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Mineral Resource Information for Development Plans Derbyshire: Resources and Constraints

D E Highley and D G Cameron



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Mineral Resource Information for Development Plans Derbyshire: Resources and Constraints

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This report accompanies the 1:100 000 scale map:
Derbyshire Mineral Resources

Cover photograph

Godkin opencast coal site, near
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INTRODUCTION

This report has been prepared to be used in conjunction with the Mineral Resources Map of Derbyshire. The principal aim of the report and its associated map is to show the broad distribution of mineral resources of current or potential economic interest in Derbyshire and to relate these to selected, nationally-recognised planning constraints on extraction of minerals. The work is intended to assist in the consideration and preparation of development plan policies in respect of mineral extraction and the protection of important mineral resources.

Development plans set out the main considerations on which planning applications are determined, and they therefore form the essential framework of the planning system. The importance of the development plan system in planning decisions is emphasised by Section 54A of the Town and Country Planning Act 1990, which requires that planning applications and appeals be determined in accordance with the development plan, unless material considerations indicate otherwise. The planning system is therefore a plan-led system.

Development plan preparation must take account of Government guidance. This is primarily set out in Planning Policy Guidance notes (PPGs), Mineral Planning Guidance notes (MPGs) and Regional Planning Guidance notes (RPGs). These provide advice on a range of general and specific issues.

The ‘development plan’ includes structure plans, which contain strategic planning policies, and local plans, containing detailed policies and proposals, or unitary development plans, which combine both functions. In addition, relevant authorities must produce local plans on minerals and waste.

Information on mineral resources is required to assist the production of mineral local plans by the identification of important resources and the planning constraints which may affect such resources. This information is also necessary for the preparation of structure, local and unitary plans, both in relation to mineral development and the prevention of the sterilisation of important mineral resources.

Three major elements of information are presented and described:

- the geological distribution and importance of mineral resources
- the extent of mineral planning permissions and the location of current mineral workings
- the extent of selected planning constraints (national statutory designations)

The map thus brings together a wide range of information, much of which is scattered and not always available in a consistent and convenient form. It is anticipated that the map and report will also provide valuable background data for a much wider audience, including the different sectors of the minerals industry, other agencies and authorities (e.g. The Planning Inspectorate, the NRA, the Coal Authority and English Nature), environmental interests and the general public.

Mineral resource classification

Mineral resources are natural concentrations of minerals which might now, or in the foreseeable future, be of economic value. However, the identification and delineation of mineral resources is imprecise as it is limited by the quantity and quality of data currently available and involves predicting what might or might not become economic to work in the

future. The pattern of demand for minerals is continually evolving due to changing economic, technical and environmental factors. The economic potential of mineral resources is not static, therefore, but changes with time.

The map of Derbyshire shows the extent of **inferred resources**, that is those mineral resources that can be defined from available geological information. They have neither, for the most part, been evaluated by drilling or other sampling methods, nor had their technical properties characterised on any systematic basis. However, the British Geological Survey has carried out mineral assessment studies of the Carboniferous limestone resources of Derbyshire and their distribution and quality is well understood. The Carboniferous limestones are shown at the **indicated resource** level, i.e. they have been drilled and sampled on a regular basis and their properties characterised. The mineral resources shown on the map take no account of the planning constraints that may limit their working.

That part of a **mineral resource** which has been fully evaluated and is commercially viable to work, is called a **reserve** or **mineral reserve**. The relationship between **inferred** and **indicated resources** shown on the map and evaluated and commercial deposits (**reserves**) is described in more detail in Appendix 3. In the context of land-use planning, however, the term **reserve** should strictly be limited to those minerals for which a valid planning permission for extraction exists (i.e. **permitted reserves**).

The map has been produced by the collation and interpretation of information held by the British Geological Survey. The geological lines are taken, with some generalisations, from available BGS one-inch or 1:50 000 scale maps. These maps are based on six inch or 1:10 000 scale surveys, which cover the whole county.

Mineral workings and planning permissions

The location and name of mineral workings, together with the main commodities produced, are shown on the map and in Appendix 1. A distinction is made between surface and underground workings.

The extent of mineral planning permissions is shown on the Mineral Resources Map. They cover active mineral workings, former mineral workings and, occasionally, unworked deposits. Some areas are covered by permissions for both underground and surface working. The planning permissions data were obtained from Derbyshire County Council, and this material has been verified by the County Council.

The present physical and legal status of individual permissions is not qualified on the map or in the report. The areas shown may, therefore, include inactive sites, where the permission has expired due to the terms of the permission, i.e. a time limit, and inactive (dormant) sites where the permission still exists. Sites which have been restored have not been separately identified. A planning permission may extend beyond the mapped resource as it may make provision for operational land, including plant and overburden tips, or it may extend to an easily identified or ownership boundary. Information on the precise status and extent of individual planning permissions should be sought from the Mineral Planning Authority.

Environmental designations

The map shows the extent of selected, nationally-designated planning constraints as defined for the purposes of this study. These constraints are defined on a common national basis and therefore represent a consistent degree of constraint across the country. No interpretation should be made from the map with regard to the relative importance of the constraints, either in relation to mineral development proposals or in relation to each other. Users should consult policy guidelines issued by the relevant Government department, statutory agency or local authority.

The constraints shown on the map are:

- Sites of Special Scientific Interest (SSSI)
- Scheduled Monuments

Information within the area of the Peak District National Park is not shown, as a separate map and report has been prepared for the National Park.

Mineral development may also be constrained by other factors not shown on the map, including local landscape designations, considerations relating to the protection of other resources, such as groundwater, and local amenity or environmental concerns such as noise, traffic and visual impact. These have been excluded because the constraint is not defined on a national basis or the information is not generally available. The extent or degree of relevance of such constraints can be ascertained from the relevant statutory agency or the Mineral Planning Authority (Appendix 2).

English Nature holds data on SSSIs in digital form, and information on the location of Scheduled Monuments has been obtained in digital form from English Heritage. This has had to be edited and the grid references converted to a form that is suitable for use by BGS Cartographic Services.

MINERAL RESOURCES

Introduction

The mineral resources of Derbyshire reflect the complex geological history of the area over the last 340 million years. These events have produced a wide-range of economic minerals, mainly of sedimentary origin, but also including igneous rocks and hydrothermal mineralisation (Table 1). It is rocks of Carboniferous age, exposed in the northern, eastern and parts of the south of the county, which are the main repositories of economic minerals including limestone, fluorspar, coal and clays. However, the Permian limestones of north-east Derbyshire also contain important resources of dolomite and the Triassic Sherwood Sandstone is a locally-important source of sand and gravel. River gravel resources, particularly those associated with the River Trent, are also an important source of sand and gravel.

The county has had a long and diverse history of mineral production, with lead mining dating back at least to Roman times. It is one of the few areas of Britain that has supported the extraction of almost every sector of the minerals industry, including metals, a wide range of construction and industrial minerals, and energy minerals, mainly coal, although it was also one of the first areas in Britain to be explored for oil. The relative importance of these different sectors of the minerals industry has changed markedly with time. The recent demise of deep-mined coal production was the latest major change, although the county remains an important source of opencast coal. The dominant sector is, and will remain for the foreseeable future, the quarrying of construction minerals, particularly limestone, sand and gravel, brick clay and sandstones, and also industrial minerals including industrial grade limestone and dolomite.

Table 1 Mineral resources of Derbyshire

| Age | Geological Unit | Commodity/Use |
|----------------------|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Quaternary | River gravels | Sand and gravel for aggregate |
| | Glacial sand and gravels | <i>Sand and gravel for construction fill</i> |
| Tertiary | ‘Pocket’ Silica Deposits | <i>Silica (industrial) sand for refractory use</i> |
| Triassic | Sherwood Sandstone | Sand and gravel for aggregate |
| Permian | Magnesian Limestone | Dolomite for construction, industrial and agricultural use |
| Carboniferous | Coal Measures | Coal, Clay/fireclay for bricks, Natural gas |
| | Millstone Grit | Clay for bricks, Sandstone for building stone and construction fill, Natural gas, <i>Oil</i> |
| | Monsal Dale Limestone | Limestone for aggregate |
| | Woo Dale/Bee Low Limestones | Limestone for aggregate and industrial use |
| | Igneous Rocks | Dolerite for aggregate |
| | Mineralisation in Carboniferous limestones | Fluorspar primarily for the manufacture of fluorine chemicals and also metallurgical use Barytes for use as a filler in rubber and plastics, and for use as a weighting agent in drilling fluids <i>Lead, zinc, silver</i> |

Italics signify commodity no longer produced

A major part of the county of Derbyshire, including large areas of limestone resources and, to a lesser extent, fluorspar, lies within the Peak District National Park. For minerals planning purposes, the Peak District Joint Planning Board is responsible for assessing all applications for minerals-related development within the Park, including those parts that fall within Derbyshire

Sand and gravel

Sand and gravel resources are divided into two broad categories:

- Superficial or ‘drift’ deposits of Quaternary age subdivided into river gravels, and glacial sand and gravel.
- Bedrock or ‘solid’ deposits within the Triassic Sherwood Sandstone Group, formerly known as the ‘Bunter Pebble Beds’.

This division reflects the distinctly different forms of the deposits, their likely workable extent and yield, their particle size and need for processing, and thus their relative importance as aggregate resources. The map uses existing data from published geological maps, interpreted by the compiler where superseded by data from the sources listed in the selected bibliography.

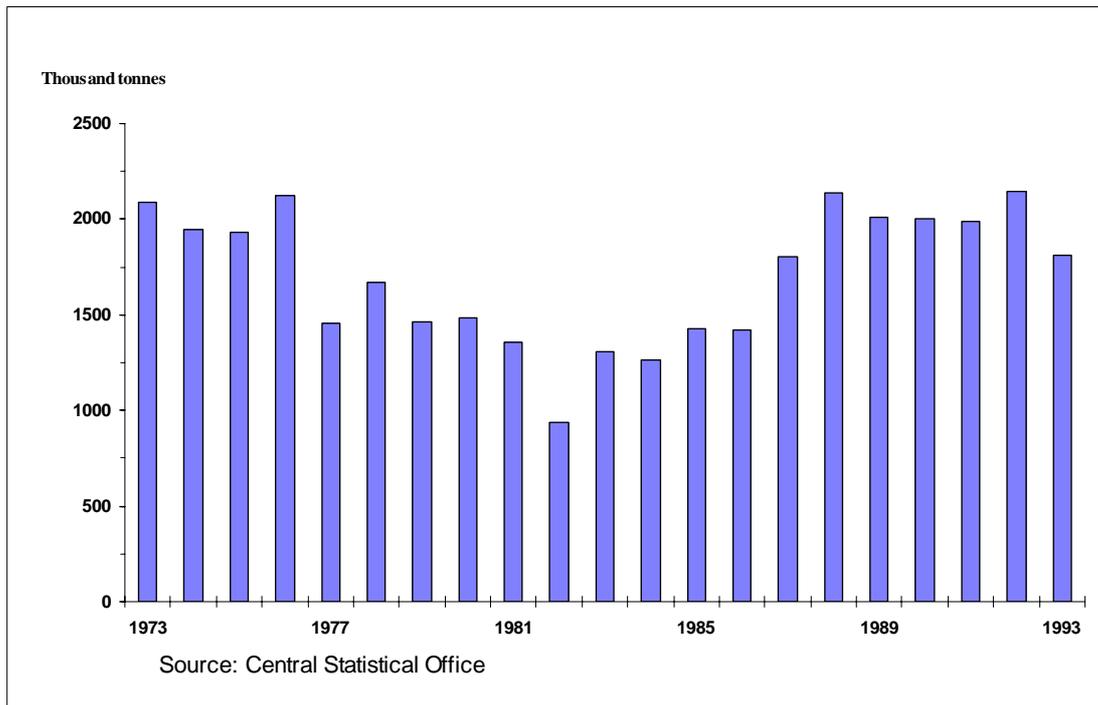


Figure 1 Production of sand and gravel in Derbyshire, 1973–1993

River gravels

River gravels include tracts of sand and gravel which occur beneath alluvium along the floors of the major valleys, and in the river terrace deposits flanking the valley sides (Figure 2). In several of the river valleys in the county, terrace-like spreads of gravel occur at higher levels than the river terrace deposits and have been mapped as glacial, or glaciofluvial, sand and gravel. It seems likely that many of these have been deposited by river action and they are here included with the river gravels. Extensive deposits of river gravels occur in the valleys of the Trent, Dove and Derwent, with smaller occurrences in the lower Erewash valley. The deposits consist of a mixture of sand and gravel in varying proportions from which coarse and fine aggregate are produced by a process of washing and size separation, usually involving screening and hydrocyclone separation.

River gravels have been accumulated and naturally processed by running water which is an efficient mechanism for separating the different size fractions of the sediment being transported. As a result, beds of sand and gravel are likely to be relatively clean, lacking a significant 'fines' (silt and clay) fraction. Their particle-size distribution is therefore, closer to user specifications. Nevertheless, beds of silt or clay may occur within the deposits and it may be impractical to avoid working these with the sand and gravel in flooded operations.

The deposits exceed 10 m in thickness only rarely, with 4–8 m being typical for the River Trent, but much thinner elsewhere. They are likely to be relatively consistent in thickness and composition locally, but different depositional regimes caused by such factors as changing valley shape and stream confluences can cause considerable variation.

The composition of the river gravels is likely to vary across the county. The coarse fraction of deposits in the south of the county are likely to be dominated by quartzite pebbles derived from the Sherwood Sandstone Group, but the Dove is likely to carry a significant load of limestone fragments from the Carboniferous limestone uplands. Flint pebbles are incorporated by the erosion of glacial deposits. The Erewash deposits are likely to comprise a variety of lithologies including limestone, sandstone, shale

and coal from the Carboniferous rocks which crop out in the catchment. The inclusion of friable and platy lithologies may reduce the value of these deposits.

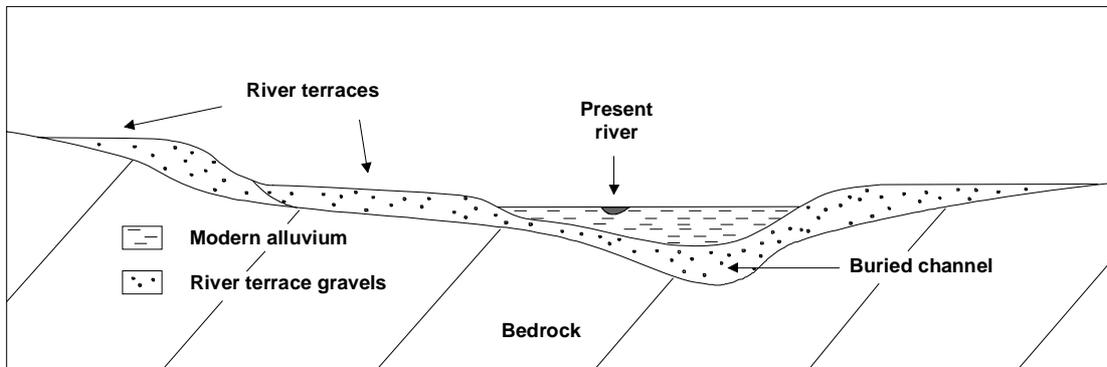


Figure 2 Sketch section across a river valley showing the relationship of alluvium to river terrace sand and gravel deposits (not to scale)

Glacial sand and gravel

These include deposits laid down by a variety of glacial and glaciofluvial processes associated with icesheets, glaciers and their meltwaters. The deposits are generally unconsolidated but may include a wide range of size fractions including a considerable proportion of 'fines'. The greater part of the constituents of the deposits are likely to be locally derived, from the mechanical erosion of the underlying rocks, but 'erratics' - derived from rock units outside the county and transported in by glacial action - are a feature of such deposits.

Deposits in Derbyshire are limited to the southern part of the county but even here only small areas have been located during mapping. In general, deposits are likely to be less than 10 m thick but may exceed this where they infill hollows and channels scoured into the underlying rock surface. Glacial sand and gravel occurs with spreads of till ('boulder clay') and may extend beneath, or lie concealed within, it. The extent, thickness and overburden ratios of such deposits are not known and are likely to be subject to considerable variation; locally, however, such accumulations may represent additional resources.

The coarse fraction of glacial deposits is likely to consist largely of well-rounded pebbles and cobbles of quartzite, derived from the pebbly sandstones and conglomerates of the Sherwood Sandstone Group, together with smaller proportions of Carboniferous limestone and flint. Glacial deposits have been worked in the past to provide construction sand and gravel, principally for local use.

Bedrock deposits

Sand and gravel resources within bedrock deposits are confined to the conglomerate (pebbly) members of the Sherwood Sandstone Group which crop out in the south of the county, and it is only these gravel-bearing areas that are shown on the Mineral Resource Map. In general, the gravel fraction, comprising poorly cemented beds of well-rounded quartzite pebbles and cobbles in a fine-grained sand matrix, is a prized resource of coarse aggregate for concrete when processed by crushing and screening. Matrix sand is of only limited use, being too fine grained to meet most constructional sand standards. However, small amounts of sand-grade material generated during crushing operations can be blended with fine sands to meet specifications for concreting, building and asphaltting sands. Pebble-free sand beds are generally regarded as waste, as are indurated sandstone beds and thin mudstones. In the south-east of the county, the sand becomes rather coarser grained locally, and has been worked in the past for use in the construction industry.

The Sherwood Sandstone Group as a whole shows a marked thinning from its development farther west in Staffordshire and, in general, conglomerate members are thinner, include a greater proportion of pebble-free sandstone and have a lower pebble content than similar deposits there. Conglomerates worked in the Hulland Ward and Mercaston areas represent the principal bedrock resource, and although exposures of 'Bunter Pebble Beds' have been worked in the past elsewhere, the low pebble content and the low value of the sand has caused workings to be abandoned.

Limestone

Limestones occur extensively in England and Wales and are quarried mainly for the production of crushed rock aggregate, for the manufacture of cement and for a wide range of industrial uses. Limestone resources occur in two main areas of Derbyshire. Carboniferous limestones form the attractive scenery characteristic of the 'White Peak' in north-west Derbyshire, although a large part of this outcrop lies within the Peak District National Park. Limestones, or more strictly dolomites or dolomitic limestones, of Permian age occur in the north-east of the county, where they form a narrow outcrop straddling the county boundary with Nottinghamshire.

Carboniferous limestones

Limestones of Carboniferous age are the major source of limestone in England and Wales, and are quarried extensively in the Mendips, Derbyshire, Staffordshire and the Peak District, south and north Wales, parts of the northern Pennines and around the fringes of the Lake District. Carboniferous limestones commonly occur in thick, uniform beds which are structurally simple, and are relatively cheap to extract and process. They usually produce strong, durable, low-porosity aggregate materials. The limestones of Derbyshire and the Peak District are noted for their uniformity over wide areas, and for the very high chemical purity and consistency of certain beds which are highly valued for a wide range of industrial uses. Nevertheless, most limestone production is for aggregate. Quarrying is centred around Buxton and Wirksworth and limestone is also mined at the Middleton mine, near Wirksworth.

The term 'high purity' is normally defined in terms of calcium carbonate content with > 96–97 % CaCO₃ defining high purity limestone and > 98–98.5 % very high purity limestone. The distribution of the latter is shown on the Mineral Resources Map. However, for many applications it is the level of the specific impurities present (for example, iron in limestone used in glassmaking) and the consistency or colour of the limestone which are of paramount importance, rather than absolute values for calcium carbonate. The term 'industrial' limestone is more appropriate. Despite its varied applications, demand for limestone for industrial use in Britain is small, being only some 6 % of the total demand for limestone. However, for most industrial applications, material of high quality is essential.

Carboniferous limestones in Derbyshire are generally pale-coloured, massive or thickly-bedded limestones which were deposited in a relatively shallow-water, marine environment. They are compositionally uniform over wide areas and often are of very high purity (>98 % CaCO₃). They are also resources of good quality aggregate materials.

The Bee Low Limestones, a unit of consistently very high purity and uniform chemistry, provide most of the Carboniferous limestone quarried in Derbyshire. The formation typically contains limestones with only small proportions of magnesia, silica, alumina, iron and other impurities. The purity is locally downgraded in beds adjacent to clay bands and igneous horizons (basaltic lavas and tuffs) which are locally interbedded with the limestone. The zone of alteration is, however, usually less than 2 m in width and impurities rarely total more than 5 % of the rock. The Bee Low

Limestones are extensively dolomitised in the Matlock–Wirksworth area and, although the dolomites are iron-rich, they contain high levels of magnesia, mostly in the range 18.0–20.5 % MgO. In the past, they have been valued for their magnesia content and between 1963 and 1966 were used for the extraction of magnesium metal. They are not currently worked.

The Bee Low Limestones generally produce strong, low porosity, aggregate materials, although where dolomitised in the Matlock–Wirksworth area they are relatively porous and weak. However, even the poorest quality Carboniferous limestone aggregate from Derbyshire is harder and less porous than, for instance, most Jurassic limestone or chalk aggregates. The Bee Low Limestones are also the most important source of industrial limestone with a range of applications, including lime production, soda ash manufacture, flue gas desulphurisation, glassmaking and as a filler in paint, rubber and plastics.

The beds immediately beneath the Bee Low Limestones, termed the Woo Dale Limestones, are not widely exposed, although they are worked in several quarries. They are also of high purity and together the two formations comprise over 300 m of industrial limestone resources. The Woo Dale Limestones are slightly dolomitised in the Buxton area, but MgO values are generally less than 1 %. Purity remains high throughout the uppermost 100 m of strata, but lower in the sequence the unexposed beds contain limestones with higher silica, alumina, iron and sulphur contents.

The limestone sequence above the Bee Low is much more chemically varied and somewhat less pure. The Monsal Dale and Eyam limestones both contain cherty and shaly beds and the Monsal Dale Limestones also contain several volcanic (lavas and tuffs) units which make up a large proportion of the total thickness in the Matlock–Ashover area. Both limestone formations produce good quality aggregates, and are quarried at several sites for crushed rock aggregates used in concrete and road construction (except road surfacing). The resource potential of the Derbyshire limestones is locally affected by mineralisation. Fluorite-barytes-lead mineralisation is mostly confined to veins and replacement bodies in the Matlock–Ashover–Wirksworth area. However, the effects are localised and generally restricted to the width of the mineral vein or body.

Permian limestones

The Permian Magnesian Limestone is the main source of dolomite $[\text{Ca},\text{Mg}(\text{CO}_3)_2]$ in Britain. It consists of dolomites, dolomitic limestones and limestones, and extends in a narrow belt, almost continuously, from Durham to Nottinghamshire. A small part of the outcrop (the Cadeby Formation) occurs in the north–east of the county, east of Bolsover.

The Magnesian Limestone is highly variable, both regionally and locally, in its physical, mechanical and chemical properties and thus its suitability for particular applications. The formation is quarried for a range of construction uses, mostly for fill and sub-base material, and, less commonly, for concrete aggregate and coated roadstone. Some is used in blockmaking and for building stone. Fines are sold for agricultural purposes. It is presumably inferior to Carboniferous limestones as a source of aggregate because of its variable character, and generally lower strength and higher porosity. Impurities such as silica, iron and alumina are a prime consideration in the selection of dolomite for its various industrial applications. At Whitwell quarry, the upper part of the dolomite has a sufficiently low silica and iron oxide content for it to be used, after calcination, as a refractory raw material and as a flux for steelmaking. The underlying dolomite is utilised for a range of construction applications.

Coal

The coal resources of Derbyshire are confined to East Pennine Coalfield, and the South Derbyshire and Leicestershire Coalfields. Coal within the Lower Coal Measures exposed in the north–western part of the county, although worked on a small scale in the past, is not likely to be of future economic interest.

The East Pennine Coalfield of Derbyshire was formerly a major centre of deep-mine production, but activity has declined markedly in recent years and the last three British Coal mines, Bolsover, Markham and Shirebrook, closed in summer 1993. The mines were offered for sale but no interest was shown and the mines remain closed. The coalfield currently supports two licensed coal mines, Amber Valley and Eckington Drift, which are working the Blackshale and Deep Soft seams respectively. In contrast, the exposed coalfield has been intensively worked as a source of opencast coal and remains an important producing area. Saleable output of opencast coal in recent years has been about 1.25 million tonnes per year.

Opencast coal resources within the East Pennine Coalfield have been defined by the crop of the lowest workable coal in the west and the county boundary or, where appropriate, the Permian outcrop in the east. In the south of the coalfield, it is some years since seams below the Kilburn Coal have been worked but these remain of interest if economic and planning factors become favourable. In the south, the base of the opencast coal resource area has been drawn on the Belperlawn Coal, the lowest coal seam within the Coal Measures. North of Belper, the resource has been defined by the overlying Alton Coal, but north of the village of Alton, north–east of Ashover, this coal thins and the base has been defined by the Mickley Thin Coal. However, the bulk of opencast activity in the north of the county has occurred at or above the Ashgate Coal (Figure 3).

Areas of former opencast coal extraction since the Second World War are shown on the Mineral Resources Map. This information has been derived from mineral consultation maps prepared by British Coal Opencast. At currently active sites, and sites with valid planning permission where coaling has not yet started, the extent of the planning permission is shown. Elsewhere only the worked area is defined. The extensive nature of the worked areas does not imply that the coal resource has been exhausted. The economics of opencast coal extraction have changed with time, allowing coals with higher overburden ratios to be extracted. Consequently, some areas have been worked on more than one occasion and may be worked for deeper coal in the future. However, more modern sites worked in the last 20 years or so are likely to have exhausted the coal-in-place.

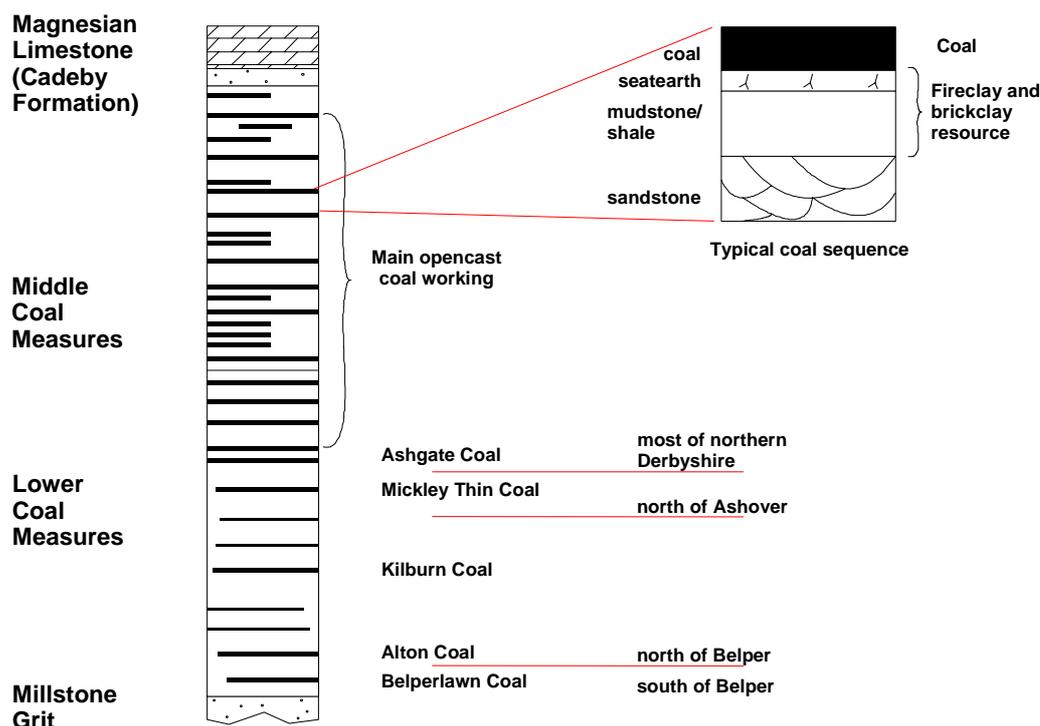


Figure 3 Sketch column showing the stratigraphical position of coal seams used to delineate the opencast coal resource area in the East Pennine Coalfield (not to scale).

The South Derbyshire and Leicestershire coalfields are separated by the south-easterly-trending Ashby Anticline. The area to the west of the Boothorpe Fault, located on the western flank of the Ashby Anticline, is known as the South Derbyshire Coalfield, although it extends into Leicestershire. The area to the east of the Boothorpe Fault is known as the Leicestershire Coalfield, although it is in part in Derbyshire. Within Derbyshire, opencast working has largely been confined to the South Derbyshire Coalfield and current activity is located in this area. The Swadlincote area of the South Derbyshire Coalfield has also been an important source of fireclays. Within the South Derbyshire Coalfield, the opencast resource area has been defined by the exposed coalfield. In the northern part of the Leicestershire Coalfield the lower part of the Lower Coal Measures, beneath the Kilburn Coal, has not been of economic interest as a source opencast coal and has not been defined as a resource area.

‘Vein’ minerals

The Southern Pennine Orefield, which lies principally within the Peak District National Park, has traditionally been the major source of fluorspar in Britain. A small, although highly mineralised, part of the orefield in the Matlock–Bonsall–Wirksworth area falls within Derbyshire and supports a number of openpit workings. The ore is mainly transported to the Cavendish Mill, near Stoney Middleton for the production of acid-grade fluorspar, together with by-product barytes and small amounts of galena. Acid-grade fluorspar contains > 97 % CaF_2 , and is used in the production of hydrofluoric acid, the starting point for the manufacture of a wide range of fluorine-bearing chemicals. Over the years there have been a number of attempts to establish fluorspar processing operations in the southern part of the orefield, although none have proved to be successful in the long term. A small plant near Ashover produces metallurgical grade fluorspar from locally extracted ore.

The fluorspar-barytes-lead mineralisation occurs in steeply inclined E–W and ENE–WSW fissure veins (rakes) in limestones which may be up to several kilometres in length and up to 10 m wide. Groups of thin veins (scrins) may be locally concentrated but only the major veins are shown on the accompanying map. The main mineralisation is confined to the eastern part of the orefield and to the highest limestones beneath the overlying shale cover, which acted as an impermeable caprock to the mineralising fluids. Volcanic rocks interbedded with the limestones are generally barren. There is a broad zonation of minerals in the mineral veins. Fluorspar is the dominant mineral in the east, with barytes and calcite becoming progressively more abundant westward. However, the zones are poorly defined in many places, with considerable overlap.

Following many years of extraction, many of the major veins are depleted as sources of openpit fluorspar. Current exploration is now being directed towards finding concealed orebodies related to cavity infillings and replacement deposits in receptive limestone horizons, generally coincident with the Monsal Dale Limestones. Such orebodies may yield 0.5 million tonnes of ore or more and represent very important targets. The mineralogy of these deposits does not correspond with the broad mineral zonation seen in the veins.

Igneous rock

Igneous rocks occupy considerable areas of the Carboniferous limestone outcrop in the Bonsall area, west of Matlock and in the Ashover inlier. Lavas and tuffs (known locally as toadstones) occur interbedded with the limestones and are up to a few tens of metres in thickness. They are invariably altered and are not, therefore classed as an aggregate resource. However, they are waste materials, and where present in significant thickness, place limitations on possible limestone quarrying. Intrusive igneous rocks (dolerites) occur in the Bonsall area and near Buxton. The Waterswallows olivine-dolerite sill, near Buxton, is worked mainly as a source of roadstone.

Clay and shale

Clay and shale occur extensively in Derbyshire. The most important resources are of Carboniferous age and are associated with the Millstone Grit and the Coal Measures, the latter being also a potential source of fireclays. The red, silty mudstones of the Triassic, Mercia Mudstone Group crop out extensively in the southern part of the county, but are not currently of economic importance.

There are currently only three brick clay operations in Derbyshire, all working Carboniferous shales. At the Mouselow quarry, Glossop, black shales of the Millstone Grit are worked and transported to brick factories in the Manchester area. At the Waingroves brickworks in Ripley, mudstones and shales of the Lower Coal Measures are extracted for brick manufacture on site. Coal Measure mudstones are also worked as Hall Lane near Staveley.

Fireclays are closely associated with coal seams (Figure 3) and thus resources are confined to the coalfields. Historically they were valued as refractory raw materials, but their traditional markets have declined markedly with changes in iron and steelmaking technology, which now demand higher quality refractories. However, some fireclays may exhibit relatively low iron contents compared with other clays and are valued for the manufacture of buff-coloured facing bricks. They have also been used in the manufacture of vitrified clay pipes. Fireclays are also used in the manufacture of stoneware pottery, as at Denby. Both fireclays and mudstones occur in association with opencast coal with which they may be worked. However, because of their variable quality, and also for operational and planning reasons this is only rarely the case.

The South Derbyshire Coalfield has, in the past, been a very important source of fireclays, particularly for the manufacture of clay pipes for sewage and surface-water drainage. The fireclays are largely confined to the Pottery Clays Formation, which contains an unusually high concentration of fireclays

and thin coals, exposed in the relatively small Swadlincote–Moiria area. During the 1970s and early 1980s large-scale fireclay extraction was carried out in conjunction with opencast coal mining and large stockpiles were developed, although production was based mainly in the Leicestershire part of the South Derbyshire Coalfield. The remaining stockpiles currently constitute a major source of fireclay, principally for the production of facing bricks and vitrified clay pipes, but also for refractory use

Whilst a wide range of clays may be used in brick manufacture, modern brickmaking technology is highly dependent on raw materials with consistent and predictable firing characteristics. The suitability of Carboniferous mudstones and fireclays for brick manufacture depend, in part, on their carbon and sulphur contents. Both may lead to firing problems (black coring) and sulphur may also give unacceptable emission levels. In general, carbon and sulphur levels should be less than 1.5 % and 0.2 % respectively, although the ease with which carbon can be burnt out, and also blending, may permit some tolerance in these figures. Blending of different clays to give a range of fired colours and aesthetic qualities is an increasingly common feature of the brick industry.

The brickmaking potential of individual clay and shale units, e.g. within the Millstone Grit, and also in the Mercia Mudstone Group, is largely unproven. Their extent is not, therefore, shown on the Mineral Resources Map.

Sandstone

Carboniferous sandstones have traditionally been a source of building and paving stone. Following a long decline in use throughout most of the 20th century, there has been a considerable revival in the last few years. The sandstones of the Millstone Grit and, to a lesser extent, the Coal Measures are a potential source of material for walling, paving, sawn and hand-crafted stone. The Millstone Grit offers sandstones with varying textures and grain size, and colours ranging from buff to pink. The Ashover Grit near Whatstandwell and Darley Dale is particularly valued, but other sandstones, including the Crawshaw Sandstone, at the base of the Lower Coal Measures near Ambergate, are also worked.

The suitability of a sandstone for building stone, given a certain minimum strength and durability, depends largely on aesthetic qualities and textural consistency, and on the size of the blocks that can be produced. Thinly-bedded sandstones may be used for flagstones and occasionally for roofing. When the bedding is more widely separated the stone is likely to be suitable for dressing and sawing into blocks. The potential of individual sandstone units is largely unproven, and their extent is not shown on the Mineral Resources Map.

Crushed Carboniferous sandstones are generally too weak and susceptible to frost damage to be used for roadstone or concrete aggregate and for the most part they are only used as source of construction fill. Lower Coal Measures sandstone is worked near New Mills for this purpose and the Millstone Grit has been worked on an intermittent basis near Hayfield.

Silica sand

Silica sand occurs locally in ‘Pocket Deposits’ formed in solution hollows in the Carboniferous limestones. The sands also contain a kaolinitic clay, and because of their refractory properties were used in the manufacture of a range of refractory products. Changes in steelmaking technology entailing more demanding operating conditions have, however, limited their use and they are unlikely to be of future economic interest for refractory applications.

Peat

One peat working has planning permission for extraction near Sapperton, in the south–west of the county. There are, however, no significant resources of lowland peat in Derbyshire.

Coalbed methane

The prime requirement for coalbed methane prospects are unworked coal seams at depths between 200 and 1500 m (low coal permeability and high drilling costs make deeper targets unattractive) and adequate levels of methane, which generally increases with rank.

South Derbyshire Coalfield

The low methane content of coals in the South Derbyshire Coalfield (average methane content 1.3 m³/tonne; Creedy, 1991) indicates that this area is a poor coalbed methane prospect, whose resources are unlikely to be exploited in the foreseeable future.

East Pennine Coalfield

In north and east Derbyshire, coal seams at depths of more than 200 m are widespread. The published methane plus ethane content of coals in the north Nottinghamshire part of the East Pennine Coalfield averages 5.13 m³/tonne (Creedy, 1983). This is the closest data to north and east Derbyshire, and would be high enough to be of interest to the coalbed methane industry, all other factors being favourable.

However, past coal mining activity will have affected the coalbed methane prospectivity of the area as coal extraction has the effect of lowering the pressure on the strata both above and below the mined seam. Lowering the pressure causes gas to desorb from the coal, often into the mine, from where it was vented to the atmosphere or used at the pithead. This downgrades the prospectivity of seams close to the mined seam. However, it does increase fracturing in the overlying and underlying measures, improving the prospects of extracting gas. Former coal mining activity can also cause drilling problems (loss of circulation) if mud or water is used as a drilling fluid.

Widespread degasification is likely to have taken place on the exposed Coal Measures, due to centuries of mining (Robinson and Grayson, 1990). Thus the most prospective part of the area is likely to be the concealed coalfield, or those areas between recently closed deep mines. However, collieries have existed all along the eastern side of the concealed North Derbyshire coalfield, from Whitwell to Shirebrook, so any unmined areas are likely to be relatively small.

Conventional hydrocarbons

The eastern part of Derbyshire is on the western margin of the East Midlands oil province. It contains the gasfield at Calow and the Hardstoft oilfield, both of which have produced hydrocarbons in the past. The Calow gasfield has recently resumed production.

Derbyshire was one of the first areas in the Britain to be explored for oil in an attempt to shore up the nation's supplies during the First World War. Wells were drilled at Ridgeway, Renishaw, Brimington, Heath, Hardstoft, and Ironville (Huxley, 1983). The Hardstoft oilfield was the first to be discovered in Britain and oil was struck on 27th May 1919. The oilfield is a small surface anticline which produced oil from a sandstone at the top of the Dinantian (Lower Carboniferous) succession at a depth of around 936 m. It originally produced oil at an average of six barrels a day under natural flow, but later its performance was erratic. Full reliable output figures are not available, but it produced more than 7,000 barrels of oil during the Second World War (Huxley, 1983).

The Calow gasfield (Fraser et al., 1990) has gas in the Crawshaw Sandstone (Coal Measures) and Chatsworth Grit (Millstone Grit). Some 280 million ft³ of gas were supplied to the Avenue Coke works at Chesterfield in its two years of operation, starting in 1965.

Small quantities of gas were found in the first (1918–1922) drilling campaign in two wells at Ironville which were drilled to locate the source of the oil seepage into the nearby Riddings coal mines. Further wells drilled by BP at Ironville in 1956–58 also encountered minor quantities of gas (Huxley, 1983), and Ironville 5 (BP, 1984) encountered minor oil shows, but tests were inconclusive. Details of these and other unsuccessful wells are given in Appendix 4.

The key factors which make the East Midlands area an oil and gas province are:

- It contains thick, Upper Carboniferous, source rocks capable of generating oil and gas
- Folding in the Variscan orogeny at the end of Carboniferous times formed traps where the oil and gas could accumulate
- The source rocks became mature when they were deeply buried in Mesozoic times, after the traps were formed
- Shales are interbedded with the Carboniferous sandstone reservoirs. These seal the traps
- The area has not been subjected to much folding and faulting after Mesozoic times, so the hydrocarbon accumulations have not been greatly disturbed

Provided that undrilled traps exist in east Derbyshire, there is a good chance that further oil or gas accumulations will be found in the area, particularly in the area east of Calow, Hardstoft and Ironville. This is why this area is one of active interest to the oil industry.

The area west of Calow, Hardstoft and Ironville is somewhat less prospective, as the main East Midlands reservoir sandstones (the Crawshaw Sandstone and the Chatsworth Grit) are absent or only shallowly buried. However, oil shows occur in some wells.

MINERAL RESOURCES AND ENVIRONMENTAL DESIGNATIONS

The character of the landscape reflects the nature and structure of the underlying rocks, the erosive forces to which they have been subjected and the soil and vegetation that they support. It is constantly changing due, in the longer term, to geomorphological processes, and in the shorter term, to economic and social pressures. Mineral extraction can produce irrevocable, but not necessarily harmful, change to a locality over a relatively short timescale. In order to ensure that such changes are both sustainable and non-injurious to the environment, the most important landscapes and habitats, such as National Parks and SSSIs, are given a greater degree of protection from mineral working. The necessity for mineral extraction in such areas has to be justified by a most rigorous examination of the merits of the proposal. This examination should consider the public interest in the development of the resources and the social desirability of employment, as well as the need to protect the environment. There is no prohibition on working minerals in such areas.

The resolution of conflicts between mineral resource development and other considerations is undertaken through the development plan framework and a balanced appraisal of the various issues associated with particular developments. The Mineral Resources Map of Derbyshire provides a synthesis of available information which can be revised and updated as additional data becomes available. It is hoped that it will assist local and national Government, the minerals industry and other interests in the consideration and production of policies included in development plans.

Outside the Peak District National Park, the greater part of which falls within Derbyshire, there are few national planning constraints. The major share of SSSIs within Derbyshire are located within the National Park, and of those outside, a number are sited in areas previously worked for minerals or are related to woodland and marsh. A number of sites are concentrated on the Carboniferous limestone outcrop, either on the extension of the main outcrop in the Matlock area or on the inliers in the south of the county. There are no National Nature Reserves or AONBs in that part of Derbyshire outside the National Park. Scheduled Monuments occur on all the mineral resource areas, with local concentrations in the Trent Valley.

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For further information on national planning policy, users should consult the following:

- Planning Policy Guidance Notes
- Minerals Planning Guidance Notes
- Regional Planning Guidance Notes and Circulars

published by HMSO for the Department of the Environment.

Information from the following documents and maps was used in the compilation of the map:

a) British Geological Survey 1:50 000 or 1:63 360* scale New Series geological map sheets

| No | Sheet Name | Published | |
|-----|--------------------|-----------|------------------|
| 86 | Glossop | (1980) | |
| 99 | Chapel-en-le-Frith | (1977) | |
| 100 | Sheffield | (1974) | |
| 111 | Buxton | (1978) | |
| 112 | Chesterfield | (1971)* | |
| 124 | Ashbourne | (1983) | |
| 125 | Derby | (1972) | |
| 140 | Burton-upon-Trent | (1982) | |
| 141 | Loughborough | (1950) | reprinted (1969) |
| 154 | Lichfield | (1924)* | reprinted (1954) |
| 155 | Coalville | (1982) | |

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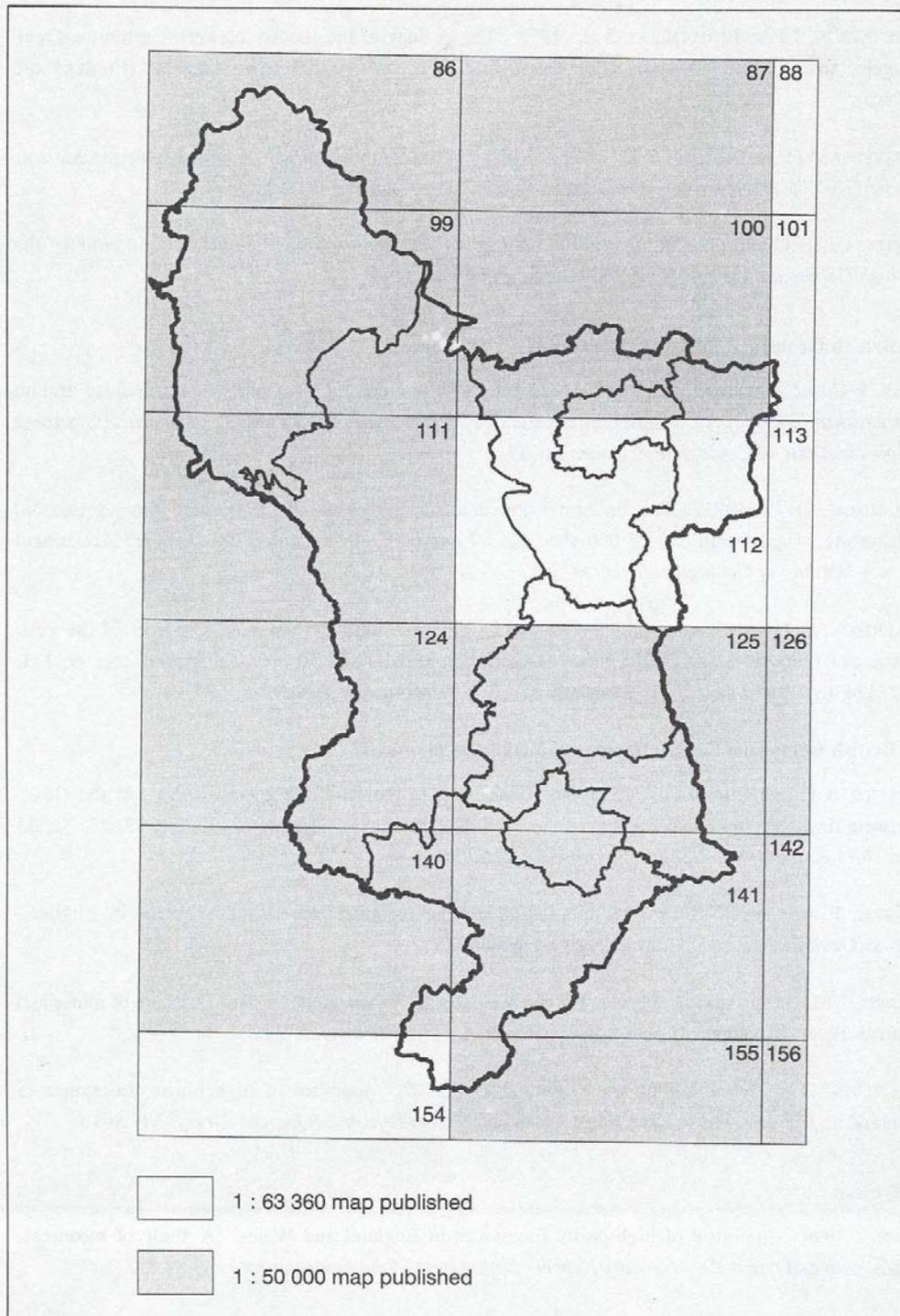


Figure 4 Availability of British Geological Survey 1:50 000 or 1:63 360 scale New Series geological map coverage of Derbyshire

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APPENDIX 1 MINERAL WORKINGS IN DERBYSHIRE (1994)

| Pit Name | Location | Operator | Commodity |
|------------------------------------|--------------|-------------------------------|-----------------------------------------|
| Amber Valley Mine | Alfreton | Amber Valley Colliery Company | Coal, Deep Mine |
| Eckington Drift Mine | Eckington | Moorside Mining Co. Ltd | Coal, Deep Mine |
| Kirk | Ripley | Miller Mining Ltd | Coal, Opencast |
| Rainge | Morton | Coal Contractors Ltd | Coal, Opencast |
| Arkwright Reclamation | Arkwright | RJB Mining plc | Coal, Opencast |
| High Cross | Swadlincote | Taylor Woodrow Mining | Coal, Opencast |
| Nadins | Swadlincote | Taylor Woodrow Mining | Coal, Opencast |
| Smotherfly | Alfreton | Kier Mining | Coal, Opencast |
| Trinity | Codnor | J J Cummins Ltd | Coal, Opencast |
| Whittington Sewage Treatment Works | Chesterfield | Fitzwise Ltd | Coal, Opencast |
| Staveley Chemical Works | Staveley | Fitzwise Ltd | Coal, Opencast |
| Summit Sidings | Staveley | Fitzwise Ltd | Coal, Opencast |
| Old Spun Pipe Plant II | Staveley | Fitzwise Ltd | Coal, Opencast |
| Old Spun Pipe Plant | Staveley | Fitzwise Ltd | Coal, Opencast |
| Spinkhill | Renishaw | RJB Mining plc | Coal, Opencast |
| Ireland Tips | Staveley | Fitzwise Ltd | Coal, Opencast |
| Waingroves Brickworks | Ripley | Butterley Brick Ltd | Common Clay and Shale |
| Hall Lane | Staveley | Fitzwise Ltd | Common Clay and Shale |
| Mouselow | Glossop | Salvesen Brick Ltd | Common Clay and Shale, and Sandstone |
| Waterswallows | Buxton | Tarmac-North West | Igneous Rock |
| Hillhead | Buxton | Tarmac-North West | Limestone |
| Brierlow | Buxton | RMC-North West Aggregates | Limestone |
| Dove Holes | Buxton | RMC-North West Aggregates | Limestone |
| Dowlow | Buxton | Redland Aggregates | Limestone |
| Tunstead-Old Moor [*] | Buxton | Buxton Lime Industries | Limestone |
| Brassington Moor | Brassington | Longcliffe Quarries Ltd | Limestone |
| Grange Mill | Wirksworth | Ben Bennett Jr Ltd | Limestone |
| Middleton Mine | Wirksworth | Croxton and Garry Ltd | Limestone |
| Middle Peak | Wirksworth | Tarmac-Eastern | Limestone |
| Dene | Cromford | Tarmac-Eastern | Limestone |
| Bolsover Moor | Chesterfield | Tarmac-Eastern | Limestone |
| Calow | Chesterfield | East Midlands Oil & Gas Ltd | Natural Gas |
| Crich | Matlock | RMC-Butterley Aggregates | Limestone |
| Whitwell | Worksop | Redland Aggregates | Limestone |
| Milltown | Ashover | Biwater Pipes & Castings | Limestone + vein |
| Slinter | Matlock | Slinter Mining Co. Ltd | Limestone + vein |
| Shardlow Pit | Shardlow | ARC-Central | Sand and Gravel |
| Mercaston | Ashbourne | ARC-Central | Sand and Gravel |
| Elvaston/Bellington Hill | Elvaston | Tarmac-Eastern | Sand and Gravel |
| Attenborough | Long Eaton | RMC-Butterley Aggregates | Sand and Gravel |
| Barkers (Birch Vale) | New Mills | D Roberts | Sandstone |
| Birch Vale (Arden) | New Mills | Birch Vale Quarry Ltd | Sandstone |
| Hayfield | Hayfield | Landelle Ltd | Sandstone |

| Pit Name | Location | Operator | Commodity |
|--------------------|-------------------------------------------|--------------------------------|------------------|
| Ridgeway | Ambergate | Ridgeway Quarry & Building Co. | Sandstone |
| Dukes | Whatstandwell | Realstone Ltd | Sandstone |
| Stancliffe | Darley Dale | Realstone Ltd | Sandstone |
| Halldale | Darley Dale | Stancliffe Stone Co. Ltd | Sandstone |
| Sapperton Manor | Church Broughton | D Prince & Sons Ltd | Peat |
| Tunstead-Old Moor* | Partly in the Peak District National Park | | |

As at 31.8.94

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| | |
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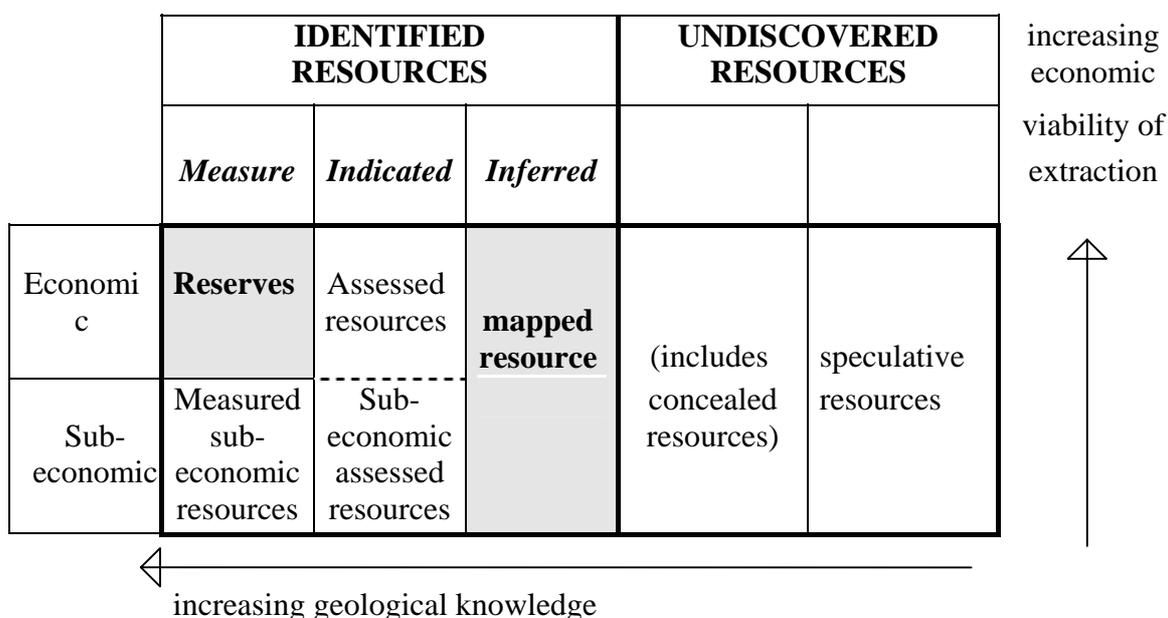
APPENDIX 3 METHODOLOGY

The British Geological Survey (BGS) was commissioned by the Department of the Environment to prepare, on a trial basis, a set of concise statements mainly in map form, to show the broad distribution of mineral resources in selected counties and to relate these to selected, nationally designated planning constraints. The trial study has developed a methodology for the collection and display of data in a consistent and comparable format based on four Mineral Planning Authority (MPA) areas - Bedfordshire, Derbyshire, Staffordshire and the Peak District National Park.

The main element of the trial study was the production of maps, with accompanying concise reports, for each MPA area. All mineral resource and planning constraint information has been captured digitally on a PC-based system using Intergraph Microstation to produce a cartographic database. Data has been captured as a series of files, structured on separate levels so that they can be viewed either independently or in various combinations, as required. Most of the information has been captured digitally from hard copy maps mainly with scales of 1:25 000, 1:50 000 and 1:63 360. The BGS 1:250 000 digital geological dataset has been used in places. Other material was obtained in a variety of digital formats which have had to be converted for use by the Intergraph Microstation System.

As the data are held digitally, map output can be on any scale but 1:100 000 has been found to be a convenient size to summarise the information for individual MPAs. This provides a legible topographic base which enables both the broad implications of the information, and sufficiently accurate detail, to be shown. The particular advantage of holding all the information in digital form is that it is comparatively easy to update and revise as additional information becomes available, and also provides scope for producing customised maps of selected information on request. Any future changes in administrative boundaries (e.g. post-local government reorganisation) can be easily accommodated.

Figure 1 Classification of resources



Based on McKelvey, 1972 and Harris, 1993

Classification of reserves and resources

The diagram, Figure 1, is a representation of a conventional method for classifying mineral reserves and resources, based on a system introduced by the US Bureau of Mines and the US Geological Survey and adapted by the British Geological Survey. In this conceptual diagram the vertical dimension of the diagram represents the economic viability of the resource and consists simply of two categories, **economic** and **sub-economic**, depending on whether or not it is commercially viable under prevailing economic circumstances. As the costs of extraction and the prices obtained for the mineral may change with time the division between the two categories is not fixed. This has been well illustrated in recent years in the coal industry where coal reserves in operational mines have moved into the sub-economic category as a direct consequence of these mines being closed.

The horizontal dimension represents degrees of geological knowledge about the resource, from mere speculation about its existence (right-hand side) to thorough assessment and sampling on a systematic basis (left-hand side).

In the present study the County Mineral Resource Maps have been produced by the collation and interpretation of data held by the British Geological Survey. Since the mineral resource data presented are not comprehensive and the quality is variable, the boundaries shown are approximate. Most of the mineral resource information presented is, therefore, at the **inferred resource** level (Figure 1), that is to say those resources that can be defined from available geological information and which may have some economic potential. They have neither been evaluated by drilling, or other sampling methods, nor had their technical properties characterised on any systematic basis. However, where mineral assessment studies, including drilling and testing, have been carried out, sufficient information may be available to define the extent and quality of the deposits at the **indicated resource** level (Figure 1). The Carboniferous limestone resources of Derbyshire have been assessed at the indicated resource level.

A mineral resource is not confirmed as economic until it is proved by a relatively expensive evaluation programme. This usually involves a detailed measurement of the material available for extraction together with an evaluation of the quality of the material, its market suitability, the revenue its sale will generate and, ultimately, the viability of the deposit. That part of a resource that is both 'measured' and 'economic', i.e. it has been fully evaluated and is commercially viable to work, is called a **reserve** or **mineral reserve**.

In the context of land-use planning, however, the term **reserve** should strictly be limited to those minerals for which a valid planning permission for extraction exists, i.e. **permitted reserves**. The extent of mineral planning permissions is shown on the Mineral Resources Map. These cover active mineral workings and also inactive (dormant) mineral permissions.

Some mineral planning permissions may have remained unworked, and others may have become uneconomic prior to being worked out. In most cases the areas involved are likely to have been worked to some extent in the past, and may now be restored. In addition, parts of the resource areas may have been fully evaluated by the minerals industry, but either have not been subject to a planning application or have been refused permission for extraction. These areas are **unpermitted reserves**.

A **landbank** is a stock of planning permissions and is commonly quoted for aggregates. It is composed of the sum of all **permitted reserves** at active and inactive sites at a given point of time, and for a given area, with the following provisos (DOE, MPG6):

- it includes the estimated quantity of reserves with valid planning permission at dormant or currently non-working sites;

- it includes all reserves with valid planning permission irrespective of the size of the reserves and production capacity of particular sites;

- it does not include estimated quantities of material allocated in development plans but not having the benefit of planning permission; and

- it does not include any estimate for the contribution that could be made by marine dredged, imported or secondary materials.

It is important to recognise, however, that some of the permitted reserves contained within landbanks have not been fully evaluated with the degree of precision normally associated with the strict use of the term **reserves**, indeed some may not have been evaluated at all.

Mineral workings and planning permissions

The location and name of currently active mineral workings are shown on the map, although given the scale of the map some small-scale workings e.g. vein mineral tributaries, are omitted. The information is derived from the British Geological Survey's Mines and Quarries Database, updated as appropriate from Derbyshire's records. Letters (e.g. **Lst** = limestone) are used to show the main mineral commodity produced. Some operations produce more than one commodity and for example, a number of vein mineral operations also produce limestone.

The requirement to define past mineral workings presented an initial difficulty, in that no comprehensive and up-to-date source of information was identified. Following discussions with the MPAs and with DOE's agreement, it was agreed to show the extent of mineral planning permissions which will reflect most activity post-1946. For Derbyshire, the County Council kindly made available index maps from which the planning permissions were digitised. Planning permissions for re-working old mine tips are not included.

The extent of the planning permissions shown on the Mineral Resources Map cover active mineral workings, former mineral workings and, occasionally, unworked deposits. A distinction is made between surface and underground permissions. The present physical and legal status of the planning permissions is not qualified on the map. The areas shown may, therefore, include inactive sites, where the permission has expired due to the terms of the permission i.e. a time limit, and inactive (dormant) sites where the permission still exists. Sites which have been restored are not separately identified. Information on the precise status and extent of individual planning permissions should be sought from Derbyshire County Council.

Most planning permissions appear on a mapped mineral resource area and thus the underlying resource colour identifies the mineral type. This is not the case in the following circumstances:

- where a planning permission for one mineral overlies another resource area, e.g. fluorspar permissions are almost entirely over limestone resource areas
- where no resource has been mapped

Planning permissions fall outside resource areas for the following reasons:

- some old permissions may be for minerals which are no longer of economic importance and no resource has, therefore, been mapped
- permissions shown partly off resource areas may extend to ownership, or other easily defined boundaries, or to include ground for ancillary facilities such as processing plants, roads and overburden tipping
- isolated workings occurring outside defined resource areas may reflect very local or specific situations not applicable to the full extent of the underlying rock type: small building stone quarries in the Millstone Grit are an example

The latest data available for the total areas of planning permissions in Derbyshire, collected for the Department of Environment Minerals Survey of 1988, is shown in Table 1. This is likely to be updated.

Table 1 Areas of planning permissions for mineral workings in Derbyshire, 1988

| | Commodity | Total (hectares) | % |
|---------------------|--------------------------|-------------------------|------------|
| Surface workings | Clay/Shale | 168 | 3.84 |
| | Coal (open cast) | 1136 | 25.9 |
| | Igneous Rock | 27 | 0.62 |
| | Limestone/Dolomite | 1383 | 31.6 |
| | Oil/Gas | 1 | 0.02 |
| | Sand & Gravel | 1412 | 32.3 |
| | Sand (Industrial/Silica) | 51 | 1.17 |
| | Sandstone | 67 | 1.53 |
| | Vein Minerals | 125 | 2.86 |
| | Other Minerals | 2 | 0.05 |
| | Total | 4372 | 100 |
| Underground working | Clay/Shale | 5 | 0.01 |
| | Coal (under GDO) | 45650 | 91.0 |
| | Coal (specific plan. | 530 | 1.06 |
| | Limestone/Dolomite | 129 | 0.26 |
| | Vein Minerals | 3823 | 7.63 |
| | Total | 50137 | 100 |

From: *Department of the Environment, Survey of Land for Mineral Workings in England, 1988.*

APPENDIX 4 DETAILS OF HYDROCARBON EXPLORATION WELLS

| | |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ridgeway 1. | Pearson for HMG, 1919. Tested Coal Measures, Millstone Grit, Carboniferous Limestone. TD (total depth) in Carboniferous Limestone at 913 m. Gas show in Coal Measures. Limited data held by BGS. |
| Bramley Moor 1. | No data held by BGS. |
| Renishaw 1. | Pearson for HMG, ?1919. Tested Coal Measures, Millstone Grit, Carboniferous Limestone. TD in Carboniferous Limestone at 1280 m. No shows recorded. |
| Whittington 1. | D'Arcy, 1945–46. Tested Coal Measures, Millstone Grit, Carboniferous Limestone. TD in Carboniferous Limestone at 1024 m. Oil staining at Coal Measures/Millstone Grit boundary at c. 213 m. |
| Brimington 1. | Pearson for HMG, 1920–21. Tested Coal Measures, Millstone Grit, Carboniferous Limestone. TD in Carboniferous Limestone at 1231 m. Gas shows in Rough rock at 320 m. Oil show in Chatsworth Grit at 1430 m, gas show at 675 m. |
| Heath 1. | D'Arcy, 1919. Tested Coal Measures, Millstone Grit, Carboniferous Limestone. TD in Carboniferous Limestone at 1219 m. Trace light oil at 1201 m. |
| Ironville 1. | Pearson for HMG, 1919. Tested Coal Measures, Millstone Grit, Carboniferous Limestone. TD in Carboniferous Limestone at 1114 m. Oil shows at 619 m at top Carboniferous Limestone. Oil residue at 699 m. |
| Ironville 2. | BP, 1956. Tested Coal Measures, Millstone Grit, Carboniferous Limestone. TD in Carboniferous Limestone at 836 m. No shows recorded on limited BGS data. |
| Ironville 3. | BP, 1956. Tested Coal Measures, Millstone Grit, Carboniferous Limestone. TD in Carboniferous Limestone at 836 m. Produced dry gas at up to 13000 cu ft/day from Kinderscout Grit. Oil shows in Coal Measures, Millstone Grit and Carboniferous Limestone. |
| Ironville 4. | BP, 1958. Tested Coal Measures, Millstone Grit. TD in Millstone Grit at 472 m. Oil and Gas shows in Coal Measures and Millstone Grit. |
| Ironville 5. | BP, 1984. Tested Coal Measures, Millstone Grit, Carboniferous Limestone. TD in ?Ordovician at 1308 m. Oil and gas shows in all major Coal Measures and Millstone Grit sandstones (DSTs inconclusive). Very poor shows in top Carboniferous Limestone. |
| Ashby G1. | D'Arcy, 1939. Tested Millstone Grit, Carboniferous Limestone. TD in Carboniferous Limestone at approximately 288 m. Poor oil shows in Millstone Grit. |