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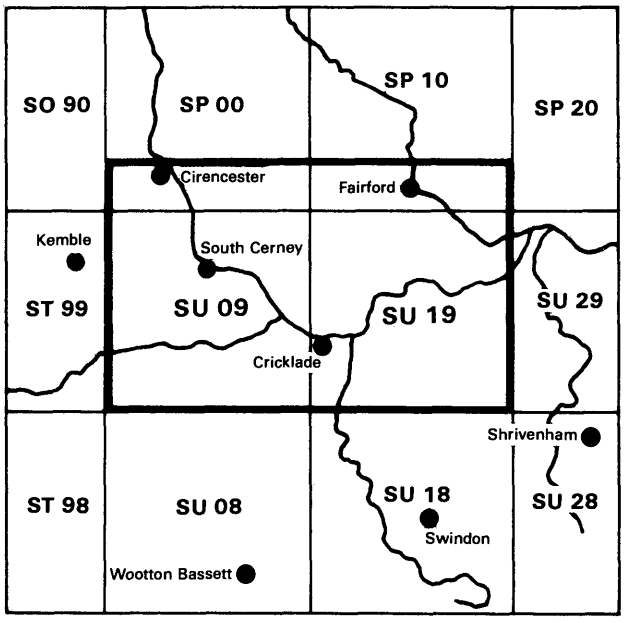
Natural Environment Research Council

Mineral Assessment Report 18



The sand and gravel resources of the Thames Valley, the country around Cricklade, Wiltshire

Description of 1:25 000 resource sheets SU 09/19 and parts of SP 00/10

P. Robson, BA

London Her Majesty's Stationery Office 1975

The Institute of Geological Sciences was formed by the incorporation of the Geological Survey of Great Britain and the Museum of Practical Geology with Overseas Geological Surveys and is a constituent body of the Natural Environment Research Council.

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 onward will appear in the Mineral Assessment Report Series 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 aggregate are available. Following a short feasibility project, initiated in 1966 by the Ministry of Land and Natural Resources, 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 220 km^2 of country around Cricklade, shown on the accompanying resource map. The survey was conducted in 1971 by Dr H. C. Squirrell assisted by Mr P. Robson who supervised the drilling and sampling programme, and Mr J. A. Gray who collated other borehole records. The work is based on geological surveys by members of the Institute's field staff. The original survey on the one-inch scale by E. Hull, was published in 1857-59 on Old Series Sheet 34. The northern margin was resurveyed on the six-inch scale by H. G. Dines in 1931 and published on the Cirencester (235) Sheet. The remainder was resurveyed at the six-inch scale by R. G. Thurrell, R. A. Bazley, E. C. Freshney, P. E. Harding and M. Williams (Upper Thames gravel area) in 1961-1962, and was revised by B. Kelk, E. G. Poole and P. Toghill in 1966-1970 to be published shortly on the Swindon (252) Sheet. Dr Kelk, Dr Thurrell and Mr Poole helped in the geological interpretation.

Mr J. W. Gardner, CBE, (Land Agent) was responsible for negotiating access to land for drilling. The ready cooperation of land owners, tenants, and gravel companies in this work, and the assistance of Gloucestershire County Council, Wiltshire County Council, and Cirencester Urban District Council is gratefully acknowledged.

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The geological maps of the Institute of Geological Sciences, pre-existing borehole information, and 52 boreholes drilled for the Mineral Assessment Unit form the basis of the assessment of sand and gravel resources in the Thames Valley near Cricklade, on the borders of Wiltshire and Gloucestershire.

All deposits in the area which 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 confidence level.

The 1:25 000 map is divided into eight resource blocks containing between 4.7 and 16.7 km^2 of sand and gravel. For the blocks assessed statistically the geology of the deposits is described and the mineral-bearing area, the mean thickness of overburden and mineral, and the mean grading of the mineral are stated. Detailed borehole data are given. The geology, the position of the boreholes and the outlines of the resource blocks are shown on the accompanying map.

Sommaire

Les sources des renseignements qui constituent les bases de l'évaluation des ressources en sable et en gravier dans la vallée de la Tamise près de Cricklade, sur les marges de Wiltshire et de Gloucestershire, comprennent les cartes géologiques de l'Institute of Geological Sciences, des données obtenues des trous de sonde déjà en existence, et de 52 trous de sonde forés pour le Mineral Assessment Unit.

Dans la région tous les dépôts qui pourraient être exploités pour le sable et le gravier ont été étudiés et on s'est servi d'une méthode statistique simple pour en évaluer le volume. Les évaluations de volume sont tenues d'être symétriquement à 95 pour cent exactes.

La carte 1:25 000 est divisée en huit blocs de ressource avec d'entre 4.7 à 16.7 km^2 de sable et de gravier. Pour les blocs évalués statistiquement on décrit la géologie des dépôts et on donne l'étendue du terrain minéralisé, l'épaisseur moyenne de recouvrement et de minéral, et le triage moyen de minéral. On présente des données détaillées des trous de sonde. La situation des trous de sonde, la géologie et les profils des blocs de ressource sont montrés sur la carte.

Zusammenfassung

Die geologischen Karten vom Institute of Geological Sciences, vorherexistierende Information über Bohrlöcher, und 52 für die Mineral Assessment Unit gebohrten Bohrlöcher, bilden den Grund für die Einschätzung der Sand- und Schottermittel im Thames Valley bei Cricklade an den Grenzen von Wiltshire und Gloucestershire.

Alle Ablagerungen im Gebiet, die möglich bearbeitbar für Sand und Schotter sind, wurden untersucht, und eine einfache statistische Methode wurde benutzt, um das Volumen zu schätzen. Man gibt die Zuverlässigkeit der Volumenschatzungen mit symmetrischen 95 Prozent Vertrauensgrenzen.

Man teilt die 1:25 000 Karte in 8 Mittelsblöcke, die zwischen 4.7 und 16.7 km^2 von Sand und Schotter umfassen. Man beschreibt die Geologie der Ablagerungen für die statistisch bewerteten Blöcke. Das mineralhaltige Gebiet, die mittlere Dicke von Überlastung und Mineral, und die mittlere Klassifizierung von Mineral werden bestimmt Ausführliche Bohrlöcherdaten werden auch gegeben. Die Geologie, die Lage der Bohrlöcher und die Skizzen der Blöcke werden auf der Begleitkarte gezeigt.

The sand and gravel resources of the Thames Valley, the country around Cricklade, Wiltshire

Description of 1:25 000 resource sheets SU 09/19 and parts of SP 00/10

P. Robson[1], BA

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, both the economic and the social factors used to decide whether a deposit may be workable in the future cannot 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).

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 geological evidence. The sites available for inspection, measurement, and sampling are too widely spaced to permit the mineral bodies to be outlined completely or the grade established throughout" (Anon., 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. 200 mesh BS sieve, about 1/16 mm) should not exceed 40 per cent.
d. The deposit must 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.

If a deposit of sand and gravel broadly meets these criteria, it 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.

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 has been adopted. The boundaries between fines (that is, the clay and silt fractions) and sand, and between sand and gravel grade material, are placed at 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 km^2 of sand and gravel. No account is taken of any factors, for example, roads, villages and 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 the mineral in parts of a block, except in the immediate vicinity of the sample points.

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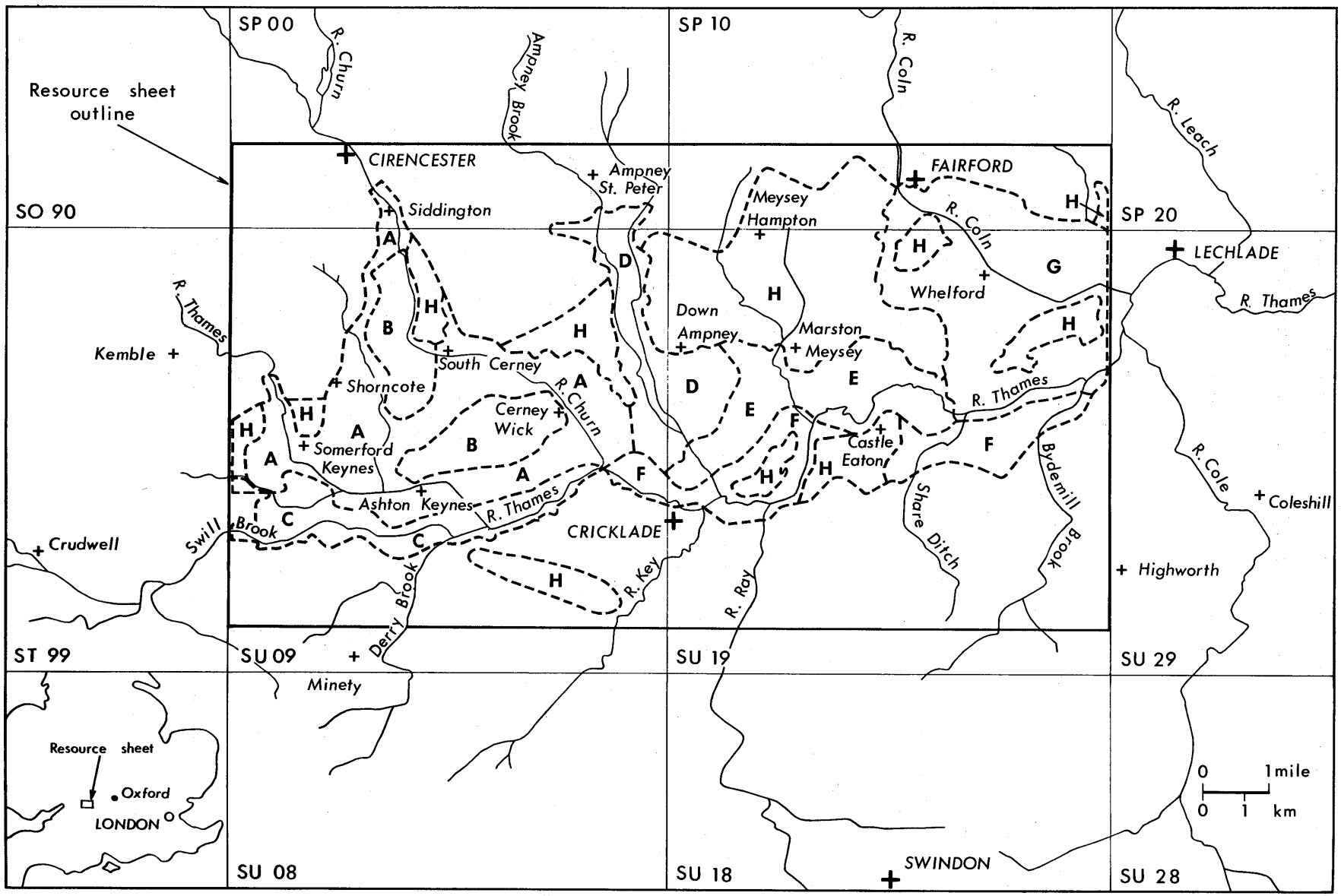


Fig. 1. Sketch map showing the location of the resource sheet and the position of the resource block boundaries

Description of the Resource Sheet

GENERAL

The resource sheet covers an area of 220 km^2 of which 36 per cent (80 km^2) is gravel-bearing. It is situated at the western end of the Thames Valley in the counties of Gloucestershire and Wiltshire between the Cotswolds to the north and the Lambourne Downs to the south (Figs. 1 and 2). The chief towns are Cirencester in the north-west, Fairford in the north-east and Cricklade in the south. The gravel-bearing deposits occupy a broad tract extending across the centre of the area (the map and Fig. 4) mostly on the low ground bordering the Thames, in the northern tributary valleys and as remnant patches, mainly in the north. Agriculture, both arable and pasture and gravel extraction are the chief sources of employment, centred on villages scattered the length of the Thames Valley. Local industries manufacturing concrete blocks and artificial stone are established at Ashton Keynes and South Cerney.

TOPOGRAPHY

The dominant feature is the valley of the Thames which crosses the area from west-south-west to east-north-east. The ground flanking the valley rises to over 137 m (450 ft) in the north-west and to over 122 m (400 ft) in the south-east. The ground is fairly hilly in the west about the head waters of the Thames and to the north and south but towards the centre of the area the slopes are gentle. The source of the Thames lies just below 107 m (350 ft) near Kemble and the river enters the floodplain at about 91 m (300 ft) near Somerford Keynes. It then follows an irregular course of some 20 km (12 miles), falling to just below 76 m (250 ft) in the east. The principal tributaries are the Churn and Coln which enter from the north and the Ray from the south.

GEOLOGY

Only Middle to Upper Jurassic rocks outcrop in the area of the resource sheet, but older rocks (Lower to Middle Jurassic) occur on the Cotswolds to the north-west, and younger rocks (Cretaceous to Eocene) in the Swindon area and Lambourn Downs to the south-east. All of these have contributed detrital material to the superficial deposits laid down in the Thames Valley (Fig. 2 and Table 1).

The solid rocks in the western part dip gently (3° to 5°) to the south-east and those in the east dip gently to the south-south-east. They undulate locally and are fractured by normal faults trending generally north-west to south-east (Fig. 3). Erosion by streams along the strike and into the dip of the relatively soft Kellaways Beds and Oxford Clay brought about the formation of the Thames Valley during the Quaternary and possibly earlier. The more resistant limestones of the Athelstan Oolite, Great Oolite, Forest Marble and Cornbrash were left as high ground on the dip slopes in the north-west, and the Corallian Beds formed an escarpment to the south-east. The northern flank of the valley was dissected by streams flowing from the north-west particularly along lines of faulting, for example, the Churn. The Corallian Beds capping the scarp to the south-east have retreated successively farther south as a result of the lateral migration of the Thames assisted by erosion by local streams.

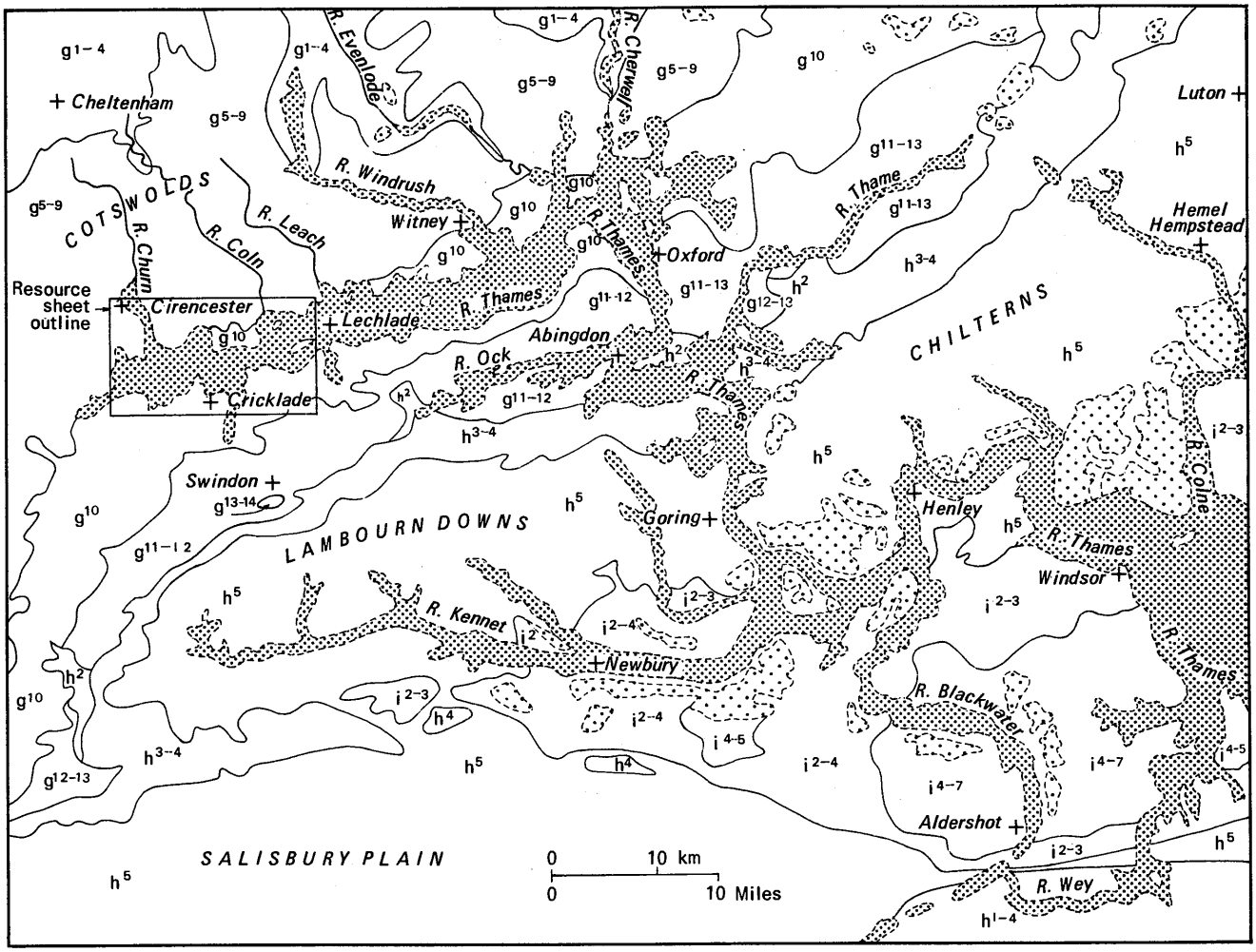
During the Pleistocene, glaciers from the west, north and east converged on the Midland Plain and periodically advanced further south. In the earliest recorded advance, ice crossed or skirted the Cotswolds escarpment and spread a thin veneer of boulder clay over the southern flank. All that remain of this deposit today are erratics including Bunter quartzite, quartz and flint which are found in the soil of the high ground or in reddish-brown clay infilling fissures in the limestone bedrock. The abundance of pebbles of northern derivation has given rise to the term 'Northern Drift' for these deposits (see Dines, 1928; 1933). The patch of undifferentiated glacial drift (a term embracing a wide range of deposits and ages) which occurs south of Cricklade is of uncertain origin.

During later glacial advances the ice either failed to surmount the high south-western ridge of the Cotswolds or did not reach the escarpment. The Thames terraces were laid down during this period in periglacial (tundra) conditions south of the main ice sheet. The terrace gravels are composed chiefly of pebbles of local oolitic limestones with some erratics reworked from the Northern Drift. Rock debris is believed to have accumulated on the hillsides in winter by freeze-thaw action (nivation) on the local bedrock and formed solifluction flows on the frozen subsoil in spring and early summer. During the seasonal thaws the tributary streams, vastly swollen by snow melt, are thought to have become torrents capable of sweeping the rock material down into the main valley, re-sorting and abrading it in the process, and laying it down finally as gravel spreads on the Thames valley floor (for a discussion of this regime in

Table 1. Strata outcropping in the resource sheet area.

DRIFT	Approximate thickness m	Major lithologies
PLEISTOCENE AND RECENT		
Alluvium	up to 1.5	Silt and clay with peat layers
First Terrace (Northmoor)	" " 8.3	Sandy gravel, local silt layers
Second Terrace (Summertown-Radley)	" " 5.4	" " " " "
Third Terrace (Wolvercote)	" " 4.5	" " " " "
Fourth Terrace (Hanborough)	" " 4.8	" " " " "
Head	variable	Pebbly clay (periglacial solifluction material)
Glacial drift, undifferentiated	variable	Pebbly silty clay
SOLID		
UPPER JURASSIC		
Corallian Beds	37	Sands, silts, oolitic and coralline limestones, & clays
Oxford Clay	104	Silty clay
Kellaways Beds	9-21	Silty clays, with impersistent calcareous sandstone
MIDDLE JURASSIC		
Cornbrash (partly Upper Jurassic in age)	4	Rubbly, very shelly oolitic limestone, with clay
Forest Marble	27	Clays and limestones
Great Oolite *	0-4	Oolitic limestone
Athelstan Oolite *	18	Oolitic limestone

* As the Athelstan Oolite and Great Oolite occupy only a small part of the north-west of the map area, the usage on the adjoining Malmesbury (251) geological sheet has been followed. The Athelstan Oolite and Great Oolite are there regarded as formations within the Great Oolite Series of Arkell.



DRIFT

Valley gravels and alluvium of the Thames and its tributaries

High level gravels

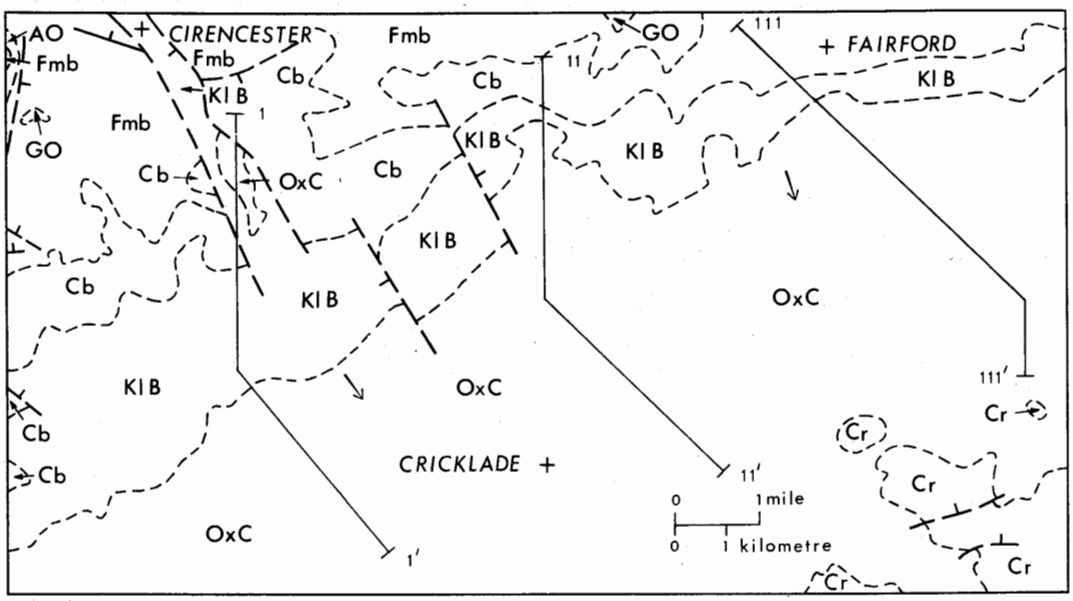
SOLID

i :	EOCENE	h :	CRETACEOUS	g :	JURASSIC
					UPPER
i^{6-7}	Barton Beds	h^5	Chalk	g^{14}	Purbeck Beds *
i^5	Bracklesham Beds	h^{3-4}	Upper Greensand and Gault	g^{13}	Portland Beds
i^4	Bagshot Beds	h^2	Lower Greensand	g^{12}	Kimmeridge Clay
i^3	London Clay	h^1	Weald Clay	g^{11}	Corallian
i^2	Woolwich and Reading Beds			g^{10}	Oxford Clay with Kellaways Beds
					MIDDLE
				g^9	Cornbrash**
				g^{6-8}	Great Oolite Series
				g^5	Inferior Oolite Series
					LOWER
				g^{3-4}	Upper Lias
				g^2	Middle Lias
				g^1	Lower Lias

* Upper part of Purbeck Beds is strictly Cretaceous on faunal evidence

** Upper Cornbrash is Upper Jurassic, the Lower Cornbrash is Middle Jurassic

Fig. 2. Sketch map of the regional geological setting of the resource sheet in the Thames Valley



KEY

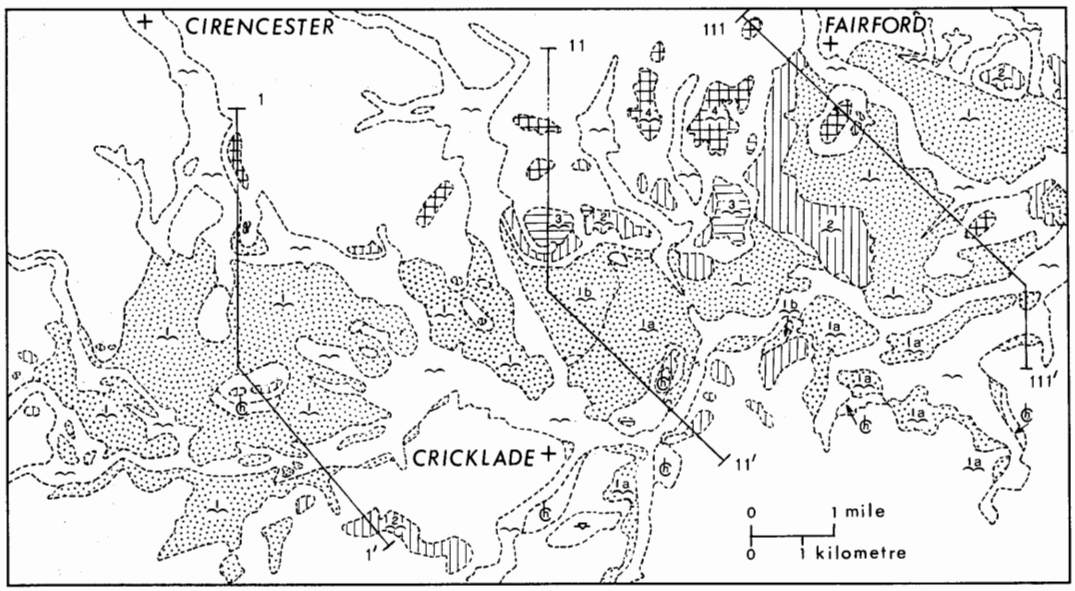
Solid boundary — Fault with downthrow → Direction of dip

Cr Corallian Beds | OxC Oxford Clay | KlB Kellaways Beds | Cb Cornbrash

Fmb Forest Marble | GO Great Oolite | AO Athelstan Oolite

1—1′ 11—11′ 111—111′ lines of section shown on Fig. 5

Fig. 3. Solid geology and structure of the resource sheet



KEY

Drift boundary

Alluvium | First Terrace, in places subdivided into 1A and 1B | Second Terrace

Third Terrace | Fourth Terrace | Head | Glacial drift, undifferentiated

1—1′ 11—11′ 111—111′ lines of section shown on Fig. 5

Fig. 4. Drift geology of the resource sheet

the Cotswolds, see Beckinsale and Smith, 1955, Beckinsale, 1970).

As the result of downcutting and the southerly migration of the Thames between the phases of terrace deposition, the older terrace deposits were left as remnants of terraces (Figs. 4 and 5) at various levels on the valley sides marking earlier courses of the floodplain, and the more recent terrace deposits were laid down generally farther to the south at successively lower levels. The four terraces recognised in the Upper Thames Valley are named after villages near Oxford and Abingdon where each was first described in detail. The Hanborough or Fourth Terrace is the highest and oldest and lies some 30 m (100 ft) above the Thames, the Wolvercote or Third Terrace lies at about 13 m (43 ft), the Summertown-Radley or Second Terrace at about 9 m (30 ft) (although in places it falls to the level of the floodplain) and the Northmoor or First Terrace (sometimes known as the Flood Plain Terrace) lies on the valley floor. In places, (for example at 1100 9566), the First Terrace has a bench on its upper surface (denoted by Terraces 1A and 1B on the map) which is believed to be an erosional feature, but may at some localities represent two separate phases of deposition. Beneath the floodplain, buried channels related to the First Terrace (and some near the northern margin possibly related to the Second Terrace) have been recognised around Ashton Keynes and Whelford.

SOLID

Descriptions of the solid formations are given to show the rock-types from which the bulk of the terrace gravels was derived.

Athelstan Oolite

The Athelstan Oolite is a cream or white limestone which may be shell fragmental, current bedded, and massive. It occurs only in the extreme north-west [002 012] where it forms a narrow outcrop along the western upthrow side of a normal fault.

Great Oolite

The Great Oolite is a white or greyish-cream oolitic limestone with, in places, dark grey oolites, shell fragments, calcite veins, and burrows infilled with calcite mudstone; it is locally finely sandy. The formation outcrops at only three places, [020 016], [001 005], and [114 019], on the high ground on the north-western side of the Thames valley.

Forest Marble

The base of the Forest Marble is marked by a whitish-grey and cream oolitic limestone some 12 m (40 ft) thick upon which rest up to 15 m (50 ft) of pale greenish-grey mudstones with thin, grey, sandy and shelly locally oolitic limestones and thin, grey, fine grained, micaceous and argillaceous calcareous sandstones. The formation outcrops in a belt across the higher and middle slopes of the northern flank of the Thames Valley.

Cornbrash

Two subdivisions of the Cornbrash are recognised, a lower consisting of pale grey, very shelly oolitic limestones with subordinate grey, silty mudstones and whitish grey, very shelly, nodular, generally non-oolitic limestones; and an upper consisting of thinly interbedded grey, partly shelly, argillaceous limestones and grey, silty, sandy, mudstones. The formation is named after its brashy rubbly soils well suited to arable farming. It outcrops mostly in a belt across the middle of the northern flank of the valley, but a few faulted inliers occur to the south along the western margin of the sheet.

Kellaways Beds

The Kellaways Beds consist of silty, micaceous, grey and bluish grey mudstones, weathering brown, with an impersistent 1.8 m (6 ft) grey calcareous sandstone in the upper part, which weathers to a reddish brown sand. The beds pass upwards into the base of the overlying Oxford Clay and the boundary between the two is in places obscure. The beds lie concealed beneath the drift deposits of the Thames Valley floor in the western part of the area, and occur as a down-faulted block beneath the drift in the valley of the Churn. On the floodplain in the west, small low hills of Kellaways Beds protrude through the drift deposits, but in the east the beds outcrop on the lower and middle slopes of the northern Thames Valley side.

Oxford Clay

The Oxford Clay is often shelly and locally dark brown in the lower part, but more usually consists of grey or bluish grey clay which weathers brown. Selenite crystals are common in the zone of weathering and pyrite fills burrows. Thin limestone bands and concretions ('race') are developed locally. The formation is concealed beneath the drift deposits of the Thames Valley in the west but outcrops on the lower slopes of the northern valley side in the east and over most of the area south of the Thames.

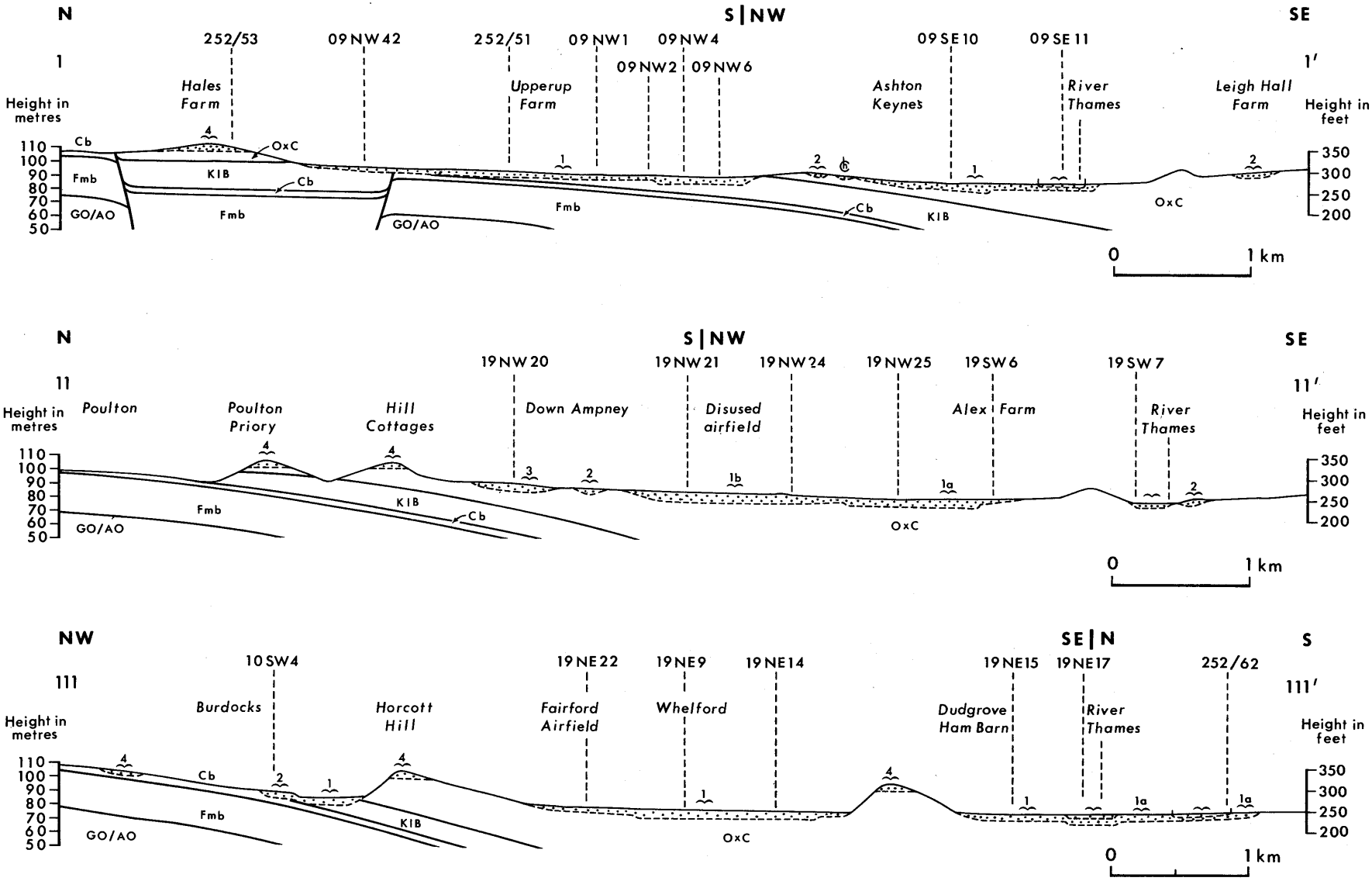


Fig. 5. Diagrammatic sections showing the general relations of the strata in the area (along the lines I-I', II-II', III-III' on Figs. 3 and 4)

Corallian Beds

The Corallian Beds consist of interbedded oolitic and coralline limestones, sand, silts and clays. The beds outcrop only in the south-east where they form a prominent scarp. A down-faulted block of the Corallian Beds extends north-westwards from the scarp, and an outlier caps Lus Hill [161 939].

DRIFT

Glacial Deposit, Undifferentiated

This occurs only at Headlands Farm [108 920] near Cricklade on the southern flank of the Thames valley between the tributary rivers Key and Ray. It is believed to be the oldest Pleistocene deposit in the area, but its mode of origin is uncertain. At Headlands Farm it consists of unbedded, orange-brown silty, slightly sandy clay containing subangular flint pebbles and well rounded small quartz pebbles.

Head

Head is a structureless silty clay derived as solifluction material, mainly from the Kellaways Beds and Oxford Clay, contemporaneous with the terraces. In places the Head deposits are pebbly and may have been derived from formerly extensive spreads of undifferentiated Glacial Drift. Head occurs at only a few localities, on the flank of the low hill at Ashton Keynes, on the low hill at Eysey, and as patches in the valleys of the southern tributaries, the Key, the Ray and Bydemill Brook.

Terrace Deposits

The First, Second, Third and Fourth Terrace deposits are Pleistocene in age and are roughly similar in composition and grading, consisting mainly of sandy oolitic limestone gravels containing varying proportions of other rocks including quartzite, quartz, flint, and ironstone. Although clean potentially workable sand and gravel rests directly on bedrock in some places, particularly where it is a hard limestone, it is more usual for the lower 0.2 to 0.9 m (1 to 3 ft) of the terrace deposits to consist of silty, sandy, pebbly clay derived by reworking of the upper surface of the solid rocks beneath. Cobbles of limestone, quartzite and flint generally occur near the base, and to a lesser extent scattered throughout. Silt layers, up to 0.3 m (1 ft) thick may also occur in the gravels, particularly in the First Terrace. The soil can be quite deep, up to 1.2 m (4 ft) on the older, Fourth and Third Terraces, where it usually consists of reddish brown stiff, silty, sandy clay often containing quartzite, quartz and flint pebbles; this probably represents an original silty alluvium but may be partly the weathering product of limestone gravel, the carbonate fraction having been leached out leaving mainly clay and siliceous pebbles. On the younger, Second and First Terraces, the soil is generally of a more dull brown colour and contains, in addition to the siliceous pebbles, weathered limestone pebbles, the latter being more numerous in the youngest, First Terrace.

The remnants of the Fourth Terrace deposits lie chiefly in a loosely defined belt across the higher slopes of the northern side of the Thames Valley, but two patches remain in the valley, capping Horcott Hill [155 998] and on the hill at Dudgrove [183 978]. This terrace has a south-easterly inclination across the valley; it is generally about 2.4 m (8.0 ft) thick, but in places (Meysey Hampton [120 999], and Furzey Hill [135 996]) the deposits range up to 4.8 m (16 ft).

Remnants of the Third Terrace are concentrated chiefly on the middle slopes of the northern flank of the Thames Valley in the centre of the area, where they rest on a surface that is inclined to the south, except at two places, Down Ampney [102 973] (on the northern margin of the valley floor) and Eysey [116 941] (on the low hill near the southern edge of the floodplain) where the patches are at roughly the same height and the terraces possibly flat-lying. The remnants are generally about 3 m (10 ft) thick, but the two larger patches on the northern flank are up to 4.5 m (15 ft).

The remnants of the Second Terrace occur on both northern and southern lower slopes of the entire length of the main valley. They are localised about the lower reaches of the tributary valleys on the northern flank, but between these and on the southern flank they follow the west to east trend of the Thames valley floor. A few patches also remain on the sides of low hills on the floodplain. A notable exception to the general pattern is the large crescent-shaped remnant which extends across the valley from Burdocks [146004] to Kempsford [158970] which marks the site of a channel whereby gravels gained access to the main valley. The terrace remnants are either flat-lying, or inclined towards the Thames and are generally about 3.0 m (10 ft) thick, but the crescent-shaped remnant is thicker, up to 5.4 m (18 ft) in places.

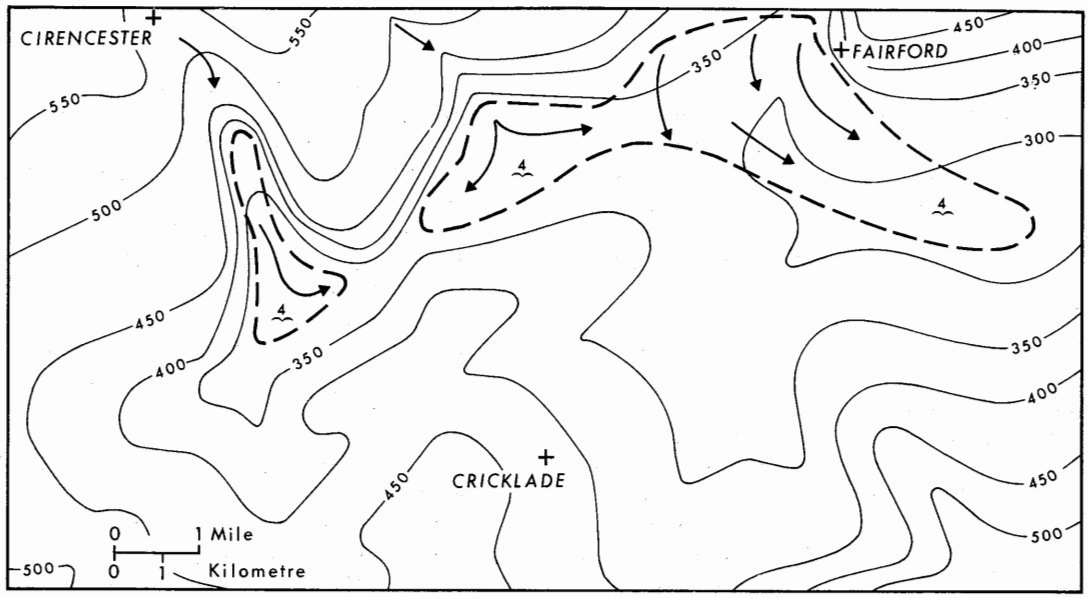


Fig. 6. Hypothetical reconstruction of the deposition of the Fourth Terrace

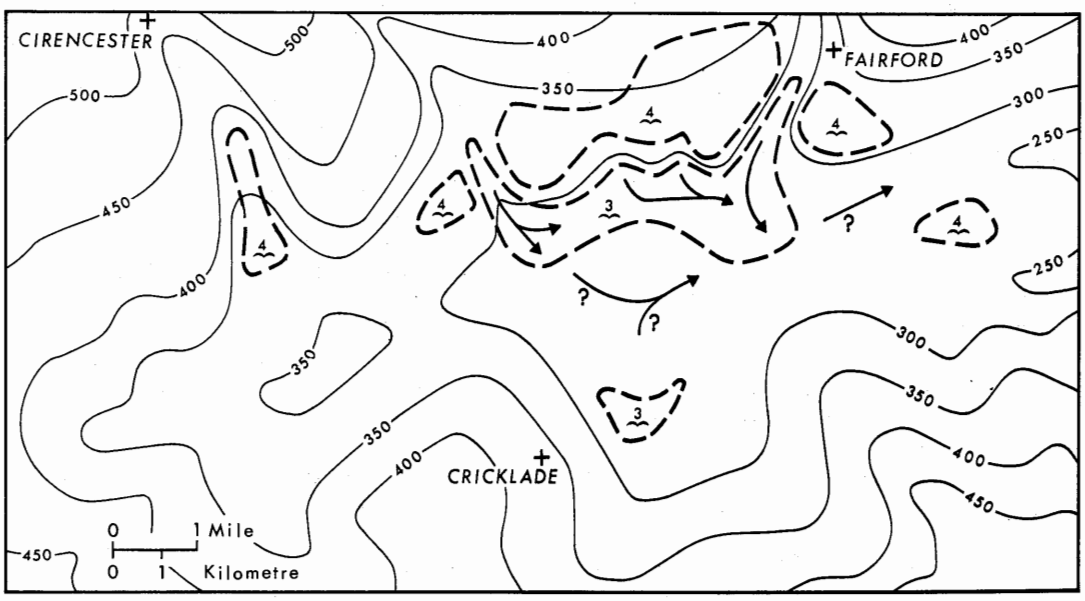


Fig. 7. Hypothetical reconstruction of the deposition of the Third Terrace

The First Terrace deposits extend down the floors of the major northern tributary valleys (the lower reaches of the Churn, the western flank of Ampney Brook, and the valleys either side of Horcott Hill); down most of the southern tributary valleys (Derry Brook, the Key, the Ray, Share Ditch and Bydemill Brook), and form a broad tract along the Thames floodplain. North of Cricklade the upper surface of the deposit is stepped, with Terrace 1B some 4 to 5 m (13 to 17 ft) higher than Terrace 1A. Terrace 1A is absent west of Cricklade but it occurs in the southern tributary valleys, the Key, the Ray, Share Ditch and Bydemill Brook. The terrace as a whole has an aggradation gradient of about 1:1600, to the east, along the main valley. The deposits are generally about 3 m (10 ft) thick, but in channels which may be $\frac{1}{2}$ to 1 km in width, thicknesses of up to 8.3 m (27 ft) occur.

Alluvium

The Alluvium consists of silt and clay with layers of peat and lenses of gravel, laid down by the present day Thames and its tributaries. It is generally of small lateral extent, but it is more extensive in the higher reaches of the Churn and Ampney Brook and adjacent to the Thames north and north-west of Cricklade. On the floodplain, Alluvium lies upon First Terrace deposits and may in places conceal buried Second Terrace deposits. The Alluvium ranges up to 1.5 m (5 ft) in thickness, generally being thickest along the banks of the streams and thinning towards the margins of the floodplain.

History

The distribution and morphology of the terrace deposits can be explained by a hypothetical reconstruction of the sequence of events. Interpretations of the relationships of the Pleistocene deposits in the Upper Thames are complicated by the patchy nature of the terrace remnants and the presence of buried channels of uncertain age. As a result, a consensus regarding the exact sequence of events has not yet emerged. Information concerning the deposits of the type area near Oxford have been collated by various authors including Sandford (1924), Arkell (1947), Sparks and West (1972), and Shotton (1973). The physiographic evolution of the Cotswolds and Upper Thames Basin is discussed by Dines (1928; 1933), Beckinsale (1970) and Kellaway and others (1971).

The following brief account extends a study begun in 1961 by members of the Southern England Field Staff of the Institute led by Dr R.G. Thurrell. The present interpretation is based on a revision of the field mapping by Dr B. Kelk, Mr E.G. Poole and Mr. P. Toghill in 1966 to 1970 and on Mineral Assessment Unit borehole information acquired during the course of this survey. The writer acknowledges valuable discussions concerning the geology with Dr Kelk, Dr Thurrell and Mr Poole.

As the Thames appears to be a 'misfit' stream too small to have laid down the considerable volume of gravel present in the terraces, its carrying-power must at times during the past have been greatly enhanced. Change in river regime caused by the periodic rejuvenation of tributary streams during the Pleistocene probably accounts for much of these deposits.

Fourth Terrace

It is not known whether the Thames as such was in existence in this area prior to the deposition of the Fourth Terrace, but it is likely that southerly flowing consequent streams drained into an easterly flowing river. The river (of unknown size) appears to have followed a course across the higher parts of the northern flank of the present valley, along the strike of the Oxford Clay bedrock. As the Fourth Terrace exists only as remnant patches its original form and extent is not known (Fig. 6) and consequently its mode of deposition is uncertain. The patches on the higher slopes of the northern flank appear to have a symmetrical distribution about the northern tributary valleys and the terrace has an original south-easterly inclination, which suggests derivation of material chiefly from the north. The base of the terrace has a relatively steep 1:200 south-easterly gradient on the northern flank but flattens out in the south-east with a gradient in that direction of 1:430 across the site of the present valley floor at Dudgrove. From this somewhat limited evidence a case might be made for glacial meltwater torrents entering the area via the northern tributary valleys and spreading gravel fans over a pre-existing river valley. An alternative hypothesis advocates deposition by normal fluvial processes over a considerable period of time by the lateral migration of a major eastward-flowing river, little evidence of which remains today. The Fourth Terrace deposits near Oxford are described in detail by Kellaway and others (1971) but the exact mode of deposition of the terrace in the higher reaches of the Upper Thames Valley including the area of this map is still unresolved.

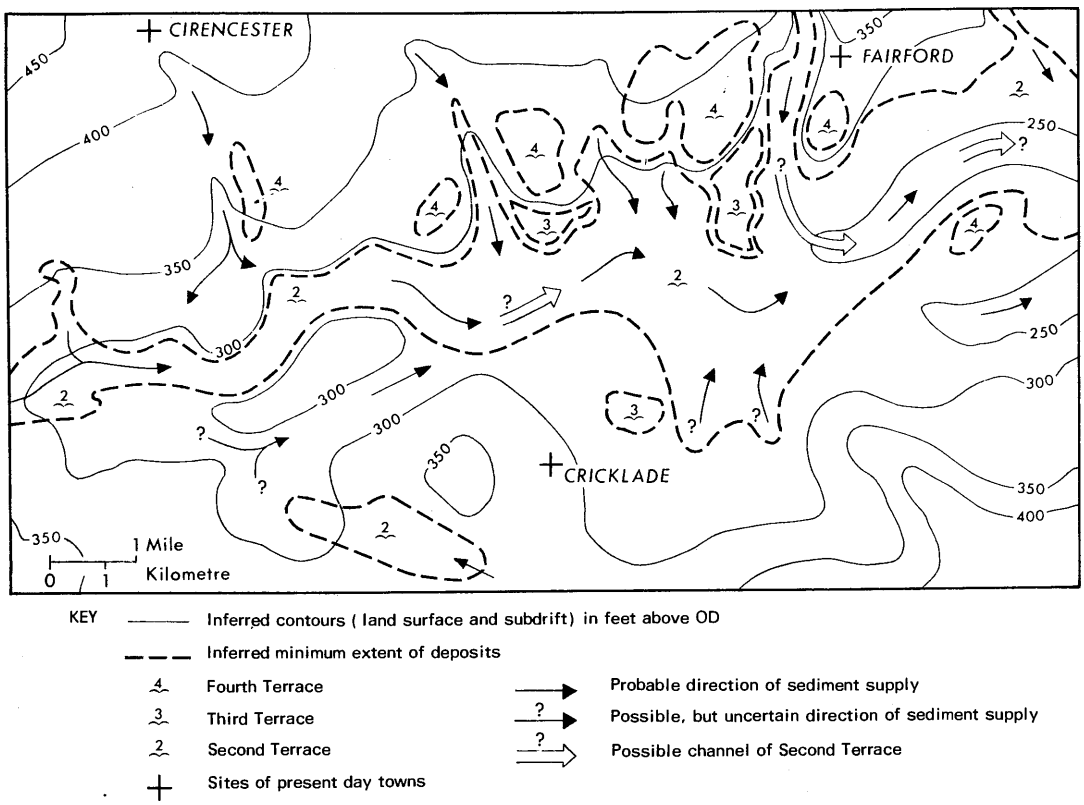


Fig. 8. Hypothetical reconstruction of the deposition of the Second Terrace

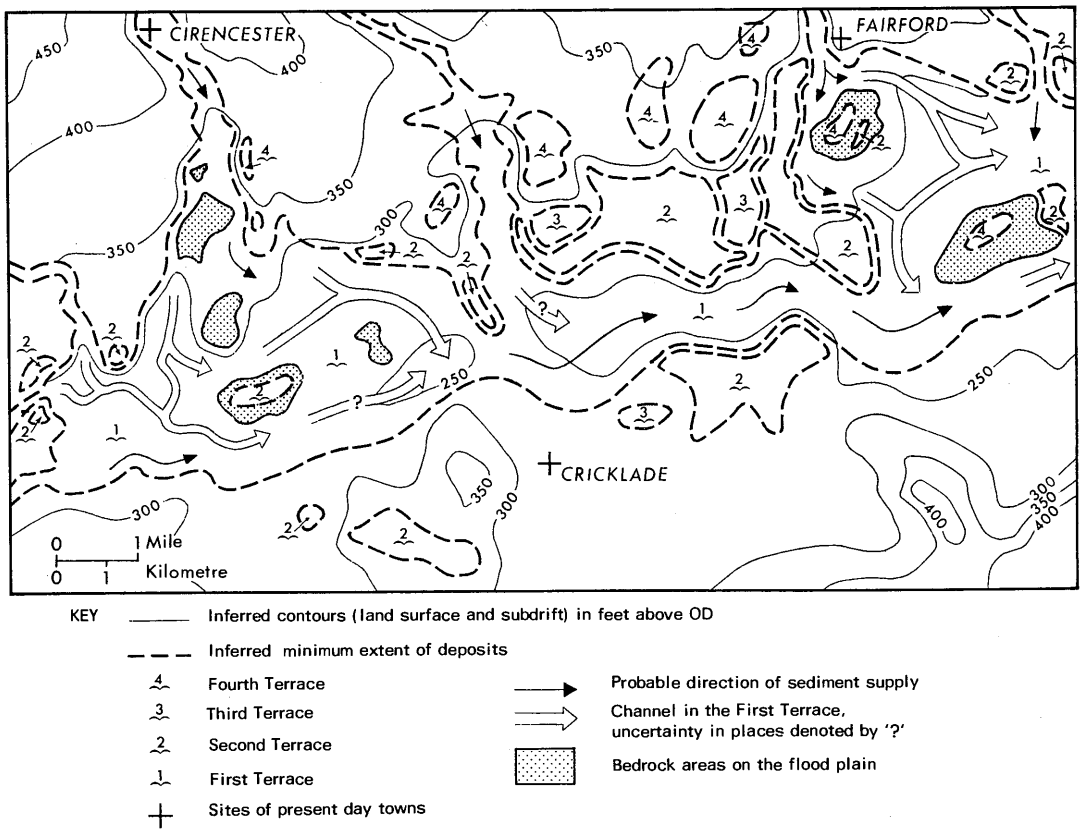


Fig. 9. Hypothetical reconstruction of the deposition of the main phase of the First Terrace

Third Terrace

Following the deposition of the Fourth Terrace the area was subjected to a long period of subaerial erosion during which the existing land surface, including the drift deposits, were much dissected. The Fourth Terrace was probably left as extensive patches on the spurs between the deepened tributary valleys, in some places (particularly on the northern flank), as much as 15 m (50 ft) above the newly lowered surface on which the gravels of the Third Terrace were laid down. The few surviving patches of the Third Terrace (Fig. 7) are localised in the centre of the area, chiefly on the middle slopes of the main valley between two northern tributaries. The base of the terrace on the northern flank is inclined steeply to the south with a gradient of 1:210, but across the position of the present valley it appears to have been flat-lying. These factors suggest that the Third Terrace was perhaps formed partly as fan-gravels by reworking of adjacent Fourth Terrace deposits, and partly by the influx of fresh material along rejuvenated tributary valleys (mostly from the north, with a little from the south) which fed a river on the Thames Valley floor.

There is no certain evidence that glacial meltwaters entered the area of the map during the deposition of the Third Terrace but further east the proximity of the ice front is shown by the presence of flint-rich gravels laid down by spillway torrents possibly from a large ice-damned lake on the northern side of the Cotswolds (the Lake Harrison of Shotton, (1953) which overflowed into the Evenlode and Cherwell (Bishop, 1958)).

Second Terrace

Before the Second Terrace was deposited the Third Terrace was dissected and patches of the Fourth Terrace further reduced in size by subaerial erosion. The deposits of the Second Terrace were laid down on a land surface which had been lowered by 3 to 4 m (10 to 13 ft) in some areas on the valley sides and floor. The distribution of the remnant patches of the Second Terrace (Fig. 8) indicates that a river of major proportions had been established along a course which lay slightly to the north of the present Thames. The river was fed chiefly by rejuvenated tributary streams from the north, but from the evidence of flinty spreads near Leigh and Minety some material was also supplied from the south (possibly from formerly extensive spreads of undifferentiated Glacial Drift, or the Chalk escarpment). In places the Second Terrace falls to the level of the present Thames valley floor and it is possible that some of the buried channels near the northern margin of the floodplain might date from this time (see Sandford, 1965).

First Terrace

Prior to the deposition of the First Terrace parts of the land surface were further reduced in height by some 9.1 m (30 ft). The First Terrace deposits (Fig. 9) gained access to the floodplain chiefly via the pre-existing tributaries from the north, although some material continued to be supplied from the south, and were spread out along the Thames valley floor which had been extended to the south. The Second Terrace deposits on the valley sides were much dissected and some of those which existed on the valley floor are believed to have been buried by the influx of First Terrace deposits. Consequently the buried channels which now lie concealed beneath the floodplain cannot be attributed to either phase of deposition with any certainty, but it is more likely that those near the southern margin belong to the First Terrace. Examination of the pit sections of the floodplain, where these have been pumped dry to facilitate gravel extraction, reveals that the First Terrace deposits are flat-lying spreads of uniform sandy gravel which show wide shallow trough structures. Tabular cross-bedding appears to be absent and foreset beds are rare, but some pebble imbrication is apparent. Continuous sand layers are not common and are generally less than 0.1 m (0.5 ft) in thickness; sand lenses are few. The gravels may represent coalescing meander (point bar) deposits of a mature river system, but they are more likely to have been deposited as lag-gravels in braided channels which migrated across gently inclined alluvial fans at the mouths of the northern tributary valleys and extended out into, or spread over channels trending south-west to north-east along the Thames Valley floor. This could be explained by the change in velocity when gravel-bearing torrents left the relatively high energy zone of the steep confining tributary valleys and entered the low energy zone of the Thames floodplain. The deposits of the Upper Thames floodplain are discussed further by Sandford (1965).

COMPOSITION OF THE SAND AND GRAVEL DEPOSITS

The chief deposits of economic interest are in the four terraces, including parts of the First and possibly Second terraces concealed beneath Alluvium. The gravel

fraction consists of subrounded, platy and tabular, cream, buff and bluish-grey, sandy, shelly, oolitic limestones with subordinate amounts of subrounded, tabular, brown ironstone; a little subangular to subrounded, tabular to irregular flint; a little well rounded, ovoid, brown quartzite and white or colourless quartz; and a few worn shells and coral fragments. Cobbles of subangular to subrounded tabular limestone, well rounded, ovoid quartzite and subrounded, tabular flint also occur. Other rock types, recorded in small amounts by Sandford (1929), include igneous and metamorphic erratics. The sand fraction consists mainly of subrounded, oolitic limestone grains and discrete ooliths with slightly lesser amounts of subangular, fine to well rounded, coarse quartz and some subrounded ironstone. Minor constituents include dark green glauconite with varying amounts of crinoid, coral, shell, echinoid and foraminiferal debris.

Most of the mineral in the terrace deposits is classified as gravel (Fig. 14), with size fractions (Table 5) commonly about gravel 50 per cent, sand 45 per cent and fines 5 per cent, by weight. Some boreholes proved sandy gravel and a few 'clayey' sandy gravel.

THE MAP

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

Geological Data

The geological boundary lines, symbols, etc, shown are taken chiefly from the Swindon (252) Sheet which was surveyed recently at the six-inch scale, and partly from the southern margin of the Cirencester (235) Sheet which was last surveyed in 1931. This information was obtained by detailed application of field mapping techniques by the Institute's field staff. Borehole data, which include the stratigraphic relations 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, it is inevitable that local irregularities or discrepancies will be revealed by some boreholes. These are taken into account in the assessment of resources (see below and Appendix B).

Mineral Resource Information

The mineral-bearing ground is subdivided into resource blocks (see Appendix A).

Within a resource block the mineral may be subdivided into areas where it is 'exposed' and areas where it is present in continuous (or almost continuous) spreads beneath overburden. The mineral is identified as 'exposed' where the overburden, commonly consisting only of soil and subsoil, averages less than 1.0 m (3.5 ft) in thickness. All the mineral on this sheet is regarded as exposed, although it is acknowledged that in some areas, for example, near present streams, the thickness of alluvium may locally exceed 1.0 m.

Beneath overburden the mineral may be continuous (or almost continuous) or discontinuous. 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. The 'almost continuous' and 'discontinuous' categories have not been recognised on the present sheet.

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

The area of the exposed sand and gravel is measured from the mapped geological boundary lines. The whole of this area is considered as mineral, although it may include small areas where sand and gravel is not present or is not potentially workable. Inferred boundaries have been inserted where sand and gravel is interpreted to be not potentially workable or absent. Such boundaries (for which a distinctive zig-zag symbol is used) are drawn primarily for the purpose of volume estimation. The symbol is intended to convey an approximate location within a likely zone of

occurrence rather than to represent the breadth of the zone, its size being limited only by cartographic considerations. For the purpose of measuring areas the centre-line of the symbol is used.

RESULTS

Only the deposits on the floodplain, namely the First Terrace deposits (including those beneath Alluvium), have a sufficient spread of borehole and pit information to warrant a statistical assessment. The block boundaries embracing the First Terrace have been drawn to indicate roughly the areas of relatively thick deposits (blocks A, D and G), those of intermediate thickness (blocks C and E), and thin deposits (blocks B and F). At Tudmoor Cottages [034 972], between Down Ampney and Marston Meysey [118 971], and in the tributary valleys of Derry Brook, the Key, the Ray and Bydemill Brook, parts of the First Terrace and First Terrace deposits beneath Alluvium have been excluded from the assessed areas of sand and gravel either because they are less than 1.0 m thick or they contain more than 40 per cent fines, or both.

Because of their limited extent (and the lack of information concerning their variation in thickness or quality) only an inferred assessment has been attempted for the scattered remnants of the Second, Third, and Fourth Terraces grouped together in block H. The results for each terrace in this block are given in Table 3, and grading particulars of selected boreholes from each terrace are shown on Fig. 11.

Accuracy of the Results

For the seven resource blocks (A to G) 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 lies within the given limits) varies from 10 per cent to 30 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 estimate of volume of a much smaller parcel of ground (say, 200 acres) 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 10 sample points will 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 sheet. The volume, 216.2 million m^3, can be estimated to limits of ± 12 per cent at the 95 per cent probability level, by a calculation based on the data from 66 sample points in blocks A to G.

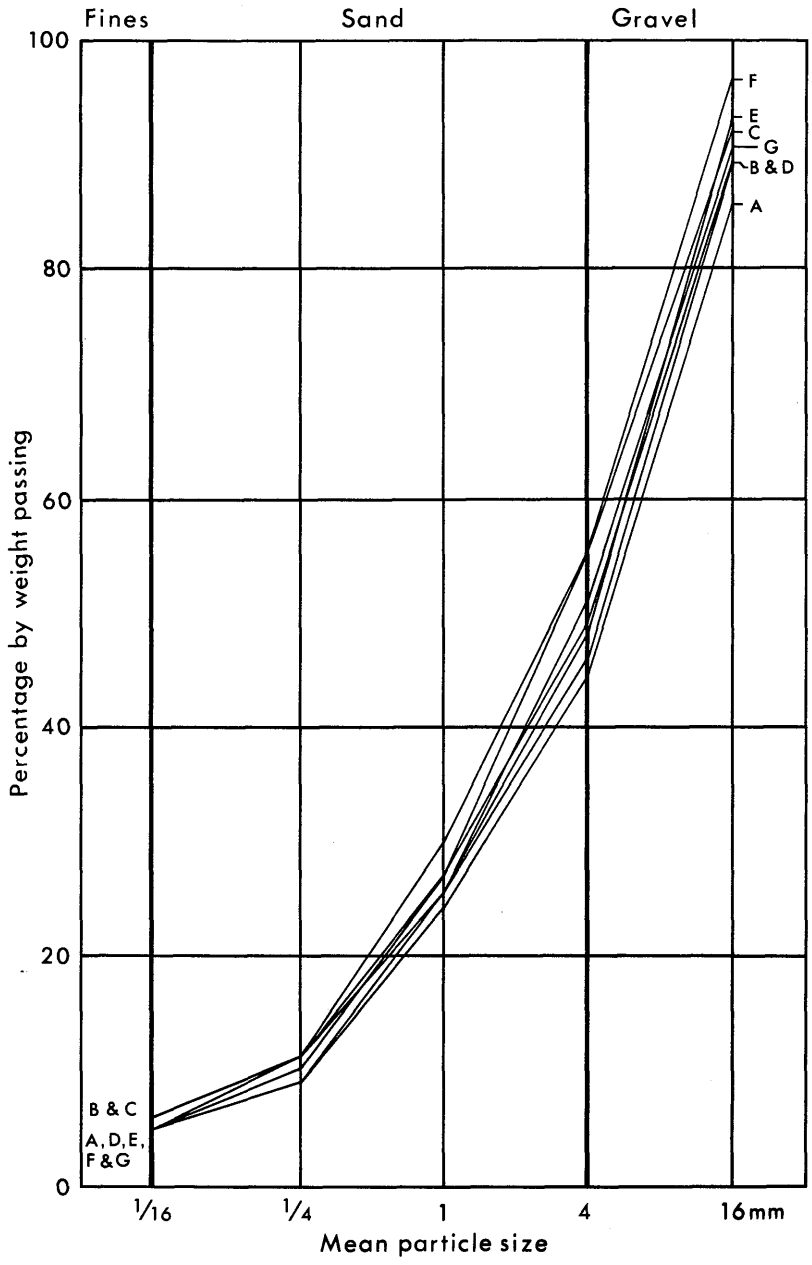
However, it must be emphasised that this quoted volume of sand and gravel bears no simple relationship to the amount that could be extracted in practice, as no allowance has been made in the calculations for any restraints (such as existing building and roads) on the use of land for mineral working.

NOTES ON RESOURCE BLOCKS A TO H

Block A

Block A covers an area of 19.6 km^2 of which 16.7 km^2 is mineral bearing, the remainder having been worked out. The existing workings are concentrated about Somerford Keynes, Ashton Keynes, South Cerney and Cerney Wick. In this area up to 8.3 m (27 ft) of sand and gravel is worked, but thicknesses of about 5.4 m (18 ft) are more usual. The bedrock ranges from Forest Marble and Cornbrash in the north, Kellaways Beds in the centre, to Oxford Clay in the south, and dips gently to the south-east. The block boundaries have been chosen to outline a group of buried channels beneath the First Terrace and Alluvium. The channels enter the main valley chiefly from the north down the dip of the bedrock by way of the headwater of the Thames at Ewen, the valley of the Churn at Cirencester, and possibly the small valley [050 980] north-east of South Cerney. Another channel enters from the west from the valley of Flagham Brook [004 948] near Poole Keynes. On the Thames Valley floor the channels coalesce in the area between Somerford Keynes and Ashton Down, then bifurcate to pass north and south of part B2 of block B, to follow courses trending south-west approximately along the strike of the bedrock. The channels are chiefly confined to areas of clay bedrock: for example, the one which enters via Cirencester runs southwards over down-faulted Kellaways Beds and is then deflected westwards by the outcrop of Cornbrash at Cowground Bridge to follow a course over a bed of clay in the Forest Marble Beds, along the western margin of part B1 of block B. On the main valley floor the channels lie mostly on Kellaways Beds and Oxford Clay.

The assessment of resources is based on



Block	Percentage by weight passing				
	1/16 mm	$\frac{1}{4}$ mm	1 mm	4 mm	16 mm
A	5	9	24	44	86
B	6	11	26	46	90
C	6	11	27	55	92
D	5	10	27	49	90
E	5	9	26	48	93
F	5	11	30	55	97
G	5	9	26	50	91

Fig. 10. Particle size distribution of the assessed thickness of sand and gravel of the First Terrace in resource blocks A to G

information from eight Mineral Assessment Unit boreholes, five Hydrogeological Department records, three other Institute registered boreholes, and several closely spaced groups of boreholes made available by Cirencester U. D. C., gravel companies and private concerns. These individual sample points have been resolved into 16 roughly equally spaced data points.

The thickness of overburden varies from 0.3 m (1 ft) in boreholes 09 SE 10 to 1.3 m (4.5 ft) in borehole 09 NW 40, with a mean of 0.7 m (2.5 ft). The overburden is generally thickest on areas of Alluvium, but this is not everywhere the case as up to 1.2 m (4 ft) is recorded on the First Terrace. The thickness of mineral sampled ranges from 4.2 m (14 ft) in borehole 09 NE 30 to 7.6 m (25 ft) in borehole 09 NE 1; the mean thickness is 4.8 m (16 ft). Thicknesses less than the 4.2 m (14 ft) minimum recorded are likely to occur in places, particularly where the deposits thin close to the valley sides. All the mineral in the Mineral Assessment Unit boreholes falls in the gravel category (see Fig. 10 and Appendix C) and consists of fine with coarse gravel ranging generally from 48 to 59 per cent (but exceptionally high 68 per cent, in borehole 09 NW 40 where it probably represents a lag deposit), coarse to medium with a trace of fine sand ranging commonly from 38 to 46 per cent (but exceptionally low, 28 per cent, in borehole 09 NW 40), and fines of silt with a little clay, uniformally low, 3 to 6 per cent. The mineral is slightly more clayey at certain localities, particularly in the neighbourhood of South Cerney and Ashton Keynes; elsewhere, in boreholes 09 NW 39, 09 NE 28, 09 NE 30, and 09 NE 33 thin silty clay layers and lenses are present.

The mean grading for the block is gravel 56 per cent, sand 39 per cent, and fines 5 per cent. The estimate of volume of mineral is 80.2 million $m^3 \pm 10$ per cent at the 95 per cent probability level. (All limits quoted for volume estimates of blocks A to G are calculated at the symmetrical 95 per cent probability level).

Block B

Block B consists of two parts, B1 and B2 which are bounded by the channels of block A, but are themselves only thinly covered by Alluvium and First Terrace deposits. Part B1 trends north to south and lies in the lower reaches of the Churn valley and part B2 trends west to east along the Thames Valley floor. The two parts total 8.4 km^2 of which 4.7 km^2 is mineral bearing. The remainder consists of deposits considered to be non-mineral (in the neighbourhood of Tudmoor Cottages [034 972]), areas of bedrock which protrude through the drift deposits, and worked out gravel quarries extended into block B from the deeper workings of block A. In part B1 a north to south trending normal fault runs close to the eastern margin with bedrock of southerly dipping Cornbrash, Forest Marble, and Kellaways Beds to the west, and down-thrown Kellaways Beds to the east. Areas of outcropping bedrock, and of drift considered to be non-mineral, lie along the western margin, but in the east the solid rocks are covered by up to 3 m (10 ft) of First Terrace deposits, in places overlain by Alluvium. The gravel-bearing drift deposits in the southern part consist of 0.6 m to 1.5 m (2 to 5 ft) of overburden on up to 1.5 m (5 ft) of mineral. Similar thicknesses are believed to occur in the northern part but relevant information is lacking. The possibility that a narrow sinuous channel might lie concealed beneath the drift deposits between the borehole sites cannot be overlooked, but is thought unlikely.

Part B2 on the main valley floor lies across the west to east trending boundary of the Kellaways Beds and Oxford Clay. The First Terrace (in places overlain by Alluvium) is up to 3.4 m (11 ft) thick, and consists of 0.3 m to 0.9 m (1 to 3 ft) of overburden on up to 2.5 m (8 ft) of mineral. It is unlikely that a buried channel exists in this part.

The assessment of resources for the whole block is based on nine sample points comprising three Mineral Assessment Unit boreholes, three Hydrogeological Department records, and three other I. G. S. registered borehole records, which have been resolved into five roughly equally spaced data points.

The overburden is generally thickest in areas of Alluvium where up to 1.5 m occurs (for example, in borehole 09 NW 42) but cover can be almost as thick on the First Terrace, particularly in the neighbourhood of Cerney Wick where 0.9 m (3 ft) is found in borehole 09 SE 9. However, as the mean for the whole block is only 0.8 m (2.5 ft), localities with overburden in excess of 1 m are not distinguished separately on the map. The mineral in the block ranges in thickness from 1.5, (5 ft) in boreholes 09 NW 42, 09 NW 57, and 252/112, to 2.5 m (8 ft) in borehole 252/101, and has a mean of 1.8 m (6 ft). The mineral in the Mineral Assessment Unit boreholes varies from sandy gravel in borehole 09 SE 9 to gravel in boreholes 09 NW 42 and 09 NE 29.

Table 2. Statistical assessment of sand and gravel resources, blocks A to G (First Terrace deposits).

Resource block	AREA		MEAN THICKNESS				VOLUME OF MINERAL				MEAN GRADING PERCENTAGE		
	Block km^2	Mineral km^2	Overburden		Mineral		million m^3	million yd^3	Limits at 95 per cent confidence level		Fines	Sand	Gravel
			m	ft	m	ft			±%	±Vol million m^3	-1/16 mm	+1/16 -4mm	+4 mm
A	19.6	16.7	0.7	2.5	4.8	16.0	80.2	105.0	10	8.0	5	39	56
B	8.4	4.7	0.8	2.5	1.8	6.0	8.5	11.1	16	1.4	6	40	54
C	6.8	6.3	0.7	2.5	2.5	8.0	15.8	20.6	12	1.9	6	49	45
D	8.1	8.0	0.8	2.5	3.8	12.5	30.4	39.7	30	9.1	5	44	51
E	9.2	8.9	1.0	3.5	2.1	7.0	18.7	24.5	15	2.8	5	43	52
F	8.6	8.6	0.9	3.0	1.3	4.5	11.2	14.7	17	1.9	5	50	45
G	17.1	15.6	0.6	2.0	3.3	11.0	51.4	67.2	24	12.3	5	45	50
TOTALS	77.8	68.8	0.8	2.5	3.2	10.5	216.2	282.8	12	25.9	5	44	51

The results for the inferred assessment of the sand and gravel resources in block H are given in Table 3.

The sandy gravel in boreholes 09 SE 9 consists of fine with coarse gravel 43 per cent, coarse and medium with a little fine sand 47 per cent and fines of fairly clayey silt 10 per cent. The mineral classified as gravel in boreholes 09 NW 42 and 09 NE 29 consists of fine with coarse gravel 57 and 62 per cent, coarse and medium with a little fine sand 40 and 33 per cent, and fines of silt 3 and 5 per cent, respectively. Both boreholes, however, contain thin silt layers. The mean grading for the block is gravel 54 per cent, sand 40 per cent and fines 6 per cent. The estimate of volume of mineral is 8.5 million m^3 ± 16 per cent.

Block C

Block C lies where the First Terrace deposits thin onto the southern margin of the Thames Valley floor. The block covers an area of 6.8 km^2 of which 6.3 km^2 is mineral bearing, the remainder consisting of worked out areas and one small area [008 934] of solid rock (Kellaways Beds) which protrudes through the drift deposits in the west near Clattinger Farm. The bedrocks consist of Kellaways Beds and Oxford Clay which dip gently to the south-east. The drift deposits are thickest along the northern boundary of the block, about 4.0 m (13 ft), where they abut the channel deposits of block A, and they thin towards the southern boundary where thicknesses of the order of 2.1 m (7 ft) are more usual. One exception to the general pattern occurs in borehole 09 SW 47 to the west of Clattinger Farm, where 5.7 m (18.5 ft) is recorded. This marks a narrow access channel along Swill Brook which peters out to the east. Across the mouth of the valley of Derry Brook the boundary distinguishing between the mineral-bearing deposits to the north and the non-mineral clayey deposits to the south, is inferred.

The assessment of resources is based on four Mineral Assessment Unit boreholes, one Hydrogeological Department record, and numerous closely spaced borehole records (many in the west and a few in the east) made available by gravel companies. These sample points have been resolved into seven roughly equally spaced data points. The overburden ranges in thickness from 0.2 m (0.5 ft) in borehole 19 SW 50 to 1.2 m (4 ft) in borehole 09 SE 11 and has a mean of 0.7 m (2.5 ft). The mineral in the block generally ranges in thickness from 2.1 m (7 ft) along the southern boundary to 3.6 m (12 ft) along the northern boundary. Although it is exceptionally thick 5.0 m (16.5 ft), in borehole 09 SW 47 in the south-west, the mineral has a mean thickness for the whole block of 2.5 m (8.0 ft). The mineral in the Mineral Assessment Unit boreholes in the west (09 SW 47 and 09 SW 48) is classified as sandy gravel and in addition, contains thin silt layers.

In these boreholes the fractions are fine with coarse gravel 38 and 40 per cent, coarse with medium and a little fine sand 55 and 53 per cent, respectively; and fines of clayey silt 7 per cent in both cases. In borehole 09 SW 47 the fines content rises to 20 per cent between 2.7 m and 3.3 m below surface. The mineral in the Mineral Assessment Unit boreholes in the east 09 SW 50 and 09 SE 11 is classified as gravel and the fractions are fine with coarse gravel 50 and 60 per cent, to coarse with medium and a little fine sand 45 and 37 per cent, and fines of silt 5 and 3 per cent, respectively.

The mean grading for the block is gravel 45 per cent, sand 49 per cent and fines 6 per cent. The estimate of volume of mineral is 15.8 million m^3 ± 12 per cent.

Block D

Block D occupies the valley of Ampney Brook (a northern tributary) and its extension onto the main Thames Valley floor. It covers an area of 8.1 km^2 of which 8.0 km^2, mapped as Alluvium, First Terrace and Terrace 1B, is mineral bearing. The remainder consists of two small areas of bedrock (one of Forest Marble in the north and one of Oxford Clay in the centre) and a small worked-out area in the south-west at Latton, all near the western margin. The bedrock consists of Forest Marble and Cornbrash in the north, Kellaways Beds in the centre and Oxford Clay in the south, all of which dip gently to the south-east. A normal fault, downthrowing to the east, runs the length of Ampney Brook, and displaces to the north the solid rocks on the eastern side. Its southerly extension beneath the drift deposits on the Thames Valley floor is uncertain. The block marks the site of an access channel in which First Terrace deposits, in places overlain by Alluvium, measure up to 4 m (13 ft) thick. The relatively thick deposit of Terrace 1B, 7 m (23 ft), in borehole 19 NW 21 at the mouth of Ampney Brook, appears to represent a continuation of the tributary valley deposits onto the Thames Valley floor, although it may possibly indicate the presence of a buried channel of Second Terrace age trending west to east along the northern margin of the Thames floodplain.

The assessment of resources is based on seven Mineral Assessment Unit boreholes. The thickness of overburden ranges from 0.3 m

(1 ft) in borehole 09 NE 31 to 1.2 m (4 ft) in borehole 19 NW 24 and has a mean of 0.8 m (2.5 ft), being generally thickest on areas of First Terrace or Terrace 1B. The thickness of mineral ranges commonly from 2.7 m (9 ft) in borehole 19 NW 22 to 3.9 m (12.5 ft) in borehole 09 NE 35, but is exceptionally high, 6.2 m (20.5 ft), in borehole 19 NW 21. The mineral has a mean thickness of 3.8 m (12.5 ft). Four of the Mineral Assessment Unit boreholes contain mineral classified as gravel and three sandy gravel. The mineral classified as gravel occurs in deposits mapped as Alluvium and Terrace 1B in borehole 09 NE 31, 09 NE 34, 19 NW 21 and 19 NW 22, and consists of generally fine with coarse gravel 53 to 57 per cent, coarse and medium with a little fine sand 38 to 51 per cent, and fines of silt with a little clay 4 to 6 per cent.

Two of these boreholes (09 NE 34 and 19 NW 21) contain thin clayey silt or peat layers but these do not affect the classification. Mineral, classified as sandy gravel, occurs in First Terrace and Terrace 1B deposits in boreholes 09 NE 35, 09 NE 36 and 19 NW 24 and is notably uniform, consisting of fine with coarse gravel 45 to 46 per cent, coarse and medium with a little fine sand 48 to 51 per cent, and fines of clayey silt 4 to 6 per cent. The mean grading for the block is gravel 51 per cent, sand 44 per cent and fines 5 per cent. The estimate of volume of mineral is 30.4 million m^3 ± 30 per cent. The relatively wide confidence limits are due to the influence of the high thickness value recorded at borehole 19 NW 21; the true volume of mineral, of course, is likely to be nearer the figure quoted than either of the limits.

Block E

Block E trends west to east along the floor of the Thames Valley and covers an area of 9.2 km^2 of which 8.9 km^2, mapped as First Terrace (locally subdivided into 1A and 1B) and Alluvium, is mineral bearing. The remainder consists of small areas of solid rock (Oxford Clay) in the north-west and north-east, one small worked-out area north of Eysey and one small area of Terrace 1A (west of Marston Meysey) which is non-mineral pebbly clay. The bedrock, which dips gently to the south-east, consists entirely of Oxford Clay. The First Terrace occurs chiefly in the centre and north-eastern part of the block, Terrace 1A in the western and south-eastern part, and Terrace 1B as a small strip in the north-west. A ribbon of Thames Alluvium runs west to east across the block and a narrow strip of Alluvium flanks a northern tributary stream in the centre. The block is situated between two north to south trending access channels confined to blocks D and G and appears to represent a shallow 'overspill area' between the two. The deposits have been reduced in thickness in certain areas by erosion recognised by the presence of Terrace 1A which is mapped here as an erosional feature.

The assessment of resources is based on 11 sample points comprising eight Mineral Assessment Unit boreholes, one Hydrogeological Department record and two other I.G.S. registered boreholes which have been resolved into eight data points. The thickness of overburden ranges from 0.3 m (1 ft) in borehole 19 NW 29 to 1.5 m (5 ft) in borehole 19 NE 6 with a mean of 1 m (3.5 ft). The variation in thickness of overburden occurs on the terraces and the Alluvium alike. The 2.8 m (9 ft) of overburden recorded in borehole 19 NW 28 is anomalous, being partly made ground and probably including some solifluction material from the adjacent Second Terrace deposits. The thickness of mineral ranges from 1.2 m (4 ft) in borehole 19 NW 28 to 2.8 m (9 ft) in borehole 19 NW 32, with a mean of 2.1 m (7 ft). Of the eight Mineral Assessment Unit boreholes in the resource block, six, 19 SW 5, 19 NW 25, 19 NW 28, 19 NW 29, 19 NW 30 and 19 NE 6 proved mineral classified as gravel, one, 19 NE 7, proved mineral classified as 'clayey' sandy gravel and one, 19 NW 26, proved non-mineral deposits and has been excluded from the calculations by being linked to the outcrop of bedrock at [115 973].

In the mineral classified as gravel the ranges of the size fractions are: fine with coarse gravel, generally 48 to 63 per cent (but exceptionally high, 70 per cent, in borehole 19 NW 28), coarse and medium with a little fine sand 35 to 48 per cent (but exceptionally low, 26 per cent, in borehole 19 NW 28), and fines of clayey silt, uniformly low, 2 to 5 per cent. For the mineral classified as 'clayey' sandy gravel in borehole 19 NE 7 the size fractions are fine with some coarse gravel 32 per cent, coarse and medium with fine sand 55 per cent, and fines of clayey silt 13 per cent. The grading for the block is gravel 52 per cent, sand 43 per cent and fines 5 per cent. The estimate of volume of mineral is 18.7 million m^3 ± 15 per cent. The gravels are reported to be partly cemented in the old workings at [112 955], and in the bed of the stream near Marston Meysey. As a consequence, the mineral in parts of this block might prove difficult to work.

Block F

Both parts of Block F, F1 near Cricklade and F2 in the east, lie on the southern margin of the Thames Valley. Together they cover 8.6 km^2, all of which, mapped as Alluvium and Terrace 1A, is mineral bearing. The bedrock of Oxford Clay dips gently to the south-east and is entirely concealed beneath the drift deposits. The Terrace 1A deposits are up to 2.1 m (7 ft) thick but the areas with a combined thickness of Alluvium and Terrace 1A reach 2.6 m (8.5 ft). The Alluvium lies adjacent to the Thames, Share Ditch, and Bydemill Brook and consists of up to 1.4 m (4.5 ft) of fine material deposited after a phase of downcutting into the Terrace 1A. Much of the southern boundary of part F2 between the mineral bearing deposits to the north and the non mineral, thin, clayey deposits to the south has been inferred.

The assessment of resources is based on six Mineral Assessment Unit boreholes, one other I.G.S. registered borehole log and one river section [1312 9532], giving eight sample points. The thickness of overburden ranges from 0.3 m (1 ft) in borehole 19 SW 6 to 1.4 m (4.5 ft) in boreholes 09 SE 12 and 19 SW 7. The thickest overburden occurs generally on areas of Alluvium. The thickness of mineral ranges from 1.1 m (3.5 ft) in boreholes 09 SE 12 and 19 SW 6, to 1.7 m (5.5 ft) in boreholes 19 SW 9 and 19 NE 16, with a mean of 1.3 m (4.5 ft). Of the six Mineral Assessment Unit boreholes, two (09 SE 12 and 19 SW 7) proved mineral classified as gravel, three (19 SW 6, 19 NE 12 and 19 NE 16) proved sandy gravel, and one (19 SE 6) 'clayey' sandy gravel. The sandy gravel in borehole 19 NE 12 also contains clayey silt lenses. In the mineral classified as gravel the ranges of the fractions are fine with some coarse gravel 54 to 56 per cent, coarse with medium and a trace of fine sand 41 to 44 per cent, and fines of silt uniformly low 2 to 3 per cent.

In the mineral classified as sandy gravel the fractions are: fine with some coarse gravel 43 to 48 per cent, coarse with medium and a little fine sand 49 to 53 per cent, and fines of clayey silt 3 to 6 per cent. The mineral classified as 'clayey' sandy gravel consists of fine gravel 23 per cent, coarse and medium with fine sand 65 per cent and fines of clayey silt 12 per cent. The mean grading for the block is gravel 45 per cent, sand 50 per cent and fines 5 per cent. The estimate of volume of mineral is 11.2 million m^3 $\pm$17 per cent.

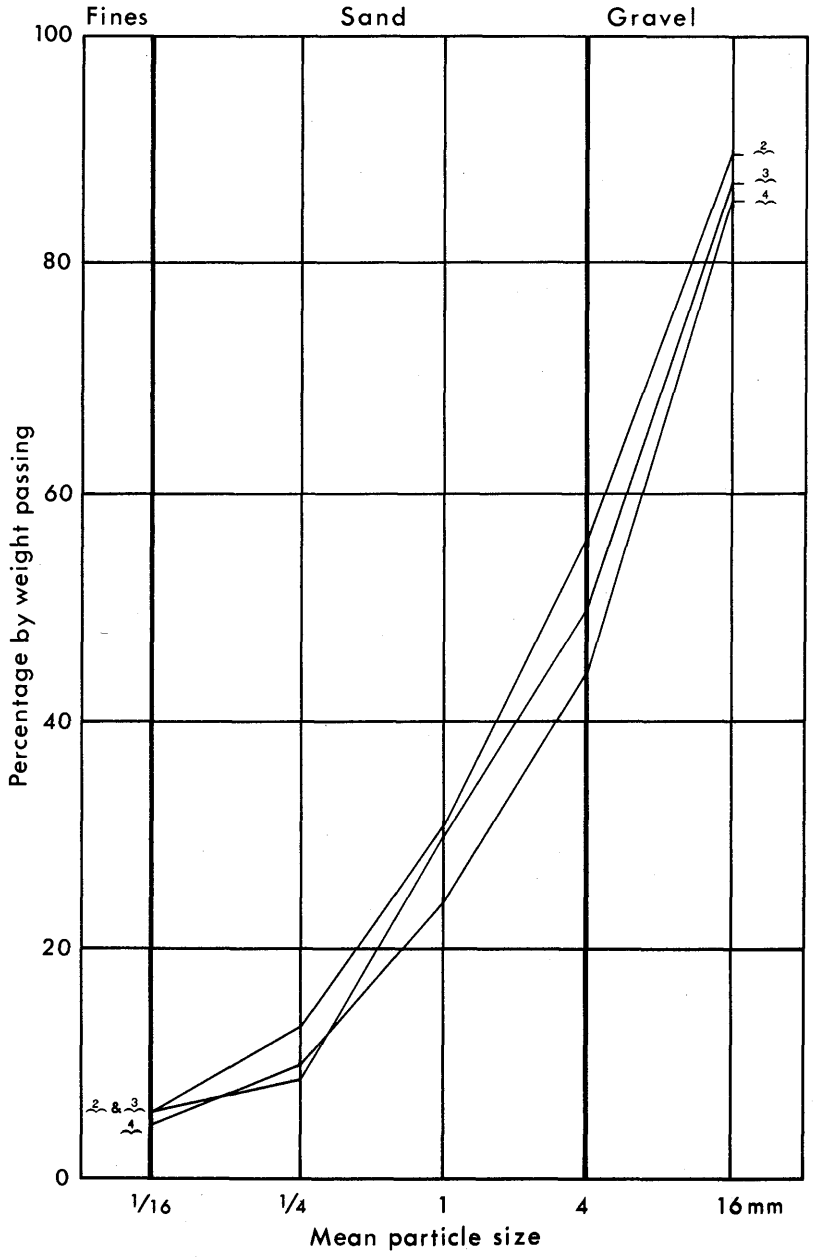
Block G

Block G covers an area of 17.1 km^2 of which 15.6 km^2, mapped as First Terrace and Alluvium, is mineral bearing, the remainder having been worked out. The gravel workings, up to 7 m (23 ft) deep, are concentrated chiefly along the Coln river, north and north-east of Whelford [171 989]; one area is worked at Horcott [150 002]. The bedrock ranges from Cornbrash and Kellaways Beds in the north-west to Oxford Clay in the centre and south-east; it strikes west to east, dipping gently to the south. First Terrace deposits cover most of the block but ribbons of Alluvium occur along the Coln in the north and in a shallow trench adjacent to the Thames in the south.

The block outlines an area of buried channels which extend from the northern flank of the Thames Valley out onto the valley floor to the south. The principal channel enters via the Coln at Fairford [150 010] in the north-west, then bifurcates to pass north and south of Horcott Hill [155 998]. The two principal branches spread out on the Thames Valley floor, then coalesce in the neighbourhood of Whelford [171 989] on the south-eastern side of Horcott Hill; a subsidiary channel is thought to pass around the southern flank of Dudgrove Hill [183 978] (Fig. 9). The thickest deposits occur in the centre parts of the main channels, whereas thinner deposits generally occur adjacent to the valley sides and close to Horcott and Dudgrove Hills. Some variation in the thickness of the deposits in the region of Fairfield Airfield [156 986], south-west of Horcott Hill, is believed to occur due to bedrock irregularities.

The assessment of resources is based on nine Mineral Assessment Unit boreholes, two Hydrogeological Department records, four other I.G.S. registered boreholes, and groups of borehole records made available by gravel companies. All of these have been taken into account and resolved into 15 roughly equally spaced data points. The thickness of overburden ranges from 0.2 m (0.5 ft) in borehole 19 NE 23 to 0.9 m (3 ft) in borehole 19 NE 15, with a mean of 0.6 m (2 ft).

There is no marked difference in overburden thickness between areas of First Terrace or Alluvium and both vary roughly between the above limits. Because the overburden is generally less than 1 m thick, the category 'mineral beneath cover' has not been used on the map. The thickness of mineral ranges from 1.6 m (5.5 ft) in borehole 19 NE 23 to 6.6 m (21.5 ft) in borehole 19 NE 13, with a mean of 3.3 m (11 ft). The thicker deposits are thought to represent channel deposits of First Terrace (or in places in the northern



Terrace	Borehole	Percentage by weight passing				
		1/16 mm	$\frac{1}{4}$ mm	1 mm	4 mm	16 mm
2nd	10 SW 4	6	13	31	56	90
3rd	19 NW 20	6	9	30	50	87
4th	19 NW 27	5	10	24	44	86

Fig. 11. Particle size distribution of the sand and gravel of the Second, Third and Fourth Terraces from selected boreholes in block H

part of possibly Second Terrace) age. Of the nine Mineral Assessment Unit boreholes, six, 19 NE 8, 19 NE 9, 19 NE 10, 19 NE 11, 19 NE 13, and 19 NE 14 proved mineral classified as gravel. Of these, 19 NE 10, 19 NE 11, and 19 NE 13, contained thin silty clay layers. The remaining three boreholes, 10 SE 4, 19 NE 15, and 19 NE 17 proved sandy gravel. The mineral classified as gravel showed the following range of grades: fine with coarse gravel 53 to 57 per cent, coarse with medium and a little fine sand 37 to 47 per cent and fines of clayey silt 3 to 8 per cent. In the mineral classified as sandy gravel the ranges of the fractions are fine with some coarse gravel 38 to 46 per cent coarse and medium with a little fine sand 49 to 57 per cent and fines of clayey silt 2 to 5 per cent. The mean grading for the block is gravel 50 per cent, sand 45 per cent, and fines 5 per cent. The estimate of volume of mineral is 51.4 million m^3 ± 24 per cent.

Block H

Block H consists of eleven parts which lie chiefly on the northern flank of the Thames Valley, with a few in the south and on low hills on the floodplain. The block covers an area of 33.5 km^2 of which 11.5 km^2, mapped as Second Terrace, Third Terrace and Fourth Terrace, is mineral bearing. The terrace deposits occur as patches scattered over the valley sides and valley floor and rest on bedrock of Cornbrash in the north, Kellaways Beds in the centre and Oxford Clay in the south. The solid rocks dip gently to the south-east.

The patches of Second Terrace are generally of small extent, ranging individually up to 0.78 km^2, except for a large crescent-shaped area between Burdocks [146 004] and Kempsford [002 954] which extends to 3.18 km^2. The smaller patches are believed to be between 1.5 m (5 ft) and 2.6 m (8 ft) thick, but the large crescent-shaped patch, which marks the site of an access channel, is 4.1 m (13.5 ft) thick in borehole 10 SW 4 at Burdocks and is reported to be up to 5.4 m (18 ft) thick elsewhere; local thinning along the margins and over bedrock irregularities may, however, be anticipated. The thickness of overburden on the Second Terrace ranges from 0.2 m (0.5 ft) in borehole 10 SW 4 [146 004] to 1.5 m (5 ft) in borehole 19 NE 20 [156 980], the estimated mean being 0.6 m (2 ft). The thickness of mineral recorded ranges from 1.2 m (4 ft) at Leigh [073 923] to 3.9 m (13 ft) in borehole 10 SW 4; the estimated mean thickness is 2.4 m (8 ft). The mineral in borehole 10 SW 4 is classified as sandy gravel and has size fractions of fine with coarse gravel 44 per cent, coarse with medium and some fine sand 50 per cent and fines of clayey silt 6 per cent. The deposit at Leigh differs from the more usual limestone gravels of the terrace deposits and consists of subangular flints in a stiff reddish-brown sandy clay. It may represent reworked earlier drift deposits from the south. Two areas of Second Terrace are considered to be non-mineral, one of pebbly clay at borehole 19 NW 23 [116 978], the other of 'clayey' sandy gravel less than 1 m thick at borehole 19 NW 31 [114 954]. These have been excluded from the assessed area.

An estimate of the mean grading of the Second Terrace has not been attempted due to the lack of detailed information but an inferred assessment of the volume of mineral for the terrace, based on the total area of 7 km^2 and the estimated mean thickness of 2.4 m (8 ft), is 16.8 million m^3 (no confidence limits can be quoted).

The patches of Third Terrace range in area up to 0.84 km^2. The deposit is 4.6 m (15 ft) thick in borehole 19 NW 20 [103 979] on the relatively large patch at Down Ampney and a comparable thickness is thought to occur on the other large patch north-east of Marston Meysey, [135 982], but elsewhere it is probably thinner, about 3 m (10 ft). The overburden ranges in thickness from 0.2 m (0.5 ft) in borehole 19 NW 33 to 1.2 m (4 ft) in borehole 19 NW 20 and has an estimated mean of 0.7 m (2.5 ft). The thickness of mineral recorded ranges up to 3.4 m (11 ft) and has an estimated mean of 2.1 m (7 ft). The mineral in borehole 19 NW 20 is classified as gravel, with size fractions of fine with coarse gravel 50 per cent, coarse and medium with a little fine sand 44 per cent, and fines of silt and clay 6 per cent. An estimate of the mean grading of the Third Terrace has not been attempted, but an inferred assessment of the volume of mineral, based on the total area of 1.4 km^2 and the estimated 2.1 m (7 ft) mean thickness, is 2.9 million m^3 (no confidence limits can be quoted).

The patches of Fourth Terrace range individually in area up to 1.4 km^2. The deposits are thickest, up to 4.8 m, on the larger patches at Meysey Hampton [120 999], Furzey Hill [135 996], and possibly Horcott Hill [155 998], but on the smaller patches they are believed to be no more than 3 m (10 ft) thick. The overburden ranges in thickness from 0.2 m (0.5 ft) in borehole 19 NE 27 to 0.7 m (2.5 ft) in borehole 252/167 and has an estimated mean of 0.6 m (2 ft). The thickness of mineral ranges up to 4.3 m (14 ft) in borehole 19 NW 27 with an estimated mean for the terrace of 2.7 m (9 ft).

The mineral in borehole 19 NW 27 is classified as gravel with the following size fractions: fine with coarse gravel 56 per cent, coarse and medium with fine sand 39 per cent, and fines of clayey silt 5 per cent. An estimate of the mean grading of the Fourth Terrace deposits has not been attempted, but an inferred assessment of the volume of mineral, based on the total area of 3.1 km^2 and the estimated mean thickness of 2.7 m (9 ft), is 8.4 million m^3 (no confidence limits can be quoted).

For the mineral deposits of the Second, Third and Fourth Terraces in block H as a whole, the estimate of mean thickness is 2.5 m (8.0 ft) and the inferred assessment of the total mineral volume is 28.1 million m^3.

A summary of the results for block H are given in Table 3 and the grading particulars of a borehole from each terrace are shown on Fig. 11.

Table 3. Inferred assessment of sand and gravel resources, block H (Second, Third and Fourth terrace deposits).

Block H	Mineral area km^2	Average thickness				Estimated volume of mineral	
		overburden		mineral		million	million
		m	(ft)	m	(ft)	m^3	yd^3
Second Terrace	7	0.6	(2)	2.4	(8)	16.8	22.0
Third Terrace	1.4	0.7	(2.5)	2.1	(7)	2.9	3.8
Fourth Terrace	3.1	0.6	(2)	2.7	(9)	8.4	11.0
Total mineral in block H	11.5	0.6	(2)	2.5	(8)	28.1	36.8

Appendix A: Field Procedure

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, 10 km^2, 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 British Standard 1377 (Anon., 1967). Random checks on the accuracy of the grading are made in the laboratories of the Institute's Geochemical Division.

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 F.

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

Appendix B: Statistical Procedure

STATISTICAL ASSESSMENT

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

2. The simple methods used in the calculations are consistent with the amount of data provided by the survey. Conventional symmetrical confidence limits are calculated for the 95 per cent probability level. That is there is a 5 per cent or one in twenty

chance of a result falling outside the stated limits.

3. The volume estimate (V) for the mineral in a given block is the product of the 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

$$S_V = \sqrt{S_A^2 + S_{\bar{l}_m}^2} \quad \ldots\ldots(1)$$

4. The above relationship may be transposed such that

$$S_V = S_{\bar{l}_m} \sqrt{1 + \frac{S_A^2}{S_{\bar{l}_m}^2}} \quad \ldots\ldots(2)$$

From this it can be seen that as $\frac{S_A^2}{S_{\bar{l}_m}^2}$ 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 mean thickness, the standard deviation for volume approximates to that for mean thickness.

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

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

$$S_{\bar{l}} = \frac{1}{\bar{l}_m} \sqrt{\frac{(l_m - \bar{l}_m)^2}{(n - 1)}}$$

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

6. The sampled area in each resource block is coloured pink on the map. Wherever possible, calculations relate to the mineral within mapped geological boundaries (which may not necessarily correspond to the limits of a deposit). Where the area is not defined by a mapped boundary, that is, where the boundary is inferred, a distinctive symbol is used. Experience suggests that the errors in determining area are small relative to those in thickness.
The relationship

$\frac{S_A}{S_{\bar{l}_m}} \leqslant 1/3$ is assumed in all cases

It follows from equation (2) that

$$S_{\bar{l}_m} \leqslant S_V \leqslant 1.05\ S_{\bar{l}_m} \quad \ldots\ldots(3)$$

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

$$\pm \frac{t}{\sqrt{n}} \times S_{\bar{l}_m}$$

or as a percentage

$$\pm \frac{t}{\sqrt{n}} \times S_{\bar{l}_m} \times \frac{100}{\bar{l}_m} \text{ per cent}$$

where t is Student's t at the 95 per cent probability level for (n - 1) degrees of freedom, evaluated by reference to statistical tables. (In applying Student's t it is assumed that the measurements are distributed normally).

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

n	t	n	t
1	∞	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, Biometrika Tables for Statisticians, Volume 1, Second Ed. 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:

$$L_{\bar{l}_m} \leqslant L_V \leqslant 1.05\ L_{\bar{l}_m}$$

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

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

and when n is greater than 20, as

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

11. The application of this procedure to a fictitious area is illustrated in Figs. 7 and 8.

INFERRED ASSESSMENT

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

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

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

15. Note on Weighting
The thickness of a deposit at any point may be governed solely by the position of the point in relation to a broad trend. However, most sand and gravel deposits also exhibit a random pattern of local, and sometimes considerable, variation in thickness. Thus the distribution of sample points need 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 within the zone as the weighting factor.

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 (less than 1/16 mm) and coarser than pebbles (more than 64 mm 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 not considered to be 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 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 Fig. 8). The procedure is as follows:

1. Classify according to ratio of sand to gravel;
2. Describe 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 Note 11, p. 32).

Many differing proposals exist 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

Block Calculation — 1:25 000 Block — Fictitious

Area
- Block: 11.08 km^2
- Mineral: 8.32 km^2

Volume
- Overburden: 21 million m^3
- Mineral: 54 million m^3

Mean Thickness
- Overburden: 2.5 m
- Mineral: 6.5 m

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 m^3

Thickness estimate: measurements in metres
l_o = overburden thickness l_m = mineral thickness

Sample point	Weighting w	Overburden l_o	Overburden wl_o	Mineral l_m	Mineral wl_m	Remarks
SE 14	1	1.5	1.5	9.4	9.4	MAU 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	½	1.2	1.6	9.8	7.2	Hydrogeological Dept record
123/45	½	2.0		4.6		
1	¼	2.7	2.5	7.3	5.8	Close group of four boreholes (commercial)
2	¼	4.5		3.2		
3	¼	0.4		6.8		
4	¼	2.8		5.9		
Totals	$\Sigma w = 8$	$\Sigma wl_o = 20.1$		$\Sigma wl_m = 52.0$		
Means		$\bar{l}_o = 2.5$		$\bar{l}_m = 6.5$		

Calculation of confidence limits

l_m	$(l_m - \bar{l}_m)$	$(l_m - \bar{l}_m)^2$
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

$\Sigma(l_m - \bar{l}_m)^2 = 15.82$

$n = 8$

$t = 2.365$

L_V is calculated as

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

$$= 1.05 \times \frac{2.365}{6.5} \sqrt{\frac{15.82}{8 \times 7}} \times 100$$

$$= 20.3$$

$\simeq$ 20 per cent

Fig. 12. Example of resource block assessment: calculation and results

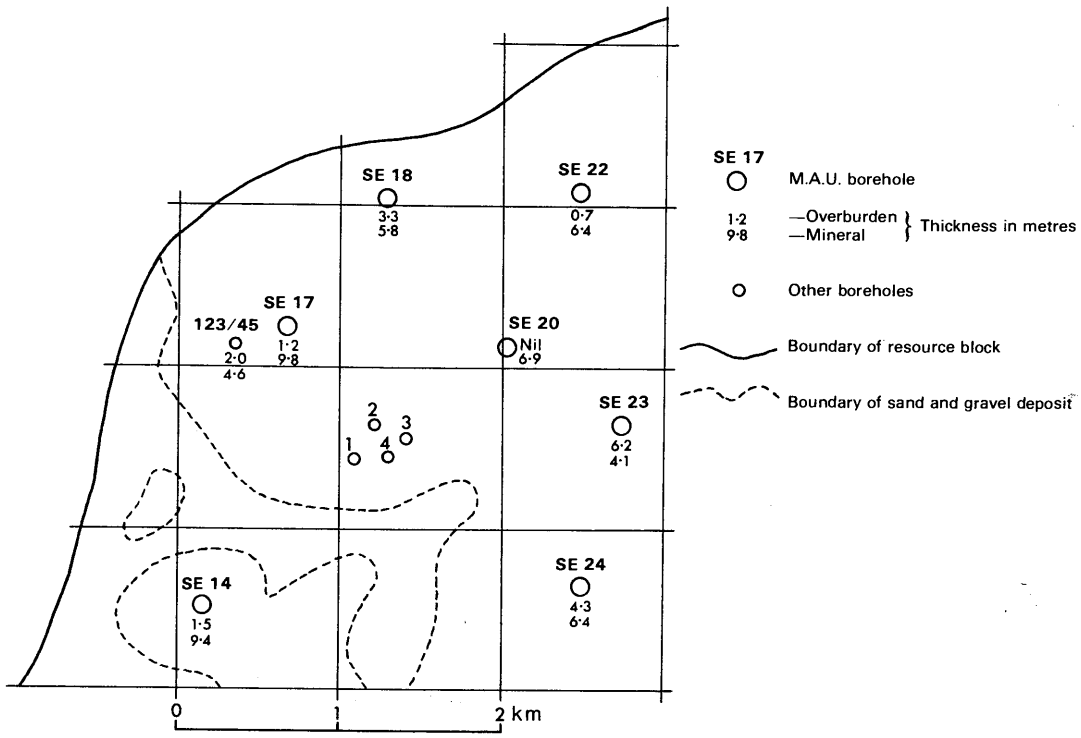
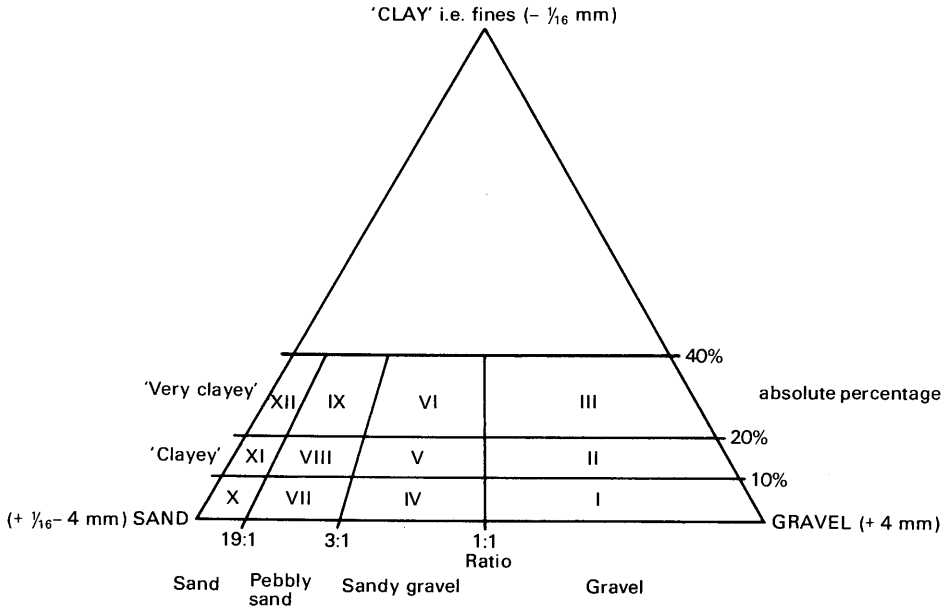


Fig. 13. Example of resource block assessment: map of a fictitious block



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

Fig. 14. Diagram to show the descriptive categories used in the classification of sand and gravel

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 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 (Table 4), which is used in this 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 ($-\frac{1}{4}$ +1/16 mm), medium (-1 $+\frac{1}{4}$ mm) and coarse (-4 +1 mm). The boundary at 16 mm distinguishes a range of finer gravel (-16 +4 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 Standard 1377 (Anon., 1967)). In this report the grading is tabulated on the borehole record sheets (Appendix F), the intercepts corresponding with the simple geometric scale 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 very approximate equal proportions with neither constituent accounting for less than about 25 per cent of the whole; 'flint with quartz' indicates that flint is dominant and quartz, the principal accessory rock type, comprises 5 to 25 per cent of the whole. Where the accessory material accounts for less than 5 per cent of the whole, but is still readily apparent, the phrase 'with some' has been used. Rare constituents are referred to as 'trace'.

The terms used in the field to describe the degree of rounding of particles, which is concerned with the sharpness of the edges and corners of a clastic fragment and not the shape (after Pettijohn, 1957), are as follows.

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

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

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

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

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

Table 4. Classification of gravel, sand and fines

Size limits	Grain size description	Qualification	Primary classification
64 mm	Cobble		Gravel
16 mm	Pebble	Coarse	
		Fine	
4 mm	Sand	Coarse	Sand
1 mm		Medium	
¼ mm		Fine	
1/16 mm	Fines (silt and clay)		Fines

Appendix D: Explanation of the Borehole Records

Annotated Example

SU 19 NE 9[1] 1706 9866[2] Whelford[3] Block G

Surface level (+75. 9 m) +249 ft[4]
Water struck at (+74. 7 m)[5]
Shell and auger (modified) 152 mm (6 in) diameter[6]
July 1971

[7]Overburden 0. 5 m (1. 5 ft)
Mineral 4. 0 m (13. 0 ft)
Waste 0. 1 m (0. 5 ft)
Bedrock 0. 4 m+ (1. 5 ft+)[9]

LOG

		Thickness m	Depth[8] m (ft)
	Soil, dark brown	0. 1(0. 5)	0. 1(0. 5)
[10]Terrace deposits (Terrace 1)	[11]Clay, silty, dark brown	0. 4(1. 5)	0. 5(1. 5)
	Gravel, Gravel: fine with coarse. Predominantly subrounded, platy and tabular, buff oolitic limestone, with some slightly to very shelly oolitic limestone, and a little brown, fine grained, sandy limestone. A few flint cobbles near the base. Sand: coarse with medium and a little fine, silty at the top. Chiefly discrete ooliths and subrounded limestone grains, with small amounts of subangular fine to rounded coarse quartz, and a trace of brown ironstone.	4. 0(13. 0)	4. 5(15. 0)
	Silt, clayey, sandy, soft, light grey	0. 1(0, 5)	4. 6(15. 0)
Oxford Clay	Clay, firm to stiff, partly shaly at top, passing into firm to hard, increasingly shaly, with scattered fragile shells, dark brown.	0. 4+(1. 5+)	5. 0(16. 5)

GRADING

Mean for Deposit

	%	mm	%
[14]Gravel	54	+16	9
		-16+4	45
Sand	41	-4+1	23
		$-1+\frac{1}{4}$	14
		$-\frac{1}{4}+1/16$	4
Fines	5	-1/16	5

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel[13]
0. 5 - 1. 5[12]	11	37	52
1. 5 - 2. 5	2	39	59
2. 5 - 3. 5	3	39	58
3. 5 - 4. 5	6	45	49

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

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

1) The number of the 1:25000 sheet on which the borehole lies, for example, SU 19.
2) The quarter of the 1:25000 sheet on which the borehole lies and its number in a series for that quarter, for example, NE 9.

Thus the full Registration Number is SU 19 NE 9 usually this is abbreviated to 19 NE 9 in the text.

2. The National Grid Reference.
All National Grid References in this publication lie within the 100 km squares SU and 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 approximate locations, for example, for farms).

3. Location.
The borehole location is generally referred to the nearest named locality on the 1:25000 base map, and the resource block in which it 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 and feet above Ordnance Datum).

6. Type of Drill and Date of Drilling.
Modified shell and auger rigs were used in this survey. The type of machine, the external diameter of the casing used, and the month and year of completion of the borehole 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. Thickness and Depth
All measurements were made in metres; Imperial conversions appear in brackets. Imperial conversions of measurements of the thicknesses of beds and the depths from the surface of their bases have been rounded off to the nearest 0. 5 ft because a more detailed quotation would imply a higher order of accuracy than could be justified by the original figures. Where figures have been rounded in this way there may be a discrepancy between the sum of the thicknesses and the recorded depths.

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

10. Geological Classification.
The geological classification (p. 4) is given whenever possible.

11. Lithological Description.
When sand and gravel is recorded a general description based on the mean grading characteristics (for details see Appendix C) is followed by more detailed particulars. The description of other rocks is based on visual examination in the field.

12. Sampling.
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 within the sand and gravel or at every 1 m of depth.

13. Grading Results.
The limits are as follows: gravel, +4 mm; sand, -4+/16 mm; fines, -1/16 mm.

14. Mean Grading.
The grading of the full thickness of the mineral horizon identified in the log is the mean of the individual sample gradings weighted by the thicknesses represented, if these vary. The classification used is shown in Table 4.

Fully representative sampling of sand and gravel is difficult to achieve particularly where groundwater levels are high. Comparison between boreholes and adjacent exposures suggests that in borehole samples the proportion of sand may be higher and the proportions of fines and coarse gravel (+16 mm) may be lower.

Appendix E: List of Boreholes Used in the Assessment of Resources

MINERAL ASSESSMENT UNIT BOREHOLES

Borehole No. by sheet quadrant	Grid Reference (All fall in 100 km square SU)	Pages
09 NW 39	0242 9544	34-54
40	0382 9974	
41	0323 9663	
42	0409 9792	
09 NE 28	0690 9695	
29	0644 9551	
30	0750 9514	
31	0871 9949	
32	0840 9619	
33	0860 9513	
34	0929 9829	
35	0948 9655	
36	0968 9523	
09 SW 47	0075 9319	
48	0130 9349	
49	0363 9214	
50	0452 9300	
09 SE 9	0558 9481	
10	0533 9398	
11	0594 9342	
12	0959 9462	
	(These fall in 100 km square SP)	
10 SW 4	1461 0034	55-57
10 SE 4	1625 0089	
7	1885 0043	

Borehole No. by sheet quadrant	Grid Reference (All fall in 100 km square SU)	Pages
19 NW 20	1025 9785	58-85
21	0135 9665	
22	1041 9544	
23	1165 9787	
24	1105 9624	
25	1177 9588	
26	1193 9688	
27	1305 9957	
28	1296 9690	
29	1353 9606	
30	1398 9641	
31	1446 9545	
19 NE 6	1557 9673	
7	1581 9593	
8	1712 9961	
9	1706 9866	
10	1686 9753	
11	1692 9757	
12	1694 9535	
13	1814 9941	
14	1792 8967	
15	1898 9721	
16	1798 9594	
17	1977 9732	
19 SW 5	1051 9425	
6	1150 9468	
7	1171 9384	
19 SE 6	1751 9474	

OTHER BOREHOLES

1. Hydrogeological Department: 252/29c, 33, 51, 53, 62, 69, 87, 101, 112, 137-141, 167, 170, 177, 198, 203 and 204; 235/243.

2. Other IGS-registered boreholes: 09 NW 1, 2, 4, 6, 43, 47, 55 and 57: 09 NE 1: 19 NW 32, 33, 34 and 35: 19 NE 18, 19, 20, 21, 22 and 23: 19 SW 8, 9 and 10.

3. Commercial boreholes: many records made available by gravel companies and a few by private concerns are held in confidence.

Appendix F: Mineral Assessment Unit Borehole Records

SU 09 NW 39 0242 9544 Near Somerford Keynes Block A

Surface level (+89.6 m) +294 ft
Water struck at (+87.5 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.5 m (1.5 ft)
Mineral 7.2 m (23.5 ft)
Bedrock 0.3 m+ (1.0 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Terrace deposits (Terrace 1)	Clay, silty, pebbly, firm to hard, brown	0.4	(1.5)	0.5	(1.5)
	Gravel, with clayey, pebbly and carbonaceous, soft, blue and brown silt from 5.3 m to 5.6 m, and a few silty, pebbly, soft light grey 20 mm to 80 mm clay layers below 5.6 m Gravel: fine with coarse passing into fine and coarse at the base. Mostly subrounded, platy and tabular, buff oolitic limestone, with some sandy and shelly, brown oolitic limestone and a little subangular to subrounded flint. A few limestone and flint cobbles present throughout, and scattered subangular to subrounded, friable, brown sandstone pebbles with a few worn shells below 5.6 m Sand: coarse and medium with some fine, silty at the top. Chiefly discrete ooliths, subrounded to rounded, buff and cream oolitic limestone grains, with some quartz, a little brown ironstone and a trace of dark green glauconite	7.2	(23.5)	7.7	(25.5)
Kellaways Beds	Clay, silty, stiff, containing fragile shells, brownish greenish grey passing into blue	0.3+	(1.0+)	8.0	(26.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	57	+16	15
		-16+4	42
Sand	37	-4+1	17
		-1+$\frac{1}{4}$	15
		-$\frac{1}{4}$+1/16	5
Fines	6	-1/16	6

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.5 - 1.5	13	46	41
1.5 - 2.5	4	36	60
2.5 - 3.5	4	43	53
3.5 - 4.5	5	34	61
4.5 - 5.3	4	52	44
5.3 - 5.6		pebbly silt	
5.6 - 6.6	8	38	54
6.6 - 7.7	2	14	84

SU 09 NW 40 | 0382 9974 | Near Siddington | Block A

Surface level (+99.4 m) +326 ft
Water struck at (+98.1 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 1.3 m (4.5 ft)
Mineral 3.4 m (11.0 ft)
Bedrock 0.7 m+ (2.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Alluvium	Clay, silty, firm, light grey	0.3	(1.0)	0.4	(1.5)
	Clay, silty, soft, grey	0.2	(0.5)	0.6	(2.0)
	Clay, silty, with wood debris and peat, dark brown	0.7	(2.5)	1.3	(4.5)
?Terrace deposits (Terrace 1)	Gravel Gravel: fine and coarse. Mostly sub-rounded, platy and tabular, cream oolitic limestone, with some partly to very shelly oolitic limestone, and light grey, fine grained sandy limestone Sand: coarse with medium and a little fine, slightly silty at the top. Chiefly discrete ooliths and subrounded oolitic limestone grains, with a little subangular fine quartz, and a trace of rounded coarse quartz, buff	3.4	(11.0)	4.7	(15.5)
Kellaways Beds	Clay, very silty, sandy, firm to soft, brown	0.3	(1.0)	5.0	(16.5)
	Clay, firm to stiff, with scattered shells, dark mauvish-grey	0.4+	(1.5+)	5.4	(18.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	68	+16	28
		-16+4	40
Sand	28	-4+1	17
		-1+$\frac{1}{4}$	9
		-$\frac{1}{4}$+1/16	2
Fines	4	-1/16	4

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
1.3 - 2.3	6	25	69
2.3 - 3.3	3	22	75
3.3 - 4.3	3	32	65
4.3 - 4.7	3	39	58

SU 09 NW 41 0323 9663 Near Shorncote Block A

Surface level (+91.4 m) +300 ft
Water struck at (+89.9 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.3 m (1.0 ft)
Mineral 4.9 m (16.0 ft)
Bedrock 0.3 m+ (1.0 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, brown	0.1	(0.5)	0.1	(0.5)
Terrace deposits	Clay, silty and slightly pebbly, firm, brown	0.2	(0.5)	0.3	(1.0)
(Terrace 1)	Gravel Gravel: fine with coarse. Predominantly subangular to subrounded, platy and tabular, bluish-brown and yellow, partly sandy, very shelly oolitic limestone, with some buff wholly oolitic limestone, and scattered rubbly limestone cobbles Sand: coarse with medium and a trace of fine. Chiefly subrounded limestone grains, with some quartz, and a little brown ironstone	4.9	(16.0)	5.2	(17.0)
Cornbrash	Limestone, hard, granular and rubbly, containing abundant shell debris, yellow	0.3+	(1.0+)	5.5	(18.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	59	+16	19
		-16+4	40
Sand	38	-4+1	21
		$-1+\frac{1}{4}$	14
		$-\frac{1}{4}+1/16$	3
Fines	3	-1/16	3

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.3 - 1.3	6	47	47
1.3 - 2.3	2	38	60
2.3 - 3.3	2	41	57
3.3 - 4.3	0	27	73
4.3 - 5.2	2	41	57

SU 09 NW 42 0409 9792 Near Claymeadow Farm, South Cerney Block B

Surface level (+94.8 m) +311 ft
Water struck at (+93.3 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 1.5 m (5.0 ft)
Mineral 1.5 m (5.0 ft)
Bedrock 0.4 m+ (1.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Alluvium	Clay, silty, firm, light brown	0.8	(2.5)	0.9	(3.0)
	Clay, silty, firm to soft, light brown mottled light grey	0.6	(2.0)	1.5	(5.0)
?Terrace deposits (Terrace 1)	Gravel, with a few thin, soft, light grey silt layers below 2.5 m Gravel: fine with coarse. Predominantly subrounded, tabular, and platy, buff and brown, partly shelly and sandy oolitic limestone, with subangular platy to irregular, rubbly, very shelly limestone, and rare worn rhynchonellid and terebratulid shells Sand: coarse and medium with a little fine Chiefly discrete ooliths and subrounded limestone grains, with a little subangular to subrounded quartz	1.5	(5.0)	3.0	(5.0)
Cornbrash	Limestone, clayey and brown at the top, becoming hard, granular and rubbly, and containing much shell debris, yellowish-brown	0.4+	(1.5+)	3.4	(11.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	57	+16	15
		-16+4	42
Sand	40	-4+1	19
		-1+$\frac{1}{4}$	16
		-$\frac{1}{4}$+1/16	5
Fines	3	-1/16	3

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
1.5 - 2.5	2	37	61
2.5 - 3.0	4	44	52

SU 09 NE 28 0690 9695 Near Wildmoorway Bridge, Cerney Wick Block A

Surface level (+84.4 m) +277 ft
Water struck at (+81.8 m)
Shell and auger (modified) 152 mm (6 in) diameter
November 1971

Overburden 0.3 m (1.0 ft)
Mineral 4.5 m (15.0 ft)
Bedrock 0.1 m+ (0.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
Alluvium	Soil slightly pebbly at base, brown	0.3	(1.0)	0.3	(1.0)
?Terrace deposits (Terrace 1)	Gravel, with firm to soft, dark greyish-blue silt containing large flints, from 4.2 to 4.3 m Gravel: fine with some coarse to 3.3 m, passing into fine with coarse. Mostly subrounded, platy and tabular, cream and buff oolitic limestone, with some shelly oolitic limestone, and sandy limestone. Scattered subangular to subrounded flint pebbles, small worn shells, and a few limestone and flint cobbles. A little brown sandstone in the lower part Sand: coarse and medium with a trace of fine, silty. Chiefly discrete ooliths and subrounded limestone grains, with a few shell fragments, a little subangular fine to rounded coarse quartz, and a trace of brown ironstone	4.5	(15.0)	4.8	(16.0)
Kellaways Beds	Limestone, shelly, very hard, brown passing into blue	0.1+	(0.5+)	4.9	(16.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	48	+16	7
		-16+4	41
Sand	46	-4+1	23
		-1+$\frac{1}{4}$	18
		-$\frac{1}{4}$+1/16	5
Fines	6	-1/16	6

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.3 - 1.3	6	52	42
1.3 - 2.3	9	51	40
2.3 - 3.3	4	39	57
3.3 - 4.2	6	50	44
4.2 - 4.3		stony silt	
4.3 - 4.8	3	30	67

SU 09 NE 29 | 0644 9551 | Cernywick Copse | Block B

Surface level (+83.8 m) +275 ft
Water struck at (+82.8 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.5 m (1.5 ft)
Mineral 2.0 m (6.5 ft)
Waste 0.5 m (1.5 ft)
Bedrock 0.2 m+ (0.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Alluvium	Clay, dark brown	0.2	(0.5)	0.3	(1.0)
	Clay, pebbly, friable to stiff, orange-brown	0.2	(0.5)	0.5	(1.5)
?Terrace deposits (Terrace 1)	Gravel, with brownish-grey pebbly silt from 1.2 to 1.3 m Gravel: fine with some coarse to 1.5 m passing into fine with coarse. Predominantly subrounded, platy and tabular, buff and cream oolitic limestone, with some buff and brown shelly, coralline, oolitic limestone, some very platy, grey, fine grained, sandy limestone, a little tabular, grey, subangular medium grained, calcareous sandstone, a few worn solitary corals, terebratulid brachiopods, and small turritellid gastropods, rare flint Sand: coarse with medium and a little fine, fairly silty in the upper part. Chiefly discrete ooliths and subrounded limestone grains, with a little subrounded quartz, a trace of brown ironstone, and rare sandy ironstone, greyish-buff	2.0	(6.5)	2.5	(8.0)
	Clay, silty, pebbly, firm, dark brown	0.5	(1.5)	3.0	(10.0)
Oxford Clay	Clay, stiff, containing fragile shells, dark brownish-grey	0.1	(0.5)	3.1	(10.0)
	Shale, silty, firm to hard, dark brown	0.1+	(0.5+)	3.2	(10.5)

GRADING

Mean for Deposit

	%	mm	%
Gravel	62	+16	10
		-16+4	52
Sand	33	-4+1	20
		-1+$\frac{1}{4}$	10
		-$\frac{1}{4}$+1/16	3
Fines	5	-1/16	5

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.5 - 1.5	8	41	51
1.5 - 2.5	2	25	73

SU 09 NE 30 0750 9514 Near Cerney Wick Block A

Surface level (+81.4 m) +267 ft
Water struck at (+80.3 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.8 m (2.5 ft)
Mineral 4.2 m (14.0 ft)
Bedrock 0.3 m+ (1.0 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Alluvium	Clay, silty, stiff, dark brown passing into medium brown	0.7	(2.5)	0.8	(2.5)
?Terrace deposits (Terrace 1)	Gravel, with firm, light grey, pebbly, silty clay layer from 1.5 to 1.7 m Gravel: fine with a trace of coarse to 1.5 m, passing into fine with coarse below 1.7 m. Mostly subrounded, tabular to platy, buff and grey oolitic limestone, with some shelly oolitic limestone, some subrounded brown ironstone (in the fine fraction), and a few worn shells in the lower part Sand: coarse with medium and a little fine, slightly silty at the top. Chiefly subrounded limestone grains and some discrete ooliths, with quartz and ironstone, greyish-buff	4.2	(14.0)	5.0	(16.5)
Oxford Clay	Clay, silty, stiff, with scattered fragile shells, and a few robust shells, bluish-grey	0.3+	(1.0+)	5.3	(17.5)

GRADING

Mean for Deposit

	%	mm	%
Gravel	54	+16	9
		-16+4	45
Sand	43	-4+1	21
		-1+$\frac{1}{4}$	17
		-$\frac{1}{4}$+1/16	5
Fines	3	-1/16	3

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.8 - 1.5	6	40	54
1.5 - 1.7		pebbly clay	
1.7 - 2.7	2	39	59
2.7 - 3.7	3	45	52
3.7 - 5.0	3	45	52

SU 09 NE 31 0871 9949 Near Charlham Farm, Down Ampney Block D

Surface level (+89.9 m) +295 ft
Water struck at (+88.7 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.3 m (1.0 ft)
Mineral 3.7 m (12.0 ft)
Waste 0.1 m (0.5 ft)
Bedrock 0.4 m+ (1.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
Alluvium	Soil, silty, clayey and pebbly at the base	0.3	(1.0)	0.3	(1.0)
?Terrace deposits (Terrace 1)	Gravel Gravel: fine with coarse. Predominantly subrounded, tabular and platy, cream, sandy, shelly and partly coralline oolitic limestone. A layer of subangular to subrounded, tabular, shelly limestone cobbles at the base Sand: coarse with medium and a little fine, silty at the top. Chiefly discrete ooliths and subrounded limestone grains, with a little subangular, fine quartz, and a trace of rounded, coarse quartz, buff	3.7	(12.0)	4.0	(13.0)
	Clay, pebbly, soft, dark brown	0.1	(0.5)	4.1	(13.5)
Kellaways Beds	Clay, slightly silty, stiff, brownish-grey passing into dark grey	0.4+	(1.5+)	4.5	(15.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	55	+16	19
		-16+4	36
Sand	39	-4+1	19
		-1+$\frac{1}{4}$	15
		-$\frac{1}{4}$+1/16	5
Fines	6	-1/16	6

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.3 - 1.3	12	32	56
1.3 - 2.3	5	40	55
2.3 - 3.3	3	41	56
3.3 - 4.0	5	44	51

SU 09 NE 32 0840 9619 Westfield Farm, Latton Block A

Surface level (+82.9 m) +272 ft
Water struck at (+81.3 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.7 m (2.5 ft)
Mineral 5.0 m (16.5 ft)
Bedrock 0.3+ (1.0 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Terrace deposits (Terrace 1)	Clay, silty, pebbly, grey and brown	0.6	(2.0)	0.7	(2.5)
	Gravel	5.0	(16.5)	5.7	(18.5)
	Gravel: fine with some coarse to 3.7 m, passing into fine with coarse. Predominantly subrounded, tabular and platy, cream and buff (often stained orange-brown), oolitic limestone, with some shelly oolitic limestone, and a little subangular, shelly, sandy limestone. A few flint and shelly limestone cobbles throughout, increasing in amount towards the base. Scattered ironstained argillaceous sandstone pebbles in the lower part				
	Sand: coarse with medium and a little fine, very silty at the top. Chiefly discrete ooliths and subrounded limestone grains, with a little quartz, and brown ironstone, orange-brown				
Oxford Clay	Clay, very silty, light grey passing into grey mottled brown	0.1	(0.5)	5.8	(19.0)
	Clay, stiff, containing fragile shells, uniformly bluish-grey	0.2+	(0.5+)	6.0	(19.5)

GRADING

Mean for Deposit

	%	mm	%
Gravel	51	+16	9
		-16+4	42
Sand	44	-4+1	24
		-1+¼	16
		-¼+1/16	4
Fines	5	-1/16	5

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.7 - 1.7	15	47	38
1.7 - 2.7	2	36	62
2.7 - 3.7	1	49	50
3.7 - 4.7	3	43	54
4.7 - 5.7	2	43	55

SU 09 NE 33 | 0860 9513 | Latton Lock, Latton | Block A

Surface level (+79.6 m) +261 ft
Water struck at (+78.6 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.8 m (2.5 ft)
Mineral 4.5 m (15.0 ft)
Bedrock 0.3 m+ (1.0 ft+)

LOG

		Thickness m	Thickness (ft)	Depth m	Depth (ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Alluvium	Clay, silty, dark brown	0.2	(0.5)	0.3	(1.0)
	Clay, silty, firm to stiff, mottled light grey and brown	0.5	(1.5)	0.8	(2.5)
?Terrace deposits (Terrace 1)	Gravel, with soft, light grey, pebbly, clayey silt from 3.9 to 3.95 m Gravel: fine with coarse to 3.9 m, passing into fine with some coarse. Mostly subrounded, platy and tabular, buff, light grey, and brown oolitic limestone, with some light grey and brown, shelly and coralline oolitic limestone. Scattered tabular to irregular flint cobbles throughout Sand: coarse with medium and a little fine to 3.9 m, passing into coarse and medium with fine, silty at the base Chiefly discrete ooliths and subrounded oolitic limestone grains, with some quartz (mostly in the fine sand fraction), and a little brown ironstone, grey	4.5	(15.0)	5.3	(17.5)
Oxford Clay	Clay, firm to stiff, containing abundant fragile shells, bluish-grey	0.3+	(1.0+)	5.6	(18.5)

GRADING

Mean for Deposit

	%	mm	%
Gravel	58	+16	17
		-16+4	41
Sand	38	-4+1	20
		-1+$\frac{1}{4}$	14
		-$\frac{1}{4}$+1/16	4
Fines	4	-1/16	4

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.8 - 1.8	3	36	61
1.8 - 2.8	3	26	71
2.8 - 3.9	2	39	59
3.9 - 5.3	8	46	46

SU 09 NE 34 0929 9829 Near Hill Barn, Down Ampney Block D

Surface level (+85.6 m) +281 ft
Water struck at (+82.2 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.6 m (2.0 ft)
Mineral 3.1 m (10.0 ft)
Bedrock 0.5 m+ (1.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, slightly pebbly, dark brown	0.1	(0.5)	0.1	(0.5)
Alluvium	Clay, silty, light brown	0.5	(1.5)	0.6	(2.0)
?Terrace deposits (Terrace 1)	Gravel, with 20 mm of silty pebbly peat at 1.4 m, and a few 20 mm, light grey, clayey silt layers below 3.5 m Gravel: fine with coarse, becoming slightly coarser in the lower part. Predominantly subrounded, platy and tabular, buff and light grey oolitic limestone, with some shelly oolitic limestone, and a little sandy, shelly limestone. Scattered subangular to angular reddish-brown flint Sand: coarse and medium with fine, fairly silty to 1.6 m, passing into coarse with medium and a little fine. Chiefly discrete ooliths and subrounded grains of oolitic and shelly limestone, with a little subrounded to rounded quartz, and a little brown ironstone. Rare subangular fragments of fine grained, white, slightly micaceous (biotitic) sandstone, a trace of crinoid debris	3.1	(10.0)	3.7	(12.0)
Oxford Clay	Clay, firm, brownish-blue, passing into firm to stiff, greyish-blue	0.5+	(1.5+)	4.2	(14.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	57	+16	12
		-16+4	45
Sand	39	-4+1	21
		$-1+\frac{1}{4}$	14
		$-\frac{1}{4}+1/16$	4
Fines	4	-1/16	4

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.6 - 1.6	8	41	51
1.6 - 2.6	3	39	58
2.6 - 3.7	2	37	61

SU 09 NE 35 0948 9655 Near Down Ampney House, Down Ampney Block D

Surface level (+82.3 m) +270 ft
Water struck at (+81.2 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 1.1 m (3.5 ft)
Mineral 3.9 m (13.0 ft)
Bedrock 0.5 m+ (1.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Terrace deposits (Terrace 1)	Clay, silty, firm, dark brown	0.2	(0.5)	0.3	(1.0)
	Clay, silty, pebbly, firm to soft light brown	0.8	(2.5)	1.1	(3.5)
	Sandy gravel Gravel: fine with some coarse to 3.1 m passing into fine with coarse. Predominantly subrounded, platy and tabular, partly shelly, and sandy, oolitic limestone, with some tabular to ovoid, coralline and belemnitic, oolitic limestone Sand: medium and coarse with a little fine. Chiefly discrete ooliths and subrounded oolitic limestone grains, with a little shell debris, some subangular fine to rounded coarse quartz, and a little brown ironstone	3.9	(13.0)	5.0	(16.5)
Oxford Clay	Clay, firm to stiff, containing scattered shells, brownish-blue passing into blue	0.5+	(1.5+)	5.5	(18.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	45	+16	7
		-16+4	38
Sand	51	-4+1	21
		-1+$\frac{1}{4}$	24
		-$\frac{1}{4}$+1/16	6
Fines	4	-1/16	4

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
1.1 - 2.1	5	49	46
2.1 - 3.1	5	53	42
3.1 - 4.1	3	49	48
4.1 - 5.0	6	51	43

SU 09 NE 36 0968 9523 Near Latton Block D

Surface level (+82.9 m) +272 ft
Water struck at (+80.7 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.8 m (2.5 ft)
Mineral 3.5 m (11.5 ft)
Bedrock 0.4 m+ (1.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
Terrace deposits (Terrace 1)	Clay, friable, becoming stiff, sandy and pebbly in the lower part, reddish brown	0.8	(2.5)	0.8	(2.5)
	Sandy gravel Gravel: fine with some coarse. Predominantly subrounded, platy and tabular, oolitic limestone, with some shelly oolitic limestone, and a little flint Sand: coarse and medium with a little fine, silty and clayey at the top. Limestone grains and quartz, reddish-brown	3.5	(11.5)	4.3	(14.0)
Oxford Clay	Clay, grey passing into dark brown	0.2	(0.5)	4.5	(15.0)
	Clay, shaly, containing fragile shells, black to dark grey, passing into bluish-grey	0.2+	(0.5+)	4.7	(15.5)

GRADING

Mean for Deposit

	%	mm	%
Gravel	46	+16	6
		-16+4	40
Sand	48	-4+1	24
		$-1+\frac{1}{4}$	19
		$-\frac{1}{4}+1/16$	5
Fines	6	-1/16	6

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.8 - 1.8	9	50	41
1.8 - 2.8	8	50	42
2.8 - 3.8	2	45	53
3.8 - 4.3	3	48	49

SU 09 SW 47 0075 9319 West of Clattinger Farm, Oaksey Block C

Surface level (+86.6 m) +284 ft
Water struck at (+85.2 m)
Shell and auger (modified) 152 mm (6 in) diameter
October 1971

Overburden 0.7 m (2.5 ft)
Mineral 5.0 m (16.5 ft)
Bedrock 0.1 m+ (0.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.2	(0.5)	0.2	(0.5)
Alluvium	Clay, firm to soft, light brown mottled light grey	0.4	(1.5)	0.6	(2.0)
	Clay, sandy, pebbly, reddish-brown	0.1	(0.5)	0.7	(2.5)
?Terrace deposits (Terrace 1)	Sandy gravel, very clayey from 2.7 to 3.3 m; a few 30 mm sandy pebbly clay layers below 3.3 m, more gravelly in the lower part, and coarser at the base Gravel: fine with some coarse to 4.3 m, passing into fine and coarse. Predominantly subrounded, platy and tabular, brown oolitic limestone and partly shelly and sandy oolitic limestone, with some subangular to subrounded, elongate to irregular flint, and a little brown ironstone. Rare constituents include well-rounded ovoid brown quartzite, and yellow vein quartz, with a few worn shell and ammonite fragments. Scattered subangular to subrounded, tabular limestone, and subrounded, irregular flint cobbles in the lower part Sand: coarse with medium and a little fine, silty down to 3.3 m. Chiefly subrounded limestone grains and subangular quartz, with some ironstone near the base, brown	5.0	(16.5)	5.7	(18.5)
Kellaways Beds	Limestone, argillaceous, shelly, hard, blue, with thin blue silt layers	0.1+	(0.5+)	5.8	(19.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	38	+16	11
		-16+4	27
Sand	55	-4+1	31
		-1+¼	18
		-¼+1/16	6
Fines	7	-1/16	7

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.7 - 1.7	9	58	33
1.7 - 2.7	6	73	21
2.7 - 3.3	20	61	19
3.3 - 4.3	5	50	45
4.3 - 5.7	2	40	58

SU 09 SW 48 0130 9349 East of Clattinger Farm, Oaksey Block C

Surface level (+86.3 m) +283 ft
Water struck at (+85.3 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.3 m (1.0 ft)
Mineral 2.8 m (9.0 ft)
Waste 0.4 m (1.5 ft)
Bedrock 0.5 m+ (1.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Terrace deposits (Terrace 1)	Clay, silty, firm to soft, light brownish grey	0.2	(0.5)	0.3	(1.0)
	Sandy gravel, very silty and locally clayey to 1.3 m, with a few 20 mm brown silt layers below 1.3 m Gravel: fine with some coarse. Predominantly subrounded, platy and tabular, buff and grey oolitic limestone, and shelly oolitic limestone, with a little flint Sand: coarse with medium and a little fine, very silty at the top. Chiefly subrounded limestone grains, and quartz, whitish-buff passing into grey	2.8	(9.0)	3.1	(10.0)
	Clay, pebbly, firm to stiff, less pebbly in the lower part, greyish-brown passing into brown	0.4	(1.5)	3.5	(11.5)
Kellaways Beds	Clay, slightly shaly, firm to stiff, carbonaceous, dark grey	0.2	(0.5)	3.7	(12.0)
	Clay, slightly shaly, stiff, containing fragile shells, blue	0.3+	(1.0+)	4.0	(13.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	40	+16	4
		-16+4	36
Sand	53	-4+1	31
		-1+$\frac{1}{4}$	17
		-$\frac{1}{4}$+1/16	5
Fines	7	-1/16	7

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.3 - 1.3	15	53	32
1.3 - 2.3	2	55	43
2.3 - 3.1	3	53	44

SU 09 SW 49 0363 9214 Near Shades Farm, Ashton Keynes

Surface level (+83.8 m) +275 ft
Water not struck
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Waste 2.2 m (7.0 ft)
Bedrock 1.0 m+ (3.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Terrace deposits (Terrace 1)	Clay, silty, stiff, mottled light grey and brown	0.4	(1.5)	0.5	(1.5)
	Clay, silty, stiff, ochreous brown mottled light grey	0.5	(1.5)	1.0	(3.5)
	Clay, silty, pebbly, stiff, light brown	1.2	(4.0)	2.2	(7.0)
Oxford Clay	Clay, firm, greenish brown streaked dark brown and grey	0.7	(2.5)	2.9	(9.5)
	Clay, partly shaly, very friable, with a few fragile shells, dark chocolate brown	0.3+	(1.0+)	3.2	(10.5)

SU 09 SW 50 0452 9300 Near Three Bridges, Ashton Keynes Block C

Surface level (+83.2 m) +273 ft
Water struck at (+81.9 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.2 m (0.5 ft)
Mineral 2.1 m (7.0 ft)
Bedrock 0.5 m+ (1.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Terrace deposit (Terrace 1)	Clay, silty, friable, brown	0.1	(0.5)	0.2	(0.5)
	Gravel, sandy in the upper part Gravel: fine with a trace of coarse to 1.2 m, passing into fine with coarse. Predominantly subrounded, platy, tabular, and subovoid, cream and buff, slightly shelly oolitic limestone, with some brown, shelly, sandy limestone, some brown, fine grained, calcareous sandstone, and a few worn belemnite fragments Sand: coarse with medium and a little fine, silty at the top. Chiefly discrete ooliths and subrounded limestone grains, with a little shell debris, a little sub-angular fine to rounded coarse quartz, and a trace of brown ironstone, buff	2.1	(7.0)	2.3	(7.5)
Oxford Clay	Clay, firm to hard, becoming shaly in the lower part, dark chocolate brown streaked grey	0.5+	(1.5+)	2.8	(9.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	50	+16	5
		-16+4	45
Sand	45	-4+1	24
		-1+$\frac{1}{4}$	17
		-$\frac{1}{4}$+1/16	4
Fines	5	-1/16	5

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.2 - 1.2	8	56	36
1.2 - 2.3	2	36	62

SU 09 SE 9 0558 9481 Near Clayhill Copse, Ashton Keynes Block B

Surface level (+84.4 m) +277 ft
Water struck at (+82.4 m)
Shell and auger (modified) 152 mm (6 in) diameter
October 1971

Overburden 0.3 m (1.0 ft)
Mineral 1.9 m (6.0 ft)
Bedrock 0.8 m+ (2.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, friable, becoming clayey and pebbly at the base, dark brown	0.3	(1.0)	0.3	(1.0)
Terrace deposits (Terrace 1)	Sandy gravel Gravel: fine with some coarse. Predominantly subrounded, tabular and platy, buff oolitic limestone, with some shelly oolitic limestone, and a little subangular to subrounded flint. A large, grey, cryptocrystalline limestone cobble with white calcite veins, at the base Sand: coarse and medium with a little fine, silty and fairly clayey. Chiefly discrete ooliths and subrounded to rounded limestone grains, with some subangular fine to rounded coarse quartz, and a trace of brown ironstone, brownish-buff	1.9	(6.0)	2.2	(7.0)
Oxford Clay	Clay, stiff, dark grey	0.8+	(2.5+)	3.0	(10.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	43	+16	7
		-16+4	36
Sand	47	-4+1	21
		$-1+\frac{1}{4}$	20
		$-\frac{1}{4}+1/16$	6
Fines	10	-1/16	10

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.3 - 1.3	10	48	42
1.3 - 2.2	11	46	43

SU 09 SE 10 | 0533 9398 | Kent End, Ashton Keynes | Block A

Surface level (+83.2 m) +273 ft
Water struck at (+81.8 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.3 m (1.0 ft)
Mineral 4.9 m (16.0 ft)
Bedrock 0.6 m+ (2.0 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Terrace deposits (Terrace 1)	Clay, silty, firm to stiff, brown	0.2	(0.5)	0.3	(1.0)
	Gravel Gravel: fine with coarse. Predominantly subrounded, tabular and platy, buff and brown, oolitic limestone, and shelly oolitic limestone, with a little sandy limestone, and a few flint and limestone cobbles Sand: coarse and medium with a little fine, silty at the top. Chiefly discrete ooliths and limestone grains, with some subangular fine to rounded coarse quartz, and brown ironstone, buff	4.9	(16.0)	5.2	(17.0)
Oxford Clay	Silt, clayey, soft, light brown	0.1	(0.5)	5.3	(17.5)
	Clay, firm to soft, light brown, becoming firm to stiff, greyish-blue	0.5+	(1.5+)	5.8	(19.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	57	+16	13
		-16+4	44
Sand	38	-4+1	19
		$-1+\frac{1}{4}$	15
		$-\frac{1}{4}+1/16$	4
Fines	5	-1/16	5

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.3 - 1.3	10	42	48
1.3 - 2.3	3	33	64
2.3 - 3.3	2	36	62
3.3 - 4.3	3	38	59
4.3 - 5.2	5	45	50

SU 09 SE 11 0594 9342 Near Waterhay Farm, Ashton Keynes Block C

Surface level (+82.0 m) +269 ft
Water struck at (+80.8 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 1.2 m (4.0 ft)
Mineral 2.5 m (8.0 ft)
Bedrock 0.3 m+ (1.0 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Alluvium	Clay, silty, with scattered pebbles, friable passing into firm, light brown	0.5	(1.5)	0.6	(2.0)
	Clay, slightly silty, very soft, light ochreous-brown mottled light grey	0.6	(2.0)	1.2	(4.0)
?Terrace deposits (Terrace 1)	Gravel Gravel: fine with some coarse. Predominantly subrounded, tabular, platy and subovoid, oolitic and shelly oolitic limestone, with a little irregular flint Sand: coarse with medium and a trace of fine, limestone grains and quartz, bluish-grey	2.5	(8.0)	3.7	(12.0)
Oxford Clay	Clay, partly shaly, containing a few fragile shells, dark chocolate brown	0.3+	(1.0+)	4.0	(13.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	60	+16	8
		-16+4	52
Sand	37	-4+1	24
		$-1+\frac{1}{4}$	11
		$-\frac{1}{4}+1/16$	2
Fines	3	-1/16	3

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
1.2 - 2.2	4	31	65
2.2 - 3.2	3	50	47
3.2 - 3.7	3	24	73

SU 09 SE 12 | 0959 9462 | North Meadow, Cricklade | Block F

Surface level (+78.3 m) +257 ft
Water struck at (+76.9 m)
Shell and auger (modified) 152 mm (6 in) diameter
October 1971

Overburden 1.4 m (4.5 ft)
Mineral 1.1 m (3.5 ft)
Bedrock 0.5 m+ (1.5 ft+)

LOG

		Thickness m	Thickness (ft)	Depth m	Depth (ft)
	Soil, with scattered pebbles, friable and dark brown, becoming clayey and medium brown	0.4	(1.5)	0.4	(1.5)
Alluvium	Clay, very soft, light grey mottled light brown, and speckled black	0.8	(2.5)	1.2	(4.0)
	Clay, pebbly, soft, containing rotted wood debris, light grey	0.2	(0.5)	1.4	(4.5)
? Terrace deposits (Terrace 1)	Gravel Gravel: fine with some coarse. Predominantly subrounded, platy and tabular, buff, oolitic, and partly shelly, coralline, and sandy oolitic limestone, with some light grey, fine grained, sandy limestone, and scattered angular to subangular, amber-coloured flint. (Many of the pebbles are encrusted with moss-like purplish-green pyrite, and a few have a honeycomb surface texture) Sand: coarse with a little medium and a trace of fine. Chiefly subrounded oolitic limestone grains, with some discrete ooliths, worn shell fragments, subrounded to rounded quartz and calcite, and a little reddish-brown ironstone, bluish-grey	1.1	(3.5)	2.5	(8.0)
Oxford Clay	Clay, stiff, dark bluish-grey, passing into shale, dark brown	0.5+	(1.5+)	3.0	(10.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	56	+16	3
		-16+4	53
Sand	41	-4+1	30
		-1+$\frac{1}{4}$	9
		-$\frac{1}{4}$+1/16	2
Fines	3	-1/16	3

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
1.4 - 2.5	3	41	56

SP 10 SW 4 | 1461 0034 | Burdocks, Fairford | Block H

Surface level (+88.7 m) +291 ft
Water not struck
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.2 m (0.5 ft)
Mineral 3.9 m (13.0 ft)
Bedrock 0.5 m+ (1.5 ft+)

LOG

		Thickness m	Thickness (ft)	Depth m	Depth (ft)
	Soil, dark brown	0.2	(0.5)	0.2	(0.5)
Terrace deposits (Terrace 2)	Sandy gravel, with a little tufa cement at the top Gravel: fine with coarse. Predominantly subrounded, platy, tabular and subovoid, cream, buff, and brown oolitic limestone, and shelly oolitic limestone, with some fine grained sandy limestone, some coarse grained sandy, shelly limestone, and a little coralline limestone. Scattered limestone cobbles throughout Sand: coarse with medium and some fine, slightly silty at the top. Chiefly subangular to subrounded oolitic limestone grains, with a little shell debris, and a trace of calcite grains. Subangular to subrounded fine quartz and rounded coarse quartz occurs in small amounts, light brown	3.9	(13.0)	4.1	(13.5)
Kellaways Beds	Clay, sandy, silty, stiff, containing shell and crinoid fragments, light greyish-brown	0.4	(1.5)	4.5	(15.0)
Cornbrash	Limestone, rubbly, sandy, containing much shell debris, friable, passing into hard, light yellowish-brown	0.1+	(0.5+)	4.6	(15.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	44	+16	10
		-16+4	34
Sand	50	-4+1	25
		-1+$\frac{1}{4}$	18
		-$\frac{1}{4}$+1/16	7
Fines	6	-1/16	6

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.2 - 1.2	8	45	47
1.2 - 2.2	5	48	47
2.2 - 3.2	5	56	39
3.2 - 4.1	4	51	45

SP 10 SE 4 1625 0089 Near Beaumoor Farm, Fairford Block G

Surface level (+82.0 m) +269 ft
Water struck at (+79.6 m)
Shell and auger (modified) 152 mm (6 in) diameter
June 1971

Overburden 0.6 m (2.0 ft)
Mineral 4.2 m (14.0 ft)
Bedrock 0.1 m+ (0.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Terrace deposits (Terrace 1)	Clay, silty, pebbly, dark brown	0.5	(1.5)	0.6	(2.0)
	Sandy gravel, with a silty calcareous matrix to 1.7 m Gravel: fine with some coarse to 2.6 m passing into fine with coarse. Predominantly subrounded, platy and tabular, grey and brown oolitic limestone, with some shelly oolitic limestone. Sand: coarse and medium with a little fine, silty in the upper part. Limestone grains and quartz, buff to 1.7 m, passing into yellowish-brown.	4.2	(14.0)	4.8	(16.0)
Kellaways Beds	Mudstone, sandy and shelly, hard, brown passing into greyish-blue	0.1+	(0.5+)	4.9	(16.0)

GRADING

Mean for Deposit				Bulk Samples			
	%	mm	%	Depth below surface (m)	Percentages Fines	Sand	Gravel
Gravel	46	+16	12				
		-16+4	34	0.6 - 1.6	7	47	46
				1.6 - 2.6	8	48	44
				2.6 - 3.6	2	49	49
Sand	49	-4+1	24	3.6 - 4.8	3	49	48
		-1+$\frac{1}{4}$	21				
		-$\frac{1}{4}$+1/16	4				
Fines	5	-1/16	5				

SP 10 SE 7 1885 0043 Claydon Farm, East of Fairford

Surface level (+79.6 m) +261 ft
Water struck at (+78.9 m)
Shell and auger (modified) 152 mm (6 in) diameter
June 1971

Waste 1.2 m (4.0 ft)
Bedrock 2.3 m+ (7.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Terrace deposits (Terrace 2)	Clay, silty, light yellowish-brown	0.6	(2.0)	0.7	(2.5)
	'Very clayey' sandy gravel Gravel: fine with a little medium and coarse. Predominantly subrounded, platy to ovoid, buff and brown oolitic limestone, with some subangular to subrounded, blue and brown, shelly limestone, and some brown, fine grained, sandy limestone. Scattered tabular, coarse-grained sandy limestone cobbles Sand: medium and coarse with fine, silty and very clayey. Chiefly discrete ooliths and subrounded limestone grains, with rounded quartz, orange-brown	0.5	(1.5)	1.2	(4.0)
Kellaways Beds	Clay, sandy, silty, becoming very silty, ochreous-brown mottled pale bluish-grey	1.2	(4.0)	2.4	(8.0)
	Clay, very silty, firm, purplish-chocolate brown mottled pale bluish-grey	0.2	(0.5)	2.6	(8.5)
	Clay, very silty, firm to friable, dark grey locally mottled dark brown, passing into dense clayey silt, dark grey	0.8	(2.5)	3.4	(11.0)
	Clay, silty, containing fragile shells, dark bluish grey	0.1+	(0.5+)	3.5	(11.5)

SU 19 NW 20 1025 9785 Down Ampney Block H

Surface level (+89.3 m) +293 ft
Water struck at (+86.3 m)
Shell and auger (modified) 152 mm (6 in) diameter
October 1971

Overburden 1.2 m (4.0 ft)
Mineral 3.4 m (11.0 ft)
Bedrock 0.4 m+ (1.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, clayey and slightly pebbly in the lower part, dark brown	0.2	(0.5)	0.2	(0.5)
Terrace deposits (Terrace 3)	Clay, silty, pebbly, stiff, reddish-brown	0.8	(2.5)	1.0	(3.5)
	Clay, sandy, very pebbly, stiff, brown	0.2	(0.5)	1.2	(4.0)
	Gravel, tufa cemented and hard down to 1.8 m	3.4	(11.0)	4.6	(15.0)
	Gravel: fine with coarse. Predominantly subrounded, platy and tabular, brown and buff oolitic limestone, with a little sandy and shelly oolitic limestone, some white and brown, angular to subangular flint, and a trace of rounded quartz. In the lower part scattered worn shell and belemnite fragments with rare grey mudstone, and a few flint and limestone cobbles				
	Sand: coarse and medium with a little fine, silty and clayey at the top. Chiefly discrete ooliths, subrounded limestone grains, and rounded quartz, with some brown and purplish-brown ironstone, and a trace of dark green glauconite				
Oxford Clay	Clay, stiff, greyish-blue	0.4+	(1.5+)	5.0	(16.5)

GRADING

	Mean for Deposit %	mm	%
Gravel	50	+16	13
		-16+4	37
Sand	44	-4+1	20
		-1+$\frac{1}{4}$	21
		-$\frac{1}{4}$+1/16	3
Fines	6	-1/16	6

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
1.2 - 2.2	12	45	43
2.2 - 3.2	5	47	48
3.2 - 4.2	2	43	55
4.2 - 4.6	3	39	58

SU 19 NW 21 1035 9665 Near Charnock Wood, Down Ampney Block D

Surface level (+82.9 m) +272 ft
Water struck at (+80.9 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.8 m (2.5 ft)
Mineral 6.2 m (20.5 ft)
Bedrock 0.5 m+ (1.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Made ground, soil and ash	0.2	(0.5)	0.2	(0.5)
Terrace deposits (Terrace 2)	Clay, pebbly, silty, firm, light brown	0.6	(2.0)	0.8	(2.5)
	Gravel, with soft, pebbly, yellow silt from 5.8 to 5.9 m Gravel: fine with some coarse, becoming coarser below 4.8 m Predominantly subrounded, tabular and platy, cream and light brown oolitic limestone, and partly shelly, sandy, oolitic limestone, with a little bluish-grey, very shelly limestone, and a trace of well rounded vein quartz Sand: coarse and medium with a little fine, locally silty. Chiefly discrete ooliths and subrounded limestone grains with some sub-angular fine, to rounded coarse quartz, a little fine grained sandstone, and a trace of brown ironstone	6.2	(20.5)	7.0	(23.0)
Oxford Clay	Clay, silty, stiff, brown	0.4	(1.5)	7.4	(24.5)
	Clay, firm to hard, with fragile shells, bluish-grey	0.1+	(0.5+)	7.5	(24.5)

GRADING

Bulk Samples

	Mean for Deposit %	mm	%	Depth below surface (m)	Percentages Fines	Sand	Gravel
Gravel	53	+16	9	0.8 - 1.8	7	43	50
		-16+4	44	1.8 - 2.8	6	32	62
				2.8 - 3.8	3	47	50
Sand	41	+4-1	22	3.8 - 4.8	10	47	43
		-1+$\frac{1}{4}$	15	4.8 - 5.8	5	43	52
		-$\frac{1}{4}$+1/16	4	5.8 - 5.9	Pebbly silt		
				5.9 - 7.0	2	38	60
Fines	6	-1/16	6				

SU 19 NW 22 1041 9544 East of Latton Block D

Surface level (+79.6 m) +261 ft
Water struck at (+78.1 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.6 m (2.0 ft)
Mineral 2.7 m (9.0 ft)
Bedrock 0.5 m+ (1.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Alluvium	Clay, silty light brown	0.5	(1.5)	0.6	(2.0)
? Terrace deposits (Terrace 1)	Gravel, silty and sandy in the upper part Gravel: fine with some coarse to 1.6 m, passing into fine with coarse. Predominantly subrounded, platy and tabular, buff and cream oolitic limestone, with brown and bluish-grey, shelly oolitic limestone, and some buff sandy limestone Sand: coarse and medium with fine, silty to 1.6 m, passing into coarse with medium and a trace of fine. Chiefly discrete ooliths and sub-rounded limestone grains, with a little subrounded to rounded quartz, and a trace of brown ironstone, buff passing into brownish-grey	2.7	(9.0)	3.3	(11.0)
Oxford Clay	Clay, silty, firm to stiff, containing abundant shell fragments, dark-grey	0.5+	(1.5+)	3.8	(12.5)

GRADING

	Mean for Deposit %	mm	%
Gravel	57	+16	10
		-16+4	47
Sand	38	-4+1	20
		-1+$\frac{1}{4}$	13
		-$\frac{1}{4}$+1/16	5
Fines	5	-1/16	5

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.6 - 1.6	10	47	43
1.6 - 2.6	2	32	66
2.6 - 3.3	2	33	65

SU 19 NW 23 1165 9787 Castle Hill Farm, Down Ampney

Surface level (+86.3 m) +283 ft
Water not struck
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Waste 1.4 m (4.5 ft)
Bedrock 1.7 m+ (5.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Terrace deposits (Terrace 2)	Clay, pebbly, dark brown	0.1	(0.5)	0.2	(0.5)
	Clay, silty, pebbly, light brown	0.2	(0.5)	0.4	(1.5)
	Clay, silty, slightly pebbly, firm, yellow mottled light grey, passing into light grey mottled yellow	1.0	(3.5)	1.4	(4.5)
Oxford Clay	Clay, stiff, blue mottled ochreous-brown, passing into bluish-grey mottled brown, with occasional brown-weathered pyritised small ammonites	1.6	(5.5)	3.0	(10.0)
	Clay, silty, bluish-grey	0.1+	(0.5+)	3.1	(10.0)

SU 19 NW 24 1105 9624 Disused Airfield, Down Ampney Block D

Surface level (+80.2 m) +263 ft
Water struck at (+77.9 m)
Shell and auger (modified) 152 mm (6 in) diameter
October 1971

Overburden 1.2 m (4.0 ft)
Mineral 3.2 m (10.5 ft)
Bedrock 0.3 m+ (1.0 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, light orange-brown	0.2	(0.5)	0.2	(0.5)
Terrace deposits (Terrace 1B)	Clay, sandy, pebbly, hard to stiff, light orange-brown	1.0	(3.5)	1.2	(4.0)
	Sandy gravel Gravel: fine with some coarse to 3.2 m, passing into fine with coarse. Predominantly subrounded, platy, buff, and light brown, oolitic limestone, and partly shelly oolitic limestone, with some black flint with white patina, and a little well rounded quartz. A few flint cobbles at the base Sand: coarse and medium with a little fine, silty at the top. Chiefly discrete ooliths and subrounded limestone grains, with some subangular fine, to well-rounded coarse quartz, some brown ironstone, and a little dark green glauconite	3.2	(10.5)	4.4	(14.5)
Oxford Clay	Clay, stiff, with a few shells, reddish-brown passing into dark greyish-blue	0.3+	(1.0+)	4.7	(15.5)

GRADING

Bulk Samples

	Mean for Deposit %	mm	%
Gravel	45	+16	9
		-16+4	36
Sand	51	-4+1	26
		-1+¼	20
		-¼+1/16	5
Fines	4	-1/16	4

Depth below surface (m)	Percentages Fines	Sand	Gravel
1.2 - 2.2	7	53	40
2.2 - 3.2	5	54	41
3.2 - 4.4	2	45	53

SU 19 NW 25 1177 9588 Near Alex Farm, Cricklade Block E

Surface level (+78.0 m) +256 ft
Water struck at (+76.7 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 1.3 m (4.5 ft)
Mineral 2.5 m (8.0 ft)
Bedrock 0.5 m+ (1.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Terrace deposits (Terrace 1A)	Clay, silty, dark brown	0.2	(0.5)	0.3	(1.0)
	Clay, very silty, light brown mottled light grey	1.0	(3.5)	1.3	(4.5)
	Gravel	2.5	(8.0)	3.8	(12.5)
	Gravel: fine with some coarse. Prediminantly subrounded, platy, to tabular, buff and light brown oolitic limestone, and slightly shelly oolitic limestone, with a little light brown sandy limestone. Scattered flint, and brown ironstone, with occasional worn shell and belemnite fragments				
	Sand: coarse and medium with a little fine. Chiefly discrete ooliths and subrounded limestone grains, with slightly lesser amounts of subrounded to well rounded quartz, some purplish and brown ironstone, and a little dark green glauconite				
Oxford Clay	Clay, firm to stiff, bluish-grey	0.5+	(1.5+)	4.3	(14.0)

GRADING

Bulk Samples

	Mean for Deposit %	mm	%
Gravel	48	+16	6
		-16+4	42
Sand	48	-4+1	24
		-1+$\frac{1}{4}$	20
		-$\frac{1}{4}$+1/16	4
Fines	4	-1/16	4

Depth below surface (m)	Percentages Fines	Sand	Gravel
1.3 - 2.3	6	41	53
2.3 - 3.3	3	54	43
3.3 - 3.8	3	52	45

SU 19 NW 26 1193 9688 Near Manor Farm, Marston Meysey

Surface level (+78.6 m) +258 ft
Water not struck
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Waste 2.1 m (7.0 ft)
Bedrock 0.7 m+ (2.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Made ground, soil, clay and stones	0.3	(1.0)	0.3	(1.0)
Terrace deposits (Terrace 1A)	Clay, silty, pebbly, stiff, light brown	0.4	(1.5)	0.7	(2.5)
	Clay, silty, soft, light brown	0.7	(2.5)	1.4	(4.5)
	Silt, clayey, sandy, pebbly, light brown mottled bluish-grey	0.7	(2.5)	2.1	(7.0)
Oxford Clay	Clay, firm, with scattered fragile shells, brownish-blue passing into greyish-blue	0.7+	(2.5+)	2.8	(9.0)

SU 19 NW 27 1305 9957 Furzey Hill, near Meysey Hampton Block H

Surface level (+102.1 m) +335 ft
Water struck at (+99.1 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.2 m (0.5 ft)
Mineral 4.3 m (14.0 ft)
Waste 0.9 m (3.0 ft)
Bedrock 0.4 m+ (1.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, pebbly, dark brown	0.2	(0.5)	0.2	(0.5)
Terrace deposits (Terrace 4)	Gravel, tufa cemented and very hard from 0.5 to 0.7 m, clayey from 1.4 to 1.5 m, sandy to 2.2 m Gravel: fine with some coarse to 2.2 m, passing into fine with coarse. Predominantly sub-rounded, platy, buff and brown oolitic limestone, with some shelly oolitic limestone, a little tabular, sandy, oolitic limestone and fairly common subangular flint. A few worn shells, belemnite fragments and irregular flint cobbles in the lower part Sand: coarse and medium with fine becoming coarser below 2.2 m. Roughly equal amounts of limestone (discrete ooliths and subrounded limestone grains) and subangular fine to rounded coarse quartz Common brown and purplish-brown ironstone, with a trace of dark green glauconite	4.3	(14.0)	4.5	(15.0)
	Silt, clayey, sandy, soft, light grey	0.7	(2.5)	5.2	(17.0)
	Clay, silty, pebbly, firm, with occasional shells, dark grey	0.2	(0.5)	5.4	(18.0)
Oxford Clay	Clay, firm to stiff, greyish-blue	0.4+	(1.5+)	5.8	(19.0)

GRADING

Bulk Samples

	Mean for Deposit %	mm	%	Depth below surface (m)	Percentages Fines	Sand	Gravel
Gravel	56	+16	14	0.2 - 1.2	6	56	38
		-16+4	42	1.2 - 2.2	9	51	40
				2.2 - 3.2	3	30	67
Sand	39	-4+1	20	3.2 - 4.5	2	23	75
		-1+¼	14				
		-¼+1/16	5				
Fines	5	-1/16	5				

SU 19 NW 28 1296 9690 Marston Meysey Block E

Surface level (+78.6 m) +258 ft
Water struck at (+75.8 m)
Shell and auger (modified) 152 mm (6 in) diameter
June 1971

Overburden 2.8 m (9.0 ft)
Mineral 1.2 m (4.0 ft)
Bedrock 0.5 m+ (1.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Made ground, stony soil with wood fragments	0.1	(0.5)	0.1	(0.5)
Terrace deposits (Terrace 1)	Clay, silty, with occasional limestone fragments, light brown	1.1	(3.5)	1.2	(4.0)
	Gravel, sandy, very clayey, light brown	0.2	(0.5)	1.4	(4.5)
	Silt, sandy, slightly pebbly, soft light brown	1.4	(4.5)	2.8	(9.0)
	Gravel	1.2	(4.0)	4.0	(13.0)
	Gravel: fine with coarse. Predominantly subrounded, tabular brown oolitic limestone, and shelly oolitic limestone, with some flint				
	Sand: coarse with medium and a little fine, limestone grains and quartz, brown				
Oxford Clay	Clay, firm, bluish-grey	0.5+	(1.5)	4.5	(15.0)

GRADING

Bulk Samples

	Mean for Deposit %	mm	%	Depth below surface (m)	Percentages Fines	Sand	Gravel
Gravel	70	+16	13	2.8 - 4.0	4	26	70
		-16+4	57				
Sand	26	-4+1	16				
		-1+$\frac{1}{4}$	7				
		-$\frac{1}{4}$+1/16	3				
Fines	4	-1/16	4				

SU 19 NW 29 1353 9606 Near Marston Meysey Bridge Block E

Surface level (+75.6 m) +248 ft
Water struck at (+73.9 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.3 m (1.0 ft)
Mineral 2.3 m (7.5 ft)
Waste 0.1 m (0.5 ft)
Bedrock 0.5 m+ (1.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Alluvium	Clay, silty, dark brown	0.2	(0.5)	0.3	(1.0)
? Terrace deposits (Terrace 1A)	Gravel Gravel: fine with some coarse to 1.3 m, passing into fine with coarse. Predominantly subrounded, platy, cream and buff oolitic limestone, with some brown, very shelly, partly coralline, oolitic limestone, and a little brown, friable, very fine grained, shelly calcareous sandstone Sand: coarse with medium and a little fine. Chiefly discrete ooliths and subrounded limestone grains, with subangular fine to rounded coarse quartz, some brown ironstone, and a trace of dark green glauconite, brown	2.3	(7.5)	2.6	(8.5)
	Clay, pebbly, firm, reddish-brown mottled grey	0.1	(0.5)	2.7	(9.0)
Oxford Clay	Clay, stiff, containing fragile shells, blue	0.5+	(1.5+)	3.2	(10.5)

GRADING

Bulk Samples

	Mean for Deposit %	mm	%	Depth below surface (m)	Percentages Fines	Sand	Gravel
Gravel	49	+16	6	0.3 - 1.3	6	55	39
		-16+4	43	1.3 - 2.6	4	39	57
Sand	46	-4+1	25				
		$-1+\frac{1}{4}$	16				
		$-\frac{1}{4}+1/16$	5				
Fines	5	-1/16	5				

SU 19 NW 30 1398 9641 South of Cox's Farm, Dunfield Block E

Surface level (+75.6 m) +248 ft
Water struck at (+74.5 m)
Shell and auger (modified) 152 mm (6 in) diameter
June 1971

Overburden 0.5 m (1.5 ft)
Mineral 2.3 m (7.5 ft)
Bedrock 0.6 m+ (2.0 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.2	(0.5)	0.2	(0.5)
Terrace deposits (Terrace 1)	Clay, silty, pebbly at the base, light brown	0.3	(1.0)	0.5	(1.5)
	Gravel, very sandy at the base Gravel: fine with coarse. Predominantly subrounded, platy and tabular, brown and bluish-grey oolitic limestone, and shelly oolitic limestone, with a little flint and brown ironstone. Scattered worn shells throughout, flint cobbles in the lower part Sand: coarse with medium and a little fine. Chiefly oolitic limestone grains, and quartz, with some ironstone, grey	2.3	(7.5)	2.8	(9.0)
Oxford Clay	Clay, firm, bluish-grey	0.6+	(2.0+)	3.4	(11.0)

GRADING

Bulk Samples

	Mean for Deposit %	mm	%
Gravel	50	+16	7
		-16+4	43
Sand	47	-4+1	24
		$-1+\frac{1}{4}$	19
		$-\frac{1}{4}+1/16$	4
Fines	3	-1/16	3

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.5 - 1.5	5	41	54
1.5 - 2.5	1	48	51
2.5 - 2.8	4	67	29

SU 19 NW 31 1446 9545 Castle Eaton Farm

Surface level (+79.9 m) +262 ft
Water struck at (+78.7 m)
Shell and auger (modified) 152 mm (6 in) diameter
June 1971

Waste 1.7 m (5.5 ft)
Bedrock 1.3 m+ (4.5 ft+)

LOG

		Thickness m	Thickness (ft)	Depth m	Depth (ft)
	Soil, silty and clayey, dark brown	0.2	(0.5)	0.2	(0.5)
Terrace deposits (Terrace 2)	Clay, silty, with scattered pebbles, light-brown	0.5	(1.5)	0.7	(2.5)
	'Clayey' sandy gravel, with 20 mm light grey silty clay layers	0.7	(2.5)	1.4	(4.5)
	Gravel: fine with some coarse. Predominantly subrounded, tabular, oolitic, limestone, with a little flint Sand: coarse and medium with a little fine, silty and clayey. Limestone grains and quartz, orange-brown				
	Clay, silty, pebbly, light brownish-grey	0.3	(1.0)	1.7	(5.5)
Oxford Clay	Clay, brownish-grey streaked blue	1.1	(3.5)	2.8	(9.0)
	Clay, silty, greyish-blue	0.2+	(0.5+)	3.0	(10.0)

GRADING

	Mean for Deposit %	mm	%	Depth below surface (m)	Bulk Samples Percentages Fines	Sand	Gravel
Gravel	32	+16	2	0.7 - 1.4	16	52	32
		-16+4	30				
Sand	52	-4+1	24				
		-1+$\frac{1}{4}$	20				
		-$\frac{1}{4}$+1/16	8				
Fines	16	-1/16	16				

SU 19 NE 6 | 1557 9673 | Kempsford | Block E

Surface level (+74.7 m) +245 ft
Water struck at (73.2 m)
Shell and auger (modified) 152 mm (6 in) diameter
June 1971

Overburden 1.5 m (5.0 ft)
Mineral 1.4 m (4.5 ft)
Bedrock 0.5 m+ (1.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
Alluvium	Clay, silty, friable, dark brown	0.3	(1.0)	0.3	(1.0)
	Clay, silty, firm, light brown mottled grey and reddish-brown, passing into light grey mottled reddish-brown	0.7	(2.5)	1.0	(3.5)
	Silt, clayey, soft, with scattered shells and a few thin layers of shells (gastropods and lamellibranchs), light grey mottled reddish-brown	0.3	(1.0)	1.3	(4.5)
	Silt, carbonaceous, soft, with scattered shells, dark grey to black	0.2	(0.5)	1.5	(5.0)
Terrace deposits (Terrace 1)	Gravel	1.4	(4.5)	2.9	(9.5)
	Gravel: fine with some coarse. Predominantly subrounded, platy, cream, buff and brown oolitic limestone, with a little platy to tabular, occasionally ovoid, shelly and very shelly oolitic limestone, a little subangular brown flint, and a trace of subrounded, black, argillaceous siltstone. A light grey argillaceous limestone cobble, and a few angular to subangular black flint cobbles (possibly artifacts) in the upper part.				
	Sand: coarse and medium with a trace of fine. Chiefly discrete ooliths and subrounded limestone grains (with a little shell debris, echinoid debris, and rare foraminiferal tests), with some subangular fine to rounded coarse quartz, a little brown ironstone, a trace of light green siltstone, a trace of white, very fine grained sandstone, and rare dark green glauconite				
Oxford Clay	Clay, firm, with a few fragile shells, bluish grey	0.5+	(1.5+)	3.4	(11.0)

GRADING

	Mean for Deposit %	mm	%	Bulk Samples Depth below surface (m)	Percentages Fines	Sand	Gravel
Gravel	62	+16	10	1.5 - 2.5	3	33	64
		-16+4	52	2.5 - 2.9	4	39	57
Sand	35	-4+1	16				
		-1+4	16				
		$-\frac{1}{4}+1/16$	3				
Fines	3	-1/16	3				

SU 19 NE 7 | 1581 9593 | South of Kempsford | Block E

Surface level (+76.2 m) +250 ft
Water struck at (+74.9 m)
Shell and auger (modified) 152 mm (6 in) diameter
June 1971

Overburden 0.7 m (2.5 ft)
Mineral 2.0 m (6.5 ft)
Bedrock 0.6 m+ (2.0 ft+)

LOG

		Thickness m	Thickness (ft)	Depth m	Depth (ft)
	Made ground, soil, ash, and stones	0.2	(0.5)	0.2	(0.5)
Terrace deposits (Terrace 1A)	Clay, pebbly, silty, light brown	0.5	(1.5)	0.7	(2.5)
	'Clayey' sandy gravel	2.0	(6.5)	2.7	(8.5)
	Gravel: fine with some coarse, subrounded, platy and tabular, oolitic limestone Sand: coarse and medium with fine, silty and clayey, oolitic limestone and quartz, light brown				
Oxford Clay	Clay, silty, brown passing into greyish-blue	0.6+	(2.0+)	3.3	(11.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	32	+16	1
		-16+4	31
Sand	55	-4+1	24
		-1+$\frac{1}{4}$	23
		-$\frac{1}{4}$+1/16	8
Fines	13	-1/16	13

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.7 - 1.3	12	51	37
1.3 - 2.3	18	55	27
2.3 - 2.7	5	59	36

SU 19 NE 8 | 1712 9961 | North of Whelford | Block G

Surface level (+78.3 m) +257 ft
Water struck at (+77.3 m)
Shell and auger (modified) 152 mm (6 in) diameter
June 1971

Overburden 0.4 m (1.5 ft)
Mineral 4.0 m (13.0 ft)
Bedrock 0.4 m+ (1.5 ft+)

LOG

		Thickness m	Thickness (ft)	Depth m	Depth (ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Alluvium	Clay, silty, light brown	0.3	(1.0)	0.4	(1.5)
? Terrace deposits (Terrace 1)	Gravel, with buff, silty, calcareous matrix in the upper part Gravel: fine with coarse. Predominantly subrounded, platy to tabular, cream, oolitic limestone, with some cream and bluish-grey, partly shelly, to very shelly oolitic limestone, a little grey, fine-grained sandy limestone, a little coralline limestone, a trace of glauconitic oolitic limestone. Scattered, worn, large belemnite fragments Sand: coarse with medium and a little fine, silty at the top and base. Chiefly discrete ooliths and subrounded limestone grains with a little shell debris, rare foraminiferal tests, and some subangular fine to subrounded coarse quartz, grey passing into brown	4.0	(13.0)	4.4	(14.5)
Oxford Clay	Clay, slightly silty, firm, bluish-grey	0.4+	(1.5+)	4.8	(16.0)

GRADING

	Mean for Deposit %	mm	%
Gravel	55	+16	15
		-16+4	40
Sand	37	-4+1	22
		$-1+\frac{1}{4}$	12
		$-\frac{1}{4}+1/16$	3
Fines	8	-1/16	8

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.4 - 1.4	12	36	52
1.4 - 2.4	3	31	66
2.4 - 3.4	1	39	60
3.4 - 4.4	16	43	41

SU 19 NE 9 | 1706 9866 | Whelford | Block G

Surface level (+75.9 m) +249 ft
Water struck at (+74.7 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.5 m (1.5 ft)
Mineral 4.0 m (13.0 ft)
Waste 0.1 m (0.5 ft)
Bedrock 0.4 m+ (1.5 ft+)

LOG

		Thickness m	Thickness (ft)	Depth m	Depth (ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Terrace deposits (Terrace 1)	Clay, silty, dark brown	0.4	(1.5)	0.5	(1.5)
	Gravel	4.0	(13.0)	4.5	(15.0)
	Gravel: fine with coarse. Predominantly subrounded, platy and tabular, buff oolitic limestone, with some slightly to very shelly, oolitic limestone, and a little brown, fine grained, sandy, limestone. A few flint cobbles near the base				
	Sand: coarse with medium and a little fine, silty at the top. Chiefly discrete ooliths and subrounded limestone grains, with small amounts of sub-angular fine to rounded coarse quartz, and a trace of brown ironstone				
	Silt, clayey, sandy, soft, light grey	0.1	(0.5)	4.6	(15.0)
Oxford Clay	Clay, firm to stiff, partly shaly at top, passing into firm to hard, increasingly shaly, with scattered fragile shells, dark brown	0.4+	(1.5+)	5.0	(16.5)

GRADING

Mean for Deposit

	%	mm	%
Gravel	54	+16	9
		-16+4	45
Sand	41	-4+1	23
		-1+¼	14
		-¼+1/16	4
Fines	5	-1/16	5

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.5 - 1.5	11	37	52
1.5 - 2.5	2	39	59
2.5 - 3.5	3	39	58
3.5 - 4.5	6	45	49

SU 19 NE 10 1686 9753 Moor Ground Barn, Kempsford Block G

Surface level (+75.0 m) + 246 ft
Water struck at (+74.3 m)
Shell and auger (modified) 152 mm (6 in) diameter
June 1971

Overburden 0.7 m (2.5 ft)
Mineral 4.2 m (14.0 ft)
Bedrock 0.5 m+ (1.5 ft+)

LOG

		Thickness m	Thickness (ft)	Depth m	Depth (ft)
	Soil, dark brown	0.3	(1.0)	0.3	(1.0)
Terrace deposits (Terrace 1)	Clay, silty, slightly pebbly, friable to stiff, dark brown	0.4	(1.5)	0.7	(2.5)
	Gravel, with buff calcareous matrix to 1.4 m, and 20 mm greyish-green silt layers from 1.7 to 2.7 m	4.2	(14.0)	4.9	(16.0)
	Gravel: fine with coarse. Predominantly subrounded, platy, buff and brown oolitic limestone, with some buff, partly shelly, and bluish-grey, very shelly oolitic limestone, a little coralline limestone, and a little sandy limestone. A few irregular flint cobbles at the base				
	Sand: coarse with medium and a little fine, silty between 1.7 and 2.7 m. Chiefly discrete ooliths and subrounded limestone grains, with a little shell debris, some subangular to subrounded quartz (mostly fine grained), a little brown ironstone, and a trace of dark green glauconite, bluish-grey and buff				
Oxford Clay	Clay, shaly, firm to hard, with common shell fragments, dark grey	0.5+	(1.5+)	5.4	(18.0)

GRADING

	Mean for Deposit %	mm	%
Gravel	57	+16	12
		-16+4	45
Sand	37	-4+1	20
		-1+$\frac{1}{4}$	13
		-$\frac{1}{4}$+1/16	4
Fines	6	-1/16	6

Bulk Samples Depth below surface (m)	Percentages Fines	Sand	Gravel
0.7 - 1.7	5	37	58
1.7 - 2.7	14	32	54
2.7 - 3.7	2	42	56
3.7 - 4.7	2	36	62
4.7 - 4.9	6	38	56

SU 19 NE 11 | 1692 9657 | East of Kempsford | Block G

Surface level (+74.7 m) +245 ft
Water struck at (+73.7 m)
Shell and auger (modified) 152 mm (6 in) diameter
June 1971

Overburden 0.7 m (2.5 ft)
Mineral 3.0 m (10.0 ft)
Bedrock 0.5 m+ (1.5 ft+)

LOG

		Thickness m	Thickness (ft)	Depth m	Depth (ft)
	Soil and humus, brown	0.2	(0.5)	0.2	(0.5)
Terrace deposits (Terrace 1)	Clay, silty, pebbly, light brown passing into yellowish-brown	0.5	(1.5)	0.7	(2.5)
	Gravel, with light grey clay lenses, and patches of tufa cement from 2.3 to 3.2 m, and a few 50 mm soft, silty, blue clay layers from 3.2 to 3.7 m	3.0	(10.0)	3.7	(12.0)
	Gravel: fine with very little coarse. Predominantly subrounded, platy to tabular, cream and buff (locally iron stained) oolitic limestone, and shelly oolitic limestone, with some shelly, coralline limestone, a little subangular, cream and brown flint, a little subrounded brown ironstone, and a trace of black argillaceous siltstone Sand: coarse with medium and a trace of fine. Chiefly subrounded limestone grains and discrete ooliths, with a little shell debris, some subangular fine to rounded coarse quartz, some brown ironstone, and a trace of dark green glauconite, orange-brown to 2.3 m, passing into bluish-grey				
Oxford Clay	Clay, firm, with fragile shells, greyish-blue	0.5+	(1.5+)	4.2	(14.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	53	+16	3
		-16+4	50
Sand	43	-4+1	22
		-1+4	18
		$-\frac{1}{4}$+1/16	3
Fines	4	-1/16	4

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.7 - 1.7	5	40	55
1.7 - 2.7	2	41	57
2.7 - 3.7	4	48	48

SU 19 NE 12 | 1694 9535 | Hannington Wick | Block F

Surface level (+74.7 m) +245 ft
Water struck at (+73.7 m)
Shell and auger (modified) 152 mm (6 in) diameter
June 1971

Overburden 0.9 m (3.9 ft)
Mineral 1.3 m (4.5 ft)
Waste 0.4 m (1.5 ft)
Bedrock 0.4 m+ (1.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.2	(0.5)	0.2	(0.5)
Terrace deposits (Terrace 1A)	Clay, silty, firm, brown	0.7	(2.5)	0.9	(3.0)
	Sandy gravel, with brown, clayey silt lenses below 1.9 m	1.3	(4.5)	2.2	(7.0)
	Gravel: fine with very little coarse. Predominantly subrounded, platy to tabular, cream and buff, partly shelly, oolitic limestone, brown and grey, platy, fine grained sandy limestone, with a little shelly, coralline limestone, and rare well rounded ovoid quartz.				
	Sand: coarse with medium and a little fine. Chiefly subrounded limestone grains, discrete ooliths, and shell debris, with subangular fine, to rounded coarse quartz, some brown ironstone, a little sandy ironstone, and rare dark green glauconite, brown				
	Silt, pebbly, slightly carbonaceous in the the upper part, soft, dark grey	0.4	(1.5)	2.6	(8.5)
Oxford Clay	Clay, firm, bluish-grey	0.4+	(1.5+)	3.0	(10.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	43	+16	3
		-16+4	40
Sand	53	-4+1	27
		$-1+\frac{1}{4}$	20
		$-\frac{1}{4}+1/16$	6
Fines	4	1/16	4

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.9 - 1.9	3	54	43
1.9 - 2.2	5	50	45

SU 19 NE 13 1814 9941 Near Long Doles Farm, Whelford Block G

Surface level (+76.2 m) +250 ft
Water struck at (+75.6 m)
Shell and auger (modified) 152 mm (6 in) diameter
October 1971

Overburden 0.5 m (1.5 ft)
Mineral 6.6 m (21.5 ft)
Bedrock 0.3 m+ (1.0 ft+)

LOG

		Thickness m	Thickness (ft)	Depth m	Depth (ft)
	Soil, friable, dark brown	0.2	(0.5)	0.2	(0.5)
Terrace deposits (Terrace 1)	Clay, silty, pebbly, firm, light brown	0.3	(1.0)	0.5	(1.5)
	Gravel, with 20 mm soft, sandy, grey silt layer at 4.4 m, and localised tufa cement below 6.5 m	6.6	(21.5)	7.1	(23.5)
	Gravel: generally fine with coarse, coarser from 2.5 to 3.5 m. Predominantly subrounded, platy, cream buff, and brown, partly shelly, to very shelly oolitic limestone, with some cream, ovoid, coralline limestone, some very platy, light grey, fine-grained calcareous sandstone, and a trace of worn belemnite fragments. Scattered flint cobbles below 5.5 m, a few tabular limestone cobbles at the base				
	Sand: coarse with medium and a little fine. Chiefly discrete ooliths, limestone grains, and a little shell debris, with some subangular fine to rounded coarse quartz, and a trace of brown ironstone, buff				
Oxford Clay	Clay, stiff, containing fragile shells, greyish-blue	0.3+	(1.0+)	7.4	(24.5)

GRADING

Mean for Deposit

	%	mm	%
Gravel	50	+16	10
		-16+4	40
Sand	47	-4+1	26
		$-1+\frac{1}{4}$	17
		$-\frac{1}{4}+1/16$	4
Fines	3	-1/16	3

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.5 - 1.5	3	47	50
1.5 - 2.5	3	43	54
2.5 - 3.5	2	34	64
3.5 - 4.5	2	47	51
4.5 - 5.5	2	55	43
5.5 - 6.5	2	48	50
6.5 - 7.1	4	58	38

SU 19 NE 14 1792 8967 Near Jenner's Farm, Whelford Block G

Surface level (+75.6 m) + 248 ft
Water struck at (+74.3 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.6 m (2.0 ft)
Mineral 4.8 m (16.0 ft)
Waste 0.2 m (0.5 ft)
Bedrock 0.4 m+ (1.5 ft +)

LOG

		Thickness m	Thickness (ft)	Depth m	Depth (ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Alluvium	Clay, silty, containing small gastropod shells, dark brown	0.5	(1.5)	0.6	(2.0)
? Terrace deposits (Terrace 1)	Gravel Gravel: fine with very little coarse to 2.6 m, passing into fine with coarse. Predominantly platy, tabular, occasionally ovoid, subrounded, cream, brown and purple-stained oolitic limestone, with brown very sandy limestone, a little shelly coralline limestone, and a trace of sub-angular flint Sand: coarse and medium with a little fine, silty at the top. Chiefly subrounded lime-stone grains, discrete ooliths, and a little shell and coral debris, with subangular fine to rounded coarse quartz, some brown ironstone and a little green glauconite, buff	4.8	(16.0)	5.4	(18.0)
	Silt, clayey, pebbly, with scattered belemnite fragments, dark grey to black	0.2	(0.5)	5.6	(18.5)
Oxford Clay	Clay, silty, stiff, containing fragile shells, greyish-blue passing into grey	0.4+	(1.5+)	6.0	(19.5)

GRADING

	Mean for Deposit %	mm	%	Bulk Samples Depth below surface (m)	Percentages Fines	Sand	Gravel
Gravel	50	+16	9	0.6 - 1.6	8	46	46
		-16+4	41	1.6 - 2.6	6	51	43
				2.6 - 3.6	2	40	58
Sand	45	-4+1	22	3.6 - 4.6	4	41	55
		-1+$\frac{1}{4}$	18	4.6 - 5.4	5	49	46
		-$\frac{1}{4}$+1/16	5				
Fines	5	-1/16	5				

SU 19 NE 15 1898 9721 Dudgrove Ham Barn, Whelford Block G

Surface level (+73.5 m) +241 ft
Water struck at (+72.4 m)
Shell and auger (modified) 152 mm (6 in) diameter
June 1971

Overburden 0.9 m (3.0 ft)
Mineral 1.9 m (6.0 ft)
Bedrock 0.6 m+ (2.0 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Made ground, soil, stones, clay, and wood fragments	0.2	(0.5)	0.2	(0.5)
Terrace deposits (Terrace 1)	Clay, silty, pebbly, dark brown	0.2	(0.5)	0.4	(1.5)
	Clay, silty, sandy, light brown	0.5	(1.5)	0.9	(3.0)
	Sandy gravel	1.9	(6.0)	2.8	(9.0)
	Gravel: fine with very little coarse. Predominantly tabular to ovoid, brown-stained oolitic limestone, and shelly oolitic limestone, with a little rounded quartz				
	Sand: coarse with medium and a little fine, limestone grains and quartz, orange-brown				
Oxford Clay	Clay, firm to stiff, with scattered shells, bluish-grey	0.6+	(2.0+)	3.4	(11.0)

GRADING

	Mean for Deposit %	mm	%	Bulk Samples Depth below surface (m)	Percentages Fines	Sand	Gravel
Gravel	38	+16	2	0.9 - 1.9	6	53	41
		-16+4	36	1.9 - 2.8	5	61	34
Sand	57	-4+1	32				
		$-1+\frac{1}{4}$	19				
		$-\frac{1}{4}+1/16$	6				
Fines	5	-1/16	5				

SU 19 NE 16 1798 9594 Near Bridge Farm, Hannington Wick Block F

Surface level (+74.1 m) +243 ft
Water struck at (+73.5 m)
Shell and auger (modified) 152 mm (6 in) diameter
June 1971

Overburden 0.6 m (2.0 ft)
Mineral 1.7 m (5.5 ft)
Bedrock 0.8 m+ (2.5 ft+)

LOG

		Thickness m	Thickness (ft)	Depth m	Depth (ft)
	Soil, dark brown	0.2	(0.5)	0.2	(0.5)
Terrace deposits (Terrace 1A)	Clay, silty, pebbly, light brown	0.4	(1.5)	0.6	(2.0)
	Sandy gravel	1.7	(5.5)	2.3	(7.5)
	Gravel: fine with very little coarse. Predominantly subrounded, platy to tabular, buff and brown, oolitic and shelly oolitic limestone				
	Sand: coarse and medium with a little fine, limestone grains and quartz, brown				
Oxford Clay	Clay, silty, brownish-grey, passing into bluish-grey, with scattered fragile shells	0.8+	(2.5+)	3.1	(10.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	48	+16	2
		-16+4	46
Sand	49	-4+1	24
		$-1+\frac{1}{4}$	21
		$-\frac{1}{4}+1/16$	4
Fines	3	-1/16	3

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.6 - 1.6	3	42	55
1.6 - 2.3	3	60	37

SU 19 NE 17 1977 9732 South of Dudgrove Farm, Whelford Block G

Surface level (+71.3 m) +234 ft
Water struck at (+71.1 m)
Shell and auger (modified) 152 mm (6 in) diameter
June 1971

Overburden 0.5 m (1.5 ft)
Mineral 3.1 m (10.0 ft)
Bedrock 0.4 m+ (1.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.2	(0.5)	0.2	(0.5)
Alluvium	Clay, silty, light ochreous-brown	0.3	(1.0)	0.5	(1.5)
? Terrace deposits (Terrace 1)	Sandy gravel Gravel: fine with very little coarse. Predominantly subrounded, tabular, and subovoid, buff and brown oolitic limestone, with some shelly oolitic limestone, and a little irregular flint. Scattered subrounded brown ironstone pebbles, and a few worn belemnite and shell fragments Sand: coarse with medium and a little fine. Limestone grains and quartz, with some ironstone	3.1	(10.0)	3.6	(12.0)
Oxford Clay	Shale, with shell impressions, passing into mudstone, dark brown	0.1	(0.5)	3.7	(12.0)
	Clay, stiff, containing fragile shells, dark bluish-grey	0.3+	(1.0+)	4.0	(13.0)

GRADING

Mean for Deposit

	%	mm	%
Gravel	46	+16	2
		-16+4	44
Sand	52	-4+1	30
		-1+$\frac{1}{4}$	19
		-$\frac{1}{4}$+1/16	3
Fines	2	-1/16	2

Bulk Samples

Depth below surface (m)	Percentages Fines	Sand	Gravel
0.5 - 1.5	2	43	55
1.5 - 2.5	2	61	37
2.5 - 3.6	2	49	49

SU 19 SW 5 1051 9425 North-east of Cricklade Block E

Surface level (+79.2 m) +260 ft
Water struck at (+78.0 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.5 m (1.5 ft)
Mineral 2.1 m (7.0 ft)
Bedrock 0.4 m+ (1.5 ft+)

LOG

		Thickness m	Thickness (ft)	Depth m	Depth (ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Alluvium	Clay, silty, firm to stiff, light grey passing into grey mottled brown, slightly pebbly in the lower part	0.4	(1.5)	0.5	(1.5)
? Terrace deposits (Terrace 1A)	Gravel Gravel: fine with coarse. Predominantly subrounded, platy and tabular, buff and light grey oolitic limestone and shelly oolitic limestone, with a little flint Sand: coarse with medium and a trace of fine, limestone grains and quartz	2.1	(7.0)	2.6	(8.5)
Oxford Clay	Clay, firm to stiff, with a few shells, bluish-grey	0.4+	(1.5+)	3.0	(10.0)

GRADING

	Mean for Deposit %	mm	%	Depth below surface(m)	Bulk Samples Percentages Fines	Sand	Gravel
Gravel	63	+16	7	0.5 - 1.5	3	32	65
		-16+4	56	1.5 - 2.6	2	31	67
Sand	35	-4+1	22				
		$-1+\frac{1}{4}$	10				
		$-\frac{1}{4}+1/16$	3				
Fines	2	-1/16	2				

SU 19 SW 6 1150 9468 Near Eysey, Cricklade Block F

Surface level (+78.9 m) +259 ft
Water struck at (+78.1 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.3 m (1.0 ft)
Mineral 1.1 m (3.5 ft)
Bedrock 0.6 m+ (2.0 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, pebbly, firm, dark brown	0.3	(1.0)	0.3	(1.0)
Terrace deposits (Terrace 1A)	Sandy gravel, locally tufa encrusted Gravel: fine with a little coarse. Predominantly subrounded, platy, buff and brown, partly shelly and very shelly oolitic limestone, with some subrounded, tabular to irregular coralline limestone, and a little subrounded, tabular to irregular flint Sand: coarse and medium with a little fine, slightly silty and clayey. Chiefly discrete ooliths and subrounded limestone grains, with a little subangular fine to rounded coarse quartz, and a trace of brown ironstone, brown	1.1	(3.5)	1.4	(4.5)
Oxford Clay	Clay, firm to stiff, brownish blue passing into blue	0.6+	(2.0+)	2.0	(6.5)

GRADING

Mean for Deposit

	%	mm	%
Gravel	45	+16	4
		-16+4	41
Sand	49	-4+1	24
		$-1+\frac{1}{4}$	19
		$-\frac{1}{4}+1/16$	6
Fines	6	-1/16	6

Bulk Samples

Depth below surface(m)	Percentages Fines	Sand	Gravel
0.3 - 1.4	6	49	45

SU 19 SW 7 1171 9384 Near Calcutt, Cricklade Block F

Surface level (+76.8 m) +252 ft
Water struck at (+75.4 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 1.4 m (4.5 ft)
Mineral 1.2 m (4.0 ft)
Bedrock 0.4 m+ (1.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.1	(0.5)	0.1	(0.5)
Alluvium	Clay, silty, stiff, brown passing into brown mottled light grey	0.7	(2.5)	0.8	(2.5)
	Clay, carbonaceous, stiff, light brown and reddish brown mottled light grey	0.2	(0.5)	1.0	(3.5)
	Clay, light brown mottled light grey	0.4	(1.5)	1.4	(4.5)
? Terrace deposits (Terrace 1A)	Gravel	1.2	(4.0)	2.6	(8.5)
	Gravel: fine with a little coarse. Predominantly subrounded, platy, light grey and buff, partly shelly and very shelly oolitic limestone, with some subrounded to subangular, coralline limestone, a little grey, very sandy (fine grained) limestone, and rare pebbles of subrounded, dark grey, glauconitic, calcareous siltstone				
	Sand: coarse with medium and a trace of fine. Chiefly discrete ooliths and subrounded limestone grains, with some subangular fine, to rounded coarse, quartz, and a little brown ironstone, brown				
Oxford Clay	Clay, firm to stiff, blue	0.4+	(1.5+)	3.0	(10.0)

GRADING

	Mean for Deposit %	mm	%	Depth below surface (m)	Bulk Samples Percentages Fines	Sand	Gravel
Gravel	54	+16	5	1.4 - 2.6	2	44	54
		-16+4	49				
Sand	44	-4+1	23				
		-1+$\frac{1}{4}$	18				
		-$\frac{1}{4}$+1/16	3				
Fines	2	-1/16	2				

SU 19 SE 6 1751 9474 Near Boxhedge Farm, Hannington Wick Block F

Surface level (+74.4 m) +244 ft
Water struck at (+73.0 m)
Shell and auger (modified) 152 mm (6 in) diameter
July 1971

Overburden 0.8 m (2.5 ft)
Mineral 1.2 m (4.0 ft)
Waste 0.1 m (0.5 ft)
Bedrock 0.4 m+ (1.5 ft+)

LOG

		Thickness m	(ft)	Depth m	(ft)
	Soil, dark brown	0.2	(0.5)	0.2	(0.5)
Alluvium	Clay, silty, slightly pebbly, firm, light ochreous-brown mottled light grey	0.6	(2.0)	0.8	(2.5)
? Terrace deposits (Terrace 1A)	'Clayey' sandy gravel, Gravel: fine only, subrounded, platy and tabular, orange-brown, oolitic and shelly oolitic limestone Sand: coarse and medium with fine, silty and clayey, limestone grains and quartz, orange-brown	1.2	(4.0)	2.0	(6.5)
	Clay, with scattered pebbles of limestone, mudstone, and ironstone, pale yellow mottled light grey	0.1	(0.5)	2.1	(7.0)
Oxford Clay	Clay, stiff, light grey	0.4+	(1.5+)	2.5	(8.0)

GRADING

	Mean for Deposit %	mm	%	Depth below surface (m)	Bulk Samples Percentages Fines	Sand	Gravel
Gravel	23	+16	0	0.8 - 2.0	12	65	23
		-16+4	23				
Sand	65	-4+1	23				
		-1+$\frac{1}{4}$	24				
		-$\frac{1}{4}$+1/16	18				
Fines	12	-1/16	12				

Appendix G: List of Workings

Most of the quarries are confined to the areas of Alluvium and First Terrace on the Thames Valley floor, but there is one abandoned small pit [141014] on the Fourth Terrace north-west of Fairford. The quarries on the floodplain are centered about Poole Keynes, Shorncote, South Cerney, Cerney Wick and Ashton Keynes in the west, and about Horcott and Whelford in the east.

All lie in areas of high water table and are worked by dragline, either wet, in which case some of the fine fraction is lost, or they are kept dry by pumping for ease of working by tractor-mounted grabs. The majority of the quarries in this area are not back-filled but are landscaped on the margins and allowed to flood in order that they may form component lakes of the proposed Cotswold Water Park (Tritton, 1969).

Table 5. List of principal active workings in 1971.

Location	Grid Reference
Poole Keynes area	010948
	015942
	020942
Shorncote	027956
Ashton Keynes area	030945
	037937
	031948
	031938
South Cerney area	048958
	063969
	069964
Horcott	151002
Whelford	177993
	188992

Appendix H: Conversion Table, Metres to Feet (to nearest 0.5 ft)

m	ft	m	ft	m	ft	m	ft	m	ft
0.1	0.5	6.1	20	12.1	39.5	18.1	59.5	24.1	79
0.2	0.5	6.2	20.5	12.2	40	18.2	59.5	24.2	79.5
0.3	1	6.3	20.5	12.3	40.5	18.3	60	24.3	79.5
0.4	1.5	6.4	21	12.4	40.5	18.4	60.5	24.4	80
0.5	1.5	6.5	21.5	12.5	41	18.5	60.5	24.5	80.5
0.6	2	6.6	21.5	12.6	41.5	18.6	61	24.6	80.5
0.7	2.5	6.7	22	12.7	41.5	18.7	61.5	24.7	81
0.8	2.5	6.8	22.5	12.8	42	18.8	61.5	24.8	81.5
0.9	3	6.9	22.5	12.9	42.5	18.9	62	24.9	81.5
1.0	3.5	7.0	23	13.0	42.5	19.0	62.5	25.0	82
1.1	3.5	7.1	23.5	13.1	43	19.1	62.5	25.1	82.5
1.2	4	7.2	23.5	13.2	43.5	19.2	63	25.2	82.5
1.3	4.5	7.3	24	13.3	43.5	19.3	63.5	25.3	83
1.4	4.5	7.4	24.5	13.4	44	19.4	63.5	25.4	83.5
1.5	5	7.5	24.5	13.5	44.5	19.5	64	25.5	83.5
1.6	5	7.6	25	13.6	44.5	19.6	64.5	25.6	84
1.7	5.5	7.7	25.5	13.7	45	19.7	64.5	25.7	84.5
1.8	6	7.8	25.5	13.8	45.5	19.8	65	25.8	84.5
1.9	6	7.9	26	13.9	45.5	19.9	65.5	25.9	85
2.0	6.5	8.0	26	14.0	46	20.0	65.5	26.0	85.5
2.1	7	8.1	26.5	14.1	46.5	20.1	66	26.1	85.5
2.2	7	8.2	27	14.2	46.5	20.2	66.5	26.2	86
2.3	7.5	8.3	27	14.3	47	20.3	66.5	26.3	86.5
2.4	8	8.4	27.5	14.4	47	20.4	67	26.4	86.5
2.5	8	8.5	28	14.5	47.5	20.5	67.5	26.5	87
2.6	8.5	8.6	28	14.6	48	20.6	67.5	26.6	87.5
2.7	9	8.7	28.5	14.7	48	20.7	68	26.7	87.5
2.8	9	8.8	29	14.8	48.5	20.8	68	26.8	88
2.9	9.5	8.9	29	14.9	49	20.9	68.5	26.9	88.5
3.0	10	9.0	29.5	15.0	49	21.0	69	27.0	88.5
3.1	10	9.1	30	15.1	49.5	21.1	69	27.1	89
3.2	10.5	9.2	30	15.2	50	21.2	69.5	27.2	89
3.3	11	9.3	30.5	15.3	50	21.3	70	27.3	89.5
3.4	11	9.4	31	15.4	50.5	21.4	70	27.4	90
3.5	11.5	9.5	31	15.5	51	21.5	70.5	27.5	90
3.6	12	9.6	31.5	15.6	51	21.6	71	27.6	90.5
3.7	12	9.7	32	15.7	51.5	21.7	71	27.7	91
3.8	12.5	9.8	32	15.8	52	21.8	71.5	27.8	91
3.9	13	9.9	32.5	15.9	52	21.9	72	27.9	91.5
4.0	13	10.0	33	16.0	52.5	22.0	72	28.0	92
4.1	13.5	10.1	33	16.1	53	22.1	72.5	28.1	92
4.2	14	10.2	33.5	16.2	53	22.2	73	28.2	92.5
4.3	14	10.3	34	16.3	53.5	22.3	73	28.3	93
4.4	14.5	10.4	34	16.4	54	22.4	73.5	28.4	93
4.5	15	10.5	34.5	16.5	54	22.5	74	28.5	93.5
4.6	15	10.6	35	16.6	54.5	22.6	74	28.6	94
4.7	15.5	10.7	35	16.7	55	22.7	74.5	28.7	94
4.8	15.5	10.8	35.5	16.8	55	22.8	75	28.8	94.5
4.9	16	10.9	36	16.9	55.5	22.9	75	28.9	95
5.0	16.5	11.0	36	17.0	56	23.0	75.5	29.0	95
5.1	17	11.1	36.5	17.1	56	23.1	76	29.1	95.5
5.2	17	11.2	36.5	17.2	56.5	23.2	76	29.2	96
5.3	17.5	11.3	37	17.3	57	23.3	76.5	29.3	96
5.4	17.5	11.4	37.5	17.4	57	23.4	77	29.4	96.5
5.5	18	11.5	37.5	17.5	57.5	23.5	77	29.5	97
5.6	18.5	11.6	38	17.6	57.5	23.6	77.5	29.6	97
5.7	18.5	11.7	38.5	17.7	58	23.7	78	29.7	97.5
5.8	19	11.8	38.5	17.8	58.5	23.8	78	29.8	98
5.9	19.5	11.9	39	17.9	58.5	23.9	78.5	29.9	98
6.0	19.5	12.0	39.5	18.0	59	24.0	78.5	30.0	98.5

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INSTITUTE OF GEOLOGICAL SCIENCES

MINERAL ASSESSMENT UNIT

THE SAND AND GRAVEL RESOURCES OF THE CRICKLADE AREA, WILTSHIRE

(Including parts of sheets SU09/19, and SP00/10)

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

ORDNANCE SURVEY

PARTS OF SHEETS SU 09/19 & SP 00/10

PROVISIONAL EDITION

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

18

GLOUCESTERSHIRE

WILTSHIRE

Scale 1:25000

Yards 1000 0 1 2 Miles

Metres 1000 0 1 2 3 Kilometres

The GRID lines on this sheet are at 1 Kilometre interval.
Heights are in feet above Mean Sea Level at Newlyn.
Contour values are in feet
1 square inch on (A1) map represents 99·679 acres on the ground.

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

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

Original geological survey on the one-inch scale by E. Hull published on Old Series Sheet 34 in 1857, revised 1889.
The northern margin revised on the six-inch scale by H. G. Orres in 1931, the remainder resurveyed on the six-inch scale by R. G. Thurrell, R. A. Bazley, E. C. Freshney, P. E. Harding and M. Williams in 1961-62, and by B. Kalk, E. G. Poole, and P. Taphill in 1966-70.
H. Dewey, S. C. A. Holmes, J. R. Earp, and G. A. Kellaway, District Geologists.

Worked out gravel areas revised by Mineral Assessment Unit in 1971

Sand and Gravel Survey by H. C. Squirrell and P. Robson in 1971
R. G. Thurrell, Head, Mineral Assessment Unit

1:25 000 Sand and Gravel Resource Sheet published 1976.
Austin W. Woodland, C.B.E., Director, Institute of Geological Sciences, Incorporating the Geological Survey of Great Britain, the Museum of Practical Geology and Overseas Geological Surveys

1150/74

Coverplied from 6" sheets last fully revised 1919-24. Other partial systematic revision 1938-56 has been incorporated. Some major roads revised 1965.

SO 90	SP 00	SP 10	SP 20
	236		
ST 99	SU 09	SU 19	SU 29
ST 98	SU 08	SU 18	SU 28
	252		

Diagram showing the relation of the National Grid 1:25,000 sheets with the One-Inch Geological Sheet 235 and 1:50,000 Geological Sheet 252

EXPLANATION OF SYMBOLS AND ABBREVIATIONS

DRIFT

A-12	Alluvium -sands silts, peat and clay, with lenses of gravel	RECENT AND PLEISTOCENE
1T-1	First Terrace (Northmoor)	
2T-1	Second Terrace (Summertown-Radley)	
3T-1	Third Terrace (Wolvercote)	-gravels and sands of the Thames and its tributaries
4T-1	Fourth Terrace (Hanborough)	
H-4	Head -pebbly clay, solifluction material	
GD-1	Glacial Drift, undifferentiated -pebbly clay	

SOLID

Cr	Corallian Beds -oolitic limestone, sandstone, clay and rubbly coral rock	JURASSIC
OxC	Oxford Clay -grey or bluish-grey clay	
KIB	Kellaways Beds -grey and bluish-grey clay with an impersistant bed of sand near the top	
Cb	Cornbrash -shelly oolitic limestones and sandy mudstones	
Fmb	Forest Marble -oolitic limestones, mudstones and sandstones	
GO	Great Oolite -white or greyish-cream oolitic limestone	
AO	Athelstan Oolite -cream or white oolitic limestone	

BOUNDARY LINES

- Geological boundary, Drift
- Geological boundary, Solid
- Fault at surface, crossmark indicates downthrow side
- Inferred boundary between recognised categories of deposits
- Resource Block boundary

Broken lines denote uncertainty

WO-4 Worked-out Ground (sand and gravel)

BOREHOLE DATA

SITE LOCATIONS

- ⊙ Mineral Assessment Unit (M.A.U.) boreholes
- ○ Other boreholes

M.A.U. BOREHOLES

(Fictitious example)

Borehole Registration Number → 08 NW 102 (Surface level in metres and feet above O.D. (Newlyn))
Borehole site → 0.5 m Overburden
Geological Classification → (—) 8.2 m Mineral (sand and gravel)
Grading Diagram → 0.6 m Waste; (OxC) 9.2 m Bedrock
Thicknesses in metres

Note:
(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 figures in italics are the metric conversions of measurements recorded in feet
(iv) The Geological Classification is given only for mineral and bedrock

Borehole Registration Number

Each M.A.U. borehole is identified by a Registration Number e.g. 19 NE 14. The first number and letters refer to the quarter sheet, and the second number to the I.G.S. serial number for that quarter. The unique designation for borehole 19 NE 14 is SU 19 NE 14

Grading Diagrams

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

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

The height of the diagram is proportional to the mineral thickness
The widths of the divisions show the proportions of **Fines, Sand** and **Gravel**

OTHER BOREHOLES

The layout of information is the same as for 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 **252/53** signifies Hydrogeological Department borehole 53 on New Series One-Inch Geological Sheet 252. The final depth of deep boreholes is quoted in metres above or below O.D.

EXPOSURES AND HAND AUGER DATA

Information from the inspection of quarries, stream sections and ditch sections, and information obtained by hand auger is shown in the same way as for boreholes, but it is located by an asterisk thus *

CATEGORIES OF DEPOSITS

- Exposed mineral. (Overburden generally less than 1m) CAT-B1
- Sand and gravel not assessed CAT-N1
- Sand and gravel either not potentially workable, or absent CAT-A2

RESOURCE BLOCKS

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

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