British Geological Survey
NATURAL ENVIRONMENT RESEARCH COUNCIL

Office of the Deputy Prime Minister
Creating sustainable communities

GREATER MANCHESTER

(comprising the Cities of Manchester and Salford and the Metropolitan Boroughs of Bolton, Bury, Oldham, Rochdale, Stockport, Tameside, Trafford and Wigan)

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

Mineral Resources

Scale 1:100 000

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For more information see www.mineralsUK.com

BIBLIOGRAPHIC REFERENCE

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SAND & GRAVEL

Superficial deposits

- Sub-alluvial: Inferred resources
- River Terrace deposits
- Glaciofluvial deposits

PEAT

SANDSTONE

} Carboniferous: Millstone Grit and Pennine Coal Measures

BRICK CLAY

- Brick clay and Fireclay coincident with coal bearing strata - Shallow Coal/ Unproductive Coal Measures

COAL

} Carboniferous: Pennine Coal Measures

- Area of shallow coal
- Opencast coal: worked area

MINERAL PLANNING PERMISSION (as at 01.01.06)

Source: Mineral Planning Authorities

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

MINERAL WORKINGS

Harwood	Active site	
Cowbury Dale	Inactive (including yet to be worked), worked-out and/or restored site	

Mineral commodity

Cl	Clay & Shale	San	Sand
Co	Coal	Sec	Secondary aggregate
CR	Crushed Rock	SiS	Silica Sand
Fr	Fireclay	Sst	Sandstone
Gas	Natural Gas	Sg	Sand and Gravel
Min	Mineral, unspecified		

■ Active rail aggregate depot

ENVIRONMENTAL Ddesignations (as at 06/07/05)

- National nature conservation designations (SSSIs and NNRs)
- International nature conservation designations (SACs, SPAs and Ramsar sites)
- National Park: Peak District (part)
- + Scheduled Monument

ADMINISTRATIVE AREAS

- Mineral Planning Authority (National Parks are also MPAs)

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 the 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 sites 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 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 reflect 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.

BRICK CLAY (including FIRECLAY)

Brick clay is the term used to describe 'clay and shale' used in the manufacture of structural clay products, such as facing and engineering bricks, pavers, clay tiles and vitrified clay pipes. These clays may also be used in cement manufacture, as a source of constructional fill and for lining and sealing landfill sites. Brick manufacture is the largest tonnage use in England. Clay bricks are versatile construction materials and one of the most visible components of the built environment. They make an important contribution to local architectural styles.

Brick clays are essentially mudstones of different geological ages and compositions. Their mineralogy, chemistry and physical properties are critical to determining their suitability for the manufacture of structural clay products. These properties affect the forming behaviour of the clay (the process of shaping the ware) and also its behaviour during drying and firing. They will also determine the technical properties of the fired product, such as strength, water absorption (porosity) and frost resistance, and thus its durability and performance in service and, importantly, its architectural appearance, such as colour and texture. Most facing bricks, engineering bricks and machine-made clay-based building products are manufactured in large automated factories. These represent a high capital investment and are therefore increasingly dependent on raw material 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.

In Manchester, brick clay has been produced for local consumption from small brick pits for over two hundred years. Historically, a variety of clays were extracted for 'common' brick making, including boulder clay, Triassic Mercia Mudstone and mudstones from the Pennine Lower and Middle Coal Measures. Fireclay, the fine-grained seatearth that commonly underlie coal seams, was mined underground or in opencast and deep mines for use in the manufacture of the 'common' brick and, subsequently, the production of the brick industry, most of these clay quarries closed. Today, one active clay quarry remains at Harwood, northeast of Bolton, working the Pennine Lower Coal Measures. This quarry produces high quality brick clay for use in facing, engineering and paving bricks but has no associated brickworks. The clay is delivered to a brickworks at Denton, in Tameside, which has no associated quarry and sources clay from a variety of locations, mainly from a site in Glossop, approximately 13 km away in Derbyshire.

Pennine Coal Measures mudstones, which occur interbedded with siltstone, sandstone, coal seams and seatearths, are the principal brick clay resource in North West England. Resources occur across the north and east of the county but are currently only worked in Bolton. The clay mineralogy of Coal Measures mudstones is dominated by kaolinite and illite which tend to provide optimum firing characteristics. Carbon and sulphur contents are also critical to firing performance. Excessive amounts of either may lead to firing problems and sulphur may also give unacceptable emission levels, although blending of clays may reduce these problems. In general, carbon and sulphur contents should be less than 1.5 per cent and 0.2 per cent respectively. Both fireclays and mudstones occur in association with opencast coal, with which they may be worked. However, this is only rarely the case because of the variable quality of the clay, particularly of the fireclays, and due to operational and planning difficulties. Fireclays have relatively low iron content compared to other brick clays and they are primarily valued for the manufacture of buff-coloured bricks and pavers. There is no current fireclay extraction in the area.

PEAT

Peat is an unconsolidated deposit of compressed plant remains in a water-saturated environment such as a bog or fen. Bogs occur in areas where inputs of water (almost exclusively from precipitation) have a low nutrient content and where the rainfall is sufficient to maintain the ground surface in a waterlogged condition. The vegetation is characterised by acid-tolerant plant communities in which the moss genus *Sphagnum* is dominant. The two main types of bog are (i) raised bogs, characteristic of flat underlying topography and found on plains and broad valley floors and (ii) blanket bogs, which occur mainly in upland areas where conditions are suitably cool and wet. Many lowland raised bogs have been designated as sites of international and national conservation areas. Peat is dug in England mainly from raised lowland bogs, almost entirely (98 per cent) for horticultural use, either as growing media or as a soil improver. Areas of upland blanket peat are not worked and therefore not shown.

Peat is being extracted from three sites on Chat Moss to the west and north west of Irlam on the Wigan/Salford boundary. The peat deposits cover an area of 2587 ha of raised bogs up to 9 m thick on a flat underlying topography. Planning permission for peat extraction covers 305 ha, both in the Wigan and Salford districts. Smaller lowland peat deposits such as Carrington Moss and Ashton Moss cover approximately two square kilometres each, but are not worked.

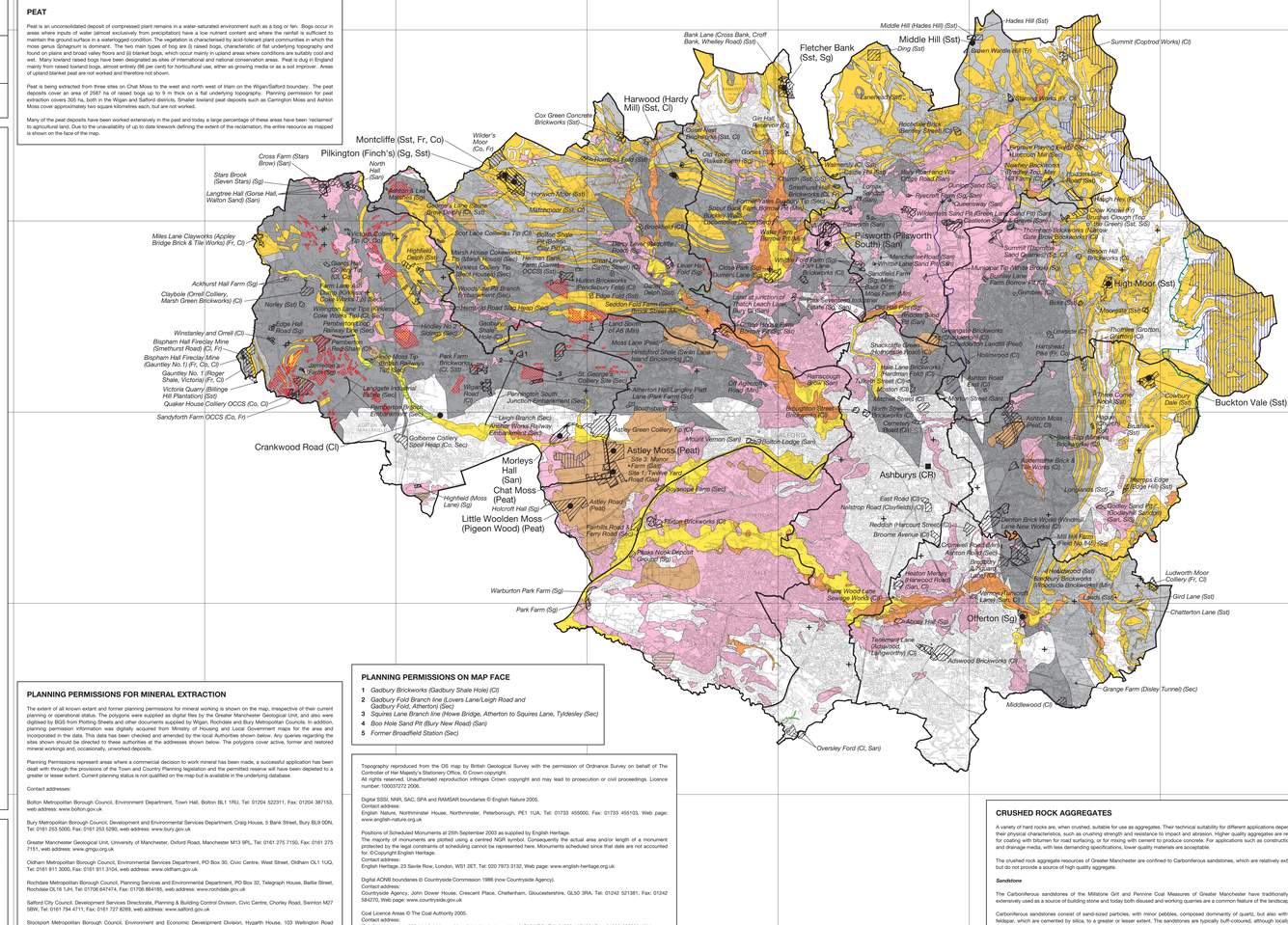
Many of the peat deposits have been worked extensively in the past and today a large percentage of these areas have been 'reclaimed' to agricultural land. Due to the unavailability of up to date linework defining the extent of the reclamation, the entire resource as mapped is shown on the face of the map.

COAL

The area lies predominantly within the South Lancashire Coalfield. The coal-bearing strata of the Pennine Lower and Middle Coal Measures (Upper Carboniferous) generally dip to the southwest and west. The South Lancashire Coalfield crops out across an area of approximately 970 km^2, stretching from Rochdale in the east to St Helens in the west. A spur runs southwards from Rochdale to just south of Stockport. In the east and north, older Namurian strata are present at outcrop and to the west and south, Permo-Triassic strata uncomformably overlie the Coal Measures. To the south, the coalfield deepens significantly to greater than 3000 m below Ordnance Datum beneath Permo-Triassic strata and passes into the Cheshire Basin. A substantial portion of the coalfield is covered by urban development.

Coal seams are numerous with in excess of 36 named coal seams, which vary laterally in both thickness and composition, chiefly by variation in the number of dirt partings present within the seam. Coals are mainly present within the Pennine Lower and Middle Coal Measures, with a few additional coals in the lower part of the Pennine Upper Coal Measures. The main coal-bearing interval typically varies from about 590 m in the west to 880 m in the east. The lower part of the Pennine Lower Coal Measures, below the Arley seam, typically contains coals that are thin and of variable quality. The rest of the Pennine Lower and Middle Coal Measures form the most important coal-bearing interval, with a number of coals in excess of 2 m in thickness. Coals from the Pennine Upper Coal Measures are generally thin, the exception being the Worsley Four Foot, which can be up to 1.8 m in thickness. Coal rank ranges from high to medium volatile.

There are no operating deep mines in the area, the last, Parkside, was closed in 1993. Any future commercial interest in coal extraction is likely to be confined to coal that can be recovered by surface mining. Historic opencast mining has occurred in the Wigan Coalfield, which has been mined for seven centuries, and across the north of the area. Opencast mining in the east has been limited by the steeper dip of the strata in this area. Recent, small-scale opencast production has been confined to the Wigan Coalfield, but there has been no production since 2000. Although there is potential for further opencast mining this is reduced by a number of factors. Firstly the basal part of the Pennine Lower Coal Measures does not contain many thick seams. Hence areas on the northern and eastern flank of the coalfield are probably not economically viable. Secondly there are thick drift deposits (up to 50 m in places) across the coalfield and, thirdly, much of the area is sterilised by urban development. Areas of shallow coal resources and former opencast worked areas are shown on the map.


Montcliffe (Sst, Fr, Co)
Pilkington (Finch's) (Sg, Sst)
Harwood (Hardy Mill) (Sst, Cl)
Fletcher Bank (Sst, Sg)
Middle Hill (Sst)
Pilsworth (Pilsworth South) (Sand)
High Moor (Sst)
Buckton Vale (Sst)
Astley Moss (Peat)
Ashburys (CR)
Morleys Hall (San)
Chat Moss (Peat)
Little Woolden Moss (Pigeon Wood) (Peat)
Crankwood Road (Cl)
Offerton (Sg)
Bank Lane (Cross Bank, Croft Bank, Whelley Road) (Sst)
Cox Green Concrete Brickworks (Sst)
Wilde's Moor (Co, Fr)
Cross Farm (Stars Brow) (San)
Stars Brook (Seven Stars) (Sg)
Langtree Hall (Gorse Hall, Walton Sand) (San)
North Hall (San)
Miles Lane Clayworks (Appley Bridge Brick & Tile Works) (Fr, Cl)
Ackhurst Hall Farm (Sg)
Claybole (Orrell Colliery, Marsh Green Brickworks) (Cl)
Winstanley and Orrell (CI)
Bispham Hall Fireclay Mine (Smethurst Road) (Cl, Fr)
Bispham Hall Fireclay Mine (Gauntley No.1) (Fr, Cb, Cl)
Gauntley No. 1 (Roger Shale, Victoria) (Fr, Cl)
Victoria Quarry (Billinge Hill Plantation) (Sst)
Quaker House Colliery OCCS (Co, Cl)
Sandyforth Farm OCCS (Co, Fr)
Middle Hill (Hades Hill) (Sst)
Hades Hill (Sst)
Summit (Coptrod Works) (Cl)
Ding (Sst)
Bolton Wanderers Hall (Tr)
Rochdale Brick (Bamfurlong Clay) (Cl)
Bury Rowe and Vale (Ringley Road Brick) (Cl)
Byeworth (Sg) (San)
Wilkinson's Sand Pit (San)
Cuerdley Hill (Sst)
Cuerdley Sand (Sg)
Dungeon Sand (Sg)
Cuerdley Way (San)
Eastleton (Sg)
Sand Pit (San)
Sandon (San)
Cliff Farm (Sg)
Cliff Farm (San)
Cliff Farm (Sst)
Cliff Farm (Fr)
Cliff Farm (Cl)
Cliff Farm (Sand)
Sandfield Farm (Sand)
Sand Pit (San)
Brook Sand Pit (San)
Brook Sand Pit (Sst)
Greenacres Brickworks (Co, Cl)
Greenacres Landfill (Peat)
Hollinwood (Cl)
Hartshead Pike (Fr, Co)
Thornham Brickworks (Fulmer Gate Brick Brickworks) (Fr)
Summit (Thornham Sand Quarries) (Fr, Cl)
Bardsley Hill Brickworks (Cl)
Musgrave Lane Farm Brickworks (Cl)
Musgrave Brickworks (Cl)
Birtle (Sst)
Thornham (Grotton Lane Quarries) (Cl)
Hospital (Sst)
Cowbury Dale (Sst)
Bradley Hall (Sst)
Ashton Moss (Peat, Cl)
Ashton Moss Brickworks (Co, Cl)
Ashton Road (Sst, Cl)
Morton Street (San)
Morton Street (Cl)
Hale Lane Brickworks (Hardman Field) (Cl)
Hale Lane Brickworks (Brickworks) (Cl)
Motcar (Cl)
Motcar Street (Cl)
North Street (Cl)
North Street Brickworks (Cl)
Cemetery Road (Cl)
Lightfoot Street (Cl)
Ashton Moss (Peat, Cl)
Bradley Hall (Sst)
Bradley Hall Brickworks
Lowerplace (San)
Lowerplace Brick & Tile Works (Cl)
Hempshaw Lane Brickworks
Hempshaw Lane Landfill (Sg)
Godley Sand Pit (Godley Hill Sand) (San, Sst)
Godley Hill (Sst)
Godley Hill Brickworks
Godley Hill Sand Pit
Godley Green Brickworks
Godley Green Landfill (Sg)
Godley Green Landfill (Peat)
Godley Green Landfill (Co)
Godley Green Landfill (Sand)
Godley Green Landfill (Fr)
Godley Green Landfill (Cl)
Godley Green Landfill (Sst)
Hyde Bank Sand Pit (San)
Hyde Bank Sand Pit (Sst)
Hyde Bank Sand Pit (Cl)
Hyde Bank Sand Pit (Sg)
Hyde Bank Sand Pit (Co)
Hyde Bank Sand Pit (Fr)
Hyde Bank Sand Pit (Sand)
Hyde Bank Sand Pit (Gravel)
Hyde Bank Sand Pit (Clay)
Hyde Bank Sand Pit (Peat