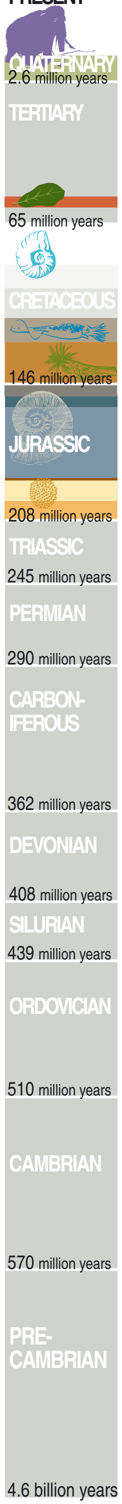
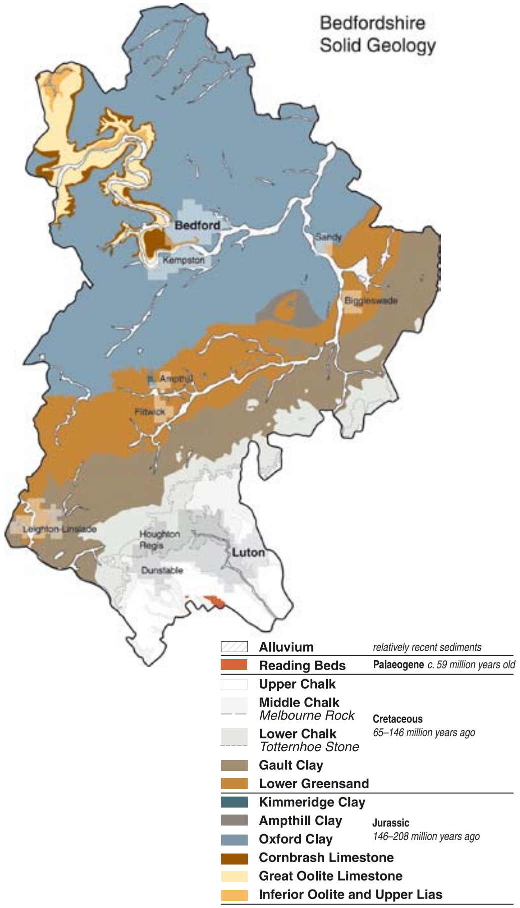
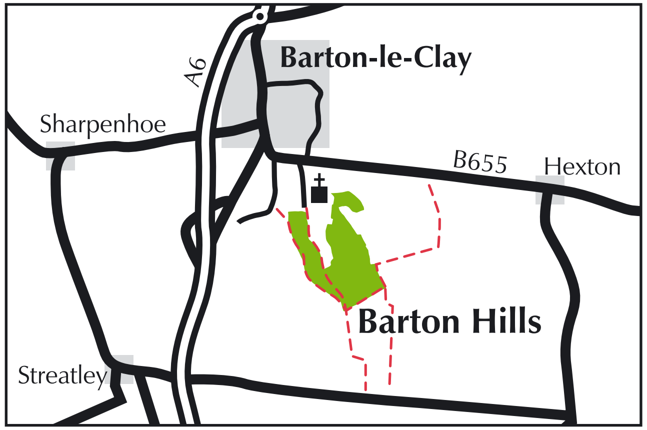


Barton-le-Clay in the Cretaceous

110 million years ago Barton would have been a seaside village. To the west the Lower Greensand had already been deposited and was soon to be covered by the sticky grey Gault Clay formed at the bottom of a deepening ocean. Barton-le-Clay is named for this clay, responsible for the flat, featureless vale. As the climate warmed, the sea rose higher. The clays of the Gault grow increasingly 'chalky' and paler in colour until they become the Lower Chalk (a clayey chalk). The most famous 'Chalk' is actually the Middle and Upper Chalk. These units are the hard rock of the hills of Barton, the whole of the Chilterns and the North and South Downs.





Barton Hills is south of the B655 between Barton-le-Clay (0.5km west of the reserve) and Hexton (1km east).

The fastest access is via footpaths from Old Road and Church Road in Barton-le-Clay.

The Bedfordshire & Luton Geology Group exists to encourage understanding of the geology and geomorphology of the county and to undertake site recording, interpretation, advice and education

Regionally Important Geological and Geomorphological Sites (RIGS) are places that reveal our geological past and are considered important enough to deserve conservation. They include sites where rocks can be seen (such as quarries and road cuttings) or where the geology or geological processes can be inferred from the shape of the landscape. Official RIGS are recognised by county councils and by Natural England.

For more information about the BLGG and our events as well as the geology and geomorphology of your area visit our website at

www.bedsrigs.org.uk

or contact Chris Andrew c/o Bedford Museum, Castle Lane, Bedford, Bedfordshire MK40 3XD.
Tel: 01234 353323; Fax: 01234 273401

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Bedfordshire & Luton Geology Group

bringing landscape to life

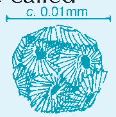
Cretaceous Chalk: Barton Hills

National Nature Reserve

The view from the top of the Chalk into Windy Hollow, the dry valley at Barton Hills NNR

This peaceful green valley was sculpted by Ice Age erosion from Chalk laid down in a tropical ocean. Come for a walk through time recorded in rock and landscape.

The **Chalk** is a pure limestone made of the skeletons of innumerable numbers of microscopic algae called *coccolithophores*. Hundreds of thousands of them could fit on a pin-head. Such a pure limestone containing no trace of sand or mud can only form an immense distance from land. Chalk is being laid down in very few places today, as even the largest oceans are too small.



The Chalk also contains fossils of animals such as sea urchins, ammonites, sponges and bivalves.

There is no evidence of events at Barton from the end of the Cretaceous 65 million years ago until the Ice Age began about 2.6 million years ago. We know sea levels fell, and the forces that raised the Alps folded the Chalk into a ridge that later became an escarpment. Several times during the Ice Age this area was cold tundra (like the modern Arctic); half a million years ago Barton-le-Clay would have been under an ice sheet that may even have flowed over the Chalk. Erosion during these cold periods sculpted the chalk ridge into the rounded hills, dry valley and coombs of modern Barton Hills.

The walk, beginning from the church

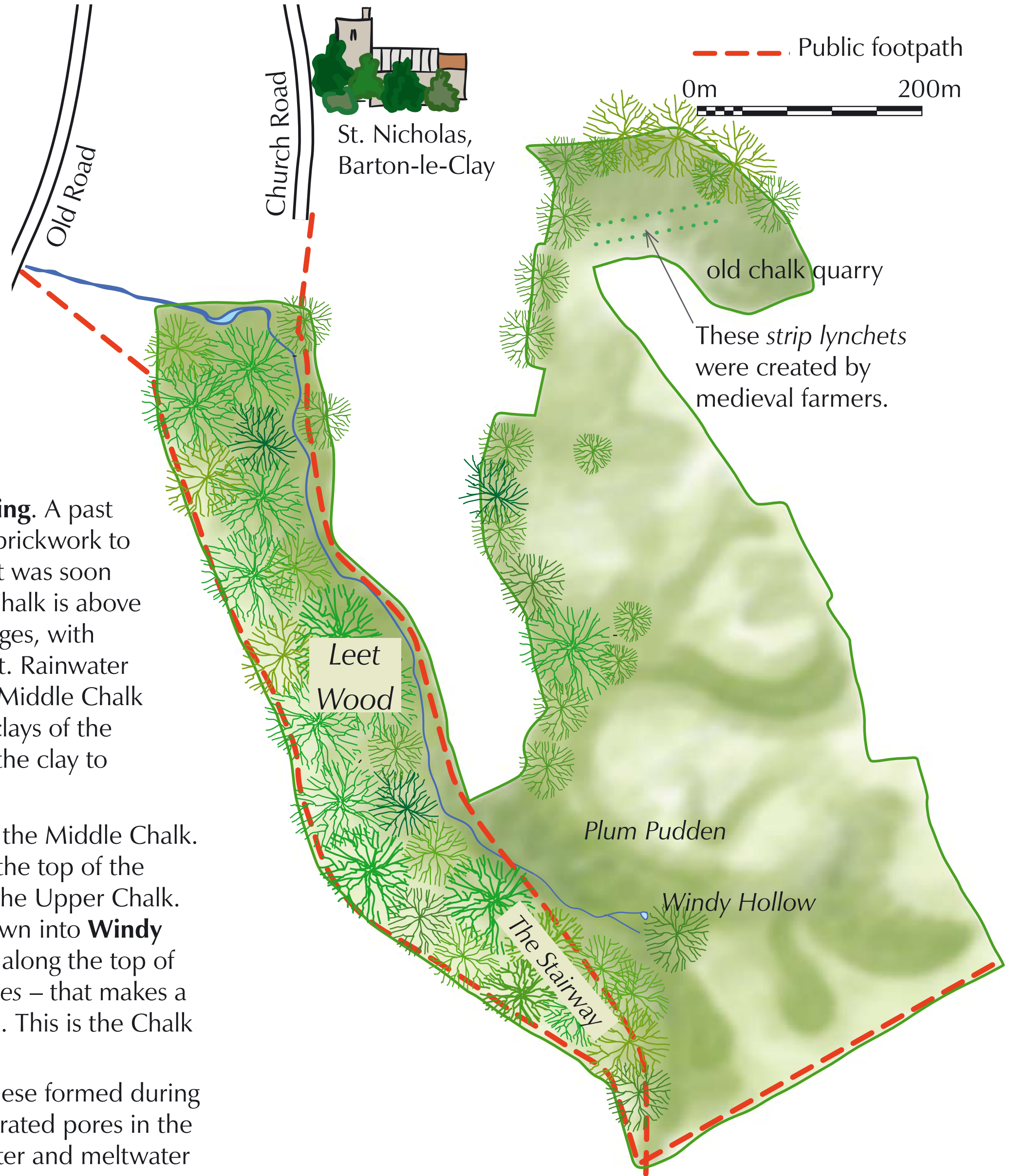
The path into the reserve lies on **pale grey clay**, very soft and sticky in wet weather. This is the Lower Chalk. Look back once you're higher on the hill and, as your eye follows the line of the Lower Chalk out into the vale, watch for a little ledge-like bump in the mid-distance. This is the location of the Totternhoe Stone, a famous local building stone in the Lower Chalk.

Look at the **pebbles** in the stream and path. Only chalk pebbles and flint are local. Well-worn rounded pebbles may have been left here by a fast-flowing meltwater river. Angular and sharply broken pebbles may be weathering out from a deposit brought here by an ice sheet. *Angular pebbles in the path (below).*

Continue up the path to the **spring**. A past lord of the manor intended the brickwork to prevent locals using the spring; it was soon demolished! The paler Middle Chalk is above the point where the spring emerges, with soft, clayey Lower Chalk below it. Rainwater flows down through the porous Middle Chalk until it meets the impermeable clays of the Lower Chalk. It then runs along the clay to emerge as hillside springs.

The Stairway takes you up onto the Middle Chalk. Watch for flints, which occur at the top of the Middle Chalk, then throughout the Upper Chalk. From the top of the hills look down into **Windy Hollow**. There's a ledge running along the top of the smaller hollows – the *coombes* – that makes a scarp face on one side of the hill. This is the Chalk Rock, a bed of harder chalk.

Windy Hollow is a *dry valley*. These formed during the Ice Age when the water-saturated pores in the Chalk were frozen solid. Rainwater and meltwater was forced to flow over the Chalk cutting valleys as rivers normally do. When the weather warmed, the Chalk thawed and water again flowed down through the rock, leaving the valley dry. The deposits on the bottom of these valleys are very important for geologists as they record Ice Age history and environment.



The **coombes** were largely formed during the Ice Age by frost breaking up the chalk into ever smaller particles that gradually move downhill in warmer weather. Even now the frost eats away at the coombes every winter. This *freeze-thaw cycle* causes *soil creep*, which creates the many tiny, parallel ledges running along the hillside. Freeze-thaw activity moves masses of soil downhill relatively quickly.