HS2 Tunnelling in Hillingdon - Frequently Asked Questions

Skanska Costain STRABAG (SCS) Railways were appointed in 2017 as the main works civils contractor working on behalf of HS2 Ltd. SCS are responsible for the design and construction of bridges, embankments, and tunnels for the Greater London section of the new railway.

SCS will be tunnelling for approximately 13 miles (21 kilometres) beneath London, from West Ruislip in the west to the Euston Approaches in the east.

This set of Frequently Asked Questions relates to the construction of the Northolt Tunnels West between West Ruislip and the Greenpark Way ventilation shaft near Greenford station in the London Borough of Ealing.

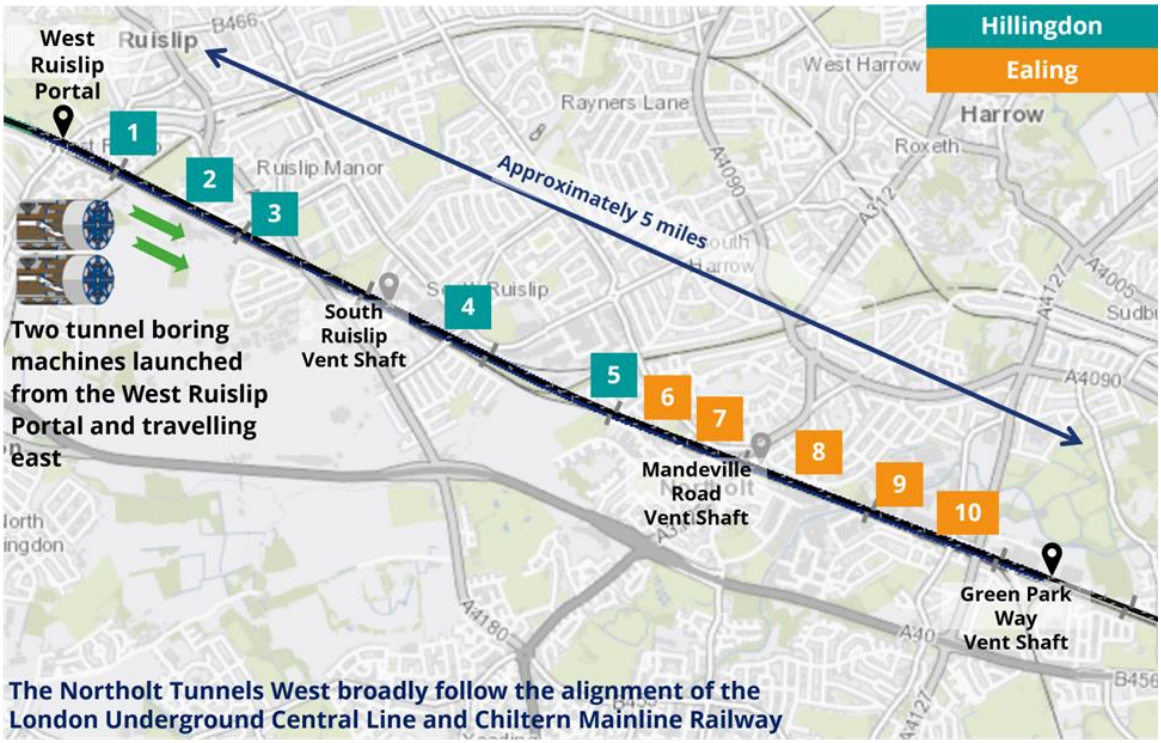
Where are the tunnels?

The Northolt Tunnels West travel for approximately five miles between the West Ruislip Portal in the west, adjacent to Ruislip Golf Course, and the Greenpark Way Vent Shaft in the east, located in Greenford and roughly adjacent to the south of the Horsenden Recreation Ground.

Cross passages will be built approximately 500 metres apart along the route and, whilst invisible to the travelling public, will have a key role in providing a safe operational railway. In an emergency, they allow the safe evacuation of trains.

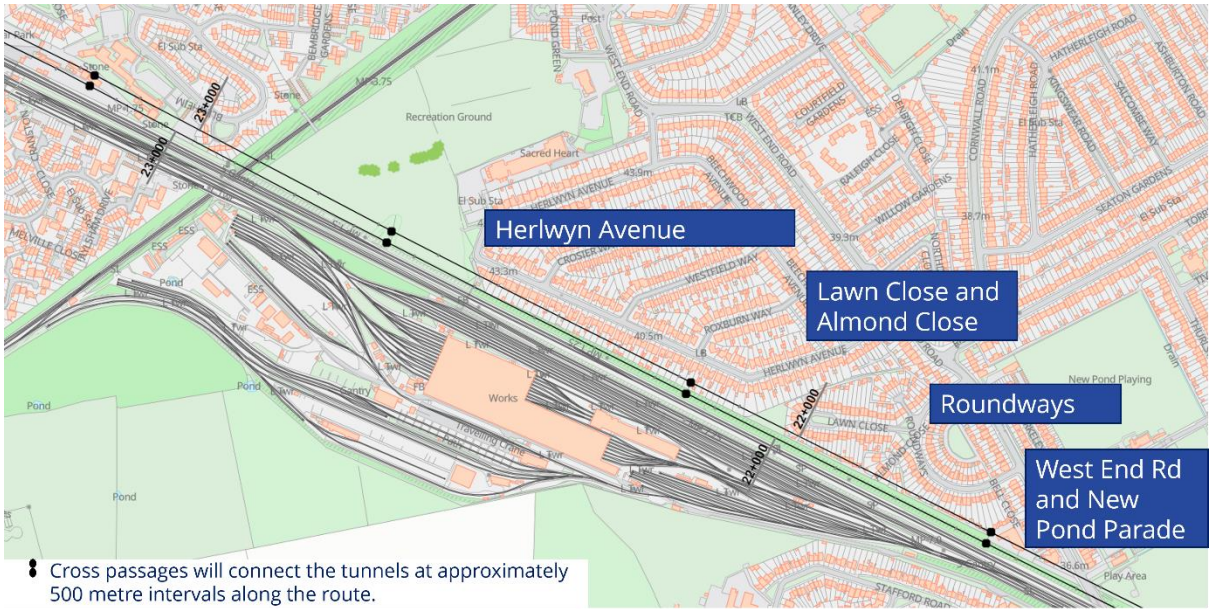
Greenpark Way is one of three ventilation (vent) shafts on this stretch of the route, the others being Mandeville Road (near Northolt Underground Station) and South Ruislip, at the Old Arla Dairy Complex behind the Victoria Retail Park (Aldi and B&M shopping complex). Vent shafts regulate air quality and temperature in the tunnel, provide access for emergency services, and allow smoke to be extracted in the event of a fire.

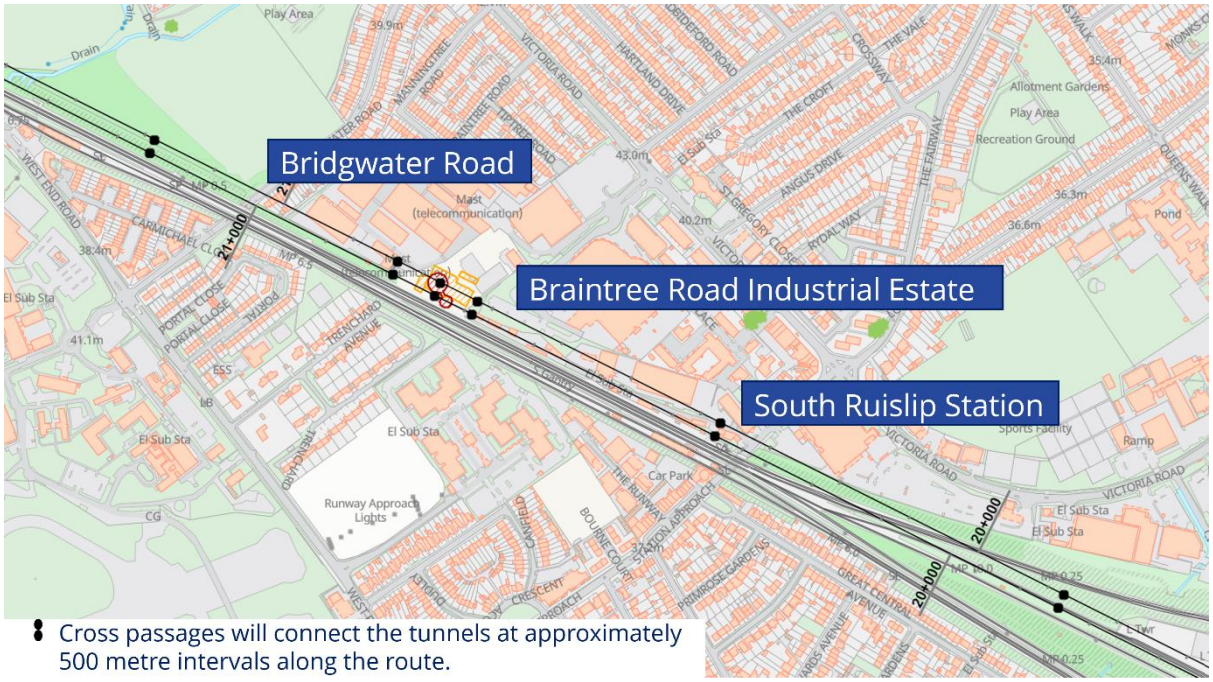
The tunnels broadly follow the alignment of the London Underground Central Line and Chiltern Mainline Railway. They will be constructed near the following residential roads in Hillingdon and Ealing.



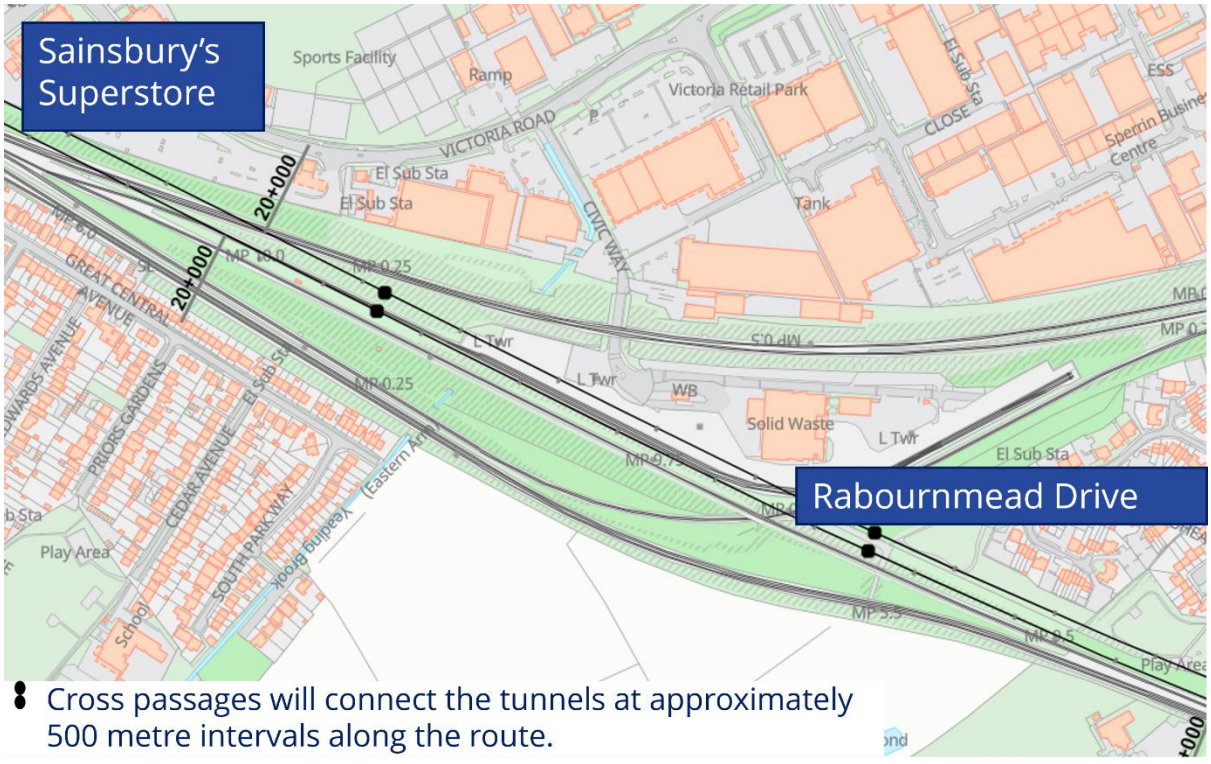
Location	Hillingdon	Location	Ealing
1	Ickenham Close and Blenheim Crescent	6	Wilsmere Drive, Newbury Close & Cartmel Court
2	Herlwyn Avenue	7	Eastcote Lane North
3	Lawn Close, Almond Close, Cherry Close & Roundways	8	Badminton Close, Carr Road and Cherry Gardens
4	Bridgwater Road	9	Long Drive, Oldfield Lane North and Station Approach
5	Rabournmead Drive	10	Rockware Avenue

Where are the cross passages?





- Cross passages will connect the tunnels at approximately 500 metre intervals along the route.



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Tunnels construction update

By Winter 2023, our tunnel boring machines (TBMs) have built nearly 4 miles (approximately 6 kilometres) of tunnels since they began their tunnelling journeys from the West Ruislip Portal.

Our community engagement team have been contacting residents whose properties are along the line of route to let them know when to expect tunnelling near their properties. We're also checking with residents after the TBM has gone past their properties.

How will the tunnels be dug?

The Northolt Tunnels West will be built using two Tunnel Boring Machines (TBMs), which are specialist pieces of equipment used for tunnelling. Twin tunnels will be bored: one for trains travelling from the West Midlands to London, known as the London tunnel and one for trains travelling from London to the West Midlands known as the Birmingham tunnel.

Excavated earth is removed via a conveyor belt from the TBMs to the West Ruislip Portal, then will be transported west via conveyor to the storage and treatment site located east of Harvil Road and south of the Chiltern line.

You can watch a video about our tunnel boring machines at this link: https://www.hs2.org.uk/building-hs2/tunnels/meet-our-giant-tunnel-boring-machines/

How will you create the cross passages between the tunnels?

The ground above the tunnel is mostly clay and approximately 16m (52 feet) thick with a sand channel running through the tunnel's crown. Because of the ground conditions at these locations, we will freeze the ground which is the proven, safest way to control the ground during cross passage construction. The side of the completed upline tunnel will be broken out and then a remote controlled robotic digger will be used to dig out the frozen ground and a sprayed concrete lining will form the interconnecting tunnel. This phase generates some ground-borne noise and vibration but because of the clay layer and the ground conditions it will be less noticeable.

How deep will the tunnels be?

The depth of the Northolt Tunnels West in these locations (from the ground surface to the crown of the tunnel) vary between 13.6m at its shallowest and 18m at its deepest (approximately the height of three and four double decker buses stacked on top of each other respectively).

If you would like specific tunnelling depth information, please get in touch by contacting the HS2 Helpdesk on 08081 434 434 or email HS2enquiries@hs2.org.uk

What are the working hours?

The TBMs operate 24 hours a day, 7 days a week (apart from Christmas Day) until the construction of the tunnel is complete. A crew of operatives will control each TBM, working in shifts to keep the machines running 24/7. They will be supported by people on the surface, managing the logistics and maintaining the smooth progress of the tunnelling operation.

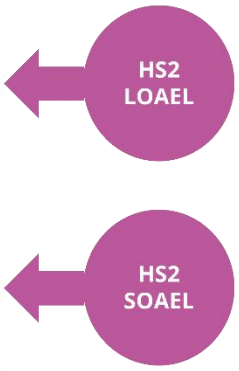
The TBMs will stop periodically for maintenance and to provide respite for the tunnelling crews.

Will it be possible to hear or feel vibrations from the tunnel boring machines and construction of the cross passages?

We are taking all reasonable steps to control ground-borne noise and vibration so that it does not exceed the Lowest Observed Adverse Effect Levels (LOAEL) set out in Information Paper E21.

Based on experience from London Underground, ground-borne noise or vibration below the LOAEL may still be perceptible to some people some of the time depending on the person's sensitivity to noise and how much sound there already is in the environment. But noise exposure below LOAEL is unlikely to have adverse effects on health or quality of life.

Impact classification	Ground-borne sound level dB L_{pASmax}	Description[1]	Existing example (where there are similar levels of ground-borne noise)[2]
Negligible	< 35	The passage of trains may be audible to particularly sensitive people during quiet periods of the day in rooms with low background noise. Very unlikely to cause complaint.	Recent rail tunnels such as Jubilee Line Extension and HS1.
Low	35-39	The passage of trains may be audible particularly during quieter periods of the day such as evening or early morning. Level of annoyance is likely to be low with few complaints.	Ground floor room 20-70 metres from London Underground Limited tunnel. Levels dependent on tunnel depth, ground-type and train speed.[3]
Medium	40-44	The passage of trains is likely to be audible regardless of the time of day. Levels likely to give rise to some annoyance during quieter periods of the day. There may be some complaints.	Ground floor room 10-40 metres from London Underground Limited tunnel. Levels dependent on tunnel depth and ground-type.[3]
High	45-49	Noise from the passage of trains will tend to be prominent and give rise to annoyance regardless of time of day. It is likely that there will be some complaints.	Directly above some atypical existing London Underground Limited lines (e.g. shallow tunnel with poor quality jointed rails).
Very high	>49	During the passage of trains ground-borne noise will probably dominate above noise from other sources (road traffic etc). Considerable annoyance likely throughout the day and night. There may be some sleep disturbance. Complaints very likely.	Directly above some exceptional sections of existing London Underground lines (e.g. extremely shallow tunnel with very poor quality jointed rails).



Our predictive assessments of ground borne noise and vibration conclude there is a low risk of vibration or ground-borne noise levels being in excess of the LOAEL for residential buildings in Hillingdon. Experience on other tunnelling projects suggests that occupants of buildings located in close proximity to the tunnelling may hear or feel some ground-borne noise and vibration. Advance notice of when the tunnel boring machines are likely to be nearby has proven very effective on projects like Crossrail and the Northern Line Extension.

How will I know when the tunnels and cross passages are being constructed?

Our community engagement team will be carrying out targeted engagement to make people aware of when the tunnel boring machines are likely to pass nearby, the duration of which should be no more than two to three days. We will also inform up to four weeks in advance those residential properties near where the cross passages will be constructed.

How will you manage settlement?

Settlement is the technical term given to the way the ground moves around an excavation, such as a tunnel, after it has been dug. Some ground movement occurs naturally at anything up to 10 millimetres a year. For example, the clay under most of London swells slightly during long wet, cool periods, and contracts slightly during very long dry hot periods. Buildings generally withstand

seasonal movement, but construction of the tunnels may cause some additional ground movement.

TBMs are the best method for safely excavating tunnels through a variety of soil and rock in dense urban areas. Each machine operates as a self-contained underground factory, which as well as digging the tunnel, will also line it with concrete wall segments and grout them into place as it moves forward at a speed of around 15m a day.

This reduces the risk of settlement (the way ground moves around a hole after it has been dug) which means we can manage any potential impacts from tunnelling on nearby buildings. As it is also the quickest method of tunnelling, any effects during tunnel construction are limited to a couple of days as the TBM passes.

How are residents protected from the potential impact of our tunnelling works?

There are legal provisions under the HS2 Act to provide protection should any damage occur from HS2 tunnelling works or excavations.

If, during or following tunnelling, you believe that damage has occurred, you can contact us to let us know. As part of the assessment of a damage claim, a second comparison survey of a property may be undertaken. You can contact HS2 Helpdesk on 08081 434 434 or email HS2enquiries@hs2.org.uk.