



**British  
Geological Survey**

NATURAL ENVIRONMENT RESEARCH COUNCIL

Applied geoscience for our  
changing Earth

# Brief overview of the quarried formations around the UK

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# Quarrying in the UK ~1750 active quarries



# Materials quarried

Rock aggregate	Rail ballast, road stone, sub base, concrete, fill, drainage medium
'Stone'	Armourstone, building stone, roofing, walling, kerbs, flagstone, flooring, monumental, decorative, rockery
Clay/Mudstone	Bricks, refractories, tiles, pipes, ceramics, fillers, cement, landfill liner, construction clay/fill, puddling, sea defences, paper
Coal	Energy
Limestones	Aggregate, cement, chemical industry, lime, pigment
Minerals	Barytes (drilling fluid), Fluorspar (flux, chemical industry), Gypsum (plaster, cement, chemical industry)
Peat	Horticulture, energy
Sand	Glass, Glass fibre, sport, horticulture, construction

# Quarries - one product for many uses



- Product used for
- armourstone,
  - crushed rock aggregate
  - road stone
  - rail ballast

Granodiorite, Mountsorrel complex, Ordovician, Mountsorrel Quarry, Loughborough, Leicestershire. Material extracted by blasting.

# Quarry working several mineral types for one product



Oxford Clay, Kellaways, Cornbrash, Blisworth Limestone and Blisworth Clay formations, Jurassic, Ketton Quarry, Rutland. The of mudstone and limestone with different engineering characteristics – all used to manufacture cement

# Working of aggregates below the water table



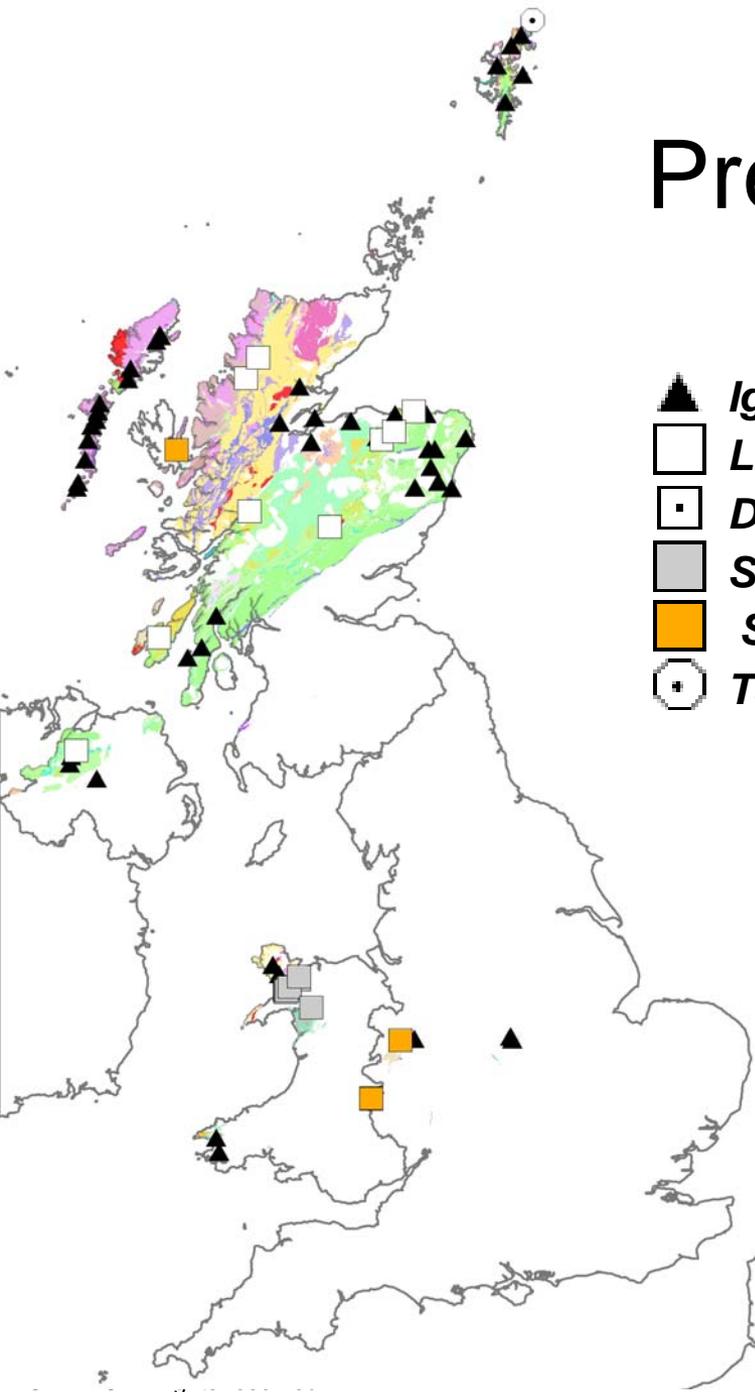
River Terrace Deposits – Sand and gravel

# The old days -



Blue Lias, Jurassic mudstone and limestone used for cement and lime manufacture. Showing the method of transport from the active part of the quarry. Barrow on Soar, Leicestershire, early 20<sup>th</sup>C.

# Precambrian, Cambrian,





South Charnian Diorite, Precambrian from Cliffe Hill Quarry, Leicestershire, used for aggregate and road stone. Blasted (see drilling rig). The stability and safe use of the Quarry must take into account the diorite and the Mercia Mudstone Group above. Water seeps from siltstone/sandstone bands (skerries) in the mudstone.

# Use, extracted material, lithology and lithostratigraphy – Precambrian and Cambrian

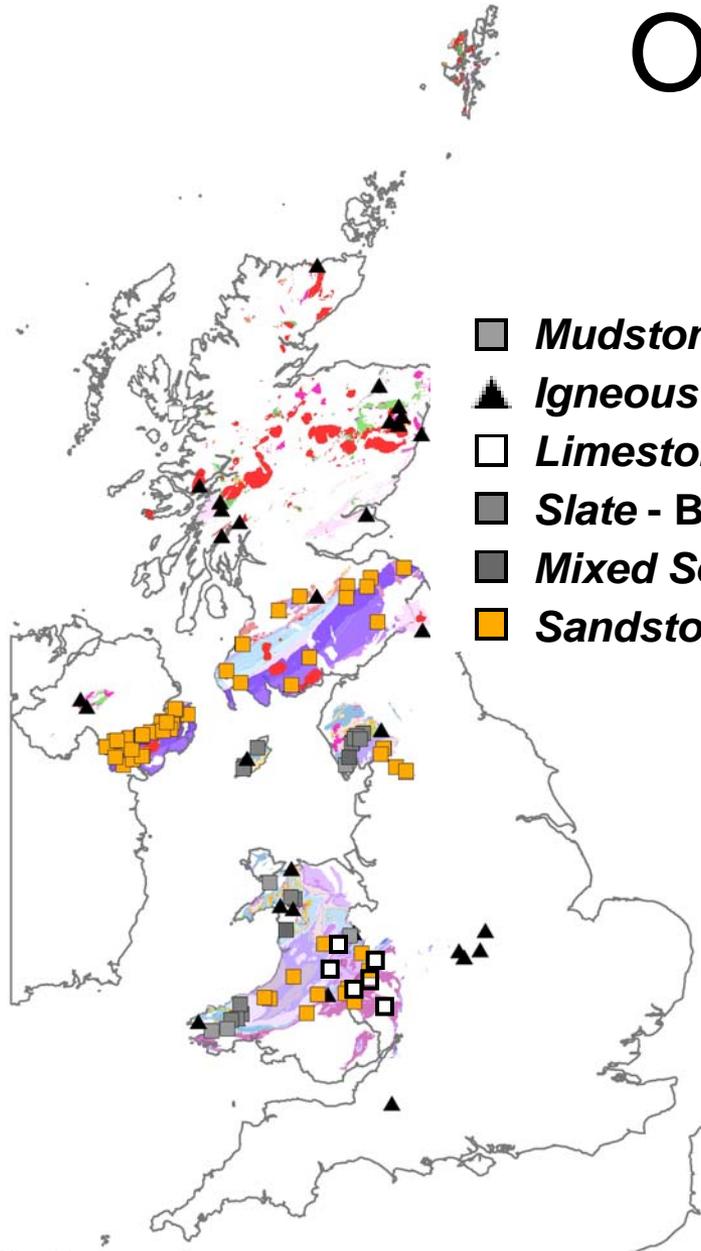
Use	Rock type	Lithostratigraphy
Aggregate	Andesite Amphibolite Basaltic Tuff Diorite Dolostone Gabbro, Gneiss, Granite, Sandstone, Metalimestone Psammite, pelite	Bardon Breccia  Uriconian Group Diorite Intrusion Durness G, Intrusive complex Lewisian Complex, Coedana Complex Applecross F, Bayston-Oakswood F Blair Athol Formation
Agriculture	Meta Limestone	Ballachulish Limestone F, Blair Atholl Dark Limestone, Boyne Castle Limestone M, Dufftown Limestone M, Storakaig Limestone M, Applecross F

M = Member, F = Formation, G = Group

# Use, extracted material, lithology and lithostratigraphy – Precambrian and Cambrian

<b>Use</b>	<b>Rock type</b>	<b>Lithostratigraphy</b>
Armourstone	Marble	Ballachulish Limestone F
	Psammite	Crom Psammite F, Collieston F, Glen Lethnot Grit F, Grampian G, Dava Succession
Building stone	Psammite	Aberdeen F, Glen Lethnot Grit F, Nethybridge Psammite F, Dava Succession
	Quartzite	Corryhabbie Quartzite F Strinds F
	Sandstone	Applecross F
	Slate	Llanberis Slates F, Maentwrog Formation
Industrial	Marble	Ballachulish Limestone F
	Talc	Shetland Ophiolite Complex

# Ordovician, Silurian



- *Mudstone - Brick*
- ▲ *Igneous rock - Armourstone, aggregate, building, road/rail*
- *Limestone – Aggregate, filler, lime, building*
- *Slate - Building*
- *Mixed Sedimentary - Aggregate*
- *Sandstone – Armourstone, aggregate, roadstone*



Horton Formation, High PSV road stone, Dry Rigg, Stainforth, North Yorkshire



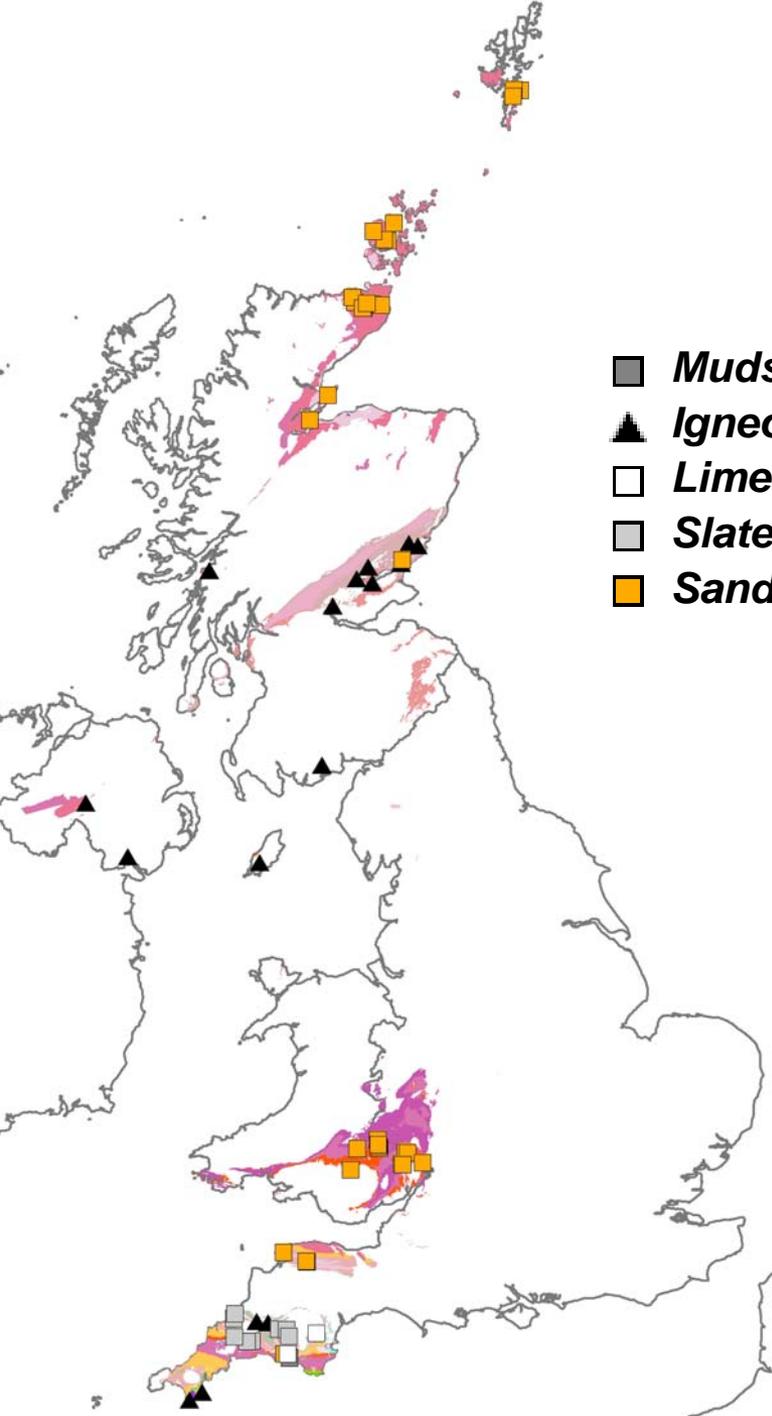
# Use, extracted material, lithology and lithostratigraphy – Ordovician/Silurian

<b>Use</b>	<b>Rock type</b>	<b>Lithostratigraphy</b>
Agriculture	Dolostone	Strath Suardal F
Armourstone	Granite/Granodiorite	Corrennie Pluton, Mountsorrel Complex, Nant Ffrancon Subgroup, Cove Granite
Aggregate	Diorite	Reay Diorite, South Leicestershire Diorite Complex,
	Basalt/andesite	Coalbrookdale F, Llanelwedd Volcanic F, Lorne Plateau Volcanic F
	Gabbro	Insch Pluton
	Granite/granodiorite	Crathes Pluton, Mountsorrel Complex, North East Grampian Granitic Suite
	Limestone	Ardwell Farm F, Dolyhir Limestone F, Stinchar Limestone F, Aymestry Limestone F
	Sandstone	Caradoc Rocks, Carghidown F, Cribarth Sandstone, Gala G, Hafod Fawr F, Horton F, Lanark G, Windermere Supergroup, Ystrad Meurig Grits F
	Tuff	Caradoc Rocks
Brick clay	Mudstone	Ogwen G, Skiddaw G, Llandovery Shales

# Use, extracted material, lithology and lithostratigraphy – Ordovician/Silurian

Use	Rock type	Lithostratigraphy
Building stone	Granite	Corrennie Pluton, Cruachan Intrusion, North East Grampian Granitic Suite, Peterhead Pluton, Strontian Pluton
	Limestone	Aymestry Limestone F
	Sandstone	Gala G, Nant Ffrancon Subgroup, Pentamerus Sandstone
Industrial	Slate	Nant Ffrancon Subgroup, Seathwaite Fell Sandstone F, Tetragraptus Shales F, Injebreck F, Maughold F
	Fillers	Aymestry Limestone F, Gala Group

# Devonian



- **Mudstone - Brick**
- ▲ **Igneous rock - Armourstone, aggregate, building, roadstone**
- **Limestone – Aggregate, lime, building, roadstone**
- **Slate – Building, roofing, walling, landscape**
- **Sandstone – Building, roadstone**

# Use, extracted material, lithology and lithostratigraphy – Devonian

Use	Rock type	Formation
Aggregate – crushed rock	Andesite/Basalt	Montrose Volcanic F, Ochil Volcanic F, Lorn Plateau Volcanic F
	Granite/Granodiorite	Foxdale Pluton, Ochil Volcanic F
	Limestone	Chercombe Bridge Limestone F, Achscrabster Flagstone M, Lybster Flagstone F
	Sandstone	Upper Stromness Flagstone F, Pickwell Down Sandstones F
Agriculture – lime	Limestone	Chercombe Bridge Limestone F.
	Andesite	Ochil Volcanic F
Armourstone	Gabbro	Lizard Gabbro
	Clay/slate	Middle Devonian Slates
Brick	Andesite/basalt	Montrose Volcanic F
	Granite/ Granodiorite	Foxdale Pluton, Criffel-Dalbeattie Pluton
Building stone	Sandstone	Brownstones F, Grey Grits F, Lower Lybster Flagstone F, ickwell Down Sandstones F, Raddery Sandstone F, Spital Flagstone F, St Maughans F, Stromness Flagstone F, Upper Stromness Flagstone F
	Slate	Delabole M, Saltash F, Tavy F, Tredorn Slate F

# Quarries in Devonian rock



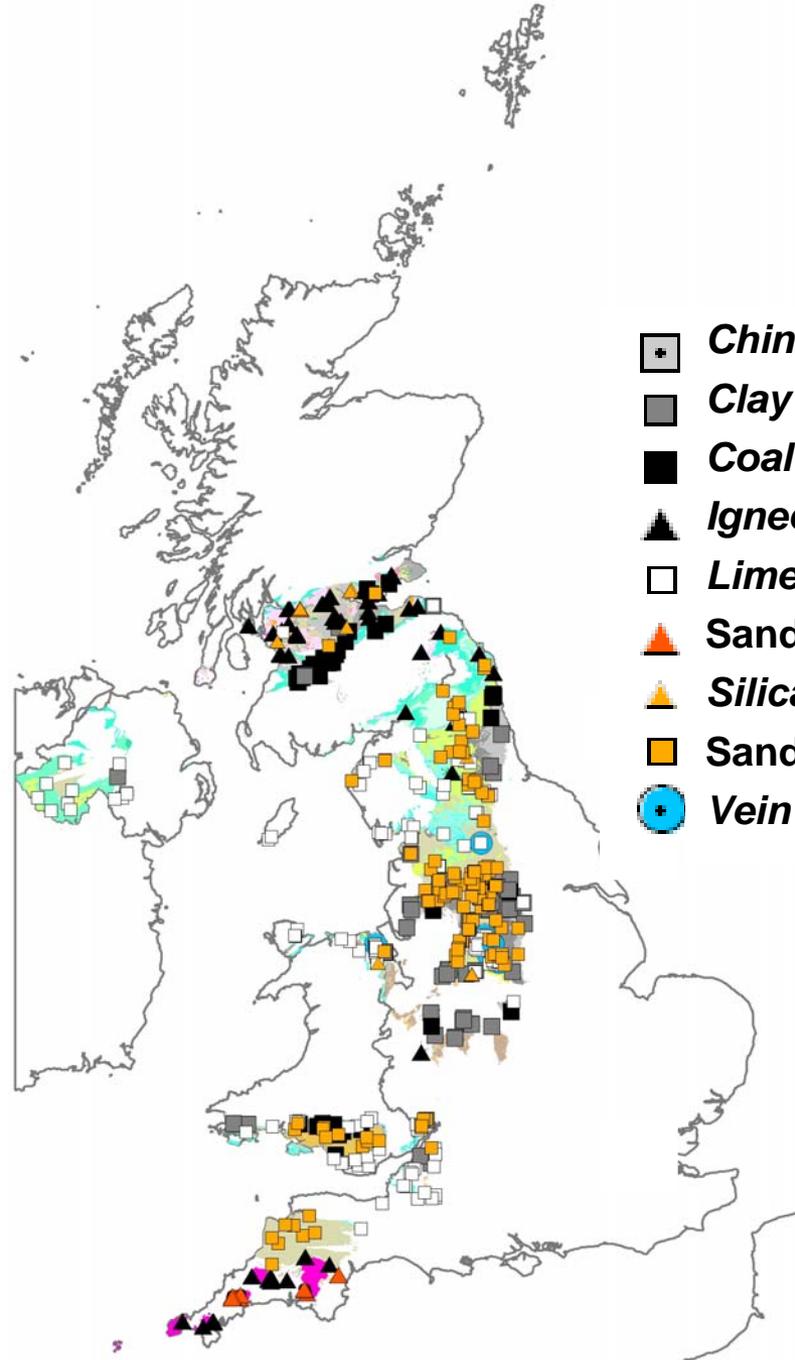
Upper Stromness Flagstone Formation.  
Building stone (flags), Orkney



Quartz Dolerite, Roadstone, Ochil  
Hills, Clackmannanshire

# Carboniferous

- **China Clay** – Filler, paper, pharmaceuticals, whiteware
- **Clay** – Brick, ceramics, cement, engineering clay, landfill liner
- **Coal** – Energy
- ▲ **Igneous** - Armourstone, aggregate, building, fill, road/rail
- **Limestone** – Aggregate, building, cement, chemical, lime, filler,
- ▲ **Sand and Gravel** – Construction
- ▲ **Silica Sand** – Ceramics, glass, foundry sand, industry
- **Sandstone** – Aggregate, Building, kerbs, paving, roadstone
- **Vein minerals** – Aggregate, chemical industry, drilling additive



# Use, extracted material, lithology and lithostratigraphy – Carboniferous

Use	Rock type	Geological Unit
Agricultural lime	Limestone	Armagh, Peak Limestone G, Clwyd Limestone G, Great Scar Limestone G, Pembroke Limestone G
Aggregate (crushed)	Basalt	Kinghorn Volcanic F
	Dolerite	Borthwick Sill, Hillhouse Sill, Kelso Subsuite, Kilbarchan Sills, Great Whin Sill, Midland Valley Sill-complex, Clyde Plateau Volcanic F,
	Dolostone	Black Rock Limestone
	Granite/Microgranite	Carnmenellis Intrusion, Bodmin Intrusion
	Limestone	Alston F, Bee Low Limestone F, Cefn Mawr Limestone F, Chatburn Limestone F, Clifton Down Limestone F, Clwyd Limestone G, Dowlais Limestone F, Eskett Limestone F, Great Scar Limestone G, Knipe Scar Limestone F, Monsal Dale Limestone F, Park Limestone F, Pembroke Limestone G, Urswick Limestone F, Westleigh Limestone F, Woo Dale Limestone F
	Sandstone	Pennant Sandstone F

# Use, extracted material, lithology and lithostratigraphy – Carboniferous

Use	Rock type	Geological Unit
Aggregate	Sand	Bude F, Dartmoor Intrusion, Douglas Muir Quartz-conglomerate M, St Austell Intrusion
Armourstone	Basalt	Clyde Plateau Subsuite
	Granite	Carnmenellis Intrusion, Bodmin Intrusion, Land's End Intrusion, Peak Limestone G
	Quartz-dolerite	Midland Valley Sill-complex
Building stone	Limestone	Scarlett Point Member, Armagh Group, Clwyd Limestone G, Great Scar Limestone G, Pembroke Limestone G, Yoredale G
	Sandstone	Bude Formation, Green Moor Rock F, Marsden F, Pennine Lower Coal Measures F, Pennine Middle Coal Measures F, Pennant Sandstone F, Rossendale F, South Wales Lower Coal Measures F, Strathclyde G

# Use, extracted material, lithology and lithostratigraphy – Carboniferous

Use	Rock type	Geological Unit
Brick, pipes, tiles	Fireclay	Scottish Lower Coal Measures F, Pennine Lower Coal Measures F
	Clay	Etruria Formation, Salop F, Grovesend F, Pennine Lower Coal Measures F, Pennine Middle Coal Measures F, Pennine Upper Coal Measures F, South Wales Coal Measures G
Cement	Clay/Mudstone	Hebden F, Lower Limestone F, Morridge F, Rossmore Mudstone F,
	Limestone	Cefn Mawr Limestone F, Cefn Mawr Limestone F, Chatburn Limestone F, Clitheroe Limestone F, Loggerheads Limestone F, Lower Limestone F, Milldale Limestone F, Monsal Dale Limestone F, Upper Limestone F
Ceramics	Sandstone	Rough Rock F
Chemical industry	Fluorspar	Eyam Limestone F, Monsal Dale Limestone F, Alston F
	Limestone	Peak Limestone G, Great Scar Limestone G, Clackmannan G, Pembroke Limestone G

# Use, extracted material, lithology and lithostratigraphy – Carboniferous

Use	Rock type	Geological Unit
Energy	Coal	Limestone Coal F, Pennant Sandstone F, Pennine Lower Coal Measures F, Pennine Middle Coal Measures F, Scottish Lower Coal Measures F, Scottish Middle Coal Measures F, South Wales Middle Coal Measures F, Upper Limestone F
Glass	Sand	Douglas Muir Quartz-conglomerate M, Passage F, Rough Rock F
Paper manufacture	Clay (kaolinite)	St Austell Intrusion



Karst in dolomitised Carboniferous Limestone, Breedon Hill, Derbyshire



Millstone Grit, Tintwistle, Derbyshire



High PSV road stone, Gritstone, Culm Measures, Venn Gritstone Quarry, North Devon



Open Cast Coal, S Wales Middle Coal Measures, Margam, S Wales. Variable rock strength



Open cast coal hazards, Old workings, Merthyr



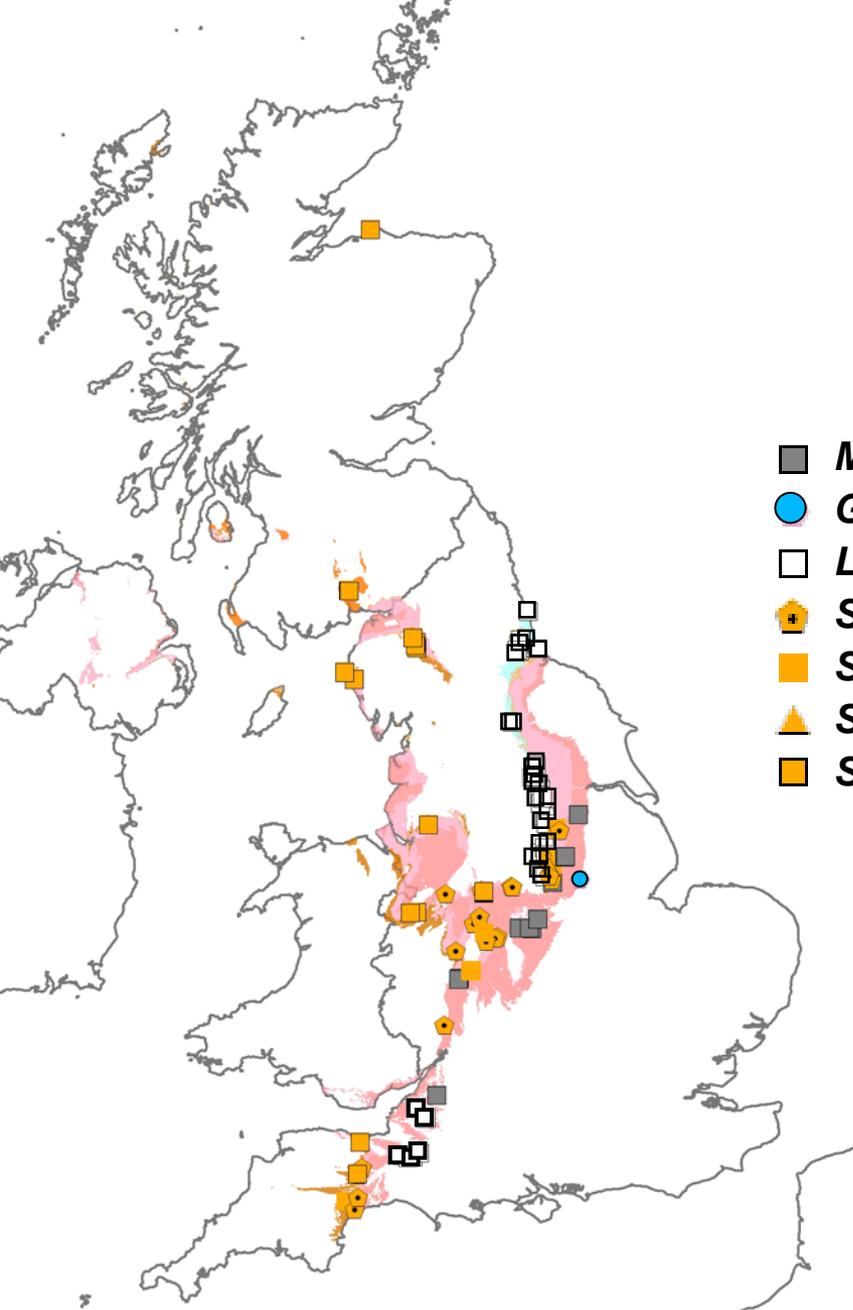
©NER China Clay, St Austell, Cornwall



Paving slabs, Lower Coal Measures, Ladycross Quarry, Northumberland



# Permo-Trias



- *Mudstone* – Brick
- *Gypsum* – Plaster, chemicals
- *Limestone* – Aggregate, building
- ⬢ *Sand and gravel* – Aggregate, building, construction
- *Sand* – Aggregate, building
- ▲ *Silica Sand* – Sports sand
- *Sandstone* – Aggregate, building

# Use, extracted material, lithology and lithostratigraphy - Permo-Tiassic

Use	Rock type	Geological Unit
Agriculture – lime	Dolomitic limestone	Cadeby F, Roker F
Aggregate (as dug)	Sand and gravel	Budleigh Salterton Pebble Beds F, Hawksmoor F, Kidderminster F, Nottingham Castle Sandstone F
	Dolomitic Limestone	Brotherton F
Aggregate (crushed)	Dolomitic limestone	Cadeby F, Brotherton F
	Limestone	Brockley Down Limestone
	Sandstone	Budleigh Salterton Pebble Beds F
Building stone	Dolomitic limestone	Cadeby F
	Sandstone	Penrith Sandstone F
Brick	Clay	Gunthorpe Formation, Cadeby F, Tarporley Siltstone F
Building sand	Sand	Bridgnorth Sandstone F, Chester Pebble Beds F, Dawlish Sandstone F, Kidderminster F, Lenton Sandstone F, Nottingham Castle Sandstone F, Wildmoor Sandstone F, Yellow Sands F

# Use, extracted material, lithology and lithostratigraphy - Permo-Triassic

Use	Rock type	Geological Unit
Building stone	Dolomitic limestone Sandstone	Brotherton F, Cadeby F Budleigh Salterton Pebble Beds F, Helsby Sandstone F, Hollington Sandstone F, Hopeman Sandstone F, Locharbriggs Sandstone F, Penrith Sandstone F, St Bees Sandstone F, Tarporley Siltstone F, Wilmslow Sandstone F
Glass	Dolomitic limestone	Cadeby F
Industrial carbonate	Dolomitic limestone	Cadeby F
Plaster/board	Gypsum	Cropwell Bishop M



Sherwood Sandstone



Arden Sandstone Formation, nr. Henley-in-Arden



Mercia Mudstone Group, Brick Clay

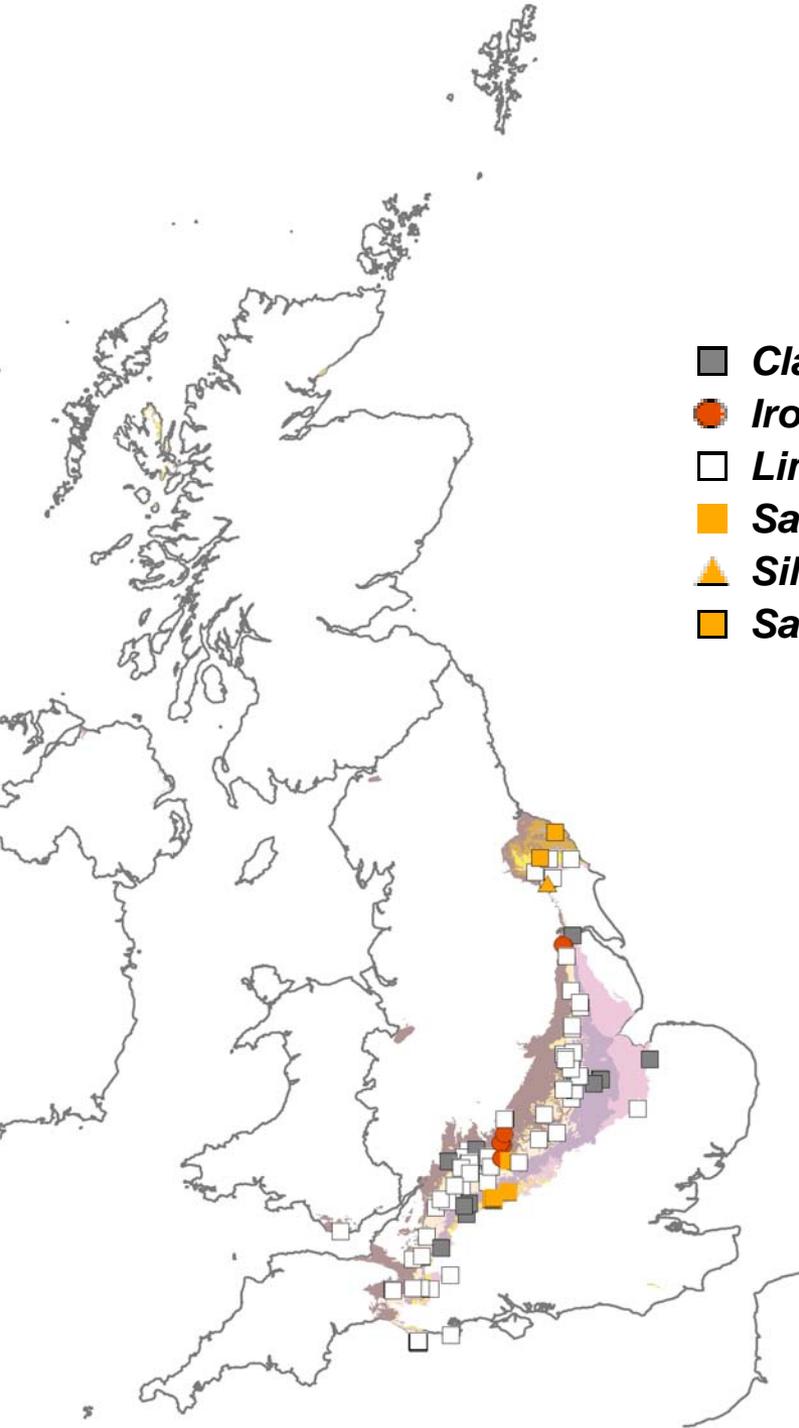


Gypsum, Cropwell Member, Branscombe  
Mudstone Formation, Mercia Mudstone Group,



# Jurassic

- **Clay** – Brick, cement, engineering, landfill liner
- **Ironstone** – Aggregate, building
- **Limestone** – Aggregate, lime, building, cement, concrete
- **Sand** – Building sand
- ▲ **Silica Sand** – Foundry sand
- **Sandstone** – Aggregate, building



# Use, extracted material, lithology and lithostratigraphy - Jurassic

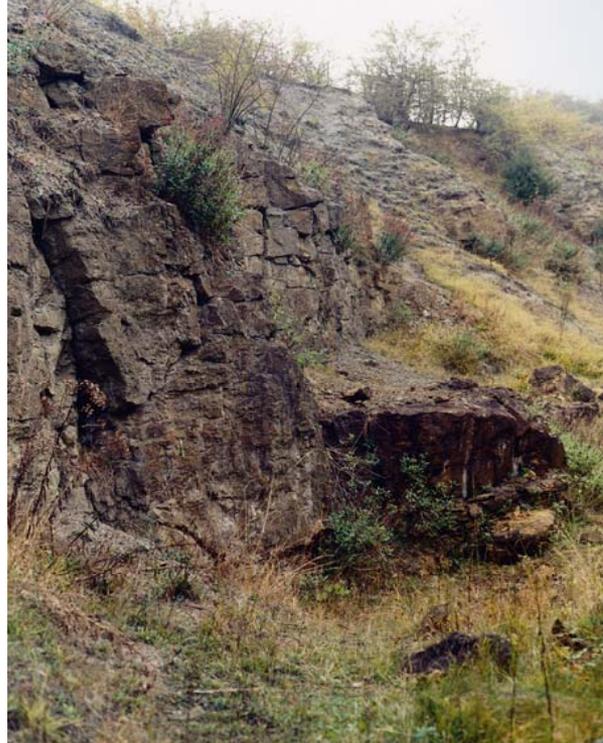
Use	Rock type	Geological Unit
Agriculture	Limestone	Lincolnshire Limestone F, Birdlip Limestone F, Forest Marble F
Aggregate	Ironstone	Frodingham Ironstone M, Marlstone Rock F
	Limestone	Coralline Oolite F, West Walton F
	Sandstone	Kingston F
Brick	Clay	Charmouth Mudstone F, Oxford Clay F, West Walton F
Building stone	Ironstone	Marlstone Rock F, Northampton Sand F
	Limestone	Birdlip Limestone F, Blisworth Limestone F, Chalfield Oolite F, Chipping Norton Limestone F, Clavellata F, Eyford M, Forest Marble F, Great Oolite G, Kingston F, Ham Hill Limestone M, Inferior Oolite G, Lincolnshire Limestone F, Portland Stone F, Taynton Limestone F, White Limestone F
	Sandstone	Cloughton F, Saltwick F

# Use, extracted material, lithology and lithostratigraphy - Jurassic

Use	Rock type	Geological Unit
Cement	Clay/Mudstone Limestone	Ancholme G, Kimmeridge Clay F, Blue Lias F Blue Lias F, Rutland F, Lincolnshire Limestone F
Landfill liner	Clay	Amptill Clay F, Charmouth Mudstone F, Kimmeridge Clay F, Oxford Clay F



Aggregate,  
building stone,  
road stone,  
Marlstone Rock  
Formation.



Aggregates, Lincolnshire Limestone Formation



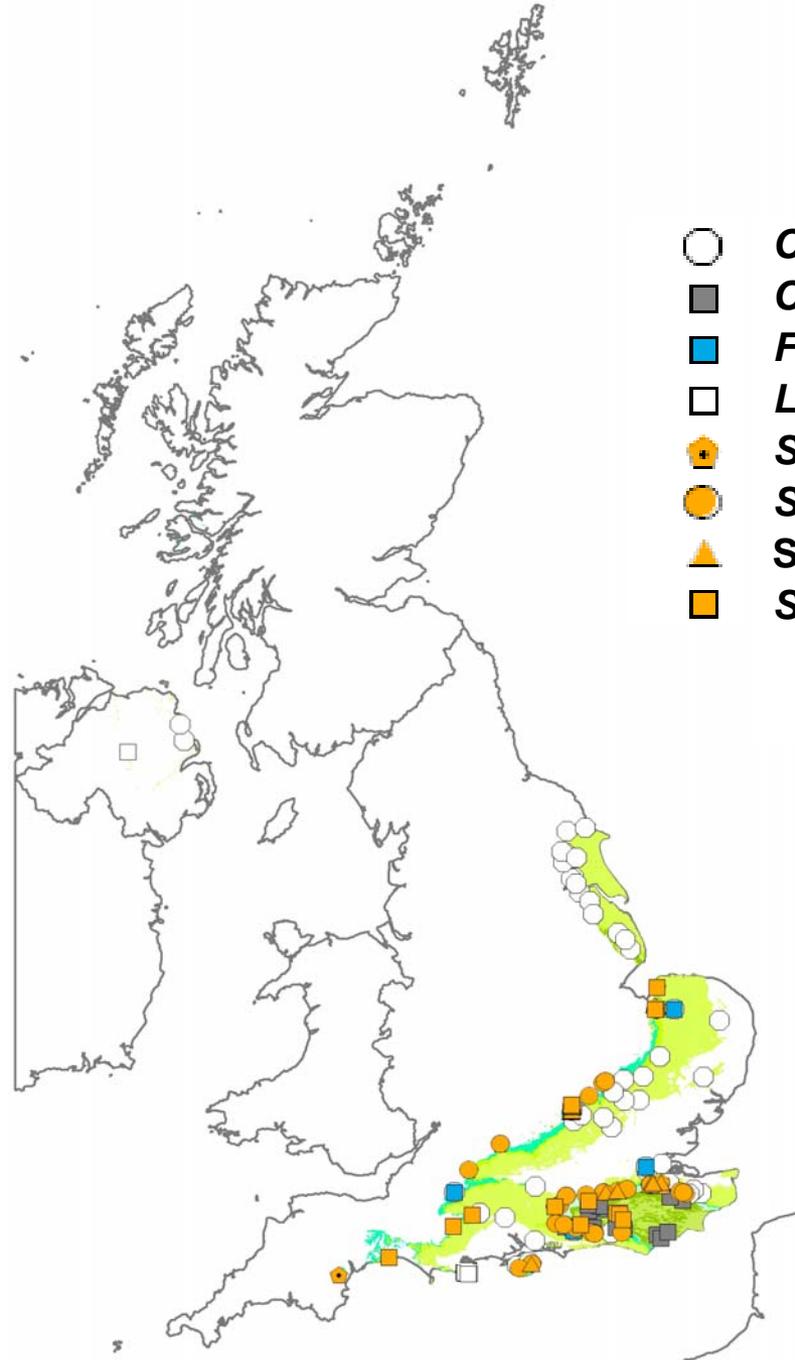
Brick clay, Oxford Clay Formation, Stewartby, Bedford



Cement, Rutland Formation,

# Cretaceous

- **Chalk** – aggregate, cement, filler, flux, lime, subbase
- **Clay** – Brick, cement, engineering, landfill liner
- **Flint** – Building, ceramics,
- **Limestone** – Aggregate, building, road stone
- ⬮ **Sand and gravel** – Building sand, concrete
- **Sand** – Aggregate, brick, building
- ▲ **Specialist Sand** – Foundry, glass, sport
- **Sandstone** – Aggregate, building



# Use, material, lithology and lithostratigraphy - Cretaceous

Use	Rock type	Geological Unit
Agriculture lime	Chalk	Ferriby Chalk F, Holywell Nodular Chalk F, Lewes Nodular Chalk F, New Pit Chalk F, Seaford Chalk F, Welton Chalk F, Ulster White Limestone G
	Sand	Woburn Sands F, Chalk G
Crushed rock	Chalk	Burnham Chalk F, Ferriby Chalk F, Holywell Nodular Chalk
	Clay	Gault F, Grinstead Clay M, Tunbridge Wells Sand F, Upper Tunbridge Wells Sand F, Wadhurst Clay F, Weald Clay F
Building stone	Chalk	Totternhoe Stone M, Lewes Nodular Chalk F, New Pit Chalk F,
	Flint	Lewes Nodular Chalk F, New Pit Chalk F
	Limestone	Durlston F
	Sandstone	Folkestone F, Woburn Sands F, Ardingly Sandstone, Carstone F, Tunbridge Wells Sand F, Hythe F, Melbury Sandstone M. Upper Tunbridge Wells Sand F
Cement	Chalk	Lewes Nodular Chalk F, Welton Chalk F

# Use, material, lithology and lithostratigraphy - Cretaceous

Use	Rock type	Geological Unit
Filler	Chalk	Burnham Chalk F, Holywell Nodular Chalk F, Seaford Chalk F, Ulster White Limestone G
	Sand	Sandrock F
Foundry sand	Sand	Folkestone F, Sandringham Sands F, Woburn Sands F,
Glass sand	Sand	Folkestone F, Sandringham Sands F, Woburn Sands F,
Industrial Carbonate	Chalk	Burnham Chalk F, Ferriby Chalk F, Holywell Nodular Chalk F, Seaford Chalk F, Welton Chalk F,
Industrial use	Sand	Folkestone F, Woburn Sands F
Metal refining	Chalk	Welton Chalk F
Sports sand	Sand	Woburn Sands F
Monumental stone	Chalk	Lewes Nodular Chalk F, New Pit Chalk F



Chalk, Westbury

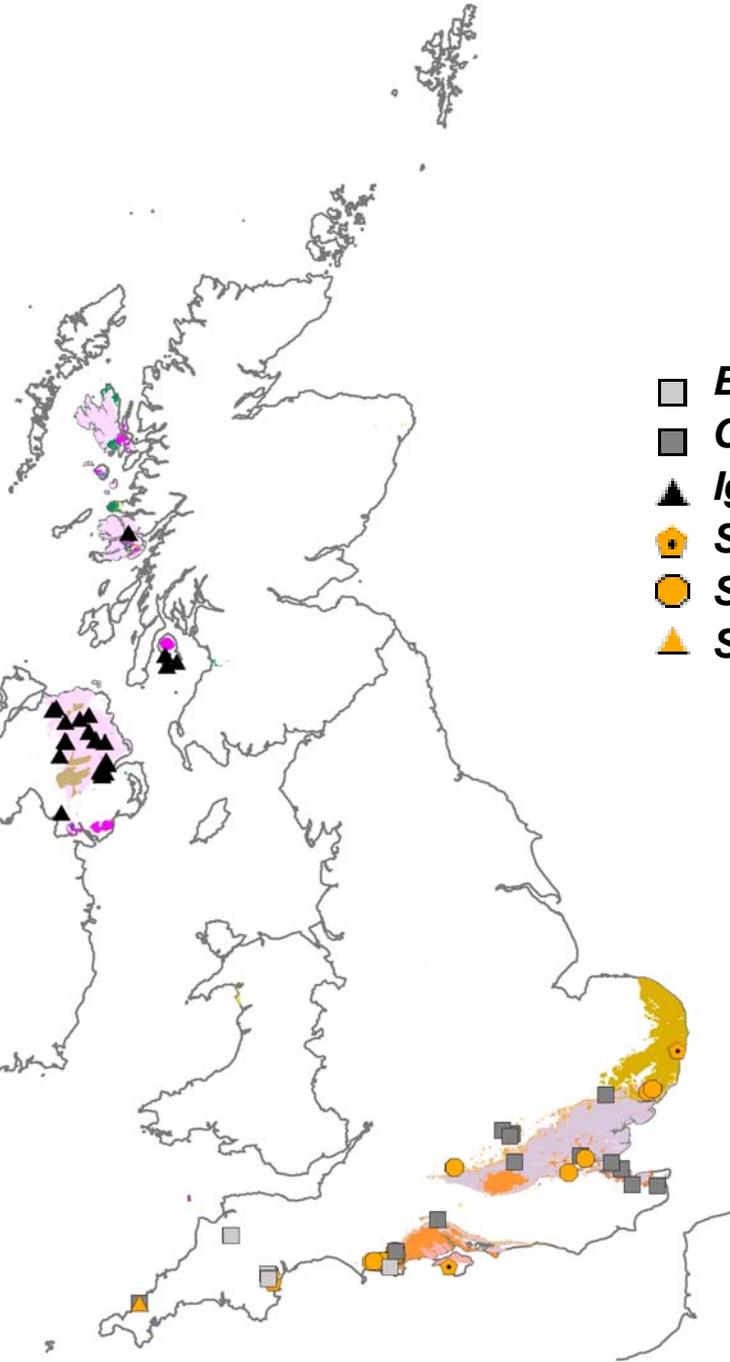


Sand (various uses), Woburn Sand Formation, Leighton Buzzard

Brick clay, Gault Formation, Selborne, Hampshire

# Tertiary

- *Ball Clay* – Filler, pottery, whiteware
- *Clay* – Brick, engineering, tiles, pottery, landfill liner
- ▲ *Igneous* – Aggregate, road stone
- *Sand and gravel* – Aggregate, building
- *Sand* - building
- ▲ *Specialist Sand* – Blast cleaning, concrete, foundry



# Use, material, lithology and lithostratigraphy - Tertiary

Use	Rock type	Geological Unit
Armourstone	Basalt	Antrim Lava G
Aggregate (crushed stone)	Basalt Granite	Antrim Lava G, Crag G, Mull Lava G Arran Central Complex
Aggregate	Sand	Aller Gravel F, Poole F, Crag G, Lambeth G, St Agnes F, Thanet Sand F
Brick	Sand and gravel	Aller Gravel F, Crag G, Clay-With-Flints F,
	Clay	Clay-With-Flints F, Lambeth G, London Clay F, Poole F, Thanet Sand F
Filler	Clay and sand	Abbrook Clay and Sand M, Bovey F, Southacre Clay and Lignite Member,
Landfill liner	Clay	London Clay F
Foundry sand	Sand	St Agnes F
Sea defences	Clay	London Clay F
White ware	Clay	Abbrook Clay and Sand M, Bovey F, Poole F, Creekmoor Clay M



Brick, London Clay Formation, SE England



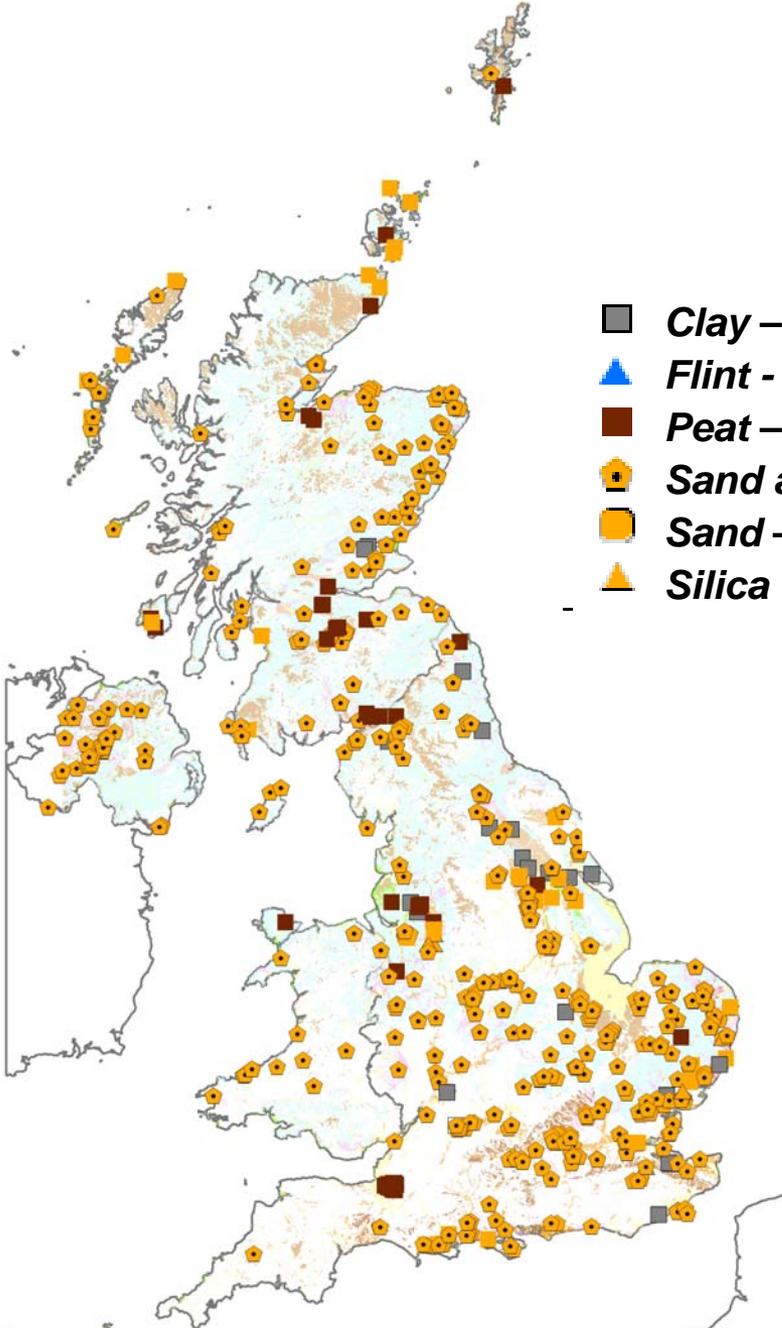
Crushed aggregate, Basalt, Antrim Lava Group  
Northern Ireland



Ball Clay for Whiteware, Bovey Formation, Devon



# Quaternary



- **Clay** – Brick, tiles, landfill liner, pottery, puddling
- ▲ **Flint** -
- **Peat** – Horticulture, energy
- **Sand and gravel** – Aggregate, asphalt, building, concrete
- **Sand** – Building, cement, fill
- ▲ **Silica Sand** – Foundry, glass

# Use, material, lithology and lithostratigraphy - Quaternary

Use	Rock type	Geological Unit
Aggregate	Sand	Aeolian (Dune) sand, Corton F,
	Sand and gravel	Alluvium, Fen Gravel, Glaciofluvial Deposits, Head, Marine Deposits, Plateau Gravel, Raised Beach Deposits, River Terrace Deposits, Storm Beach Deposits
Brick/tiles	Clay	Crag G, Glacial Till, Head brickearth (loess), Glaciolacustrine Deposits, Raised Marine Deposits,
Cement	Sand	Aeolian (Dune) sand
Energy	Peat	Peat
Foundry sand	sand	Glaciofluvial Deposits
Horticulture	Peat	Peat
	Sand	Glaciofluvial Deposits
Landfill liner	Clay	River Terrace Deposits



Bricks, Glacial Till, Warrington



Glaciofluvial sand and gravel,  
Aggregate, building sand,

River Terrace sand and gravel, Concrete aggregate, building sand

# Summary

Great variation of quarries and materials extracted

Wide range of methods of extraction from blasting to digging  
and

Further information see [www.mineralsuk.com](http://www.mineralsuk.com)  
and



# Directory of Mines and Quarries



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