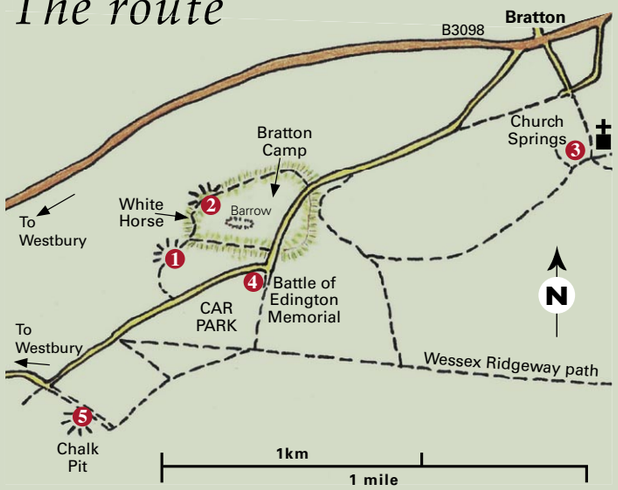
4 The Battle of Ethandune (Edington) memorial stone here commemorates the battle when the invading Danes were defeated and driven back to the north by the Saxon King Alfred in 878. It is said that the original white horse was cut to celebrate the victory.

5 Chalk quarry: This pit, which cuts deep into the Chalk of Salisbury Plain, provides the raw material for the Westbury cement works. Chalk is made up of the remains of countless millions of microscopic plankton that were floating in the sea around 80 million years ago. These were eaten and then excreted by other plankton, and their 'skeletons' of tiny calcium carbonate plates sank to the sea floor, thereby producing a rain of debris that over 25 million years built up to form the Chalk. Preserved within the rock are fossils of a variety of other animals living in the sea at the time.

The route



WILTSHIRE GEOLOGY GROUP

c/o WILTSHIRE WILDLIFE TRUST

ELM TREE COURT • LONG STREET

DEVIZES • WILTSHIRE • SN10 1NS

The group aims to promote and protect our geological heritage. For more information about Wiltshire's geoconservation organisation and how to become a member write to the address above, call 01380 871008, email info@wiltsgeology.org.uk or visit our website at **www.wiltsgeology.org.uk**

This guide was funded by English Nature and produced by the Wiltshire Geology Group.

White Horse photo courtesy of Bristol United Press

WILTSHIRE GEOLOGY GROUP

EXPLORE

THE LANDSCAPE AROUND *Westbury White Horse*

LANDSCAPE & GEOLOGY TRAIL

3.25 miles (5km) takes about 2 hours

The spectacular view from the hill top above Westbury's white horse has long been appreciated. Bratton Camp is one of the many Iron Age hill-forts along the chalk escarpments of Wiltshire, occupied about 2300 years ago.

The Chalk, here forming the northern edge of Salisbury Plain, provided an easily defensible well-drained site with a clear panoramic view. However, the site was occupied even earlier, as within the huge boundary banks and ditches of Bratton Camp is a long barrow, a multi-chambered tomb, dating from 5-6000 years ago in the Stone Age. As permanent religious sites used over many generations, long barrows were carefully sited on hill-tops and ridges - they were meant to be visible from a distance.

This trail will show how the underlying rocks affect not just the landscape, but also how people have made use of the natural resources.

The White Horse, cut in 1778, is the oldest of the eight white horses adorning the steep escarpments of Wiltshire's downs. It replaced an earlier horse that faced the other way.


The Long Barrow

1 From the viewing plinth, you can see the effect of the different rock types on the landscape: the Jurassic limestones of the Cotswolds form the horizon to the northwest, notched by the river at Bradford-on-Avon. They dip gently down to the south-east beneath the softer clays which form the broad vale containing the Bristol Avon and its tributary, the Biss, as shown in the cross-section below right.

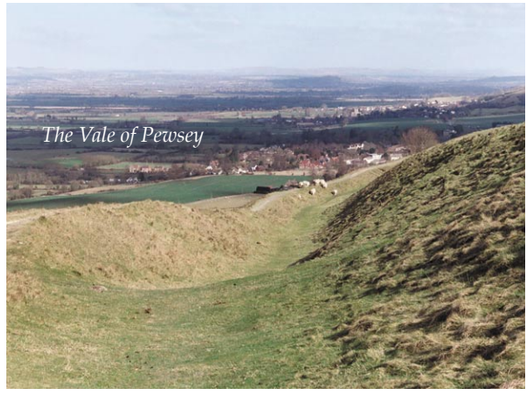
The Chalk forming the escarpment is the youngest rock formation here, Cretaceous in age (70-95 million years old). Although it is a relatively soft rock, a harder layer caps the escarpment.

Chalk resists erosion because it is porous and rainwater sinks in rather than running over the surface where it could erode the rock. The terracettes or 'sheep tracks', which are common features on the steep escarpment slopes are actually the result of soil creep downhill over the millennia.

By the cement works chimney is a clay pit. This is in the Kimmeridge Clay, which built up on the Jurassic sea floor 150 million years ago. Fossil remains of the many sea creatures which lived and died here include huge pliosaurs, marine reptiles, now on display in Bristol City Museum.

The principal raw materials for cement are chalk and clay. The chalk is crushed and turned into slurry in the quarry then carried through a buried pipeline down to the cement works below. Clay (from the clay pit) is then added, along with iron oxide, sand and ash - the composition is carefully controlled. The mixture is pumped into massive kilns and heated up to 1400°C. This drives off water and carbon dioxide, leaving calcium silicates as a clinker. The clinker is then ground up and gypsum is added to control setting time, making cement.

2 From the White Horse corner of the hill-fort the Vale of Pewsey can be seen cutting through the Chalk into the Greensand below. Streams have eroded along a weakness in the Earth's crust here, where Africa pushing against Europe over millions of years has caused the rock to warp upwards.



From the eastern ramparts of the hill-fort, the dry valley leading down to Bratton Church comes into view. This was cut by running water during the last Ice Age, which finished about 10,000 years ago. Then the ground was frozen and surface water couldn't sink into the normally permeable Chalk.

3 Church Springs: A spring gushes out of the base of the hill below the church, where the valley cuts into the water-saturated lower levels of the porous Chalk. Beneath the Chalk is the Greensand, itself underlain by the thick Gault Clay. As the Chalk and Greensand underneath are both permeable, rainwater sinks into them until they become saturated, forming a huge reservoir from which springs emerge as the clays below prevent the rainwater sinking any lower. This ready water supply all along the Greensand gave rise to villages such as Bratton and Edington, and indeed Westbury.

SECTION ACROSS THE CLAY VALE FROM BRADFORD-ON-AVON TO SALISBURY PLAIN