South of Kilsby Block E
 Surface level +150.3 m (+493 ft) Waste 19.5 m
 Water struck at +141.5 Bedrock 0.3 m+
 September 1973

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, brownish grey, silty with chalk and flint pebbles	4.6	4.8
	Clay, greyish blue, silty with chalk, flint, siltstone and limestone pebbles	6.4	11.2
Glacial Sand and Gravel	'Very clayey' gravel, Gravel: coarse and fine, flint and quartzite Sand: medium	1.1	12.3
Boulder Clay	Clay, brownish grey with chalk pebbles	0.7	13.0
	Clay, reddish brown, silty with pebbles of flint and siltstone and some quartzite and quartz	6.5	19.5
Middle Lias	Clay, greyish blue, silty	0.3+	19.8

SP 57 SE 16 5784 7457 Crick Lodge Block E
 Surface level +130.5 m (+428 ft) Waste 0.2 m
 Water not struck Bedrock 3.7 m+
 September 1973

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Lower Lias	Silty clay, pale brownish grey with traces of calcareous cemented siltstone nodules	2.9	3.1
	Silty clay, greyish blue with fine shell fragments	0.8+	3.9

SP 57 SE 17 5792 7319 North west of Crick

Block E

Surface level +123.7 m (+406 ft)
Water struck at +120.9 m
September 1973

Overburden 2.1 m
Mineral 1.9 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Boulder Clay	Silty clay, bluish-greyish brown with angular flint and rounded chalk pebbles	2.0	2.1
Glacial Sand and Gravel	'Clayey' sandy gravel Gravel: fine with coarse, limestone, flint and ironstone with chalk and some quartzite sandstone and quartz Sand: coarse	1.9	4.0
Lower Lias	Silty clay, greyish blue, shaley	1.0+	5.0

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	
18	42	40	2.1-3.1	20	8	17	23	29	3	0
			3.1-4.0	15	5	10	21	26	23	0
			Mean	18	7	13	22	27	13	0

SP 57 SE 18 5742 7232 South-west of Crick

Block E

Surface level +131.5 m (+431 ft)
Water struck at +119.7 m
November 1973

Overburden 0.3 m
Mineral 12.2 m
Bedrock 0.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Glacial Sand and Gravel	'Clayey' sandy gravel, 'very clayey' at top Gravel: fine with coarse, rounded limestone with angular flint and rounded quartzite and sandstone and some chalk and ironstone Sand: mainly medium	12.2	12.5
Lower Lias	Silty clay, greyish brown, becoming greyish blue with depth	0.9+	13.4

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	
17	44	39	0.3-1.2	34	25	25	4	8	4	0
			1.2-2.0	24	12	21	13	21	9	0
			2.0-3.0	19	9	23	12	20	17	0
			3.0-4.0	10	7	36	16	21	20	0
			4.0-5.0	11	8	20	13	26	22	0
			5.0-6.0	13	9	20	16	26	16	0
			6.0-7.0	15	11	24	13	25	12	0
			7.0-8.0	13	9	26	12	26	14	0
			8.0-9.0	15	9	21	17	28	10	0
			9.0-10.0	18	8	15	14	23	22	0
			10.0-11.0	19	8	18	17	23	15	0
			11.0-12.0	9	5	11	12	20	43	0
			12.0-12.5	13	14	25	12	18	18	0
			Mean	17	10	21	13	22	17	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	14	14	3	16	47	2	2	2
+4-16 mm	16	6	2	18	46	4	7	1

SP 57 SE 19 5731 7163 North-east of Kilsby

Block E

Surface level c. +145.0 m (c. +475 ft)
Water struck at 135.9 m
September 1973

Overburden 4.3 m
Mineral 17.8 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Boulder Clay	Clay, greyish brown with pebbles of chalk, flint, quartzite and ironstone; orange-brown and sandy between 3.3 m and 4.3 m	4.2	4.3
Glacial Sand and Gravel	a 'Very clayey' sandy gravel Gravel: fine with coarse, angular to rounded, limestone with flint, sandstone and quartzite and some quartz ironstone and chalk Sand: medium b 'Clayey' sandy gravel Gravel: mainly fine, angular to subrounded, limestone with flint and sandstone and some ironstone, quartzite and quartz Sand: mainly medium	4.0	8.3
		13.8	22.1
Middle Lias	Clay, greyish blue with fine shell fragments	0.5+	22.6

GRADING

	Mean for deposit percentages			Depth below surface (m)	percentages						
	Fines	Sand	Gravel		Fines			Sand			
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	22	42	36	4.3-5.3	25	19	14	9	21	12	0
				5.3-6.3	23	16	18	13	20	10	0
				6.3-7.3	21	9	15	13	21	21	0
				7.3-8.3	21	10	17	14	19	19	0
				Mean	22	14	16	12	20	16	0
b	15	44	41	8.3-9.3	13	8	15	9	17	38	0
				9.3-10.3	14	8	17	16	25	20	0
				10.3-11.3	13	8	14	11	24	30	0
				11.3-12.3	13	8	14	10	20	35	0
				12.3-13.3	17	9	20	13	23	18	0
				13.3-14.3	14	9	25	11	24	17	0
				14.3-15.3	16	13	31	1	26	13	0
				15.3-16.3	14	17	33	15	21	0	0
				16.3-17.3	13	9	30	13	27	8	0
				17.3-18.3	14	6	16	21	34	9	0
				18.3-19.3	11	6	23	24	27	9	0
				19.3-20.3	25	8	11	31	18	7	0
				20.3-21.3	11	6	19	24	31	9	0
				21.3-22.1	21	6	16	16	22	19	0
				Mean	15	8	21	15	24	16	0
a+b	17	43	40	Mean	17	9	20	14	23	16	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	18	16	3	15	34	7	1	6
+4-16 mm	15	10	4	14	32	7	12	6

SP 57 SE 20 5707 7081 Near Kilsby Tunnel

Block E

Surface level +152.4 m (+500 ft)
Water struck at +148.9 m
September 1973

Waste 10.3 m
Bedrock 0.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Boulder Clay	Silty clay, brownish grey with pebbles of chalk, flint and some ironstone	3.1	3.2
	Silty clay, greyish blue with pebbles of chalk and flint; sandy between 9.8 m and 10.3 m	7.1	10.3
Middle Lias	Clay, bluish grey	0.3+	10.6

SP 57 SE 21 5784 7044 Kilsby Grange

Block E

Surface level +153.3 m (+503 ft)
Water not struck
October 1973

Overburden 13.1 m
Mineral 4.5 m
Waste 0.6 m
Bedrock 0.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Silty clay, greyish blue with sandy partings and pebbles of flint and chalk	12.8	13.1
Glacial Sand and Gravel	"Very clayey" sandy gravel Gravel: fine, limestone with flint, sandstone and chalk Sand: mainly medium with clay layers	4.5	17.6
Boulder Clay	Clay, brownish grey with chalk pebbles	0.6	18.2
Middle Lias	Silty clay, greyish blue	0.2+	18.4

GRADING

	Mean for deposit percentages			Depth below surface (m)	percentages						
	Fines	Sand	Gravel		Fines			Sand			
					- $\frac{1}{2}$	+ $\frac{1}{2}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
	20	46	34	13.1-14.1	20	16	23	16	21	4	0
				14.1-15.1	15	12	16	13	23	21	0
				15.1-16.1	24	17	19	15	18	7	0
				16.1-17.1	20	9	17	13	24	17	0
				17.1-17.6	19	13	16	16	26	10	0
				Mean	20	14	18	14	22	12	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	25	7	0	15	33	12	0	8
+4-16 mm	15	7	4	14	43	11	6	0

SP 57 SE 22 5880 7412 South-east of Crick Lodge

Block E

Surface level +127.4 m (+418 ft)
Water not struck
September 1973

Waste 0.7 m
Bedrock 2.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.7	0.7
Lower Lias	Silty clay, yellowish brown becoming bluish grey	2.4+	3.1

SP 57 SE 23 5865 7283 Near Manor House, Crick

Block E

Surface level +128.3 m (+421 ft)
Water struck at 124.6 m
November 1973

Overburden 0.5 m
Mineral 4.3 m
Bedrock 0.5 m+

b 'Clayey' sandy gravel 5.0 17.9
Gravel: fine, chalk, platy ironstone, oolitic limestone
quartzite and sandstone
Sand: mainly coarse, silty, pale brown

c Sandy gravel 3.4 21.3
Gravel: fine with coarse, flint, quartzite and limestone
Sand: coarse with medium

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.5	0.5
Glacial Sand and Gravel	'Very clayey' gravel Gravel: fine and coarse, flint with ironstone, sandstone and quartzite and some quartz, chalk and limestone Sand: coarse with medium	4.3	4.8
Lower Lias	Clay, bluish grey	0.5+	5.3

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	
24	36	40	0.5-1.5	25	11	11	16	20	17	0
			1.5-2.5	25	9	12	15	20	19	0
			2.5-3.5	23	7	12	14	20	24	0
			3.5-4.8	21	8	13	17	26	15	0
			Mean	24	8	12	16	21	19	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	46	13	7	21	0	0	10	3
+4-16 mm	47	9	4	7	5	4	24	0

SP 57 SE 24 5853 7190 South-west of Crick

Block E

Surface level +141.2 m (+463 ft)
Water struck at +123.2 m
November 1974

Overburden 8.0 m
Mineral 3.0 m
Waste 1.9 m
Mineral 8.4 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, brownish grey becoming reddish brown; sandy and silty with pebbles of chalk; flint and quartzite	7.7	8.0
Glacial Sand and Gravel	a 'Clayey' sand Sand: fine with silty clay layers	3.0	11.0
	Sandy clay, pale brown, alternating silty sand and clay bands	1.9	12.9

Middle Lias

Clay, grey 0.5+ 21.8

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
a	19	81	0	8.0-9.0	13	60	26	1	0	0	0
				9.0-10.0	14	59	26	1	0	0	0
				10.0-11.0	32	47	21	0	0	0	0
				Mean	19	56	24	1	0	0	0
b	17	48	35	12.9-13.9	18	11	12	19	25	15	0
				13.9-14.9	19	7	16	21	28	9	0
				14.9-15.9	16	9	12	29	29	5	0
				15.9-16.9	18	15	18	19	27	3	0
				16.9-17.9	13	12	25	17	22	11	0
				Mean	17	11	16	21	27	8	0
c	3	52	45	17.9-18.9	4	6	23	22	26	19	0
				18.9-19.9	4	3	24	31	22	16	0
				19.9-21.3	3	3	15	28	27	24	0
				Mean	3	4	20	28	25	20	0
a+b+c	13	58	29	Mean	13	21	15	22	19	10	0

SP 57 SE 25 5904 7158 Mill Hill House

Block E

Surface level +155.4 m (+510 ft)
Water not struck
September 1973

Waste 1.7 m
Bedrock 1.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Boulder Clay	Clay, brown, silty, sandy with sandstone and flint pebbles	1.6	1.7
Marlstone Rock Bed (Middle Lias)	Clay, brownish yellow, silty, micaceous with hard ironstained partings along bedding planes	1.3+	3.0

SP 57 SE 26 **5866 7104** **North-east of Kilsby Grange** **Block E**
 Surface level +146.0 m (+479 ft)
 Water struck at +135.4 m
 September 1973
 Overburden 15.8 m
 Mineral 6.7 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Silty clay, reddish brown with pebbles of chalk and siltstone	2.9	3.1
	Silty clay, greyish blue with a reddish brown band between 9.0 m and 10.6 m; pebbles of flint and chalk		
Glacial Sand and Gravel	a 'Very clayey' sand Sand: fine with silty clay layers	5.1	20.9
	b 'Clayey' sandy gravel Gravel: fine, flint and limestone with some ironstone, sandstone, chalk, quartzite and quartz Sand: mainly fine	1.6	22.5
Middle Lias	Silty clay, greyish blue	0.5+	23.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	percentages						
	Fines	Sand	Gravel		Gravel						
					-½	+½ -¼	+¼ -1	+1 -4	+4 -16	+16 -64	+64 mm
a	33	67	0	15.8-16.8	33	51	15	0	0	1	0
				16.8-17.8	33	54	12	1	0	0	0
				17.8-18.8	31	55	13	1	0	0	0
				18.8-19.8	34	50	15	0	0	1	0
				19.8-20.9	33	53	13	0	1	0	0
				Mean	33	52	14	1	0	0	0
b	16	52	32	20.9-21.5	18	43	17	9	12	1	0
				21.5-22.5	15	8	15	20	29	13	0
				Mean	16	20	15	17	23	9	0
a+b	29	63	8	Mean	29	45	14	4	6	2	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	37	10	6	9	28	4	6	0
+4-16 mm	28	0	0	7	45	9	11	0

SP 57 SE 27 **5504 7162** **Rains Brook** **Block E**
 Surface level +106.7 m (+350 ft)
 Water not struck
 September 1973
 Waste 0.2 m
 Bedrock 2.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Lower Lias	Silty clay, pale brownish yellow	1.6	1.8
	Clay, greyish blue with fine shell fragments	0.7+	2.5

SP 65 NW 1 **6072 5879** **South of Dodford Mill** **Block A**
 Surface level +90.1 m (+296 ft)
 Water not struck
 October 1974
 Waste 2.2 m
 Bedrock 0.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Alluvium	Silty clay, pale brown, becoming sandy to base with ironstone nodules	2.1	2.2
Lower Lias	Silt, grey becoming blue, micaceous with traces of iron concretions	0.8+	3.0

SP 65 NW 2 **6262 5991** **West of Road Weedon** **Block D**
 Surface level +112.2 m (+368 ft)
 Water not struck
 November 1973
 Overburden 0.4 m
 Mineral 1.1 m
 Waste 0.4 m
 Mineral 3.1 m
 Waste 4.6 m
 Bedrock 0.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.4	0.4
Glacial Sand and Gravel	a 'Very clayey' sandy gravel Gravel: fine and coarse, limestone with ironstone and some flint, chalk, quartzite and sandstone Sand: medium	1.1	1.5
	Sandy clay, pale brown	0.4	1.9
	b 'Clayey' gravel, with a cemented layer from 3.8 to 4.3 m Gravel: as above Sand: as above	3.1	5.0
Boulder Clay	Silty clay, brown with pebbles of flint, sandstone and chalk	1.4	6.4
	Clay, greyish blue with sand partings	2.3	8.7
	Silty, clay, brown, pebbly	0.9	9.6
Upper Lias	Clay, greyish blue	0.4+	10.0

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	25	41	34	0.4-1.5	25	16	16	9	10	24	0
b	15	34	51	1.9-2.8	14	6	12	17	29	22	0
				2.8-3.8	16	9	13	19	29	14	0
				3.8-4.3	15	8	12	16	26	23	0
				4.3-5.0	15	9	8	9	19	27	13
			Mean	15	8	11	15	26	21	4	
a+b	17	36	47	Mean	17	10	12	14	22	22	3

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	8	9	1	15	45	10	11	1
+4-16 mm	12	5	0	0	38	12	43	0

SP 65 NW 3 6335 5990 Road Weedon Block C

Surface level +78.9 m (+259 ft)
 Water not struck
 November 1973
 Waste 4.6 m
 Bedrock 0.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Alluvium	Silty clay, pale brown becoming bluish grey; with some flint pebbles and peat	4.3	4.6
Middle Lias	Silty clay; grey	0.4+	5.0

SP 65 NW 4 6401 5974 Near Flore House Block B

Surface level +83.1 m (+273 ft)
 Water not struck
 November 1973
 Waste 1.8 m+
 Bedrock 1.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Alluvium	Silty clay, pale brown becoming greyish brown and micaceous; pebbles of flint and quartzite	1.6	1.8
Middle Lias	Silt, mottled, greyish brown, micaceous	1.2	3.0
	Silty clay, greyish blue	0.5+	3.5

SP 65 NW 5 6361 5905 South-east of Weedon Bec Block A

Surface level +87.1 m (+286 ft)
 October 1974
 Waste 1.3 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, pale brownish orange becoming pale greyish yellow at base, sandy, silty, with flint and ironstone pebbles	1.0	1.3
Middle Lias	Silty clay, pale greyish yellow, micaceous with traces of ironstone concretions	0.5+	1.8

SP 65 NW 6 6450 5950 South-east of Flore Mill Block C

Surface level +75.6 m (+248 ft)
 Water struck at +73.1 m
 November 1973
 Overburden 2.5 m
 Mineral 1.1 m
 Waste 0.8 m
 Mineral 1.8 m
 Waste 4.1 m
 Bedrock 0.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Alluvium	Clayey silt, pale brown with some fine flint, sandstone and ironstone pebbles	2.2	2.5
River Terrace Deposits	'Clayey' sandy gravel Gravel: fine and coarse, subrounded to rounded ironstone and quartzite and angular flint with some sandstone, limestone and quartz Sand: mainly medium	1.1	3.6
	Clayey silt, pale greyish brown	0.8	4.4
	Gravel, as above	1.8	6.2
	Silty clay, greyish brown	4.1	10.3
Middle Lias	Silty clay, greyish brown micaceous	0.2+	10.5

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	13	47	40	2.5-3.6	13	11	23	13	22	18	0
b	3	27	70	4.4-5.4	2	2	5	9	34	48	0
				5.4-6.2	5	9	16	13	37	20	0
				Mean	3	6	11	10	36	34	0
a+b	7	33	60	Mean	7	7	15	11	31	29	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	24	38	4	14	6	0	13	1
+4-16 mm	14	8	2	13	9	2	52	0

SP 65 NW 7 6436 5880 Stowehill

Surface level +105.7 m (+347 ft)
Water struck at +96.1 m
November 1973

Block A

Overburden 0.3 m
Mineral 1.1 m
Waste 0.2 m
Mineral 3.1 m
Waste 12.6 m
Bedrock 0.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Glacial Sand and Gravel	Pebbly sand Gravel: mainly fine limestone with flint and chalk Sand: medium and fine	1.1	1.4
	Clay, pale brown, sandy, silty	0.2	1.6
	'Clayey' sandy gravel Gravel: mainly fine, limestone with flint and chalk and some ironstone, sandstone, quartz and quartzite Sand: mainly medium	3.1	4.7
Boulder Clay	Silty clay, greyish blue with chalk, flint and sandstone pebbles	12.6	17.3
Upper Lias	Silty clay, greyish blue	0.2+	17.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	percentages						
	Fines	Sand	Gravel		percentages						
					- $\frac{1}{2}$	+ $\frac{1}{4}$ - $\frac{1}{2}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	9	81	10	0.3-1.4	9	30	47	4	7	3	0
b	14	47	39	1.6-2.6	12	18	23	11	19	17	0
				2.6-3.6	15	8	21	17	28	11	0
				3.6-4.7	16	8	19	15	28	14	0
				Mean	14	12	21	14	25	14	0
a+b	13	55	32	Mean	13	16	27	12	21	11	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	24	1	2	4	45	20	4	0
+4-16 mm	23	2	2	2	40	25	6	0

SP 65 NW 10 6358 5879 West of Stowehill

Surface level +102.1 m (+335 ft)
Water not struck
Minuteman power auger, 115 mm diameter
October 1975

Block A

Overburden 0.5 m
Mineral 1.9 m
Waste 0.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.5	0.5
Glacial Sand and Gravel	Sand: fine, silty with pebbles of flint and ironstone	1.7	2.2
	'Clayey' pebbly sand Gravel: angular flint and ironstone Sand: medium, reddish brown	0.2	2.4
Boulder Clay	Silty clay, greyish brown with pebbles and grains of chalk	0.1+	2.5
	No grading results available		

SP 65 NE 59 6562 5872 North-west of Nether Heyford

Surface level +87.8 m (+288 ft)
Water struck at 84.2 m
October 1974

Block A

Overburden 2.5 m
Mineral 5.3 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, pale brown, sandy, silty with angular flint pebbles	2.2	2.5
Glacial Sand and Gravel	a Pebbly sand Gravel: fine, flint, chalk, limestone and ironstone Sand: medium with fine	1.0	3.5
Milton Sand	b Sand, pebbly and 'clayey' at base Gravel: fine, ironstone and sandstone	4.3	7.8
Middle Lias	Clay, bluish grey	0.5+	8.3

GRADING

	Mean for deposit percentages			Depth below surface (m)	percentages						
	Fines	Sand	Gravel		percentages						
					- $\frac{1}{2}$	+ $\frac{1}{4}$ - $\frac{1}{2}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
a	8	85	7	2.5-3.5	8	28	52	5	6	1	0
b	9	87	4	3.5-4.5	6	30	56	4	4	0	0
				4.5-5.5	6	31	57	4	2	0	0
				5.5-6.5	8	29	54	5	4	0	0
				6.5-7.8	16	30	39	8	6	1	0
				Mean	10	30	51	5	4	0	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	3	0	0	32	0	3	48	14
+4-16 mm	2	0	0	28	10	0	60	0

SP 65 NE 60 6662 5924 South of Upper Heyford Block B
 Surface level +83.3 m (+273 ft) Waste 11.8 m
 Water struck at +71.5 m Bedrock 0.3 m+
 June 1974

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground		0.4	0.4
Boulder Clay	Clay, pale brown, sandy, silty and pebbly	0.9	1.3
Glacial Sand and Gravel	'Clayey' sandy gravel	0.2	1.5
Boulder Clay	Clay, grey, silty, pebbly	10.3	11.8
Middle Lias	Clayey silt, bluish grey with shell fragments	0.3+	12.1

SP 65 NE 61 6643 5889 North-east of Nether Heyford Block C
 Surface level +70.9 m (+233 ft) Overburden 0.7 m
 Water struck at +69.4 m Mineral 4.2 m
 April 1974 Waste 21.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil and Alluvium	0.7	0.7
River Terrace Deposits	Sandy gravel; gravel content decreases towards the base Gravel: fine and coarse, angular to subrounded, ironstone with quartzite and some flint, sandstone, limestone and quartz Sand: fine to coarse	4.2	4.9
Glacial Lake Deposits	Sandy silt with fine sand partings, greyish brown, laminated	13.9	18.8
Boulder Clay	Silty clay, brownish blue, pebbly	6.2+	25.0

GRADING

Mean for deposit percentages			Depth below surface (m)	percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
				-4	+4 -1	+1 -4	+4 -16	+16 -64	+64 mm	
5	50	45	0.7-2.0	9	13	19	14	26	19	0
			2.0-3.0	2	6	14	19	31	28	0
			3.0-4.0	2	7	19	25	24	23	0
			4.0-4.9	6	29	28	9	15	13	0
			Mean	5	14	20	16	24	21	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	6	36	9	11	8	0	27	3
+4-16 mm	15	0	2	8	4	1	68	2

SP 65 NE 62 6663 5760 North-west of Bugbrooke Block A
 Surface level +93.6 m (+307 ft) Waste 9.5 m
 Water struck at +85.5 m Bedrock 0.3 m+
 October 1974

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Soil and rubble	0.5	0.5
Boulder Clay	Clay, greyish brown, becoming grey, sandy, silty with pebbles of flint, chalk and sandstone		9.0
Middle Lias	Clay, grey	0.3+	9.8

SP 65 NE 63 6748 5918 North-west of Bugbrooke Mill Block C
 Surface level +69.9 m (+229 ft) Overburden 0.6 m
 Water struck at +68.6 m Mineral 6.6 m
 April 1974 Waste 12.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Alluvium	Silty, clay, pale brown, with fine sand and some pebbles	0.4	0.6
River Terrace Deposits	a 'Very clayey' sandy gravel Gravel: fine, angular to subrounded, ironstone and quartzite with flint Sand: mainly medium	1.9	2.5
	b Gravel Gravel: coarse and fine, quartzite and ironstone with flint, sandstone and limestone Sand: mainly coarse	2.7	5.2
Glacial Lake Deposits	c 'Very clayey' sand Sand: fine, silty, greyish brown	2.0	7.2
	Sandy silt, greyish brown	12.1+	19.3

GRADING

	Mean for deposit percentages			Depth below surface (m)	percentages						
	Fines	Sand	Gravel		Fines		Sand		Gravel		
					-1/16	+1/16 - 1/8	+1/8 - 1/4	+1/4 - 1/2	+1/2 - 3/4	+3/4 - 1	+1 - 1.18
a	20	55	25	0.6-1.6 1.6-2.5 Mean	24 16 20	19 14 16	32 25 29	7 13 10	14 20 17	4 12 8	0 0 0
b	2	37	61	2.5-3.5 3.5-4.5 4.5-5.2 Mean	2 2 2 2	2 3 9 5	13 11 14 12	17 21 20 20	28 31 27 28	38 32 28 33	0 0 0 0
c	29	70	1	5.2-6.2 6.2-7.2 Mean	27 31 29	64 60 62	8 8 8	0 1 0	1 0 0	0 0 1	0 0 0
a+b+c	15	51	34	Mean	15	24	16	11	18	16	0
a+b	10	43	47	Medn	10	9	19	15	24	23	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	17	47	0	16	5	1	14	0
+4-16 mm	15	9	0	0	8	0	68	0

45

SP 65 NE 64	6788 5779	North-east of Bugbrooke	Block A
Surface level +92.3 m (+303 ft) Water not struck April 1974		Overburden 1.1 m Mineral 0.9 m Bedrock 0.5 m+	
LOG			
Geological classification		Lithology	Thickness m Depth m
		Soil	0.2 0.2
Boulder Clay		Sandy clay, pale brown, with pebbles of chalk and ironstone	0.9 1.1
Milton Sand		'Very clayey' sand, pebbly in part Sand: medium	0.9 2.0
Middle Lias		Silty clay, pale brown, micaceous	0.5+ 2.5
		No grading data available	

SP 65 NE 65	6754 5747	Bugbrooke	Block A
Surface level +78.4 m (+257 ft) Water struck at +76.4 m April 1974		Waste 2.0 m Bedrock 2.4 m+	

LOG				
Geological classification		Lithology	Thickness m	Depth m
		Soil	0.3	0.3
Alluvium		Clay, pale brown, sandy and silty with pebbles of flint and sandstone	1.7	2.0
Middle Lias		Silty clay, brownish grey, micaceous	1.9	3.9
		Clayey silt, greyish blue with shell fragments	0.5+	4.4

SP 65 NE 66	6875 5943	Harpole Mill	Block C
Surface level +66.7 m (+219 ft) Water struck at +63.8 m October 1974		Waste 9.3 m Bedrock 0.2 m+	

LOG				
Geological classification		Lithology	Thickness m	Depth m
		Soil	0.2	0.2
Alluvium		Clayey silt, pale brown with some fine flint pebbles	2.7	2.9
		'Clayey' gravel Gravel: subrounded to rounded quartzite, angular flint and sandstone	0.6	3.5
Boulder Clay		Clay, grey, sandy, silty with some fine chalk pebbles	5.8	9.3
Middle Lias		Silty clay, greyish blue, micaceous	0.2+	9.5

SP 65 NE 67	6911 5856	Bugbrooke Road	Block A
Surface level +78.3 m (+257 ft) Water struck at +71.9 m April 1974		Waste 18.4 m+	

LOG				
Geological classification		Lithology	Thickness m	Depth m
		Soil	0.3	0.3
Boulder Clay		Clay, pale brown becoming greyish brown, silty, sandy with pebbles of flint and chalk	8.2	8.5
Glacial Lake Deposits		Silty clay, greyish brown with chalk grains; laminated between 16.3 m and 18.4 m	9.9+	18.4

SP 65 NE 68 6910 5759 Near Corporation Farm

Surface level +89.5 m (+294 ft)
Water struck at +79.5 m
October 1974

Block A

Overburden 0.3 m
Mineral 12.1 m
Waste 0.3 m
Mineral 0.8 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Milton Sand	a 'Clayey' pebbly sand, sandy gravel at base Gravel: fine, platy ironstone Sand: medium with fine	12.1	12.4
	Silty clay, pale greyish brown, micaceous	0.3	12.7
	b Sandy gravel Gravel: fine ironstone Sand: medium	0.8	13.5
Upper Lias	Silt and siltstone, grey, micaceous	0.5+	14.0

GRADING

	Mean for deposit percentages			Depth below surface (m)	percentages							
	Fines	Sand	Gravel		percentages							
					Fines	Sand	Gravel			mm		
-1/2	+1/4 -1/4	+1/4 -1	+1 -4	+4 -16	+16 -64	+64	mm					
a	10	81	9	0.3-1.0	16	34	40	3	4	3	0	
				1.0-2.0	14	36	42	1	4	3	0	
				2.0-3.0	17	23	56	1	2	1	0	
				3.0-4.0	7	24	66	2	1	0	0	
				4.0-5.0	7	22	68	2	1	0	0	
				5.0-6.0	7	22	66	4	1	0	0	
				6.0-7.0	7	24	61	3	4	1	0	
				7.0-8.0	9	33	56	1	1	0	0	
				8.0-9.0	11	33	50	3	2	1	0	
				9.0-10.0	12	36	38	5	5	4	0	
				10.0-11.0	11	35	38	5	6	5	0	
				11.0-12.4	7	12	17	20	34	10	0	
				Mean	10	27	49	5	6	3	0	
b	5	53	42	12.7-13.5	5	5	14	34	36	6	0	
a+b	10	78	12	Mean	10	25	46	7	9	3	0	

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	0	0	0	0	0	0	100	0
+4-16 mm	0	0	0	0	0	0	100	0

SP 66 NW 1 6041 6667 Ryehill Farm

Surface level +98.6 m (+324 ft)
Water not struck
June 1974

Block D

Overburden 2.0 m
Mineral 4.0 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.4	0.4
Glacial Sand and Gravel	'Clayey' sandy gravel Gravel: fine and coarse, angular flint, subrounded sandstone and ironstone and rounded quartz	0.7	1.1
	Clay, brown, sandy with pebbles of flint, quartz and ironstone	0.9	2.0
Milton Sand	'Very clayey' sand Sand: fine	4.0	6.0
Middle Lias	Clayey silt, pale brown, micaceous	1.0+	7.0

GRADING

Mean for deposit percentages	Depth below surface (m)	percentages								
		Fines			Sand			Gravel		
		-1/2	+1/4 -1/4	+1/4 -1	+1 -4	+4 -16	+16 -64	+64 mm		
31	69	0	2.0-3.0	37	62	1	0	0	0	0
			3.0-4.0	29	69	1	1	0	0	0
			4.0-5.0	27	71	1	1	0	0	0
			5.0-6.0	33	65	1	1	0	0	0
			Mean	31	67	1	1	0	0	0

SP 66 NW 2 6100 6627 Near Greenhill Farm

Surface level +111.8 m (+367 ft)
Water not struck
May 1974

Block D

Overburden 0.2 m
Mineral 2.1 m
Waste 2.8 m
Bedrock 0.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Glacial Sand and Gravel	'Clayey' gravel, with a fine silty sand parting Gravel: coarse with fine, subangular to rounded, flint, sandstone, limestone and ironstone with some chalk and quartzite Sand: fine to coarse	2.1	2.3
Boulder Clay	Clayey silt, mottled yellowish brown with pebbles of flint quartzite and ironstone	2.8	5.1
Middle Lias	Clayey silt, brownish grey and ironstained, micaceous	0.6+	5.7

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
16	40	44	0.2-1.2	16	15	13	12	17	27	0
			1.2-2.3	16	17	12	10	21	24	0
			Mean	16	16	13	11	19	25	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	33	5	1	23	29	3	2	4
+4-16 mm	27	1	1	12	25	4	29	1

SP 66 NW 3 6063 6610 West of Greenhill Farm Block C

Surface level +97.7 m (+321 ft) Overburden 3.7 m
 Water struck at +94.0 m Mineral 2.1 m
 August 1974 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground		0.4	0.4
Alluvium	Silty clay, pale brown, sandy with some pebbles of flint and wood fragments	1.9	2.3
	Silty clay, greyish black, very sandy with flint pebbles	1.4	3.7
River Terrace Deposits	Gravel Gravel: coarse with fine, angular to rounded, flint quartzite, sandstone and ironstone with limestone and quartz Sand: medium and coarse	2.1	5.8
Lower Lias	Silty clay, greyish blue with traces of shells	0.5+	6.3

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
4	34	62	3.7-4.7	4	3	10	14	22	46	1
			4.7-5.8	3	4	20	19	33	21	0
			Mean	4	3	15	16	28	33	1

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	25	32	5	31	0	0	7	0
+4-16 mm	20	9	7	18	6	0	40	0

SP 66 NW 4 6046 6521 Near Thrupp Grounds Block D

Surface level +127.4 m (+418 ft)
 Water struck at +120.5 m
 June 1974

Overburden 0.2 m
 Mineral 2.3 m
 Waste 0.3 m
 Mineral 1.0 m
 Waste 3.1 m
 Mineral 5.8 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Glacial Sand and Gravel	a 'Very clayey' sandy gravel Gravel: fine with coarse, angular flint with rounded sandstone and platy ironstone Sand: medium	2.3	2.5
	Silty clay, pale brown with fine, angular flint pebbles	0.3	2.8
	b Sand, with some ironstone pebbles: fine and medium	1.0	3.8
Boulder Clay	Clay, pale brown sandy, silty with pebbles of ironstone, flint and quartzite	3.1	6.9
Glacial Sand and Gravel	c Pebbly sand Gravel: fine, subrounded ironstone Sand: medium with fine	5.8	12.7
Middle Lias	Silty clay, bluish grey with a brown parting, micaceous	0.5+	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
a	22	41	37	0.2-1.2	22	13	20	10	21	14	0
				1.2-2.5	22	7	21	12	24	14	0
				Mean	22	10	20	11	23	14	0
b	8	91	1	2.8-3.8	8	48	42	1	1	0	0
c	5	88	7	6.9-7.9	4	40	49	3	2	2	0
				7.9-8.9	6	35	48	5	4	2	0
				8.9-9.9	5	25	42	6	15	7	0
				9.9-10.9	4	31	61	2	2	0	0
				10.9-11.8	4	31	59	2	4	0	0
				11.8-12.7	8	21	59	8	4	0	0
				Mean	5	31	53	4	5	2	0
a+b+c	9	78	13	Mean	9	28	45	5	9	4	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	36	3	3	18	0	0	40	0
+4-16 mm	30	3	3	16	0	0	46	2

SP 66 NW 5 6132 6995 Near Watford Lodge

Block E

Surface level +146.9 m (+482 ft)
Water not struck
June 1974

Overburden 3.0 m
Mineral 6.5 m
Waste 1.4 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, pale brown, sandy, silty with fine angular flint pebbles	1.4	1.7
	Clay, greyish brown, sandy, silty	1.3	3.0
Glacial Sand and Gravel	'Clayey' sandy gravel Gravel: fine, angular to rounded, limestone, ironstone and sandstone with flint, quartzite and quartz Sand: mainly medium, but coarsens with depth	6.5	9.5
Boulder Clay	Silty clay, bluish grey with ironstone and flint pebbles	1.4	10.9
Upper Lias	Clayey silt, grey	0.5+	11.4

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
14	60	26	3.0-4.1	14	47	32	4	3	0	0
			4.1-5.1	17	19	30	14	17	3	0
			5.1-6.1	12	13	32	12	19	12	0
			6.1-7.1	12	12	33	13	19	11	0
			7.1-8.1	11	9	22	22	26	10	0
			8.1-9.2	13	7	22	27	26	5	0
			9.2-9.5	19	9	13	26	28	5	0
			Mean	14	17	27	16	19	7	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	7	16	2	25	26	0	23	1
+4-16 mm	5	5	7	21	28	0	27	6

SP 66 NW 6 6127 6799 Broek Hill Lodge

Block E

Surface level +136.3 m (+447 ft)
Water struck at +133.0 m
October 1974

Overburden 0.2 m
Mineral 3.2 m
Waste 2.8 m
Bedrock 0.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Glacial Sand and Gravel	'Very clayey' sandy gravel, 'clayey' gravel in last metre Gravel: fine, angular flint and rounded quartzite sandstone and ironstone with quartz Sand: medium with fine	3.2	3.4
Boulder Clay	Silty clay, greyish blue with flint, quartzite and ironstone pebbles	2.8	6.2
Upper Lias	Clay, greyish blue with some fine shell fragments	0.3+	6.5

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
22	42	36	0.2-1.2	22	20	19	9	16	14	0
			1.2-2.6	27	15	21	11	18	8	0
			2.6-3.4	15	9	13	7	21	8	27
			Mean	22	15	18	9	19	9	8

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	30	26	0	28	0	0	16	0
+4-16 mm	25	10	13	6	0	0	40	0

SP 66 NW 7 6160 6556 Near Surney Lodge

Block D

Surface level +105.9 m (+347 ft)
Water not struck
June 1974

Overburden 0.9 m
Mineral 1.5 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Boulder Clay	Sandy clay, pale brown with flint and ironstone pebbles	0.8	0.9
Milton Sand	'Clayey' sand Sand: fine with medium	1.5	2.4
Middle Lias	Clay, pale brown, silty, micaceous	0.5+	2.9

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
16	84	0	0.9-2.4	16	54	29	1	0	0	0

SP 66 NW 8 6220 6958 Near Rodmore Lodge Block E
 Surface level +130.6 m (+429 ft)
 Water not struck
 September 1974
 Waste 3.2 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay pale brown, silty with some angular flint pebbles	3.0	3.2
Marlstone Rock Bed (Middle Lias)	Silt and sandstone, pale brownish grey, micaceous	0.5+	3.7

SP 66 NW 9 6299 6992 Near Foxhill Farm Block E
 Surface level +137.3 m (+450 ft)
 Water not struck
 July 1974
 Overburden 0.3 m
 Mineral 2.5 m
 Waste 3.1 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Glacial Sand and Gravel	'Clayey' pebbly sand Gravel: fine, angular flint with rounded quartzite, sandstone and ironstone Sand: fine with medium	2.5	2.8
Boulder Clay	Clay, grey, sandy, silty with flint pebbles and thin sand layers	3.1	5.9
Upper Lias	Silty clay, greyish blue	0.5+	6.4

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
19	63	18	0.3-1.5	17	28	28	8	13	6	0
			1.5-2.8	21	39	17	6	13	4	0
			Mean	19	34	22	7	13	5	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	54	19	3	16	0	0	3	5
+4-16 mm	39	3	9	3	0	0	43	3

SP 66 NW 10 6267 6874 South of Vanderplanks Covert Block E
 Surface level +136.9 m (+449 ft)
 Water not struck
 June 1974
 Waste 8.1 m
 Bedrock 0.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, sandy, silty, brownish grey with flint and chalk pebbles	2.5	2.7
	Clay, silty, sandy, grey with flint and chalk pebbles	5.1	7.8
	Silty sand, fine, brownish yellow	0.3	8.1
Upper Lias	Silty clay, greyish blue	0.2+	8.3

SP 66 NW 11 6285 6834 North of Long Buckby Block E
 Surface level +123.9 m (+407 ft)
 Water not struck
 June 1974
 Waste 5.9 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Silty clay, brown becoming greyish brown with depth; with pebbles of flint, sandstone, ironstone and chalk	4.5	4.8
Glacial Sand and Gravel	'Clayey' pebbly sand Gravel: fine, ironstone and limestone Sand: medium with fine	1.1	5.9
Upper Lias	Silty clay, pale brownish grey with ironstained siltstone bands	0.5+	6.4

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
10	75	15	4.8-5.9	10	28	38	9	11	4	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	0	0	0	7	31	0	62	0
+4-16 mm	0	0	0	14	43	0	40	3

SP 66 NW 12 6259 6720 Long Buckby Block B

Surface level +138.7 m (+455 ft)
 Water struck at +134.5 m
 August 1974
 Waste 10.1 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: coarse, angular flint with rounded quartzite, sandstone, quartz and ironstone Sand: fine and medium	0.9	1.1
	Clay, pale brownish grey, silty sandy with flint and chalk pebbles, band of 'clayey' sand between 2.6 m and 2.8 m	3.7	4.8
	Clayey silt, grey, pebbly with an orange-brown silt band between 5.2 m and 5.7 m	3.9	8.7
Glacial Sand and Gravel	'Clayey' sand with some chalk pebbles	0.6	9.3
Boulder Clay	Silty clay, grey, sandy with fine chalk pebbles	0.8	10.1
Upper Lias	Clay, dark grey, firm	0.5+	10.6

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
32	43	25	0.2-1.1	32	20	19	4	6	19	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	42	23	4	20	4	0	7	0
+4-16 mm	21	21	17	11	0	0	30	0

SP 66 NW 13 6202 6582 Surney Bridges

Surface level +93.8 m (+308 ft)
 Water struck at +91.1 m
 June 1974

Block C

Overburden 2.7 m
 Mineral 1.7 m
 Waste 0.4 m
 Bedrock 0.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Alluvium	Silty clay, brown, sandy with flint pebbles; bluish grey from 2.0 m and to base	2.5	2.7
River Terrace Deposits	'Very clayey' sandy gravel Gravel: fine, angular flint, subrounded quartzite and ironstone with subrounded sandstone, limestone and quartz Sand: medium	1.7	4.4
	Silty clay, pale brown with some flint pebbles	0.4	4.8
Middle Lias	Silty clay, greyish blue	0.3+	5.1

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
26	44	30	2.7-4.4	26	11	23	10	22	8	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	26	42	5	14	13	0	0	0
+4-16 mm	28	7	7	13	9	0	32	4

SP 66 NW 14 6243 6588 North-west of Elm Lodge

Surface level +98.0 m (+322 ft)
 Water not struck
 June 1974

Block B

Waste 2.1 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Silty clay, pale brown with pebbles of flint and ironstone	1.8	2.1
Middle Lias	Silty clay, grey	0.5+	2.6

SP 66 NW 15 6339 6931 South of Buckby Lodge

Block E

Surface level c+152.0 m (c+500 ft)
Water struck at +119.6 m
September 1974

Overburden 3.8 m
Mineral 1.7 m
Waste 6.4 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Boulder Clay	Clay, sandy, silty, brownish grey with fine chalk pebbles	3.7	3.8
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: fine with coarse, angular flint, subrounded sandstone and limestone and some ironstone, chalk and quartzite Sand: fine to coarse	1.7	5.5
Boulder Clay	Silty clay, grey with chalk pebbles and thin sand partings	6.4	11.9
Upper Lias	Silty clay, grey	0.5+	12.4

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
34	38	28	3.8-4.8	40	12	13	11	14	10	0
			4.8-5.5	29	11	16	12	21	11	0
			Mean	34	12	14	12	17	11	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	33	8	0	37	22	0	0	0
+4-16 mm	37	0	0	9	28	9	17	0

SP 66 NW 16 6379 6805 Near Cotton End

Block B

Surface level +149.6 m (+491 ft)
Water struck at +131.6 m
November 1974

Overburden 7.8 m
Mineral 3.0 m
Waste 10.2 m
Bedrock 0.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Glacial Sand and Gravel	'Very clayey' pebbly sand Gravel: coarse, rounded quartzite Sand: medium	0.7	0.9
Boulder Clay	Clay, greyish brown, sandy, silty with some pebbles of flint and chalk	3.1	4.0
Glacial Lake Deposits	Sandy silt, brown, laminated with some pebbles of flint and chalk	3.8	7.8

Glacial Sand and Gravel	'Clayey' pebbly sand Gravel: fine, subangular to rounded, ironstone with sandstone and some flint, limestone, and chalk Sand: fine with medium	3.0	10.8
Glacial Lake Deposits	Sandy silt, pale brown, soft, laminated with chalk and siltstone pebbles	10.2	21.0
Upper Lias	Clay, bluish grey, soft	0.3+	21.3

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
19	75	6	7.8-8.8	18	44	24	7	5	2	0
			8.8-9.8	21	47	20	6	5	1	0
			9.8-10.8	19	54	16	6	4	1	0
			Mean	19	49	20	6	5	1	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	1	0	0	26	2	9	62	0
+4-16 mm	9	4	2	18	11	7	49	0

SP 66 NW 17 6368 6751 South of Long Buckby

Block B

Surface level +138.9 m(+456 ft)
Water not struck
September 1974

Waste 15.6 m
Bedrock 0.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Silty clay, grey with chalk, flint, limestone and siltstone	15.4	15.6
Upper Lias	Clay, greyish blue	0.4+	16.0

SP 66 NW 18 6372 6694 North-east of Panther Lodge

Block B

Surface level +117.8 m (+387 ft)
Water not struck
August 1974

Overburden 0.2 m
Mineral 1.9 m
Waste 10.5 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: coarse and fine, angular flint with some sandstone, quartzite and ironstone Sand: medium and fine	1.9	2.1

Boulder Clay	Clay, brown to 4.5 m then grey, sandy, silty with chalk, limestone and ironstone pebbles	10.5	12.6
Upper Lias	Clay, greyish blue	0.5+	13.1

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
28	40	32	0.2-1.2	39	22	18	3	6	12	0
			1.2-2.1	18	13	18	6	19	18	8
			Mean	28	18	18	4	13	15	4

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	89	4	0	5	0	0	1	1
+4-16 mm	81	2	2	7	0	0	6	2

SP 66 NW 19 6308 6653 New Brooks Barn Block B

Surface level +127.6 m (+419 ft)
Water not struck
June 1974

Waste 9.0 m
Bedrock 0.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground		0.5	0.5
Boulder Clay	Clay, pale brown, silty, sandy with pebbles of flint and chalk; some fine sand layers	5.4	5.9
	Silty clay, greyish brown with chalk and flint pebbles	3.1	9.0
Upper Lias	Silty clay, grey	0.3+	9.3

SP 66 NW 20 6327 6574 South-west of Perkins Lodge Block B

Surface level +113.9 m (+374 ft)
Water not struck
June 1974

Overburden 1.3 m
Mineral 3.6 m
Bedrock 0.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, brown, sandy, silty with some pebbles of quartzite and flint	1.1	1.3
Milton Sand	'Clayey' sand, 'very clayey' at base Sand: mainly fine with some ironstone pebbles	3.6	4.9
Upper Lias	Silty clay, pale brownish grey	0.3+	5.2

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
15	84	1	1.3-2.8	12	47	38	1	1	1	0
			2.8-3.8	12	56	31	1	0	0	0
			3.8-4.9	22	59	18	1	0	0	0
			Mean	15	53	30	1	1	0	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	0	0	0	0	0	0	0	0
+4-16 mm	0	0	0	0	0	0	100	0

SP 66 NW 21 6401 6998 North-west of Leighton Lodge Block E

Surface level +137.8 m (+452 ft)
Water not struck
July 1974

Overburden 0.1 m
Mineral 1.0 m
Waste 0.6 m
Bedrock 1.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Glacial Sand and Gravel	'Clayey' gravel, clay band between 0.6 m and 0.7 m Gravel: coarse and fine, angular flint, rounded quartzite and ironstone and some sandstone and quartz Sand: medium	1.0	1.1
Boulder Clay	Silty clay, brownish grey with flint and quartzite pebbles and some crinoid ossicles	0.6	1.7
Upper Lias	Silty clay, grey	1.1+	2.8

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
16	39	45	0.1-1.1	16	13	17	9	21	24	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	29	28	12	13	0	0	18	0
+4-16 mm	31	10	4	9	0	0	46	0

SP 66 NW 22 6494 6980 East of Leighton Lodge Block E
 Surface level +176.0 m (+577 ft)
 Water not struck
 July 1974
 Waste 6.0 m
 Bedrock 0.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, brownish grey, sandy, silty with pebbles of flint and chalk and some quartzite	2.4	2.7
	Clay, grey to 5.2 m then brown, sandy, silty with chalk and flint pebbles	3.3	6.0
Northampton Sand (Inferior Oolite Series)	Sand, silty with thin ironstone bands	0.7+	6.7

SP 66 NW 23 6407 6672 North-west of Patford Bridge Block B
 Surface level +130.4 m (+428 ft)
 Water not struck
 June 1974
 Waste 8.3 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, brown, sandy, silty with flint and chalk pebbles	4.2	4.5
	Clay, greyish blue, sandy, silt with pebbles of flint, chalk, quartzite and oolitic limestone	3.8	8.3
Upper Lias	Clay, greyish blue with fine shell fragments	0.5+	8.8

SP 66 NW 27 6123 6686 West of White Barn Farm Block B
 Surface level c. +99 m (c. +325 ft)
 Water not struck
 October 1974
 Waste 0.7 m
 Bedrock 0.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Alluvium	Sandy clay, pale brown	0.6	0.7
Middle Lias	Silty clay, pale brown	0.2+	0.9

SP 66 NE 1 6588 6836 South-east of Covert Farm Block B
 Surface level +165.1 m (+542 ft)
 Water not struck
 August 1974
 Overburden 0.3 m
 Mineral 1.2 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Glacial Sand and Gravel	'Very clayey' pebbly sand Gravel: fine and coarse, rounded chalk with rounded limestone and ironstone, subangular sandstone and angular flint Sand: mainly fine, dark brownish orange, silty	1.2	1.5
Northampton Sand (Inferior Oolite Series)	Silty sand and sandstone, orange-brown	0.5+	2.0

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	70	8	0.3-1.5	22	40	24	6	4	4	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	16	6	1	12	27	34	2	2
+4-16 mm	13	2	0	10	15	47	13	0

SP 66 NE 2 6599 6639 East Haddonhill Block B
 Surface level +130.4 m (+428 ft)
 Water not struck
 September 1974
 Waste 2.3 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, brown, sandy, silty with pebbles of flint and rare ironstone	2.1	2.3
Upper Lias	Silty clay, bluish grey	0.5+	2.8

SP 66 NE 3 6670 6905 Near Washbrook Bridge

Block B

Surface level +123.1 m (+404 ft)
Water not struck
August 1974

Waste 1.6 m
Bedrock 0.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Silty clay, pale brown	1.2	1.4
	Silty sand, orange-brown with some angular, platy ironstone pebbles	0.2	1.6
Upper Lias	Silty clay, greyish blue, fissile and micaceous	0.3+	1.9

SP 66 NE 4 6657 6843 Priests Well

Block B

Surface level +148.5 m (+487 ft)
Water not struck
August 1974

Overburden 0.4 m
Mineral 2.3 m
Waste 0.2 m
Mineral 1.5 m
Waste 5.4 m
Bedrock 0.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground		0.4	0.4
Glacial Sand and Gravel	a 'Very clayey' sandy gravel Gravel: fine, angular flint and rounded chalk and limestone Sand: mainly medium	2.3	2.7
	Sandy clay, brown	0.2	2.9
	b 'Very clayey' sandy gravel Gravel: as above Sand: as above	1.5	4.4
Boulder Clay	Clay, grey, sandy, silty with chalk and flint pebbles	5.4	9.8
Northampton Sand (Inferior Oolite Series)	Silty sand and sandstone, orange-brown	0.3+	10.1

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	22	43	35	0.4-1.4	26	13	14	11	24	12	0
				1.4-2.9	19	14	19	13	21	14	0
				Mean	22	14	17	12	22	13	0
b	22	46	32	2.9-4.4	22	16	18	12	18	7	7
a+b	22	44	34	Mean	22	15	17	12	21	10	3

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	34	4	1	5	21	27	6	2
+4-16 mm	23	0	2	3	23	41	8	0

SP 66 NE 5 6665 6625 East of East Haddonhill

Block B

Surface level +116.6 m (+383 ft)
Water struck at +101.9 m
September 1974

Overburden 0.2 m
Mineral 1.6 m
Waste 0.3 m
Mineral 0.6 m
Waste 4.1 m
Mineral 11.9 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Glacial Sand and Gravel	a 'Very clayey' pebbly sand, gravel content increases to base Gravel: fine, subrounded limestone with subangular flint and subrounded chalk Sand: fine with medium	1.6	1.8
	Silty clay, greyish brown, laminated	0.3	2.1
	b 'Clayey' sandy gravel Gravel: as above Sand: as above	0.6	2.7
Glacial Lake Deposits	Clayey silt, pale brown, stoneless, laminated, micaceous with traces of iron pan	4.1	6.8
Glacial Sand and Gravel	c 'Very clayey' pebbly sand but 'clayey' from 12.8 m to 17.8 m laminated clayey silt layers throughout Gravel: fine, limestone with ironstone, flint, chalk and sandstone Sand: mainly fine	11.9	18.7
Upper Lias	Clay, bluish grey fissile	0.5+	19.2

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	24	64	12	0.2-1.0	25	46	18	3	4	4	0	
				1.0-1.8	23	25	23	13	11	5	0	
				Mean	24	35	21	8	8	4	0	
b	17	54	29	2.1-2.7	17	21	18	15	17	12	0	
c	21	73	6	6.8-7.8	25	48	14	5	7	1	0	
				7.8-8.8	29	55	8	2	4	2	0	
				8.8-9.8	29	60	9	1	1	0	0	
				9.8-10.8	30	37	27	4	1	1	0	
				10.8-11.8	23	31	36	5	3	2	0	
				11.8-12.8	20	45	31	2	1	1	0	
				12.8-13.8	17	19	33	11	17	3	0	
				13.8-14.8	19	32	39	6	2	2	0	
				14.8-15.8	13	37	44	5	1	0	0	
				15.8-16.8	18	39	34	4	3	2	0	
				16.8-17.8	13	37	33	4	6	7	0	
				17.8-18.7	21	38	34	5	1	1	0	
				Mean	21	40	29	4	4	2	0	
a+b+c	21	71	7	Mean	22	38	27	6	4	3	0	

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	13	0	5	11	45	13	13	0
+4-16 mm	9	2	0	6	41	20	22	0

SP 66 NE 6 6694 6507 East of Great Brington

Block B

Surface level +122.7 m (+403 ft)
Water not struck
September 1974

Waste 7.2 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, greyish brown, sandy, silty with chalk, flint and quartzite pebbles	2.4	2.7
	Clay, greyish blue, silty with chalk pebbles	4.5	7.2
Upper Lias	Silty clay, greyish blue fissile		

SP 66 NE 7 6777 6817 East of East Haddon

Block B

Surface level +150.4 m (+493 ft)
Water not struck
September 1974

Waste 2.6 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, pale brown, sandy, silty with pebbles of flint and chalk	2.3	2.6
Northampton Sand (Inferior Oolite Series)	Silty sand with sandy ironstone layers	0.5+	3.1

SP 66 NE 8 6719 6696 Near East Haddon Grange

Block B

Surface level +127.9 m (+420 ft)
Water struck at +120.7 m
September 1974

Overburden 0.3 m
Mineral 1.7 m
Waste 10.5 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Glacial Sand and Gravel	'Very clayey' pebbly sand Gravel: fine, subrounded limestone and chalk with some flint Sand: mainly medium	1.7	2.0
Boulder Clay	Sandy silt, pale yellowish brown	1.2	3.2
	Clay, greyish brown, sandy, silty, with chalk pebbles	2.2	5.4
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: chalk and flint	1.0	6.4
Boulder Clay	Clay, brownish grey, very sandy with chalk and flint pebbles	0.8	7.2
Glacial Sand and Gravel	'Very clayey' gravel Gravel: fine and coarse chalk and flint Sand: fine to coarse	0.5	7.7
Boulder Clay	Clay, grey, sandy, silt with fine chalk pebbles	4.1	11.8
Upper Lias	Clay, greyish blue, fissile	0.5+	12.3

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	
	26	60	14	0.3-1.3	26	14	25	19	14	2	0	
				1.3-2.0	27	18	28	15	1	1	0	
				Mean	26	16	27	17	13	1	0	

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	9	1	1	2	61	23	3	0
+4-16 mm	12	0	0	4	38	42	4	0

SP 66 NE 9 6714 6631 South-east of East Haddon Grange

Surface level +105.4 m (+346 ft)
Water struck at +99.8 m
September 1974

Block B

Overburden 0.4 m
Mineral 8.6 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.4	0.4
Glacial Sand and Gravel	a 'Very clayey' sand, mainly fine with some flint and chalk pebbles	2.5	2.9
	b 'Very clayey' sandy gravel; silt layers from 3.9 m to 7.6 m Gravel: fine with coarse, angular to subrounded, limestone with sandstone, ironstone and flint and some chalk and quartzite Sand: mainly fine	6.1	9.0
Upper Lias	Clayey silt, bluish grey, micaceous	0.5+	9.5

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	22	75	3	0.4-1.4	24	39	30	5	1	1	0
				1.4-2.4	19	46	30	4	0	1	0
				2.4-2.9	25	39	26	5	2	3	0
				Mean	22	42	29	4	1	2	0
b	22	43	35	2.9-3.9	16	17	16	12	15	24	0
				3.9-4.9	27	32	16	7	10	8	0
				4.9-5.6	21	32	18	7	14	8	0
				5.6-6.6	33	20	9	8	20	10	0
				6.6-7.6	22	26	13	6	14	19	0
				7.6-9.0	15	12	7	8	36	22	0
				Mean	22	21	14	8	19	16	0
a+b	22	52	26	Mean	22	27	18	7	14	12	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	17	7	1	30	36	5	4	0
+4-16 mm	11	3	2	14	25	17	26	2

SP 66 NE 10 6784 6549 Althorp Park

Surface level +90.8 m (+298 ft)
Water struck at +84.7 m
September 1974

Block B

Overburden 0.1 m
Mineral 2.4 m
Waste 1.0 m
Mineral 1.4 m
Waste 1.9 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Glacial Sand and Gravel	a 'Very clayey' pebbly sand Gravel: fine, angular flint and subrounded chalk and limestone Sand: fine with coarse	2.4	2.5
	Sandy clay, with flint and chalk pebbles	1.0	3.5
	b 'Very clayey' sandy gravel Gravel: coarse with fine, angular sandstone Sand: fine	1.4	4.9
	Silt, pale brown, laminated, micaceous with some ironstone pebbles	1.9	6.8
Upper Lias	Silt, greyish brown, micaceous with fine shell fragments	0.5+	7.3

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	31	58	11	0.1-1.5	33	37	21	4	3	2	0
				1.5-2.5	28	8	19	24	18	3	0
				Mean	31	25	21	12	9	2	0
b	19	39	42	3.5-4.9	19	23	8	8	12	30	0
a+b	27	50	23	Mean	26	25	16	9	11	13	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	30	0	2	12	38	16	2	0
+4-16 mm	26	0	0	7	17	30	11	9

SP 66 NE 11 6878 6981 West of Teeton Grange Block E
 Surface level +98.1 m (+322 ft)
 Water not struck
 September 1974
 Overburden 0.1 m
 Mineral 1.8 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
River Terrace Deposits	'Clayey' sandy gravel Gravel: fine, subrounded sandy ironstone and some flint Sand: fine to coarse	1.8	1.9
Upper Lias	Silty clay, greyish blue	0.5+	2.4

GRADING

Mean for deposit percentages			Depth below surface (m)	percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
				-1/8	+1/8 - 3/8	+3/8 - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm
19	43	38	0.1-1.1	20	18	14	17	25	6	0
			1.1-1.9	18	14	10	13	23	22	0
			Mean	19	16	12	15	24	14	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-63 mm	20	7	4	5	0	0	64	0
+4-16 mm	12	2	2	0	0	0	82	2

SP 66 NE 12 6906 6889 Near Holdenby North Lodge Block B
 Surface level +125.5 m (+412 ft)
 Water not struck
 August 1974
 Waste 12.7 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Boulder Clay	Clay, pale brown and light grey, mottled, sandy, silty with pebbles of chalk, flint, quartzite and sandstone	4.0	4.1
	Clay, grey, silty with fine sandy layers and some chalk pebbles	8.6	12.7
Northampton Sand (Inferior Oolite Series)	Silty sand with sandy limestone bands	0.5+	13.2

SP 66 NE 13 6894 6818 Near Holdenby House Block B
 Surface level +140.4 m (+461 ft)
 Water not struck
 August 1974
 Waste 7.5 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, pale brown, very sandy, silty with sandstone, chalk and quartzite pebbles	2.1	2.3
Glacial Sand and Gravel	'Very clayey' sandy gravel	0.6	2.9
Boulder Clay	Clay, grey, sandy, silty with chalk, limestone, sandstone and flint pebbles	4.6	7.5
Northampton Sand (Inferior Oolite Series)	Sand, orange-brown, silty, fine with some ironstone layers	0.5+	8.0

SP 66 NE 14 6983 6975 East of Teeton Grange Block E
 Surface level +91.4 m (+300 ft)
 Water not struck
 September 1974
 Waste 2.5 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
River Terrace Deposits	Clay, greyish brown with flint, quartzite and sandstone pebbles	2.2	2.5
Upper Lias	Clay, greyish blue	0.5+	3.0

SP 66 NE 15 6988 6755 Near Holdenby Block B
 Surface level +120.2 m (+394 ft)
 Water not struck
 August 1974
 Waste 18.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, brownish grey, sandy, silty with flint and chalk pebbles	3.8	4.0
	Silty clay, grey with sandy clay bands and pebbles of chalk, flint, sandstone and ironstone: some shells present	14.4+	18.4

SP 66 NE 16 **6982 6664** **South of Coneybury Hill** **Block B**
 Surface level +106.4 m (+349 ft)
 Water not struck
 August 1974
 Waste 22.8 m
 Bedrock 0.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Boulder Clay	Silty clay, brownish grey with chalk pebbles	2.2	2.3
	Silty sand, pale brown with sandstone pebbles	0.4	2.7
	Silty clay, grey with pebbles of chalk, flint and coal and some shells	20.1	22.8
Northampton Sand (Inferior Oolite Series)	Silty sand, orange-brown with sandstone layers	0.4+	23.2

SP 66 SW 1 **6061 6299** **Noborough Farm** **Block D**
 Surface level +125.7 m (+412 ft)
 Water not struck
 June 1974
 Overburden 0.1 m
 Mineral 2.9 m
 Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Glacial Sand and Gravel	'Clayey' sand gravel Gravel: fine and coarse, angular flint with rounded limestone and chalk, subangular ironstone and some rounded quartz and quartzite Sand: medium	2.9	3.0
Middle Lias	Silty clay, brown; grey below 3.5 m	1.0+	4.0

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	52	33	0.1-1.1	14	10	25	15	17	19	0
			1.1-2.1	14	15	24	15	17	15	0
			2.1-3.0	17	13	23	16	18	13	0
			Mean	15	13	24	15	17	16	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	39	5	7	5	21	13	10	0
+4-16 mm	31	0	0	2	36	7	24	0

SP 66 SW 2 **6068 6219** **South of Noborough Farm** **Block D**
 Surface level +135.0 m (+443 ft)
 Water not struck
 June 1974
 Overburden 3.5 m
 Mineral 3.9 m
 Waste 1.2 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Silty clay, brownish grey with fine, rounded chalk and angular flint pebbles; more sandy between 2.5 m and 3.5 m	3.3	3.5
Glacial Sand and Gravel	'Very clayey' sandy gravel, 'clayey' gravel at base Gravel: fine with coarse, rounded limestone with angular flint and rounded chalk and some rounded quartzite, subangular sandstone and ironstone Sand: fine with medium	3.9	7.4
Boulder Clay	Silty clay, brownish grey with fine, angular siltstone pebbles	1.2	8.6
Upper Lias	Silty clay, pale brownish yellow becoming clayey silt, greyish brown, shelly with ironstaining	0.5+	9.1

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
20	48	32	3.5-4.5	22	28	16	7	19	8	0
			4.5-5.5	18	24	17	9	21	11	0
			5.5-6.5	21	25	19	11	10	14	0
			6.5-7.4	18	13	15	11	24	19	0
			Mean	20	22	17	9	19	13	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	21	7	0	12	48	8	1	3
+4-16 mm	21	2	2	5	37	25	8	0

SP 66 SW 3 **6096 6175** **Dodford Lodge** **Block D**
 Surface level +139.0 m (+456 ft)
 Water not struck
 June 1974
 Waste 7.9 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, pale brown, sandy, silty with fine, angular flint and rounded chalk pebbles	1.2	1.4
	Silty clay, brownish grey, mottled with pebbles of flint, chalk, ironstone, quartzite and sandstone	6.5	7.9
Upper Lias	Silty clay, greyish blue with fine shell fragments	0.5+	8.4

SP 66 SW 4 **6053 6107** **South-west of Dodford Lodge** **Block D**
 Surface level +125.0 m (+410 ft)
 Water struck at +110.2 m
 June 1974
 Overburden 0.5 m
 Mineral 12.3 m
 Waste 3.4 m
 Bedrock 0.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.5	0.5
Glacial Sand and Gravel	'Clayey' gravel, 'very clayey' between 7.2 m and 8.6 m Gravel: fine with coarse but becoming coarser to base, limestone and flint with chalk, sandstone and ironstone Sand: medium with coarse	12.3	12.8
Boulder Clay	Clay, greyish brown, silty, sandy with chalk, ironstone, quartzite, flint and limestone pebbles	1.9	14.7
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: fine and coarse, flint and sandy ironstone Sand: fine to coarse	0.8	15.5
Boulder Clay	Clay, pale brown, sandy, silty	0.7	16.2
Upper Lias	Silty clay, pale brown becoming grey, micaceous	0.6+	16.8

GRADING

Mean for deposit percentages			Depth below surface (m)	percentages						
Fines	Sand	Gravel		Fines	Sand		Gravel			
				- $\frac{1}{2}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
15	42	43	0.5-1.5	13	14	21	16	29	7	0
			1.5-2.5	11	11	21	14	29	14	0
			2.5-3.5	10	12	21	14	27	16	0
			3.5-4.2	13	10	20	16	30	11	0
			4.2-5.2	17	7	18	17	23	18	0
			5.2-6.2	16	8	20	19	28	9	0
			6.2-7.2	14	6	13	13	28	26	0
			7.2-8.0	22	10	18	17	19	14	0
			8.0-8.6	34	7	12	12	17	18	0
			8.6-9.6	14	6	15	14	16	35	0
			9.6-10.6	15	7	19	17	18	24	0
			10.6-11.6	15	6	17	17	22	23	0
			11.6-12.8	16	5	14	14	15	36	0
			Mean	15	9	18	15	24	19	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	25	6	1	12	36	9	4	7
+4-16 mm	21	0	2	11	29	17	16	4

SP 66 SW 5 **6058 6017** **South-west of Dodford** **Block D**
 Surface level +127.7 m (+419 ft)
 Water not struck
 October 1974
 Overburden 6.3 m
 Mineral 6.7 m
 Waste 3.1 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, pale brown but grey between 2.0 m and 5.4 m, sandy, silty with pebbles of chalk and rare sandy ironstone, coal and oolitic limestone	6.1	6.3
Glacial Sand and Gravel	'Clayey' sandy gravel Gravel: fine with coarse, rounded limestone and angular flint with rounded ironstone, sandstone, chalk and quartzite Sand: mainly medium	6.7	13.0
Boulder Clay	Clay, grey, firm, sandy, silty with chalk, flint and ironstone pebbles	3.1	16.1
Upper Lias	Clayey silt, grey	0.5+	16.6

GRADING

Mean for deposit percentages			Depth below surface (m)	percentages						
Fines	Sand	Gravel		Fines	Sand		Gravel			
				- $\frac{1}{2}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
13	44	43	6.3-7.3	15	14	19	14	25	13	0
			7.3-8.3	11	12	22	16	23	16	0
			8.3-9.3	10	11	17	14	26	22	0
			9.3-10.3	5	7	14	14	33	27	0
			10.3-11.3	11	11	16	18	33	11	0
			11.3-12.3	19	14	15	16	29	7	0
			12.3-13.0	22	9	17	17	22	13	0
			Mean	13	11	18	15	27	16	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	25	17	1	15	26	3	12	1
+4-16 mm	19	1	4	10	26	18	19	3

SP 66 SW 6 6098 6477 Near of Whilton Lodge

Surface level +122.8 m (+403 ft)
Water struck at +110.7 m
June 1974

Block D

Overburden 0.3 m
Mineral 5.7 m
Waste 1.4 m
Mineral 1.1 m
Waste 3.7 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Glacial Sand and Gravel	a 'Clayey' sandy gravel Gravel: fine with coarse, angular flint with rounded ironstone, sandstone, quartzite, chalk and limestone Sand: medium	5.7	6.0
Boulder Clay	Clay, pale brown, sandy, silty with angular flint pebbles	1.4	7.4
Glacial Sand and Gravel	b 'Very clayey' sandy gravel Gravel: fine with coarse flint Sand: medium with fine	1.1	8.5
Boulder Clay	Silty clay, grey with some flint and chalk pebbles	3.7	12.2
Middle Lias	Silty clay, greyish blue, micaceous with shell fragments	0.5+	12.7

GRADING

	Mean for deposit percentages			Depth below surface (m)	percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{8}$	+ $\frac{1}{4}$ - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm
a	16	45	39	0.3-1.1	20	19	25	8	17	11	0
				1.1-2.1	18	7	16	13	23	16	7
				2.1-3.1	15	14	25	8	19	19	0
				3.1-4.1	13	11	27	12	24	13	0
				4.1-5.1	13	6	22	13	27	19	0
				5.1-6.0	16	7	21	15	25	16	0
				Mean	16	10	23	12	22	16	1
b	22	61	17	7.4-8.5	22	24	30	7	12	5	0
a+b	17	47	36	Mean	17	12	24	11	21	15	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	27	15	1	12	13	14	15	3
+4-16 mm	38	2	5	11	13	9	20	2

SP 66 SW 7 6133 6397 Norton Park

Surface level +100.0 m (+328 ft)
Water struck at 96.0 m
May 1974

Block D

Overburden 0.3 m
Mineral 3.9 m
Waste 1.1 m
Mineral 0.5 m
Bedrock 0.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Glacial Sand and Gravel	'Clayey' sand, 'very clayey' at top pebbly in part Gravel: fine, ironstone and some flint, sandstone and quartzite Sand: medium with fine	3.9	4.2
	Clay, pale brown, very sandy	1.1	5.3
	'Clayey' pebbly sand	0.5	5.8
Middle Lias	Silty clay, brownish grey, becoming greyish blue at 6.2 m	0.9+	6.7

GRADING

Mean for deposit percentages			Depth below surface (m)	percentages						
Fines	Sand	Gravel		Fines			Gravel			
				- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{8}$	+ $\frac{1}{4}$ - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm
20	77	3	0.3-1.2	38	28	29	2	2	1	0
			1.2-2.2	16	30	49	3	2	0	0
			2.2-3.2	12	31	49	4	4	0	0
			3.2-4.2	16	39	45	5	3	0	0
			Mean	20	30	43	4	3	0	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	27	13	0	22	0	0	38	0
+4-16 mm	12	3	0	12	0	0	73	0

SP 66 SW 8 6172 6322 Near Norborough Lodge

Block D

Surface level +96.4 m (+316 ft)
Water not struck
May 1974

Overburden 1.4 m
Mineral 1.9 m
Bedrock 2.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Sandy clay, brown with rare angular flint pebbles	1.1	1.4
Glacial Sand and Gravel	'Very clayey' pebbly sand Gravel: fine, angular flint and some rounded ironstone, limestone, quartzite, sandstone and quartz Sand: medium and fine	1.9	3.3
Middle Lias	Silty clay and siltstone, pale brown but bluish grey below 5.0 m	2.0+	5.3

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	58	12	1.4-2.4	29	24	27	9	8	3	0
			2.4-3.3	31	24	24	8	8	5	0
			Mean	30	24	26	8	8	4	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	63	12	3	3	7	0	12	0
+4-16 mm	46	9	7	7	11	0	20	0

SP 66 SW 9 6142 6241 Ivy House Farm

Block D

Surface level +129.8 m (+426 ft)
Water not struck
June 1974

Overburden 0.9 m
Mineral 2.2 m
Waste 3.4 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Boulder Clay	Silty clay, brown, sandy with pebbles of coarse angular flint	0.8	0.9
Glacial Sand and Gravel	'Very clayey' sandy gravel with beds of sand Gravel: fine, rounded ironstone with angular flint and rounded sandstone Sand: fine and medium	2.2	3.1
Boulder Clay	Sandy clay, pale brown with flint pebbles	2.6	5.7
Glacial Sand and Gravel	'Very clayey' sandy gravel	0.8	6.5
Middle Lias	Silt, pale brownish yellow with siltstone excretions	0.5+	7.0

GRADING

Mean for deposit percentages			Depth below surface (m)	percentages						
Fines	Sand	Gravel		Fines	Sand		Gravel			
				- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
22	55	23	0.9-3.1	22	28	21	6	16	7	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	16	3	2	29	5	0	45	0
+4-16 mm	17	6	4	6	4	0	61	2

SP 66 SW 10 6183 6180 Hill House

Block D

Surface level +120.0 m (+394 ft)
Water struck at +114.1 m
June 1974

Waste 13.7 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder clay	Silty clay, brownish grey, with thin sand layers and some flint and chalk pebbles	3.0	3.2
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: fine and coarse chalk flint and ironstone Sand: medium	0.5	3.7
Boulder Clay	Silty clay, greyish brown, with flint and chalk pebbles and some sand partings	2.2	5.9
Glacial Sand and Gravel	Sand, coarse with some angular flint and sandstone pebbles	0.3	6.2
Boulder Clay	Silty clay with angular flint and rounded chalk pebbles	7.5	13.7
Upper Lias	Silty clay, greyish blue	0.5+	14.2

SP 66 SW 11 6143 6031 Dodford

Block D

Surface level +114.0 m (+374 ft)
Water not struck
June 1974

Waste 15.7 m
Bedrock 2.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder clay	Silty clay, brown, sandy with chalk, flint and ironstone pebbles: becoming brownish grey below 3.0 m and grey below 5.0 m	15.5	15.7
Upper Lias	Silty clay, greyish blue with thin sand layers	1.2	16.9
	Silty clay, orange brown, micaceous	0.9	17.8
Marlstone Rock Bed (Middle Lias)	Sandy marlstone, yellowish brown with belemnites	0.3+	18.1

SP 66 SW 12 6190 6407 South-west of Whiltonlocks

Block D

Surface level +90.5 m (+297 ft)
Water not struck
June 1974

Overburden 1.2 m
Mineral 3.3 m
Waste 0.4 m
Bedrock 0.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Alluvium	Silty clay, pale brown with angular flint pebbles	1.0	1.2
River Terrace Deposits	'Clayey' sandy gravel: 'very clayey' at base Gravel: fine to coarse, angular flint and rounded sandy ironstone with rounded quartzite and sandstone Sand: medium	3.3	4.5
	Silty clay, brownish grey, with shell fragments and flint pebbles	0.4	4.9
Middle Lias	Silty clay, greyish blue with fine shelly fragments	0.3+	5.2

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	
19	46	35	18	9	18	14	21	20	0	
			18	10	21	17	21	13	0	
			21	12	21	16	19	11	0	
			19	10	20	16	20	15	0	

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	33	25	5	21	0	0	15	1
+4-16 mm	21	3	8	2	0	0	64	2

SP 66 SW 13 6304 6452 West of Whilton

Block B

Surface level +133.7 m (+439 ft)
Water struck at +128.7 m
May 1974

Overburden 0.1 m
Mineral 1.0 m
Waste 1.9 m
Mineral 2.9 m
Waste 4.4 m
Bedrock 1.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Glacial Sand and Gravel	a 'Very clayey' sandy gravel Gravel: coarse with fine, angular flint with rounded sandstone quartzite and sandy ironstone Sand: medium and fine	1.0	1.1

Boulder Clay	Clay, gravelly, pale brown; coarse angular flint and rounded quartzite pebbles	1.9	3.0
Glacial Sand and Gravel	b 'Very clayey' pebbly sand Gravel: fine with coarse, flint, quartzite and ironstone Sand: fine and medium	2.9	5.9
Boulder Clay	Silty clay, greyish blue with fine subrounded ironstone and flint pebbles	4.4	10.3
Upper Lias	Clayey silt, buff with shell fragments	0.9	11.2
Marlstone Rock Bed (Middle Lias)	Limestone, grey, shelly with calcite veins and ironstaining	0.8+	12.0

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	36	42	22	0.1-1.1	36	20	17	5	9	13	0
b	27	58	15	3.0-4.0	28	37	21	3	8	3	0
				4.0-5.0	27	21	27	6	13	6	0
				5.0-5.9	26	25	27	8	9	5	0
				Mean	27	28	25	5	10	5	0
a+b	29	55	16	Mean	29	24	25	6	9	7	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	58	15	3	21	0	0	2	1
+4-16 mm	42	8	8	20	0	0	20	2

SP 66 SW 14 6239 6322 Muscott

Block C

Surface level +87.2 m (+286 ft)
Water struck at +85.4 m
September 1974

Overburden 1.2 m
Mineral 0.8 m
Waste 2.3 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Alluvium	Clayey silt, pale brown with some fine, angular grey flint pebbles	1.0	1.2
	'Very clayey' sandy gravel Gravel: flint, quartzite and limestone	0.8	2.0
	Silt clay, grey with fine angular flint and rounded quartzite pebbles	2.3	4.3
Middle Lias	Silty clay, grey, micaceous	0.5+	4.8

SP 66 SW 15 6234 6257 Near Diamond Bridge

Surface level +103.6 m (+340 ft)
Water not struck
June 1974

Block D

Overburden 1.0 m
Mineral 1.7 m
Waste 0.2 m
Mineral 4.1 m
Waste 1.1 m
Mineral 6.0 m
Bedrock 0.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made ground	Soil and rubble	1.0	1.0
Glacial Sand and Gravel	a 'Clayey' sand Sand: medium with fine	1.7	2.7
	Clayey silt, greenish brown, micaceous	0.2	2.9
	b Sand, 'clayey' at base Sand: medium with fine	4.1	7.0
Boulder Clay	Silty clay, pale brownish grey with fine flint chalk and limestone pebbles	1.1	8.1
Milton Sand	c 'Clayey' pebbly sand, less 'clayey' at base Gravel: fine, platy sandy ironstone with shelly limestone Sand: medium	6.0	14.1
Middle Lias	Silt, yellow and grey mottled	0.4+	14.5

GRADING

	Mean for deposit percentages			Depth below surface (m)	percentages						
	Fines	Sand	Gravel		percentages						
					Fines	Sand	Gravel			mm	
			- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64	mm	
a	13	85	2	1.0-1.6	23	30	41	3	2	1	0
				1.6-2.7	9	35	54	1	1	0	0
				Mean	13	34	50	1	1	0	0
b	8	91	1	2.9-3.9	8	32	59	1	0	0	0
				3.9-4.9	6	34	58	1	1	0	0
				4.9-5.9	7	24	67	1	1	0	0
				5.9-7.0	12	49	38	0	1	0	0
				Mean	8	35	55	1	1	0	0
c	11	81	8	8.1-9.1	14	38	40	4	4	0	0
				9.1-10.1	13	22	38	7	10	10	0
				10.1-11.1	11	19	55	6	9	0	0
				11.1-12.1	12	22	52	7	7	0	0
				12.1-13.0	10	20	56	6	7	1	0
				13.0-14.1	8	39	51	1	1	0	0
				Mean	11	27	49	5	6	2	0
a+b+c	11	84	5	Mean	11	30	51	3	4	1	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	10	0	0	0	42	0	48	0
+4-16 mm	0	0	0	trace	32	0	65	0

SP 66 SW 16 6280 6164 Near Skew Bridge

Surface level +87.4 m (+287 ft)
Water struck at +86.2 m
October 1974

Block D

Overburden 0.2 m
Mineral 4.1 m
Waste 0.4 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Glacial Sand and Gravel	'Clayey' sandy gravel. 'very clayey' at top Gravel: fine and coarse, angular flint and subrounded sandy ironstone, sandstone and quartzite Sand: medium with fine	4.1	4.3
Boulder Clay	Silty clay, pale brown with fine angular flint and quartzite pebbles	0.4	4.7
Middle Lias	Silty clay, grey	0.5+	5.2

GRADING

Mean for deposit percentages			Depth below surface (m)	percentages						
Fines	Sand	Gravel		percentages						
				Fines	Sand	Gravel			mm	
			- $\frac{1}{8}$	+ $\frac{1}{8}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64	mm
17	60	23	0.2-1.1	34	21	24	5	7	9	0
			1.1-2.1	16	30	31	6	10	7	0
			2.1-3.1	11	26	34	6	15	8	0
			3.1-4.3	6	11	37	9	16	21	0
			Mean	17	22	31	7	12	11	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	34	23	2	27	0	0	14	0
+4-16 mm	32	1	5	9	0	0	53	0

SP 66 SW 17 6228 6069 Dodmoor Farm

Surface level +106.6 m (+350 ft)
Water not struck
June 1974

Block D

Waste 6.2 m
Bedrock 0.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, brown, silty and sandy with chalk, flint, quartzite and sandy ironstone pebbles	3.6	3.9
	Clay, very sandy, dark brown, with flint and quartzite pebbles	0.9	4.8
	Clay, grey, sandy and silty with flint pebbles	1.4	6.2
Middle Lias	Silty clay, pale brown becoming greyish blue at 6.6 m	0.8+	7.0

SP 66 SW 18 **6307 6399** **Windmill Barn** **Block B**
 Surface level +131.5 m (+431 ft)
 Water struck at +129.6 m
 May 1974
 Overburden 1.9 m
 Mineral 0.9 m
 Waste 3.6 m
 Bedrock 0.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, sandy, silty, pale brown with pebbles of angular flint and dark grey clay	1.7	1.9
Glacial Sand and Gravel	'Very clayey' pebbly sand Gravel: fine with coarse, angular flint and ironstone Sand: medium with fine	0.9	2.8
Boulder Clay	Silty clay, bluish grey with fine pebbles of angular flint and subrounded ironstone	3.6	6.4
Marlstone Rock Bed (Middle Lias)	Limestone, shelly, ironstained	0.3+	6.7

GRADING

Mean for deposit percentages			Depth below surface (m)	percentages						
Fines	Sand	Gravel		Fines	Sand	Gravel				
				- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
37	55	8	1.9-2.8	37	23	30	2	6	2	0

SP 66 SW 19 **6373 6365** **North-east of Gazewell Farm** **Block B**
 Surface level +130.0 m (+427 ft)
 Water struck at +124.0 m
 September 1974
 Waste 15.0 m
 Bedrock 0.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, very sandy and silty, greyish brown with grey angular flint and subrounded coarse chalk pebbles	2.6	2.8
	Clay, sandy and silty, grey with cream oolitic limestone and silty clay pebbles	12.2	15.0
Marlston Rock Bed (Middle Lias)	Siltstone, grey weathering to yellowish brown	0.3+	15.3

SP 66 SW 20 **6325 6142** **South-west of Greenway Spinney** **Block C**
 Surface level +81.1 m (+266 ft)
 Water struck at +79.8 m
 June 1974
 Overburden 1.3 m
 Mineral 1.7 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Alluvium	Clay, pale brown, silty and sandy with some flint, quartzite and ironstone pebbles	1.1	1.3
River Terrace Deposits	Sandy gravel Gravel: fine with coarse, angular to rounded, ironstone, flint, limestone, sandstone, and quartzite Sand: medium	1.7	3.0
Middle Lias	Silty clay, bluish grey, micaceous with fine shell fragments	0.5+	3.5

GRADING

Mean for deposit percentages			Depth below surface (m)	percentages						
Fines	Sand	Gravel		Fines	Sand	Gravel				
				- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
8	52	40	1.3-2.3	8	5	17	15	37	18	0
			2.3-3.0	9	12	37	18	20	4	0
			Mean	8	9	27	16	29	11	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	26	16	9	30	2	0	15	2
+4-16 mm	18	0	5	4	23	3	45	2

SP 66 SW 21 **6345 6073** **Near Hobmill Spinney** **Block B**
 Surface level +112.9 m (+370 ft)
 Water struck at +105.1 m
 October 1974
 Overburden 0.1 m
 Mineral 1.3 m
 Waste 12.9 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: fine and coarse, angular flint and rounded sandstone and ironstone with rounded quartzite Sand: mainly medium and fine	1.3	1.4
Boulder Clay	Clay, sandy, silty, brown to 4.0 m then grey	12.9	14.3
Upper Lias	Silty clay, grey, shaley	0.5+	14.8

64

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			
31	47	22	0.1-1.4			31	17	17	13	12	10	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	28	11	0	36	0	0	25	0
+4-16 mm	47	0	0	0	0	0	53	0

SP 66 SW 22 6384 6025 Near Florehill Block B

Surface level +108.2 m (+355 ft)
 Water not struck
 October 1974

Overburden 0.1 m
 Mineral 4.1 m
 Waste 5.1 m
 Mineral 3.3 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Glacial Sand and Gravel	a 'Very clayey' gravel, less 'clayey' to base Gravel: fine and coarse, angular flint and rounded limestone and ironstone Sand: coarse with medium and fine	4.1	4.2
Boulder Clay	Clay, brownish grey, sandy and silty with chalk, flint, sandstone and limestone pebbles	5.1	9.3
Glacial Sand and Gravel	b 'Clayey' sandy gravel; increase in gravel content at base Gravel: fine and coarse, ironstone with limestone and some quartzite and sandstone Sand: mainly fine	3.3	12.6
Upper Lias	Silt, pale brown, micaceous	0.5+	13.1

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				
a	21	29	50	0.1-1.1			31	11	10	15	23	10	0
				1.1-2.1			23	6	8	15	27	21	0
				2.1-3.1			15	7	6	10	25	37	0
				3.1-4.2			17	8	7	11	24	33	0
				Mean			21	8	8	13	25	25	0
b	16	46	38	9.3-10.3			18	31	20	10	13	8	0
				10.3-11.3			17	18	16	13	21	15	0
				11.3-12.6			13	10	11	9	20	28	0
				Mean			16	19	15	11	18	20	0
a+b	18	35	44	Mean	18	12	11	12	22	22	0		

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	18	10	1	14	43	2	10	2
+4-16 mm	13	7	3	14	22	2	35	4

SP 66 SW 23 6414 6457 Ringmore Grounds Block B

Surface level +117.3 m (+385 ft)
 Water struck at +113.3 m
 May 1974

Overburden 0.1 m
 Mineral 8.9 m
 Waste 1.6 m
 Bedrock 0.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: fine with coarse, rounded ironstone with sandstone, limestone quartzite and flint Sand: mainly fine	8.9	9.0
Boulder Clay	Silt and clay, greyish brown with some flint pebbles	1.6	10.6
Upper Lias	Silty clay, bluish grey	0.3+	10.9

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			
27	53	20	0.1-0.9			28	22	15	10	24	1	0
			0.9-2.0			19	53	21	3	2	2	0
			2.0-3.1			22	41	15	3	5	2	12
			3.1-4.1			28	19	20	11	17	5	0
			4.1-5.1			33	20	14	9	14	10	0
			5.1-6.4			31	23	15	11	15	5	0
			6.4-7.4			33	30	13	8	10	6	0
			7.4-8.4			19	33	8	6	8	26	0
			8.4-9.0			28	37	9	7	8	11	0
			Mean			27	30	15	8	11	8	1

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	8	9	1	22	22	0	38	0
+4-16 mm	9	7	4	7	7	0	66	0

CS

SP 66 SW 24 6439 6424 South of Ringmore Grounds

Block B

Surface level +123.6 m (+406 ft)
Water struck at +116.5 m
May 1974

Waste 15.5 m
Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.4	0.4
Boulder Clay	Silty clay, brown with angular flint and subrounded chalk pebbles	3.1	3.5
	Silty clay, grey with sandy clay partings and chalk and flint pebbles	12.0	15.5
Upper Lias	Clayey silt, greyish brown	1.0+	16.5

SP 66 SW 25 6496 6379 West of White House

Block B

Surface level +130.0 m (+427 ft)
Water struck at +111.0 m
May 1974

Waste 16.9 m
Bedrock 3.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Boulder Clay	Silty clay, brown with pebbles of angular flint and rounded chalk	3.1	3.2
	Sandy, silty clay, greyish brown with reddish brown sand partings and pebbles of flint and chalk	2.8	6.0
	Silty clay, greyish brown with pebbles of chalk and flint and some quartz and limestone	10.9	16.9
Upper Lias	Silt, greyish brown	3.1+	20.0

SP 66 SW 26 6037 6398 Near Norton

Block D

Surface level +124.2 m (+408 ft)
Water not struck
June 1974

Overburden 0.4 m
Mineral 5.5 m
Waste 2.3 m
Mineral 0.9 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.4	0.4
Glacial Sand and Gravel	a 'Clayey' sandy gravel, increasingly 'clayey' to base Gravel: fine, rounded shelly limestone with angular flint and some ironstone and sandstone Sand: medium	5.5	5.9
Boulder Clay	Silty clay, grey to 7.1 m then pale brown; with flint and oolitic limestone pebbles	2.3	8.2
Glacial Sand and Gravel	b 'Very clayey' sandy gravel Gravel: fine with coarse, flint, quartzite ironstone and sandstone Sand: fine and medium	0.9	9.1
Middle Lias	Silt and sandstone, pale brownish yellow, micaceous	0.5+	9.6

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	17	57	26	0.4-1.3	13	12	34	17	17	6	0
				1.3-2.3	12	9	34	20	18	7	0
				2.3-3.3	14	12	30	17	21	6	0
				3.3-4.3	19	10	31	16	18	6	0
				4.3-5.3	18	9	29	18	18	8	0
				5.4-5.9	22	10	24	15	19	10	0
				Mean	17	10	30	17	19	7	0
b	28	50	22	8.2-9.1	28	21	19	10	15	7	0
a+b	19	57	24	Mean	19	12	29	16	17	7	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	24	2	6	13	43	6	3	3
+4-16 mm	26	3	2	8	28	19	13	1

SP 66 SE 5 6541 6439 East of Moor Farm

Block B

Surface level +133.1 m (+437 ft)
Water struck at 130.6 m
May 1974

Overburden 0.8 m
Mineral 3.7 m
Waste 3.6 m
Bedrock 0.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Silty clay, orange-brown with sand layers and pebbles of angular flint	0.5	0.8
Glacial Sand and Gravel	'Very clayey' sandy gravel, increasingly 'clayey' to base Gravel: fine, subangular to subrounded, chalk, limestone and flint with some sandstone and ironstone Sand: fine and medium	3.7	4.5
Boulder Clay	Sandy clay, grey, stiff with flint, chalk and sandstone pebbles and a sand band between 7.7 m and 8.1 m	3.6	8.1
Upper Lias	Clay, stiff, grey	0.4+	8.5

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
23	50	27	0.8-1.8	17	25	22	9	18	9	0
			1.8-2.8	21	25	21	9	18	6	0
			2.8-3.8	21	18	17	10	22	12	0
			3.8-4.5	33	15	17	11	17	7	0
			Mean	23	21	19	10	19	8	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	23	2	0	8	30	34	3	0
+4-16 mm	25	0	2	5	22	39	7	0

SP 66 SE 6 6564 6353 Near White House

Block B

Surface level +140.0 m (+459 ft)
Water not struck
May 1974

Overburden 3.8 m
Mineral 3.3 m
Waste 0.3 m
Bedrock 0.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Boulder Clay	Sandy clay, orange-brown with pebbles of angular flint	3.7	3.8
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: fine with coarse, angular flint with subrounded sandstone, and sandy ironstone Sand: medium with fine	3.3	7.1
Boulder Clay	Clay, orange-brown and yellow brown, ironstained with pebbles of flint and ironstone	0.3	7.4
Upper Lias	Clay, pale grey	0.4+	7.8

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
31	49	20	3.8-4.8	36	17	23	10	9	5	0
			4.8-5.8	27	19	25	8	12	9	0
			5.8-7.1	30	18	19	9	13	11	0
			Mean	31	18	22	9	12	8	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	54	10	1	18	0	0	12	5
+4-16 mm	38	0	3	7	0	0	52	0

SP 66 SE 7 6561 6007 Hollondstone Farm

Block B

Surface level +84.5 m (+277 ft)
Water not struck
June 1974

Waste 1.3 m
Bedrock 0.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Boulder Clay	Sandy clay, pale brown with some pebbles of flint and quartzite	1.2	1.3
Middle Lias	Clayey silt, pale brownish yellow, mottled, micaceous with some ironstone nodules	0.7+	2.0

SP 66 SE 8 6650 6479 Great Brington Block B
 Surface level +129.7 m (+426 ft)
 Water struck at 124.0 m
 May 1974
 Waste 10.0 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Silty, sandy, clay, brown with flint and chalk pebbles	4.0	4.3
	Silty clay, laminated, orange-brown with some sandy ironstone pebbles	1.4	5.7
Glacial Sand and Gravel	'Very clayey' sandy gravel with clay bands Gravel: fine and coarse, angular flint and subrounded sandstone Sand: fine and medium	1.3	7.0
Boulder Clay	Silty clay, pale brown with pebbles of flint and chalk	3.0	10.0
Upper Lias	Clay, shaley, bluish grey	0.5+	10.5

SP 66 SE 9 6661 6353 East of Little Brington Block B
 Surface level +135.0 m (+443 ft)
 Water struck at +130.6 m
 May 1974
 Waste 16.0 m
 Bedrock 0.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Silty clay, brown with chalk and flint pebbles	3.9	4.2
Glacial Sand and Gravel	Sand, fine, silty	1.1	5.3
Boulder Clay	Clay, dark grey, stiff	9.2	14.5
Glacial Sand and Gravel	Sand, fine to medium with grey silty clay	1.5	16.0
Upper Lias	Clay, dark grey	0.6+	16.6

SP 66 SE 10 6799 6396 South of Chinkwell Clumps Block B
 Surface level +130.4 m (+428 ft)
 Water not struck
 May 1974
 Waste 6.7 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Sandy clay, brown with flint and chalk pebbles	0.5	0.7
	Clay, stiff, brownish grey and grey	6.0	6.7
Northampton Sand (Inferior Oolite Series)	Sand, orange-brown, fine to medium	0.5+	7.2

SP 66 SE 11 6774 6290 North-west of Nobottle House Block B
 Surface level +124.5 m (+408 ft)
 Water struck at +119.5 m
 May 1974
 Waste 15.4 m
 Bedrock 1.1+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, brownish grey passing into grey below 4.0 m; pebbles of flint and chalk and fine sand layers	9.4	9.7
	Silty clay, greyish brown	0.8	10.5
	Clay, grey, stiff with ironstone pebbles; fine and medium sand between 10.9+11.1 m	4.9	15.4
Upper Lias	Clay, olive green to dark grey, hard	1.1+	16.5

SP 66 SE 12 6873 6303 Broadgow Spinney Block B
 Surface level +112.8 m (+370 ft)
 Water not struck
 September 1974
 Waste 3.3 m
 Bedrock 1.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, sandy, silty, brownish grey with flint, chalk and ironstone pebbles	3.0	3.3
Upper Lias	Silt, pale brown; grey below 4.2 m	1.4+	4.7

SP 66 SE 13 6835 6223 Near The Lodge Block B
 Surface level +129.8 m (+426 ft)
 Water struck at +124.1 m
 May 1974
 Waste 15.9 m
 Bedrock 1.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, stiff, mottled greyish brown with pebbles of chalk and ironstone	3.1	3.3
	Silt clay, brown, stiff and stonefree	2.4	5.7
	Silty sand, fine, brown	0.2	5.9
	Clay, dark grey with flint, sandstone and chalk pebbles	10.0	15.9
Northampton Sand (Inferior Oolite Series)	Sand, clayey, yellowish white	1.1+	17.0

SP 66 SE 14 6968 6326 South of Harlestone

Block B

Surface level +116.2 m (+381 ft)
Water not struck
September 1974

Waste 16.8 m
Bedrock 0.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, grey, sandy, silty with pebbles of chalk, flint, oolitic limestone and sandstone	16.5	16.8
Upper Estuarine Series (Great Oolite Series)	Silty sand, pale brownish yellow passing into orange-brown below 17.1 m	0.6+	17.4

SP 66 SE 15 6918 6196 South-west of Lodge Barn

Block B

Surface level +116.0 m (+381 ft)
Water struck at +110.1 m
May 1974

Waste 9.6 m
Bedrock 0.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Soil and brick rubble	0.5	0.5
Boulder Clay	Clay, stiff, mottled brownish grey with carbonaceous fragments and fine chalk pebbles	0.5	1.0
Glacial Sand and Gravel	'Clayey' sandy gravel Gravel: subangular to subrounded flint pebbles Sand: fine to coarse	0.6	1.6
Boulder Clay	Clay, stiff, brownish grey becoming grey below 3.2 m with pebbles of chalk and flint	8.0	9.6
Great Oolite Limestone (Great Oolite Series)	Sandy oolitic limestone, pale cream-brown	0.4+	10.0

SP 67 SW 1 6055 7402 Flinthill Farm

Block E

Surface level +145.8 m (+478 ft)
Water struck at +144.5 m
July 1974

Waste 3.4 m
Bedrock 0.6+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Made ground	0.2	0.2
Boulder Clay	Sandy clay, pale brown with quartzite and sandstone pebbles	0.9	1.1
	'Clayey' sand, pale brownish grey with some quartzite pebbles	0.3	1.4
	Silty clay, greyish brown with ironstone and quartzite pebbles and traces of shell fragments	2.0	3.4
Middle Lias	Silty clay, grey, shaley, micaceous	0.6+	4.0

SP 67 SW 2 6091 7290 South-east of Mount Pleasant

Block E

Surface level +167.6 m (+550 ft)
Water not struck
October 1974

Waste 9.3 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, pale brown becoming mottled greyish brown, sandy, silty with sandstone and flint pebbles	2.1	2.3
	Clay, brown to 6.2 m then grey; with pebbles of flint and chalk and some oolitic limestone and ironstone	7.0	9.3
Middle Lias	Silt, pale brownish yellow	0.5+	9.8

SP 67 SW 3 6088 7194 North of Silsworth Lodge Block E

Surface level +167.5 m (+550 ft)
Water not struck
July 1974

Overburden 4.2 m
Mineral 6.5 m
Bedrock 0.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, brown, sandy, silty with flint and chalk pebbles	3.9	4.2
Glacial Sand and Gravel	a 'Clayey' gravel Gravel: fine to coarse, subangular limestone with angular flint, rounded chalk, quartzite and sandstone and some ironstone quartz Sand: medium	4.0	8.2
	b 'Very clayey' pebbly sand Gravel: fine chalk Sand: fine with medium	2.5	10.7
Upper Lias	Silty clay, greyish brown	0.6+	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
a	14	42	45	4.2-5.2	13	8	18	10	21	30	0
				5.2-6.2	13	7	12	14	22	25	7
				6.2-7.2	14	9	18	16	28	15	0
				7.2-8.2	14	15	30	11	21	9	0
				Mean	14	10	20	12	23	20	2
b	20	76	4	8.2-9.6	19	46	24	4	7	0	0
				9.6-10.7	20	46	32	1	1	0	0
				Mean	20	46	27	3	4	0	0
a+b	16	53	31	Mean	16	21	23	9	17	13	1

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	14	14	2	8	48	13	1	0
+4-16 mm	13	4	7	9	39	22	6	0

SP 67 SW 4 6005 7167 West of Silsworth Lodge Block E

Surface level +163.6 m (+537 ft)
Water struck at +161.3 m
November 1974

Waste 5.5 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, pale brown, very sandy	2.7	2.9
	Clay, grey, sandy, silty with pebbles of ironstone flint and limestone	2.6	5.5
Upper Lias	Silty clay, grey, shaley with numerous ammonite fragments	0.5+	6.0

SP 67 SW 5 6061 7119 Flavell's Lodge Block E

Surface level +164.0 m (+538 ft)
Water not struck
July 1974

Overburden 4.5 m
Mineral 3.1 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, pale brown; greyish brown between 2.2 m and 3.4 m, sandy, silty with pebbles of flint, chalk and ironstone	4.3	4.5
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: fine with coarse, angular flint, subangular limestone and rounded quartzite sandstone and ironstone Sand: medium with fine	3.1	7.6
Upper Lias	Silty clay, greyish blue	0.5+	8.1

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
30	47	23	4.5-5.5	28	13	16	13	17	13	0	
			5.5-6.5	26	20	18	8	16	12	0	
			6.5-7.6	35	24	29	1	10	1	0	
			Mean	30	19	21	7	14	9	0	

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	16	30	3	19	12	6	12	2
+4-16 mm	25	8	4	18	16	7	15	7

SP 67 SW 6 6117 7460 North-west of Winwick Grange Block E

Surface level +120.7 m (+396 ft)
 Water not struck
 July 1974
 Waste 0.1 m
 Bedrock 1.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Lower Lias	Silty clay, pale brownish grey, weathered with some small cementstone nodules	1.2	1.3
	Silty clay, greyish blue	0.2+	1.5

SP 67 SW 7 6158 7373 East of Flinthill Block E

Surface level +153.0 m (+502 ft)
 Water not struck
 July 1974
 Overburden 0.2 m
 Mineral 7.6 m
 Waste 2.0 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Glacial Sand and Gravel	'Clayey' gravel, 'very clayey' to 2.5 m and with a 'clayey' sand layer between 3.4 m and 4.2 m Gravel: fine and coarse, ironstone and limestone with quartzite, flint, sandstone, and some quartz Sand: fine and medium	7.6	7.8
Boulder Clay	Clay, brownish grey, sandy, silty with flint, sandstone and ironstone pebbles	2.0	9.8
Middle Lias	Silty clay, bluish grey	0.5+	10.3

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	
18	47	35	0.2-1.2	37	17	21	4	10	11	0
			1.2-2.5	24	11	17	9	16	23	0
			2.5-3.4	12	15	27	11	23	12	0
			3.4-4.2	16	65	17	1	1	0	0
			4.2-5.2	13	14	17	10	27	19	0
			5.2-6.2	14	14	15	13	24	20	0
			6.2-7.2	12	13	17	10	27	21	0
			7.2-7.8	18	8	9	11	17	37	0
			Mean	18	21	18	8	18	17	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	19	23	8	16	22	1	11	0
+4-16 mm	9	11	4	11	24	0	41	0

SP 67 SW 8 6166 7328 North-east of Wold Farm Block E

Surface level +156.8 m (+514 ft)
 Water struck at +154.4 m
 July 1974
 Overburden 0.3 m
 Mineral 1.1 m
 Waste 0.9 m
 Mineral 2.4 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Glacial Sand and Gravel	a 'Very clayey' pebbly sand Gravel: coarse, ironstone with sandstone, limestone and quartzite and some flint and quartz Sand: fine	1.1	1.4
	Clayey silt, greyish brown with rootlets	0.9	2.3
	b 'Very clayey' sand Sand: fine	2.4	4.7
Middle Lias	Silty clay, grey	0.5+	5.2

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	35	68	7	0.3-1.4	35	33	21	4	2	5	0
b	23	77	0	2.3-3.3	22	68	9	0	1	0	0
				3.3-4.7	24	68	7	1	0	0	0
				Mean	23	68	8	1	0	0	0
a+b	27	71	2	Mean	27	58	11	2	0	2	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	4	16	0	32	26	1	21	0
+4-16 mm	8	4	5	13	20	0	48	2

SP 67 SW 9 6192 7184 West of West Haddon Block E
 Surface level +145.7 m (+478 ft)
 Water not struck
 July 1974
 Waste 15.6 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, pale brown passing into mottled brownish grey at 1.1 m; sandy and silty with pebbles of flint, chalk, ironstone and some oolitic limestone	5.0	5.2
	Silty clay, grey with flint and chalk pebbles	10.4	15.6
Middle Lias	Silty clay, grey	0.5+	16.1

SP 67 SW 10 6116 7126 South of Silsworth Lodge Block E
 Surface level +159.8 m (+524 ft)
 Water not struck
 July 1974
 Overburden 0.3 m
 Mineral 2.8 m
 Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
GLacial Sand and Gravel	'Very clayey' sandy gravel Gravel: fine and coarse, angular flint, rounded quartzite and ironstone Sand: fine and medium	2.8	3.1
Middle Lias	Clayey silt, pale brownish grey to 4.0 m, then grey, micaceous	1.0+	4.1

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
31	47	22	0.3-1.3	33	17	20	7	10	13	0
			1.3-2.2	26	11	21	9	15	18	0
			2.2-3.1	34	41	14	2	5	4	0
			Mean	31	23	18	6	10	12	0

SP 67 SW 11 6162 7082 South-east of Silsworth Lodge Block E
 Surface level +136.3 m (+447 ft)
 Water not struck
 July 1974
 Waste 1.2 m
 Bedrock 0.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, pale brown, sandy, silty with flint and quartzite pebbles	1.0	1.2
Middle Lias	Clayey silt, pale brownish grey, micaceous	0.8+	2.0

SP 67 SW 12 6118 7038 East of Watford Covert Block E
 Surface level +143.7 m (+471 ft)
 Water struck at +139.8 m
 August 1974
 Overburden 0.2 m
 Mineral 3.3 m
 Waste 0.5 m
 Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Glacial Sand and Gravel	'Clayey' sandy gravel, 'very clayey' in first metre Gravel: fine, subangular ironstone and limestone with angular flint, rounded to subrounded sandstone and quartzite and some quartz Sand: medium to coarse	3.3	3.5
Boulder Clay	Clay, greyish brown, sandy, silty with flint and quartzite pebbles	0.5	4.0
Upper Lias	Silty clay, greyish brown, weathered to 4.8 m then greyish blue	1.0	5.0

GRADING

Mean for deposit percentages			Depth below surface (m)	percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
				- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
18	46	36	0.2-1.2	32	15	22	11	12	8	0
			1.2-2.2	11	7	27	21	25	9	0
			2.2-3.5	11	4	13	19	42	11	0
			Mean	18	8	21	17	27	9	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	6	14	3	21	24	0	29	3
+4-16 mm	14	6	6	14	26	0	31	3

SP 67 SW 13 6208 7348 South-west of Winwick Block E
 Surface level +157.2 m (+516 ft)
 Water not struck
 July 1974
 Overburden 0.2 m
 Mineral 3.5 m
 Bedrock 0.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Glacial Sand and Gravel	'Clayey' sandy gravel, 'very gravel' in top 1.1 m Gravel: fine with coarse, angular flint rounded limestone and ironstone with some quartzite, sandstone, quartz and chalk Sand: medium	3.5	3.7
Middle Lias	Silty clay, grey	0.4	4.1

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
21	43	36	0.2-1.3	23	17	21	10	17	12	0
			1.3-2.3	14	16	20	11	25	14	0
			2.3-3.7	17	12	21	11	25	14	0
			Mean	21	12	20	11	22	14	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	27	12	5	11	22	6	17	0
+4-16	19	0	2	9	21	11	36	2

SP 67 SW 14 6233 7273 Near West Haddon Grange

Block E

Surface level +173.2 m (+568 ft)
Water not struck
July 1974

Overburden 0.3 m
Mineral 0.9 m
Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Glacial Sand and Gravel	'Very clayey' sand with some flint and sandstone pebbles	0.9	1.2
Northampton Sand (Inferior Oolite Series)	Sand, silty and clayey, brownish yellow with ironstained layers	2.5+	3.7

SP 67 SW 15 6275 7177 West Haddon

Block E

Surface level +163.6 m (+537 ft)
Water struck at +154.9 m
July 1974

Overburden 0.2 m
Mineral 9.1 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Glacial Sand and Gravel	a 'Clayey' sandy gravel, 'very clayey' in first 1.3 m Gravel: fine and coarse, rounded limestone with angular flint, subrounded ironstone and rounded chalk, quartzite, sandstone and quartz Sand: mainly medium	4.2	4.4
	b 'Clayey' pebbly sand Gravel: fine, angular flint, rounded chalk and limestone Sand: medium and fine	4.9	9.3
Upper Lias	Silty clay, bluish grey	0.5+	9.8

GRADING

Mean for deposit percentages			Depth below surface (m)	percentages							
Fines	Sand	Gravel		Fines		Sand		Gravel			
				- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm	
a	18	42	40	0.2-1.5	29	19	18	5	10	19	0
				1.5-2.5	13	8	18	18	25	18	0
				2.5-3.5	15	9	18	19	26	13	0
				3.5-4.4	16	11	13	13	19	28	0
				Mean	18	12	17	13	20	20	0
b	16	75	9	4.4-5.4	15	31	32	8	12	2	0
				5.4-6.4	15	31	32	7	13	2	0
				6.4-7.4	17	35	35	6	7	0	0
				7.4-8.4	18	32	33	8	8	1	0
				8.4-9.3	17	33	49	1	0	0	0
				Mean	16	33	34	8	8	1	0
a+b	17	60	23	Mean	17	23	28	9	14	9	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	22	11	3	11	35	7	11	0
+4-16 mm	11	3	5	5	32	15	29	0

SP 67 SW 16 6242 7119 South-west of West Haddon

Block E

Surface level +134.4 m (+441 ft)
Water struck at +131.4 m
July 1974

Overburden 0.7 m
Mineral 2.5 m
Waste 1.4 m
Bedrock 0.5 m

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder clay	Silty clay, brown with some pebbles of angular flint	0.4	0.7
Glacial Sand and Gravel	'Very clayey' pebbly sand Gravel: fine, sandstone, quartzite, flint and ironstone with some quartz Sand: fine and medium	2.5	3.2
Boulder Clay	Clay, grey, sandy and silty with flint, ironstone and limestone pebbles	1.4	4.6
Middle Lias	Silty clay, bluish grey	0.5+	5.1

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
25	58	17	0.7-1.8	32	26	20	6	12	4	0
			1.8-3.2	20	26	30	7	14	3	0
			Mean	25	26	26	6	13	4	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	18	33	7	34	0	0	8	0
+4-16 mm	24	13	9	20	0	0	33	1

SP 67 SW 17 6307 7444 North-east of Winwick Block E

Surface level +122.3 m (+401 ft)
 Water not struck
 July 1974
 Waste 0.7 m
 Bedrock 0.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Boulder Clay	Silty clay, brown with pebbles of quartzite, quartz and flint	0.6	0.7
Upper Lias	Silty clay, light brown, weathered becoming fresh, greyish blue below 1.3 m	0.9+	1.6

SP 67 SW 18 6358 7413 West of Winwick Warren Block E

Surface level +164.4 m (+539 ft)
 Water not struck
 July 1974
 Waste 3.9 m
 Bedrock 0.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, pale brown, sandy and silty with flint and quartzite pebbles; very sandy between 2.5 m and 3.9 m	3.6	3.9
Upper Lias	Silty clay, bluish grey, weathering to brownish grey between 3.9 m and 4.3 m	0.6+	4.5

SP 67 SW 19 6312 7375 East of Winwick Block E

Surface level +137.7 m (+445 ft)
 Water not struck
 July 1974
 Waste 2.1 m
 Bedrock 0.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, pale brown, sandy and silty with flint and chalk pebbles	1.9	2.1
Middle Lias	Siltstone, brownish grey	0.2+	2.3

SP 67 SW 20 6309 7235 North of West Haddon Block E

Surface level +178.9 m (+587 ft)
 Water not struck
 July 1974

Overburden 0.1 m
 Mineral 2.0 m
 Bedrock 1.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Glacial Sand and Gravel	'Clayey' pebbly sand Gravel: fine, subrounded ironstone Sand: fine	2.1	2.1
Northampton Sand (Inferior Oolite Series)	'Very clayey' pebbly sand, orange-brown with layers of ironstone	1.9+	4.0

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	69	13	0.1-1.1	26	53	6	5	8	2	0
			1.1-2.1	10	59	12	4	10	5	0
			Mean	18	56	9	4	9	4	0

SP 67 SW 21 6344 7214 East of West Haddon Block E

Surface level +175.5 m (+576 ft)
 Water not struck
 July 1974

Overburden 0.1 m
 Mineral 1.0 m
 Bedrock 0.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: coarse with fine, sandy ironstone with some quartzite and trace flint Sand: mainly fine	1.0	1.1
Northampton Sand (Inferior Oolite Series)	'Clayey' sand, orange-brown with sandy ironstone layers	0.4+	1.5

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
22	55	23	0.1-1.1	22	38	14	3	9	14	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	0	29	0	0	0	0	71	0
+4-16 mm	6	11	0	0	0	0	83	0

SP 67 SW 22 6396 7126 Near Torkington Farm

Block E

Surface level +174.7 m (+573 ft)
Water not struck
July 1974

Overburden 1.5 m
Mineral 0.9 m
Bedrock 1.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, pale brown, sandy and silt with flint and quartzite pebbles	1.3	1.5
Glacial Sand and Gravel	'Very clayey' pebbly sand Gravel: flint, quartzite and ironstone Sand: fine and medium	0.9	2.4
Northampton Sand (Inferior Oolite Series)	'Clayey' sand, orange-brown with thin layers of sandy ironstone	1.5+	3.9

SP 67 SW 23 6418 7468 North of Winwick Warren

Block E

Surface level c+168 m (c+550 ft)
Water not struck
July 1974

Waste 13.8 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, greyish brown, sandy and silty with flint, chalk and sandy ironstone pebbles	4.1	4.3
	Silty clay, grey with flint chalk quartzite and oolitic limestone pebbles	9.5	13.8
Upper Lias	Silty clay, grey	0.5+	14.3

SP 67 SW 24 6469 7465 North-east of Winwick Warren

Block E

Surface level +188.8 m (+619 ft)
Water struck at +186.8 m
July 1974

Overburden 0.8 m
Mineral 1.1 m
Waste 16.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, pale brown, silty and sandy with flint and chalk pebbles	0.5	0.8
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: fine, rounded limestone with angular flint, rounded ironstone, chalk, quartz and sandstone Sand: mainly medium	1.1	1.9
Boulder clay	Silty clay, firm with flint, chalk sandstone and oolitic limestone pebbles	16.5+	18.4

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
30	39	31	0.8-1.9	30	12	16	11	21	10	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	33	0	9	0	58	0	0	0
+4-16 mm	6	0	3	15	46	9	21	0

SP 67 SW 25 6418 7259 Near Manor House

Block E

Surface level +176.3 m (+578 ft)
Water struck at 160.9 m
July 1974

Overburden 5.2 m
Mineral 2.8 m
Waste 2.9 m
Mineral 4.3 m
Bedrock 0.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	'Clay', pale brown, sandy and silty with flint pebbles; 'very clayey' pebbly sand band between 1.5 m and 1.8 m and from 4.1 m to base, colour to grey	4.9	5.2
Glacial Sand and Gravel	'Clayey' sandy gravel Gravel: fine and coarse, limestone with flint, sandstone, chalk and ironstone and some quartzite and quartz Sand: mainly coarse and medium	2.8	8.0
Boulder Clay	Clay, pale brown, sandy and silty with bands of 'very clayey' sandy gravel between 8.4 m and 8.8 m and 10.4 m and 10.7 m	2.9	10.9
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: fine, ironstone, sandstone and flint with quartzite and limestone and some quartz and chalk Sand: mainly medium	4.3	15.2
Northampton Sand (Inferior Oolite Series)	Sandstone, orange-brown and ironstained with silty sand layers	0.8+	16.0

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	19	47	34	5.2-6.2	23	16	14	8	17	22	0		
				6.2-7.2	16	10	18	17	26	13	0		
				7.2-8.0	19	9	18	30	11	13	0		
				Mean	19	12	17	18	18	16	0		
b	26	45	29	10.9-11.9	29	17	17	13	22	2	0		
				11.9-12.9	22	15	19	12	21	11	0		
				12.9-13.9	23	18	23	10	18	8	0		
				13.9-15.2	29	12	16	11	15	17	0		
				Mean	26	15	19	11	20	9	0		
a+b	23	47	30	Mean	23	14	18	15	18	12	0		

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	16	26	1	24	26	1	4	2
+4-16 mm	19	8	4	17	21	11	18	2

SP 67 SW 26 6438 7184 North-east of Ostor Hill Block E
 Surface level +161.1 m (+529 ft) Waste 9.3 m
 Water struck at +154.0 m Bedrock 1.0 m+
 July 1974

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, brown becoming grey from 2.5 m; sandy and silty with flint, chalk, ironstone and sandstone pebbles	6.8	7.0
Glacial Sand and Gravel	'Clayey' pebbly sand Gravel: fine, angular flint and subangular ironstone Sand: fine to medium	0.6	7.6
Boulder Clay	Silty clay, with pebbles of quartzite, sandstone and ironstone	1.7	9.3
Upper Lias	Silty greyish clay, bluish, micaceous	1.0+	10.3

SP 67 SW 27 6491 7134 West Haddon Lodge

Surface level +165.7 m (+544 ft)
 Water not struck
 July 1974

Block E
 Overburden 0.2 m
 Mineral 9.1 m
 Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Glacial Sand and Gravel	'Clayey' gravel Gravel: fine and coarse, chalk with quartzite, sandy ironstone, flint, sandstone and traces of shell fragments Sand: mainly medium	9.1	9.3
Northampton Sand (Inferior Oolite Series)	Silty sand, orange-brown with ironstained sandstone layers	1.0+	10.3

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						
17	41	42	0.2-1.2	11	9	13	10	24	33	0		
			1.2-2.2	15	9	18	13	21	24	0		
			2.2-3.2	16	9	20	11	18	26	0		
			3.2-4.2	20	12	21	14	20	13	0		
			4.2-5.2	19	18	16	9	20	18	0		
			5.2-6.2	17	12	13	11	20	27	0		
			6.2-7.2	17	12	10	13	22	26	0		
			7.2-8.2	16	19	25	10	20	10	0		
			8.2-9.3	19	17	23	11	18	12	0		
			Mean	17	13	17	11	21	21	0		

SP 67 SW 28 6452 7055 Near Haddon Lodge

Surface level +179.4 m (+589 ft)
 Water struck at +155.6 m
 July 1974

Block E
 Overburden 0.3 m
 Mineral 6.8 m
 Waste 17.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Glacial Sand and Gravel	'Very clayey' sandy gravel, 'clayey' between 3.2 m and 5.2 m Gravel: fine and coarse, limestone and flint with quartzite, sandstone and ironstone and some quartz and chalk Sand: medium	6.8	7.1
Boulder Clay	Clay, grey, sandy and silty with pebbles of flint, chalk ironstone, quartzite, sandstone and limestone	13.7	20.8
Glacial Sand and Gravel	'Clayey' sandy gravel Gravel: fine, flint, sandstone, quartzite, limestone and chalk Sand: medium	3.3+	24.1

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			
23	45	32	0.3-1.2	26	22	22	4	11	15	0			
			1.2-2.2	25	17	22	6	13	17	0			
			2.2-3.2	28	12	20	11	14	15	0			
			3.2-4.2	16	12	26	6	17	23	0			
			4.2-5.2	17	10	24	8	19	22	0			
			5.2-6.2	21	13	27	10	16	13	0			
			6.2-7.1	25	15	24	9	16	11	0			
			Mean	23	14	24	7	16	16	0			
			20.8-24.1	No grading available									

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	27	10	5	18	22	5	7	6
+4-16 mm	26	7	4	15	28	6	12	2

SP 67 SW 30 6411 7205 North of Ostor Hill Block E
 Surface level +166.2 m (+545 ft)
 Water not struck
 Minuteman Auger
 October 1975
 Overburden 0.1 m
 Mineral 2.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Glacial Sand and Gravel	Sand, medium with some pebbles of flint, quartz, quartzite, chalk and limestone	2.3+	2.4

SP 67 SE 1 6556 7470 Thornby Grange Block E
 Surface level +160.5 m (+527 ft)
 Water struck at 158.5 m
 August 1974
 Overburden 2.0 m
 Mineral 5.7 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Silt, brown, sandy; pebbly to 1.2 m then stoneless	1.8	2.0
Glacial Sand and Gravel	'Very clayey' sandy gravel, with thin clay bands Gravel: fine, ironstone with sandstone, flint and quartzite and some quartz and limestone Sand: medium with coarse	5.7	7.7
Upper Lias	Silty, clay, bluish grey	0.5+	8.2

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			
26	38	36	2.0-3.0	22	9	15	13	24	17	0			
			3.0-4.0	28	7	11	14	25	15	0			
			4.0-5.0	33	13	18	11	24	1	0			
			5.0-6.0	27	9	14	13	24	13	0			
			6.0-7.0	25	11	13	12	22	17	0			
			7.0-7.7	22	13	16	13	22	14	0			
			Mean	26	10	15	13	23	13	0			

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	19	17	4	23	5	0	28	4
+4-16 mm	15	3	4	15	5	0	56	2

SP 67 SE 2 6508 7335 East of White House Block E
 Surface level +192.4 m (+631 ft)
 Water not struck
 August 1974
 Overburden 5.6 m
 Mineral 6.3 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, brown; grey between 2.2 m and 4.7 m; sandy and silty with flint, quartzite and chalk pebbles	5.3	5.6
Glacial Sand and Gravel	'Clayey' gravel Gravel: fine with coarse, limestone with flint, chalk ironstone and some quartzite and sandstone Sand: coarse	6.3	11.9
Northampton Sand (Inferior Oolite Series)	'Clayey' sand, orange-brown with sandstone and sandy ironstone layers	0.5+	12.4

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			
16	39	45	5.6-6.6	15	9	14	12	21	29	0			
			6.6-7.6	15	9	14	14	24	24	0			
			7.6-8.6	17	10	18	11	25	19	0			
			8.6-9.6	15	12	15	13	23	22	0			
			9.6-10.6	15	12	15	16	26	16	0			
			10.6-11.9	18	11	18	13	27	13	0			
			Mean	16	10	15	14	24	21	0			

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	24	5	1	9	46	10	5	0
+4-16 mm	15	1	1	4	45	19	15	0

SP 67 SE 3 6582 7365 South-east of Guilsborough Lodge

Block E

Surface level +191.2 m (+627 ft)
Water not struck
August 1974

Overburden 0.1 m
Mineral 4.2 m
Waste 5.1 m
Bedrock 0.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Glacial Sand and Gravel	'Very clayey' sandy gravel with silt and clay layers Gravel: fine and coarse, angular flint with rounded to subrounded ironstone, sandstone and quartzite Sand: mainly medium	4.2	4.3
Boulder Clay	Clay, grey, sandy and silty with chalk and flint pebbles; below 7.6 m pale brown stiff clayey silt	5.1	9.4
Northampton Sand (Inferior Oolite Series)	'Clayey sand', orange-brown with sandstone and sandy ironstone layers	0.6+	10.0

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
26	45	29	0.1-1.1	31	15	15	8	16	15	0
			1.1-2.1	25	14	20	8	16	17	0
			2.1-3.1	19	18	25	10	17	11	0
			3.1-4.3	27	18	23	7	15	10	0
			Mean	26	16	20	9	16	13	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	47	19	2	18	0	0	14	0
+4-16 mm	31	6	5	29	0	0	29	0

SP 67 SE 4 6584 7289 West of Grange Farm

Block E

Surface level +179.6 m (+589 ft)
Water not struck
August 1974

Overburden 2.3 m
Mineral 2.0 m
Waste 3.0 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, pale brown with grey streaks sandy and silty with flint and quartzite pebbles	2.1	2.3
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: fine and coarse, angular flint, rounded quartzite and subrounded sandstone and ironstone Sand: fine with medium	2.0	4.3
Boulder Clay	Clay, pale brown but grey between 5.4 m and 9.6 m; sandy and silty with flint, chalk and quartzite pebbles	3.0	7.3
Northampton Sand (Inferior Oolite Series)	Silty sand, fine, orange-brown with sandstone and sandy ironstone layers	0.5+	7.8

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
35	44	21	2.3-3.3	35	21	17	6	11	10	0
			3.3-4.3	No grading available						

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	22	43	2	25	0	0	1	7
+4-16 mm	29	7	10	12	0	0	38	4

SP 67 SE 5 6548 7231 Coton Lodge

Block E

Surface level +156.7 m (+514 ft)
Water not struck
July 1974

Overburden 0.1 m
Mineral 0.9 m
Waste 6.1 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Glacial Sand and Gravel	'Very clayey' gravel Gravel: fine and coarse, with angular flint cobbles Sand: fine and medium	0.9	1.0

Boulder Clay	Clay, pale brown, sandy and silty with flint and ironstone pebbles; band of 'very clayey' sandy gravel between 1.5 m and 1.7 m	2.1	3.1
	Clay, grey, sandy and silty with pebbles of chalk, sandstone and ironstone	4.0	7.1
Northampton Sand (Inferior Oolite Series)	'Clayey' sand, orange-brown with ironstone layers	0.5+	7.6

GRADING

Mean for deposit percentages			Depth below surface (m)	percentages						
Fines	Sand	Gravel		Fines	Sand		Gravel			
				-1/8	+1/8 - 1/4	+1/4 - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm
27	29	44	0.1-1.0	27	13	11	5	11	13	20

SP 67 SE 6	6550 7139	East of West Haddon Lodge	Block E
Surface level +147.9 m (485 ft) Water not struck July 1974			Waste 4.1 m Bedrock 1.0 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Silty clay, brown with pebbles of flint and chalk	3.8	4.1
Northampton Sand (Inferior Oolite Series)	'Clayey' sand, pale brownish orange with ironstained sandstone layers	1.0+	5.1

SP 67 SE 7	6580 7066	South of Botany Farm	Block E
Surface level +164.7 m (+540 ft) Water struck at +148.7 m July 1974			Waste 18.7 m Bedrock 0.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, brown to 5.6 m then grey; sandy and silty with pebbles of flint, chalk, sandstone and quartzite; band of 'very clayey' sandy gravel between 15.2 m and 15.5 m	18.5	18.7
Northampton Sand (Inferior Oolite Series)	'Very clayey' sand, fine, orange-brown with thin sandy ironstone layers	0.8+	19.5

SP 67 SE 8	6535 7027	Chorley Cop	Block E
Surface level +173.9 m (+571 ft) Water not struck July 1974			Waste 18.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Silty clay, brownish grey with some pebbles of chalk, quartzite, flint and ironstone	3.8	4.0
	Clay, grey, silty and sandy with thin sand layers; pebbles of flint and sandstone	14.3+	18.3

SP 67 SE 9	6679 7354	South-west of Rye Hills	Block E
Surface level +181.3 m (+595 ft) Water not struck August 1974			Waste 6.6 m Bedrock 0.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Boulder Clay	Clay, pale brown, sandy and silty with chalk, flint and quartzite pebbles	6.5	6.6
Northampton Sand (Inferior Oolite Series)	Silty sand, fine, orange-brown with sandy ironstone layers	0.4+	7.0

SP 67 SE 10	6683 7308	West of Guilsborough	Block E
Surface level +168.1 m (+522 ft) Water not struck September 1974			Overburden 0.3 m Mineral 6.3 m Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Glacial Sand and Gravel	'Clayey' sandy gravel, 'very clayey' in first 1.1 m Gravel: fine with coarse, oolitic limestone with flint, sandstone, chalk and ironstone and some quartzite and quartz Sand: fine to coarse	6.3	6.6
Northampton Sand (Inferior Oolite Series)	'Clayey' sand, orange-brown with sandy ironstone layers	0.5+	7.1

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 - 1/2	+4 - 16	+16 - 64	+64 mm
18	46	36	0.3-1.4	28	21	18	8	14	11	0
			1.4-2.4	13	22	23	10	22	10	0
			2.4-3.4	13	15	19	12	25	16	0
			3.4-4.4	15	13	18	9	23	16	6
			4.4-5.4	19	17	19	12	21	12	0
			5.4-6.6	18	18	15	11	20	18	0
			Mean	18	17	11	18	21	14	1

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	12	8	5	14	45	9	7	0
+4-16 mm	8	4	2	8	44	17	17	0

SP 67 SE 11 6627 7114 East of Botany Farm

Block E

Surface level +140.4 m (+461 ft)
Water not struck
September 1974

Waste 7.2 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, brown; grey below 4.3 m, sandy and silty with chalk, flint, quartzite and sandstone pebbles	6.9	7.2
Northampton Sand (Inferior Oolite Series)	Sand, orange-brown, silty with sandy ironstone and sandstone layers	0.5+	7.7

SP 67 SE 12 6629 7014 Near Ravensthorpe

Block E

Surface level +159.5 m (+523 ft)
Water not struck
August 1974

Waste 13.9 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground		1.1	1.1
Boulder Clay	Silty clay, greyish brown becoming greyish blue at 5.0 m and pale brown at 13.0 m; thin sand layers throughout and pebbles of chalk and flint and some sandstone and limestone	13.8	13.9
Northampton Sand (Inferior Oolite Series)	Silty sand, orange-brown with sandy ironstone layers	0.5+	14.4

SP 67 SE 13 6801 7453 East of Nortoft Lodge

Block E

Surface level +121.5 m (+399 ft)
Water struck at +119.5 m
August 1974

Overburden 1.0 m
Mineral 1.2 m
Waste 0.7 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Alluvium	Clay, pale brown, silty and sandy with angular flint pebbles	0.8	1.0
River Terrace Deposits	'Clayey' sandy gravel Gravel: fine with coarse, subangular sandstone and ironstone with angular flint, rounded quartzite and some quartz Sand: medium and fine	1.2	2.2
	Clay, grey, silty and sandy with flint and chalk pebbles	0.7	2.9
Upper Lias	Silty clay, greyish blue	0.5+	3.4

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 - 1/2	+4 - 16	+16 - 64	+64 mm
17	50	33	1.0-1.2	17	17	22	11	21	12	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	6	16	3	42	0	0	31	2
+4-16 mm	19	4	9	16	0	0	50	2

SP 67 SE 14 6836 7452 North of Hanwell Spinney

Block E

Surface level +136.1 m (+447 ft)
Water struck at +129.1 m
August 1974

Waste 18.3 m
Bedrock 0.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Boulder Clay	Silty, clay, brownish grey and sandy to 2.5 m then grey: pebbles of chalk, flint, limestone, quartzite, sandstone and ironstone and some shells	18.2	18.3
Upper Lias	Silty clay, shaley, greyish blue	0.3+	18.6

SP 67 SE 15 6934 7457 Calender Farm

Surface level c+122 m (c+400 ft)
Water not struck
August 1974

Block E

Waste 1.8 m
Bedrock 0.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Silty clay, pale brown with flint and chalk pebbles	1.6	1.8
Upper Lias	Silt clay, pale brown to 1.9 m then greyish blue	0.6+	2.4

SP 67 SE 16 6963 7309 Near Hollowell Grange

Surface level +154.3 m (+506 ft)
Water not struck
August 1974

Block E

Waste 14.4 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground		0.2	0.2
Boulder Clay	Clay, brownish grey to 5.0 m then grey; sandy and silty with chalk and flint pebbles	14.2	14.4
Northampton Sand (Inferior Oolite Series)	Silty sand, orange-brown with sandstone and sandy ironstone layers	0.5+	14.9

SP 75 NW 159 7045 5970 North-east of Kisingbury

Surface level +64.5 m (+212 ft)
Water struck at +64.2 m
November 1974

Block C

Overburden 0.1 m
Mineral 3.7 m
Bedrock 5.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Alluvium	a 'Very clayey' sandy gravel Gravel: fine, angular flint and rounded quartzite Sand: medium	1.1	1.2
River Terrace Deposits	b Gravel Gravel: fine with coarse, angular flint, rounded to subrounded quartzite, sandstone and ironstone Sand: coarse and medium	2.6	3.8
Middle Lias	Silty clay, grey to 8.7 m then greyish blue, stiff and micaceous	5.4+	9.2

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	37	43	20	0.1-1.2	37	14	22	7	15	5	0
b	4	42	54	1.2-2.2	4	4	18	20	41	13	0
				2.2-3.2	4	3	17	23	34	19	0
				3.2-3.8	5	2	11	24	38	20	0
				Mean	4	3	17	22	37	17	0
a+b	13	42	45	Mean	13	7	18	17	31	14	0

SP 75 NW 160 7010 5940 Kisingbury

Surface level +67.1 m (+220 ft)
Water struck at +64.6 m
October 1974

Block A

Overburden 0.9 m
Mineral 2.0 m
Bedrock 0.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Brick and ash	0.3	0.3
	Boulder of oolitic limestone	0.6	0.9
Glacial Sand and Gravel	'Clayey' gravel Gravel: fine with coarse, angular flint with rounded to subrounded sandstone and ironstone and some quartzite, limestone and quartz Sand: mainly medium	2.0	2.9
Middle Lias	Silty clay, grey	0.7+	3.6

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
	19	40	41	0.9-2.9	19	10	17	13	25	16	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	53	11	2	21	11	0	2	0
+4-16 mm	36	4	5	12	4	0	39	0

SP 75 NW 161 7033 5739 Hill Farm

Surface level +93.9 m (+308 ft)
Water struck at +92.0 m
October 1974

Block A

Overburden 8.2 m
Mineral 7.8 m
Waste 0.6 m
Mineral 0.9 m
Bedrock 0.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, brown but grey between 3.0 m and 4.8 m, sandy and silty with flint and chalk pebbles. 'Very clayey' pebbly sand band occurs between 1.5 m and 1.8 m	8.0	8.2
Glacial Sand and Gravel	a 'Clayey' sandy gravel Gravel: fine, angular flint, rounded chalk limestone and ironstone Sand: coarse and medium	0.7	8.9
Milton Sand	b Pebbly sand Gravel: fine, subrounded ironstone and sandstone Sand: medium	7.1	16.0
	Silty clay, pale brown	0.6	16.6
	c Pebbly sand Gravel: fine subrounded ironstone and sandstone Sand: medium	0.9	17.5
Upper Lias	Silty clay, pale brown; greyish blue below 17.9 m, micaceous	0.9+	18.4

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	13	55	32	8.2-8.9	13	7	22	26	21	7	4
b	9	84	7	8.9-9.9	7	29	58	3	3	0	0
				9.9-10.9	7	25	60	4	4	0	0
				10.9-11.9	8	23	60	4	5	0	0
				11.9-12.9	10	22	56	5	6	1	0
				12.9-13.9	9	17	65	3	5	1	0
				13.9-14.9	13	24	49	6	7	1	0
				14.9-16.0	9	20	43	13	14	1	0
				Mean	9	23	56	5	6	1	0
c	9	73	18	16.6-17.5	9	20	39	14	17	1	0
a+b+c	9	80	11	Mean	9	21	50	9	9	2	0
b+c	9	83	8	Mean	9	23	54	6	8	0	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	1	0	0	14	8	10	29	38
+4-16 mm	6	0	1	4	11	8	67	3

SP 75 NW 162 7041 5644 South-west of Rothersthorpe

Surface level +95.6 m (+314 ft)
Water not struck
October 1974

Block A

Waste 5.9 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, pale brown to 2.2 m then grey, sandy and silty with flint and chalk pebbles	5.6	5.9
Upper Lias	Clay, shaley, greyish blue	0.5+	6.4

SP 75 NW 163 7162 5977 Upton Hall Farm

Surface level +69.3 m (+227 ft)
Water struck at +67.7 m
May 1974

Block F

Overburden 0.2 m
Mineral 2.9 m
Waste 21.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Glacial Sand and Gravel	Sandy gravel, 'clayey' in first 2.1 m Gravel: fine subangular flint with subrounded quartzite, ironstone and sandstone and some quartz Sand: medium	2.9	3.1
Boulder Clay	Clay, stiff grey with pebbles of chalk and flint	2.9	6.0
Glacial Lake Deposits	Silty clay, grey with pale brown silty layers	19.0+	25.0

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
8	55	37	0.2-1.3	11	21	25	10	20	13	0	
			1.3-2.3	13	7	29	12	24	15	0	
			2.3-3.1	1	9	30	20	32	8	0	
			Mean	8	13	28	14	25	12	0	

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	45	33	4	11	0	0	7	0
+4-16 mm	45	5	6	10	0	0	32	2

SP 75 NW 164 7134 5882 Pineham Barn

Surface level +66.9 m (+219 ft)
Water struck at +64.9 m
October 1974

Block F

Waste 2.5 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, brown, sandy with ironstone pebbles	0.5	0.7
Glacial Sand and Gravel	Clayey sandy gravel Gravel: fine, rounded quartzite and sandstone subangular flint and ironstone Sand: fine to coarse	0.5	1.2
Boulder Clay	Clay pale brown with angular flint pebbles	0.6	1.8
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: fine, flint and ironstone Sand: medium	0.7	2.5
Middle Lias	Clayey silt, pale greyish brown, micaceous, with siltstone nodules	0.5+	3.0

SP 75 NW 165 7174 5708 North of Rothersthorpe

Surface level +75.6 m (+248 ft)
Water not struck
August 1974

Block A

Waste 3.2 m
Bedrock 0.8 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, pale brown, sandy, with chalk and flint pebbles Clayey silt, brownish grey, laminated with pebbles of rounded chalk	2.4	2.7
Upper Lias	Silty clay, brownish grey, laminated, micaceous	0.8+	4.0

SP 75 NW 166 7181 5639 South-east of Rothersthorpe

Surface level +79.0 m (+259 ft)
Water not struck
April 1974

Block A

Overburden 0.2 m
Mineral 2.3 m
Waste 0.6 m
Bedrock 0.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Milton Sand	'Very clayey' pebbly sand Gravel: fine, platy, sandy ironstone increasing in amount with depth Sand: medium and fine	2.3	2.5
	Silty clay, pale brownish grey, mottled and ironstained	0.3	20.8
	'Very clayey' sandy gravel	0.3	3.1
Upper Lias	Silt, yellowish brown, micaceous, with siltstone nodules to 3.7 m, then greyish blue, micaceous with numerous shells	0.9+	4.0

GRADING

Mean for deposit percentages			Depth below surface (m)	percentages						
Fines	Sand	Gravel		Fines		Sand		Gravel		
				- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1-4	+4-16	+16-64	+64 mm
21	70	9	0.2-1.2	23	35	36	2	4	0	0
			1.2-2.5	19	20	35	11	14	1	0
			Mean	21	27	36	7	9	0	0

SP 75 NW 167 7121 5614 South of Rothersthorpe

Surface level +91.9 m (+302 ft)
Water not struck
October 1974

Block A

Waste 5.0 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, mottled brownish grey to 4.8 m and grey to base pebbles of flint and chalk	4.8	5.0
Upper Lias	Clay, grey shaley	0.5+	5.5

SP 75 NW 168 7277 5994 East of Upton

Surface level +63.3 m (+208 ft)
Water struck at +57.9 m
May 1974

Block F

Overburden 5.4 m
Mineral 2.4 m
Waste 17.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, brown, silty with flint and sandstone pebbles Clay, orange-brown, sandy and silty	4.1	4.4
Glacial Sand and Gravel	'Clayey' gravel Gravel: coarse and fine, angular flint, rounded ironstone and quartzite with some sandstone, quartz and trace limestone Sand: coarse	2.4	7.8
Glacial Lake Deposits	Silt, grey, soft with fine sand and some flint pebbles	17.2+	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
11	30	59	5.4-6.4	9	3	9	22	38	19	0
			6.4-7.8	13	8	8	10	18	43	0
			Mean	11	5	9	16	28	31	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	41	34	4	13	1	0	4	3
+4-16 mm	24	6	5	9	0	0	56	0

SP 75 NW 169 7212 5928 South-east of Uptonhall Farm Block F
 Surface level +62.0 m (+203 ft) Overburden 0.2 m
 Water struck at +60.5 m Mineral 3.5 m
 November 1974 Waste 26.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Alluvium	a 'Very clayey' pebbly sand Gravel: fine, angular flint, subangular sandstone and rounded quartzite Sand: mainly medium	1.1	1.3
River Terrace Deposits	b Gravel Gravel: fine with coarse, angular flint, rounded quartzite, sandstone and ironstone Sand: coarse with medium	2.4	3.7
Glacial Lake Deposits	Clay, greyish brown soft becoming increasingly hard some traces of chalk granules and microfossils	26.3+	30.0

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	28	55	17	0.2-1.3	28	19	28	8	13	4	0
b	7	35	58	1.3-2.3	7	5	19	14	34	21	0
				2.3-3.7	7	3	15	15	33	27	0
				Mean	7	4	16	15	33	25	0
a+b	13	41	46	Mean	13	8	20	13	27	19	0

SP 75 NW 170 7216 5808 West of Rothersthorpe Crossing Block F
 Surface level +62.8 m (+206 ft) Overburden 1.2 m
 Water struck at +61.6 m Mineral 1.7 m
 April 1974 Bedrock 0.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Alluvium	Clay, pale brown, sandy with flint pebbles	0.9	1.7
River Terrace Deposits	'Clayey' gravel with clay seams Gravel: fine, flint and ironstone with some sandstone, limestone, quartzite, quartz and chalk Sand: medium and coarse	1.7	2.9
Middle Lias	Clay, bluish grey, silty, micaceous	0.6+	3.5

GRADING

Mean for deposit percentages			Depth below surface (m)	percentages						
Fines	Sand	Gravel		Fines	Sand			Gravel		
				- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm
15	39	46	1.2-2.9	15	9	17	13	34	12	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	33	6	4	16	9	0	32	1
+4-16 mm	27	1	2	2	10	6	47	5

SP 75 NW 171 7292 5722 Milton Ham Block F
 Surface level +77.0 m (+253 ft) Waste 5.0 m
 Water not struck Bedrock 0.5 m+
 April 1974

LOG

Geological classification	Lithology	Thickness m	Depth m
Made Ground	Soil and brick rubble		0.8
Boulder Clay	Clay, greyish brown, sandy and silty with sand bands and pebbles of flint, chalk and oolitic limestone	4.2	5.0
Upper Lias	Clay, greyish blue, silty	0.5+	5.5

SP 75 NW 172 7365 5708 Lady Bridge Block F
 Surface level +68.6 m (+225 ft) Overburden 2.1 m
 Water struck at +66.6 m Mineral 1.1 m
 April 1974 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
Alluvium	Clay, mottled, pale brownish grey, with angular flint pebbles	1.8	2.1
River Terrace Deposits	Sandy gravel Gravel: fine, angular, flint and sandy ironstone Sand: medium	1.1	3.2
Middle Lias	Clay, silty, micaceous, bluish grey	0.5+	3.7

GRADING

Mean for deposit percentages			Depth below surface (m)	percentages						
Fines	Sand	Gravel		Fines		Sand			Gravel	
				- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm
5	52	43	2.1-3.2	5	6	32	14	32	11	0

SP 75 NW 173 7423 5985 North-west of Cotton End Block F

Surface level +58.3 m (+191 ft)
 Water struck at +55.2 m
 November 1974

Overburden 3.1 m
 Mineral 1.0 m
 Waste 11.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Alluvium	Clay, pale brown; grey below 2.2 m silty with some pebbles of flint and ironstone	3.0	3.1
River Terrace Deposits	Gravel Gravel: fine and coarse, angular flint, rounded quartzite and subangular ironstone Sand: coarse and medium	1.0	4.1
Glacial Lake Deposits	Clay, grey silty, laminated, soft but becoming increasingly hard with depth massive with a shaley appearance in last 0.5 m	11.4+	15.5

GRADING

Mean for deposit percentages			Depth below surface (m)	percentages						
Fines	Sand	Gravel		Fines		Sand			Gravel	
				- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ - 1	+1 - 4	+4 - 16	+16 - 64	+64 mm
5	34	61	3.1-4.1	5	3	13	18	33	28	0

SP 75 NW 174 7409 5678 South-east of Lady Bridge Block F

Surface level +75.8 m (+249 ft)
 Water struck at +73.4 m
 April 1974

Overburden 1.4 m
 Mineral 1.6 m
 Bedrock 1.1 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay pale brownish yellow, sandy and silty with fine angular flint pebbles	1.2	1.4
Glacial Sand and Gravel	'Very clayey' pebbly sand Gravel: fine to coarse, limestone with chalk and flint and some quartzite, ironstone, quartz and sandstone Sand: medium with fine	1.6	3.0
Upper Lias	Clay, greyish blue	1.1+	4.1

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
24	63	13	1.4-2.4	25	23	33	8	8	3	0
			2.4-3.0	22	30	27	5	8	8	0
			Mean	24	25	32	6	8	5	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	19	5	0	0	56	20	0	0
+4-16 mm	23	8	3	3	40	19	4	0

SP 75 NW 175 7422 5578 North-west of Maple Cottage Block A

Surface level +84.4 m (+277 ft)
 Water struck at +78.0 m
 April 1974

Overburden 0.2 m
 Mineral 5.5 m
 Waste 0.2 m
 Mineral 5.8 m
 Waste 0.4 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Glacial Sand and Gravel	a 'Very clayey' pebbly sand Gravel: fine, ironstone, flint and limestone with some sandstone and quartzite Sand: medium	0.8	1.0
Milton Sand	b Pebbly sand, 'clayey' in first 0.6 m Gravel: fine, angular, sandy ironstone Sand: medium with fine	4.7	5.8
	Sandy clay	0.2	5.9
	c Clayey pebbly sand, less 'clayey' in last 1.8 m Gravel: fine angular, sandy ironstone Sand: medium with fine	5.8	11.7
	Clay, pale brown, sandy and silty with some ironstone pebbles	0.4	12.1
Upper Lias	Clay, bluish grey, silty with belemnites	0.5+	12.6

GRADING

	Mean for deposit percentages			Depth below surface (m)	percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					-#	+# -#	+# -1	+1 -4	+4 -16	+16 -64	+64 mm
a	36	49	15	0.2-1.0	36	7	32	10	12	3	0
b	8	87	5	1.0-1.6	14	17	49	9	10	1	0
				1.6-2.8	9	15	51	10	14	1	0
				2.8-3.8	5	41	51	1	2	0	0
				3.8-4.8	7	38	52	2	1	0	0
				4.8-5.7	8	37	51	2	2	0	0
				Mean	8	31	51	5	4	1	0
c	9	79	12	5.9-6.9	10	46	35	4	5	0	0
				6.9-7.9	10	49	34	3	3	1	0
				7.9-8.9	10	47	36	4	3	0	0
				8.9-10.1	10	48	38	2	2	0	0
				10.1-11.1	4	8	31	24	30	3	0
				11.1-11.9	7	13	29	28	19	4	0
				Mean	9	35	34	10	11	1	0
a+b+c	11	79	10	Mean	11	31	40	8	8	2	0
b+c	8	84	8	Mean	8	34	42	8	8	0	0

SP 75 NW 176 7140 5851 Pineham Barn

Block F

Surface level c. +68.0 m (c. +223 ft)
Water not struck
Minuteman auger
October 1975

Waste 0.9 m
Bedrock 0.2 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Glacial Sand and Gravel	Sandy silt, pale brown with pebbles of fine angular flint and subangular ironstone	0.6	0.9
Middle Lias	Silty, clay, mottled greyish brown, with fine shell fragments	0.2+	1.1

SP 75 NW 177 7067 5910 South-east of Kislingbury

Block F

Surface level c. +66.0 m (c. +217 ft)
Water struck at c+63.3 m
Minuteman auger
October 1975

Overburden 0.5 m
Mineral 1.8 m
Waste 4.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.5	0.5
Glacial Sand and Gravel	'Clayey' sand with flint, quartzite and limestone pebbles	1.8	2.3
Boulder Clay	Silty clay, greyish brown with rounded chalk and subrounded ironstone pebbles	4.3+	6.6

SP 75 NW 178 7372 5671 South of Lady Bridge

Block F

Surface level c. +73.2 m (c. +240 ft)
Water not struck
Minuteman auger
October 1975

Waste 0.4 m
Bedrock 0.9 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.4	0.4
Upper Lias	Silty clay, pale brown becoming grey with brown patches; iron concretions present below 1.0 m	0.9+	1.3

SP 75 NW 179 7333 5500 South of Milton

Block A

Surface level +88.6 m (+291 ft)
Water not struck
October 1974

Overburden 0.1 m
Mineral 8.1 m
Bedrock 0.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.1	0.1
Milton Sand	a 'Clayey' pebbly sand Gravel: fine, angular platy ironstone Sand: mainly fine	3.0	3.1
	b 'Clayey' sand, fine with some ironstone pebbles	5.1	8.2
Upper Lias	Silty clay, grey	0.6+	8.8

GRADING

	Mean for deposit percentages			Depth below surface (m)	percentages						
	Fines	Sand	Gravel		Fines			Gravel			
					-#	+# -#	+# -1	+1 -4	+4 -16	+16 -64	+64 mm
a	15	69	16	0.1-1.1	15	42	23	4	10	6	0
				1.1-2.1	14	43	19	7	13	4	0
				2.1-3.1	15	43	19	8	12	3	0
				Mean	15	42	20	7	12	4	0
				b	12	85	3	3.1-4.1	7	70	20
4.1-5.1	14	65	17					2	1	1	0
5.1-5.9	14	66	18					1	1	0	0
5.9-6.9	12	67	15					2	4	0	0
6.9-8.2	14	67	14					1	3	1	0
Mean	12	67	17					1	2	1	0
a+b	13	79	8	Mean	13	58	18	3	6	2	0

SP 75 NE 388 7517 5607 Collingtree Grange **Block F**
 Surface level +75.2 m (+247 ft)
 Water struck at +72.0 m
 April 1974
 Overburden 3.2 m
 Mineral 2.2 m
 Waste 15.1 m
 Bedrock 0.3 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Silty clay, pale brown with flint pebbles	1.2	1.4
Glacial Sand and Gravel	'Very clayey' sandy gravel Gravel: fine and coarse, flint, limestone and chalk Sand: fine and medium	0.7	2.1
Boulder Clay	Silty clay, mottled pale brownish grey with flint pebbles	1.1	3.2
Glacial Sand and Gravel	'Clayey' gravel Gravel: fine and coarse, limestone and flint with some quartzite, chalk, ironstone, sandstone and trace quartz Sand: fine to coarse	2.2	5.4
Boulder Clay	Silty clay, bluish grey with chalk, flint and ironstone pebbles	15.1	20.5
Upper Lias	Silty clay, greyish blue	0.3+	20.8

GRADING

Mean for deposit percentages			Depth below surface (m)	percentages						
Fines	Sand	Gravel		Fines	Sand		Gravel			
				- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
19	40	41	3.2-4.2	24	14	18	13	15	16	0
			4.2-5.4	15	10	13	12	23	27	0
			Mean	19	12	16	12	19	22	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	29	11	0	9	45	3	3	0
+4-16 mm	29	2	2	9	41	10	7	0

SP 75 NE 389 7577 5545 East of Collingtree **Block F**
 Surface level +82.2 m (+270 ft)
 Water struck at +70.5 m
 April 1974
 Waste 18.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, brownish grey, sandy and silty with flint, ironstone and oolitic limestone pebbles	10.2	10.4
	Clayey silt, brownish grey with laminations	2.8	13.2
	Clay, brownish grey, sandy and silty with chalk and some flint pebbles	5.2+	18.4

SP 75 NE 390 7638 5881 Delapre Farm **Urban area**
 Surface level +67.2 m (+220 ft)
 Water not struck
 October 1974
 Overburden 0.3 m
 Mineral 1.0 m
 Waste 1.9 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Glacial Sand and Gravel	'Very clayey' pebbly sand Gravel: fine with coarse, angular flint with ironstone, sandstone, quartzite and some quartz Sand: mainly fine	1.0	1.3
Boulder Clay	Clay, pale brown, sandy and silty with some flint pebbles	1.9	3.2
Upper Lias	Silty clay, pale greyish brown	0.5+	3.7

GRADING

Mean for deposit percentages			Depth below surface (m)	percentages						
Fines	Sand	Gravel		Fines	Sand		Gravel			
				- $\frac{1}{16}$	+ $\frac{1}{16}$ - $\frac{1}{4}$	+ $\frac{1}{4}$ -1	+1 -4	+4 -16	+16 -64	+64 mm
39	47	14	0.1-1.3	39	25	16	6	9	5	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	60	13	2	15	0	0	10	0
+4-16 mm	28	10	6	33	0	0	23	0

SP 75 NE 391 7680 5515 South-east of Courteenhall Lodge **Block A**
 Surface level +81.1 m (+266 ft)
 Water not struck
 October 1974
 Overburden 0.3 m
 Mineral 2.9 m
 Bedrock 0.6 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Glacial Sand and Gravel	'Very clayey' pebbly sand with a sandy clay layer between 0.7 m and 0.9 m Gravel: fine, angular flint with some rounded quartzite and sandstone Sand: medium and fine	2.9	3.2
Upper Lias	Silty clay, pale greyish yellow, mottled	0.6+	3.8

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
27	60	13	0.3-1.3	28	24	30	7	9	2	0
			1.3-2.3	28	27	27	6	10	2	0
			2.3-3.2	25	21	29	8	14	3	0
			Mean	27	24	28	8	11	2	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	0	0	0	0	0	0	0	0
+4-16 mm	78	5	2	11	0	0	4	0

SP 75 NE 392 7752 5867 West of Ford Farm

Urban area

Surface level +63.7 m (+209 ft)
Water struck at +60.2 m
April 1974

Overburden 0.2 m
Mineral 3.0 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Glacial Sand and Gravel	'Clayey' sandy gravel Gravel: fine angular flint, rounded quartzite and ironstone with some quartz and sandstone Sand: fine to coarse	3.0	3.2
Upper Lias	Silty clay, bluish grey, micaceous with ammonite fragments	0.5+	3.7

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
18	43	39	0.2-1.5	21	22	22	9	21	5	0
			1.5-2.5	16	8	17	16	25	18	0
			2.5-3.2	16	7	13	15	35	14	0
			Mean	18	12	17	14	27	12	0

COMPOSITION

Fraction	Flint	Quartzite	Quartz	Sandstone	Limestone	Chalk	Ironstone	Others
+16-64 mm	37	37	6	14	0	0	6	0
+4-16 mm	32	8	8	4	0	0	46	2

SP 75 NE 393 7764 5544 West of Preston Deanery

Block A

Surface level +75.3 m (+247 ft)
Water not struck
May 1974

Overburden 0.2 m
Mineral 0.9 m
Bedrock 0.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Milton Sand	'Clayey' sand, medium and fine	0.9	1.1
Upper Lias	Clay, greyish blue with traces of shell fragments	0.7+	1.8

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
19	79	2	0.2-1.1	19	33	40	6	1	1	0

SP 75 NE 394 7888 5729 East of Hardingstone Lodge

Block F

Surface level +110.7 m (+363 ft)
Water struck at +107.7 m
April 1974

Waste 13.0 m
Bedrock 0.7 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.2	0.2
Boulder Clay	Clay, pale brown, silty and sandy with flint, chalk and some limestone pebbles	2.7	2.9
	Clay, greyish brown, chalky	10.1	13.0
Blisworth Clay (Great Oolite Series)	Silty clay, brownish olive	0.7+	13.7

SP 75 NE 395 7830 5612 Preston Grange

Block A

Surface level +91.4 m (+300 ft)
Water struck at +78.5 m
April 1974

Waste 13.5 m
Bedrock 0.4 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, pale brown becoming greyish brown with depth; sandy and silty with pebbles of chalk and shelly limestone	13.2	13.5
Blisworth Clay (Great Oolite Series)	Clay, greyish brown, micaceous	0.4+	13.9

SP 75 NE 396 7893 5593 Preston Deanery Block A
 Surface level +82.6 m (+271 ft)
 Water struck at +76.4 m
 May 1974
 Overburden 6.1 m
 Mineral 6.6 m
 Waste 0.7 m
 Mineral 1.6 m
 Waste 4.7 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, pale brown, silty with chalk and flint pebbles	3.8	4.1
	Clay, bluish grey	2.0	6.1
Glacial Sand and Gravel	a 'Clayey' pebbly sand Gravel: fine, sandy ironstone and oolitic limestone Sand: fine and medium	6.6	12.7
	Clay, sandy, silty and laminated	0.7	13.4
	b 'Clayey' pebbly sand Gravel: limestone	1.6	15.0
	Clay, brownish grey, sandy and silty	1.5	16.5
	Sandy gravel Gravel: fine, platy, sandy ironstone Sand: fine and coarse	0.9	17.4
Boulder Clay	Clay, bluish grey, silty with chalk and flint pebbles	2.3	19.7
Upper Lias	Clay, bluish grey	0.5+	20.2

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	13	81	6	6.1-7.1	10	20	44	14	9	3	0
				7.1-8.1	9	24	37	19	10	1	0
				8.1-12.7	14	42	32	9	3	0	0
				Mean	13	35	35	11	5	1	0
b	17	76	7	13.4-15.0	17	48	18	10	7	0	0
a+b	14	80	6	Mean	14	38	31	11	5	1	0

SP 75 NE 397 7970 5816 South of Great Houghton Block A
 Surface level +105.5 m (+346 ft)
 Water not struck
 April 1974
 Waste 4.8 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, pale brown becoming brownish grey, sandy and silty with flint and chalk pebbles	4.5	4.8
Blisworth Clay (Great Oolite Series)	Clay, greyish brown	0.5+	5.3

SP 75 NE 398 7971 5571 East of Preston Deanery Block A
 Surface level +94.7 m (+311 ft)
 Water not struck
 May 1974
 Waste 7.1 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.4	0.4
Boulder Clay	Clay, pale brown, sandy and silty with pebbles of chalk and flint which increase in number between 2.0 m and 2.1 m	1.9	2.3
	Clay, brownish grey, sandy and silty with flint and chalk pebbles	4.8	7.1
Upper Lias	Silty clay, greyish blue	0.5+	7.6

SP 76 SW 175 7052 6169 West of Beechwood Lodge Block B
 Surface level +115.9 m (+380 ft)
 Water not struck
 September 1974
 Waste 3.1 m
 Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness m	Depth m
	Soil	0.3	0.3
Boulder Clay	Clay, greyish brown, sandy and silty with chalk, flint and oolitic limestone pebbles	2.8	3.1
Northampton Sand (Inferior Oolite Series)	'Clayey' sand, orange-brown with thin sandy ironstone layers	0.5+	3.6

SP 76 SW 176 7163 6065 Upton Lawn

Block F

Surface level +106.2 m (+348 ft)
Water not struck
September 1974

Waste 2.3 m
Bedrock 0.5 m+

LOG

Geological classification	Lithology	Thickness	Depth
Made Ground		0.9	0.9
Glacial Sand and Gravel	'Very clayey' sand with fine flint, sandstone and limestone pebbles	0.6	1.5
Boulder Clay	Clay, pale brown, sandy and silty with chalk, limestone, sandstone and coal pebbles	0.8	2.3
Lower Estuarine Series (Inferior Oolite Series)	Silt, pale brownish buff	0.5+	2.8

SP 76 SE 544 7980 6146 South-east of Weston Favell

Block F

Surface level +55.4 (+183 ft)
Water not recorded
July 1975

Overburden 2.4 m
Mineral 1.2 m
Waste 17.4 m+

LOG

Geological classification	Lithology	Thickness	Depth
	Soil	0.8	0.8
Alluvium	Clay, reddish and greyish brown, very sandy with ironstone, quartzite and flint pebbles	1.6	2.4
River Terrace Deposits	'Clayey' gravel Gravel: fine with coarse, angular flint and subrounded to rounded ironstone and quartzite Sand: mainly medium	1.2	3.6
Glacial Lake Deposits	Silty clay, pale and dark grey, laminated and micaceous	17.4+	21.0

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
20	38	42	2.4-3.6	20	7	19	12	24	18	0

OTHER BOREHOLES

Hydrogeological Department boreholes: 185/53, 185/198

Other IGS registered boreholes: SP 57 SW 1; SP 75 NW 6; and SP 75 NW 4; motorway boreholes MI - 310, 312, 330, 334, 340.

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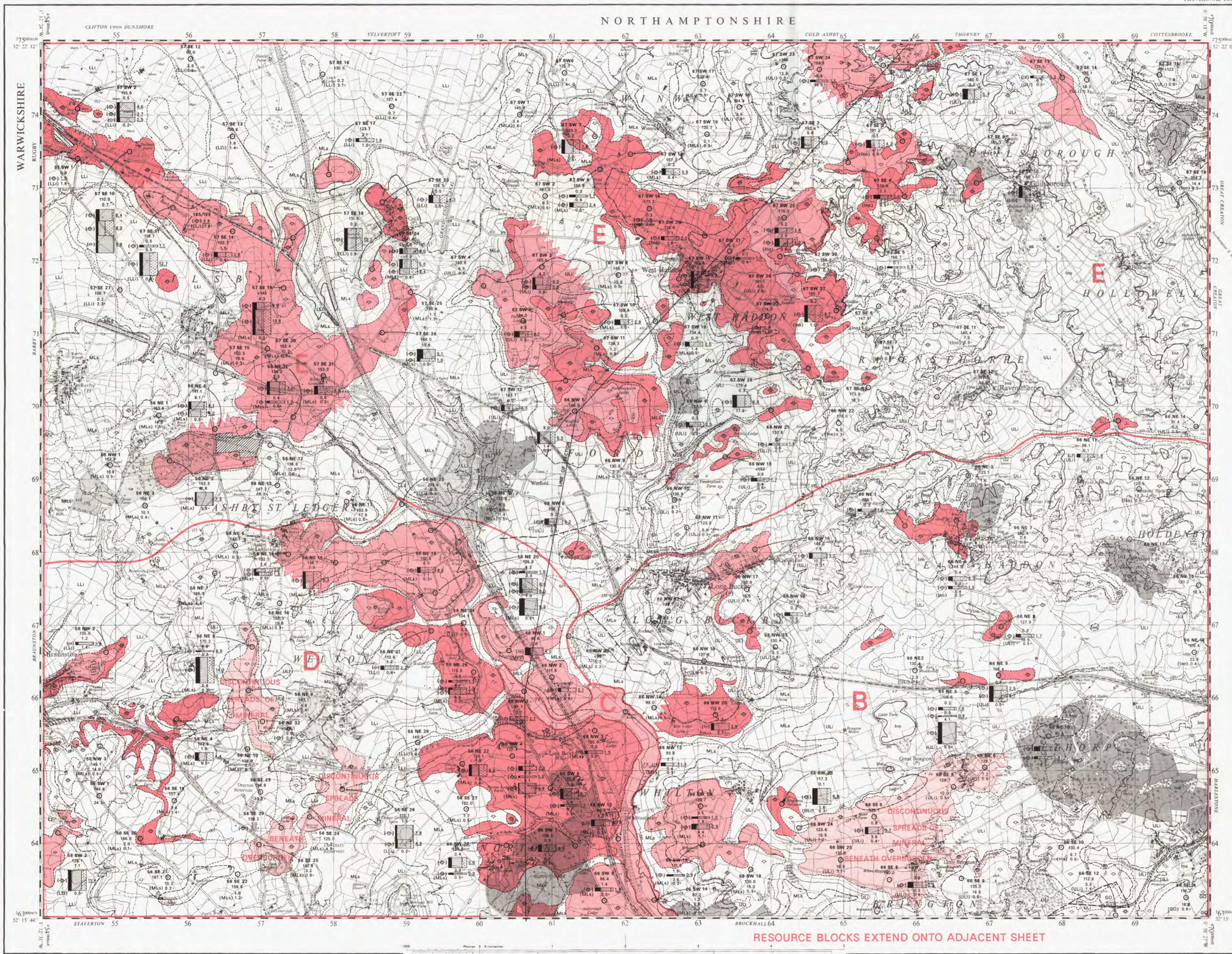
THE SAND AND GRAVEL RESOURCES BETWEEN RUGBY AND NORTHAMPTON - SHEET 1 (NORTH)

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

ORDNANCE SURVEY
PARTS OF SHEETS SP56,57,66, & 67
PROVISIONAL EDITION

107 (SHEET 1)

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



EXPLANATION OF SYMBOLS AND ABBREVIATIONS
(FOR SHEETS 1 AND 2)

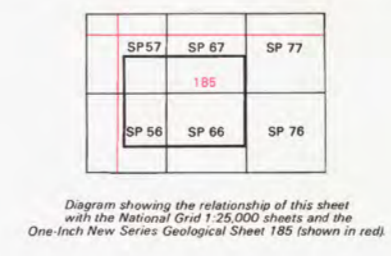
- DRIFT**
- Alluvium - soft silty clays, locally sandy and peaty. **A-65**
 - River Terrace Deposits - sand and gravel comprising quartz-rich sands, and gravels of flint, vein-quartz, quartzite, ironstone and limestone.
 - Head - clayey sand and gravel derived by solifluction from adjacent Solid and Drift deposits.
 - Glacial Lake Deposits - laminated clays and silty clays occupying a deep Drift-filled channel.
 - Boulder Clay - firm bluish grey silty clay containing pebbles of chalk and flint, and firm reddish brown clay containing quartzite pebbles.
 - Glacial Sand and Gravel - poorly sorted sand and gravel containing pebbles of chalk, flint, quartzite, limestone and ironstone.
 - Milton Sand (Fluvioglacial Gravel) - quartz-rich sands containing pebble beds of locally derived ironstone and limestone.
- SOLID**
- Great Oolite Series - a sequence of green and grey silts, sands and clays with interbedded limestone (Great Oolite or Blithworth Limestone) in upper part.
 - Inferior Oolite Series - predominantly ferruginous sandstone (Northampton Sand) but including clays, sands and limestones.
 - Upper Lias - firm bluish grey clay with beds of limestone.
 - Middle Lias - a sequence of grey silty clays, overlain by a shelly limestone (the Marlstone Rock Bed).
 - Lower Lias - firm bluish grey clay with beds of limestone.
- Made Ground** **MG-2**
- Areas of worked-out sand and gravel** **W0-13**
- BOUNDARY LINES**
- Geological boundary, Drift
 - Geological boundary, Solid (broken line denotes uncertainty)
 - Fault, crossmark indicates downthrow side
 - Inferred boundary of buried Drift-filled channel
 - 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: 66 SW 6
Surface level in metres above O.D. (Newlyn): 122.8
- Borehole Site: 66 SW 6
Overburden: 0.3
Mineral (sand and gravel): 1.7
Waste: 0.1
Bedrock: 0.5
- Geological Classification: (M.L.) 0.5
- Thicknesses in metres
- Notes:**
- (i) Figures underlined denote thickness 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. 66 SW 6, the first four characters refer to the quarter sheet and the figures following to the I.G.S. serial number for the borehole within that quarter. The unique designation for borehole 66 SW 6 is SP 66 SW 6.
- Grading Diagrams**
- Each grading diagram shows the mean particle size distribution of a distinct deposit of mineral.
- Sand (+1/16 - 4mm)
- Fine Gravel (-1/16 mm) (+4 mm)
- The height of the diagram is proportional to the mineral thickness
The width of the divisions shows the proportions of Fines, Sand and Gravel.
- 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, except for records in the Hydrogeological Department, for example 185-198 signifies Hydrogeological Department borehole 188 on New Series One-Inch Geological Sheet 185.
- CATEGORIES OF DEPOSITS**
- Exposed mineral, assessed. **CAT-E2**
 - Continuous or almost continuous spreads of mineral beneath overburden. **CAT-C1**
 - Discontinuous spreads of mineral beneath overburden. **CAT-D1**
 - Sand and gravel either not potentially workable (see Report) or absent. **CAT-A2**
 - Sand and gravel not assessed. **CAT-N1**
- RESOURCE BLOCKS**
- For assessment purposes the mineral-bearing land is divided into Resource Blocks (see Report). Each is designated by a letter of the alphabet.
- Detailed records may be consulted on application to: Head, Industrial Minerals Assessment Unit, Institute of Geological Sciences, Keyworth, Nottingham NG12 5GG.
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Minor revision by G. Horton in 1975, and by K. Ambrose, J. Brewster and M.G. Sumbler in 1977-1979.
A.W. Woodland C.B.E., Director
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1:25,000 Sand and Gravel Resource Sheet published in 1982
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The GRID Lines on this sheet are at 1 Kilometre intervals.
Heights are in feet above Mean Sea Level at Newlyn.

Compiled from 6" sheets last fully revised 1999-1998.
Other partial systematic revisions 1988-90 have been incorporated. Major roads revised 1963-72.

I figure inch on this map represents 0.625 inches on the ground.
Data quoted for an individual borehole refer strictly to that site; reliable conclusions cannot be drawn about the thickness and grading elsewhere in the blocks, particularly in material so 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.



See SHEET 1 FOR KEY
107 (SHEET 2)

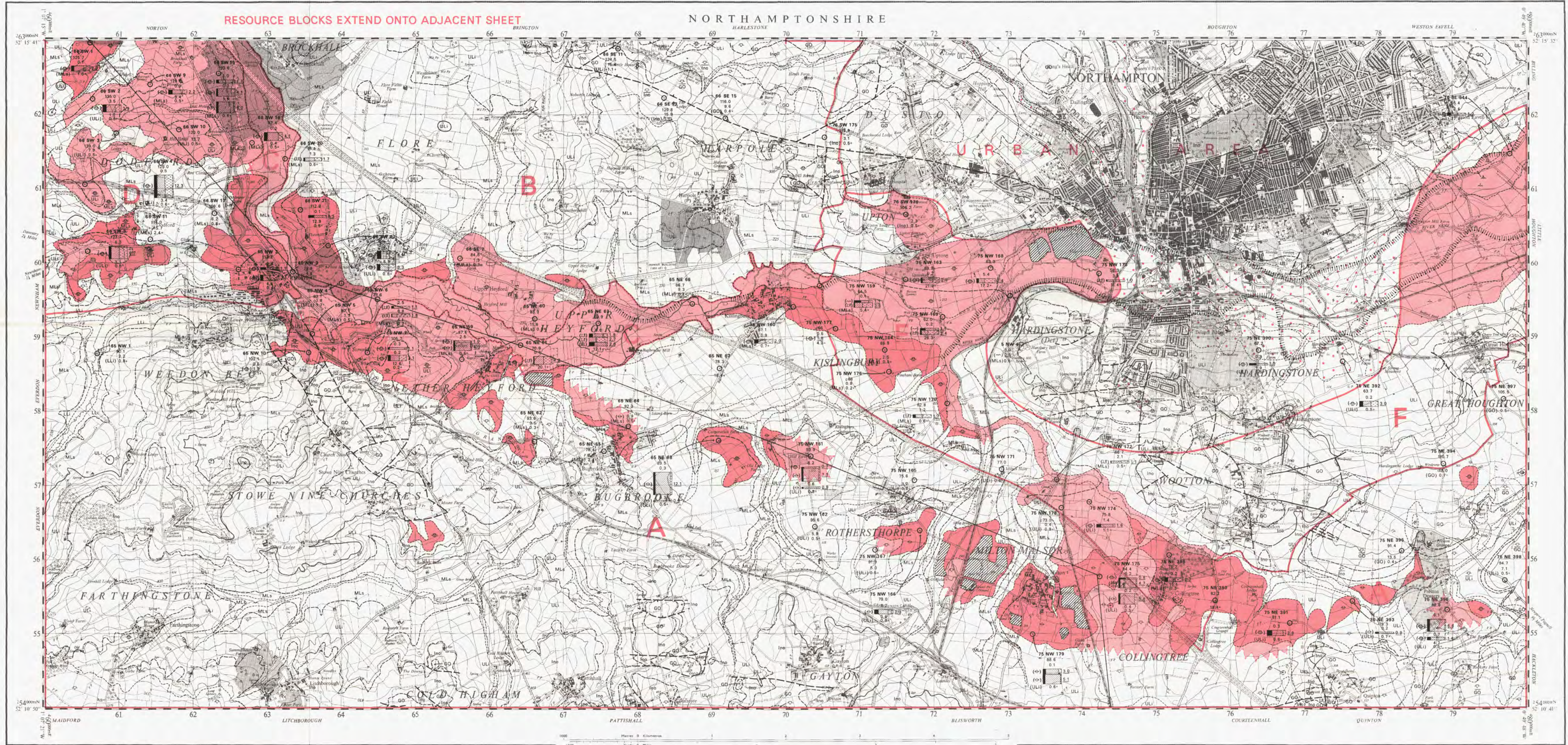
INSTITUTE OF GEOLOGICAL SCIENCES
INDUSTRIAL MINERALS ASSESSMENT UNIT

THE SAND AND GRAVEL RESOURCES BETWEEN RUGBY AND NORTHAMPTON - SHEET 2 (SOUTH)

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

ORDNANCE SURVEY
PARTS OF SHEETS SP 65,66,75 & 76
PROVISIONAL EDITION

107
(SHEET 2)
SEE
SHEET 1
FOR
KEY



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

The GRID Lines on this sheet are at 1 Kilometre interval.
Heights are in feet above Mean Sea Level at London.
Contours shown are in feet.
1 square inch on this map represents
62.5 square acres on the ground.

Compiled from 6" sheets last fully revised 1899-1938.
Other partial systematic revisions 1937-50 has been incorporated.
Major roads revised 1964-69.

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 so 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.

EXPLANATION OF SYMBOLS AND ABBREVIATIONS
(see SHEET 1)

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

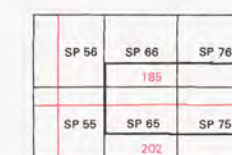


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