

DERBYSHIRE AND DERBY MINERALS LOCAL PLAN

BRICK CLAY AND FIRECLAY SUPPORTING PAPER

JANUARY 2015

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1. Introduction and Background

- 1.1 Clay, shale and mudstones are fine grained sedimentary rocks that occur extensively in the United Kingdom. Despite being widespread only limited deposits of clay, shale and mudstones have sufficient qualities to make them economically important minerals. (When they are extracted for commercial use they are generally known by the term 'clay and shale'.¹)
- 1.2 Brick clay is the term used to describe the clay and shale used in the manufacture of structural clay products, notably facing and engineering bricks, pavers, clay tiles for roofing and cladding, and pipes. Brick manufacture is the largest use, by tonnage, of brick clay and bricks are one of the most visible components of the built environment in our villages, towns and cities. Most brick clays are red firing producing red coloured products. Fireclays are sedimentary mudstones that underlie almost all coal seams; they are particularly important for the manufacture of buff and pale-bodied facing bricks.²
- 1.3 Clay and shale can also be used for engineering and environmental purposes, i.e. capping and lining areas of landfill, and lining water bodies such as lakes, ponds and canals and for general constructional purposes (fill). Clay and shale is also of secondary importance, to limestone and chalk, in the production of cement. Its use for this purpose is dealt with separately in the following Paper, Towards a Strategy for the Provision of Industrial Limestone, December 2014 and in the Supporting Paper on Cement, December 2014.

2. National and Local Planning Policy

2.1 National Policy

The National Planning Policy Framework (NPPF) recognises that minerals are essential to support sustainable economic growth and our quality of life and that it is important, therefore, that there is a sufficient supply of material to provide the infrastructure,

¹ Page 10, British Geological Survey, Commissioned Report CR/03/281N - Definition and characteristics of very fine grained sedimentary rocks: clay, mudstone, shale and slate, 2003,

² Page 17, Trends in UK Production of Minerals, UK Minerals Forum, January 2014

buildings, energy and goods that the country needs. It also recognises that minerals are a finite resource so it is important to make best use of them to secure their long term conservation.

National Government Policy on making provision for industrial minerals, including brick clay and fireclay, is set out in the NPPF at paragraph 146 which states that Mineral Planning Authorities (MPAs) are required to plan for a steady and adequate supply of industrial minerals. Key factors identified to achieve this include:

- the need to co-operate with neighbouring and more distant authorities in order to recognise the wider importance of minerals and their use in the industrial and manufacturing processes
- the need to safeguard or stockpile important minerals for the future
- the need to provide a sufficient stock of permitted reserves at individual sites to support the level of (actual and proposed) investment required for new or existing plant and the maintenance and improvement of existing plant and equipment – at least 25 years' worth is suggested for brick clay
- the need to take into account the need for provision of brick clay from a number of different sources to enable appropriate blends to be made.

NPPF paragraph 147 also adds that MPAs should provide for coal producers to extract separately, and if necessary, stockpile fireclay so that it remains available for use.

The NPPF, specifically relating to the preparation of local plans at paragraph 163, requires MPAs to develop and maintain an understanding of the extent and location of mineral resources in their area and to assess the projected demand for their use taking into account any opportunities to replace the need for primary minerals. Paragraph 182 sets out the need for plans to be positively prepared based on a strategy which meets objectively assessed development requirements, including unmet requirements from neighbouring authorities where it is reasonable to do so and consistent with achieving sustainable development.

2.2 National Planning Practice Guidance

The National Planning Practice Guidance (NPPG) sets out guidance on how MPAs should plan for the steady and adequate supply of minerals (in order of priority):

- designating Specific Sites – where viable resources are known to exist, landowners are supportive of minerals development and the proposal is likely to be acceptable in planning terms. Such sites may also include essential operations associated with mineral extraction
- designating Preferred Areas, which are areas of known resources where planning permission might reasonably be anticipated. Such areas may also include essential operations associated with mineral extraction, and/or
- designating Areas of Search – areas where knowledge of mineral resources may be less certain but within which planning permission may be granted, particularly if there is a potential shortfall in supply.

NPPG provides specific advice on how MPAs should plan for industrial minerals. It suggests that recognition should be given to any marked differences in geology, physical and chemical properties, markets and supply and demand between different industrial minerals which can have different implications for their extraction. Such differences include:

- geology influencing the size of a resource, how it may be extracted and the amount of mineral waste generated
- the market demand for minerals to be of consistent physical and/or chemical properties, resulting in the fact that industrial minerals are often not interchangeable in use
- the potential for the quality of a mineral extracted from a single site varying considerably
- the economic importance of the mineral as a raw material for a wide range of downstream manufacturing industries
- some industries are dependent on several industrial minerals and the loss of supply of one mineral may jeopardise the whole manufacturing process.

NPPG also sets out advice on the best way of providing for sufficient stocks of permitted reserves at individual sites. It advises that stocks of permitted reserves should be used as an indicator to assess whether further permitted reserves are required at an industrial minerals site. Stocks of permitted reserves should be calculated when a planning application is submitted to extract the mineral (through either a site extension or a new site) or when capital investment is proposed e.g. for a new kiln. The overall amount required should be directly linked to the scale of capital investment to construct and operate the required facility. For a brick factory the NPPF suggested providing a stock of permissions equivalent to at least 25 years.

2.3 Adopted saved local planning policy

Policy MP32 of the Derby and Derbyshire Minerals Local Plan (2002) states that proposals for the working of clay will be permitted, provided that the mineral is needed to enable the continuation of production and employment in the clay products industries or as a raw material in the construction of waste disposal facilities; and where the proposal would not have an unacceptable impact on the environment and is designed to secure the rapid working and reclamation of the site. The policy also states that planning permission will not be granted where the stocking of clay on the mineral site would significantly delay the reclamation of the site.

3. Method of Working/Processing/Transportation/Restoration

3.1 Method of Working

Brick clays are worked entirely by open pit methods in shallow or deep quarries. The extraction is undertaken in a 'campaign' where there is a concentrated short period of excavation usually on an annual basis. The nature of extraction varies but typically within the Plan area annual clay and shale extraction is small scale, in terms of tonnage (around 50,000), with some sites operating for many years.

The impracticability and cost of removing impurities is such that brick clays undergo little processing other than grinding and screening to remove any hard or coarse components. It is important therefore to extract clays selectively, avoiding

contaminating material, to ensure that feed to the plant has consistent and predictable firing characteristics. Brick clays with different properties are often laid down in stockpiles as layers, which are later removed vertically to ensure a consistent mix. Open air stockpiling is common practice, allowing the stored brick clay time to 'sour', a process of weathering over several months to increase its ability to be moulded.

Fireclay extraction is not normally commercially viable on its own and almost all production is as a co- or by-product of surface coal production. However, only a small proportion of surface coal sites (less than 20%)³ will have associated fireclay recovery. Where fireclay is recovered for sale it must be worked carefully to ensure there is no contamination with associated minerals. Under favourable conditions fireclay can be worked down to a bed of less than 0.3m. Fireclays are then normally stockpiled.

3.2 Processing

Historically, most urban areas had brickworks and associated clay pits. Nowadays, most facing bricks, engineering bricks and related clay based building products are manufactured in large automated factories. These represent high capital investment in plant (including kilns for firing) and are increasingly dependent on raw materials with predictable and consistent firing characteristics in order to achieve high yields of saleable products. Continuity of supply of consistent raw materials is of paramount importance. Blending different brick and fireclays to achieve improved durability and to provide a range of fired colours and textures is an increasingly common feature of the brick industry.

3.3 Transportation

Whilst in the past brick clay and fireclay was consumed locally, today increasing tonnages are transported to large scale automated brickworks for blending purposes and to serve plants with no clay reserves. Generally, clays are transported to the plant by road and the finished product is usually delivered to the market by road. Brick clay

³ British Geological Survey, Mineral Planning Factsheet, Fireclay,2006

is a high weight and low value commodity and as such transportation affects costs significantly. Fireclay has a slightly higher value than brick clay, which means that longer journeys are more economically feasible.

3.4 Restoration

The nature of the brick clay market raises particular issues for clay working in terms of the length of time taken to work and restore sites and in terms of the need for stockpiling. Fluctuations in the economy impact on the construction industry and the consequent demand for structural clay products especially bricks. Periods of decline may lead to the mothballing or closure of extraction and processing facilities, including brickworks, which may result in a landscape of inactivity. There is a particular need to minimise the impact of stockpiled clay material both on the environment and local amenity.

If brick or fireclay clay is worked in association with surface coal mining, schemes usually require short extraction periods with quick restoration which limits stockpiling opportunities. Brick and fireclay may be stocked at the brick works or clay products site rather than at the excavation site.

4. Brick and Fireclay Resources

4.1 General

The character of clay, shale and mudstones can vary markedly depending on their geological age and the extent to which they have been buried and altered by tectonic events e.g. earthquakes etc. Clay is the least mature and occurs most commonly in the younger sedimentary rocks that form outcrops in southern and eastern England. More mature shale and mudstone deposits are associated with older rocks forming outcrops in central and northern England (including the Plan area). In these areas shale and mudstones are commonly found interbedded with sandstones.⁴

⁴ British Geological Survey, Commissioned Report CR/03/281N - Definition and characteristics of very fine grained sedimentary rocks: clay, mudstone, shale and slate, 2003, Page 10

Whilst clays occur extensively in many parts of the United Kingdom and resources are, therefore potentially very large, only certain sources have the specific geological properties suitable for manufacturing structural clay products.

4.2 Brick clay

Brick clays are essentially sedimentary clays, shale and mudstones of different geological ages and compositions. These range from relatively soft, plastic clays to hard mudstones. Their chemical properties, which are related to their mineral composition and their physical properties, particular grain size, are critical in determining their suitability for the manufacture of structural clay products. These properties include strength, water absorption (porosity) and frost resistance, and thus durability and performance in service. Importantly, they also affect aesthetic appearance, such as colour and texture; most brick clays are red 'firing' producing red coloured products.

4.3 Fireclay

Fireclays are sedimentary mudstones that occur as seathearts or fossil soils that underlie almost all coal seams. Fireclays are typically thin (normally <1m, although rarely 3m) and extraction on their own would not be economically viable because of the high overburden to mineral ratios. In contrast to brick clays, which are normally red-firing due to the presence of iron oxides, fireclays have relatively low iron contents and are particularly valued for the production of buff coloured bricks and pavers. Bricks made from fireclay also exhibit superior technical properties, such as strength and durability.

4.4 Plan area

Clay, shales and mudstones occur extensively in the Plan area but only a small proportion are suitable for brick manufacture (most are too high in carbon and sulphur). The most important economic 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

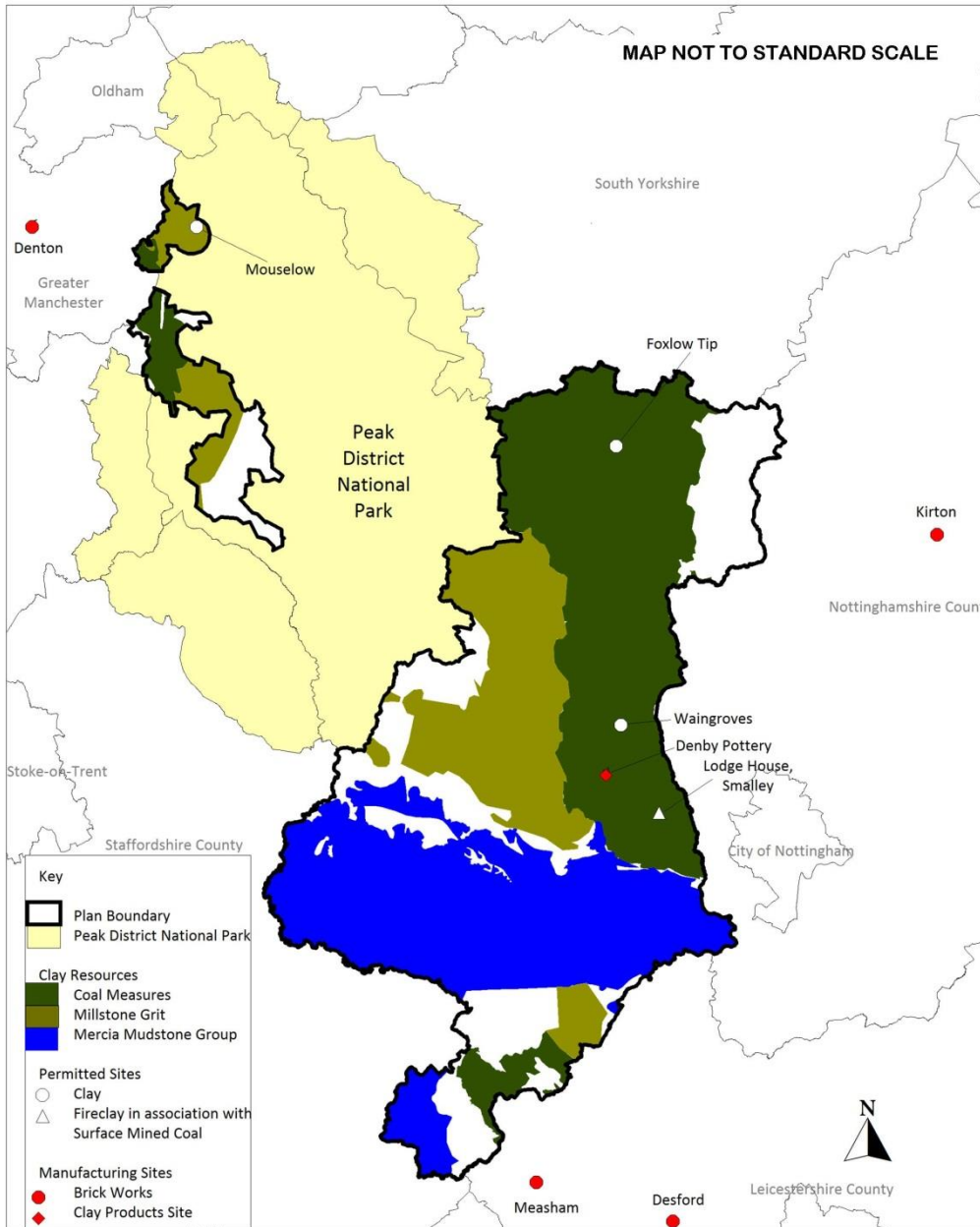
Group outcrop extensively in the southern part of the County, but they do not contain any permitted reserves and are not anticipated to be of future economic importance.

There are currently only three brick clay operations within the Plan area, all working Carboniferous shales. Originally these quarries were opened to supply nearby brickworks which have since all been demolished. At Mouselow Quarry, Glossop black shales of the Millstone Grit are worked and transported to a brickworks at Denton, east Manchester. At Waingroves Quarry, Ripley mudstones and shales of the lower coal measures are extracted and transported to Hansons brickworks sites in Leicestershire and Nottinghamshire. Coal measure mudstones and shales have also been recovered from land adjoining a former foundry waste tip at Foxlow Tip, Barrow Hill, Staveley originally intended to supply the now demolished Phoenix Brickworks at Barrow Hill. The clay is now stockpiled on the extraction site.

Fireclays are closely associated with coal seams and thus resources are confined to coalfields. There is only one active surface coal mining site within the Plan area at Lodge House Farm, Smalley where a small amount (up to 50,000 tonnes) of potential marketable fireclay has been identified for extraction in association with the coal. The resources and sites are shown on the Map (Clay Resources, Quarries and Manufacturing Sites – 2014).

4.5 Safeguarding

Since minerals are a finite resource it is important to ensure that non-minerals development does not needlessly prevent the extraction of known mineral resources of local and national importance. One way of achieving this is through the inclusion of resources within Mineral Safeguarding Areas. Whilst clay, shale and mudstones are widespread only limited deposits have sufficient qualities to make them economically important. In preparing the Minerals Local Plan we will need to assess which clay resources should be safeguarded. More detailed information is available in the Paper, Towards a Strategy for safeguarding mineral resources, November 2014 and in its accompanying supporting Paper on Minerals Safeguarding, November 2014.



Title

Clay Resources, Quarries and Manufacturing Sites - 2014

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5. Demand

5.1 There are no national demand figures for brick clay or fireclay production. The industry is market-led and production is related closely to trends in the construction industries. Brick clays are used in the manufacture of structural clay products, notably facing and engineering bricks, pavers, clay tiles for roofing and cladding, and pipes. Brick manufacture is the largest use of brick clay by tonnage with house building the principle consumer of bricks, together with other construction projects. A recent report⁵ on trends in the UK production of Minerals states that brick clay consumption has declined significantly since the 1970s from 18 million tonnes per annum (tpa) in 1974 to 4 million tpa in 2011. The initial decline was due mainly to the demise of common bricks in houses which have been replaced, in the inner leaves of cavity walls, by concrete blocks and, in internal walls, by blocks and plasterboard. The later decline can be attributed to a significant reduction in the number of new houses being built, together with a trend towards smaller houses and flats and the increasing use of timber framed prefabricated construction, which relegates bricks to an external cosmetic and weather facing skin, resulting in the need for fewer bricks. The Report adds that, with increasing pressure for new homes, the declining trend in house building is likely to be reversed. How far this translates into increased demand for brick clay or imports of bricks, in the light of the above trends in unit size and construction methods, remains to be seen. In the past the United Kingdom has largely been self-sufficient in the manufacture and supply of bricks, but since the late 1990s there has been an increasing reliance on imports. The above factors, together with the reduction in the scale of surface coal mining have also led to a decline in the consumption of fireclays.

5.2 Economic importance

In terms of wealth created by United Kingdom minerals production, figures show that at 2012, the construction and industrial minerals sector contributed just 7 % of total wealth compared to the oil and gas sector's 90%⁶. However, the importance of

⁵ Page 17, Trends in UK Production of Minerals, UK Minerals Forum, January 2014

⁶ Page 9, United Kingdom Minerals Yearbook 2013, BGS Minerals and Waste Programme Open Report OR/14/036, 2014

construction and industrial minerals as essential inputs to downstream industries, mainly within the manufacturing and construction sectors, needs to be recognised.

Brick clay and fireclay working can provide an important source of local employment both in rural and former coal mining areas. In 2013, the most recent date for which statistics are available, 15⁷ people were employed in clay and shale mining in Derbyshire; 3 were directly employed, 7 were employed by contractors and 5 were drivers (based on site in an average week).

5.3 Heritage importance

Clay bricks and tiles make an important contribution to the local architectural styles in our cities, towns and villages. The variety of clay used gives rise to the distinctive local variations in the built environment. Some brickworks specialise in hand-made products for the repair of historic and traditional brick built features and buildings.⁸

5.4 Alternatives/Recycling

In terms of finding alternatives to primary materials for brick manufacture some secondary materials and waste types have been used in certain circumstances as a partial substitute for primary clay. Reclaimed bricks have been also been used but they tend to be expensive and therefore their impact in reducing the overall demand for brick clay is marginal.

6. Production and Reserves

6.1 The recent economic downturn and resultant recession in the construction sector means that the demand for building products and hence brick and fireclay is low. This national picture is reflected within the Plan area; currently there are only three sites with planning permission for brick clay working and one active surface coal mining site where incidental fireclay is being extracted. Annual production, permitted reserves and estimates of the lifespan of existing quarries are shown on Table 1 below. The locations of the quarries and the brickworks/clay products site they serve are shown

⁷ DCLG, Mineral Extraction in Great Britain 2013, Business Monitor PA1007

⁸ British Geological Survey, Mineral Planning Factsheet, Brick clay, 2007

on the Map above (Clay Resources, Quarries and Manufacturing Sites - 2014). There are currently no brickworks within the Plan area and all brick clay excavated is exported to adjoining MPAs. The fireclay extracted at Lodge House, Smalley will be used within the Plan area, to supply the nationally renowned pottery manufacturers at Denby.

Table 1 : Production and permitted reserves at clay and shale quarries within the Plan area

| Quarry | Production 2011 | Production 2012 | Production 2013 | Permitted Reserves 2013 | Anticipated annual production over plan period | Estimated lifespan of sites (in years) based on estimated average production over plan period | Estimated date that permitted reserves will be worked out based on estimated average production over plan period | Expiry date of planning permission |
|-------------------|-----------------|-----------------|-----------------|-------------------------|--|---|--|------------------------------------|
| Brick Clay | | | | | | | | |
| Mouselow | 61,000 | 18,000 | 45,000 | 405,000 (1,450,000)* | 45,000 | 9 | 2022 | 2042 |
| Waingroves | 81,000 | 66,000 | 69,000 | 3,050,000 | 80,000 | 38 | 2053 | 2042 |
| Foxlow Tip | | | | 250,000 * | | N/A | N/A | 2029 |
| Totals | 142,000 | 8,400 | 109,000 | 4,950,000 | | | | |
| Fireclay | | | | | | | | |
| Lodge House Farm | | | | 50,000 | | Development to be completed between 2011-2015 | 2015 | 2015 |
| Totals | | | | 50,000 | | | | |

All figures in tonnes

*See explanation of reserves figures below

6.2 Mouselow, Glossop

A clay and shale quarry, operated by Wienerberger UK, is located at Mouselow, near Glossop. The quarry has been operational for many years, at least since 1879 and historically there was a brick factory on the site. Brick clay extraction is undertaken by the 'campaign' method; the material is then stockpiled on site. The raw material is removed offsite to the customer which is Wienerberger UK's Denton Brickworks, in east Manchester, some 10 miles away.

6.3 Geology

The quarry is worked primarily to extract shale for use in brick making. The shales are part of the Millstone Grit Group which consists of an interbedded sequence of shales, mudstones and sandstones.

The uppermost shales which remain in the knoll feature in the western part of the site are currently the main source of brick making material. Below the upper shales, lies a 6 metre thick deposit of high sulphur shales which are not suitable for brick making as the sulphur content is higher than can be used in the Denton factory. Below the high sulphur shales there are further low sulphur shales suitable for brick making which currently form a minor amount of the extracted material from the site. These lower shales can only be extracted after the overlying high sulphur shales have been removed.

In addition, a 4 to 8 metre thick bed of sandstone occurs between the upper shales and the high sulphur shales. This sandstone is also removed to allow extraction of the underlying shales. The sandstone is used as a high quality building stone with a minor amount, which is not suitable for use as building stone, being used as a construction aggregate. Sandstone has already been removed from approximately half the extraction area.

6.4 Reserves

As of the end of 2013 the reserves of shale and sandstone material within the current planning permission area were as follows⁹:

- Upper shales – 354,600 tonnes (197,000 cubic metres)
- Sandstone – 10,800 tonnes (125,000 cubic metres)
- Lower shales – 1,085,400 tonnes (603,000 cubic metres)
- Total – 1,450,800 tonnes (806,000 cubic metres)

(Tonnage estimates based on using a conversion factor of 1.8 tonnes/cubic metre)

6.5 Production

⁹ Planning Application CM1- 0214 -162 to vary conditions of planning permission R1/0310/24 to alter restoration landform and extend the end date for winning and working of minerals at Mouselow Quarry, Wienerberger Ltd, January 2014, Vol 2 Non Technical Summary

At the present time, extraction from Mouselow has been substantially reduced from the levels experienced in the 1990s due to the closure of Cheadle brickworks, which it also supplied, and reduced output of the Denton brickworks. Output from Mouselow is currently around 45,000 tpa and is unlikely to increase in the immediate future. If the economy improves further in the longer term, output is anticipated to rise to approximately 54,000 tpa⁹.

The proposed rate of extraction for the foreseeable future, from the beginning of 2014, as set out in the planning application was as follows⁹:

- Upper shales – 39,600 tonnes (22,000 cubic metres) per year - 9 years reserves remaining.
- Sandstone – 10,800 tonnes (6,000 cubic metres) per year - 21 years reserves.
- Lower shales – 5,400 tonnes (3,000 cubic metres) per year currently, to be increased after all the upper shales have been exhausted in 9 years to 54,000 tonnes (30,000 cubic metres) per year - approximately 28 years reserves in total.

Based on this information, the stockpiles and extensive permitted reserves at Mouselow would last well beyond the plan period. Planning permission was granted in December 2014 to vary a time limited planning condition on the site which extends the period of working from 2019 to 2042, enabling these reserves to be worked throughout the Plan period and beyond.

6.6 Proposed extension

More recently, in January 2015, the operator has submitted evidence¹⁰ indicating that, after recent trialling, because of the high carbon content, the lower shale reserves are not economic to use on their own without blending with the upper shale reserves. This reduces greatly the availability of suitable brick making reserves from the quarry. Based on the future production of 45,000 tpa, as set out in the planning application, the quarry has only sufficient reserves of upper shales to last for approximately 9 years

¹⁰ Email to Derbyshire CC from Wienerberger UK, dated 28/1/15

(this calculation takes into account the use of a small quantity of lower shales for blending purposes).

To compensate for this loss of reserves the operator is promoting, through the local plan process, a small extension to the area of extraction within the permitted site, (as shown on the Map: Mouselow Quarry) which will generate a further 1,400,000 tonnes of Upper Shale. These additional reserves of high quality brick making shale will ensure the supply of material to Denton beyond the Plan period. Planning permission will be required to enable the mineral to be extracted from this area.

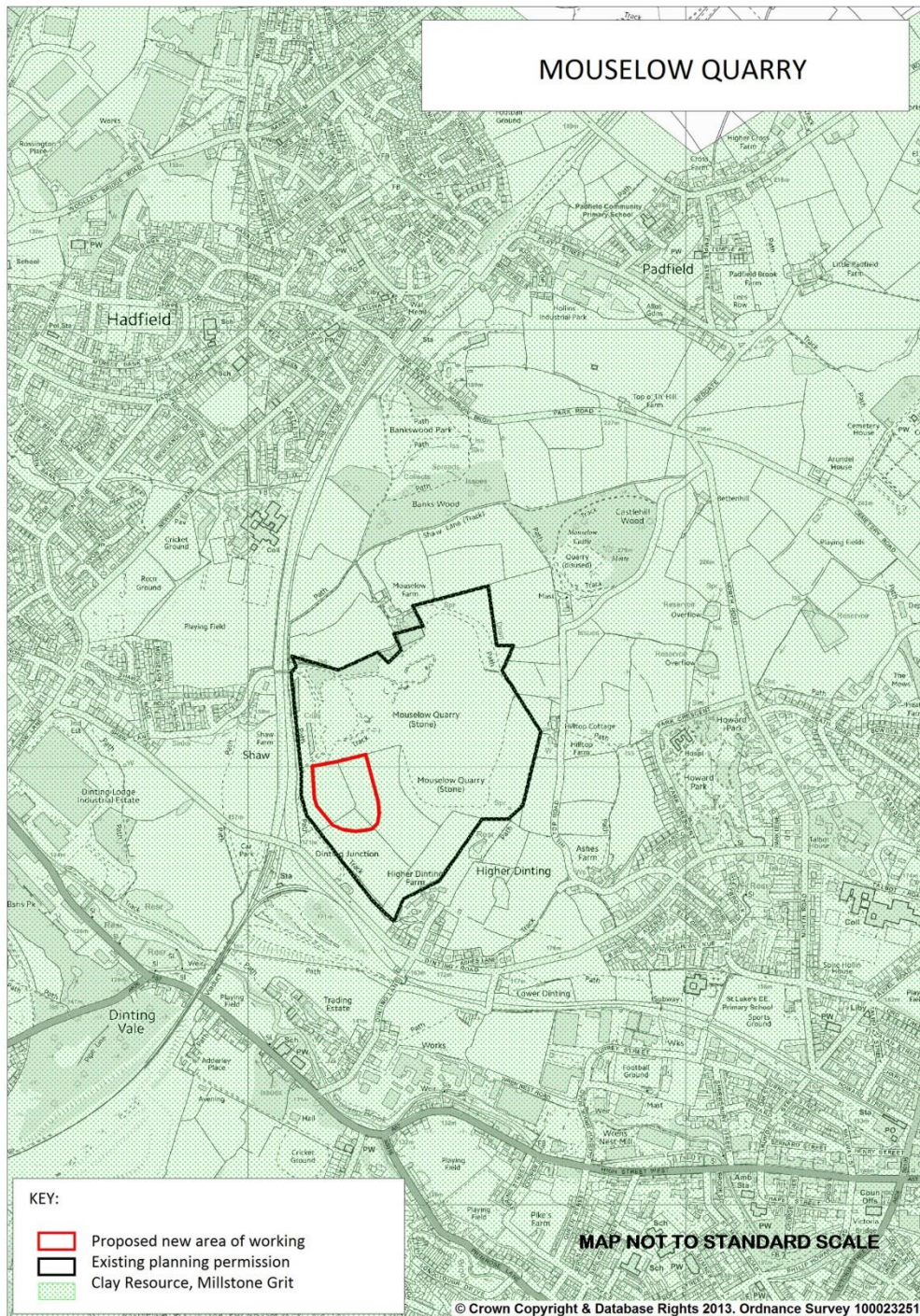
6.7 Denton

The Denton factory is a substantial modern facility with the ability to produce over 50 million high quality bricks per year which are used in building work locally and further afield. It supports over 60 direct and indirect employees.

Mouselow clay and shale makes up the largest proportion of brick making material used at the Denton plant, over 50% overall, and is used in most of the brick clay mixes; a total of 67 different product types are produced at Denton. The Mouselow material has good consistency, low sulphur, good potash and medium carbon levels in comparison with other clay and shale sources.

Additional raw materials are supplied from Harwood Quarry, Bolton, Bradford and Leicestershire. The Bolton source of material is 30km away from Denton but cannot be used exclusively because of issues with colour and silica levels. The Bradford material is transported 65km to Denton and is again used as a blend to achieve the required mix. The Leicestershire material is transported 145km and consists of fireclay with specific refractory and colour properties. This fireclay material constitutes a small proportion of the brick making mix and is mixed with Mouselow material to produce 13 of the 67 products. These other raw materials cannot be used to the exclusion of the Mouselow clay and shale. There are very few other sources of brickmaking clay and shale within 25km of the Denton factory. Wienerberger has searched for alternative supplies extensively over recent years as the Denton factory uses a blend

of raw materials to produce its range of products. Mouselow clay and shale is essential for the continued operation of the brickworks.



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6.8 Waingroves, Ripley

A brick clay extraction site, operated by Hanson Brick Ltd, is located at Waingroves, Ripley. Planning consent exists up to the year 2042. The brickworks at Waingroves ceased production in 2006 and has since been demolished. Brick clay extraction is undertaken by the 'campaign' method; the material is stockpiled on site. The excavated material is then removed off-site to the Company's brick works, at Desford and Measham in Leicestershire and at Kirton brickworks in Nottinghamshire, as depicted on Table 2. Approximately 70% of output is transported to Leicestershire, split evenly between the two sites located there. The remaining 30% is transported to Nottinghamshire. The brick clay is then blended with clay and shale material from other active quarries at the brickworks, because being a Carboniferous Shale it gives a far stronger fired product than ones made purely from Keuper Marl and helps the brick to be frost resistant. As a result, it is used to manufacture bricks destined for engineering specifications rather than general house building.

Permitted reserves at Waingroves are estimated to be around 3.05 million tonnes. The operator estimates that production is likely to increase again in 2014 to 2011 levels of around 80,000 tonnes. Using this figure as an indication of future annual demand indicates that Waingroves could maintain supplies at this level for a further 38 years, well beyond the Plan period. The planning permission includes conditions requiring ongoing restoration including site profiling, planting and landscaping.

Table 2: Destination of brick clay extracted from Waingroves Quarry

| Destination | Production 2011 | Production 2012 | Production 2013 |
|---|----------------------------|----------------------------|----------------------------|
| Kirton Brickworks, Nottinghamshire | 23,682 | 10,444 | 5,240 |
| Desford Brickworks, Leicestershire | 29,020 | 23,296 | 36,936 |
| Measham Brickworks, Leicestershire | 28,162 | 32,545 | 26,987 |
| Total | 81,044 | 66285 | 69,163 |

6.9 Kirton

Kirton brickworks, Nottinghamshire operated by Hansons produces high quality facing bricks. Its main source of clay is the adjacent quarry located on the Mercia Mudstone resource. Nearly all of the mineral extracted is red firing clay, but some cream firing clay is also extracted. Permitted reserves of red firing brick clay are anticipated by the operator to be exhausted by 2023. The reserves of cream firing clays are worked in a separate part of the pit and are expected to last until at least 2030. The operator is promoting a site to extend the quarry as part of the local plan process.

Nottinghamshire County Council, in the Minerals Local Plan Preferred Options 2013, identify the existing reserves at Kirton and an extension area to the quarry as being sufficient to enable a 25 year landbank to be maintained at Kirton over the plan period.

6.10 Measham and Desford

Measham and Desford brickworks, operated by Hansons, are located in Leicestershire. Both of these works are supplied principally with brick clay from adjoining quarries. The most recent information about reserves¹¹ indicates that at 1/1/2015 Desford had approximately 15 years of permitted reserves and Measham 13 years. Leicestershire County Council is preparing a new Minerals and Waste Plan which will replace its adopted Core Strategies. This new Plan will include policies to allow for the additional working of brick clay to ensure the supply of material to the existing brickworks and to maintain a 25 year landbank of permitted reserves.

6.11 Foxlow Tip, Barrow Hill

Planning permission was granted in 2008 for the extraction of 600,000 tonnes of brick clay from land adjacent to Foxlow Tip, Barrow Hill, Staveley to supply the company's (Phoenix Brick Ltd) brickworks at Barrow Hill. The excavation lasted for three years. The proposal was to stockpile the clay for an additional eighteen years (21 years in total) on the footprint of the old tip. Clay would be removed off site at a rate of 30,000

¹¹ Email to Derbyshire CC from Leicestershire CC, dated 7/1/15

tpa; and based on these estimates the permitted reserves would last approximately 20 years. The planning permission specified that clay extracted from the site was only to be used for the purposes of supplying the brickworks at Barrow Hill. However, the brickworks ceased production in Spring 2013 and has since been demolished.

Current information from the operator indicates that the brick clay reserves recovered from the tip totalled some 250,000 tonnes which is stockpiled on the extraction site. Planning permission has been granted for a waste treatment plant adjoining the former brickworks site. If the treatment plant is developed and performs as expected the operator has indicated that it could provide sufficient energy to make the development of a new brickworks a viable proposition in view of the stockpiled material.

The current planning permission includes a condition requiring the site to be restored progressively when the stockpiled clay is removed off site. The restoration scheme includes an agricultural after-use for most of the site, together with an area of habitat creation, reflecting the character of the 'riverside meadows' landscape. Final restoration is not envisaged until 2030 i.e. the end of the Plan period.

6.12 Lodge House Farm, Smalley

A small amount (up to 50,000 tonnes) of potential marketable fireclay has been identified at Lodge House Farm, Smalley (operated by UK Coal) for extraction in association with the coal. The clay will be used to supply the nearby pottery manufacturers at Denby. Development of the site began in 2011 and is expected to be completed by the end of 2015.

6.13 Other uses of clay and shale

Clay and shale can also be used for engineering and environmental purposes i.e. capping and lining areas of landfill, and lining water bodies such as lakes, ponds and canals and for general constructional purposes (fill). These uses don't require the specialist properties of brick clay or fireclay and therefore the extensive clay and shale deposits within the Plan area can be used to source these uses. Clay for these

purposes is often worked incidentally both in association with the extraction of other minerals and prior to non-mineral development or as borrow pits in association with major construction projects.

7. Conclusions – Issues for Making Provision for the Supply of Brick and Fireclay

- 7.1 The NPPF does not set out figures for how much brick clay or fireclay should be produced. Production is market-led and closely related to the needs of consumers and to trends in the construction industries. During buoyant economic periods, demand for brick and fireclay increases for the production of bricks, tiles, terracotta pipes, refractory products, etc. Periods of decline can lead to mothballing or shutting down of extraction and processing facilities giving rise to longer than anticipated timescales for working and reclamation. A key issue for the Plan, therefore, is the need to maintain essential supplies to consumers when they are needed whilst seeking to encourage the rapid working and reclamation of sites to minimise impacts. A related issue is the most appropriate location for stockpiling material i.e. at the excavation or manufacturing site or elsewhere.
- 7.2 The change in the nature of brick manufacturing to large scale automated plants has led to a requirement for different sources of clays to enable their blending to produce a variety of products. Additionally, in order to develop or maintain new or existing brick manufacturing plants, NPPF requires that the level of investment needed should be supported by a land bank of sufficient permitted reserves (at least 25 years' worth).
- 7.3 Brick clay resources within the Plan area are currently and are likely to continue to be called upon to supply plants in adjoining authorities throughout the Plan period. Material from Mouselow Quarry supplies a brickworks at Denton, east Manchester and material from Waingroves Quarry supplies three brickworks, two in Leicestershire and one in Nottinghamshire. The importance of maintaining these supplies is identified as a strategic cross border issue, which we need to have regard to under the

‘Duty to Co-operate’. In developing our strategy for brick clay provision, we will need to ensure that such movements are appropriately taken into account.

7.4 The Plan will need to recognise the importance of fireclay and make provision for its extraction in association with surface coal working.