

Whiteleaf Hill to Dunsmore circular Geo-Cycle Trail

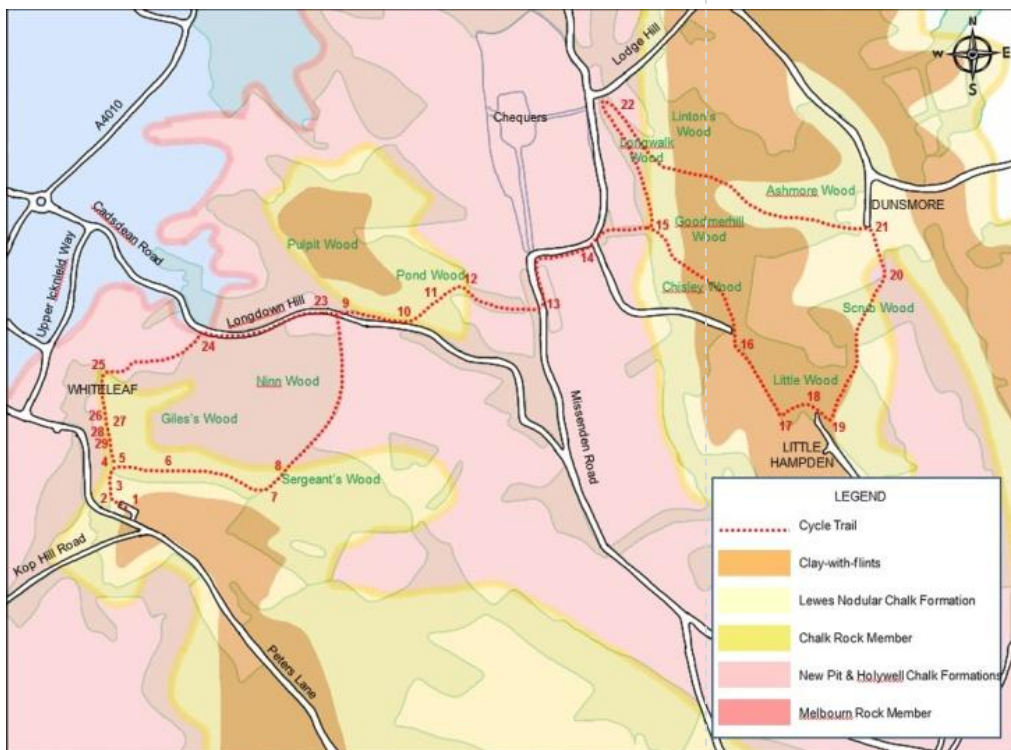
'An exploration of the geomorphology and geology of the Chilterns by bicycle'

About the Trail

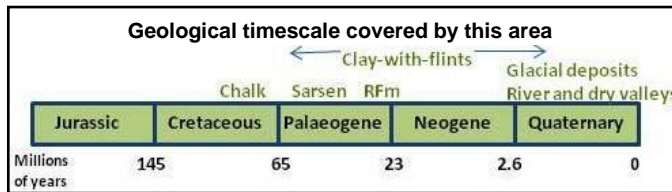
Although suitable for the hiker, this 7.5 km trail is especially enjoyable for the keen cyclist to explore the geomorphology (geologically controlled form) and geology of the undulating Chiltern landscape between Whiteleaf Hill and Dunsmore.

The trail starts and finishes at the Whiteleaf Hill car park (see map below) and follows part of the Sustrans' National Cycle Network and the Icknield Way, the latter marked by round signs with a blue arrow on a white circle and the words 'riders route' and bridle path signs.

Caution: The trail can be muddy and slippery during the winter or after prolonged periods of wet weather and therefore requires sturdy footwear or a mountain bicycle during these periods.



The Geomorphology and Geology



The geomorphology of this area is broadly one of eroded older and softer rocks forming the low-lying Aylesbury vale with younger and harder rock forming the Chiltern escarpment and hills. The undulating form of the Chiltern Hills is the result of the ice age (Quaternary period) and erosion and dissection of the now 'dry valleys' originally cut by meltwater rivers that flowed over the frozen Chalk between half a million and 10,000 years ago.

The geological story directly observable along this trail starts with the deposition of the Chalk in warm seas between 99 and 84 million years ago during the Cretaceous period.

Geological stratigraphical units of this period are from the lowermost Melbourn Rock Member & Holywell Nodular Chalk Formation (old classification = The Middle Chalk) to the overlying Chalk Rock Member & Lewes Nodular Chalk Formation (formerly the Upper Chalk).

Much of the stratigraphical units between 84 and 5 million years ago are missing owing to a period of crustal uplift and predominantly subaerial weathering and erosion, although patches of this story may still be found such as sarsens and Reading Formation sands and clays (of Palaeogene age).

The stratigraphical unit overlying the Chalk is the Clay-with-flints which formed as a result of

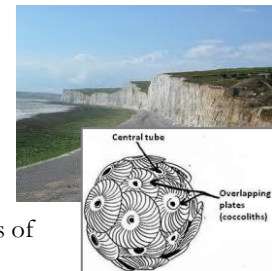
dissolution of the Chalk from 65 million years ago to present.

Chronology of the stratigraphical units traversed on this trail.

Age in Ma	Stratigraphical Unit	Old Classification
Up to 5	Clay-with-flints	
84 – 94 89 – 94	Lewes Nodular Chalk Formation With the Chalk Rock Member at its base	Upper Chalk
89 – 99	New Pit & Holywell Chalk Nodular Formation. With the Melbourn Rock Member at its base	Middle Chalk

More about the Chalk

The Chalk is a fine-grained, porous, sedimentary rock – a pure limestone, being almost entirely composed of the mineral calcite (calcium carbonate) and is predominantly the result of millions of years of deposition of the skeletal remains (coccoliths) of marine algae (coccolithophores). These algae flourished in oceans that covered large parts of the continental masses of the northern hemisphere at a time during which the world was undergoing the largest global warming recorded in the geological record.



More about Flints

Within the topmost Middle and throughout the Upper Chalk, lying along the bedding planes, are varying numbers of nodules or bands of chert, more commonly called flint. Flint is a very fine-grained silica rich sedimentary rock which originates from the remains of siliceous organisms such as sponges. The alkaline environment of the chalk sediments promotes dissolution and dispersion of the silica over time. This dissolved silica can re-solidify to form nodular flints in acidic conditions such as that around decaying organic matter within seafloor sediments and burrows. Widespread anoxic conditions caused by sea level rise interrupting ocean currents, which replenish oxygen to the sea-floor, also cause dissolved silica to re-solidify in extensive flat laminar bands on the seafloor. Repeated extensive flint layers within the Chalk indicate the sea floor bottom at the time was subject to many periods of anoxia.



More about Clay-with-flints

The clay-with-flints is distributed in patches over the Chalk escarpment and is a residual deposit consisting of sandy clay and flints, formed during the Neogene and Quaternary periods by weathering of the Chalk and Palaeogene formations. The clay can be yellow, but is more usually reddish to orange-brown. Angular flints are derived from the Chalk and the rounded flints, sand and clay from the Palaeogene formations. As nutrients are bound to the clay minerals within the clay, the Clay-with-flints makes for a particularly fertile soil as evidenced in the presence of many cultivated fields.

Directions and Points of Interest

1. [Start in the Whiteleaf Hill Car Park \(Grid Reference: SU 8215 0370\)](#), ride past the information board on your left hand side.
2. [Take the first turn to the right in the direction of the Whiteleaf Cross](#), this path is part of the 'Ridgeway' – a prehistoric group of tracks at least 5,000 years old that once stretched from the Dorset to Norfolk coasts, providing a route over higher ground for drovers, travelers and traders that was less wooded and drier than the through the spring line area below the chalk escarpment. The woodland here is ancient semi-natural woodland, existing since at least the 1600's, containing ancient woodland floor plant species such as the wood sorrel (*Oxalis acetosella*) with its clover-leaf shaped leaves, wood anemone (*Anemone nemorosa*) with pretty predominantly white spring flowers and the ubiquitous purpley-blue English bluebells (*Hyacinthoides non-scripta*) of which the best spring displays can be seen on the neighboring Brush Hill on the other side of Peters Lane.

3. Slightly further up this path on the right you will see some linear depressions which were originally dug as practice trenches during WWI.



4. A late Bronze Age/early Iron Age cross ridge dyke cuts across the path at the narrowest part of the hill boundary. It is believed this was constructed as a barrier/boundary through which access to and from the promontory on the hill could be controlled and, combined with vegetation, could also have been part of an animal corral.
5. [Take the first right turn eastwards marked with a 'Bridle Way' and the blue arrow signs](#) This path is part of the Upper Icknield Way, another ancient trading route between the southwest and Norfolk, although thought not to be as old as The Ridgeway. Here you cycle through woodland scrub which represents a progression from the open chalk grassland to mature woodland. Scrub species like Hawthorn (*Crataegus monogyna*), Blackthorn (*Prunus spinosa*), Guelder Rose (*Virburnum opulus*), Dog Rose (*Rosa canina*), Dog Wood (*Cornus sanguinea*) and Spindle (*Euonymus europaeus*) provide valuable shelter and food for insects and birds. Keep an eye out for the pretty Speckled Wood (*Pararge aegeria*) and Peacock (*Inachis io*) butterflies. Keep your eyes open for the 1700 to 1800's practice of coppicing and pollarding. Coppiced trees have multiple trunks sprouting at ground level; pollards sprout from higher up (to keep new branch growth out of reach of deer).

6. Underlying geology of this path is Lewes Nodular Chalk Formation composed of interbedded hard nodular and softer chinks with regular seams of flints



7. [Turn left towards north-east.](#)
8. The trail crosses a small band of the Chalk Rock Member and then over the New Pit Chalk and Holywell Nodular

Chalk Formations. Although not readily visible in the trail here, you can see these further along.

9. [Cross Longdown Hill road and take the path eastwards up the incline parallel to the road.](#)

Beneath the initial sharp incline you can see the stark white of the Chalk Rock Member showing through. The Victorians called this unit of very hard chalk 'clunch', using it as a building and carving stone as it can be cut by a saw and carved with woodworking tools. Examples of use of this stone can be seen in old houses and churches in Princes and Monks Risborough.



10. [Take the sharp turn to the right, then left just before the wooden gate towards the north-east.](#) You are now back on top of the Lewes Nodular Chalk Formation.
11. [Shortly afterwards the trail veers to the right](#), but you can take a diversion to the left to visit the Iron Age fort on Pulpit hill, used by ancient people about 2,600 years ago. This path crosses from the Lewes Nodular Chalk Formation into the Clay-with-flints which although not directly visible, can be inferred by the boggy ground underneath where the impermeable clay holds onto water more effectively than the porous Chalk.
12. [The trail turns east-wards](#), crossing the Chalk Rock again and back into the New Pit and Holywell Nodular Chalk Formations. Through the trees to the left you will be able to see the Prime Minister's country residence 'Chequers' with its long beech tree drive. To the right of this part of the trail there are a couple of large sink holes where areas of crossing joints have focused surface water drainage and subsequent dissolution of the chalk.



The tangle of beech tree roots left proud of the dissolved chalk gives the woodlands a rather fantastical feel.

13. Cross the busy Missenden road and turn northwards on the trail just off the main road which skirts the field on your right, following a line between the field and hedgerow.



14. From the break in the hedgerow cross the small side road and pick up the trail signposted 'Ridgeway' and 'Bridle Way' which climbs up into Goodmerhill Wood, again crossing the Chalk Rock and into the Lewes Nodular Chalk Formation underneath.

15. At the 4 way junction turn right towards the south-east and follow the trail into Chisley Wood. In this path you can see the wide variety of flint colours, being all shades of whites, greys, browns and blacks. The Common or European Beech tree (*Fagus sylvatica*) is a natural component of this landscape and has been managed for many hundreds of years for firewood and timber. During the 18th and 19th centuries wood workers camped and made their living in the woods as bodgers and green wood turners, creating rough chair legs to be sent to factories in High Wycombe for finishing.

16. Follow the trail towards the left and then take the track between the metal gate and beech tree to skirt the woodland on the left with farmland on your right. The Clay-with-flints can readily be seen in the ploughed soil.



17. Take the first left turn to the west back into the woodland.
18. Take the next right turn.

19. As you reach the hamlet of Little Hampden Common keep the houses to your right and turn left through the gap in the metal gate and go north-eastwards into Little Wood followed by Scrub Wood.

20. Take the next left turn at the wooden fence on the edge of Scrub Wood keeping the fence on your left.

21. Entering the edge of Dunsmore hamlet, turn left at Cobnut farm to go into Ashmore Wood and follow the trail north-west into Longwalk Wood. The beech woodlands here are particularly rich in mosses clothing the woodland floor and tree trunks. Fungi and lichens can be closely examined on felled and fallen branches near the path.



22. Through Longwalk Wood the trail is hollowed out with high banks flanking either side. Just before you reach Lodge Hill road there is a cutout on your right hand side giving a nice view of the Holywell Nodular Chalk Formation. Shortly before Lodge Hill road turn southwards. Before you reach point 15. a marked change to harder white ground marks the outcrop of the Chalk Rock. Return along points 15. to 9.



23. Turn right and proceed west along Longdown Hill road.
24. Take the first turn down to and around the left side of The Plough at Cadsden. Keeping the pub on your right hand side, take up The Ridgeway along Thorns Lane. This crosses over the Melbourne Rock, a hard blocky fractured chalk with numerous nodular chalk beds.
25. Turn south for a steep and slippery climb up Whiteleaf Hill over the Chalk Rock which can be observed attached to the roots of toppled trees slightly down the bank on

your left. At the top of the hill go through wooden gate up onto the chalk grassland of Whiteleaf Hill.

26. One of the features you first encounter on the Whiteleaf Hill is a mound with a curious cross shape depression at its centre. From excavations this is believed to be the base for a Windmill,



probably in use between the 16th and 17th centuries. Other investigations in the area uncovered evidence for late Neolithic testing and rough shaping of flint nodules before being removed for final finishing elsewhere. The chalk grassland is a relic of sheep grazed land and supports a rich diversity of insects such as the chalkhill blue (*Lysandra choridon*) and marbled white (*Melanargia galathea*) butterflies and plants like clustered bellflower (*Campanula glomerata*) and horseshoe vetch (*Hippocrepis comosa*).



27. From this point you have a panoramic view which is particularly picturesque at sunset. Towards the south-west you can see across the Princes Risborough gap dry valley to the high ground of the Chalk escarpment on the other side at the Bledlow Cop. The view extending from west to north is over the Aylesbury Vale which contains rocks that range in age from 94 – 164 million years old i.e. the Lower Cretaceous at the base of Whiteleaf Hill back to the middle Jurassic in the far distance. The rocks of the vale are clays, mudstones and siltstones with mid-vale topographically higher outliers of harder limestones and sandstones forming the hills of Shotover, Brill, Chilton, Long Crendon, Ashendon, Haddenham,

Cuddington, Upper Winchendon, Waddesdon, Hartwell and Stone. These deposits tell a story of repeated sea transgressions and regressions and finally crustal uplift and erosion.

28. Being careful not to slip on the steep hillside, you can go and investigate the Whiteleaf Cross on foot which is cut into the hillside below the observation benches.



It is not known exactly when and why the cross symbol was created, although because it was first mentioned as an antiquity by Francis Wise in 1742 it is believed to be post-Medieval.

29. Neolithic Barrow SP 822 040. To the south of the Whiteleaf Cross is a double mound. Excavated in the 1930's and early 2000's this feature was found to be a



burial mound for a single man around 45 years old exhibiting badly worn teeth and arthritic joints. Radio carbon dating has constrained the burial and staged mound building which contains evidence of ceremonial feasting (pottery shards and animal bones) to 3,750 – 3,100 BC during the Neolithic age. The single burial indicates the man's importance to the local community at the time of his death. Apart from affording good views of the surrounding countryside from which to observe and hunt game, it is likely this high point had a significance of its own to Neolithic people as there is evidence for the mound having being built in stages as well as an urn with the cremated remains of a child being buried in the barrow during the Bronze Age.

- End. [Take the path through the metal gate to the south of the Neolithic barrow back to the Car Park.](#)

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For more geological trails or geological information and events visit the Bucks Earth Heritage Group website on:

www.bucksgeology.org.uk

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