British Geological Survey NATURAL ENVIRONMENT RESEARCH COUNCIL NATURAL ENVIRONMENT RESEARCH COUNCIL	MINERAL RESOURCES MAP OF NORTHERN IRELAND A key aspect of sustainable development is the conservation and safeguarding of non-renewable resources, such
TISS NATURAL ENVIRONMENT RESEARCH COUNCIL WWW.detini.gov.uk	minerals. There is a need to ensure that these resources are not needlessly sterilised by other development thus leav insufficient supplies for future generations. The purpose of the maps in this series, therefore, is to show the broad distribut of those mineral resources which may be of current or potential economic interest. The maps are intended to assist strate decision making in respect of mineral extraction and the protection of important mineral resources against sterilisation. The 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 Geologi
and	Survey of Northern Ireland. The Geological Survey of Northern Ireland and counterpart The British Geological Survey have produced the maps via commission from the Department of the Environment. This map, along with one for each of the five other counties (includ county boroughs), was completed in 2012 and a series of six digitally generated maps at a scale of 1:100 000 are availab The mineral resource data depicted on these maps are also available in a digital format for use within a Geographi Information System (GIS).
BELFAST Mineral Resource Map of Northern Ireland	Mineral resources Mineral resources are natural concentrations of minerals which might now, or in the foreseeable future, be of economic value The assessment of mineral resources is, therefore, a dynamic process which must take into account a range of factor
Mineral Resources Scale 1:100 000	These include geological reinterpretation as additional data becomes available, as well as the continually evolving dema for minerals, or specific qualities of minerals, due to changing economic, technical and environmental factors. Consequen the economic potential of mineral resources is not static, but changes with time. Generally, a mineral resource is known to exist within the boundaries outlined by geological mapping, which may supplemented by more in depth geological data. Mineral Resource data depicted on the map shows the inferred extent of
Compiled by: P.A. Lusty, J.M. Mankelow, M.R. Cooper, D.G. Cameron, P.E.J. Pitfield, R.A. Shaw, and K.A. Linley	mineral resource. Inferred resources are those defined from available geological information and assumed but not verif geological continuity. They have neither been evaluated by drilling or other sampling methods, nor had their techni properties characterised, on any systematic basis. <i>Limitations</i>
Project Leaders: J.M. Mankelow (BGS) and M.R. Cooper (GSNI) Digital Cartography: N.A. Spencer (BGS) This map is one of a series of six maps comprising the Mineral Resource Map of Northern Ireland, commissioned by the Department of the Environment (Northern Ireland).	The mineral resource data presented are based on the best available information, but are not comprehensive and the quality is variable. The inferred boundaries shown are, therefore, approximate. Mineral resources defined on the nudelineate the areas within which potentially workable minerals may occur. These areas are not of uniform potential and a take no account of planning constraints that may limit their working. Much of Northern Ireland is covered by thick supering the presented to be accounted by the statement of the presented are the presented area.
BGS map reference: Mineral Resource Map of Northern Ireland - County Antrim and Belfast	deposits of peat and glacial till, neither of which is shown on the main map. This overburden would need to be removed p to the working of many of the bedrock resources depicted. Peat, as a mineral resource, is included on an inset map. Till is considered to be a resource although it may contain small sand and gravel deposits. The economic potential of specific si can only be proved by a detailed evaluation programme. Such an investigation is an essential precursor to submittin planning application for mineral working. Areas are shown on the map as having no mineral resource potential, but so isolated mineral workings may occur. The presence of these operations generally reflect very local or specific situations.
Lusty, P.A.J., Mankelow, J.M., Cooper, M.R., Cameron, D.G., Pitfield, P.E.J., Shaw, R.A. and Linley, K.A. OR/12/017	The locations of extant or expired planning permissions for the extraction of mineral are shown. These have been supplied the Department of the Environment. Due to the complex and historic nature of planning permissions, some digital outlines not available and, therefore, may not be shown on the map. In addition, building stone quarries are also shown. Information on the location of building stone quarries was taken from the Natural Stone Database of Northern Ireland, developed by
SAND AND GRAVEL Superficial deposits	Consarc Design Group and Queens University Belfast, supplemented by information from GSNI. Due to the historic nature many building stone quarries, digital outlines of the planning permission are unavailable and, therefore, are not shown on map. While the compilers have tried to ensure that the site details are as accurate as possible, any map depicting location of mines and quarries is a snapshot in time. Moving the extraction location as reserves become exhausted or a r extension starts production, and renaming of sites are regular occurrences, and in addition planning permission may cease be extant.
Raised beach deposits	The map is intended for general consideration of mineral issues and not as a source of detailed information on specific si The map should not be used to determine individual planning applications or in taking other decisions on the acquisition use of a particular piece of land, although they may give useful background information which sets a specific proposal wi context.
Blown sand Glaciofluvial and glacial deposits	Copyright Topographic data is Crown Copyright and is reproduced with the permission of Land & Property Services under delega authority from the Controller of Her Majesty's Stationery Office © Crown Copyright and database rights, EMOU206.1 (201
SANDSTONE	Environmental designation data is based on Crown Copyright and is reproduced with the permission of Land & Prop under delegated authority from the Controller of Her Majesty's Stationery Office © Crown copyright and database rig EMOU206.2. Northern Ireland Environment Agency Copyright 2012.
Sandstone with potential for high specification aggregate Other sandstone	Mineral planning permission data and areas of constraint on mineral developments are reproduced with the permission of Planning and Local Government Group, Northern Ireland Department of the Environment. Copyright 2012. The locations of building stone quarries from the Natural Stone Database of Northern Ireland are reproduced with permiss of the Consarc Design Group. Copyright 2012 Stone Database.
IGNEOUS AND META-IGNEOUS ROCKS	Geological Map © Crown Copyright 2012. All rights reserved. This publication has been produced by the British Geological Survey and Geological Survey of Northern Ireland for Department of the Environment (Northern Ireland). The publication (excluding logos) may be reproduced free of charge any format or medium for research, private study or circulation within an organisation. This is subject to it being reprodu
Dolerites, lamprophyres, and their metamorphic equivalents (meta-dolerites and meta-gabbros) suitable for high specification aggregateOther igneous and meta-igneous rocks (basalts, andesites, rhyolites,	accurately and not in a misleading context. The material must be acknowledged and the title of the publication specified.
granites, volcanogenic and meta-volcanic rocks) META-SEDIMENTARY ROCKS	BUILDING STONES A wide range of rock types are used as a source of building stone for masonry, field walling, roofing and flooring purposes of which give a specific character to an area. The stones can be used as coarsely dressed 'rubble walling', but there is als need for finer, more easily worked, stones for details such as mullions and sills on buildings. The suitability of particular r types depends not only on aesthetic qualities such as colour and textural consistency but also factors such as strength
Psammites and quartzites	durability, as well as other commercial considerations. A wide variety of hard rocks are suitable for use as building stone including igneous, sedimentary and their metamor equivalents (igneous or sedimentary rocks that have been altered by heat and/or pressure). Many rock types suitable building stone are also suitable for crushed rock aggregate (see text box on Crushed Rock Aggregates). Some units, not
LIMESTONE High purity limestone (>97% CaCO ₃) - Ulster White Limestone	the thicker sandstone formations, lend themselves to being used as a freestone or dimension stone as they can be worke any direction without splitting or failing. A continuing supply of building stone is important for new build and conserva work. <i>Igneous and meta-igneous rocks</i>
Other limestone	Although a wide range of rock types have been worked historically for building stone in County Antrim, currently there is one active quarry (Budore, west of Belfast) which extracts basalt for building stone. Historically, basalt has been worked building stone at a number of quarries across the county. A number of old building stone quarries are concentrated along edge of the basalt plateau, to the north and west of Belfast. Beds of andesitic lava up to 15 metres thick are interbedded the Lower Basalt Formation of the Antrim Lava Group. Some of these are very flaggy, fine-grained rocks and break into s
DOLOMITE Dolomite	Intersection of the Antimic Lava Choup. Some of these are very hagg, integramed rocks and break into some of these blocks which may have limited use in bridge building and repairing walls. The Deer Park Andesite, found to the sout Antrim, was worked in two small quarries. The Shane's Castle Andesite, located to the west of Antrim, has also b quarried on a very minor scale as it is an attractive very fine-grained blue grey and uniform rock. The columnar rhyolite of Tardree Complex, north-west of Antrim, has been widely used in older buildings around Tardree and on other hist buildings in Co. Antrim (see text box on Perlite). Although it has an attractive cream colour on weathered surfaces, it does
PERLITE	weather very well. Sedimentary and meta-sedimentary rocks In the past, working of freestone was an important industry in the Belfast area, although most of the better quality sandsi
SALT	came from quarries in the Scrabo area of Co. Down. However, in the Lagan Valley, sandstones were worked on a si scale, notably for local railway bridge and canal construction. To the north-east of Lisburn, fairly massive, yellow sandstone appears to have been quarried for building stone at the Dunmurry River Site. Sandstones and conglomer have been extracted for building stone to the north and west of Cushendall. Sandstones to the east and south of Ballyca (see text boxes on Silica Sand and Lignite) on the north coast of Co. Antrim have also been worked for building stone.
Subsurface extent of salt-bearing strata	The Ulster White Limestone (see text box on Limestone), a very hard and dense rock, has furnished building stone to north of Belfast and along the east coast of Co. Antrim between Glenarm and Carnlough.
SILICA SAND Silica sand	
LIGNITE AND COAL Lignite (coincident with Lough Neagh Clay)	
Subsurface extent of lignite	DIATOMITE Diatomite, or diatomaceous earth, deposits, up to 0.9 metres thick in the valley of the River Bann, have been extensi
Shallow coal (coincident with fireclay)	blatomite, of diatomaceous earth, deposits, up to 0.9 metres thick in the valley of the river bain, have been extensis worked between Toome and Portglenone on the border with County Londonderry. Deposits with a minimum worka thickness of 0.25 metres extend northwards from Toomebridge. The diatomite was deposited in freshwater lakes during early post-glacial times and consists of microscopic siliceous skeletons of diatoms. When dry, diatomite is a friable, will chemically inert powder that can be used as a filler in paint, plastic or rubber manufacture, as an absorbent in animal litter abrasive for metal polish, an insulator, and as a filtration agent in the food, beverage and pharmaceutical industri
CLAY Lough Neagh Clay (coincident with lignite)	Diatomite extraction ceased in the early 1980's, by which time up to 400 000 tonnes had been extracted, mainly f workings near Toomebridge. Remaining reserves were estimated at between 240 000 and 290 000 tonnes.
Brick clay	LIMESTONE Limestones are sedimentary rocks composed mainly of calcium carbonate (CaCO ₃). Dolomites are limestones which a contain between 10–50 per cent magnesium carbonate (MgCO ₃). As well as being relatively hard and durable, n limestones and dolomites form bedded deposits which are generally easy to work. These properties mean that they
Fireclay (coincident with shallow coal) MINERAL WORKINGS (as at 23.03.12)	commonly worked for construction aggregate and building stone. Limestones are also valued for their chemical properties applications such as cement manufacture, glass making, iron ore smelting, flue gas desulphurisation, as a soil condition food supplement and white filler. The strict chemical limits applied to material used in these applications restricts extraction high purity stone (>97% CaCO ₃).
Killagan (Sag) Extent of valid (extant) planning permission (name, mineral commodity)	Compared to some other counties in Northern Ireland, County Antrim is a relatively small producer of limestone, accour for six per cent of total production. The Cretaceous-age Ulster White Limestone Formation, which is exposed around the margins of the Antrim Plateau, is extremely hard, high purity product (>97% CaCO ₃). It has been extensively worked north and west of Belfast as a source
Ballyboyland (Ign) Extent of expired planning permission (name, mineral commodity) Building stone quarries (including histroical)	agricultural lime and for the manufacture of white filler. Numerous quarries were opened along the Ulster White Limest outcrop on the southern flanks of Cave Hill, at Bellevue, at Carnmoney and around the flanks of Squire's Hill. None of the quarries remains in operation. Up to 2001, the Ulster White Limestone was worked for cement production at Magherand Quarry, south of Larne. In the past it has also been used for building stone and crushed rock aggregate (see text box Building Stone). Ulster White Limestone is currently extracted at two sites in Co. Antrim. Demesne Quarry, near to Glena supplies a range of white limestone aggregates, sands and fillers. Limestone sand, aggregate and calcium carbo
Wharf landing sand and gravel	A relatively thin zone of metamorphosed (altered by heat and/or pressure) limestone occurs in the Precambrian- metamorphic rocks in north-east Co. Antrim and represents a potential source of general purpose aggregate (see text boo Crushed Rock Aggregates). A small area of dolomite (magnesium-rich limestone) occurs on the southern side of Belfast.
Mineral commodityBauBauxiteLstLimestoneSagSand and gravelSalSalt	unit is laterally extensive with recorded thicknesses up to 36 metres in Co. Down.
San Sand Sst Sandstone METALLIC MINERAL OCCURRENCES	CLAY Brick clay 'Brick clay' is a term used to describe clay and shale used predominantly in the manufacture of bricks, and to a lesser exists of tiles and clay pipes. These clays may sometimes be used in cement manufacture, as a source of constructional fill
 Au Symbol indicates elemental occurrence Symbol Element Symbol Element 	for lining and sealing landfill sites. The suitability of the raw material depends principally upon its behaviour during shap drying and firing. This dictates the properties of the fired brick such as strength and frost resistance and, importa architectural appearance. Most facing bricks, engineering bricks and related clay-based building products are manufactured in large automa
AlAluminiumBaBarytesCuCopperFeIronPbLead	factories. These represent a high capital investment and are increasingly dependent, therefore, on raw materials predictable and consistent firing characteristics in order to achieve high yields of saleable products. Blending different of to achieve improved durability and to provide a range of fired colours and textures is an increasingly common feature of brick industry. Continuity of supply of consistent raw materials is of paramount importance.
ENVIRONMENTAL DESIGNATIONS (as at 23.03.12)	Belfast area and the Lagan Valley in southern County Antrim during the latter half of the 19th and first half of the 20th cent There are currently no sites working brick clay in Co. Antrim. South-west of Ballymoney, on the border with Co. Londonderry, brownish to grey diatomaceous clay has been used for the making.
Image: Second state of the second s	Fireclay Fireclay is a non-marine sedimentary mudstone that occurs as 'seatearths' which underlie coal seams.These con essentially of the clay mineral kaolinite with varying proportions of hydrous mica (illite) and quartz together with impuri
Area of Outstanding Natural Beauty: Causeway Coast, Antrim Coast and Glens and Lagan Valley (part)	such as ironstone nodules and carbonaceous matter. Its composition is similar to ball clay, but it is not as plastic and not li firing. In the past, the uses of fireclay stemmed from its refractory nature, that is, the ability to withstand high temperat without deforming or becoming chemically unstable. The value of the raw material depended on the content of alkalis, oxides and carbon. Traditionally, these clays were used for the manufacture of fire bricks, crucibles, furnace lining and pipes. However, fireclays are now valued chiefly as a raw material for the manufacture of high-quality, weather-resistant, b
+ Scheduled Monument MINERAL CONSTRAINT (as at 23.03.12)	coloured facing bricks. Fireclay occurs in association with Carboniferous 'Coal Measures' around Ballycastle in north Co. Antrim, and are show coincident with shallow coal on the map face (see text box on Lignite and Coal). Although no longer worked in the cou fireclay was an important by-product of the coal industry and was formerly used in the manufacture of refractory bricks.
Area of Constraint on Mineral Developments	Lough Neagh Clay The Lough Neagh clays extend over 500 km ² , of which 300 km ² underlie the lough. The clays occur in two areas in Antrim. In the south of the county they extend around the south-eastern shore of the lough. The clays are interbedded flat lying or shallow dipping sands, silts and lignite measuring up to 400 metres in thickness, within small fault-bour
ADIVIINIS I RATIVE AREAS Local Government District WARNING: Please be aware that the printed colours may differ due to the settings of the printer used.	 basins (see text box on Lignite and Coal). The Lough Neagh clay also occurs in north-west Co. Antrim, around the tow Ballymoney. Ball clay was extracted on the east side of Lough Neagh, near Portmore, for sanitary pipes. The clays have been thorou investigated through numerous boreholes. Over 200 million tonnes of iron-rich clay and ironstone have been identified in
	Crumlin-Glenavy area at depths down to 60 metres. However, thick and variable overburden is likely to be a major prob for future extraction. In the Ballymoney area, the Lough Neagh Group is concealed by up to 70 metres of superficial cover The Lough Neagh clays are of a similar age and character to the ball clay deposits found in the south-west of England. principal exploitable properties of these ball clays are their plasticity, dry strength, white-firing character and vitrifica behaviour. Unfortunately, the high iron content of the clays around Lough Neagh limits their use and no resources have b
	identified that would be acceptable to modern ceramic producers. <i>Laterite</i> Lateritic clays are developed within the basalts of the Antrim Lava Group (see text box on Metalliferous Minerals). A sr
	quantity of bauxite (aluminium-rich laterite) is extracted at Clinty, near Ballymena, as feedstock for water purification mater Lateritic clays have also been examined for their use as landfill liner material.
	PERLITE Perlite is the industrial name for volcanic glass, with sufficient water content to cause it to expand when heated. Perlite, wh fused, froths up and forms inert, lightweight and porous granular products with a wide range of uses in constructi insulation, packaging and agricultural industries. It occurs at Sandy Braes, south-east of Ballymena, County Antrim, when
	insulation, packaging and agricultural industries. It occurs at Sandy Braes, south-east of Ballymena, County Antrim, when forms part of the Tardee Rhyolite Complex (see text box on Building Stone). This area produced about 13 500 tonnes perlite between 1952 and 1968. Subsequent exploration involved a considerable amount of drilling and pitting in the Sar Braes and Browndod areas. A nearby occurrence at Loonburn is a sinuous lenticular deposit. Whilst the resource shown the map is based on the extent of the pyroclastic breccia facies of the Tardree Rhyolite Complex, borehole data sugge

