

ROCKY FOUNDATIONS

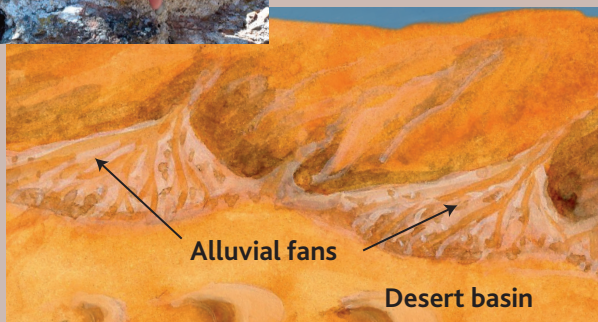
The landscape of the Westmorland Dales has its foundation in the underlying rocks and is the result of millions of years of Earth history. The wonderful countryside around Kirkby Stephen tells a story of tropical seas, arid deserts, glaciers and the shaping of the landscape by people.

TROPICAL SEAS AND DESERT PLAINS

In the Carboniferous Period, 360 to 300 million years ago, Britain lay near the Equator and this area was periodically covered in shallow tropical seas. The remains of sea creatures built up, eventually becoming the limestone we see today in the local fells. By 270 million years ago, in the Permian, this area had become a desert with hills of Carboniferous limestone rising above dune fields. Rubbly scree accumulated at the base of the hills and hardened into a distinctive local rock known as brockram. The dune sands became red sandstones. During the following Triassic, 250 million years ago, rivers flowed across the desert plains, depositing sand which became more red sandstone.



Brockram (seen here in a wall in Kirkby Stephen) is made of fragments of Carboniferous limestone set in red siltstone and sandstone. It formed in alluvial fans in Permian desert landscapes.



ICE AND WATER

In more recent geological times the landscape has been sculpted by ice and meltwater. At the height of the last ice age, around 26,000 years ago, there would have been hundreds of metres of ice above you here. Glaciers moulded glacial deposits into small hills known as drumlins, which now form much of this area's rolling green countryside.

Water continues to shape the landscape by eroding, transporting and depositing material. Impressive erosional features can be seen in the River Eden at Stenkrith Park.

EXPLORING THE WESTMORLAND DALES

This lovely part of east Cumbria forms the north-western corner of the Yorkshire Dales National Park. With support from the National Lottery Heritage Fund, the Westmorland Dales Landscape Partnership is working with Cumbria GeoConservation and other partners to reveal and celebrate the area's rich natural and cultural heritage, including its superb geology and landscape.

Walk length/time: 4¾ miles / 7.7km, 2.5 - 3 hours

Start: Kirkby Stephen public car park NY771084

Terrain: Public rights of way on grassy paths and farm tracks through fields, with gates, stiles and short sections of road.

Facilities: Refreshments and toilets in Kirkby Stephen

OS map: Explorer OL19 Howgill Fells & Upper Eden Valley



Yorkshire Dales National Park (Westmorland Dales)

Yorkshire Dales National Park



Cumbria
Wildlife Trust

www.cbdc.org.uk/cumbria_geoconservation_home/
www.cumbriawildlifetrust.org.uk
www.yorkshiredales.org.uk • www.friendsofthelakedistrict.org.uk
thewestmorlanddales.org.uk • dalesrocks.org.uk

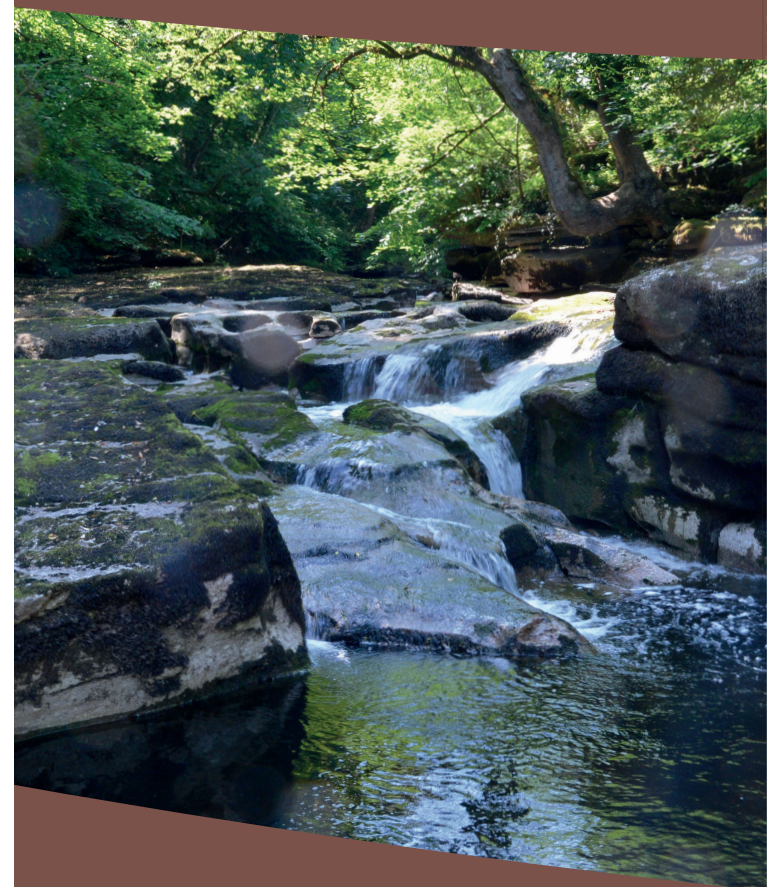


WESTMORLAND DALES

A geology walk around

KIRKBY STEPHEN & STENKRITH

4¾ miles / 7.7km



Made possible with

Heritage
Fund

👉 Look out for these features along the way!

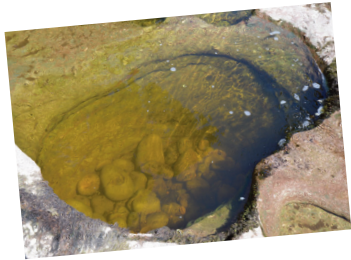
A This distinctive building at the entrance to the churchyard is The Cloisters. Built in 1810, it is made of **red sandstone** which is such a feature of the Eden Valley. The local red sandstones formed in desert dunes and rivers in Permian and Triassic times.

B The walls of the lane are built of **brockram**. This is an example of breccia, a rock made of fragments of even older rock, in this case **Carboniferous limestone**. It formed as scree and rubble in a Permian desert.

C Near a field barn and when the water is low you can see outcrops of layered (bedded) red sandstone in the riverbed. This is **St Bees Sandstone**, which formed from sand deposited by rivers flowing across desert plains in the Triassic.



D The River Eden at Stenkrith Park is a great place to see excellent waterworn brockram. The river has carved impressive erosional features in the brockram, including circular **potholes** and a dramatic **canyon** under the bridge.



One of the potholes at Stenkrith Park, formed by boulders swirling around in times of flood.

E Here you can see the exposed contact between Carboniferous limestone and the overlying Permian brockram (see right). The surface between them represents a time gap of around 70 million years and is known as an **unconformity**.

F Between the river and Nateby you pass many good exposures of brockram, which are packed with limestone fragments. Near the village the brockram has been quarried, probably for use as a local building material.

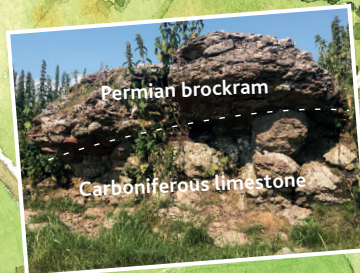
G In this small beck there are deposits of buff-coloured **tufa** where water flows over small cascades. Tufa is a limy deposit (made of calcium carbonate) which forms at some lime-rich springs, aided by the action of mosses and algae. In the banks of the beck you can see red St Bees Sandstone.

1 At far end of car park turn left to follow footpath past auction mart. Cross road and keep straight on through alleyway. Cross road to Market Square and go past red building [👉A].



5 Follow path through Stenkrith Park [👉D]. Climb up towards road. Before gate onto road turn left to cross footbridge over river. Turn right to go under road bridge and follow path up to small car park. Turn left and cross road bridge. Immediately turn left through gate (signed 'Wharton'), go down steps and along railed path. Climb to wicket gate into field. Turn left and follow path through two fields. Turn right to cross a stile and walk up edge of field to Halfpenny House.

6 Go through field gate, turn left and follow concrete farm track towards Wharton Hall. After cattle grid look out for a rock outcrop on the left [👉E].



Permian brockram
Carboniferous limestone

7 Take footpath on left signed 'Nateby'. Go downhill, over bridge and turn left along field edge. After next gate bear right, climbing up bank past brockram exposures [👉F] to a gate. Cross next field to a metal gate, then aim for a wall corner. Follow narrow path between walls to road and turn left into Nateby.

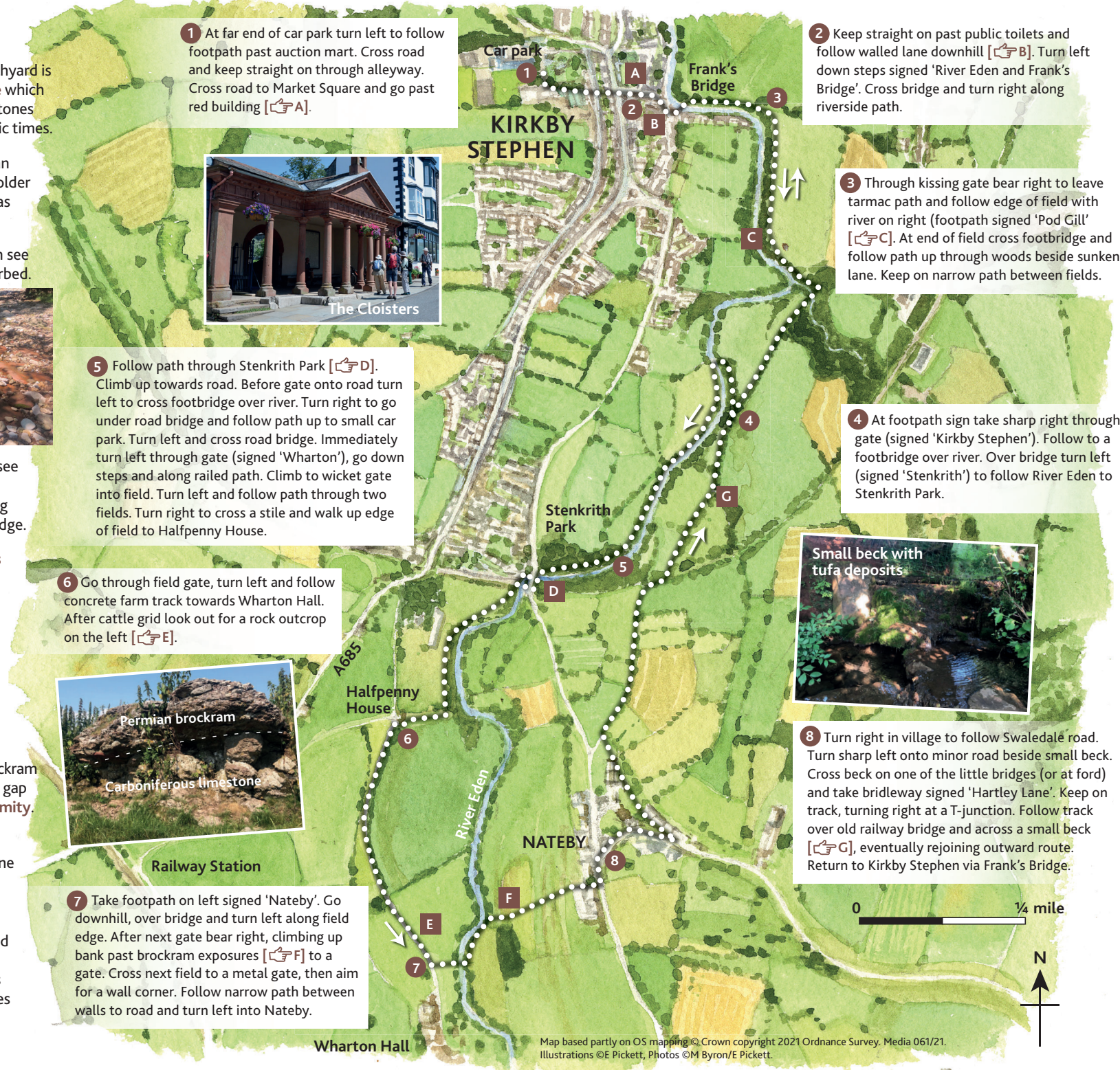
2 Keep straight on past public toilets and follow walled lane downhill [👉B]. Turn left down steps signed 'River Eden and Frank's Bridge'. Cross bridge and turn right along riverside path.

3 Through kissing gate bear right to leave tarmac path and follow edge of field with river on right (footpath signed 'Pod Gill' [👉C]). At end of field cross footbridge and follow path up through woods beside sunken lane. Keep on narrow path between fields.

4 At footpath sign take sharp right through gate (signed 'Kirkby Stephen'). Follow to a footbridge over river. Over bridge turn left (signed 'Stenkrith') to follow River Eden to Stenkrith Park.



8 Turn right in village to follow Swaledale road. Turn sharp left onto minor road beside small beck. Cross beck on one of the little bridges (or at ford) and take brideway signed 'Hartley Lane'. Keep on track, turning right at a T-junction. Follow track over old railway bridge and across a small beck [👉G], eventually rejoining outward route. Return to Kirkby Stephen via Frank's Bridge.



Wharton Hall