



Local Geological Site Proposal Form

To be submitted to panel meeting convenor

Site Name	395 Barnt Green Road Quarry	
Grid Reference	SP 001 753	
Landowner	Birmingham City Council	
Site Surveyor(s)/Proposer(s)	Alan Richardson	
Boundary Map attached?	Yes	
Date proposed	18.06.2020	
Panel decision	Date	Decision

Site summary & initial condition (status determined using standard CM form)

Location:

The quarry lies on the eastern margin of the Lickey Hills Ridge, within the Type Area for the Lickey Quartzite (Lickey Hills between Kendal End [SP 001 746] and Holly Hill [SO 991 784]; Cofton Hill [SP 001 753] and Rednal Gorge [SO 998 759]). The locked gate to the site may be accessed from the Lickey Hills Visitors' Centre car park by a steeply descending footpath, or more directly, from a vehicle access point on the B4120 Barnt Green Road, opposite Reservoir Road. The key to the gate is available from the Country Park Rangers. There is open access to a public viewing area that is provided with three interpretation panels to explain the geology.

Summary:

The rocks here are believed to represent the lowest exposed sequence in the Lickey Quartzite Formation. They are less mature and have more interbedded mudstones and micaceous horizons than rocks higher in the formation. The mudstones are predominantly soft clays – it is yet to be established whether any of them are bentonites of volcanic origin. When freshly exposed they are typically green in colour, but rapidly weather to red on exposure to oxygen and water. Some thin layers are purplish in colour and contain abundant muscovite.

The most dramatic feature of the quarry is the recumbent folding in the quartzite. The fold axis trends north-east to south-west. The structural alignment together with the localised nature of the deformation suggests that it may be associated with thrust faulting, evidence of which is seen in the Rose Hill Quarries. This level in the Lickey Quartzite may have been particularly prone to this type of deformation owing to the abundance of clay layers interbedded with the quartzite.

In the south-east corner of the quarry, a zone of brecciation, more or less parallel to the bedding identifies the position of a fault. Movement appears to have followed a plane of weakness corresponding to a clay layer. At the point where the fracture has passed from one limb of the fold to the next, the fault has tracked along bedding in a different orientation to generate a step-over, before returning to its previous orientation. Drag folding of the bedding shows it to be a normal fault, which must post-date the folding. Stereographic analysis of the planes of movement suggests a movement vector of 359/22. This must be regarded as approximate as the fault is a 20-30cm wide zone of breccia with no clearly-defined bounding surfaces.

The BGS *Geology of Britain Viewer* records the age of the Lickey Quartzite as “approximately 444 to 485 million years ago in the Ordovician Period”, but if analysis of the interbedded clays identifies any

bentonites, this date may be further refined. Textural evidence suggests burial in excess of 1000m, followed by folding along a north-south axis, with thrust faulting generating localised recumbent folding. The timing of the normal faulting isn't certain. Subsequent uplift exposed the Lickey formation to erosion before deposition of the Upper Landoverly Rubery Sandstone. During the deposition of this formation, but after lithification of the earliest units, extension opened fissures, which filled with fragments of both formations and a matrix of unlithified sand, probably during the early Silurian transtension event.

Condition status:

Site Type: ED. At present, the status is uncertain. The lower parts of the quarry faces are regularly maintained by the Lickey Hills Geo-Champions, and the 'step-over fault' is clearly visible. This area of the site is 'Good Improving'. However, since a major clearance in 2010, employing a long-arm excavator and high-pressure water hoses, the upper reaches, which most clearly reveal the recumbent folding, have become increasingly obscured by accumulating debris and plant growth. Major funding is required to restore these parts of the site; without this work, they must be regarded as 'Poor Declining'.

Designation Criteria	Description	Tick if applicable
Scientific	The value of a site for study by both professional and amateur Earth scientists	✓
Educational	The value of a site for educational purposes in formal education & life-long learning	✓
Historical	The historical value of a site in terms of important advance in Earth science knowledge, events or human exploitation	✓
Aesthetic	The aesthetic value of a site in the landscape, particularly in relation to promoting public awareness and appreciation of Earth sciences	✓

Evidence Base

Geological evidence - *Free text box; not all boxes need to be populated*

<p>Appreciation of nature Value of site for experiencing and enjoying nature</p>	It is a place to stand and wonder upon the many and varied processes that have combined to create the natural sculpture that lies within, and the inconceivable extent of geological time.
<p>Connectivity with landscape Site provides evidence of a landscape scale process/change/feature</p>	The Lickey Hills constitute a prominent north-south ridge of resistant rock that stands above the surrounding younger rocks. The Barnt Green Road Quarry is cut into the base of the eastern flank of the ridge, immediately adjacent to the break in slope that reflects the boundary with the less resistant adjoining formation.

<p>Diversity</p> <p>Value of site in reflecting geodiversity of an area</p>	<p>As the best Lickey Quartzite quarry with public access, it provides a peerless window into the internal makeup of the Lickey Hills inlier.</p>
<p>Education</p> <p>Site provides opportunity for formal or informal education</p>	<p>Provides opportunities for field sketching of the recumbent folds and the 'step-over fault'. Can be used to demonstrate the way the eye can be deceived by apparent dips in adjacent quarry faces – the anticline that seems to be apparent in the SE corner of the quarry does not exist. Three interpretation panels are provided.</p>
<p>Historical associations</p> <p>Significant historical events or associations</p>	<p>In World War 2 Barnt Green Road Quarry was used to accommodate a barrage balloon mounting, as part of a barrage around the Austin Aero Works at nearby Longbridge.</p>
<p>Naturalness</p> <p>Value of site in reflecting past or present natural processes</p>	<p>The sediments provide evidence of fluctuating conditions in the environment of deposition, and variations in sediment supply. The deformation structures illustrate the ductile nature of rocks under high confining pressures when subjected to stress over long periods of time.</p>
<p>Rarity</p> <p>Rare or exceptional features</p>	<p>The only site in the area where this intensity of folding can be observed. It is unusual in being localised recumbent folding. The deformation may be related to the thrust faulting seen in the Rose Hill Quarries, and may have considerable significance in terms of Palaeozoic tectonics. The site appears to be the only exposure of the lowest part of the Lickey Quartzite formation. The fault at the SE corner provides an unusually clear example of a step-over.</p>
<p>Typicalness</p> <p>Exemplary feature or structure, representing the natural character of an area</p>	<p>It constitutes part of the Type Area for the Lickey Quartzite (Lickey Hills between Kendal End [SP 001 746] and Holly Hill [SO 991 784]; Cofton Hill [SP 001 753] and Rednal Gorge [SO 998 759]).</p>

Additional evidence - *Free text box; not all boxes need to be populated*

<p>Cultural associations</p> <p>Site is associated with cultural heritage/local distinctiveness</p>	<p>BGRQ is one of the Lickey quartzite quarries which were once prominent features of the local industrial landscape. They provided roadstone in the early 20th century, but were abandoned in the 1920s.</p>
<p>Fragility</p> <p>Risk of rapid loss of site or features</p>	<p>The dominant feature of the quarry is the recumbent folding that has now become heavily obscured by rock debris and plant growth. Without costly remediation it will disappear from sight.</p>

References

- Old, R. A. (1991) Redditch. Memoir for Sheet E183; BGS
- Boulton, W. S. (c.1927) The Geology of the Lickey Hills; pp255 – 266 “The Geology of the Northern part of the Lickey Hills, near Birmingham”
- Hardie, W. G., Bennison, G. M., Garrett, P. A., Lawson, G. A., Shotton, F. W. (1971) Geologists’ Association Guides N^o.1 The Area Around Birmingham; pp 12 – 15. Geologists’ Association
- Unknown, (2011) Lickey Hills – Barnt Green Road Quarry. Herefordshire & Worcestershire Earth Heritage Trust.
https://ehtchampions.org.uk/ch/wpcontent/uploads/pdfs/Lickey_Hills_booklet.pdf
- Richardson, A. S. (2019) The Lower Palaeozoic Geology of the Lickey Hills. Richardson
- BGS, Geology of Britain Viewer; <https://mapapps.bgs.ac.uk/geologyofbritain/home.html>
- BGS, Lexicon of Named Rock Units; <https://www.bgs.ac.uk/lexicon/lexicon.cfm?pub=LQ>

Maps



Map 1. Location of the Barnt Green Road Quarry.



Map 2. Barnt Green Road Quarry, showing the vehicular access point opposite Reservoir Road. Site boundary in red.

Photographs



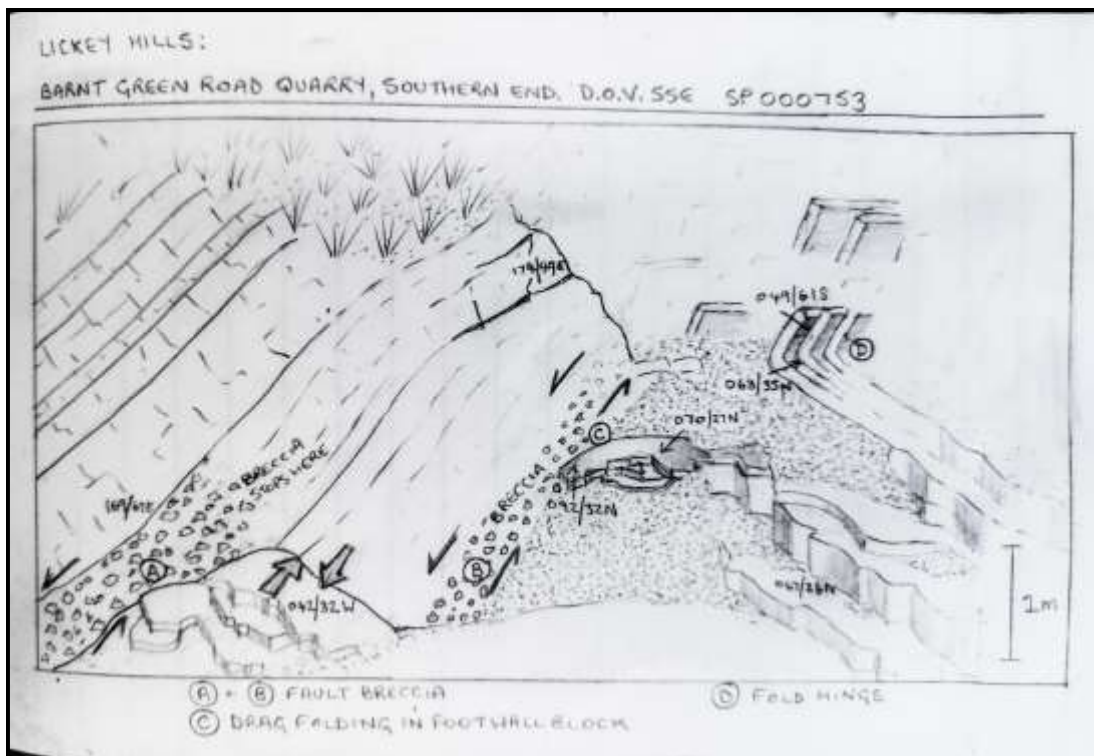
SP 001 753 - Composite panorama of the SE and SW faces of Barnt Green Quarry. The 'offset fault' is shown in yellow; the recumbent syncline is in blue. [2018 Alan Richardson]



SP 001 753 - The main (SW) face of the Barnt Green Road Quarry after restoration works in 2010. The hinge of the recumbent syncline can be seen at the top of the face in the right hand half of the picture. [2010 Lickey Hills Geo-Champions]



SP 000 753 - The 'stepover fault', showing the zones of fault breccia on either side of the stepover; the drag folding providing evidence of the sense of movement, and the hinge of the recumbent syncline. [2018 Alan Richardson]



Field sketch of the 'stepover fault'. [Alan Richardson]



SP 001 753 - Archive photograph of the fold structures. 1904. Photo P237646 Bilberry Hill. Overfolded Cambrian Quartzite reproduced courtesy of the British Geological Survey, UKRI 2019.

Source:<http://geoscenic.bgs.ac.uk/assetbank/action/viewAsset?id=78462&index=0&total=1&viewSearchItem>