HS2

Balancing ponds and replacement floodplain storage areas

This factsheet outlines the approach to balancing ponds and replacement floodplain storage areas which is expected to be used to mitigate the impact of the Proposed Scheme on water resources and flood risk.

Version 3.0

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1 Introduction

1.1.1 High Speed Two (HS2) is the Government's proposal for a new, high speed north-south railway. The proposal is being taken forward in phases. Phase One will connect London with Birmingham and the West Midlands. Phase 2a will extend the route to Crewe. The Western Leg of Phase 2b comprises an extension of the network to Manchester and a connection to the West Coast Main Line at Golborne, and is referred to as the Western Leg hybrid Bill. The Eastern Leg of Phase 2b currently comprises an extension of the network from the West Midlands through the East Midlands to Leeds.

1.1.2 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.

1.1.3 The construction and operation of Phase One of HS2 is authorised by the High Speed Rail (London – West Midlands) Act (2017). In July 2017, the Government introduced a hybrid Bill to Parliament to seek powers for the construction and operation of Phase 2a.

1.1.4 In February 2020, the Government announced its intention to draw up an Integrated Rail Plan. This will recommend a way forward on scoping, phasing and sequencing the delivery of HS2 Phase 2b, Northern Powerhouse Rail, Midlands Rail Hub and other proposed rail investments across the north. At the same time, the Government asked HS2 Ltd to prepare the Western Leg hybrid Bill, provided it does not prejudge any recommendations or decisions that will be taken in this plan, which will be published by the end of the year.

1.1.5 It is intended to deposit a Western Leg hybrid Bill seeking powers to construct and operate this phase in Parliament in early 2022 or sooner if possible (the Proposed Scheme). The work to produce the Bill will include an Environmental Impact Assessment (EIA), the results of which will then be reported in an Environmental Statement (ES). The ES would be submitted alongside the Bill when it is introduced to Parliament. As was the case with Phase One and Phase 2a, when the Bill is introduced to Parliament the Secretary of State will also publish draft Environmental Minimum Requirements (EMRs). The EMRs will set out the environmental and sustainability commitments that will be observed in the construction of the Proposed Scheme.

1.1.6 A series of information papers were produced for the Phase One and Phase 2a hybrid Bills, explaining the commitments made in those Bills and EMRs. It is the Secretary of State's intention to follow a similar process for the Western Leg Bill. These information papers will be used to provide information about the Proposed Scheme itself, the powers contained in the Bill and how decisions on

the Proposed Scheme have been reached. It is currently proposed that these information papers for the Western Leg of Phase 2b will be published at the time the Bill is introduced in Parliament.

1.1.7 The Secretary of State for Transport will be 'the Promoter' of the Western Leg Bill. The Promoter will also eventually appoint a body responsible for delivering the Proposed Scheme under the powers to be granted by the Bill. This body will be known as the 'nominated undertaker'. There may well be more than one nominated undertaker. However, any and all nominated undertakers will be bound by the obligations contained in the Bill, the policies established in the Western Leg EMRs and any commitments provided in the Western Leg information papers.

1.1.8 These Western Leg factsheets have been produced to provide information on the emerging proposals for measures to manage the design process for the Proposed Scheme and to control impacts which may arise from the construction and operation of the Proposed Scheme. These measures may then be applied to the Western Leg as commitments made through the eventual Bill, EMRs or information papers.

2 Overview

2.1.1 This factsheet outlines the approach to balancing ponds and replacement floodplain storage areas which is expected to be used to mitigate the impact of the Proposed Scheme on water resources and flood risk.

2.1.2 The design of the Proposed Scheme would include various drainage measures to control the rate, volume and quality of water run-off from the rail corridor of the Proposed Scheme and other associated infrastructure, taking into account projected climate change impacts. These drainage measures, referred to as sustainable drainage systems (SuDS), would include balancing ponds and various other drainage techniques (such as use of swales[1] and linear soakaways[2]).

2.1.3 These systems would help to avoid an increase in flood risk and would help to maintain natural water flow by encouraging storm water to soak into the ground or, where that is not reasonably practicable, would discharge it into watercourses or surface water/combined sewers at a controlled rate.

[1] Swales are shallow vegetated channels designed to convey water and which may also allow infiltration to the ground

[2] Soakaways are sub-surface structures (usually filled with stones or rubble) into which surface water is conveyed for infiltration into the ground without a connection to a piped system. Linear soakaways usually take the form of a stone filled trench

2.1.4 The design of the Proposed Scheme would also include measures to mitigate losses of flood water storage capacity that occur where development is required within the floodplain of watercourses.

2.1.5 Floodplains play a key role in naturally reducing volumes and rate of downstream flood flows. When ground levels are artificially raised within a floodplain area, it can reduce the amount of water storage available and increase flood flows downstream. Where possible, the design of the Proposed Scheme will endeavour to avoid floodplains, but where this may be unavoidable, loss of storage would be compensated for by creating replacement floodplain storage areas ~~where reasonably practicable~~.

3 Balancing ponds

3.1.1 Balancing ponds will be required in order to regulate water flows to avoid an increase in flooding from new surface water drainage systems. These systems will include the drainage required for all aspects of the Proposed Scheme covering railway drainage, new or altered highway drainage networks and new land drainage arrangements.

3.1.2 Balancing ponds are of three types:

- Attenuation ponds, which can temporarily store rapid water run-off and then discharge it at an agreed lower rate to a nearby watercourse, thereby reducing the risk of localised flooding;
- Infiltration ponds, which allow water run-off to be absorbed into the ground where conditions are suitable; and
- Hybrid ponds, which combine attenuation and infiltration features.

3.1.3 Balancing ponds will typically be unlined and have banks with a varying profile (see Figure 1 below). Their size will depend on local drainage requirements taking climate change allowances into account. The majority will not be designed to hold water permanently, but will be dry most of the time, except following intense rainfall events.

3.1.4 Balancing ponds required for land drainage purposes only will often resemble depressions in the ground rather than actual ponds. These can be any of the three types listed above.

3.1.5 Infiltration to ground is the preferred option for sustainable drainage systems, in certain locations balancing ponds may be designed to be permanently wet where there are site specific environmental requirements to retain water. These would take the form of attenuation ponds.

Figure 1: Example of a hybrid balancing pond during dry weather, with land potentially suitable for grazing

3.1.6 In many cases, it will not be possible to combine balancing ponds for different types of drainage systems (e.g. railway, highway and land), as they need to be kept separate due to varying ownership, management and maintenance requirements.

3.1.7 Systems have been designed to drain by gravity where possible. Pumping will only be adopted where it is unavoidable, to save on energy and maintenance, and as pumping introduces a risk of failure.

3.1.8 Underground attenuation tanks may also be considered in some constrained locations, but these are generally avoided for sustainability reasons[3] and because they are always more difficult to maintain than open ponds.

4 Replacement floodplain storage areas

4.1.1 Replacement floodplain storage areas would be provided to mitigate any impact of the Proposed Scheme on existing floodplains, and to ensure that the

[3] Sustainability reasons for avoiding the use of underground tanks includes: - they do not provide habitat for wildlife; - they do not provide any improvement in the quality of water discharged; - they do not allow any water to infiltrate into the ground; and - they often require pumping, and hence have on-going energy requirements and CO2 emissions implications

Proposed Scheme does not cause an increased flooding risk as a result of its construction or operation.

5 Fencing

5.1.1 Fencing would likely be required for railway and road drainage ponds, but would be assessed on a case-by-case basis, depending on a risk assessment. The degree and nature of security required would be proportionate to the level of risk and take into account the nature of the locality.

5.1.2 Balancing ponds for land drainage would often be located in land suitable for livestock grazing once returned to landowners. Fencing of such ponds may not be required, but a simple agricultural fence for land or livestock management purposes is likely to be assumed in the ES.

5.1.3 Replacement floodplain storage areas, as with land drainage balancing ponds, may be suitable for grazing once the Proposed Scheme is operational.

6 Maintenance access

6.1.1 Permanent access routes to balancing ponds for railway drainage would be retained by the Proposed Scheme and suitable means of access to new road drainage ponds would be constructed, which would be handed over to highway authorities (roads authorities in Scotland) on completion. Access and maintenance rights are not expected to be retained for most balancing ponds for land drainage since these would generally be returned to landowners.

7 Detailed design

7.1.1 Final arrangements of balancing ponds and floodplain storage areas, including their size and depth will be finalised during detailed design stage. The design of all elements associated with these drainage systems, including built elements, landscape earthworks and planting would be sympathetic to its local context, environment and setting.

7.1.2 The detailed design would be done in conjunction with statutory bodies such as the Environment Agency (EA), Lead Local Flood Authorities (e.g. county councils and metropolitan borough councils), Internal Drainage Boards and sewerage undertakers in England. In Scotland, this would be performed by the Scottish Environment Protection Agency (SEPA), Local Authorities and Scottish Water.

8 Legislation and policy

8.1.1 The balancing ponds and replacement floodplain storage areas for the Proposed Scheme will be designed to ensure compliance with European legislation such as the Management of Floods Directive and the Water Framework Directive (as implemented through UK national regulations) and national legislation such as the Flood and Water Management Act 2010 and Flood Risk Management (Scotland) Act 2009. Large balancing ponds may also be governed by the Reservoirs Act 1975, as amended by the Flood and Water Management Act 2010 in England and in Scotland, by the Flood Risk Management (Scotland) Act 2009.

8.1.2 The design of balancing ponds is also based on the requirements of the National Planning Policy Framework (NPPF) and the associated web-based Planning Practice Guidance on flood risk, which was produced by the Department for Communities and Local Government in England. In Scotland, the Scottish Planning Policy would apply.

9 More information

9.1.1 Further factsheets and details on the Proposed Scheme can be found at: www.hs2.org.uk/phase2b