

Local Development Framework for Bradford

Core Strategy

Minerals Evidence Base Report

October 2011



City of Bradford MDC

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1.0 INTRODUCTION

- 1.1 This document is intended to support the development of the Minerals elements within the draft Core Strategy by providing a summary of the evidence which has been used to inform the development of the draft minerals policies. The document should be read in conjunction with the draft Core Strategy consultation document.
- 1.2 The report is set out in sections summarising the evidence which has been considered in respect of the relevant national planning policies, evidence of the spatial distribution of the resources within the District, the economic demand for those resources, feedback from earlier rounds of consultation, consideration of cross-boundary issues and an assessment of the current context of minerals development within the District.
- 1.3 If you consider that any important pieces of evidence have been missed or that any items of evidence which have been considered have been misinterpreted please utilise the consultation period to submit your suggestions on how the evidence should be reinterpreted or what additional evidence should be collected or considered.

2.0 POLICY CONTEXT

2.1 National Minerals Policies

2.1.1 National minerals planning policy is set out in Minerals Planning Guidance Notes (MPGs) and the new replacement Minerals Policy Statements (MPSs). The key national policy document relevant to the forward planning of minerals in the Bradford District is **Minerals Policy Statement 1: Planning and Minerals** (MPS1) published in 2006. MPS1 sets out the Government's key overarching policies and principles relating to planning for the supply of all minerals, applying the principles of sustainable development.

2.1.2 The key policy objectives in MPS1 are:

- to secure adequate and steady supplies of minerals needed by society and the economy within the limits set by the environment;
- to ensure the prudent, efficient and sustainable use of minerals and recycling of suitable materials;
- to conserve mineral resources through appropriate domestic provision and timing of supply;
- to encourage the use of high quality materials for the purposes for which they are most suitable;
- to safeguard mineral resources as far as possible;
- to protect internationally and nationally designated areas of landscape value and nature conservation importance from minerals development;
- to protect and seek to enhance the overall quality of the environment once extraction has ceased, through high standards of restoration.

2.2 National Aggregates Policy

2.2.1 Annex 1 to MPS1 sets out national planning policy on the provision of aggregates. A quantitative approach to aggregate supply is adopted, based upon sub-regional apportionments, with the objective being to maintain a landbank amounting to at least 7 years supply for sand and gravel and at least 10 years supply for crushed rock. MPS 1 advises that Mineral Planning Authorities (MPAs) should make sufficient site allocations to provide for the sub-regional apportionment of the current National and Regional Guidelines for land-won aggregate¹.

2.2.1 Sub-regional apportionments were previously made by the Regional Planning Body through the Regional Spatial Strategy (RSS) acting on advice from Regional Aggregates Working Parties (RAWP). However this regional level managed aggregate provision framework no longer existing as a consequence of recent planning reforms. At the time of writing this report no formally agreed arrangements have been put in place within the Yorkshire and Humber Region for the sub-regional apportionment of the 2005-2020 aggregate provision guidelines.

¹ Department for Communities and Local Government, 2009. *National and regional guidelines for aggregates provision in England 2005-2020*.

2.3 National Building Stone Policy

2.3.1 Annex 3 to MPS1 sets out national planning policy on the provision of natural building and roofing stone. The key policy messages in MPS1 Annex 3 are:

- safeguarding will be most appropriate where stone is believed to be scarce in terms of its technical properties and/or aesthetic characteristics, or has been identified as having characteristics which match those required for repair and preservation purposes;
- important historic quarries should be safeguarded where it can be shown that the quarry could provide stone for the repair of historic buildings or monuments;
- small-scale extraction of building stone might be sustainable at, or close to, relic quarries, which have been designated in respect of industrial archaeology, wildlife and geological conservation, where small-scale extraction would contribute to repair of historic buildings without compromising the requirement to protect designated sites;
- Mineral Planning Authorities (MPAs) should have regard to the local, regional and national need for certain building and roofing stones for the conservation and restoration of England's historic built environment;
- MPAs should have regard to the local, regional and national need for certain building stones for new construction, where their use is specified because of proven durability, aesthetic or technical properties and any design requirements set out in local design guides, planning policies and supplementary planning documents;
- MPAs should identify quarries of importance to built heritage, whether disused or active, and describe the approach to be taken to these in terms of minerals and other planning applications.

2.4 National Fireclay Policy

2.4.1 Although there is no specific national policy guidance on fireclay, annex 2 to MPS1 relates to the supply of clay for brick manufacturing, including fireclays. Annex 2 of MPS1 advises that:

- MPAs should safeguard acceptable sources of etruria formation clays and fireclays from other types of development and should, where practicable, encourage prior extraction of clay where built development is planned;
- consideration should be given to stockpiling fireclay where a market for its use cannot immediately be found;
- MPAs should encourage coal producers to make the best possible use of fireclay reserves so that it remains available for use rather than being replaced in the void during site restoration.

2.5 National Coal Policy

2.5.1 **Minerals Planning Guidance 3: Coal mining and colliery spoil disposal** (MPG3), published in 1999, sets out national policy advice on Coal Mining. MPG3 indicates that the planning system should not seek to predetermine the appropriate levels of coal to be produced by underground or opencast mining but that instead MPAs should determine the acceptability of individual projects in accordance with the

principles of the planning system. However MPG3 also advises that MPAs should indicate any areas where coal extraction may be acceptable in principle, or where coal resources should be safeguarded, by including in development plans, where appropriate, broad areas of search and/or the extent of the shallow coalfield and the constraints within that area.

- 2.5.2 MPG3 also advises that opencast sites provide one of the few viable sources of fireclay and every opportunity to recover fireclay from a proposed coal working should be examined, provided that the site can be properly restored and the overall proposal meets the tests contained in MPG3.
- 2.5.3 An Energy White Paper² published by the previous government in 2007 emphasised the importance of maintaining access to economically recoverable indigenous coal resources. However the new government have not yet set out their policy position on the exploitation and safeguarding of indigenous coal resources and therefore the only relevant national policy guidance on planning for coal supply remains MPG3.

² Department of Trade and Industry, 2007. *Meeting the Energy Challenge A White Paper on Energy*.

3.0 EVIDENCE BASE – SAND AND GRAVEL

3.1 Regional Sand and Gravel Issues

- 3.1.1 The Regional Planning Body (RPB) (now abolished) previously estimated that there was a 32 million tonne shortfall in the permitted reserves of sand and gravel in the Yorkshire and Humber Region to meet the apportionments likely to be set by the government up to 2021³. The RPB commissioned a series of reports to inform their policy response to this shortfall. The British Geological Society (BGS) published a phase 1 study in 2004⁴. This first phase helped to identify the extent of sand and gravel resources within the Region and how these relate to environmental constraints. Sand and gravel deposits were identified within the Bradford District within the flood plains of the rivers Aire and Wharfe.
- 3.1.2 Following on from the BGS study, a phase 2 study was published in late 2007⁵. The phase 2 study developed and appraised spatial options for revised sub-regional apportionments of sand and gravel to address the shortfall in permitted reserves. The recommendation of the phase 2 study was that the proportion of sand and gravel supply met by sand and gravel resources located within South and West Yorkshire should be substantially increased, with a 3 fold increase in the West Yorkshire sub-regional apportionment.
- 3.1.3 A number of local authorities including Bradford Council raised concerns about the viability of increasing sand and gravel extraction within West Yorkshire to the levels recommended in the phase 2 report. In response to this the RPB commissioned BGS to carry out a consultation exercise with the sand and gravel extraction industry. A report collating the views expressed by representatives of the 4 largest companies operating sand and gravel extraction sites within the Region was published in June 2009⁶.
- 3.1.4 In summary the findings of the report were:
- The industry estimate that the amount of potentially viable sand and gravel within West Yorkshire, is between 90 – 96% lower than was estimated in the phase II study.
 - Only sites containing 1-1.5 million tonnes of sand and gravel (taking up 10-25ha of land) would be likely to be economically viable. Much of the potentially viable sand and gravel resource within West Yorkshire is divided by rivers, canals, railways and roads therefore there are only likely to be a very small number of viable sites.

³ British Geological Survey, 2004. *Yorkshire and Humber Regional Aggregates Working Party: Sand and Gravel Study*.

⁴ *Ibid*

⁵ Land Use Consultant, 2007. *Phase 2 Sand and Gravel Study for Yorkshire and Humber Appraisal of Apportionment Options*.

⁶ British Geological Survey, 2009. *West Yorkshire sand and gravel resources: Investigating the potential for an increased sub-regional apportionment*.

- The Wharfe Valley is considered to have some of the largest areas of unworked high quality sand and gravel in the region; however the industry regard it as unviable for new extraction sites due to the proximity of landscape/ environmental designations coupled with the potential for relatively strong opposition from local communities.
- The industry have identified 5-10 potential sites for sand and gravel extraction within West Yorkshire; however issues relating to access, environmental, hydrological, and/or planning restrictions are considered too problematic relative to the volumes and quality of reserves to merit developing any of them.

3.1.5 A final recommendation on possible revisions to the sub-regional sand and gravel allocations was to be considered by the RPB and taken forward in the development of an Integrated Regional Strategy. However subsequent to the change in national government and the intended revocation of regional level development plans it is unclear how future sub-regional aggregate apportionments will be made. The interim approach taken in the most recent annual report of the Yorkshire and Humber Regional Aggregates Working Party⁷ is to simply plan for a continuation of current supply levels.

3.2 Evidence of Current Supply Levels

3.2.1 The **Yorkshire and Humber Regional Aggregates Working Party (RAWP)** is a body composed of representatives of minerals planning authorities and the extractive industry within the Yorkshire and Humber region with the purpose of monitoring aggregate and sand and gravel reserves and output within the Region. A monitoring report is published annually, which quantifies the length of sub-regional landbanks and describes any detected significant changes or trends in reserve levels or mineral output within the Region.

3.2.2 The RPB previous split Yorkshire and the Humber into 4 sub-regions for minerals planning purposes: North Yorkshire, West Yorkshire, South Yorkshire and Humber. The aggregate provision apportionment allocated to the Region by national government was then divided between the sub-regions by the RPB. Minerals Planning Authorities were expected to plan to provide for sufficient permitted reserves to allow the sub-regional apportionments to be met. The method used to assess whether sufficient reserves are available to allow the sub-regional apportionments to be met were landbanks calculated by the RAWP through the annual monitoring reports. A landbank is equal to the number of years it would take for permitted reserves to be exhausted if the target sub-regionally aggregate supply levels were to be achieved.

3.2.3 As discussed in section 3.3 below the 2009 RAWP report does not contain landbanks based upon the nationally allocated aggregate

⁷ Yorkshire and Humber Region Aggregates Working Party, 2011. *Annual Report 2009 Aggregates Monitoring 2009*.

provision apportionments. Furthermore, due to the low level of output from West Yorkshire, no landbank at all has been produced for West Yorkshire, only a combined West and South Yorkshire figure.

- 3.2.4 Although no sub-regional landbank has been calculated the 2009 RAWP report does contain sufficient information to understand current supply levels within West Yorkshire. The 2009 RAWP report indicates that the permitted reserves of sand and gravel within West Yorkshire were 0.33 million tonnes as of 31 December 2009. These reserves are located at 1 site within the neighbouring District of Leeds and are currently being worked at a rate of 52,000 tonnes per year. Therefore, at the current rate of output, if no further reserves of sand and gravel are permitted in the meantime, sand and gravel reserves within the sub-region will be exhausted by the end of 2007.

3.3 Evidence of Economic Need for Sand and Gravel

- 3.3.1 The economic need for aggregates is quantified by national government through a published series of guidelines for aggregate provision which predict future demand for aggregates over 16 year periods. The guidelines apportion set levels of aggregates to be produced within each region to meet the demands of the construction industry, allowing for predicted increases in the contribution made by recycled and secondary aggregates. In the past the regional apportionments were then broken down to a sub-regional level by Regional Planning Bodies.
- 3.3.2 Within West Yorkshire the most recent sub-regional apportionments made within the Yorkshire and Humber Region were of the National and Regional Guidelines for Aggregates Provision in England 2001-2016. These sub-regional apportionments were made by the RPB within the Yorkshire and Humber Plan (2008). The sub-regional apportionment used a simple methodology based upon average sales figures for aggregates from each sub-region over the period 1997-2001 adjusted to provide for the level of output necessary to meet the regional apportionment. This apportionment method resulted in West Yorkshire being apportioned to supply of 0.34 million tonnes of sand and gravel per year (7.5% of the Regional total).
- 3.3.3 The updated Regional Guidelines for Aggregates Provision in England: 2005-2020, published in June 2009, superseded the regional apportionments made in the 2001-2016 guidelines. The updated figures increased the Regional sand and gravel supply apportionment by 7% from the 2001-2016 apportionment. It was previously the job of the RPB to adjust the sub-regional apportionments within the Yorkshire and Humber to provide for the increased regional apportionment.
- 3.3.4 Asides from the general slight increase in sub-regional apportionments which would be necessary to respond to the increased regional apportionments the RPB were also considering significantly increasing the share of sand and gravel supply that should be borne by West and

South Yorkshire to provide for a more sustainable distribution of sand and gravel extraction sites (see section 3.1 above). However the RPB has now been abolished and legislation is currently progressing through parliament which would result in the revocation of the Yorkshire and Humber Plan and therefore it is currently unclear how sub-regional apportionments will be made in the future.

3.3.5 The RAWP have taken the approach that, in the interim before a new system for sub-regionally apportioning the nationally allocated regional apportionments for aggregates provision has been devised, it will calculate indicative landbanks based on a continuation of current output levels (averaged out over a 7 year period). However unfortunately due to the low level of output from West Yorkshire average 7 year sales from the sub-region could not be disclosed for commercial confidentiality reasons therefore no separate indicative landbank for West Yorkshire has been included in the 2009 annual monitoring report.

3.3.6 This interim approach merely plans for a continuation of historic supply patterns and does attempt to provide for any redistribution of extraction to West and South Yorkshire from other part so the Region. Furthermore, as historic supply levels within the Region have fallen significantly below the guideline apportionments allocated by the government, the maintenance of landbanks based upon the figures adopted within the 2009 RAWP would result in an under provision of the nationally apportioned Yorkshire and Humber figure for land won sand and gravel supply by 755,000 tonnes p.a, see table 1 below.

Table 1

	Reserves 31/12/2009	Sub-regional Apportionment of 2005-2020 Guideline Figures (based on historic shares)	Average Sales (2003-2009)	Shortfall
North Yorkshire	18.42	2.96	2.50	0.46
South Yorkshire	5.36	0.65	0.55	0.10
West Yorkshire				
East Riding and North Lincolnshire	10.83	1.26	1.07	0.20
Yorkshire and Humber	34.61	4.88	4.12	0.76

Note: All figures quoted in millions of tonnes

3.3.7 Although no sub-regional apportionments have been made it is possible to calculate the length of the regional landbank of sand and gravel based upon the reserve figures contained in the 2009 RAWP report and the 2005-2020 guideline figures, see table 2 below:

Table 2

	Reserves 31/12/2009	Sub-regional Apportionment of 2005-2020 Guideline Figures (based on historic shares)	Landbanks (based on 2005-2020 National Guidelines)
North Yorkshire	18.42	2.96	6 years 3 months
South Yorkshire	5.36	0.65	8 years 2 months
West Yorkshire			
East Riding and North Lincolnshire	10.83	1.26	8 years 7 months
Yorkshire and Humber	34.61	4.88	7 years 1 month

Note: All figures quoted in millions of tonnes

3.3.8 In summary, although no sub-regional apportionment of the current national aggregate provision guidelines has been made, the evidence is clear that significant additional reserves of sand and gravel will need to be permitted within the Yorkshire and Humber Region within the plan period and that West Yorkshire is currently only making a very small contribution to achieving the guideline aggregate provision levels.

3.4 Historic Evidence of Sand and Gravel Extraction

3.4.1 BGS data and historical records indicate that commercial sand and gravel extraction last took place within the Bradford District in the 1950s at two sites: Ben Rhydding, adjacent the River Wharfe east of Ilkley, and Goose Eye, adjacent to Dean Beck/ North Beck west of Keighley. However following the closure and restoration of these sites in the 1960s the planning authority have no further records of any commercial scale extraction of sand and gravel taking place within the District.

3.5 Evidence of the Location of Potential Resources

3.5.1 Data on potential sand and gravel resources within the Region is provided by the British Geological Survey (BGS) through their 1:100,000 scale digital mineral resource maps⁸. The resource areas shown on these maps have generally been inferred from available geological information and have not been evaluated by drilling or other sampling methods. The boundaries of the inferred resources are therefore approximate and the economic viability of the resources is unproven and variable. Figure 1 below shows the areas of potential sand and gravel resources within the District mapped by BGS.

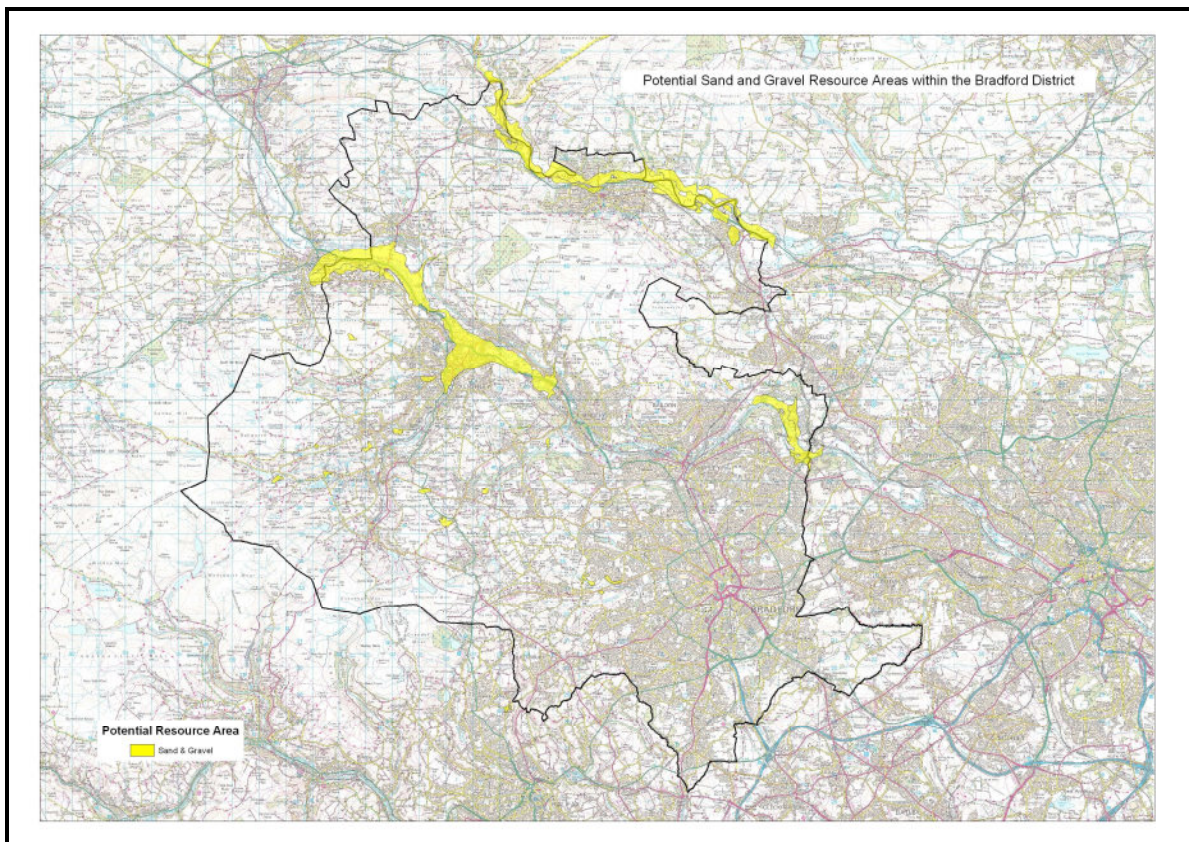
3.5.2 The largest potential sand and gravel resource shown within the District is an area of inferred sub-alluvial river terrace deposits located adjacent to the western stretch of the river Aire between Steeton and Crossflats and adjacent to the northernmost stretch of the river Worth at its confluence with the river Aire. However a large proportion of this potential resource appears to be heavily constrained by urban

⁸ British Geological Survey, 2009. Mineral Resource Data for City of Bradford MDC 1:100,000 scale (DiGMapGB-100) data [CD-Rom], Version 1_0

development in and around Keighley. River terrace deposits, both exposed and sub-alluvial, are also mapped adjacent to the river Aire in the area east of Esholt; this potential resource area appears to be predominantly located within the site of the Esholt Waste Water Treatment Works and therefore is potentially less constrained by other forms of development.

3.5.3 Inferred sub-alluvial and exposed river terrace sand and gravel deposits are also mapped by the BGS adjacent to the river Wharfe between Addingham and Burley in Wharfedale. Previous working of sand and gravel resources in this part of the Wharfe Valley has been recorded both at the Ben Rhydding gravel pits, east of Ilkley, and a site at West Hall east of Addingham (outside of the District). The resources adjacent to the Wharfe appear to be constrained by urban development at Ilkley and Addingham. The 2009 BGS industry consultation⁹ exercise found that the sand and gravel industry view the prospect of opening new extraction sites within the Wharfe Valley as being problematic, due to both the proximity of landscape/ environmental designations and the potential for relatively strong opposition from local communities.

Figure 1



(Plan produced by CBMDC; resource area derived from British Geological Survey data)

⁹ British Geological Survey, 2009. *West Yorkshire sand and gravel resources: Investigating the potential for an increased sub-regional apportionment.*

4.0 EVIDENCE BASE – SANDSTONE (AGGREGATES)

4.1 Evidence of Current Supply Levels

4.1.1 The 2009 Yorkshire and Humber RAWP Annual Report indicated that the permitted reserves of crushed rock aggregate within West Yorkshire were 27 million tonnes at the end of 2009¹⁰. Subsequently planning permission has been granted for a 10 million tonne quarry extension within the District of Wakefield in January 2011. Descriptively the RAWP report stated that “There are high levels of reserves throughout the region except in the East Riding and North Lincolnshire”.

4.1.2 The stated sales of crushed rock aggregate from West Yorkshire during 2009 were 0.9 million tonnes. Based upon the assumption that the level of sales has remained consistent during 2010/2011, and that there have been no significant increases in permitted reserves other than the Wakefield quarry extension, it can be estimated that reserve levels within West Yorkshire at the end of June 2011 are likely to have been approximately 36 million tonnes.

4.2 Evidence of Economic Need for Crushed Rock Aggregate

4.2.1 As with sand and gravel, the need for crushed rock aggregate is quantified through the National and Regional Guidelines for Aggregates Provision in England: 2005-2020. Sub-regional apportionments have previously been made by the RPB. The previously set sub-regional apportionment for the supply of crushed rock aggregates from West Yorkshire equated to 1.11 million tonnes per annum; however this apportionment was based on the predecessor to the current National and Regional Guideline figures.

4.2.2 The 2005-2020 Yorkshire and Humber crushed rock apportionment was reduced by 4% from the 2001-2016 figure. If the same simplistic methodology is adopted, of basing sub-regional apportionments on historic sub-regional output shares, the adjusted annual apportionment for West Yorkshire would be adjusted to 1.17 million tonnes. The landbank length for West Yorkshire based upon output increasing to guideline levels would be 23 years 64 months, see table 3 below:

¹⁰ Yorkshire and Humber Region Aggregates Working Party, 2011. *Annual Report 2009 Aggregates Monitoring 2009*.

Table 3

	Reserves 31/12/2009	Average Sales (2003 - 2009)	RAWP 2009 Landbank	Sub-regional Apportionment of 2005-2020 Guideline Figures (based on historic shares)	Landbanks (based on 2005- 2020 National Guidelines)
North Yorkshire CC	103.90	3.67	28.30	4.46	23.28
Yorkshire Dales N P	106.24	3.70	28.70	4.49	23.66
South Yorkshire	63.41	2.30	27.50	2.80	22.67
West Yorkshire	27.14	0.96	28.30	1.17	23.30
East Riding	1.71	0.28	6.20	0.34	5.09
Yorkshire and Humber	302.40	10.91	27.73	13.25	22.82

Note: All figures quoted in millions of tonnes

4.2.3 Based on the assumptions described in paragraph 4.1.2 the landbank length at the end of June 2011 is likely to have been approximately 30 years and 9 months. This is three times the length recommended in Minerals Policy Statement 1.

4.3 Evidence of the Economic Value of Aggregate Resources within the District

4.3.1 Crushed rock aggregates are essential for a wide range of construction activities. Statistics quoted in the British Geological Society (BGS) Minerals Yearbook 2009 (see table 4 below), indicate that the primary economic use for crushed rock aggregate produced in England during 2008 was for road surfacing and concrete production, with a significant proportion also being used for unstipulated lower specification uses such as engineering fill. Both concrete and roadstone applications require aggregates which conform to certain specifications in relation to water absorption, resistance to abrasion (AAV) and resistance to polishing (PSV).

Table 4 – End-Uses for Crushed Rock Produced in England in 2008

End-Use	Roadstone	Railway Ballast	Concrete	Other (including fill)	Armorstone & Gabion Walling	Total
Thousands of Tonnes	30,628	2,248	16,928	24,923	450	75,177
Percentage	41%	3%	23%	33%	1%	100%

(source: British Geological Survey, 2010. United Kingdom Minerals Yearbook 2009)

4.3.2 The BGS Minerals Planning Factsheet for Construction Aggregates (2007) indicates that a reasonable gauge of the suitability of a rock for use as a construction aggregate is its water absorption characteristics; with good quality aggregates generally requiring water absorption of less than 2% and concrete grade aggregate requiring less than 1%. The properties of the principle sandstone units within the District were assessed in a study reported within a 1996 BGS Technical Guide to Ground Conditions¹¹ and technical data on several of the worked

¹¹ British Geological Survey, 1996. *A geological Background for Planning and Development in the City of Bradford Metropolitan District, Volume 2: A Technical Guide to Ground Conditions*. BGS: Nottingham.

sandstone resources within the District is also available on the Building Research Establishment British Stone List¹². These data indicate that sandstone resources within the district have water absorption values significantly in excess of 2% which would imply they are unsuitable for higher specification uses.

- 4.3.3 The assumption that the sandstones within the District are of low economic value is substantiated by comments made in the 1996 BGS Technical Report which stated that “In general, the Carboniferous sandstones in Yorkshire are too weak and porous and susceptible to frost damage for them to be used for good quality roadstone or concrete aggregate”¹³. This is further corroborated by a government commissioned 2004 report on high specification aggregates which states that, “most Upper Carboniferous formations tend to possess very limited resistance to impact, crushing, abrasion and weathering, and therefore do not meet HSA [High Specification Aggregates] requirements”¹⁴.
- 4.3.4 Therefore the evidence indicates that in general, the relatively coarse grained Upper Carboniferous sandstones, which represent the majority of the resource within the District, whilst highly suited to producing strong, durable building and paving stones, are generally unsuitable for high specification aggregate applications such as road construction and concrete manufacture. The crushed sandstone aggregates which are produced within the District, as an ancillary operation to building stone quarrying, are likely to be primarily suitable for relatively low specification uses such as bulk and selected fill materials. Such low specification aggregate uses are likely to offer good opportunities for the substitution of primary aggregates with recycled and secondary aggregates (RSA) and therefore any increase in the production of aggregates from Bradford may reduce such opportunities and be detrimental to the relative competitiveness of RSA.

4.4 Evidence of the Location of Potential Resources

- 4.4.1 Data on sandstone resources within the region potentially viable for aggregate production are provided by the BGS through their 1:100,000 scale digital mineral resource maps¹⁵. The BGS data show extensive potential sandstone resources located in numerous distinct pockets in a central band across the District; see figure 2 below. The central band of sandstone resources extends north from Queensbury and Bradford City Centre up to Morton Moor, to the north of Riddlesden/ East Morton. The only parts of the District shown not to contain any pockets

¹² Available online at <http://projects.bre.co.uk/ConDiv/stonelist/stonelist.html>

¹³ British Geological Survey, 1996. *A geological Background for Planning and Development in the City of Bradford Metropolitan District, Volume 2: A Technical Guide to Ground Conditions*. BGS: Nottingham, page 37.

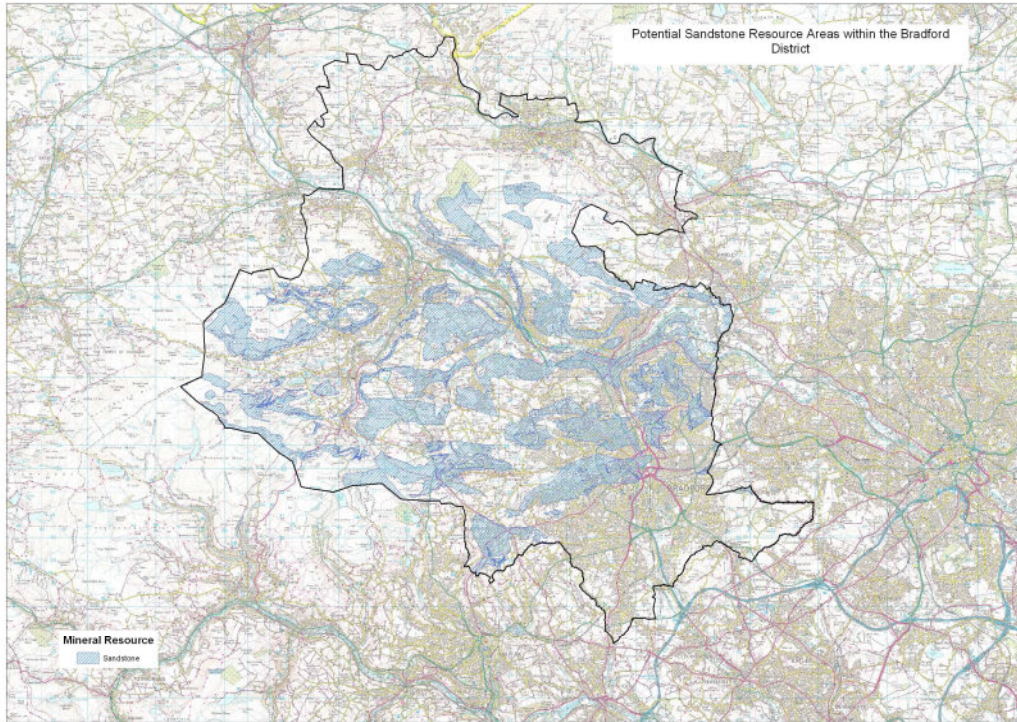
¹⁴ Capita Symonds, 2004. *The Sustainable Use of High Specification Aggregates for Skid-Resistant Road Surfacing in England*. Capita Symonds: East Grinstead, page 4.

¹⁵ British Geological Survey, 2009. Mineral Resource Data for City of Bradford MDC 1:100,000 scale (DiGMapGB-100) data [CD-Rom], Version 1_0

of sandstone resources are the south-eastern corner and the far rural north of the District.

Figure 2

(Plan produced by CBMDC; resource area derived from British Geological Survey data)



5.0 EVIDENCE BASE – SANDSTONE (BUILDING, ROOFING AND PAVING STONE)

5.1 The Symonds Report

- 5.1.1 In March 2004 the government published a report by the Symonds Group on the planning issues relevant to the supply of natural stone building materials, a document which became known as the Symonds Report¹⁶. The report was the culmination of a research project, utilising survey work, analysis of published statistics and case studies, which looked into the issues affecting the supply of building and roofing stone in England and Wales. Demand was discussed but not quantified, due to the variability and unpredictability of building stone markets.
- 5.1.2 The Symonds Report found that the majority of quarries are relatively small scale, under 3 hectares in area, with relatively low output, producing less than 2,000m³ of building stone products per annum, and are often only worked intermittently. However the majority of production is concentrated within a small number of larger and more intensive operations.
- 5.1.3 The report highlighted the significance of carboniferous sandstones in terms of building and roofing stone production, which account for both the largest number of individual quarries and the highest level of output. The importance of Yorkshire, in terms of the supply of carboniferous sandstones, commonly known as Yorkstone, is particularly noted.
- 5.1.4 The supply data analysis indicated that there was a generally slowly rising trend in building and roofing stone production in England and Wales in the period from 1992 to 2001. Subsequent BGS Minerals Yearbooks appear to indicate that this general rise in building and roofing stone production continued until 2005; however production fell in 2006 and 2007, with output in 2007 returning to similar levels to 2003¹⁷.
- 5.1.5 The Symonds Report notes that most successful building stone quarries tend to concentrate on the production of blockstone and/ or naturally riven flagstones, and that roofing stone production appears to have declined as a consequence of a number of factors including:
- the bedding characteristics of the resources which continue to be worked;
 - the incompatibility of roofing stone production with modern quarrying techniques;
 - the relatively low and unsteady demand for roofing stone.

¹⁶ Symonds Group, 2004. *Planning for the Supply of Natural Building and Roofing Stone in England and Wales*

¹⁷ British Geological Society, 2009. *United Kingdom Minerals Yearbook 2008*

- 5.1.6 The report highlighted that the proportion of building and roofing stone demand being met by imports increased dramatically over the period between 1992 and 2001; with imports being 14% greater than domestic production in 1992 but 200% greater by 2001. Imports are stated to be the perceived biggest threat to the UK building stone industry. In particular sandstone from India and China is noted to be competing directly with materials such as Yorkstone paving at less than half the price.
- 5.1.7 However the data for building and roofing stone imports quoted in the Symonds Report should be treated with caution. The BGS Minerals Yearbook 2008 indicates that the disproportionately high figure quoted for unworked granite imports prior to 2006 (which accounted for 74% of total imports) may have been due to a reporting error. The most recent BGS Minerals Data indicates that a total of 1,459,000 tonnes of worked and unworked building and dimension stone were imported into the UK in 2007, including 323,000 tonnes of unworked sandstone and 297,000 tonnes of worked paving and flagstones. The figure for the domestic production of sandstone building and dimension stone within Great Britain in 2007 was 419,000 tonnes, with total building and dimension stone production from all types of minerals at 790,000 tonnes¹⁸.
- 5.1.8 Because the figures for imports include Northern Ireland and the production figures only account for Great Britain they are not directly comparable, however it is clear that imports substantially exceed domestic production. In terms of sandstone an unrecorded proportion of the worked flag and paving stones imported into the UK are composed of sandstone. If half of the worked paving and flag stone is assumed to be sandstone (148,500) and Northern Ireland is assumed to account for 20% of UK imports then the total figure for sandstone imports to Great Britain would be 377,000 tonnes, which was 90% of domestic production in 2007.
- 5.1.9 The Symonds Report concludes that the widespread use of artificial and imported materials, where local sources of building or roofing stones are either no longer available or unable to win competitive contracts, provides evidence that demand for building and roofing stone in England and Wales is “potentially somewhat greater than the current supply from indigenous sources”¹⁹. However it is acknowledged that the ‘unfulfilled’ element of demand cannot easily be quantified.

5.2 Local Distinctiveness and Protection of Heritage

- 5.2.1 The need for materials for the repair, alteration or extension of historic and culturally important buildings within the district, such as listed buildings and many buildings within Conservation Areas, is less significant than new build in terms of sales but of key importance in

¹⁸ British Geological Society, 2009. *United Kingdom Minerals Yearbook 2008*

¹⁹ Symonds Group, 2004. *Planning for the Supply of Natural Building and Roofing Stone in England and Wales*. p.54.

terms of the maintenance of the character of the traditional built environment of Bradford.

- 5.2.2 To inform the development of minerals policies the Council's Design and Conservation Team have produced a report discussing the relationship between the built heritage of the district and the availability of minerals resources²⁰. The report notes that the character of the settlements within Bradford and the 'sense of place' of the inhabitants is primarily derived from the use of local building stone materials and that the use of artificial stone, brick or contrasting materials can dilute local character and result in the loss of a sense of place.
- 5.2.3 The report goes on to note that there are only a limited number of operational quarries supplying building stone with appropriate aesthetic characteristics for use within the District. The scarcity of supply of coarse grained 'gritstone' walling, suitable for use in settlements to the north of the district, and stone slate roofing are particularly highlighted. Concerns are raised that the natural stone materials currently imported from outside the district can have subtly different aesthetic characteristics to local stone, in terms of colour, texture and course thickness. The report concludes that there is a clear need for greater availability of local stone for local use, and that particular emphasis should be placed on increasing supplies of roofing stone.

5.3 Historic Buildings and Monuments

- 5.3.1 Enquiries have been made with both English Heritage and the West Yorkshire Archaeological Advisory Service (WYAS) to establish if any records exist of specific quarries within the District which may be important in supplying materials for the repair and maintenance of historic sites and monuments. English Heritage indicated that they intend to undertake a survey of building stone quarrying within West Yorkshire, but that, pending the outcome of the survey, they cannot currently provide any assistance in identifying such sites. WYAS likewise indicated that they do not hold any records of sites within Bradford which have provided material for the repair of historic sites or monuments.
- 5.3.2 The BGS are currently undertaking a Strategic Stone Survey (SSS) funded by English Heritage with the purpose of:
- identifying and describing the main building stone types;
 - identifying representative buildings and villages where the identified building stone types have been used;
 - locating and mapping all historical building stone quarries across England and identifying the type of stone produced.
- This information will be digitised and published in the form of a publically accessible online GIS database, named EBSPits. However,

²⁰ Ackroyd, J. 2008. *Identifying mineral resources in the Bradford District – local distinctiveness and protection of heritage*. (unpublished)

at a recent meeting organised by the RPB, English Heritage indicated that the Yorkshire and Humber Region would not be surveyed until August 2010 with the results being published at some unspecified later date. Therefore the SSS may not be published in time to inform the minerals safeguarding or supply policies of the Core Strategy.

5.4 Evidence for the Occurrence of Building Stone Resources

- 5.4.1 The suitability of sandstone deposits for use in the production of building, paving or roofing stones depends on a multitude of factors including the spacing of bedding planes and joints, fracturing, strength, texture and colour²¹. There can often be significant variation in 1 or more of these factors over relatively short vertical or horizontal distances across a bed of sandstone and therefore predicting the viability of potential sandstone resources for the production of natural stone building materials is problematic²². As a consequence of the difficulties of identifying and estimating new reserves there tends to be a strong general preference among the building stone industry to extend existing quarries or re-open disused quarries rather than open new greenfield sites²³.
- 5.4.2 A geographical/ geological evidence base is required in order to fulfil the spatial planning objectives set out in MPS1 of safeguarding building, roofing and paving stone resources from sterilisation and identifying potential sites or areas where building stone quarries may be permitted in the future. No distinct potential resource areas for building stone, as opposed to aggregates, are currently identified by the BGS. The general sandstone resource areas which have been identified are relatively indiscriminate, accounting for a substantial proportion of the land area of the District, see figure 2 above. It is therefore currently not possible to identify the location of those sandstone resources which have the necessary characteristics to make them suitable for building, roofing or paving stone production. The output from the English Heritage study referred to in 5.3 above may provide information which would be helpful in refining our understanding of the distribution of building stone resources; however it is unclear when this information will be available or how useful it is likely to be.

5.5 Evidence of the Spatial Scale of Building Stone Supply

- 5.5.1 Building stones, and in particular flagstones, produced within the District are thought to be sold both locally and throughout the UK for both new paving and building schemes and projects relating to the restoration or improvement of historic buildings and sites. The only current evidence on the spatial extent of markets for the building stones produced within the District is available from the local stone producers themselves. Quarry operators within the District advertise

²¹ British Geological Survey, 2007. *Minerals Planning Factsheet: Building and Roofing Stone*.

²² *Ibid*

²³ Symonds Group, 2004. *Planning for the Supply of Natural Building and Roofing Stone in England and Wales*.

that their sandstone products have been recently used in projects at nationally significant sites such as Saltaire World Heritage Site, York Minster and Buckingham Palace. Therefore the available evidence indicates the supply of natural stone products from the District has implications of more than local significance.

5.6 Delivery of the Development Plan

5.6.1 The need for natural stone building materials within the district is integrally linked to housing, built heritage and design policy objectives set out elsewhere in the Local Development Framework (LDF). The most significant element of building, roofing and paving stone demand is from new build projects, including new housing developments and public realm projects. The LDF will set out targets for housing provision within the Bradford District over the plan period. Depending upon the location of the housing and the design policies adopted by the Council, a certain proportion of the building materials required to construct these new houses will comprise natural sandstone products such as architectural masonry. Likewise design objectives are likely to require natural Elland Flag paving and decorative/ monumental stone for a certain proportion of public realm projects.

5.6.2 At this stage of the plan making process it is difficult to quantify this need for stone to deliver other policies within the LDF. However it is evident that the sustainable delivery of housing, design and public realm policies is linked to the maintenance of sufficient supplies of local natural stone building materials over the plan period. The consequence of a failure to supply demand for building, roofing and paving stone from local sandstone resources could be the haulage of natural stone building materials over long distances, with a consequent increase in environmental costs, or compromising design objectives through the use of inappropriate materials.

6.0 EVIDENCE BASE – COAL AND FIRECLAY

6.1 Fireclay

- 6.1.1 Fireclays are a type of sedimentary mudstone occurring as seatearths beneath coal seams. Fireclays were traditionally valued as a raw material for manufacturing refractories for lining furnaces. Nationally demand from refractory manufacturers has diminished and fireclay is now more commonly used for manufacturing high quality buff coloured facing bricks²⁴. However demand has continued for the extraction of the fireclay resources located to the west of the City of Bradford and east of Halifax, for the production of specialist refractory products for the glass industry. The fireclay resources suitable for this specialist use are associated with the Halifax Hard Bed coal seam which occurs within the western part of the coal measures resources present within the District²⁵. The particular highly siliceous properties of this fireclay are specifically mentioned within the BGS Minerals Planning Factsheet on Fireclay (2006).
- 6.1.2 In the past fireclay workings were widespread to the south of the District around the settlements of Denholme, Queensbury, Thornton, Tong and the south of the City of Bradford²⁶. However most of these sites appear to have ceased operating by the 1960s/ 1970s and the most recent fireclay production statistics (from 2003) indicate that the total annual output of fireclay across West Yorkshire was only 10,000 tonnes²⁷. A small-scale fireclay extraction site continued to operate within the District until 2006 at a site 2Km east of Denholme, supplying the refractory business referred to above. In April 2011 a dormant fireclay extraction site located within the District was reactivated. It is unclear to what use the remaining fireclay reserves intended to be extracted from the site will be put.
- 6.1.3 There is very little evidence of a current economic demand in for the fireclay resources present within the District. In terms of demand from the brick making industry, all brickworks previously located within the District have closed and there is no current evidence of any economic interest in the fireclay resources from the District for brick making. In terms of the specialist demand for the highly siliceous fireclays present within the western part of the District for refractory products, the only refractory business which has utilised these resources in recent times has verbally indicated that they do not intend to open any further sites within the District following the closure of the site east of Denholme. The BGS Minerals Planning Factsheet on fireclay advises that future

²⁴ British Geological Survey, 2006. *Minerals Planning Factsheet: Fireclay*.

²⁵ British Geological survey, 1996. *Applied Geology of the Bradford Area; Map 2b: Bedrock Geology Map*

²⁶ Historical minerals workings data gathered using British Geological Survey, *Minerals Information Online* (accessed January 2009)

²⁷ British Geological Survey, 2006. *Minerals Resource Information in Support of National, Regional and Local Planning: West Yorkshire*.

opportunities for fireclay recovery is likely to be dependant upon the extraction of other minerals, primarily coal²⁸.

6.1.4 In terms of evidence of the geographical spread of fireclay resources within the District, the BGS have not defined any distinct fireclay resource area. However fireclays only tend to occur as seatearths beneath coal seams and therefore the shallow coal resource areas defined by the BGS can be used as a general indicator of the parts of the District within which fireclays are likely to be located, see figure 3 below. The suitability of a fireclay for a specific purpose is highly dependant upon the particular fireclay seam's quality, purity and composition and therefore it cannot be assumed that all fireclays within the shallow coal resource area are of economic value. There is no available geological evidence to identify just those parts of the fireclay resource within the District which are of economic value.

6.2 Coal

6.2.1 There has been widespread historic deep mining of coal within the District; however opencast mining has been relatively limited and confined to the far east of the District in the area of open land surrounding Tong. There are currently no active deep or opencast coal mines within the district. Both minerals industry bodies and the Coal Authority were consulted on the previous minerals topic papers; however no evidence has come forward of any current economic interest in the mining of the coal resources present within the District. However a 2006 BGS report on minerals planning within West Yorkshire advised that "prospects for opencast coal remain"²⁹.

6.2.2 The coal resource within the District primarily comprises the lower (older) part of the Westphalian A (Langsettian) coal measures geological series³⁰. The methodology report supporting the 2006 BGS coal resource mapping exercise³¹ identifies primary, secondary and tertiary coal resource areas. Primary areas are stated to constitute the main target for opencast coal extraction, comprising a relatively closely spaced succession of variable but generally thick coals resource areas. Secondary coal resource areas are described as containing coals which are generally thinner and less concentrated in vertical and areal distribution and therefore generally less viable for large scale opencast mining.

6.2.3 The 2006 BGS resource appraisal methodology report identifies the base of the primary coal resource within the West Yorkshire Coalfield as being the Better Bed Band Coal with the remainder of the underlying coal measures formation identified as a secondary resource. The BGS bedrock geology map of the District indicates the Better Bed only

²⁸ See pages 2&3 of the British Geological Survey, 2006. *Minerals Planning Factsheet: Fireclay*

²⁹ British Geological Survey, 2006. *Minerals Resource Information in Support of National, Regional and Local Planning: West Yorkshire*. P. 10.

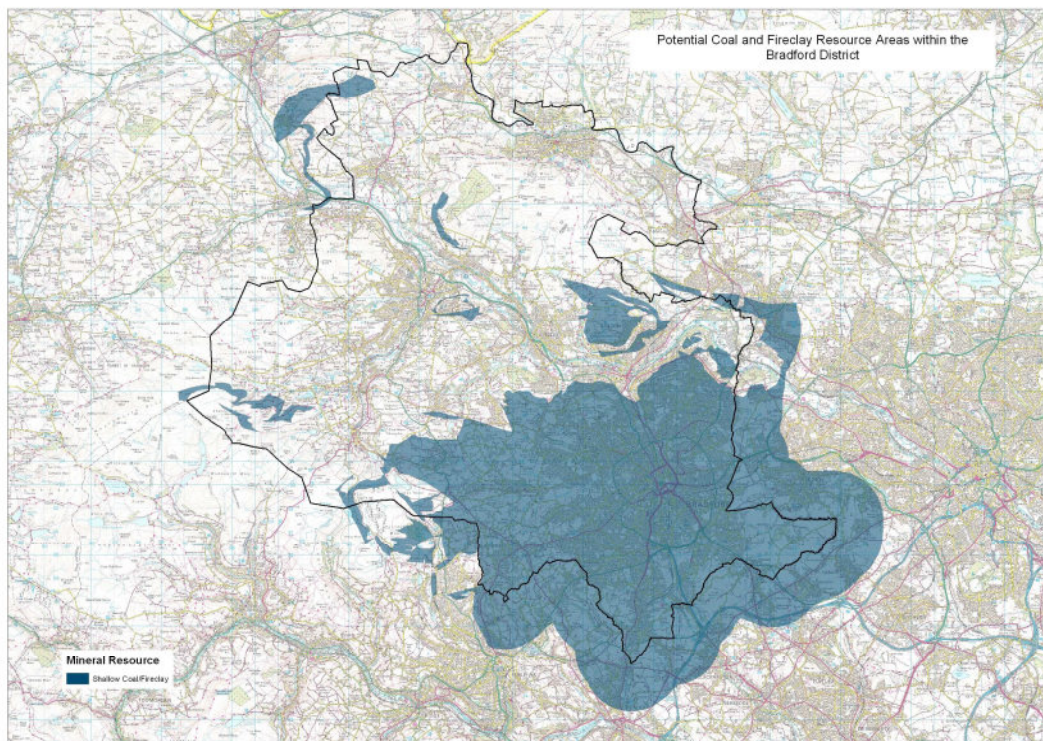
³⁰ British Geological Survey, 1996. *Applied Geology of the Bradford Area: Bedrock Geology Map*.

³¹ British Geological Survey, 2006. *Coal Resource Appraisal Maps: methodology and datasets used*.

occurs within the south-eastern part of the Elland Flag series present within the District.

6.2.4 The BGS have provided a coal resource map which differentiates between the parts of the coal resource present within the district which are thought to constitute primary, secondary and tertiary coal beds. This map corroborates the assumption that only the southern and eastern part of the coalfield identified by the Coal Authority is a primary coal resource which would be likely to be viable for future extraction. Figure 3 below shows the full extent of the theoretical coalfield within the District undifferentiated according to quality. A plan illustrating the division of this resource between primary, secondary and tertiary coal resources was not available at the time of publication.

Figure 3



(Plan produced by CBMDC; resource area derived from Coal Authority data)

6.2.5 In order to support the development of safeguarding policies an analysis was undertaken of the likely scale of viable opencast coal workings. This analysis revealed that 65% of the 23 new opencast sites granted planning permission between 2004 and 2008 had a site area of over 50 hectares; only 3 of the new sites (13%) had a site area below 10 hectares and 1 below 5 hectares.³² Based on these statistics it seems to be a reasonable assumption that prior extraction of coal is highly unlikely to be viable on smaller development sites of less than 1 hectare.

³² Information obtained from British Geological Survey, 2009. *Coal: Opencast coal mining statistics*. Available online at: <http://www.bgs.ac.uk/mineralsuk/minequar/coal/occ/home.html>

7.0 CONSULTATION FEEDBACK

7.1 Responses to Initial Topic Paper

7.1.1 The consultation for the development of minerals policies to be included within the Core Strategy has taken place in 3 stages. An initial topic paper was published in February 2007. The response from this consultation was limited to comments from non-industry stakeholders, in summary the comments were:

- Extraction should not take place in locations where it would affect designated wildlife sites.
- The Core Strategy should ensure secondary aggregates are used wherever appropriate in the construction of new developments.
- Robust policies to maximise the potential benefits to wildlife from minerals afteruse should be adopted.
- The Core Strategy will need to refer to the outcomes of the regional Sand & Gravel Study (Phase 2).
- Both existing and formerly worked sites which have (or could) provide material for the repair of historic buildings and structures within the area should be identified and protected.
- The spatial strategy should include a high-level policy framework specific to the district for the safeguarding, conservation and supply of minerals.
- If it is not possible to comply fully with national policy because of the particular resource circumstances of the district this must be robustly justified with evidence.

7.2 Responses to Updated Topic Paper

7.2.1 A revised and updated minerals issues and options paper was published for public consultation in November 2008. A wide range of minerals industry stakeholders were specifically targeted in this consultation exercise. However again the response from this consultation was limited to comments from non-industry stakeholders, in summary the comments were:

- In view of the significant permitted reserves of aggregate within the sub-Region, we would favour a strategy based upon restricting further extraction of crushed rock aggregates, maximising the use of secondary materials where appropriate, and of safeguarding such resources from sterilisation by other forms of development.
- It is important that aggregate production at building stone quarries does not compromise the ability of those quarries to provide building or roofing stone.
- Given the uncertainty regarding the viability of known sand and gravel resources within Bradford, it would seem logical to explore further the potential of these resources within the District.
- It is essential that an assessment is undertaken of the extent and location of potential sources of building and roofing stone within the District. To this end, English Heritage would be willing to liaise with the Council about how it can assist in the delivery of such an assessment.

- Building and roofing stone resources should be safeguarded from sterilisation by other forms of development.
- In the Core Strategy, Bradford will need to identify the broad locations of sites.
- The constraints on the exploitation of sand and gravel resources in West Yorkshire should be explained.
- Safeguarding of sand and gravel resources is a requirement not an option.

7.3 Mineral Industry Stakeholder Consultation Meeting

7.3.1 As a further attempt to engage minerals industry stakeholders in the minerals policy option development process a minerals industry stakeholder meeting was arranged for February 2009. This meeting was attended by 15 representatives of the industry including minerals operators, stone merchants and planning agents. Policy options were discussed in facilitated small discussion groups, notes of the comments made during these discussions were recorded. In summary the key points raised were:

7.3.2 Safeguarding:

- Safeguarding is particularly appropriate for proven resources adjacent to existing workings and for particularly scarce resources such as those capable of producing dimension stone.
- Some sites which are being redeveloped for housing are good quality mineral sources.
- Surface coal and fireclay resources could become very important in the future and we should safeguard such sites across the district, geologically, fireclay sites in Bradford are world class.
- Except for coal, urban areas should only be included in MSAs if the resource is of a very high calibre, otherwise this could be too restrictive.
- MSA buffer sizes can range from 50m to 500m. Given the differences in scale and practices between quarries, it is difficult to set an MSA buffer size which would be appropriate to all. Urban quarries tend to operate with practically no buffer from surrounding housing.

7.3.3 Supply and Demand:

- The importance of the building stone industry to Bradford should be highlighted. The building stone industry provides employment, keeps traditional crafts and skills alive and provides high quality building materials for use all over the UK.
- A large proportion of building stone and flag produced in Bradford is exported to other regions, London and overseas markets. Yorkstone is a widely marketable product and sales are not limited to areas where buildings have traditionally been built from this material.
- There is a drastic shortage of building stone, especially that of certain calibres. Reduction in variety/ diversity of supply is also concerning.
- The dimension stone produced in the district is sought after and is unique to the district/sub region.

- Reserves of high quality stone have decreased in the area; riven flagstone (Elland Flag) is in particularly short supply.
- A lack of supply can make blockstone so expensive that developers are reluctant to use it.
- There are problems with stone slate supply due to the expense of producing it and a lack of skills.
- There is a need for local stone to maintain the local identity of Bradford and to avoid having to transport stone significant distances.
- There are concerns about the sustainability of importing stone and the quality of stone supplied from abroad.
- Block and flag stone are important for the historical built environment for the district and beyond.
- There should not be a presumption against open cast mining; we must recognise that fireclay recovery requires open cast coal mining.
- The aggregates landbank is within the control of a few operators. The landbank is an artificial concept. There is a need to consider real demand and supply issues.
- Prohibiting aggregate production at building stone quarries would make most quarries impractical to operate.
- No building stone quarry operator would crush any stone reserves which are capable of producing building stone; as the value of building stone is much greater than aggregate.

7.3.4 Location of New Minerals Development:

- Minerals extraction can only take place where suitable resources occur; therefore mineral planning authorities should not seek to influence the location of new minerals development.
- Areas adjacent to existing operational minerals extraction sites are the most likely locations for new minerals development.
- The opening of new or re-opening of dormant/ disused sites might be preferable to the extension of existing quarries in certain cases.
- Options for the re-opening of dormant and disused quarries should be explored before looking at greenfield sites.
- New technology/machinery could make dormant quarries and disused quarries viable again.
- Exposures from existing workings and the experiences of individual quarry operators are generally the best sources of information on the potential viability of new resources.

7.3.5 General:

- Minerals planners should work more closely with the Minerals Industry. Policies should have sufficient flexibility to allow for the differences in the scale and characteristics of individual quarries and the unpredictability of resources and markets for finished products.

8.0 CROSS BOUNDARY ISSUES – CONSULTATION WITH NEIGHBOURING AUTHORITIES

- 8.1 Minerals supply and demand issues cannot usefully be addressed without looking at flows of minerals into and out from the district. With regards to sand and gravel West Yorkshire is a net importer of large quantities of sand and gravel, primarily for use in producing concrete. The Council have held discussions with representative of North Yorkshire County Council (the Region's largest producer of sand and gravel) regarding the current dependency of the Bradford District and the West Yorkshire sub-region more generally on North Yorkshire to supply sand and gravel. The representatives from North Yorkshire indicated that they felt that this Regional dependency upon sites in North Yorkshire could not be sustained indefinitely due to the increasing constraints on resources exploited within North Yorkshire.
- 8.2 The Council have also been involved in working with other unitary authorities in the sub-region to make representations to the late Regional Planning Body (RPB) regarding concerns over the viability of the proposed changes to the sub-regional sand and gravel apportionments referred to in section 3.1 above. This lobbying has resulted in the recent BGS reality checking exercise with the industry³³ which cast significant doubt on some of the assumptions made in the phase 2 study regarding the viability of significant increases in sand and gravel exploitation with West Yorkshire.
- 8.3 Another major cross boundary mineral flow which is of relevance to the forward planning of minerals supply within the District is the flow of building, roofing and paving stones out of and into the district. The majority of sandstone building stone quarries with the sub-region are clustered within Bradford, Kirklees, Calderdale and Leeds and therefore detailed discussion have been held with these authorities regarding the issues affecting the supply of building stone within the sub-region. This joint working has led to a better understanding of the supply and demand situation within the sub-region and an understanding of the limitations of the current evidence base.
- 8.4 Further consultation with neighbouring authorities, including Kirklees, Calderdale, Leeds, North Yorkshire and Lancashire Councils will be undertaken as part of the consultation on this preferred options document.

³³ British Geological Survey, 2009. *West Yorkshire sand and gravel resources: Investigating the potential for an increased sub-regional apportionment.*

9.0 CURRENT MINERALS SUPPLY SITUATION WITHIN BRADFORD

9.1 The principal mineral resource commercially extracted within the District is sandstone, the primary use of which is for the production of building, roofing and paving stones. Crushed sandstone aggregates are also produced at many sites utilising either permitted reserves considered to be unsuitable to produce building, roofing or paving stones, or stone wasted during the working and dressing of such products. However no quarries within the District have the primary purpose of commercial aggregate production. A surface clay deposit, suitable for engineering purposes, is currently worked at one site to the south of Denholme. Fireclay is extracted from a nearby site on the same hillside to the east. Currently no commercial coal or sand and gravel extraction takes place within the District.

Table 5
Active Extraction Sites within the Bradford District (June 2011)

Site	Grid Ref	Mineral	Site Area (ha)	Extraction End Date
Bank Top Quarry	SE091374	Sandstone	13	01/12/2039
Bolton Woods Quarry	SE162364	Sandstone	25	21/02/2042
Branshaw Quarry	SE032401	Sandstone	5.8	31/12/2020
Cragg Lane Quarry	SE081323	Sandstone	4.9	21/02/2042
Deep Lane Quarry	SE130327	Sandstone	2.6	31/12/2015
Fagley Quarry	SE187352	Sandstone	4	21/02/2042
Hainworth Shaw Quarry	SE067389	Sandstone	7.9	21/02/2042
Midgeham Cliffe End Quarry	SE072383	Sandstone	6.2	30/09/2012
Naylor Hill Quarry	SE040364	Sandstone	5.4	31/12/2025
Ten Yard Lane Quarry	SE081340	Sandstone	5.6	05/11/2012
Far Shay Fireclay Pit	SE079316	Fireclay	3.9	21/02/2042
Soil Hill Extension	SE073318	Clay	4	04/03/2012

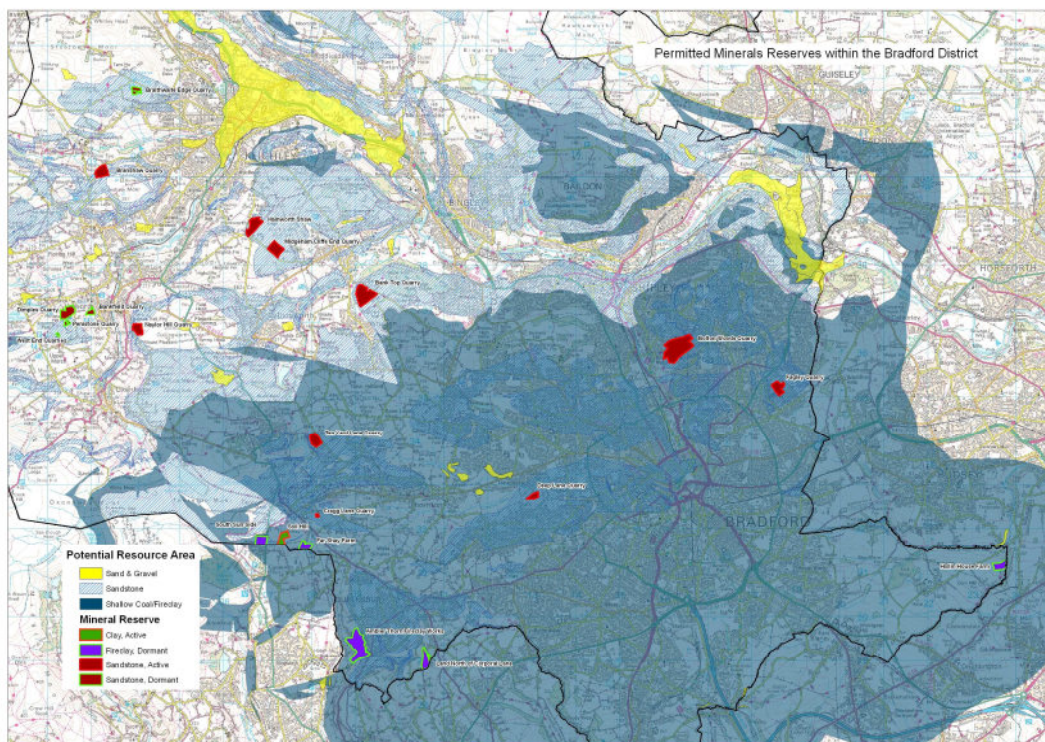
9.2 Table 5 above identifies the active extraction sites currently located within the District. Currently active sites comprise 10 sandstone quarries, 1 clay extraction site and 1 fireclay extraction site. Four of the sandstone quarries are thought to only be intermittently active with very low output. Of the 6 quarries with significant output 4 of the sites produce blocks of stone which are sawn into a variety of building stone products including walling stone, lintels, cills, sawn paving and kerb stones. The other 2 sites primarily produce riven or sawn paving (flag) stones. The production of hand riven flags and stone slate roofing is thought to have declined substantially. Reserves appear to be close to exhaustion at 3 of the 10 quarries (less than 50,000 tonnes remaining).

9.3 Extraction is required to cease at the clay extraction site in March 2012. The clay deposit is thought to have been used primarily for landfill engineering purposes. Working has only recently recommenced

at the previously dormant fireclay extraction site; it is unknown what use the fireclay will be put to. In addition to the active extraction sites 9 dormant minerals extraction sites are located within the District³⁴, 4 fireclay extraction sites and 5 sandstone quarries; however it appears that a number of these dormant sites may now be unworkable due to subsequent sterilising development.

- 9.4 Figure 5 below shows the location of the minerals sites within the district. The majority of sites are located west of the City of Bradford around the settlements of Bingley, Cullingworth, Wilsden, Thornton, Denholme and Oxenhope. However several 'urban quarries' are located within the City of Bradford itself.

Figure 5

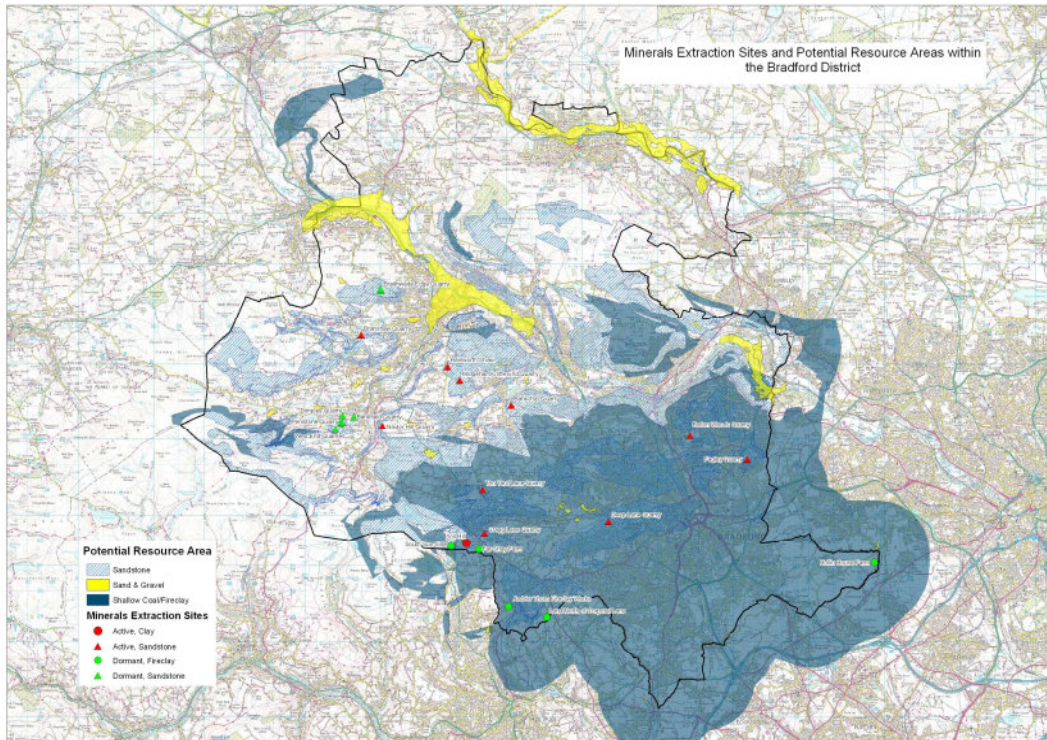


(Plan produced by CBMDC; resource areas derived from British Geological Survey and Coal Authority data)

- 9.5 Most of the active quarries are long established sites that have provided stone for the construction of buildings within the District for over a century. The landscapes within which the quarries tend to be situated are predominantly either mixed upland pasture areas or gritstone moorland and often the quarries themselves form part of the established character of the landscapes. As can be seen from Figure 6 below certain sandstone rock units no longer contain any active workings, such as the coarser gritstones to the north of the District.

³⁴ A dormant site is a minerals extraction site which was registered as dormant under the review of mineral planning permissions brought about by the Environment Act 1995. Dormant sites can not re-open until a modern set of planning conditions has first been approved by the Mineral Planning Authority.

Figure 6



(Plan produced by CBMDC; resource areas derived from British Geological Survey and Coal Authority data)

10.0 METHODOLOGY FOR DEFINING URBAN AREAS FOR EXCLUSION FROM AREAS OF SEARCH AND MSAs

10.1 The following method has been adapted from an approach to defining Urban Areas described in the British Geological Survey, 2007. *A guide to Mineral Safeguarding in England*:

- 1) Select all buildings (feature code 10021) from MasterMap within a 5km buffer of the authority boundaries.
- 2) Buffer all buildings by 50m (equating to a 100m separation) to generate overlapping building.
- 3) Dissolve the buffered buildings to formulate the clusters where buildings are within 100m of each other.
- 4) Infill interior polygons.
- 5) Remove the buffer effect from the building clusters by using a negative buffer (-25m). This leaves a 25m buffer around the edge of the outermost buildings to allow for detached development.
- 6) Extract those clusters which are greater than 20ha.

