British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Office of the Deputy Prime Minister
Creating sustainable communities

WILTSHIRE

(comprising Wiltshire and Swindon)

Mineral Resource Information in Support of National, Regional and Local Planning

Mineral Resources

Scale 1:100 000

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This map comprises part of a summary of the 'Mineral Resources of the South-West of England Region'. For further information see www.mineralsUK.com

BIBLIOGRAPHIC REFERENCE

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SAND & GRAVEL

Superficial deposits

- Sub-alluvial: Inferred resources
- Sub-alluvial: Indicated resources (only in area assessed by BGS)
- River terrace deposits
- Boundary of area assessed for sand and gravel at the indicated resource level

Bedrock deposits

- Lower Greensand Group (Cretaceous), Corallian Group (Jurassic), Bracklesham Group and Lambeth Group (Palaeogene)

CHALK

- Chalk: Higher purity (93-98% $CaCO_3$) } White Chalk Subgroup: Upper Cretaceous
- Chalk: Low purity (< 93% $CaCO_3$) } Grey Chalk Subgroup: Upper Cretaceous

LIMESTONE

- Purbeck Limestone Group, Portland Group, Corallian Group and Great Oolite Group } Jurassic

MINERAL PLANNING PERMISSION (as at 31/03/04)

Source: Mineral Planning Authorities

- Surface planning permission (valid and expired)
- Underground planning permission other than coal (valid and expired)

MINERAL WORKINGS

- Westbury — Active site
- *East Knoyle* — Inactive (including yet to be worked), worked-out and/or restored site

Ch	Chalk	Fi	Flint	Sg	Sand & gravel
Cl	Common clay & shale	Istn	Ironstone	SiS	Silica Sand
Cs	Construction Sand	Lst	Limestone	Sst	Sandstone

ENVIRONMENTAL DESIGNATIONS (as at 30/06/03)

- National nature conservation designations (SSSIs and NNRs)
- International nature conservation designations (SACs, SPAs and Ramsar sites)
- National Park: New Forest (part). Designated but not yet confirmed
- Area of Outstanding Natural Beauty (AONB): Cranborne Chase (part), Cotswolds (part) and North Wessex Downs (part)
- Scheduled Monument

ADMINISTRATIVE AREAS

- Mineral Planning Authority
- District

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Digital SSSI, NNR, SPA, SAC and Ramsar boundaries © English Nature 2003
Contact address:
English Nature, Northminster House, Northminster, Peterborough, PE1 1UA. Tel: 01733 455000; Fax: 01733 455103. Web page: www.english-nature.org.uk

Positions of Scheduled Monuments at 25th September 2003 as supplied by English Heritage.
The majority of monuments are plotted using a centred NGR symbol. Consequently the actual area and/or length of a monument protected by the legal constraints of scheduling cannot be represented here. Monuments scheduled since that date are not accounted for. © Copyright English Heritage.
Contact address:
English Heritage, 23 Savile Row, London, W51 2ET, Tel: 020 7973 3130, Web page: www.english-heritage.org.uk

Digital AONB boundaries © Countryside Commission 1986 (now Countryside Agency).
Contact address:
Countryside Agency, John Dower House, Crescent Place, Cheltenham, Gloucestershire, GL50 3RA, Tel: 01242 521381, Fax: 01242 584270, Web page: www.countryside.gov.uk

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Aims and Limitations

The purpose of the maps in this series is to show the broad distribution of those mineral resources which may be of current or potential economic interest and to relate these to selected nationally-recognised planning designations. The maps are intended to assist in the consideration and preparation of development plan policies in respect of mineral extraction and the protection of important mineral resources against sterilisation. They bring together a wide range of information, much of which is scattered and not always available in a convenient form.

The maps have been produced by collation and interpretation of mineral resource data principally held by the British Geological Survey. Information on the extent of mineral planning permissions has been obtained from the relevant Mineral Planning Authority (MPA). Some of these permissions may have lapsed or expired. The status of individual areas can be ascertained from the appropriate MPA. Location information on national planning designations has been obtained from the appropriate statutory body (Countryside Agency, English Nature and English Heritage). For further information the relevant body should be contacted.

The mineral resource data presented are based on the best available information, but are not comprehensive and their quality is variable. The inferred boundaries shown are, therefore, approximate. Mineral resources defined on the map delineate areas within which potentially workable minerals may occur. These areas are not of uniform potential and also take no account of planning constraints that may limit their working. The economic potential of specific sites can only be proved by a detailed evaluation programme. Such an investigation is an essential precursor to submitting a planning application for mineral working. Extensive areas are shown as having no mineral resource potential, but some isolated mineral workings may occur in these areas. The presence of these operations generally reflects very local or specific situations.

The maps are intended for general consideration of mineral issues and not as a source of detailed information on specific sites. The maps should not be used to determine individual planning applications or in taking other decisions on the acquisition or use of a particular piece of land, although they may give useful background information which sets a specific proposal within context.

PLANNING PERMISSIONS FOR MINERAL EXTRACTION

The extent of all known extant and former planning permissions for mineral working is shown on the map, irrespective of their current planning or operational status. The polygons were digitised by BGS from Plotting Sheets and other documents supplied by Wiltshire County Council and any queries regarding the sites shown should be directed to these authority at the address shown below. The polygons cover active, former and restored mineral workings and, occasionally, unworked deposits.

Planning Permissions represent areas where a commercial decision to work mineral has been made, a successful application has been dealt with through the provisions of the Town and Country Planning legislation and the permitted reserve will have been depleted to a greater or lesser extent. The current planning status is not qualified on the map but is available in the underlying database.

Contact address:

Wiltshire County Council, Environmental Services Department, County Hall, Bythesea Road, Trowbridge BA14 8JD, Tel: 01225 713000, Fax: 01225 713400, Web page: www.wiltshire.gov.uk

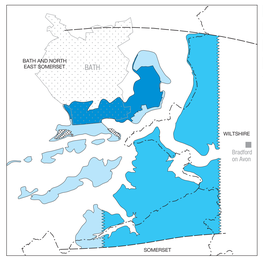
Swindon Borough Council, Planning and Transportation Department, Premier House, Station Road, Swindon SN1 1TZ, Tel: 01793 463000, Fax: 01793 466442, Web page: www.swindon.gov.uk

FULLER'S EARTH

The term 'fuller's earth' is used to describe clays composed essentially of the clay mineral Ca-smectite, which exhibits a unique combination of properties on which its many industrial applications are based. Fuller's earth deposits were formed by the alteration of volcanic ash deposited in seawater. The accumulation and preservation of volcanic ash into thick beds involved a complex set of geological processes and consequently fuller's earth deposits of potential economic interest have a very restricted distribution in Britain.

A single bed of fuller's earth of Jurassic age (the Fuller's Earth Bed) up to 3.3 m thick occurs between 3 m and 10 m below the top of the Fuller's Earth Formation and the base of the Great Oolite Formation. It was mined to the south of Bath in Somerset at the Combe Hay Mine until its closure in 1929 because of the high costs of underground extraction. The eastern limit of the Fuller's Earth Bed is not known but east of the River Avon, and into west Wiltshire, it has only been proved in boreholes, where it is of lower quality than at Combe Hay.

With the exception of the Bath deposits, all the other fuller's earth deposits which are, or have been, worked in southern England are of Lower Cretaceous age and occur in the Lower Greensand. In Wiltshire the principal outcrops of Lower Greensand occur to the east and south west of Calne. These have, in the past, been examined for their fuller's earth potential but no beds were discovered. Prospects for discovering significant fuller's earth resources in the county are, therefore, believed to be small.



BRICK CLAY

The term 'brick clay' is used to describe clay used predominantly in the manufacture of bricks and, to a lesser extent, roof tiles and clay pipes. These clays may sometimes be used in cement manufacture, as a source of construction fill, and for lining and sealing landfill sites. The suitability of a clay for the manufacture of bricks depends principally on its behaviour during shaping, drying and firing. This will dictate the properties of the fired brick, such as strength and frost resistance, and importantly its architectural appearance.

Most facing bricks, engineering bricks and related clay-based building products are manufactured in large automated factories. These represent a high capital investment and are increasingly dependent, therefore, on raw materials with predictable and consistent firing characteristics in order to achieve high yields of saleable products. Blending different clays to achieve improved durability and to provide a range of fired colours and textures is an increasingly common feature of the brick industry. Continuity of supply of consistent raw materials is of paramount importance.

There are no brick and tile manufacturing sites in Wiltshire, although the formations that are exploited in neighbouring counties such as Hampshire (Reading Formation) and Dorset (London Clay Formation) are also present in Wiltshire. In the past the Amphill Clay Formation, Gault Formation and Kellaways Formation have all been used for brick making or as engineering clay in Wiltshire, although they are not being worked at present.

At Purton, near Swindon, the Weymouth Member of the Oxford Clay Formation is currently exploited as source of engineering clay. Near Westbury in west Wiltshire, the Kimmeridge Clay Formation is quarried for use in cement manufacture. The extent of the various clay-bearing formations is not shown on the map because of their very localised use.

BUILDING STONE

The Jurassic, Cretaceous and Palaeogene rocks of the county have provided a wide variety of stone for building purposes.

The Middle Jurassic (Bathonian) oolitic and shelly Bath limestones are the county's most prolific building stone resource. They are still mined and quarried extensively to the east of Bath, around Corsham, Box, and Monkton Farleigh. Further north smaller quarries operated at Luckington and Sherston. The shelly and fissile limestones of the Forest Marble Formation have been worked for local use as roofing slate across their outcrop, notably in the Chippenham and Malmesbury areas at Charlwood, Alworth and Bolitaxe.

The Upper Jurassic shelly and sandy Corallian (Oxfordian) limestones were also extensively quarried along their outcrop for local building stone in the past as at Calne, Godiaxe Seend, Calcomb and Purton. The sandy limestones of the Portland Group of the Vale of Wardour, used for the construction of Salisbury Cathedral, are still mined and quarried in the Chilmark, Tisbury and Chickgrove areas. Important quarries once worked the Portlandian and Purbeckian limestones in Swindon (Okus and Town Garden quarries). The fissile limestones from the Lower Purbeck succession were also used locally for roofing slate.

The Lower Cretaceous glauconitic sandstones were once extensively worked for local building purposes. Particularly notable were the quarries at Potterne, east of Calne, Firwart, Seend and in the parishes of Lyneham and Pewsham (Chippenham). The Upper Greensand Formation has also been quarried locally for use in traditional buildings at Hurdcott near Barford St. Martin, and is still exploited on a small scale.

The chalk rocks of the Upper Cretaceous have been sparsely used in the past for local building stone across its outcrop, as at Corton Down. Flints derived from the Chalk are, however, commonly used as a local building material over much of its outcrop area, in typical chequerwork patterns, as at Wilsford and Tilshead.

As a result of their hardness the grey and reddened silica-cemented sandstone boulders, known as Sarsen stones, remnants from a once more extensive Eocene succession, commonly occur. They have been used throughout the area, not only for the well known prehistoric stone structures like Avebury and Stonehenge, but also dressed for use in local housing as in Marlborough and Lockeridge.

There are currently seven quarries in the county working the Middle Jurassic limestones and two quarries working the Upper Jurassic limestones for building stone.

CEMENT RAW MATERIALS

Cement is an essential constituent of concrete and mortar and is a vital material for the building and civil engineering industries. Portland cement clinker is manufactured by heating a homogenised and controlled mixture of calcareous and clayey raw materials to partial fusion (typically at 1400 -1500° C). Small amounts of iron oxide, sand (silica) and certain waste materials, such as pulverised fuel ash (pfa - a by-product of coal-fired power stations), may be added to optimise the mix. These raw materials supply the lime, silica, alumina and iron oxide necessary for the formation of the calcium silicates and lesser but significant amounts of calcium aluminate that constitute cement clinker. The clinker is cooled and then finely ground, typically with 5% gypsum/anhydrite, to form the final cement. Gypsum/anhydrite is introduced to control the initial rate of reaction with water and to allow concrete to be placed and compacted before hardening commences. Limestone, or chalk, provides lime for the production of cement clinker and clay or mudstone provides most of the silica, alumina and iron oxide. Cement making is highly capital intensive and cement plants are normally located in close proximity to the main feedstock, i.e. limestone/chalk. Large reserves of raw materials are required to provide security of supply.

Wiltshire is an important cement producing county with a large plant located at Westbury. The plant has a clinker capacity of 720 000 tonnes a year and production is based on chalk and clay. The Grey Chalk and the lower part of the White Chalk are the source of the calcareous raw material. The source of the clay is the nearby Westbury clay quarry which exploits the Kimmeridge Clay of Jurassic age. The extent of the Kimmeridge Clay resource in Wiltshire has not been shown on the map as, except for at Westbury, it is not of economic importance. Usage of Kimmeridge Clay has declined because of the increased use of pfa as a partial substitute, which has been used to lower the alkalis content of the total blend.

SAND AND GRAVEL

Sand and gravel are defined on the basis of particle size rather than composition. In current commercial practice, following the introduction of new European standards from 1st January 2004, the term 'gravel' (or more correctly coarse aggregate) is used for general and concrete applications to define particles between 4 and 80 mm, and the term 'sand' for material that is finer than 4 mm, but coarser than 0.063 mm. For use in asphalt 2 mm is now the break point between coarse and fine aggregate. Most sand and gravel is composed of particles that are rich in silica (quartz, quartzite and flint), but other rock types may occur locally.

The principal uses of sand are as fine aggregate in concrete, mortar and asphalt. The main use of gravel is as coarse aggregate in concrete. Substantial quantities of sand and gravel may also be used for construction fill.

Wiltshire produced 1.3 million tonnes of sand and gravel in 2002, and has estimated permitted reserves of 13.5 million tonnes (source: AM2001 survey). Recent production figures may be seen on the inset graph.

Sand and gravel resources occur in a variety of geological environments. In Wiltshire, these resources fall into two categories: superficial deposits (mostly river terrace deposits), and bedrock sand and gravel. The first category was assessed in parts of Wiltshire by BGS in the 1970s and 1980s. Resources identified in these areas are identified separately on the map, and the possible extent of sand and gravel concealed beneath overburden is shown. These concealed resources were defined by (overburden to mineral ratios (overburden to mineral less than 3:1). Outside these areas, available data are more limited. Generally, only exposed sand and gravel are defined, although sub-alluvial resources of sand and gravel occurring beneath modern river floodplains may be extensive in some areas, and are marked on the map. However, narrow (< 200 m width) spreads of sub-alluvial deposits are mainly excluded from the map. Their limited width is likely to preclude economic working of any sand and gravel present.

River Terrace Deposits

Most current sand and gravel workings in Wiltshire are in river terrace deposits. The river terrace deposits were probably deposited mostly from meltwater during glacial episodes. These deposits occur in both raised river terrace sequences and as flood plain terraces associated with and underlying present day alluvium. They are of late Anglian to Devensian age. River terraces occur at several levels in most of the major valleys in the county flanking the present floodplain, particularly associated with the River Thames, the Bristol River Avon near Bath and the Salisbury River Avon. The Thames river terraces are more extensive and generally thicker than those on the other major rivers in Wiltshire, and therefore constitute a greater resource.

The older terraces are higher above the present course of the river and are generally dry in their upper parts. Younger terraces can be saturated at their bases. The deposits comprise sequences of sands and gravels with sheet-like morphology, sub-horizontal upper surfaces, and thicknesses of up to a few metres. The younger deposits are more laterally continuous since they have been less down cut by subsequent river erosion.

River terrace deposits represent an important resource in the county since they are generally clay-poor. They are being worked extensively in the Thames Valley in the north of Wiltshire.

Bedrock sand and gravel

Several formations in Wiltshire consist of poorly consolidated sandstones that have been worked for building sand. In particular, the Lower Calcareous Grit Formation of the Corallian Group (also known as the Kingston Formation) in the north and west of the county, the Lower Greensand Group near Calne, and the Bracklesham Group in the south-east of the county are currently being quarried.

The Lower Calcareous Grit Formation crops out in a north-south direction through the central northern part of Wiltshire. The Lower Calcareous Grit Formation (also known as the Hazelbury Bryan Formation) consists mainly of fine-grained sands with occasional layers of coarser calcareous sandstone. It has only limited development, but has a maximum thickness of up to 20 m to the north-east of Melksham. It is currently being quarried in this area.

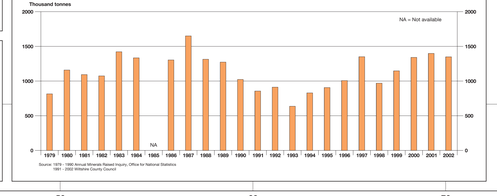
The Lower Greensand Group follows a similar distribution to the Corallian Group, but crops out further to the east. Its thickness is variable, with a maximum of about 12 m between Melksham and Calne. There is also a thin bed around Tisbury in the south of the county. The Lower Greensand Group consists of marine sands and sandstones with some mudstone beds, and is generally highly ferruginous. It is currently being quarried in two locations near Calne.

The Bracklesham Group of the Eocene crops out in the far south of Wiltshire and has only a limited extent in the county. In Dorset, it is the principal sand resource and it is of regional importance as a source of concreting and asphalting sand. In Wiltshire there are currently workings to the south-east of Redlynch in the Marsh Farm Formation of the Bracklesham Group.

In the south east of the county the Reading Formation of the Lambeth Group of Palaeogene age is worked for sand in the vicinity of Whiteparish. The formation consists predominantly of clay, but locally sand and pebble beds also occur. There are marked differences in the proportions of the different rock types. The full extent of the Reading Formation is, therefore, shown.

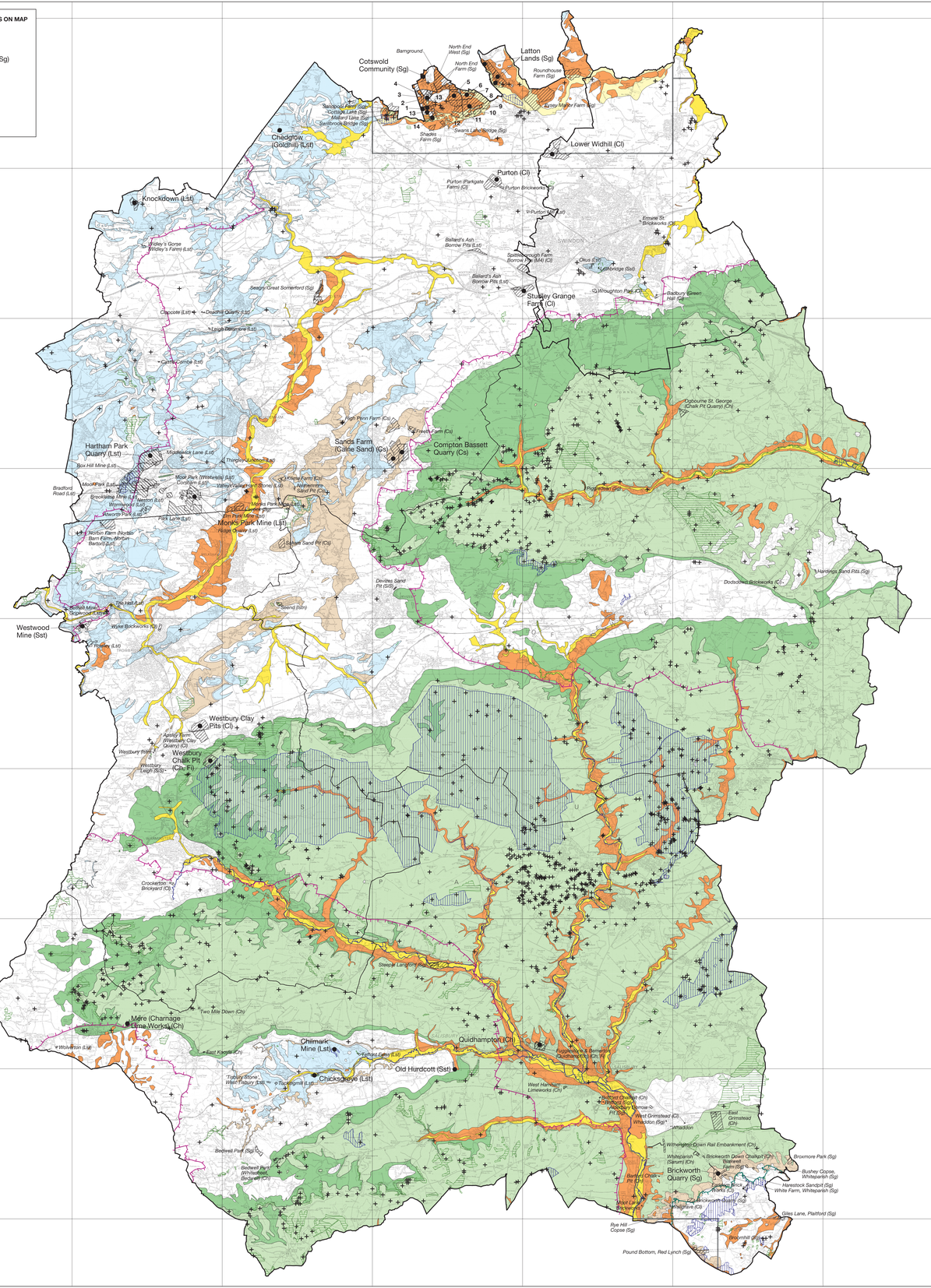
Several other formations have been worked for sand and gravel in the past. These include the Bridport Sand Formation of the Lower Jurassic Lias Group in the west, the Upper Calcareous Grit Formation, the Upper Greensand Formation, and the Whitecliff Sand Member of the London Clay Formation. None of these formations are currently worked, and are thus not shown on the map face.

Production of sand and gravel, 1979 - 2002
Total permitted reserves = 13,457,000 tonnes (as at 31.12.01)



KEY TO PLANNING PERMISSION NUMBERS ON MAP

1 Freeths Wood (Sg)
2 *Lake 37 (Sg)*
3 Manor Farm North (Sg)
4 *Lake 35 (Sg)*
5 Kent End Complex (Kent End Farm) (Sg)
6 *Wickwater Farm (Sg)*
7 Wheatley Barn Farm (Sg)
8 Cleveland Farm Complex (Sg)
9 *Manor Farm, Leigh (Sg)*
10 *Upper Waterhay (Upper Waterhay Meadows) (Sg)*
11 *Rixon Farm (Sg)*
12 *Manor Farm South (Sg)*
13 Dairy Farm/Manor Farm South (Sg)
14 3 Bridges (Sg)


Barnground
North End West (Sg)
North End Farm (Sg)
Cotswold Community (Sg)
Latton Lands (Sg)
Roundhouse Farm (Sg)
Eastrey Manor Farm (Sg)
Sandpool Farm (Sst)
Cottage Lane (Sg)
Mallard Lake (Sg)
Sandbrook Bridge (Sg)
Shades Farm (Sg)
Swans Lake Bridge (Sg)
Chedglow (Gotchia) (Lst)
Lower Widhill (Cl)
Purton (Cl)
Purton (Parkgate Farm) (Cl)
Purton Brickworks
Purton (Lst)
Ermine St. Brickworks (Cl)
SWINDON
Knockdown (Lst)
Tetbury Road (Lst)
Wildey's Gorse Wildey's Farm (Lst)
Ballard's Ash Borrow Pits (Lst)
Spittlemarsh Farm Borrow Pits (Sst) (Cl)
Okus (Lst)
Lydiaridge (Sst)
Wroughton Park (Cl)
Badbury Green Hall Fm
Stubbery Grange Farm (Cl)
Seagry Great Somerford (Sg)
Cleverton (Lst)
Deadhill Quarry (Lst)
Large Removes (Lst)
Cadley Combe (Lst)
Dobbourne St. George Chalk Pit Quarry (Cl)
High Penn Farm (Cl)
Freeths Farm (Cs)
Compton Bassett Quarry (Cs)
Sands Farm (Calne Sand) (Cs)
Hartham Park Quarry (Lst)
Middlehick Lane (Lst)
Box Hill Mine (Lst)
Thickwood Farm (Lst)
Moor Park (Sst)
Moor Park (Wistlewell) (Lst)
Corsham (Lst)
Valley View Farm (Stone) (Lst)
Home Farm (Cl)
Melksham Sand Pit (Sg)
Bradford Road (Lst)
Brockleaze Mine (Lst)
Monkton Farleigh (Lst)
Monkton Park (Lst)
Westwood Park (Lst)
Park Lane (Lst)
Norton Farm (Norton Barn Farm) (Norton Barton) (Lst)
Monks Park Mine (Lst)
Ridge Quarry (Lst)
Sellars Sand Pit (Cs)
Pagham (Sg)
Devizes Sand Pit (SiS)
Dodsdown Brickworks (Cl)
Harolds Sand Pits (Sg)
Bowlditch Mine
Bowlditch Lst
The Hall (Lst)
Westwood Mine (Sst)
Wyke Brickworks (Cl)
Seend (Istn)
Westbury Clay Pits (Cl)
Asselby Farm (Westbury Clay Quarry) (Cl)
Westbury Rifle
Westbury Leigh (SiS)
Westbury Chalk Pit (Ch, Fi)
Crockerton Brickyard (Cl)
Steeple Langford Rifle Range
Mere (Charnage Lime Works) (Ch)
Two Mile Down (Ch)
Wolverton (Lst)
Chilmark Mine (Lst)
Tisbury (Lst)
East Knoyle (Ch)
Tisbury Stone Wash Tisbury (Lst)
Tisbury Mill (Lst)
Chickgrove (Lst)
Old Hurdcott (Sst)
Quidhampton (Ch)
Coggleshall & Bemerton Quarries (Ch, Sg)
West Hamham Limeworks (Ch)
Bishop Cannings (Ch)
Bishopstrow (Ch)
Bishopstrow Pit Stone
West Grimstead (Cl)
Whaddon (Sg)
East Grimstead (Ch)
Whaddon
Bedwell Park (Sg)
Bedwell Park Wheatsheaf Bedwell (Ch)
Wilton Park (Ch)
Wilton Park Mine
Wilton Park Quarry
Wilton Park Brickworks
Wilton Park Lst
Wilton Park Sst
Wilton Park Sg
Wilton Park Ch
Wilton Park Fi
Wilton Park Cl
Wilton Park Cs
Wilton Park Istn