

Site Name

Munday's Hill Quarry, near Heath & Reach

BEDFORDSHIRE LOCAL GEOLOGICAL SITE DESIGNATION FORM

SITE LOCATION, ACCESS, OWNERSHIP, STATUS & SUITABILITY

(1) **Name of site:** Munday's Hill Quarry, near Heath & Reach, Bedfordshire

(2) **National grid reference:** SP 938 280

(3) **Unitary authority:** Central Bedfordshire

(4) Site access and local amenities

Site access is good. When the office/works are open the gates are unlocked and ample parking is available in the car park. Out of office/works hours, there is parking for about eight cars outside the locked gates. Site visits can only be made with permission and they are usually accompanied (midweek and Saturday mornings only). There are no facilities at the site other than toilets.

(5) **Site ownership:** Aggregate Industries.

(6) **Mineral rights ownership:** Aggregate Industries.

(7) **Is permission needed to access the site?**

a. No

b. Yes ✓

If yes, from whom?

Quarry Manager
Eastern Way
Heath & Reach
Bedfordshire
LU7 9LF

Tel: 01525 237 911

(8) **Locality status:** Active ✓ Disused Historical Managed Restored New Other

(9) **Suitable for visits by:** a. General public

b. Small parties ✓

c. Large parties ✓

d. Primary school

e. National Curriculum

f. AS/A-Level ✓

g. Adult ✓

h. Undergraduate teaching ✓

i. Research ✓

(10) **Site suitable for frequent visits by parties?**

a. No

b. Yes ✓

(11) **Should collecting and hammering be encouraged at the site?**

a. No

b. Yes ✓

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SITE DESCRIPTION		
(12) Exposure type:	a. Inland natural outcrop	b. Road cutting
c. Railway cutting	d. Active quarry/pit ✓	e. Disused quarry/pit
f. Old mine workings	g. Mine dump	h. Active mine
(13) Dimensions of exposure of interest: Several faces, each c.50 x 15m depending on the workings.		
(14) Main interest(s):	a. Structural	b. Geomorphological
	c. Mineralogical	d. Palaeontological ✓
	e. Petrological ✓	f. Stratigraphical ✓
<p>(15) Summary description and reason for designation</p> <p>This is a large quarry that has been worked since 1925 and, over the decades, it has revealed excellent and unusually complete Lower Cretaceous successions. Formerly known as Garside's Pit, a typical succession (based on Shephard-Thorn <i>et al.</i>, 1994), with maximum stratigraphic thicknesses indicated, comprises:</p> <ul style="list-style-type: none">• Gault Clay (10m), including the 'Cirripede Bed' locally near the base• Shenley Limestone (0.1m)• Woburn Sands 'Red Sands' (4m)• Woburn Sands 'Silty Beds' (4.5m)• Woburn Sands 'Silver Sands' (10m)• Woburn Sands 'Brown Sands' (5m)		
<p>(16) What threats exist for the site?</p> <p>This is a working quarry and hence exposures are changing all the time. Active quarrying maintains the exposure but the site is backfilled as work progresses and parts of the successions are lost for ever. Increasingly onerous health and safety demands makes this site difficult to visit on a regular basis, so it is inevitable that the detailed palaeontological and sedimentological research that has been carried out here over the decades will not be continued in the future.</p> <p>As the quarry reaches exhaustion it may be possible to preserve some faces, but the practicality of this will need assessing.</p>		
<p>(17) What additional work is required to enhance this site?</p> <p>Researchers periodically visit the site and detailed accounts of the stratigraphy have been published relatively recently (e.g. Evers 1992a, 1995a,b; Shephard-Thorn <i>et al.</i>, 1994). However, the transient nature of the exposures here makes this a difficult site to document progressively or compare between visits.</p>		

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(18) Published/unpublished references to the site and wider area

Allen, J. R. L. 1981. Lower Cretaceous tides revealed by cross-bedding with mud-drapes. *Nature*, **289**, 579-581.

Bristow, C. R. 1963. *Upper Jurassic and Lower Cretaceous rocks in the areas between Aylesbury (Bucks) and Leighton Buzzard (Beds)*. Unpublished PhD Thesis, University of London.

Buck, S. 1987. *Facies and sedimentary structures of the Folkestone Beds (early Cretaceous) and equivalent strata in southern England*. Unpublished PhD Thesis, University of Reading.

Buck, S. 1991. *A 3-D view of shallow marine tidal sands: the Lower Cretaceous Woburn Sands at Leighton Buzzard*. PESGB Field excursion booklet.

Eyers, J. 1991. The influence of tectonics on early Cretaceous sedimentation in Bedfordshire, England. *Journal of the Geological Society of London*, **148**, 405-414.

Eyers, J. 1992a. Sedimentology and palaeoenvironments of the Shenley Limestone (Albian, Lower Cretaceous), an unusual shallow-water carbonate. *Proceedings of the Geologists' Association*, **103**, 293-302.

Eyers, J. 1992b. *Lithostratigraphy of the Lower Greensand and Gault (Lower Cretaceous) of the Bedfordshire Province, England*. Unpublished PhD Thesis, Open University.

Eyers, J. 1995a. Correlation of the Lower Greensand (Woburn Sands and Carstone) of the Bedfordshire Province, England. *Cretaceous Research* **16**, 385-413.

Eyers, J. 1995b. The Silty Beds: a tidal flat sequence at the junction of the Lower Greensand and Gault (Albian, Lower Cretaceous) of Bedfordshire, England. *Proc. of the Geologists' Association*, **106**, 107-118.

Owen, H. G. 1972. The Gault and its junction with the Woburn Sands in the Leighton Buzzard area, Bedfordshire and Buckinghamshire. *Proceedings of the Geologists' Association*, **83**, 287-312.

Shephard-Thorn, E. R. *et al.* 1986. An outline study of the Lower Greensand of parts of south-east England. *Technical Report of the British Geological Survey*, WF/MN/86/1.

Shephard-Thorn, E. R. *et al.* 1994. *Geology of the country around Leighton Buzzard*. Memoir for the 1:50 000 geological sheet 220 (England and Wales), London, HMSO.

Smart, P.J. 1994. Two rare shark teeth from Leighton Buzzard. *Bedfordshire Magazine*, **24**, 293-295.

Smart, P.J. 1995. Hexanchid shark teeth (Chondrichthyes, Vertebrata) from the Lower Cretaceous Albian sediments of Leighton Buzzard, South-central England. *Proc. of the Geologists' Association*, **106**, 241-246.

Smart, P.J. 1996. Five fossil shark teeth from Leighton Buzzard. *Bedfordshire Magazine*, **25**, 151-153.

Smart, P.J. 2007. Anacoracid shark teeth (Chondrichthyes, Vertebrata) from the early Cretaceous Albian sediments of Leighton Buzzard, south-central England. *Proc. of the Geologists' Association*, **118**, 375-380.

Lower Greensand – Munday's Hill Quarry. B&LGG information leaflet. www.bedsrigs.org.uk

SCIENTIFIC SIGNIFICANCE

(19) Does the site exhibit features of local/regional importance?	a. No	b. Yes ✓
(20) Is the site already a designated SSSI?	a. No ✓	b. Yes
(21) Collector interest: a. Rare species ✓	b. Common species ✓	c. Local significance
d. Regional significance ✓	e. National significance ✓	
(22) List of confirmed fossils, minerals, etc: For details see the references above, but this is an important site for fossils, particularly brachiopods from the Shenley Limestone and a wide range (ammonites, belemnites, bivalves, crabs, shark and bony fish teeth and vertebrae, rare plesiosaur vertebrae) from the marine Gault Clay.		

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HISTORICAL/AESTHETIC VALUE		
(23) Does the site have important historical associations?	a. No	b. Yes ✓ This site has set the standards for sand types which are used by the aggregate industry worldwide.
(24) Does the site form a key part of an attractive or evocative landscape?	a. No ✓	b. Yes
<p>(25) Full description of site and its significance Munday's Hill provides one of the best exposures of the Woburn Sands Formation and the Gault Clay in Bedfordshire. It is not only large, offering many opportunities to inspect different sections at various orientations, but it contains a very full stratigraphy. The lowermost part of the succession used to reveal the estuarine 'Brown Sands' but these have been obscured by backfill since 2008. The overlying 'Silver Sands' are now the oldest sediments exposed and they probably formed as sand bars at the mouth of an estuary. They contain beautifully developed sedimentary structures showing the tidal nature of the currents. These include: ripples (some with mud drapes), cross-bedded (bi-directional) tidal bundles, ripple cross-lamination, channels and higher energy granule layers. A good assemblage of trace fossils and fossil wood also occur in the 'Silver Sands'. The wood shows different styles of preservation (lignite, charcoal, and replacement by iron minerals) and varies in size from tiny fragments up to logs several metres long.</p> <p>The upper part of the succession commences with the 'Silty Beds' that represent a tidal flat sequence and contain wavy partings of dark grey silty clay. Above them, the 'Red Sands' are medium- to coarse-grained and cross-bedded, with goethite grains concentrated in thin bands giving a striped effect.</p> <p>The Shenley Limestone is a phosphatic limestone that contains a fully marine fauna and records a rapid, worldwide rise in sea-level. This is the only site in Bedfordshire that provides an (intermittent) exposure of this historically important stratigraphic interval (see Owen, 1972, for a literature review). The lowermost Gault Clay occasionally preserves a bright red clay called the 'Cirripede Bed' due to the number of cirripede barnacles within it. The Gault contains numerous horizons that are highly phosphatic and contain fossils and nodules. The most fossiliferous horizon is the <i>varicosum</i> band, named after an ammonite which is common at this level.</p>		

RECORDER'S DETAILS	
(26) Name: Dr Jill Eyers	(27) Organisation: Consultant geologist working on behalf of B&LGG.
(28) Date of designation: August 2005	

CURRENT SITE CONDITION
(29) Site condition at March 2009 is GOOD DECLINING; assessed by Jill Eyers.

NOTES
(30) Form revised and updated by Dr Martin Whiteley, B&LGG Local Geological Site Manager, November 2009. For further details contact Anne Williams: annew36@hotmail.com