



THE  
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MINERAL  
LINE

## How to find us

### To the Brendon Hills

#### By bus

For up to date information check the Travel Line website at [www.travelinesw.com](http://www.travelinesw.com) or the Exmoor National Park "Getting around" pages at [www.exmoor-nationalpark.gov.uk/getting-around](http://www.exmoor-nationalpark.gov.uk/getting-around).

#### By car

**To Raleigh's Cross Inn:** Leave the M5 at Junction 25 (Taunton) and follow the signs to the A358 towards Minehead. Approximately 1 mile (1.6 km) after the sign for Bishops Lydeard, turn left along the B3224 for 8 miles (12.8 km). The Inn is on the left hand side at a crossroads.

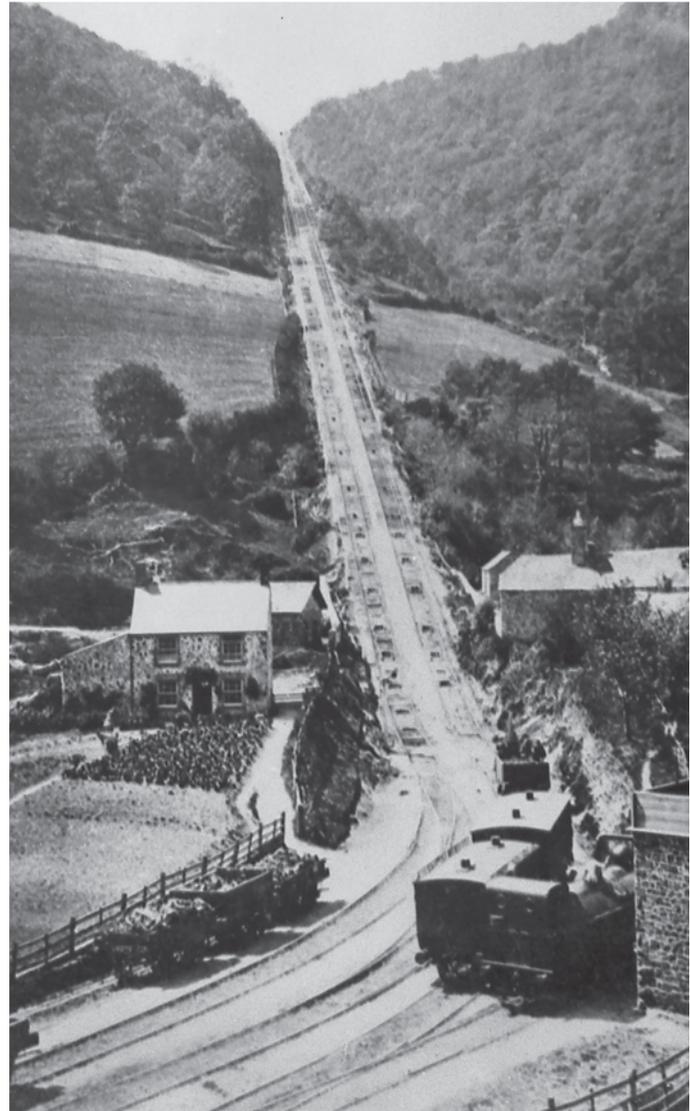
#### On foot

The Incline can be accessed via the public rights of way network. Ordnance Survey map OL9 covers Exmoor National Park, and includes the Brendon Hills and Watchet. Other maps are also available from most Tourist Information Centres. For the Winding House: OL9 Grid reference ST 023 344. The public bridleway meeting the Incline is: OL9 Grid reference ST 025 347.



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## The Incline and Winding House



A hidden heritage

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# West Somerset Mineral Railway

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## A history of the Incline and Winding House

The Incline is a spectacular example of Victorian engineering. It was constructed between 1857 and 1861 to provide a vital link between the iron mines of the Brendon Hills and the harbour of Watchet. It was a uniform gradient of 1 in 4 and was just over one kilometre in length.

The Winding House at the top of the Incline contained winding drums which lowered wagons of iron ore down the slope, at the same time hauling empty wagons back to the top.

The West Somerset Mineral Railway ran along the Brendon Hills transporting wagons of iron ore from the mines. The locomotives (weighing 13 tonnes) stopped near the brakehouse at the top of the Incline. Four girders supported the railway rails and the flat roof.

When the mines closed in 1883 no ore was going down the Incline to bring the empties up, so in order for it to keep operating a semi portable *Robey* steam engine was installed in the west side of the Winding House.

The railway finally closed in 1898, and the winding drum cables were greased and coiled around the drums. Nine years later when the Incline was re-opened by the Somerset Mineral Syndicate it took a week for the grease to de-solidify and the cable to unwind to the foot of the Incline.

In 1907 the Raleigh's Cross mines and buildings (situated south west of the Incline) were blown up, and the rubble was used to fill descending wagons, thereby hauling the empties up.

The winding drums were dynamited in 1917, which destroyed the east and west walls of the Winding House. They were rebuilt and secondhand windows put in during the Second World War as part of a scheme to convert the building to agricultural use.

**Cover image:** The Incline, c. 1870. The fireman fills *Pontypool's* tank from the water crane. Passengers waiting to ascend have climbed aboard a lightly loaded three plank wagon. Wagons wait in the siding on the left to be taken down to Watchet. Photograph courtesy of Mike Jones.



In the 1890s, the machinery was operated by the winding engine driver Jimmy Hoil. The triangular crank you can see in the photograph attached to the eastern end of the drum's axle meant that as the drums turned, the water was supplied to the locomotive and stationary pumping engine. Photograph courtesy of Mike Jones.

### Researching and conserving the structure

Between 2001 and 2003 the Exmoor Mines Research Group undertook an excavation of the floor of the Winding House to investigate how the Incline had operated and what equipment had been installed in the building. The group exposed the drum anchor bolt holes, which can now be seen on the floor of the Winding House.

In 1998 Exmoor National Park Authority purchased the track bed of the Incline, and it was scheduled as an Ancient Monument.

In 2009 the award of a Heritage Lottery grant enabled conservation work to be undertaken on the Incline and Winding House to protect the archaeology of this feat of Victorian engineering.



## How did the Incline work?

The Winding House contained two massive cast iron drums (1 metre wide and 5.2 metres in diameter). These drums lowered wagons of iron ore down the Incline, and wound empties or wagons of coal, lime or even passengers “at their own risk” back up.

The winding drums were mounted on a single axle, and so turned together. The axle was supported by four plummer blocks bolted to wrought iron trusses, which rested on timber blocks sunk into the Winding House floor and were anchored down by 16 wrought iron bolts, 15 of which can still be seen in the ground today.

The two cables were wound round each drum separately. One cable passed over the top of the west drum and along a duct between the rails, to emerge close to the brakehouse at the top of the Incline. The other cable came off the bottom of the eastern drum and through the arched opening in the wall to emerge close to the brakehouse. Each cable was over 1000 metres (3280 ft) long and weighed 3.2 tonnes.

Semaphore signals were used to communicate between the top and the bottom of the Incline. The banksman at Comberow attached the cable to the ascending wagon by the means of three short lengths of chain, and by pulling a lever, raised the signal at the top of the Incline. The brakesman at the top coupled the descending wagon to the other cable, operated the semaphore at Comberow and raised back the stop block across the rail. This meant the other cable tightened, and drew the ascending wagon up.

The winding drums were self operating - as one cable wound down the other wound up. Three chains were hooked onto the

wagon, and it took 12 minutes for it to reach the bottom, with the winding drums turning at a rate of five revolutions per minute.

There were brake bands around each drum, and the brakesman put the brakes on as the wagon came over the brow of the Incline about 30 metres (98 ft) north of the winding house. The stop block was lowered, the wagon brake applied, and one of the Neilson locomotives passed over the roof of the Winding House to be coupled to the wagon. At the foot of the Incline, the descending wagon was uncoupled and shunted into a siding by horse.

Watchet Market House Museum has a working model of the Incline, as well as a model of the *Lizzie*, which transported iron ore to Wales.

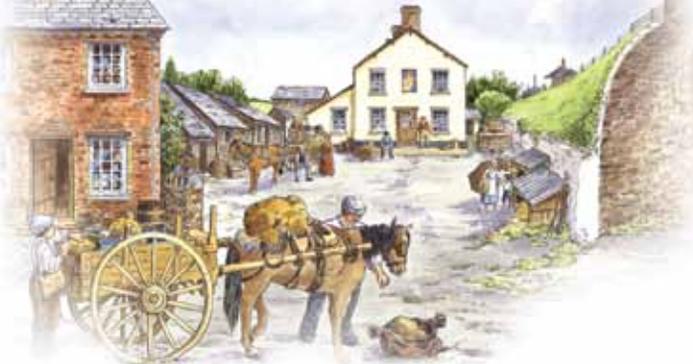


An artist's reconstruction of the Incline and Winding House. Drawing by Anne Leaver.

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## Brendon Hill village



Fireplaces can still be seen at the eastern end of the Winding House. The fireplaces would have been lit in the building once known as Drum Cottage. This simple house was inhabited by the brakeman, but was not lived in after 1875. This was just one of many cottages which were built nearby in the 1860s to form Brendon Hill Village, and housed more than 250 workers and their families.

### The spiritual life of the miners

Each chapel had a Sunday school, and the iron church which stood at the top of the Incline was used as a school on weekdays for the miners' children.

Beulah Chapel was built in 1861 to serve the spiritual needs of the Bible Christians (a splinter group of the Wesleyan Methodist church which was founded in North Devon and quickly spread to West Somerset). After the mines closed in 1883 the congregation dwindled and by 1900 it was derelict. It re-opened again in 1910 and is still used today.

Before the houses were built, a miners' dormitory was opened over the Company stables. It held around fifty single men who walked home on

Saturday afternoons and returned by 7.00 am to resume their shifts on Monday mornings. After the houses were built, the dormitory was used as a Wesleyan chapel.

### The Bampton Road Stores

In 1857 the Watchet Trading Company was formed to provide necessities such as coal, lime bricks and agricultural materials. They built two stone and slated buildings with a yard between them. At the front of the ground floor of the western block was a general shop, a warehouse held artificial fertilizer, and on the first floor dry goods were stored.

Once the Incline opened in 1861 the Bampton Road Stores were officially in business. A year later a man named John Vickery from Luxborough opened the general store.

The stores did not survive long after the closure of the railway in 1898. When the Mineral Line Syndicate re-opened in 1907 the stores were occupied by miners and their families. Single men slept in bunk beds in the storage area. In 1910 the buildings were finally vacated and left to decay.

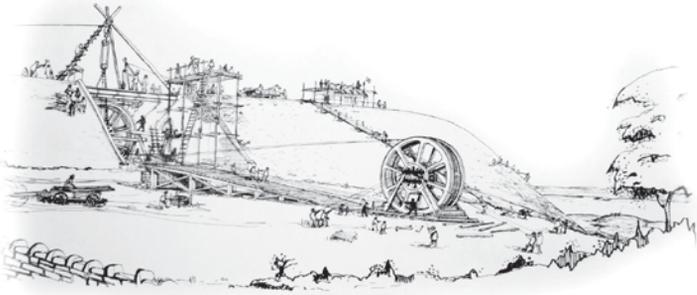
The Iron church at the top of the Incline, c. 1861. The brakeman's hut can also be seen. Photographer Daniel Nethercott. Photograph courtesy of Chris Tilley.



An artist's reconstruction of Brendon Hill Village. Drawing by Anne Leaver.



## Constructing the Incline



The Incline was designed by Rice Hopkins, a Welshman with experience of railway design. He died before construction of the WSMR had reached Comberow.

Construction of the Incline began in 1857, before the completion of the line from Watchet to Comberow. Contractors started at the bottom by constructing underbridge 13 and associated retaining walls, and a dry stone wall between underbridges 13 and 14 was built to minimise in fill required. A stationary steam winding engine was brought over from South Wales to haul rock uphill, although it proved inadequate and had to be replaced. The formation of an embankment was achieved gradually by blasting out over 25,000 cubic metres of rock to form four cuttings.

A subsequent engineer imported more fill to improve the embankments, and diverted the stream down the east side of the Incline, constructing three weirs to reduce its flow. It was culverted under the Incline and discharged through a hole in the retaining wall.

The Incline was the most expensive element of the West Somerset Mineral Railway. The lower six miles of the West Somerset Mineral Railway cost £2,700 per mile to build; the upper six miles cost £4,400 per mile to build. However the mile which includes the Incline cost £44,800 to build, over £2 million today! It was however vital for transporting the ore down from the Brendon Hills to the valley below.

Above, an artist's impression of the winding drums being erected. Drawing by Mike Jones.



## Further information

### Contacts

**West Somerset Mineral Railway** - visit [www.westsomersetmineralrailway.org.uk](http://www.westsomersetmineralrailway.org.uk) for further information about the Mineral Line, the Heritage Lottery funded project, a selection of images and educational material.

**Watchet Market House Museum** - is the ideal starting point for exploring the Mineral Line. For opening hours please visit [www.watchetmuseum.co.uk](http://www.watchetmuseum.co.uk).

**Exmoor National Park Centres** - provide informative displays, maps, publications and specialist knowledge to enhance your visit to Exmoor.

- Dunster 01643 821835**
- Dulverton 01398 323841**
- Lynmouth 01598 752509**

Please check [www.exmoor-nationalpark.gov.uk](http://www.exmoor-nationalpark.gov.uk) for more information about the Exmoor National Park Authority, and for opening hours of the National Park Centres.

**West Somerset Railway** - this railway connects several Mineral Line locations. Occasional tours run from Minehead. Visit [www.west-somerset-railway.co.uk](http://www.west-somerset-railway.co.uk) or call 01643 704996 for more information.

**Raleigh's Cross Inn** - is a sixteenth-century coaching inn situated a few miles from the remains of the West Somerset Mineral Railway on the Brendon Hills. To find out more please visit [www.raleighscross.co.uk](http://www.raleighscross.co.uk) or call 01984 640 343.

**Forestry Commission** - is owner of two key Mineral Line sites. For more information visit [www.forestry.gov.uk](http://www.forestry.gov.uk).



Watchet Market House Museum. Photograph courtesy of EPNA.



Large font versions of these leaflets are available to download from [www.westsomersetmineralrailway.org.uk](http://www.westsomersetmineralrailway.org.uk).