

High Speed UK Design Methodology

All the new and upgraded routes proposed under the High Speed UK (HSUK) initiative are supported by designed horizontal alignments, with every straight, circular curve and interlinking transition defined. Where necessary, complementary vertical alignments have also been prepared. This allows the size and the type of railway structure (i.e. tunnel/viaduct/cutting/embankment) to be defined, and it also allows the maximum speed of the line to be assessed at any point along its length.

This matches the design effort that supports the established HS2 proposals extending northwards from London to the key cities of the North i.e. Manchester, Leeds and Sheffield. So far no equivalent design exists for Northern Powerhouse Rail (NPR) routes interlinking these cities across the Pennines; there is only a specified requirement for 30 minute journey times between the 3 cities (along with other primary intercity and city-to-airport links). Therefore the methodologies employed in the development of HSUK's routes have also been used to 'reverse engineer' conjectural NPR routes meeting this journey time specification.

Calculation of Infrastructure Costs

Cost estimates for High Speed UK are baselined upon the £55.6 billion total cost that the Government has predicted for the HS2 'Y-network', extending from London to Birmingham, Manchester and Leeds. Allowing £8.9 billion (16%) for rolling stock, the remaining £46.7 billion represents the estimated cost of the built HS2 infrastructure i.e. track, structures, stations and depots. All the proposed HS2 infrastructure has been assessed, and unit costs per kilometre have been applied to all types of structure (e.g. tunnels, viaducts, stations etc), with due allowance made also for local sensitivity and access issues. These rates have then been 'scaled' so that the total HS2 infrastructure cost adds up to the predicted £46.7 billion. These same scaled rates have then been applied to the proposed HSUK and NPR infrastructure to calculate total costs for each scheme, and therefore enable rigorous cost comparisons to be made.

Calculation of Journey Times

Journey times for high speed routes between the northern cities have been calculated by breaking down the routes into shorter sections, and considering the speed capability and length of each section. Due allowance has been made for acceleration and deceleration of trains, based upon published data for the Siemens AV360 high speed train. All calculated journey times have then been inflated by 10% to allow for operational slack. This methodology is believed to generally follow the practices adopted by HS2 Ltd, and it has been verified by checking that journey times calculated for proposed HS2 services match the journey times published by HS2 Ltd. The methodology can therefore be used with confidence in the calculation of journey times for both High Speed UK and Northern Powerhouse Rail services between the principal cities of the North.

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