Worcestershire Minerals Local Plan Background Document

Building Stone in Worcestershire Background Document

September 2018

Document Details:
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Contents

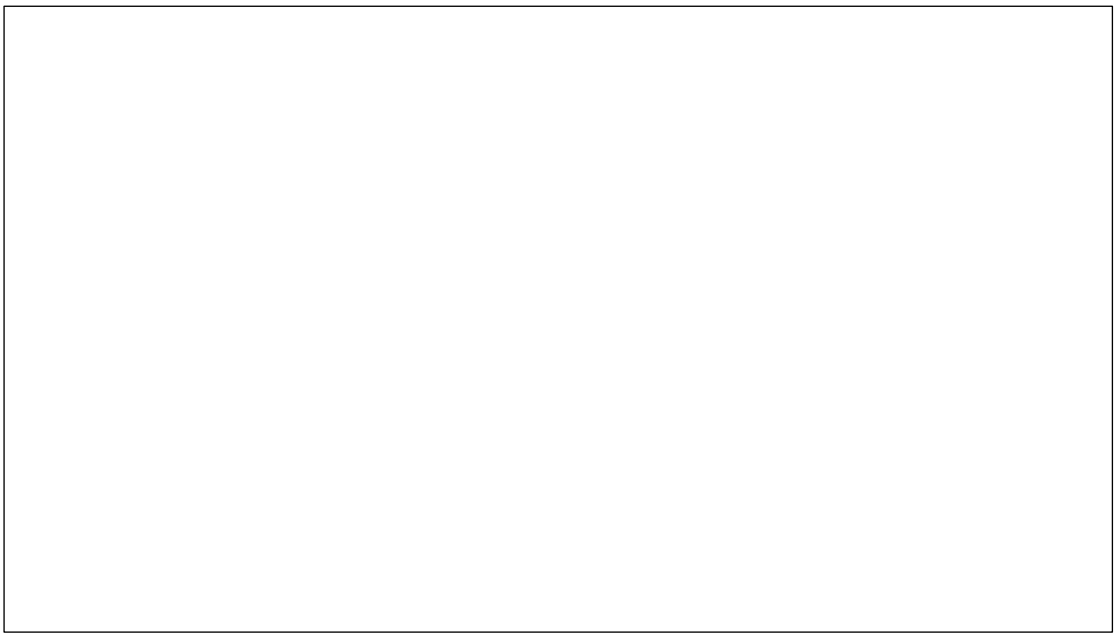
-15- (iii)-6Pi)3:/TOCI_Page 9eTc 25.3-4 (f)-1.7 (..5Td[(...........2]Tb5/TOCI_61gC /TOMM7.813 49)

Cotswolds Area of Outstanding Natural Beauty (AONB) Management Plan

Malvern Hills Area of Outstanding Natural Beauty (AONB) Management

monumental stone and material worked for architectural uses such as cladding buildings[4]. Building stone is a broader definition that can include stone quarried for paving, rubble walls and other uses.

2.7 Quarrying is a localised activity: stone can only be extracted from where it occurs naturally due to the underlying geology. The geology of the UK is therefore very strongly linked to both the diverse landscapes and locarse o.362da9 1 rg19.766



2.16 There are three main subdivisions within the market:

3. Building stone resources in Worcestershire

3.1

Quarrying

3.11 Minerals are only able to be worked where they are found and those locations are predetermined by the underlying geology. This means that quarry locations are fixed, and stone reserves are limited.

3.12 The term 'quarry' comes from the Latin *quadrare*, which means 'to make square'. This definition relates to traditional quarrying methods, and the term quarry should therefore technically only be applied to dimension stone quarries. Over time, the term has come to refer to all rock excavations and crushed rock aggregate production. This definition drift is problematic because the public perception of the environmental impacts of these large-scale operations has obscured the substantial differences between these and the generally much smaller-scale shallow building or roofing stone workings[31].

3.13 Building stone quarries are selected based on the quality of stones they contain colour, texture, pattern, durability and surface finish are important considerations. The strength and durability of a stone is determined by various geological factors.

3.14 Quarrying building stone is a fairly delicate process as the characteristics of the stone must be preserved. Quarrying can take place at a surface outcrop or underground (or some combination of the two). At most building stone quarries, stone is extracted directly from the exposed quarry face.

3.15 The precise method of extraction differs depending on the type of stone being quarried and its properties, and a combination of traditional and modern methods may be used. The primary concern is to avoid damaging the stone in any way that would make it unusable.

3.16 The basic principles of extraction are as follows:

Cut out relatively large blocks of stone

Divide them into several smaller pieces or slices

3.17 The extraction process usually generates some aggregate production as well, and this takes place at most active building stone quarries, though on a much smaller scale than in dedicated hard rock aggregate quarries[32].

3.18 For harder stones such as granites, techniques may include drilling, bursting (using wedges), diamond wire saws and, in exceptional cases,

3.19 For softer stones including many limestones and sandstones, extraction

History of building stone quarries in Worcestershire

3.22 There are no active building stone quarries in Worcestershire.

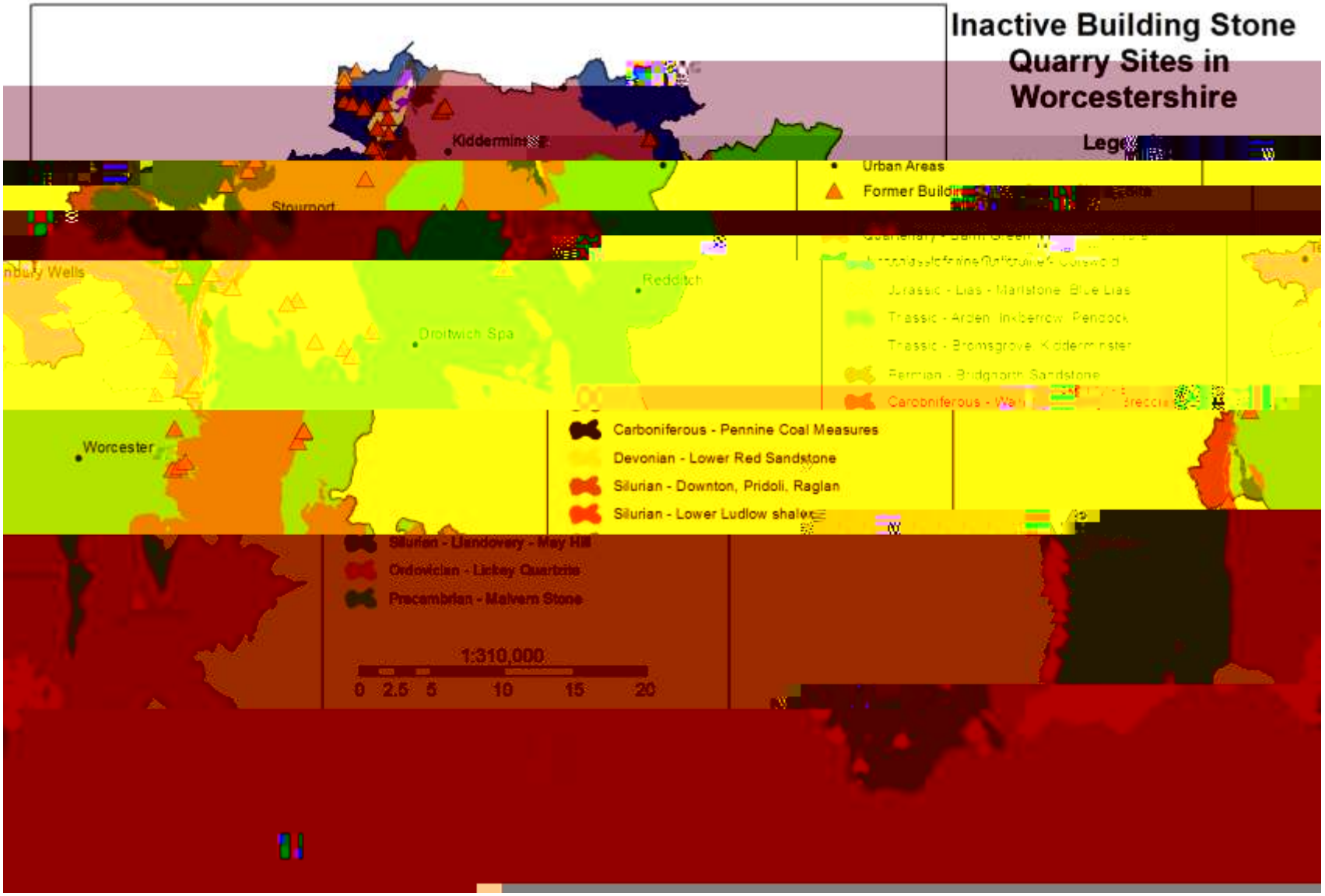
3.23 English Heritage (now known as Historic England) completed a strategic stone study of the UK. This study identified 60 building stone quarries within Worcestershire, only one of which is classed as 'active' the quarry near Broadway known as Fish Hill, where extraction ceased in 2010. Jurassic limestone from the Inferior Oolite Group was worked for building stone and aggregate at Fish Hill. Limestone from this quarry was traditionally used only in the small part of the county that consists of outliers of the Cotswolds (around Bredon Hill and Broadway)[36]. This was the last remaining building stone quarry in the county, and building stone was always produced there as ancillary to the production of aggregates. It has now ceased operating and is undergoing restoration, part of which may incorporate an on-going 'low key' use with a stone masonry business on the site.

3.24 In 1997, 629,000 tonnes of limestone was produced in the county, but only 1,000 tonnes of that was used for building stone[37]. Because the production of building stone in the county has ceased, there are no recent numbers available.

3.25 No other local building stone has been produced in Worcestershire for decades. Quarrying of igneous rocks in the Malvern Hills ceased in the 1960s, and these quarries only supplied a small area of the county around the Malvern Hills[38].

3.26 Other local stones have been widely used as building stones within the county on a much smaller scale, primarily limestones, sandstones, and granites.

[36] Worcestershire County Council (2010) *Annual Monitoring Report 2009-2010*
[37] Bloodworth, A.J., et al. (1999) *Mineral Resource Information for Development Plans: Phase One Herefordshire and Worcestershire: Resources and Constraints* British Geological Survey Technical Report WF/99/4
[38] Worcestershire County Council (2010) *Annual Monitoring Report 2009-2010*


Inactive Building Stone Quarry Sites in Worcestershire
Kidderminster
Stourport
Redditch
Droitwich Spa
Worcester
Urban Areas
Former Building
Jurassic - Lias - Marlstone, Blue Lias
Triassic - Arden, Ankerrow, Pendock
Triassic - Bromsgrove, Kidderminster
Carboniferous - Pennine Coal Measures
Devonian - Lower Red Sandstone
Silurian - Downton, Pridoli, Raglan
Silurian - Lower Ludlow shales
Silurian - Llandovery - May Hill
Ordovician - Lickey Quartzite
Precambrian - Malvern Stone
1:310,000
0 2.5 5 10 15 20

Re-use of existing stones for conservation

3.27 It may not be possible to obtain stone from historical sources for use in conservation, but windfall sources of building stone may become available. Such stone would typically be obtained through the demolition of existing buildings.

3.28 The best stone to use for conservation works is the original stone from the same quarry to ensure the best possible match[39].

3.29 Obtaining building stones through architectural salvage and recycling of construction and demolition waste has a long history, including stones quarried by the Romans being recycled in the middle ages. Many picturesque medieval ruins were created by local people 'quarrying' old buildings to build new houses and walls, and many monuments of national importance have been lost through the quarrying of their stones for other structures. The "cycle of substitution with cheaper alternatives leading to declining production and increasing cost has been an issue since the 19th century"[40]. In order to conserve historic buildings and structures, "technically suitable and compatible materials must be used"[41].

3.30 The Malvern Hills Area of Outstanding Natural Beauty Partnership supports the re-use of local stone in the repair of historic buildings and to add character to new development in and around Malvern. It is helping to facilitate the recovery and storage of stone for this purpose where buildings

been temporarily re-opened to supply walling stone, stone roofing slates and even stone for crushing (to help replicate medieval mortar mixes)"[43].

3.33 Many disused quarries are in private ownership or located within designated areas. Permission from the landowner must be sought before visiting any quarry, and considering old quarry sites as potential sources of supply may be a sensitive issue.

3.34 There can be considerable variation of colour and quality within a quarry, and workings that have closed may no longer provide a stone that is an appropriate match. Old quarry faces may be unstable and unsafe, and weathering may have caused exposed stone to become unusable.

3.35 A feasibility assessment of the quality and quantity of stone in the quarry must be completed to ensure compatibility with existing material, and to ensure that enough new stone can be provided within the timescale of the project[44]. Historic England provides extensive guidance on matching stone sources[45], please refer to Appendix 3: Additional Resources.

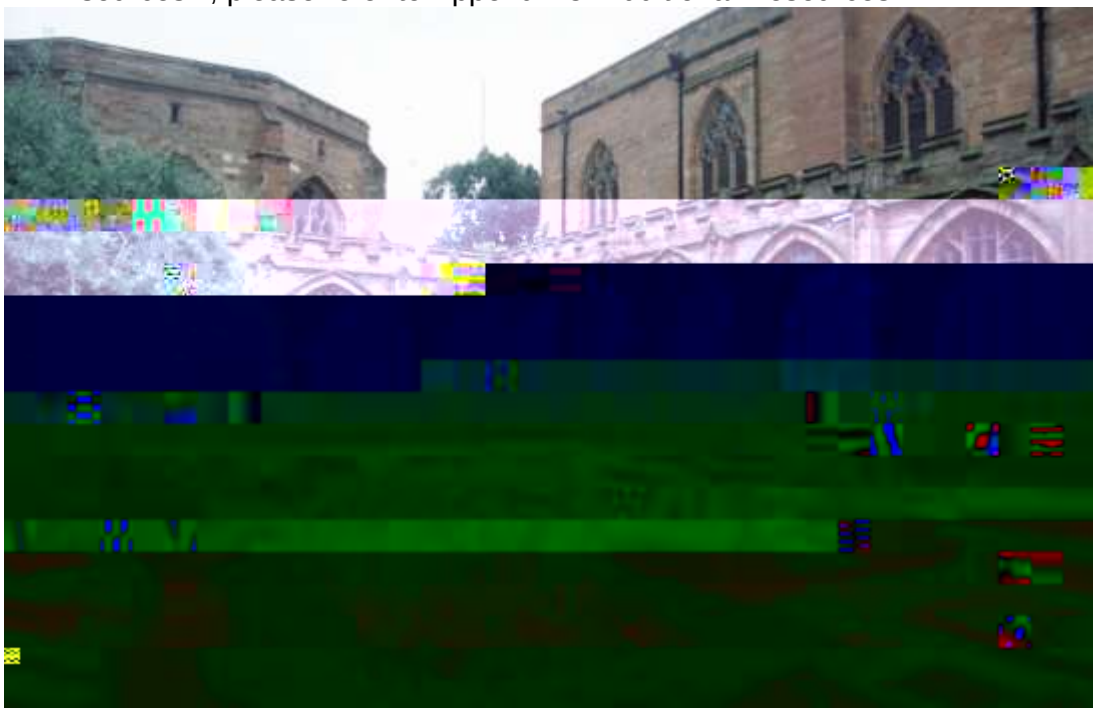


Image 3: Worcestershire Cathedral contains building stones from across the county, including Highley Sandstone, Alveley Stone, Bromsgrove Sandstone and Tufa from the Quartenary limestone deposits in the Teme Valley. *Photo ©Visit Worcestershire.*

[43] Jefferson, D., Hanna, S. and Martin, B. (2006) *Identifying and Sourcing Stone for Historic Building Repair: An approach to determining and obtaining compatible replacement stone* English Heritage.
[44] Jefferson, D., Hanna, S. and Martin, B. (2006) *Identifying and Sourcing Stone for Historic Building Repair: An approach to determining and obtaining compatible replacement stone* English Heritage.
[45] English Heritage (2008) *Mineral Extraction and the Historic Environment* English Heritage Publications.

mineral extraction, most building stone quarries are small-scale and have a far lower rate of extraction when compared to other quarries. This means that their local environmental impacts may be significantly less. Such quarries often continue in operation for a very long period, and may be involving stockpiling of stone".

Local Planning Policies

4.5 There is a range of local planning policy and guidance in Worcestershire that makes reference to local materials, conservation, and building stone.

Hereford and Worcester Minerals Local Plan

4.6 The adopted Minerals Local Plan from 1997 forms part of the existing Development Plan and makes brief mention of building stone resources in the county in paragraphs 3.1 and 3.2, but states that because of its "specialised nature and extremely small scale production" building stone will not be considered in the plan[51]. However, the intention is for the new Minerals Local Plan to address all types of minerals, including building stone.

Borough of Redditch Local Plan No. 4

4.7 The Borough of Redditch Local Plan No.4 includes policies that seek to conserve and enhance designated and non-designated heritage assets. Of specific relevance to the need for building stone are policies 37 and 38.

4.8 Policy 37 seeks the conservation and enhancement of all historic buildings and structures and the reasoned justification accompanying the policies states, at paragraph 37.12, that "The alteration or extension of a historic building will be expected to reflect the special characteristics of the existing building and be designed either to merge unobtrusively with it or appear as a separate entity. Materials used in the construction of extensions or alterations must strive to achieve as close a match as possible with the original in their selection and application".

4.9 Policy 38 on Conservation Areas includes part A(iv), which requires development within conservation areas to "demonstrate attention to the quality, sourcing and application of materials, finishes and detail, reflecting but not necessarily copying the elements of existing buildings within the area".

4.10 The Local Plan also seeks to ensure appropriate materials are used in modern development. Policy 40, on high quality design and safer communities, states that all development will be expected to, among other things, "be of a high quality design that reflects or complements the local surroundings and materials".

[51] Worcestershire County Council (1997) *Adopted Minerals Local Plan*

Image 4: Cotswold Stone buildings on Broadway High Street.

4.17 There are also parts of two Areas of Outstanding Natural Beauty (AONBs) within the county, and the management plans for these areas contain guidance on issues related to the supply and use of building stone.

Cotswolds Area of Outstanding Natural Beauty (AONB) Management Plan

4.18 The Cotswolds Area of Outstanding Natural Beauty (AONB) extends into Worcestershire in and around Bredon Hill and Broadway. This area contains the recently closed Fish Hill quarry which produced Cotswold stone for walling.

4.19 The Cotswold AONB Management Plan (2013 2018) states that "to ensure continued supplies of suitable high-
existing quarries within the AONB must continue to operate effectively". The Cotswold AONB has also produced a position statement on minerals and waste planning, which states that "a continuous supply of walling and building stone, including stone roofing slates, is required to conserve and enhance the distinctive built environment of the Cotswolds" and that "The character of stone varies considerably across the AONB, and local sources

Herefordshire, Worcestershire or Gloucestershire where the shape, size, colours and textures of the stone reflect that of surrounding buildings. This helps to reduce the carbon footprint of the development and supports the local economy".

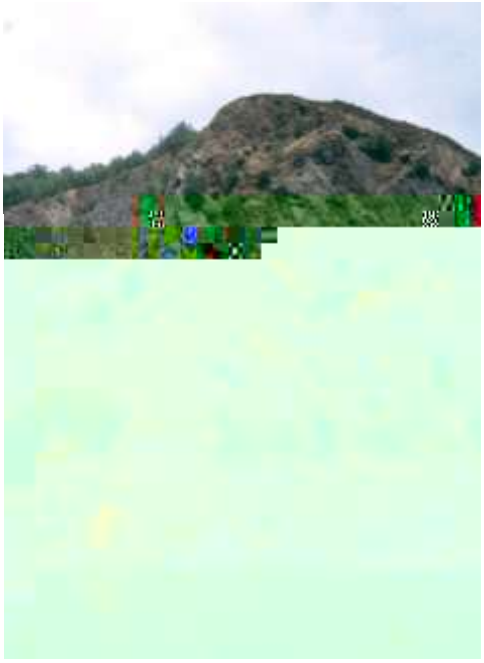


Image 6 (right): Gullet Quarry on the border of Worcestershire and Herefordshire. Quarrying took place here until 1977. The quarry produced Malvern Stone which was used widely as a building stone around the Malvern Hills.

Image 7 (above): Malvern Station Tea Rooms. A Malvern Stone wall is visible on the left of the image. *Photo ©Visit Worcestershire.*

Herefordshire and Worcestershire Earth Heritage Trust

4.24 Earth Heritage Trust is a charity active in Worcestershire and Herefordshire. Their mandate is to record, protect and promote geology and landscape and to raise general awareness of earth heritage by offering educational programmes to the public[52].

[52] Earth Heritage Trust (2013) Welcome page [online] available at: Earth heritage Trust website accessed 11.09.2018

Geodiversity Action Plan for Worcestershire

4.25 The Trust has produced a Geodiversity Action Plan (GAP) for Worcestershire, which identifies a number of objectives and actions to "provide long term and sustainable support for the conservation of geodiversity within Worcestershire"[53].

4.26 Objective 7 of the GAP is to "improve and sustain the links between geodiversity, biodiversity, archaeology and landscape".

A Thousand Years of Building in Stone

4.27 The Earth Heritage Trust's 'A Thousand Years of Building with Stone' project traced the history of stone buildings and re-discovered former quarries across Worcestershire and Herefordshire[54].

4.28 One of the key project outcomes is a database that records "over 4500 stone buildings and quarries across Herefordshire and Worcestershire, connecting buildings with their quarry sources"[55].

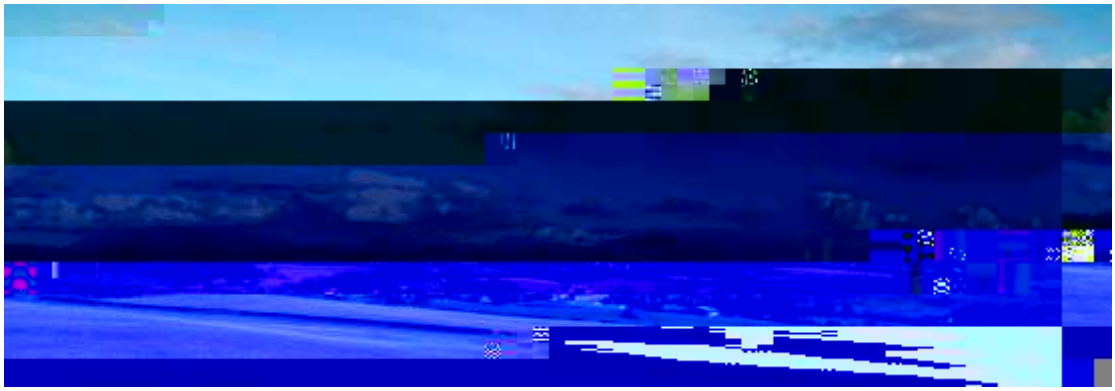


Image 8:

5. Planning issues arising from building stone quarrying

5.1 The emerging Minerals Local Plan is required to provide a policy framework that will ensure that the environmental, amenity and other impacts from any building stone quarrying in the county are acceptable. Potential impacts and other planning issues are detailed below.

5.2 It is important to recognise the differences in scale and methods of working between large crushed stone aggregate quarries and building stone quarries, as discussed earlier in this document.

5.3 Generally, dimension stone quarrying has less environmentare aqunTlckd--10 (y)10 (i)-650ei.5

and areas in which the minerals industry can contribute to sustainability targets. These include energy efficiency and renewable energy, transportation and other emissions, flood mitigation, habitat creation and biodiversity.

5.32 The capacity for building stone quarries to contribute to these targets may be influenced by the particular characteristics of building stone sites that is, they are frequently very small in size and operate over a long time frame.

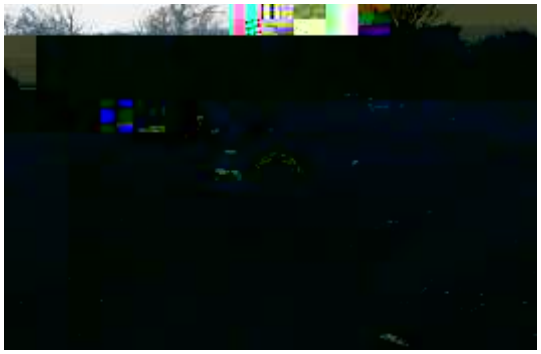
Potential for restoration

5.33 Quarrying is ultimately a temporary land use, and quarries present excellent opportunities for restoration and for biological, geological and cultural conservation. Restored sites can make an important contribution toward green infrastructure goals, including recreation opportunities. The NPPF requires that planning authorities ensure that "worked land is reclaimed at the earliest opportunity" and that "high quality restoration and aftercare of mineral sites takes place".

5.34 Much of the best practice guidance for quarry restoration applies to large-scale sand and gravel or aggregate extraction sites that are able to progressively return large areas of former workings to productive use and contribute to biodiversity or habitat creation targets. The building and roofing stone sector is somewhat behind the aggregates industry in terms of conservation and restoration[69]. As the majority of building stone quarries are small, this guidance may not necessarily apply.

5.35 Most historical building stone quarries in Worcestershire have simply been abandoned and left to regenerate naturally with no explicit programme of restoration. For small exposures4 (re)4 (s4 (re)4 (s4 (r)4 (d))-20 (a)4 (y)8 (n)4btf)2 (q)40rogra

5.37 The building stone needs of restoration and conservation projects is often small scale and intermittent, requiring a creative approach to workings. Where the original source of a local stone is known, best practice is to use the original stone for subsequent work. The English Stone Forum details some successful examples of this, notably at Pitchford Church near Shrewsbury. The church needed re-roofing, and luckily the original quarry for the church roof stones was located nearby. A combination of a willing land-owner and support from the Minerals Planning Authority in the area allowed a six-week long delve to take place which provided enough stone to replace the Church roof and supply three other listed buildings in the area. Within four months of the quarrying being completed, the site was completely restored to parkland, and planning permission on the site has been renewed in case the stone is needed again[72].




Images 11 and 12: The Pitchford delve during operation and six months later. *Photos ©Chris Wood, English Heritage. Further detail is available on the English Stone Forum website.*

5.38 A similar example is found in Herefordshire where the roof of Dore Abbey was restored using stone from two small temporary quarries which were granted planning consents especially for that purpose. These delves were originally consented with a size of only 1/10 hectare in area, but good management eased public concerns and the size and time limit of the consent were subsequently extended[73], providing a source of Old Red Sandstone slates for roof restoration across the county.

5.39 In Warwickshire, Arden Sandstone quarry was re-opened for repair work on Baddesley Clinton, a nearby National Trust property.

5.40 Safeguarding small temporary building stone workings against other types of development or designation is of utmost importance as there is a risk that appropriate local sources of building stone will be permanently lost if development is permitted on or near them. Guidance from the British Geological Survey recommends creating Mineral Safeguarding Areas of "known mineral resources that are of sufficient economic or conservation value (such as building stones) to warrant protection for generations to

[72] Wood, C. (2005)

come"[74]. This concept of safeguarding supply is especially pertinent in the case of quarries that may be worked intermittently and have the potential to

6. Conclusions

6.1 Although there are building stone resources in Worcestershire, none of these are presently being worked and detailed information about the resources available is poor. The work of the English Heritage Strategic Stone Study and the subsequent Earth Heritage Trust 'A Thousand Years of Building with Stone' project and database has helped to provide some of this information. The likelihood of disused workings being re-opened for large-scale extraction is low, due to the fact that they are often located within AONBs or other designated areas and because of public resistance. There have been no applications for building stone workings in the county since at least 1990.

6.2 There is a critical need for local stone for restoration and conservation of stone buildings, and there is some policy support for the extraction of limited quantities of local materials for these purposes. There are a large number of buildings in the county constructed with local stone, and it is possible that in the future the re-opening of old quarries or the creation of new ones will be necessary to meet the repair and restoration needs of these buildings.

6.3 If historical workings were to be re-opened, this would require careful consideration of their potential impacts, with the main issues likely to include noise, visual impacts, biodiversity, and habitat loss. The generally small size of building stone quarries may help to keep these effects to a minimum, but it is important to bear in mind that building stone quarries may require intermittent access over very long time frames.

6.4 Protecting local building stone sites from other development by creating

Appendix 1: Restoration case studies

CASE STUDY: **CLICKER QUARRY (ADRENALINE QUARRY)**
Location: Cornwall, near Liskeard
Stone quarried: Blue Elvin (or Elvan, or Alvan)

Clicker Quarry operated from 1932 to 1969 as a quarry for the hard stone known locally as "Blue Elvin" granite. This stone was used as ballast for the Great Western Railway, and locally as a building stone. Recreational use of the quarry began in 1986, and the following 25 years have seen the further development including the UK's longest zip wire. The site is a designated geological SSSI, and the management company for Adrenaline Quarry have a woodland management programme in place to ensure that the wildlife who reclaimed the quarry during the decades it lay silent can continue to call the quarry home. The Cornwall Council's planning department declared the quarry "an intelligent use of space"[76]

CASE STUDY: **STONEY STANTON (STONEY COVE)**
Location: Leicestershire, Stoney Stanton
Stone quarried: South Leicestershire Diorite (granite)

Quarrying at Stoney Stanton began in the early 19th century. By 1850, the site