



# HIGH SPEED TWO PHASE ONE INFORMATION PAPER

## E4: WATER RESOURCES AND FLOOD RISK

This paper outlines the approach to assess and mitigate the impact on water resources and flood risk of Phase One of High Speed 2.

It will be of particular interest to those potentially affected by the Government's proposals for high speed rail.

This paper was prepared in relation to the promotion of the Bill for Phase One of the scheme which is now enacted. Although the contents were maintained and updated as considered appropriate during the passage of the Bill (including shortly prior to the enactment of the Bill in February 2017) the contents are now historic and are no longer maintained.

If you have any queries about this paper or about how it might apply to you, please contact the HS2 Helpdesk in the first instance.

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# E4: WATER RESOURCES AND FLOOD RISK

## 1. Introduction

- 1.1. High Speed Two (HS2) is the Government's proposal for a new, high speed north-south railway. The proposal is being taken forward in two phases: Phase One will connect London with Birmingham and the West Midlands and Phase Two will extend the route to Manchester, Leeds and beyond.
- 1.2. HS2 Ltd is the non-departmental public body responsible for developing and promoting these proposals. The company works to a Development Agreement made with the Secretary of State for Transport.
- 1.3. In November 2013, HS2 Ltd deposited a hybrid Bill<sup>1</sup> with Parliament to seek powers for the construction and operation of Phase One of HS2 (sometimes referred to as 'the Proposed Scheme'). The Bill is the culmination of nearly six years of work, including an Environmental Impact Assessment (EIA), the results of which were reported in an Environmental Statement (ES) submitted alongside the Bill. The Secretary of State has also published draft Environmental Minimum Requirements (EMRs), which set out the environmental and sustainability commitments that will be observed in the construction of the Proposed Scheme.
- 1.4. The Bill is being promoted through Parliament by the Secretary of State for Transport (the 'Promoter'). The Secretary of State will also appoint a body responsible for delivering the Proposed Scheme under the powers granted by the Bill.
- 1.5. This body is known as the 'nominated undertaker'. There may well be more than one nominated undertaker – for example, HS2 Ltd could become the nominated undertaker for the main railway works, while Network Rail could become the nominated undertaker for works to an existing station such as Euston. But whoever they are, all nominated undertakers will be bound by the obligations contained in the Bill and the policies established in the EMRs.
- 1.6. These information papers have been produced to explain the commitments made in the Bill and the EMRs and how they will be applied to the design and construction of the Proposed Scheme. They also provide information about the Proposed Scheme itself, the powers contained in the Bill and how particular decisions about the project have been reached.

## 2. Overview

- 2.1. This information paper outlines the approach taken to assess and mitigate the impact on water resources and flood risk of the Proposed Scheme. This includes impacts and mitigations on surface and groundwater resources and flood risk;

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<sup>1</sup>The High Speed Rail (London – West Midlands) Bill, hereafter 'the Bill'.

the general approach to monitoring, the Water Framework Directive, engagement with statutory bodies and legislative provisions.

### 3. Surface water

- 3.1. HS2 Ltd has designed the project to avoid or reduce adverse impacts on rivers, streams, ponds, canals and groundwater. Structures along the route have been designed to ensure the quality of watercourses is not adversely affected. The route crosses rivers and streams either by viaduct, clear span bridges or, where necessary, culverts. River diversions have been designed to be sympathetic to their surroundings and take account of ecological requirements. Structures that include significant below ground works, such as cuttings for example, have been designed to take into account the potential impact on springs, ponds, watercourses and ecological sites.
- 3.2. The design of the Proposed Scheme includes Sustainable Drainage Systems (SuDS) to control the rate, volume and quality of run-off from the rail corridor and other infrastructure, including an additional allowance for climate change. These systems will help to avoid an increase in flood risk and will help to maintain natural flow regimes by encouraging storm water to soak into the ground or, where that is not reasonably practicable, will discharge it into watercourses or surface water/combined sewers at a controlled rate. This will be undertaken by implementation of SuDS which include balancing ponds, swales, infiltration trenches and other forms. Where possible, these drainage systems will also help to avoid having an adverse effect on the quality of the water which the run-off flows into by allowing sediments to settle out.

### 4. Groundwater

- 4.1. Impacts of the Proposed Scheme on groundwater flows, levels and quality, have been analysed. Where the assessment predicts that a likely significant adverse effect may occur, a strategy to manage the risk will be agreed with the Environment Agency. Potential significant adverse effects on groundwater, due to construction, (such as excavations to form cuttings or tunnels, including green tunnels), will be mitigated locally wherever reasonably practicable. The tunnels will be designed so that the ingress of groundwater is not significant. The assessment has demonstrated that the passage of groundwater past the tunnels is not significantly reduced. The drainage within the Proposed Scheme will be designed, where reasonably practicable, to encourage the recharge of groundwater bodies.
- 4.2. Potential adverse effects on groundwater quality will be mitigated through the implementation of measures set out in the draft Code of Construction Practice (CoCP). Impacts to groundwater from existing land contamination are presented in the Volume 2, CFA reports, Section 8 and their associated Volume 5 Appendices.

## 5. Flood risk

- 5.1. Where the railway and associated works has the potential to increase flood risk, the design reflects the approach required by the National Planning Policy Framework (NPPF) and the supporting Technical Guidance (such as the incorporation of flood risk mitigation measures). The design aim is for no increase in the risk of flooding for vulnerable receptors including residential property (defined as more/highly vulnerable and essential infrastructure in Table 2 of the NPPF) during the lifetime of the development, including an additional allowance for climate change. If required, the design will mitigate loss of floodplain by creating replacement storage areas for the 1 in 100 year (1%) annual rainfall probability event, with an allowance for climate change.
- 5.2. Where it can be substantiated that, as a result of the works undertaken, the adjacent or nearby land is subject to an increase in flood risk which results in a reduction in land value, compensation may be claimed in accordance with the Compulsory Purchase Act 1965 and Land Compensation Act 1961.
- 5.3. A high level climate change risk and resilience assessment has been undertaken to identify the potential risks of climate change on the Proposed Scheme, and to assess the Proposed Scheme's resilience and capacity to cope with these potential risks. In addition a comprehensive flood risk assessment has been carried out for each community forum area in consultation with the Environment Agency; see Volume 5, Appendix WR-003-001 to WR-003-026. A route-wide flood risk assessment has also been carried out.

## 6. Monitoring

- 6.1. Monitoring will be undertaken in consultation with the Environment Agency prior to and during construction, and if required post construction, to establish baseline conditions for surface water and groundwater and to confirm the effectiveness of temporary and permanent mitigation measures together with any remedial works deemed necessary.

## 7. Water Framework Directive

- 7.1. HS2 Ltd has also reported on the compliance of the Proposed Scheme with the objectives of the Water Framework Directive. Refer to ES Volume 5, Appendix WR-001-000 and the [Water Framework Directive compliance assessment review](#) for further details. The scope and the assessment methodology was agreed with the Environment Agency.

## 8. Engagement

- 8.1. Engagement has been, and will continue to be, undertaken with the Environment Agency, Lead Local Flood Authorities, Internal Drainage Boards, the Canal & River Trust and water companies, to ensure that likely residual significant adverse effects are managed and mitigated appropriately.

## 9. Legislative Provisions

- 9.1. The Protective Provisions of the Bill, state that before beginning to construct any “specified work” (in the main, those affecting drainage, flood storage and flood defence, the flow or purity of water and conservation of water resources), the nominated undertaker will submit plans, including method statements, for the works to the Environment Agency or other regulatory bodies for approval. Works will be constructed in accordance with the approved plans.
- 9.2. The Environment Agency or other statutory bodies may, amongst other matters, make conditions requiring the nominated undertaker at its own expense to construct such protective works as are reasonably necessary to safeguard any drainage work against damage or to secure that its efficiency for flood defence purposes is not impaired during the construction of the specified works.
- 9.3. These provisions have effect instead of the normal consenting regime which would apply, for example, under the Land and Drainage Act 1991, or the Water Resources Act 1991.

## 10. More information

- 10.1. More detail on the Bill and related documents can be found at: [www.gov.uk/HS2](http://www.gov.uk/HS2)
- 10.2. More detail on the approach to Water Resources and Flood Risk can be found within the Environmental Statement and Environmental Memorandum.