

HS2 announces start of construction on UK's longest railway bridge

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HS2 Ltd has said that work has begun on building the railway's first and longest viaduct, with the launch of a 700-tonne bridge-building machine.

The event was attended by HS2 minister Andrew Stephenson MP, just outside London.

Stretching for more than two miles (3.4km) across a series of lakes and waterways between Hillingdon and the M25, the Colne Valley Viaduct will also be the longest railway bridge in the UK.

- **HS2 reveals the innovative slurry treatment technology supporting the Colne Valley 'rewilding' project**
- **HS2 reveals ambitious plans to create one of the largest areas of chalk grassland on the edge of the Chilterns in the Colne Valley**
- **Tarmac and Align trial innovative low carbon concrete on HS2**

The start of construction is the latest major milestone in the delivery of the HS2 project, which is designed to improve rail links between London, Birmingham and North, help level-up the economy and provide a low

carbon alternative to car and air travel.

HS2 Minister, Andrew Stephenson said: “Today, HS2 began construction on what’s set to be Britain’s longest railway viaduct, a landmark moment for HS2 and a feat of British engineering, taking the HS2 line from London, and into Hertfordshire and Buckinghamshire.

“Infrastructure is the backbone of HS2 and this viaduct will be integral to delivering faster journeys and an increased capacity rail network.”

Known as a ‘launching girder’, the 160m long bridge-building machine is the only one of its kind in the UK and will be used to lift the giant concrete deck segments that form the viaduct’s arches into position. Once each section is complete, the machine will inch itself forward into position to build the next stage.

A total of one thousand deck segments will be needed, with each one weighing up to 140 tonnes. To allow for the gentle curves of the viaduct as it crosses the valley, all the segments are slightly different shapes and made on site at a purpose-built temporary factory close to the north abutment.

Welcoming the milestone, HS2 Ltd chief executive Mark Thurston said: “I’m absolutely delighted that we have started work to assemble the giant deck segments that will form the Colne Valley Viaduct. It is yet another big milestone for HS2 Ltd, as we work to deliver the UK’s new high speed railway. Once complete, this record-breaking structure will form a key part of the HS2 railway – helping to deliver better connections across the UK, free up rail capacity on the train network, and offer passengers a zero carbon travel option.

“I’d like to thank all those involved in getting us to this exciting stage and look forward to seeing the whole viaduct come together over the coming years.”

The huge viaduct project is being led by HS2’s main works contractor Align JV – a team made up of Bouygues Travaux Publics, Sir Robert McAlpine and VolkerFitzpatrick.

Originally built in 2004, the launching girder was first used during the construction of the Hong Kong East Tsing Yi Viaduct. Specially designed to handle complex viaduct construction, the machine is named ‘Dominique’ in memory of Bouygues engineer Dominique Droniou who played a leading role in its design and development.

56 piers each weighing around 370 tonnes are being constructed along the Colne Valley ahead of the girder, with the girder moving from one pier to the next, installing the deck segments as it goes. One segment is put in place each side of the central pier, using a cantilever approach to balance the structure, as two half-arches either side of each pier are constructed simultaneously. Steel tensioning cables will be threaded through the segments to strengthen the bridge.

Every segment will be a slightly different shape depending on where it fits into the viaduct and the modular approach was chosen to ensure quality, safety and efficiency.

The viaduct pre-cast factory where the segments are made at the peak of construction will cast around 12

segments every week using a 'match-casting' technique. This approach – where each segment is poured against the previous one – will ensure the whole deck fits perfectly when assembled on the piers. The mammoth 100m long viaduct precast factory, which is visible from the M25, has an internal volume of 105,000 cubic metres – making it larger than the Royal Albert Hall.

Once construction is complete, the factory and surrounding buildings will be removed and the whole area between the viaduct and the Chiltern tunnel will be transformed into an area of chalk grassland and woodland as part of **HS2's** 'green corridor' project.

Align Project Director, Daniel Altier said: "The start of the erection of the deck segments marks the latest important milestone for **Align**, relating to the construction of the Colne Valley Viaduct.

"There has been a lot of hard work involved to get us to this point, and the achievements so far are a great example of what collaboration and excellent teamwork can deliver. I would specifically like to acknowledge the contribution from our supply chain partners – **VSL, Kilnbridge, KVJV, VolkerStevin, Tarmac, Sendin** and **Vaughan Plant Haulage.**"

The design of the Colne Valley Viaduct was inspired by the flight of a stone skipping across the water, with a series of elegant spans, some up to 80m long, carrying the railway around 10m above the surface of the lakes, River Colne and Grand Union Canal.

Set low into the landscape, wider spans will carry the viaduct crosses the lakes, with narrower spans for the approaches. This design was chosen to enable views across the landscape, minimise the viaduct's footprint on the lakes and help complement views across the natural surroundings.

In another visible sign of progress on the project, the team have also completed the construction of three of four jetties across the lakes to get equipment into position to support the construction and help take construction vehicles off local roads. Where the viaduct crosses the lakes, the piles are being bored directly into the lakebed, using a cofferdam to hold back the water while the pier is constructed.