BRITAIN'S HIGH SPEED 2: ALL ABOARD? (A)

"The biggest transport project Britain's done in centuries... Complicated? Yes. But fun."
[HS2 Chairman]

By early January 2013, Doug Oakervee, the shrewd chairman of HS2 Ltd was optimistic. HS2 Ltd was the company wholly owned by the UK's Department for Transport (DfT), created in January 2009 to promote a new high-speed railway. The goal was to connect London to Birmingham by 2026, and then connect Birmingham to two major conurbations in the North of England, Manchester and Leeds, by 2032. The scheme's P50 budget[1] was £32.7bn (in 2011 prices) and included a robust £8bn contingency, but was yet to include a projected budget for acquiring over 170 train cars.

The last major railway line north of London had been built over 120 years ago and thus, while the HS2 goal was ambitious, many felt that it was justified. The project enjoyed strong cross-party consensus since the idea gained traction in 2008. The UK was going through a severe economic downturn, and the political leaders shared the conviction that the time was right to modernize the national railway network. Therefore, when a Tory-led coalition ousted the Labour government in May 2010, the scheme continued to enjoy governmental support. This was despite fierce lobbying against it from interest groups in the Tory heartland north of London, Doug said:

'The people who want HS2 are Manchester, Leeds, Sheffield, Birmingham; Londoners are a bit indifferent ...but the people between London and Birmingham say "well, what's in it for me?"—huge lobby against us, the Chilterns...we've got other pockets, Warrington, Cheshire.'

Through a process that Doug facetiously dubbed 'too democratic' ("nothing is too democratic, but it feels like that sometimes", he quipped), the HS2 route had been nailed down. By January 2009, consultation for Phase One was completed, but the outcome of legal challenges taken against HS2 Ltd was yet to be announced. Still, Doug and Alison, the chief executive of HS2 Ltd, were optimistic. Furthermore, details of the route for Phase Two were due to be published later in January, and plans to publish a draft Environmental Statement for consultation were also on track.

The political pressure to keep the scheme on track was enormous since the government had pledged to get the first phase (approximately 225km long) approved by the Parliament[2] by May 2015, ahead of the next national elections. To meet this target, HS2 Ltd had been instructed to lodge the HS2 Hybrid Bill for Phase One with the Parliament by Autumn 2013. The passage of a Hybrid Bill through Parliament was the only way the UK Government could secure the powers to construct a new line.

HS2 Ltd officials were dancing to the government's tune, but privately many thought that the 2015 deadline was unrealistic. Only the UK Parliament could give legal powers for the government to

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1 A P50 budget meant that the probability of the final costs exceeding £32.7bn was 50:50 based on a risk assessment that quantified the likelihood of occurrence of foreseeable risks and the eventual cost impacts

[2] During a British national election each electoral constituency chooses one Member of Parliament (MP). This elected official will represent their entire electoral district along with representatives of other electoral districts in the House of Commons. MPs are elected through the first-past-the-post method so-called winner-takes-all since a winning candidate is required only to have received the highest number, and not the majority, of votes; voters are allowed to vote for only one candidate from the list of candidates competing to represent that district.

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compulsorily purchase the land required for the scheme. If history were anything to go by, this would take time. First, the Parliament needed to listen to petitions from everyone who felt materially disadvantaged by the bill. A previous bill for the £5.8bn 108km High Speed 2 (HS1) connecting London to the Channel Tunnel received 1,000 petitions and took 25 months of discussions (and the addition of 647 undertakings and assurances) to become law.[3]

Doug, Alison and other highest ranked officials spent countless days in meetings all over the country. Doug said, 'I was engaged as a two days a week job, but usually I find it more like a four days a week job.' For the first phase, the most difficult issue was integrating HS2 into London's transport network. The plan was to develop two stations. One would be located on a derelict industrial site (Old Oak Common) for which the London leaders had great ambitions. The other would involve overhauling the dilapidated and congested Euston station in central London that was operated by Network Rail, the state monopoly that owned the UK railway infrastructure. The plan was ambitious:

'*A bit like a fairy-godmother scheme where we came along with our magic wand and we sort of obliterate everything and start again with everything new and shiny.' [HS2 senior official]*

As discussions continued, demands from the London stakeholders kept coming in. At Old Oak Common, key stakeholders—four local councils, Greater London Authority[4], and Transport for London[5]—wanted to seize the opportunity that a new high-speed line would bring. For them, the scheme could catalyse the development of over 19,000 new homes and thus address the shortage of affordable housing in London. Thus, the scope of the HS2 station had to augment, which would. put massive pressure on the budget that HS2 officials had earmarked for the station.

Things were even more complicated at Euston. First, the political leaders of the local council opposed HS2 because of the land take that was required and the impacts to the borough. Even so, the council wanted to redevelop the Euston station, and thus joined forces with the GLA and TfL to develop a so-called 'Euston Area Plan'. As discussions progressed, the cost estimate to rebuild Euston almost doubled from £1.1bn to over £2bn, and the time required to complete all works spiralled to ten years away from the initially planned seven or eight years.

What should Doug and Alison recommend to the government? "If we keep on with that", one HS2 official said, "…we're going to so severely breach our targets that the whole reputation of HS2 will be in doubt". Given that parts of Euston were still fit for purpose, they could backtrack from their role as 'fairy-godmother' granting wishes, and propose a more modest intervention. This would surely infuriate the local stakeholders who had already bought into the idea of lowering all the platforms and tracks at Euston, as that was the option that best met their vision for the area.

[3] 365 petitions were lodged against another scheme, the £15bn, 118km Crossrail, The issues were settled outside Parliament for 252 petitions (only 113 followed through). However, it still took 40 months of discussions and agreeing to around 700 undertakings and assurances before the bill became law.

[4] Greater London Authority was the top-tier administrative body for Greater London, mostly funded by government grants. It consisted of a directly elected executive Mayor of London, Boris Johnson at the time, and an elected 25-member Assembly with scrutiny powers.

[5] Transport for London was a local government body responsible for most aspects of the transport system in Greater London, and was part of the GLA.

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The HS2 executives were also troubled that following the consultation, the Secretary of State had agreed to mitigation measures to resolve a conflict over the design for the Chilterns, an area of outstanding beauty. The deal committed HS2 Ltd to design extra tunnelling through the Chilterns at an additional cost of £700m, increasing the price of the whole scheme. Furthermore, the decision could potentially set a tricky precedent since consultation suggested that people wanted tunnels:

It's a bit of a poker game here... because if you give it away in the beginning the next thing is they want something else ... and I'm not too certain what real difference it's made... you're never going to satisfy the Chilterns, they're always an opposition group [Doug]

"Why couldn't things always be as simple as developing the Manchester stations?", remarked Doug. In Manchester, although there were a lot of local players at the negotiating table, settling the issues on critical development decisions had so far been relatively straightforward.

Doug and Alison's calendar was jam-packed with meetings with the DfT, the London stakeholders, and many others. Under pressure to submit the bill for Phase One by the end of 2013 — the whole thing was expected to exceed 50,000 pages — the HS2 leaders needed to sketch a strategy to keep the development on track. One thing they were sure about was that the London stakeholders and many others would petition against the bill to try to extract more concessions in Parliament.

HIGH-SPEED RAILWAY TECHNOLOGY

The history of High-speed rail (HSR) technology dates as far back as 1940 when Japan forged ahead with Tokaido Shinkasen, the world's first high-speed line. The Shinkasen, operating between Tokyo and Osaka, was completed in 1964. It was initially designed to run trains at a top speed of 210 km/h (130 mph), but since then the trains have reached top speeds of 270 km/h. The Shinkasen was the most heavily travelled high-speed rail route in the world. Following the success of HSR in Japan, countries around the world began to invest similar technologies. In 1967, France launched the world's first regular service by classic train at 200km/h between Paris and Toulouse. Later in 1969, America inaugurated the Metroliner rail service between New York and Washington D.C.

Over time, HSR trains became faster. In 1981, the French inaugurated the first section of the Paris-Lyon High-Speed line with a 260km/h top speed, which was raised to 270km/h soon after. Following France, Germany launched a Hannover-Würzburg high-speed railway, operating at a top speed of 280 km/h. Then in 2000 America launched the Acela Express, which could reach a maximum speed of 241 km/h on a small section of a line along the East coast.

For four decades Shinkansen was the only high-speed rail in Asia, but in the 2000s things started to change. In 2004, South Korea launched services on the Seoul-Busan corridor, Korea's busiest traffic corridor, which could reach top speeds of 305 km/h in regular service though the infrastructure was designed for 350 km/h. In 2007, Taiwan launched its first and only HSR line. In addition between 2003 and 2012 China opened four HSR lines. The Wuhan–Guangzhou high-speed line was launched at 350 km/h, an unprecedented speed. In December 2012 China set yet another record by opening the world's longest high-speed rail line, the 2,208 km (1,372 mi) Beijing–Guangzhou–Shenzhen–Hong Kong Railway service. By 2011, China already had the world's longest HSR network with 8,358 km of tracks, and was on target to fully complete a National High Speed Rail Grid by 2015.

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HIGH-SPEED RAIL IN THE UK

Having launched the world's first locomotive-hauled railway in 1825, the UK boasted the world's oldest railway system. In the 1970s British Rail introduced high-speed when it pursued two projects: the development of a tilting train technology, the 'Advanced Passenger Train', and the development of a conventional high-speed diesel train, the 'High Speed Train'. The former was eventually abandoned while the latter broke the world speed record for diesel trains of 230km/h.

High Speed rail in Britain was augmented when the East Coast Main Line was electrified. British Rail Class 91 was then introduced. The line was designed for a maximum service speed of 225 km/h. However, the first high-speed rail line actually delivered in the UK was the Channel Tunnel Rail Link (HS1). HS1's first phase opened in 2003 and the line hosted an international passenger service between London's St Pancras and Continental Europe, reaching speeds of up to 300km/h.

Proponents of the high-speed railway technology in the UK argued it offered fast and efficient transport, increased capacity; and encouraged economic growth by linking various cities. Still, in the UK, an Anglo-Saxon democracy with a strong regime of property rights and a stringent planning process, new schemes faced staunch opposition. And thus, the country was lagging behind in the global race to build high-speed railways. To catch up, the UK Government would have to secure the powers to construct a new line through Parliament by the passage of a Hybrid Bill, which would need to consider all the public and private interests affected by the scheme. Only once the Hybrid Bill was passed and the project received Royal Assent could a new railway scheme move into delivery.

THE EARLY YEARS OF HIGH SPEED 2

As the first phase of the HS1 scheme approached completion in 2003, the idea of developing a new line linking London with northern regions started to gain traction. To kick-off a discussion, the Strategic Rail Authority launched a consultation based on existing studies commissioned to transport consultant WS Atkins. To further prepare for the consultation the Commission for Integrated Transport, a statutory body, commissioned a study from transport consultants Steer Davies Gleave to evaluate the adequacy of the UK's approach to economically appraise large investments.

The study concluded that a lack of strategic investment in transport infrastructure could lead to severe transport bottlenecks in the medium term and lasting negative effects on the national economy. Thus the case for building a new rail line was a strong one. However, the study also highlighted that HS1 had been the world's most expensive railway scheme per kilometre even when ignoring financial costs [**Exhibit 1**], and warned that the expansion would be "difficult, disruptive, and very expensive" (pp. 62). It also noted that the UK was the only country in the world that increased expected capital costs by up to 66% and timescales by up to 25% to account for risk and so-called 'optimism bias factors'; contingencies as low as 5 to 10% were the norm elsewhere.

These reports did not stop Network Rail from continuing to work on the so-called HS2. But in July 2007, a white paper[6] published by the Department for Transport poured cold water on the scheme.

[6] White papers are documents produced by the Government setting out details of future policy on a particular subject. A White Paper will often be the basis for a Bill to be put before Parliament. The White Paper allows the Government an opportunity to gather feedback before it formally presents the policies as a Bill.

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The report, which received backing from Ruth Kelly, the transport secretary at the time, suggested that a decision on the new railway line could wait for another 15 years.

However, by September 2007, the world had changed beyond recognition. The markets were hit by a financial tsunami that brought back memories of the 1930s Great Depression. The UK economy had been strongly hit, and the British pound fell abruptly. The UK saw the first bank run in the last 150 years and by February 2008 the government was bailing out major banks. Investment in the construction industry collapsed, and lobbyists asked the government to accept Keynesian arguments that investment in new infrastructure was vital to shore up the economy and weather the storm.

In response, by October 2008, the transport secretary established a National Networks Strategy Group to look into strategic investment in transport. Geoff Hoon said:

The Minister of State, Lord Adonis, will chair a National Networks Strategy Group, with senior partners from the Highways Agency, Network Rail, HM Treasury and other Government Departments as required. ...the study … will include consideration of wholly new rail lines, including high-speed rail. We are committed to developing a modern sustainable rail system that supports economic growth, including housing development, and the climate change agenda.... However, it is crucial that the case for such investment is underpinned by robust evidence on long-term demand projections and a clear understanding of the capacity of the existing networks.

By 2009, work by the National Networks Strategy Group revealed a strong case for promoting HS2.

HS2 LTD

Lessons from previous mega-projects in the UK suggested that establishing a company wholly independent from governmental departments was essential to accelerate development. Thus in January 2009 the government created High Speed Two Ltd (HS2 Ltd). In the company's remit, detailed in a letter from the Secretary of State to the Chair [**Exhibit 2**], HS2 Ltd was tasked with establishing the case for new high-speed lines, and assessing the environmental impact and business cases of different routes. HS2 Ltd was owned by the Department for Transport (DfT), but required direct spending approvals from the Cabinet office and the HM Treasury. A HS2 Programme Board was created and made accountable for the programme meeting its objectives and realizing the expected benefits. This board included representatives from the DfT, HS2 Ltd, HM Treasury and Infrastructure UK[7], and received authority to carry on development work up to £100m [**Exhibit 3**].

Internally, HS2 Ltd had its own executive board comprising a chief executive and six directors appointed by the DfT [**Exhibit 4**]. The Board's responsibilities included:

- Effectively governing the company
- Ensuring company decisions are made at the right time
- Properly managing risks
- Shaping, challenging and directing the agenda for the company delivering stated priorities
- Monitoring performance and risk
- Making choices (or recommendations to ministers) on priorities / risk appetite
- Overseeing the health of relations with stakeholders and commercial partners.

[7] Infrastructure UK was a unit within the Treasury that worked on the UK's long-term infrastructure priorities and on securing private sector investment.

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HS2 Ltd subsequently set up a Professional Services Framework (PSF) to gain access to services that would support development work. The framework comprised a shortlist of organizations eligible to tender for work packages. These would then be awarded in secondary competitions. HS2 Ltd awarded framework agreements in four categories or 'lots' of work [**Exhibit 5a, 5b**]. The framework was set to last for six years, and companies on the framework received the option to extend the framework duration if the scheme went ahead.

In August 2011, after issuing the framework agreements, HS2 launched the procurement for a *Development Partner*. The successful partner would scoop a lucrative contract worth between £50m and £70m over six years, and would be responsible for managing the firms carrying out the design, environmental and land referencing work for Phase One. By November 2011, the shortlist of bidders included Turner & Townsend, Mace, CH2MHill and Parsons Brinckerhoff. In January 2012, HS2 awarded the contract to CH2MHill[8] - a global leader in programme and project management.

Between October 2010 and January 2013, HS2 let around £110m of contracts. The contracting sphere was dominated by a handful of top consultants, e.g., £34.5m for Arup, £17.5m for Mott MacDonald, and £19.1m for Atkins. By January 2013 more than 1,500 people were working directly on HS2, and HS2 Ltd had over 200 staff.

DESIGNING AND DEVELOPING HIGH-SPEED 2

In 2009, after a 12-month study, Network Rail made a strong case for investing in a new high-speed route with city-centre terminal stations at London, Birmingham, Manchester, Glasgow and Edinburgh, and connecting to Heathrow airport by a spur [**Exhibit 6**]:

We're running one million more trains per year than just five years ago... By 2020 the main rail line to Birmingham and the North West will be full...high-speed rail is now widespread throughout the rest of Europe and across the globe...a new high-speed line to Scotland more than pays for itself [NR 2009 Meeting the Capacity Challenge: The Case for new Lines]

As it turned out, the design layout changed rapidly after HS2 Ltd took control of the development, even though several NR employees were seconded to the company. The new plan aimed to provide more links to the UK's major economic centres, releasing capacity on regional services. HS2 would also provide links into the European Network through a permanent link to HS1 at London St Pancras.

In March 2010, the government published the first command paper detailing the new proposal. A new line would be built between London and the West Midlands, with connections to HS1 at London St Pancras, and to Heathrow airport via a spur. The service would host 400m long trains, and would be future-proofed[9] to run trains at up to 400km/h and carry 1,100 passengers. A Y-shaped route would link London to Birmingham, and from there it would go on to Manchester and Leeds [**Exhibit 7a**]. Further connections onto existing tracks would allow the services to travel to Newcastle, Liverpool, and Scotland. The vision fell short of the expectations of the lobby group, Greengauge 21

[8] CH2M Hill had just acquired the UK consultant Halcrow, which had experience of working on HS1 and Crossrail; CH2M Hill had also been involved in the delivery of the 2012 London Olympics.

[9] Guarding against a technology becoming obsolete by protecting it from consequences in the future

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[**Exhibit 7b**] but still the new line would stretch along 539km in total. To reduce noise and visual impact, the line would hug the contours of the land. Overall journey times would improve as follows:

	Before HS2	**After HS2**
London to Birmingham:	1 hour 24 minutes	49 minutes
London to Sheffield:	2 hours 5 minute	1 hour 19 minutes
London to Manchester:	2 hours 8 minutes	1 hour 8 minutes
London to Leeds:	1 hours 53 minutes	1 hour 23 minutes

Source: HS2 Ltd. http://www.hs2.org.uk/phase-two/facts-figures

HS2 was estimated to cost £30bn (in 2009 prices). The 192km stretch from London to the West Midlands would cost between £15.8bn and £17.4bn and treble rail capacity. Of the total £30bn cost, a significant proportion was associated with tunneling. Tunnels made up only 10% of 206km route, but contributed around 25% of the base construction cost. Tunnels were most important in two sections: first, in and around London; and second in the Chilterns where they would mitigate the environmental impact on the Chiltern's Area of Outstanding Natural Beauty (AONB). In this AONB, an estimated 32% of the route would be tunneled, while 37% would follow existing route corridors as closely as possible. For the second phase, the cost of the route per kilometre was expected to halve, primarily because of the reduced amount of tunneling likely to be needed.

Another idea embedded in the first command paper was that city centre super-stations could catalyze urban regeneration and economic growth opportunities. Sir Terry Farrell, a leading architect and a contributor to the government's command paper, argued:

The potential of stations to transform cities is critically important…Stations have become pre-eminent in their role as place-makers. This is all a far cry from the origins of rail in the 19th century, where it was initially associated with goods transportation (NCE 22 April 2010)

The Conservative Party and the Labour Party shared the goal. But with general elections looming, the Conservative Party opted out of cross-party discussions over HS2. Accused by the government of playing 'cheap politics' and jeopardizing the HS2 timescale, the Tories hit back. They criticised the government for not including a hub at Heathrow airport, and suggested an alternative S-shaped route [**Exhibit 8**]. The shadow transport secretary Theresa Villiers said:

Labour has not focused strongly enough on the need for a top class rail hub for Heathrow to connect it to Europe via the HS1 to provide an alternative to thousands of short haul flights.

Concerned that the scheme was becoming a political football, Sir David Rowlands, the chairman of HS2 Ltd was critical of the political leaders and insisted that the scheme be a key part of a comprehensive, integrated transport policy:

No high-speed railway will be built unless the government finds a way of balancing the national need with the local interest [Sir David Rowlands, HS2 chairman]

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In the middle of the political fighting, the government instructed HS2 Ltd to address the criticisms surfacing against the command paper. HS2 Ltd was tasked to look at both a line that went through Heathrow, as well as assessing the options for linking HS1 with HS2.

By May 2010, power had changed hands and a Conservative-led coalition was in charge. A report was released in July 2010 commissioned by the previous government, *High Speed Rail Access to Heathrow,* the so-called 'Mawhinney report'. This report insisted that proposals for a Heathrow hub station had not a compelling case. Unexpectedly, the Mawhinney report also recommended that "serious consideration" be given to making Old Oak Common, in the west, the primary London terminus instead of the HS2 Ltd-favored central London station at Euston:

Connecting at Old Oak Common on to Crossrail would give a quicker and more convenient overall journey to many destinations in and around London rather than would travelling via Euston

As the scheme continued to move forward, opposition started to mount from campaigners such as 'Stop HS2' a campaign group whose convener told the Parliament:

There is no business case, no environmental case and no money for HS2. The more we find out (about) the project, the worse it seems to be (Joe Rukin, NCE, 30 November 2010)

By December 2010, the Coventry City Council voted to oppose HS2, becoming the first council not directly affected by the location of the line to take a position against the plans. Network Rail in turn publicly defended the scheme after it released its own Route Utilization Strategy. In it, NR argued that HS2 was essential because the west coast main line route would run out of capacity by 2024 with passenger demand set to grow by as much as 61% between London and Manchester.

Amid an increasingly heated debate about the business case for HS2, the new government made a U-turn on ideas that the Tories had raised during the electoral campaign. The government ditched plans for a Heathrow Hub endorsing instead the link to Heathrow via a spur and an interchange station between HS2 and Crossrail at Old Oak Common. The new government also insisted on including a direct link to the HS1 line at an estimated cost of between £2.5bn and £3.9bn.

In February 2011 HS2 Ltd launched a six-month public consultation on the proposed £16.8bn (2011)[10] first stage due to be completed by 2026. Over 30 public road shows would be organised. The budget was at £32.2bn (in 2011 prices), a cost increase attributed to extra engineering to improve the route.

Opposition to the project by some independent groups continued to mount. In July 2011, for example, an economic think tank called the Institute of Economic Affairs (IEA) argued:

10 *Economic Case for HS2 The Y Network and London – West Midlands*, Department for Transport, UK February 2011, table 7; all costs and benefits are shown in 2011 prices

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The wasteful allocation of resources is demonstrated by the 'gold-plating' of the HS2 route...The first 8km from Euston to Old Oak Common, for example, will add almost 25% (about £4 billion) to the cost of the first phase but deliver negligible time savings....

In response, a pro-HS2 group 'Campaign for High Speed Rail' e-mailed subscribers urging supporters to come forward since the number of negative responses [to the public consultation] was far greater than the number of positive responses. Seventy top bosses gave their public backing for HS2. Aware of the controversy, the Parliament's Commons Transport Committee commissioned an independent review, and the chairman said: "*The review is a guide for us. We felt we needed it".*

In October 2011, HS2 Ltd published a contract notice to recruit up to 19 firms to do preparatory work. In January 2012, after the end of the consultation Justine Greening, the new transport secretary, announced that the government was proceeding with Phase One of an amended HS2 scheme. This included more tunnelling through the Chilterns and other sensitive locations at an extra cost of £700M. HS2 would be a £32.7bn scheme with Euston alone costing £1.2bn. The line was being designed to run up to 18 trains an hour in each direction, travelling at up to 362km/h.

The cost of the first phase was estimated, based on a high-level process, to be £16.8bn (2011 prices, undiscounted) after a review by Infrastructure UK found that costs could be reduced by £1.5bn given that UK construction costs on high-speed rail were 20% higher than in Europe[11]. (Other concomitant DfT documents showed a range between £15.4bn and £17.3bn). In addition, the estimated cost of the trains for Phase One was £2.6bn (2011 prices). Whilst the government admitted that it had revised down the economic benefits of the scheme, it confirmed its commitment to go ahead:

I have decided Britain should embark upon the most significant transport infrastructure project since the building of the motorways...By following in the footsteps of the 19th century railway pioneers [Justine Greening 2012]

The government also pledged to release preliminary plans for Phase Two that included stations at Manchester, East Midlands, Sheffield, and Leeds. Having announced the intention to proceed with Phase One, the government and HS2 Ltd had to refine the plans with local authorities, Network Rail, Highways Agency, and other actors, for example, environment and heritage organisations. Agreeing on a compensation package for homeowners along the route was another important task, but fell under the remit of the Department for Transport's 100 person HS2 team.

In January 2012, HS2 chose CH2MHill to be its development partner, and selected 13 consultants for its professional services six-year framework. Pleased with her performance, in March 2012, the government reappointed Alison Munro as HS2 chief executive, and appointed Doug Oakervee for the role of HS2 chairman. Doug was seasoned in these battles, having been executive chairman for the Crossrail project during the Hybrid Bill phase. In June 2012, HS2 Ltd awarded the final professional service contracts covering land access and land referencing services.

Also in June 2012, amidst controversy over value for money, the HS2 technical director publicly insisted that his team preferred to think of HS2 as a '£25bn project', with none of the £8bn earmarked as optimism bias added to it—"We've no intention of going near [the £8bn]" (NCE, June

11 HM Treasury and Infrastructure UK, *Infrastructure Cost Review*, December 2010

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2012). Doug and Alison seemed to take a more hedged position. Doug said:

The bill gives you the limits of deviation where you can build within and some outline design... it provides the power to build it and outline planning permission.... The real design has got to be done after you've got the powers, and then the detailed design is approved by the local authorities... So really you're talking about route and opportunity and problems.

There was a lot of work ahead before the bill for the first phase was ready to submit. Things in London were complex. At times it seemed that key players such as Camden Council, Transport for London and the Mayor were holding the government to ransom. Even in Birmingham, development for two stations was not clear-cut.

To complicate matters further, four groups of campaigners launched a legal challenge against the government's consultation. They hoped to overturn the decision to forge ahead with Phase One. The groups had overlapping claims and between them agreed to focus on specific areas to challenge the transport secretary's January 2012 decision.

- One group, Heathrow Hub, insisted that the Heathrow Hub should be built;
- 51M, a collection of nineteen local authorities along the route, argued the DfT failed to: 1. provide an adequate environmental assessment; 2. properly consider alternatives to increasing capacity; and 3. consider the impact of looming capacity crunches at Euston Underground station and on the North London Line which would be used to connect HS1 and HS2.
- HS2 Action Alliance (HS2AA), a non-profit organisation working with over 70 local community groups, alleged HS2 failed to comply with Strategic Environmental Assessment (SEA) regulations; and that HS2 was in breach of the Habitats Directive.
- Finally, Aylesbury Park Golf Club alleged that the compensation payments to be made to affected landowners along the route were insufficient.

As the project unfolded, Alison and Doug breathed a sigh of relief when it came to Manchester; for the time being at least, things seemed to be going smoothly there.

CHILTERNS

The most direct route from London to Birmingham would pass through the Chiltern Hills, a protected Area of Outstanding Natural Beauty. In fact, any viable line of route between London and Birmingham would traverse some part of the Chilterns. When routes avoiding the Chilterns were considered it was found that their alignments would result in longer journey times, and involve significantly more demolition.

Substantial tunnelling would enable to mitigate the negative impacts of HS2 along the route. However, balancing the extra costs of tunnelling with the noise and visual impacts that a surface route would have on local communities was difficult. Tunnelling definitely had some appealing benefits. Long tunnelled sections would be less obtrusive for the communities. In contrast, surface routes could have visual and noise impacts, required compulsory purchases and demolitions of property, and could cause severance if it created a new transport corridor.

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But tunnelling also had negative impacts. It would involve higher and more uncertain costs than surface alignments, and had environmental costs too. For one, tunnelling included higher 'embedded' carbon in construction, and created a need to dispose of a substantial volume of excavated material. It also required developing surface works for ventilation purposes; and (relatively small) risks could arise of surface properties being affected by subsidence during construction and by ground-borne noise and vibration afterwards.

In addition to devising recommendations for the government regarding tunnelling, HS2 leaders had to consider how close to existing motorway alignments the line should follow. Following existing motorways closely could reduce the potential impacts of a new rail line. However, because high-speed rail required shallower curves than either conventional rail or motorways, it would not be possible to follow many existing routes without requiring frequent speed restrictions. Taking these issues into consideration, HS2 Ltd short-listing three potential routes through the Chilterns:

- A route following the same corridor to Ruislip, but passing in tunnel beneath Gerrards Cross before crossing the Chilterns using tunnelling and surface routes ('Route 2.5').
- A route leaving London via the existing Chiltern Line corridor, and then using a combination of tunnelling and the existing A413 corridor to reduce impacts ('Route 3').
- A route leaving London via a 28km tunnel towards Kings Langley, before passing through the Chilterns and close to the town of Berkhamsted ('Route 4').

HS2 Ltd eventually recommended 'Route 3' because it was shorter, provided a faster journey time, and was more economical **[Exhibit 9]**. Its estimated cost of £3.7bn (excluding provision for risk) was lower than Route 2.5 (~£4.3bn) and Route 4 (~£5.1bn). Further, Route 3 offered sustainability and environmental advantages over the other options given its potential for isolation from existing settlements and ground-borne noise. Its visual intrusion was reduced through the use of cuttings and screening with vegetation and embankments.

In line with HS2 Ltd, the Government agreed that Route 3 was the best option going forward. The route would, however, be subject to consultation. The new line would still despoil the Chilterns, damaging four Wildlife Trust reserves, 10 Sites of Special Scientific Interest and over 50 ancient woodlands. Furthermore, it would run close to a National Trust property. All this would spawn no small amount of local objection in Tory heartland.

Campaigners in the Chilterns demanded the abandonment of the entire scheme. Unashamedly NIMBYs[12], the campaigners claimed the HS2 case was weak and transitory; and that more effort was needed to provide a new railway line without causing long-term damage to the environment.

In reaction, the Transport Secretary delayed any announcement over the future of HS1 until January 2012. Instead she would consider options for upping environmental protection in the Chilterns. This reflected the political reality of the project, which some argued could risk giving way to 'parochial

12 NIMBY is an acronym for the phrase "Not In My Back Yard and is typically used as characterization of opposition by residents to a proposal for a new development because it is close to them.

Rehema Msulwa, PhD student, and Professor Nuno Gil, The University of Manchester, prepared this case as the basis for class discussion.

pressure groups'. When the government announced the intention to proceed, the amended HS2 proposal included a medley of mitigation measures proffered to the naysayers:

1. A longer, continuous tunnel from Little Missenden to the M25 through the Chilterns
2. A new 4.4 km bored tunnel along the Northolt Corridor to entirely avoid major works to the Chilterns Line and impacts on local communities in the Ruislip area
3. A longer green tunnel past Chipping Warden and Aston Le Walls, and to curve the route to avoid a cluster of important heritage sites around Edgcote
4. A longer green tunnel to significantly reduce impacts around Wendover, and an extension to the green tunnel at South Heath

Doug believed that the tunnels in the Chilterns had been a premature concession. The Chilterns' residents would not necessarily back down because they had received tunnels. In fact, they could well request more concessions in the future. Building HS2 through the Chilterns was proving to be a contentious issue. Equally contentious, however, were the discussions in London.

LONDON

As early as 2009 Sir Terry Ferrell, a leading UK architect, argued that though expensive, Euston was an obvious choice for locating the London terminus [**Exhibit 10**] together with another station at Heathrow. In the summer 2010, however, an independent report commissioned by the government titled *"High Speed Rail Access to Heathrow"* insisted that running HS2 via Heathrow at an additional cost of £2bn to £4bn was unlikely to represent value for money. The report also recommended that serious consideration be given to making Old Oak Common the initial London terminus.

HS2 Ltd had however undertaken an extensive 'Options Sifting Process' **[Exhibit 11]** before arriving to Euston as its station of choice. Doug and Alison were confident in the decision to stick with the station. The sifting process started with a list of 27 sites, which included inner and outer London locations, both surface and underground options. The structures considered included a single London terminus, two smaller termini, and two configurations of a central London through-station.

During this process, all the locations were assessed against various criteria including: overall fit with the remit, operational/engineering feasibility and demand. A shorter list of potential stations was then developed. From this list a single-level station at Euston was identified as the most promising option based on sustainability, cost and a superior economic case.

The new Euston station would comprise 10 high-speed platforms and 14 classic platforms **[Exhibits 12a, b**]. It would accommodate the proposed new high-speed line's long-term maximum service pattern of 18 trains per hour. To avoid blighting lots of sites during the sifting process for selecting the London sites, HS2 Ltd consulted the Transport for London, Network Rail, and the Greater London Authority, but did not involve the local authorities in the discussions. Still, HS2 Ltd was mindful of Camden Council's plans to improve the connection between the communities on either side of the Euston station. Thus, in its preferred design for Euston, all the platforms would be built 2m below the current track level trains to almost the full length of the trains. This would create opportunity to introduce new streets and public squares above.

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Alongside Euston, an interchange between HS2 and Crossrail would be another big-ticket item in the proposed London infrastructure [**Exhibit 13**]. The interchange would connect to Crossrail, Heathrow airport and the Great Western Mainline. It would create a connection to the airport with an 11-minute journey time and would include a direct link to the European high-speed rail network High Speed 1. These direct connections would ease crowding at Euston and improve links to important London destinations such as Canary Wharf, the Reading corridor, and the City of London.

If the Interchange was introduced, a third of all HS2 passengers would be expected to use it instead of Euston, relieving pressure on existing Tube lines around Euston. This would address an issue raised by Transport for London.

From a construction perspective, Old Oak Common was the only site in West London suitable for launching the tunnel boring machines needed to create the tunnels to reach Euston. A new interchange station at Old Oak would also contribute to the urban regeneration of this area.

The Government accepted HS2 Ltd.'s recommendations for an HS2-Crossrail Interchange, at Old Oak Common. The financing of the plan was, however, unclear as the Government expected equitable contributions from local beneficiaries. Still, the Old Oak Common station would form part of the public consultation on the route.

In December 2010 when the Transport Secretary first unveiled plans for Phase One, the plans were met with significant opposition. The more significant tension points were:

Ditching plans for Euston Some respondents raised concerns as to whether there was sufficient evidence supporting Euston Station as the central London station. It was suggested that instead of having two separate stations in London there be only one, St Pancras near the HS1 terminus. Others proposed Old Oak Common as the only London station. Stopping HS2 short of the city centre was however an unacceptable option for Boris Johnson, the capital's Mayor, and other influential parties.

Crossrail 2 For those who insisted HS2 needed to go to Euston, concerns were mounting about all passengers who would descend on Euston Station, and how to disperse the pressure that the new line would bring to local Tube stations. In August 2011, the Greater London Authority floated the idea of completing Crossrail 2, another underground line, before opening the second phase for HS2.

GLA was not alone in this appeal. TfL, the London Mayor, the business lobby group London First[13] , and others all agreed that the Crossrail-HS2 Interchange at Old Oak Common was essential to minimize the pressure that HS2 would bring to Euston. But they also insisted that Crossrail 2 (which had been on the drawing board for several decades) needed to be built. For the London stakeholders Crossrail 2 was indispensable to relieve congestion on the Tube even if HS2 were not built, thus the lobbying for the line gained momentum. But financing it was an issue. Potential options included a mix of government grants, fares and contributions from developers and local businesses.

By June 2012, TfL demanded that the HS2 bill for Phase One included plans to safeguard for Crossrail 2. This would avoid having Euston 'dug up twice' and ensure that the Euston station was not forced

13 London First had been created by business to "agitate for London's infrastructure".

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to close under the pressure of overcrowding after opening HS2. To put pressure on the Government, TfL and London First joined forces to consult Londoners on two alternatives for Crossrail 2:

- A shorter, Tube-style metro from Clapham Junction to Seven Sisters via Tottenham Court Road, Euston and King's Cross St Pancras, estimated to cost £6bn [**Exhibit 14a**]
- A regional metro like Crossrail 1 with an extended route connecting the South West with the North East. This longer route would come in at around £10bn [**Exhibit 14b**]

Some at HS2 Ltd felt that this was a case of logrolling[14]. Arguably, the London stakeholders were blackmailing the government to secure financing for Crossrail 2, and perhaps even trying to transfer part of the Crossrail 2 costs onto the HS2 budget. Others disagreed — London stakeholders had a good point, and were simply doing their jobs by protecting the interests of their constituencies. Either way, it was clear that the Mayor of London was flexing his political muscles. Boris Johnson was certainly proving to be a thorn in the government's plans.

Demolition and disruption at Euston The headaches in London did not stop. Camden council was aggrieved with the HS2 plans for Euston and felt excluded from the decision–making process:

Things weren't shared as openly in the early days with the thinking about the London terminus... Camden would argue that the decision-making about where the station was in London wasn't something that they were particularly involved in... they were sort of told. [HS2 official]

The Camden elected officials were not happy to see their plans for Euston ignored by HS2. The proposed demolition around Euston and in surrounding 'urban green' areas such as The Regents Park and Primrose Hill was a major concern. The proposal would require demolishing at least five blocks of flats occupied by Council tenants. The Council elected officials insisted that appropriate housing should be created in advance of demolitions, and further expressed concerns about the impact that constructing the new railway line would have on local business and trade.

To address the housing issue, the government committed to prioritizing the development of proposals for re-accommodating people and also committed to exploring rehousing options on-site as part of the redevelopment. However, for the Council politicians, the government proposals were inadequate, and thus they legally challenged the Government's decision. Sarah Hayward, the Council's elected leader, wrote in in her blog in February 2012:

The impact in Camden is colossal, devastating and ill-considered by Government… We really were left with nowhere else to go... In Camden nearly 500 families will be forced from their homes. Currently those people have no idea where or what they will be offered as an alternative... this is one of the poorest areas of the country… We're not nimbys... we oppose HS2 because it will devastate our borough.

If at a political level the fight was unpleasant, things were better at a professional level. HS2 Ltd officials were working with the officials of the Council as well as of Transport for London and Greater London Authority on the best possible plan for Euston. From the onset, HS2 Ltd ruled out the idea of a double-decker station. Although this could reduce the footprint of the revamped Euston station,

[14] Logrolling is the exchange of political favours, especially the trading of influence or votes among legislators to achieve passage of projects that are of interest to one another.

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HS2 Ltd insisted it was not affordable and its implementation would create horrendous disruption to the train services running into London Euston. Thus, the discussions centred on rebuilding the existing Euston station. The Council officials liked the idea of fully modernising Euston, thus creating conditions for exciting over ground developments. As TfL, the Council, NR and others added things to the scope, by January 2013 the budget doubled the initial £1.1bn estimate, and the works would last at least three extra years. This created a problem for HS2 Ltd.

If HS2 Ltd recommended that the government ditch the plans for a complete rebuild of Euston station, it would further infuriate the local stakeholders. A mor economical scheme [**Exhibit 15**] could retain rather than rebuild 13 of the existing platforms and only the 11 new platforms for the high-speed trains would be sunk into the ground. Such scheme would cost only around £1.6bn and it could be ready by 2026 as initially planned. The revised station would include:

- A sub-surface pedestrian link between Euston and Euston Square Tube stations
- Better connections with the Underground, including a new Underground ticket hall
- New facilities for all passengers in a redeveloped, integrated station
- East-West pedestrian routes across the station, helping to link communities on either sides

A more modest £1.6bn scheme would still unlock development opportunities . But it remained more expensive than the initially cost of £1.1bn and therefore HS2 Ltd argued that they should not finance all the costs. The question, as one HS2 official said, thus remained "how to carve it [the budget] up?"

MANCHESTER

Greater Manchester was one of the UK's largest conurbations and acted as the principal economic hub for the wider Northern region. Manchester was also one of the largest centres of inter-city rail demand in the country. The core of the Greater Manchester conurbation included two cities, Manchester and Salford, which operated as two separate authorities. Any station developed in the centre would therefore have to serve both authorities.

In March 2012, whilst Phase One of HS2 was being consulted, HS2 Ltd received a remit from the Secretary of State to develop route proposals and options for Phase Two. A relevant aspect of the remit was to develop station options that would serve the Manchester city centre. The remit asked HS2 Ltd to consider an interchange station in Greater Manchester and develop station options that would provide access to major airports. With regards to the latter, Manchester Airport warranted proper analysis as the largest airport outside of London in terms of passengers served.

In deciding where to locate the Manchester stations, HS2 Ltd adopted its 'Sifting Process' going from the initial generation of options to long listing, short listing, before selecting options for refinement. Given the blight risks, HS2 Ltd opted to consult but not to invite any local authorities to participate in the sifting process for determining the line of route for the two legs of Phase Two. Instead, internal working groups would delineate the line after sifting through the various options for the routes.

However, to nail down the location of the stations, HS2 Ltd involved the local players with planning and transport responsibilities. People attending the meeting would be asked to sign confidentiality agreements, and could not take any paperwork away from the meeting rooms. The HS2 Ltd leaders anticipated that this would reduce the risks of leaks of information and thus unnecessary blight on

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property. HS2 Ltd asked the Manchester City Council to identify local stakeholders who should attend the meetings, and created two working groups, one to explore a city-centre station, and another to explore an interchange station for Greater Manchester [**Exhibit 16**].

Following much deliberation with local stakeholders, in March 2012 the Government announced its preferred route and choices for the four remitted stations that would form part of Phase Two of HS2. To arrive at its final proposal, the Government reviewed the recommendation prepared by HS2 Ltd, and also considered the reports prepared by local players. In addition, ministers and officials visited the proposed route and station options and met with the local political and economic leaders to hear their views first hand. The western leg of the route presented by Government would serve proposed stations at Manchester Airport and Manchester Piccadilly [**Exhibit 17]**.

A new station would be built alongside the existing Piccadilly station, in the heart of the city, and the HS2 platforms would be parallel to the existing platforms [**Exhibit 18]**. The redevelopment of Piccadilly station would enhance connectivity with the local transport network and add new car parking. A bigger station with more facilities and better links with public transport would also allow easy connections with regional rail services.

The Manchester Airport station, on the other hand, would serve the airport and the local market for rail demand. With improved transport links, the airport would be capable of increasing its passenger volumes. Additionally, an HS2 station alongside Manchester Airport would create opportunities for passengers to interchange directly between high-speed rail services and the airport.

Resolving the location for the city centre station had been straightforward. The process started with forty-two potential sites after refinements[15] with choices quickly boiling down to two options; one near the existing Piccadilly station and another in Salford, reasonably close to the BBC headquarters in the North West. Local leaders then quickly agreed on Piccadilly as the right location, which had one local official muse whether "they had it too easy".

Discussions continued between the government, HS2 Ltd, and local stakeholders. For one, the Manchester stakeholders were unhappy with the HS2 Ltd proposal for developing a simple station adjacent to the existing station in the city centre. This was a once-in-a-life-time opportunity to regenerate the area around Manchester Piccadilly, and the Council planned to commission studies to develop plans for a grandiose scheme that would integrate the existing station with the new facility for receiving the high-speed two trains. Clearly, such a vision would cost more than the £350m that HS2 Ltd had earmarked for the station, but the Manchester Council was digging its heels in. To bolster its case, the council announced it would establish a working group to further explore how to seize the opportunity to catalyse a multi-billion pound regeneration plan around a new-look Piccadilly station. The council also had a 'strategic regeneration framework' in the works, which drew inspiration from the likes of Amsterdam and New York. A Council official explained:

This is a once in a century opportunity to have a major transport interchange… We want... one fantastic station that is iconic in design... they've [HS2 Ltd] got an idea of what they want to see and

15 (Temple-ERM, 2013) *High Speed Rail: Consultation on the route from the West Midlands to Manchester, Leeds and beyond Sustainability Statement* (A Report by Temple-ERM for HS2 Ltd)

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we've got an idea about what we want to see, and I think we're both respectful of each other's position... broadly we want to get to the same end result, a station that is successful and that is generating growth and development

Issues were also emerging around the plans for the Manchester Airport Station. Although vacant land for the station had been identified, HS2 Ltd and the local stakeholders disagreed on the economic case for the station. For HS2 Ltd, the economic case was a weak one especially since the route connecting the airport to the city centre would require significant tunnelling. If such tunnelling were undertaken, it would further push up the estimated costs for the second stage.

The local stakeholders disagreed, and argued that there was a strong business case for the airport station. This was argued in view of the local vision championed by the Manchester Airport Group (MAG), a holding company that was owned by the ten metropolitan borough councils of Greater Manchester and an Australian investment fund. The ambitious airport company, which was in the process of purchasing the Stansted airport in London for £1.5bn, had confirmed plans to develop a £800m Manchester Airport City in January 2013. The Manchester site had been announced as an Enterprise Zone[16], and MAG was initiating discussions with international investors to fund the development of the Enterprise Zone. The HS2 leaders were not convinced; for them, the central Government should ask local stakeholders to finance significant elements of the airport station.

Still, compared to the tumultuous developments in the Chilterns and London, for the HS2 leaders, the systematic way in which development had been unfolding in Manchester was refreshing. The region was living up to its reputation of taking the 'bull by the horns,' and being very well prepared for opportunities that arose. Doug said:

You've got first class people at the top of it, and you've got the structure to make decisions quite quickly; they work collaboratively within the northwest much more so. Certainly when I go up there, you're in a very organised lobby. They just grasp the opportunities

Indeed, in support of its proposition for an affordable airport station, the Manchester stakeholders committed to draw up a package of innovative funding measures. Coupled with this, the Government committed to working with the MAG and the wider region to develop funding principles and outline a package, which would be sufficient for the Airport station to go ahead.

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Doug and Alison had less than 10 months to submit the HS2 Phase One Bill to the Parliament. The good news was that apart from a handful of Members of Parliament who represented the interests of NIMBYs North of London, cross-party political support remained very strong. Furthermore, there was plenty of time to resolve the issues around Phase Two since that bill would not be submitted before 2015. This interval was important firstly because pressure was mounting to add another station on the Western leg at Crewe without which lobbyists argued Liverpool and Warrington would be disadvantaged. Secondly because conversations on the Eastern leg, with three remitted stations, appeared to be far more complicated than those on the Western leg up to Manchester.

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16 Urban Enterprise Zones are areas where companies can locate free of certain local and state taxes and restrictions to encourage development in blighted neighbourhoods

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Significant concessions had already been made for the Chilterns. Even more unsettling was that on some days it seemed that the HS2 plans for London were about to implode given the ongoing political fights—"HS2 isn't an organisation that puts the world right", said Doug, "we're the infantry...[we] get all the fights... we're the bad boys, but we're really only doing what we're instructed to do". Be that as it may, it seemed that everyone expected a lot more from HS2 Ltd.

Ultimately, significant questions remained: should HS2 Ltd continue to plough ahead with a scheme that fit within their budget, with the best information they had at the time, and draft a bill that would not preclude other opportunities that were emerging? Things could always be amended through additional provisions, and people could also deal with emergent pieces of work integral to HS2 through Transport Works Acts. Or instead, should the controversy give them pause, and thus should they recommend the government to delay the whole thing by another year or so. More time would be helpful to resolve the differences in London and other locations, and reconcile whatever decisions would come with a revised and more robust budget and timescale. Also, how detailed did the bill actually need to be? It seemed that the key piece of the law was to define the scheme's limits of deviation[17]. In the end it was within those limits that the bill would grant legal powers.

HS2 Ltd also needed to focus attention on the scheme's business case. The scheme needed to get a majority in Parliament to get approved, and thus HS2 Ltd needed supporting evidence to persuade as many MPs as possible of its merits. However, concerns were mounting around the reliability of the benefit-cost ratio, first announced in March 2010 at 2.4 to 1, but restated in August 2012 at 1.9 to 1 for the whole network and 1.4 to 1 for Phase One. There was a lot of scrutiny ahead of them.

For one, the National Audit Office, the government's watchdog, was preparing its first review of the HS2 business case. The House of Commons Committee of Public Accounts was also planning to look at the HS2 business case. Another watchdog, the Major Projects Authority, had raised concerns about risks regarding the timetable, governance and resources in late 2011, noting that the £32.7bn estimate was yet to include VAT and inflation. Clearly appealing to intuition in arguing that HS2 was a springboard for economic growth, job creation, and securing Britain's prosperity was not enough.

17 The maximum extent within which the railway and ancillary works would be built

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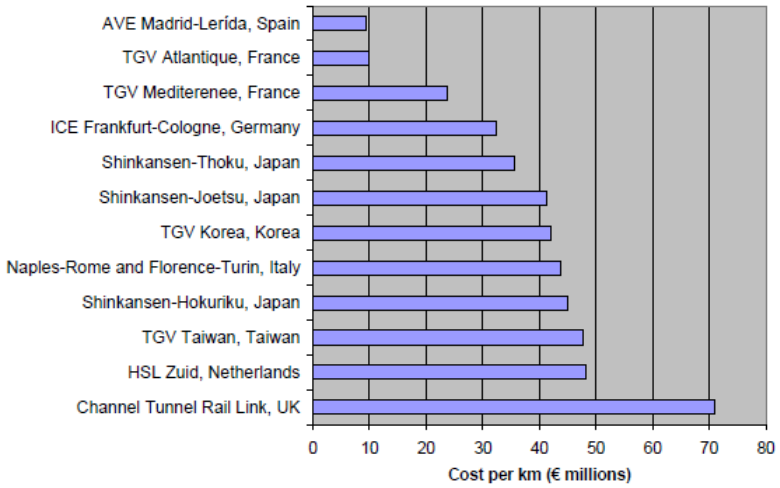
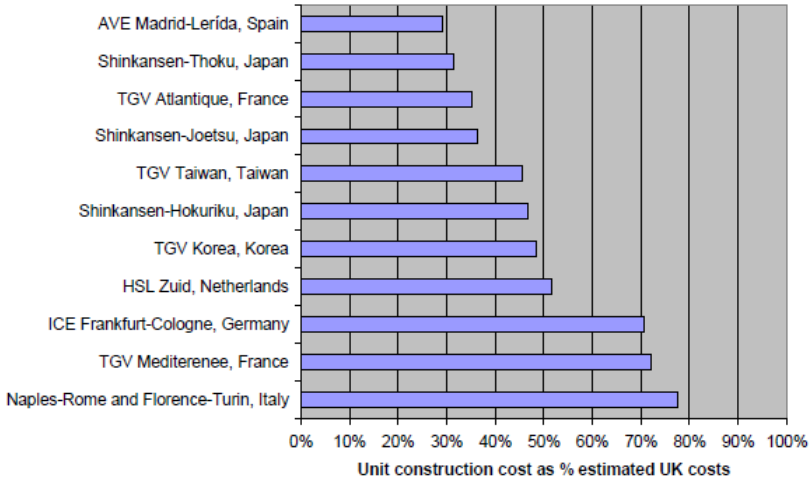
EXHIBIT 1 – High Speed Line Construction Costs per KM (Steer Davies Gleave 2004, High-speed rail: international Comparisons. February)





Summary of principal recommendations

- Standard optimism bias assumptions are inappropriate for high speed rail and should be reduced, based on a deeper understanding of relevant project overruns.
- Project-specific values of time and for the proportion of working time should be used in appraisals.
- The wider economic benefits of major transport projects should be quantified and included in the appraisal.
- Safety and environmental regulations that significantly increase costs should be reviewed and subject to cost benefit analysis.
- The priority for further work should be to seek means of reducing costs to levels closer to those seen elsewhere in Europe.

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EXHIBIT 2: HS2 Remit (Letter from the Secretary of State to the HS2 Chairman, 2010)

From the Secretary of State

Department for Transport

Great Minster House
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Fax: 020 7944 4399
E-Mail: andrew.adonis@dft.gsi.gov.uk

Web site: www.dft.gov.uk

Sir Brian Briscoe
Chairman
High Speed Two Ltd
3rd Floor
55 Victoria Street
LONDON
SW1E 0EU

17 March 2010

Dear Brian,

REMIT FOR HS2 Ltd

Following publication of *High Speed Rail*, which sets out our strategy for the future of high speed rail and responds to your report *High Speed Rail - London to the West Midlands and Beyond*, I am writing to record the work I would like HS2 Ltd to take forward to deliver this strategy. This has two main elements: further work on London to the West Midlands; and developing detailed proposals for lines to Manchester and Leeds.

London to the West Midlands

Building on the work that HS2 Ltd reported at the end of 2009, I wish you to progress the work set out below.

1. In preparation for the formal public consultation in the Autumn, refine aspects of HS2 Ltd's recommended route, reporting developments and any recommended changes to Government by the end of August. In particular:

   1.1 Further refine the assessment of, and proposals for, mitigation of impacts of Route 3, especially in respect of noise and other environmental impacts.

   1.2 With the Crossrail sponsors – the Department for Transport and Transport for London – as well as with relevant London boroughs (in particular Hammersmith & Fulham Council), develop more detailed plans for the Crossrail Interchange station including

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opportunities for improving access and dispersal at the Crossrail Interchange and Euston.

1.3 With the Department for Transport and the relevant rail and airport operators, further develop the indicative specification for services from the Crossrail Interchange station, including services to Heathrow and services on Crossrail and the Great Western Main Line.

1.4 With Camden Council, Transport for London and Network Rail, undertake further work on the phasing of redevelopment at Euston, having regard to:

- residents who would potentially need to be re-housed;
- passengers using Euston;
- local businesses and amenities.

This initial further work should be ready for consultation in Autumn 2010, recognising that detailed design work is expected to take several years.

1.5 With West Midlands partners, elaborate the opportunities for improved connections between Curzon Street and other central Birmingham stations, and development opportunities at Eastside.

1.6 Undertake further assessment of sites for rolling stock and infrastructure maintenance depots and other related facilities for High Speed Two, including whether a West Midlands rolling stock depot continues to be an appropriate solution for a network also covering routes to Manchester and Leeds, and recommend a preferred location.

1.7 Update and develop the Appraisal of Sustainability.

1.8 Work with rail delivery partners to develop the approach to the interactions with the existing rail network, including the operational implications for through running of high speed rail services onto the classic network.

2. Undertake the consultation on the Exceptional Hardship Scheme (EHS), reporting to Government on the responses to the consultation and recommending a way forward as soon as possible after the end of the consultation period.

3. If Government decides to take forward the EHS, implement the scheme, including taking responsibility for acquisition and management

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of property as necessary.

4. Undertake further work on the options for connecting High Speed Two to High Speed One by a dedicated rapid transit system linking Euston and St Pancras and by a direct rail link to High Speed One, and assess the viability and cost of each of these, including a full assessment of the business case, prior to any public consultation. This should report to the Government by the end of August to inform the consultation.

5. Assist Lord Mawhinney's review on high speed rail access to Heathrow.

6. Working closely with the Department for Transport, continue pre-consultation engagement with key stakeholders to ensure that any particular local, regional or cultural sensitivities are fully factored into consultation and communication plans. Manage the formal public consultation on the detailed London to the West Midlands route, and present to Government a report on the responses to that element of the consultation.

7. Advise the Department for Transport on the need for any early safeguarding of the London to the West Midlands route.

8. Work with the Department for Transport and also with relevant local partners to develop plans and identify an appropriate funding package, including third party contributions, for each of the major station and interchange developments.

9. Work with the Department for Transport and Infrastructure UK on its review of whether and how the cost of relevant construction works could be lowered. Keep under review the cost estimates and business case for London to the West Midlands in the light of the results emerging from this work.

The 'Y': West Midlands – Manchester and West Midlands – Leeds

In developing detailed proposals for lines to Manchester and Leeds, we wish you to reflect the objectives for capacity, connectivity and sustainability set out in *High Speed Rail*. We also wish you to adopt the same technical specification as you have recommended for the London to West Midlands route, and which we have agreed.

10. The work that we wish you to undertake will include developing route proposals and options for West Midlands to Manchester, with a link onto the West Coast Main Line, and West Midlands to Leeds with a link

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onto the East Coast Main Line, to the same level of detail as for the London to the West Midlands route. This work should be completed in summer 2011. In particular it will cover:

10.1 Proposals for the location of stations to serve the Manchester and Leeds conurbations, South Yorkshire and the East Midlands, including consideration of city centre and /or interchange locations, and of providing access to the major airports in these regions.

10.2. The proposed location(s) of any additional rolling stock and infrastructure maintenance facilities.

10.3. The case for gauge clearance of conventional lines for through running services beyond Manchester and Leeds, with estimates of the work involved and costs.

10.4. Whether, in the light of this, the recommendation for a mixed fleet of dedicated and classic-compatible trains for High Speed Two remains appropriate for a wider network; and if so, the recommended mix.

10.5. An indicative specification for high speed services and for 'hybrid' services running from the high speed lines onto the classic network.

10.6. Indicative proposals for the use of released capacity, including for freight.

10.7. The business case for extensions to Manchester and Leeds, including financial, economic, social and environmental assessments.

or critical journey times between London and Glasgow and Edinburgh
n particular.

Arrangements to consult on, and in due course implement, an
Exceptional Hardship Scheme in respect of the recommended route
options to Manchester and Leeds.

d be grateful if you would report to me your recommendations and
s to meet the above remit in respect of the routes to Manchester,
and beyond by 30 June 2011.

Yours ever,

Andrew.

ANDREW ADONIS

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EXHIBIT 3- HS2 Programme Governance Structure (NAO 2013, High Speed 2: A review of early programme preparation)

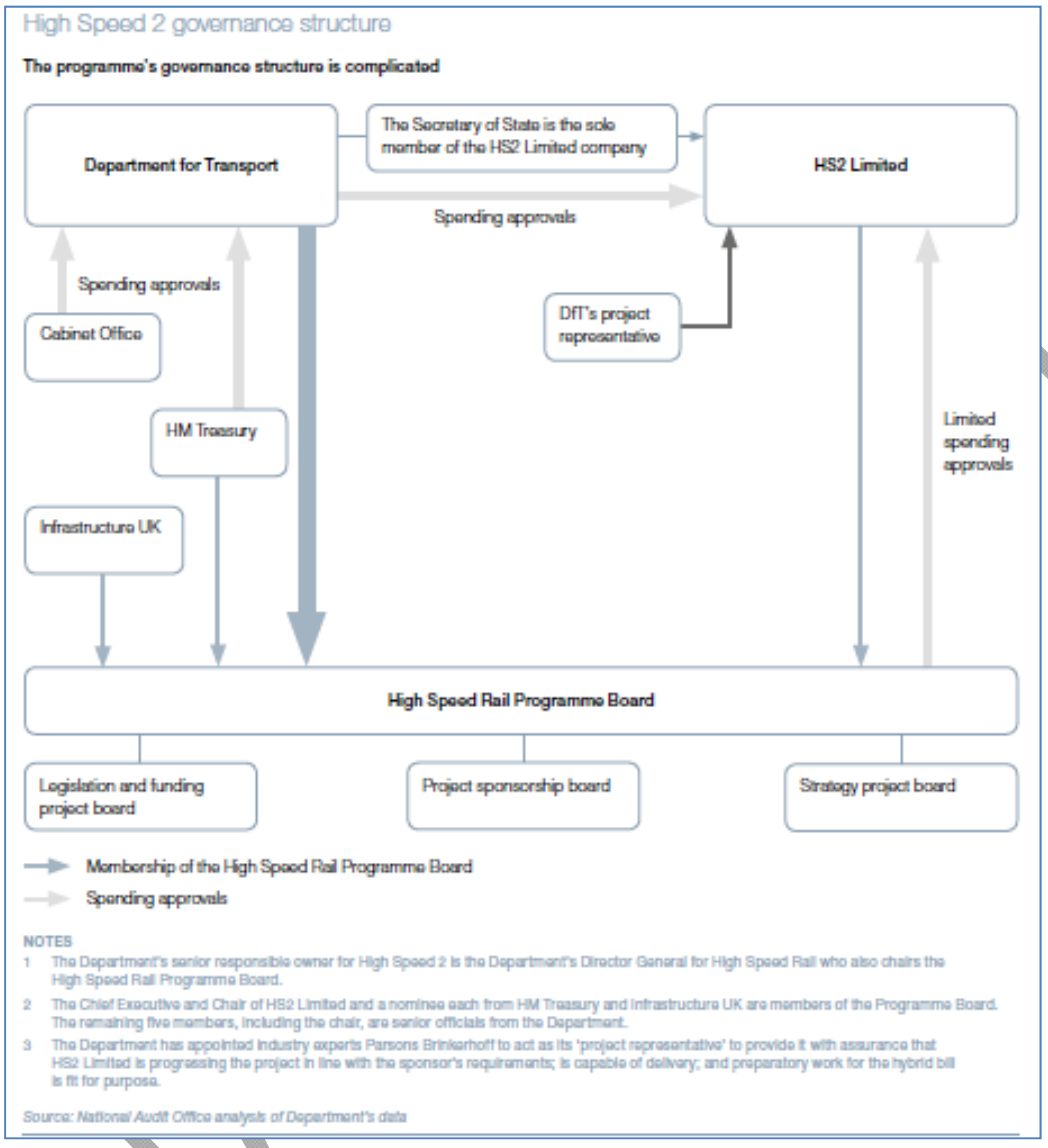

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EXHIBIT 4: The HS2 Ltd Governance Structure (HS2 Ltd, 2012)

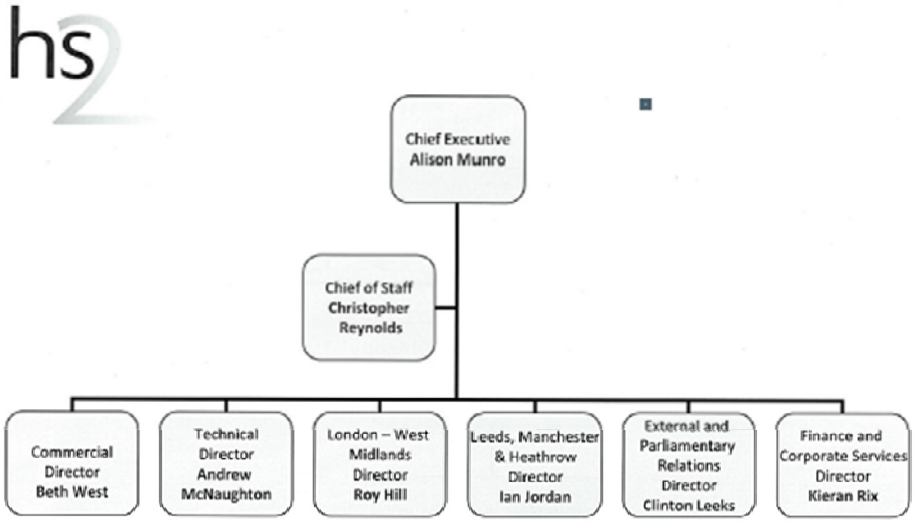

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EXHIBIT 5a: Overview of 'Lots' Professionals Services Framework (NCE, 2012)

Lot No 1: Civil Engineering and Structural Design Services

Professional Services Consultants (PSCs) appointed will produce affordable, good value, and environmentally acceptable preliminary designs. They will need to deliver design and cost estimating services associated with the requirements of the anticipated work packages. This will include railway and station civil and structural engineering, architectural services, station systems, tunnelling, and the interfaces with railway systems designed by the Railway Systems Design Services team.

Lot No 2: Railway Systems Design Services

PSCs appointed will produce affordable, good value and environmentally acceptable preliminary designs, as well as the full range of design and cost estimating services associated with train control, communications, permanent way, overhead line equipment, traction power, local power, passenger support systems and matters relating to rolling stock, service specification (timetabling) and railway operations.

Lot No 3: Environmental Services

PSCs appointed will produce environmental impact assessments, the environmental statement and associated reports. Lot 3 PSCs will need to be capable of undertaking the full range of environmental surveys required for the anticipated work packages and will be required to work together to support the development of a balanced and proportionate environmental statement and associated reports.

Lot No 4: Land Referencing Services

PSCs appointed will produce the land plans and schedules required for the purposes of the HS2 Parliamentary Bill procedures if the transport secretary decides to move forward to that stage. Lot 4 PSCs will work under the management of the HS2 Development Partner (currently being procured) and will work collaboratively with design and environmental consultants appointed to produce the HS2 designs and environmental assessments.

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EXHIBIT 5b: HS2 Professional Service Framework Phase One Agreements (HS2, 2013)

Lot 1 Civil Structural Design Services	
Arup	Prepare preliminary designs for the HS2 terminus station at Euston Prepare preliminary designs for the Birmingham Curzon Street station complex and Birmingham interchange station Washwood Heath Rolling Stock Maintenance Depot and a link from Birmingham Interchange station to the NEC and Birmingham Airport
Mott Macdonald	Prepare the preliminary designs for the London Metropolitan Area from London Euston station through northwest London, including the link to HS1 and a new interchange station at Old Oak Common.
Atkins	Prepare preliminary designs for the route through Buckinghamshire, Northamptonshire and Oxfordshire.
Capita Symonds Ineco JV	Prepare preliminary designs for the route through Warwickshire and Staffordshire, and the connection to the West Coast Mainline.
Lot 2 Railway Systems Design Services	
Parsons Brinckerhoff	Prepare designs for high-speed rail systems for Phase 1 of HS2 from London to the West Midlands.
Parsons Brinckerhoff	Design modifications to the existing Network Rail systems at key interface points such as Euston, Old Oak Common and the connection to the West Coast mainline, to enable the construction of HS2 and ensure minimal disruption to existing rail services.
Lot 3 Environmental Services	
ARUP supported by URS Scott Wilson	Provide technical leadership and oversight in the preparation of our Environmental Impact Assessments (EIAs) and the production of our Environmental Statement.
ARUP again supported by URS Scott Wilson	Carry out the EIA for West Midlands Metropolitan Area covering Birmingham and Solihull.
ERM Temple Group Mott Macdonald Consortium	Carry out the EIAs for the London Metropolitan Area and the section of the route covering Buckinghamshire, Hertfordshire, Oxfordshire and Northamptonshire. (2 contracts)
Atkins	Carry out the EIAs for route section covering Warwickshire and Staffordshire.

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EXHIBIT 5b: HS2 Professional Service Framework Phase One Agreements (HS2, 2013)

Lot 4 Land Referencing Services	
Terraquest	Provide land-referencing services from London Euston to the Colne Valley viaduct, including the link to HS1 and the interchange station at Old Oak Common.
Terraquest	Provide land-referencing services for Birmingham Curzon Street station complex and Birmingham Interchange Station, Washwood Heath Rolling Stock Maintenance Depot and a link from Birmingham Interchange Station to the NEC and Birmingham Airport.
Mouchel	Provide land Referencing services from the Colne Valley through Buckinghamshire, Northamptonshire and Oxfordshire.
Mott MacDonald	Provide land-referencing services through Warwickshire and Staffordshire, and the connection to the West Coast Main Line.

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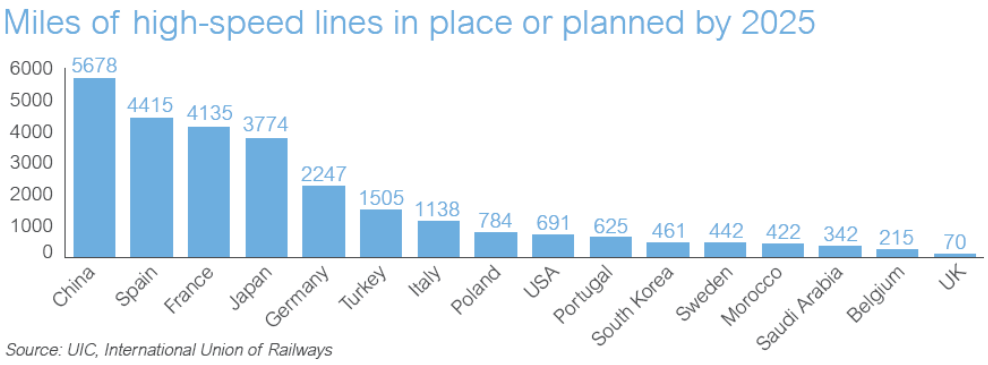
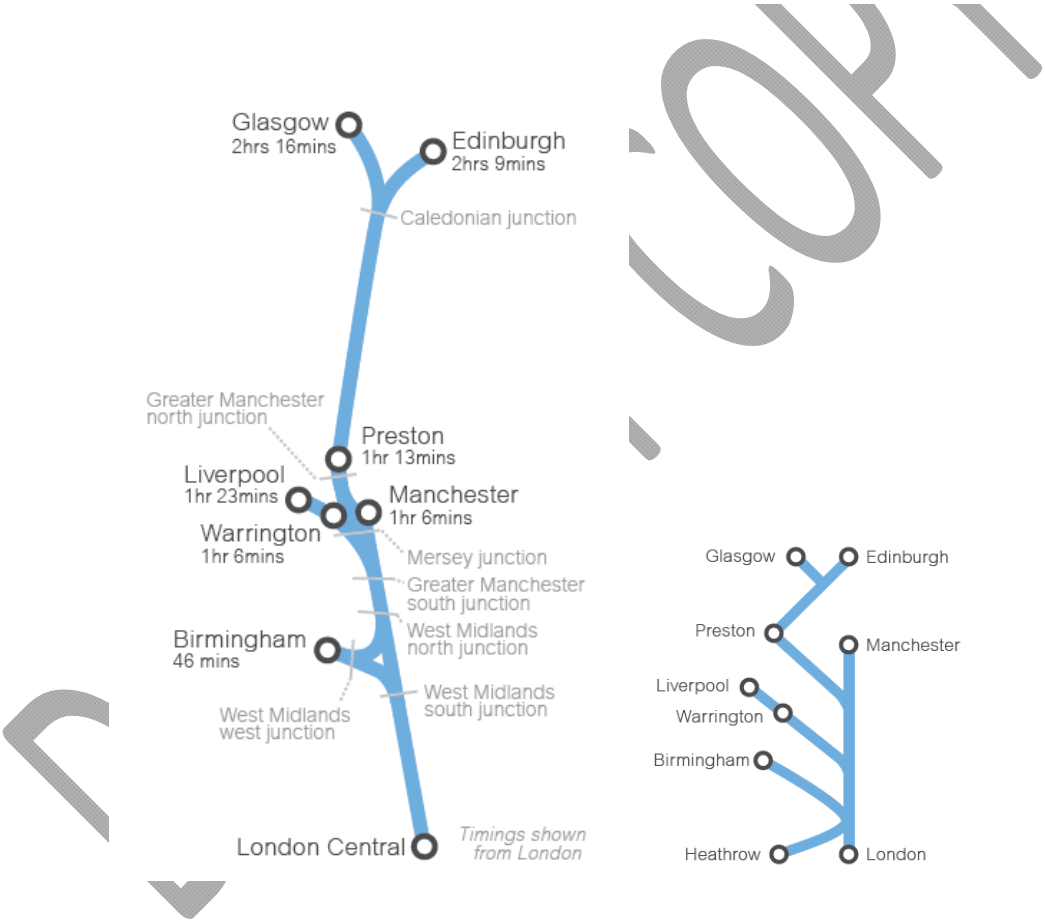
EXHIBIT 6: The Network Rail proposal (NR 2009, Meeting the Capacity Challenge)





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EXHIBITS 7a, b HS2 Proposed Y Route and Greengauge 21 proposal (NCE, 2010)

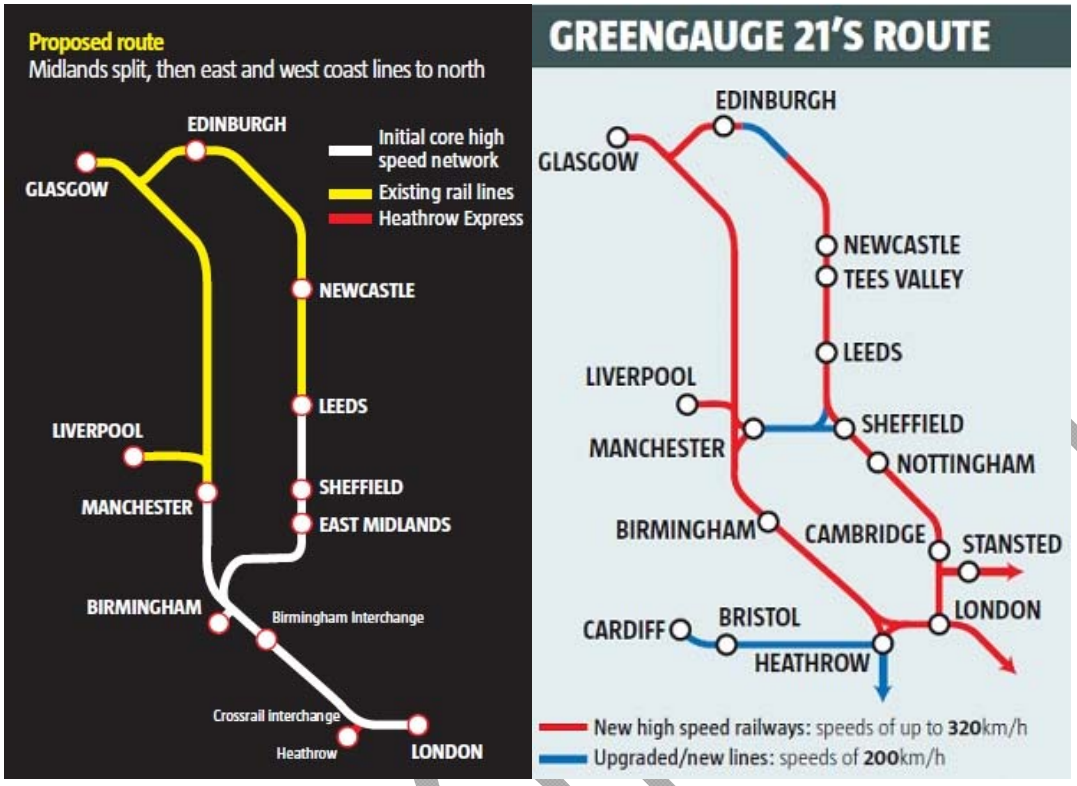

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EXHIBIT 8: Plan floated by Tories in 2010 for discussion (NCE, 2010)

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EXHIBIT 9: Chilterns Route 3 (Chilterns Conservation Board, 2012)

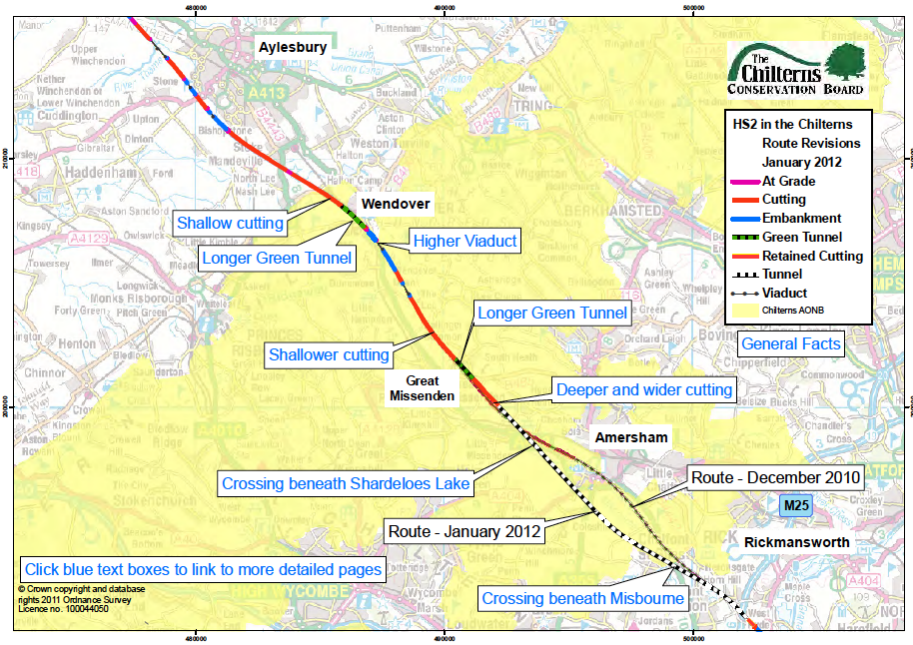

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EXHIBIT 10: Sir Terry Farrell's Euston Station Design (DfT Command Paper, 2010)

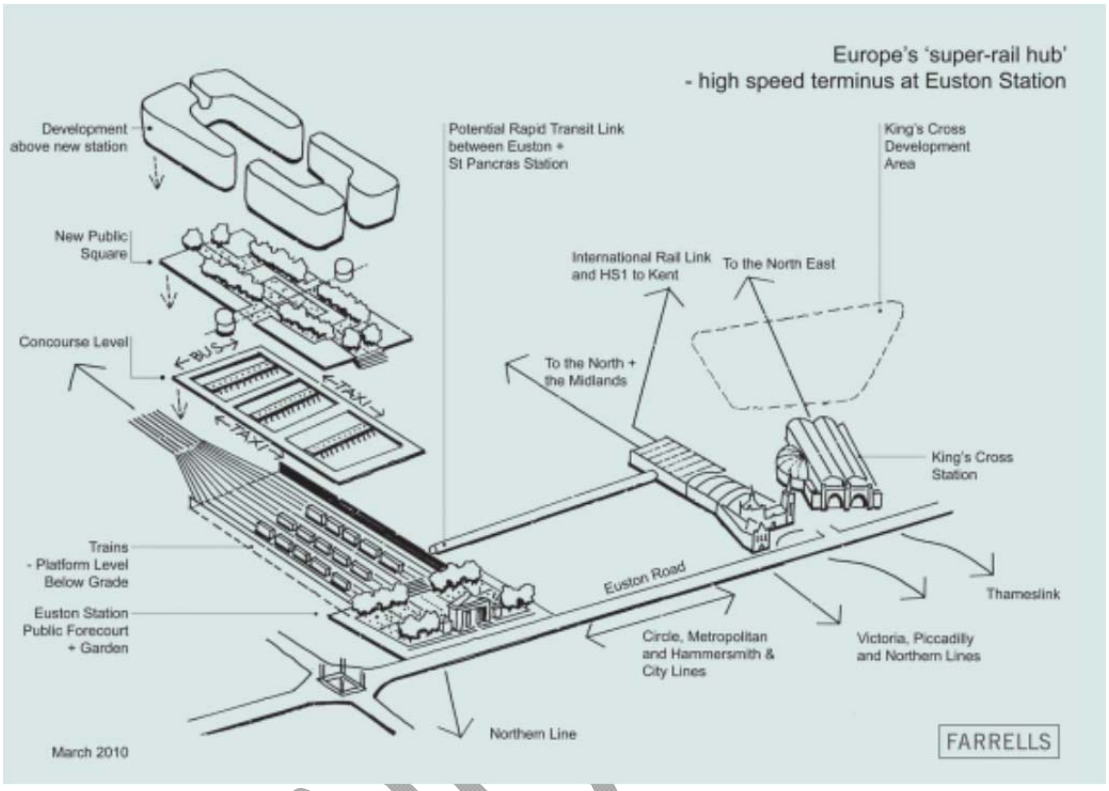

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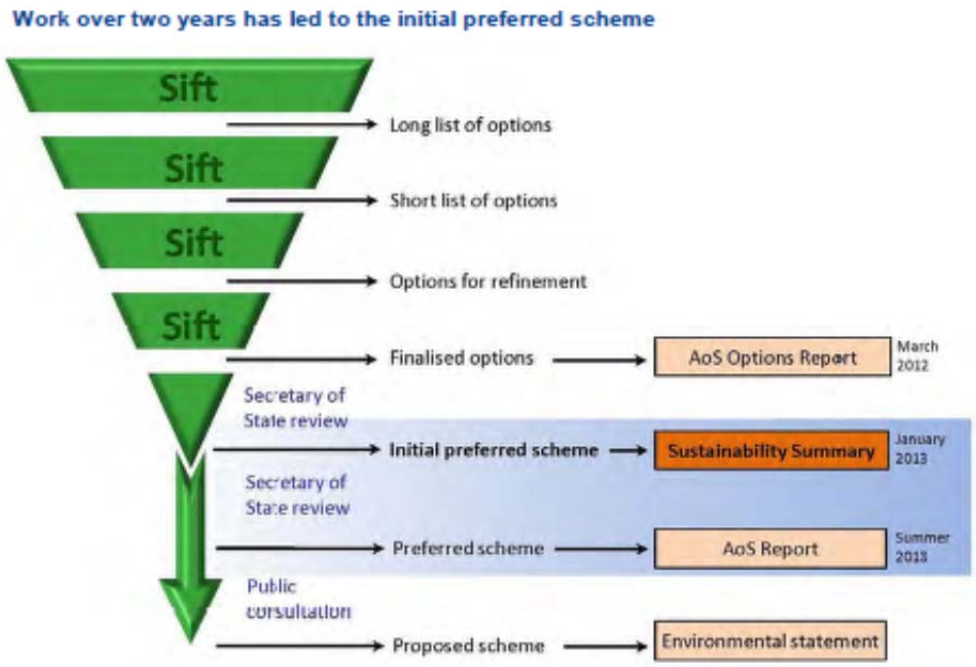
EXHIBIT 11: Options Sifting Process (HS2 Ltd, 2013. HS2 Phase Two Initial Preferred Scheme Sustainability Summary)



Sifting Phase	Phase Overview
Initial generation of options and long listing	The initial options for approaches were formed by looking at the possible ways of linking the main route options and the city centre station options that had already been generated Initially approach routes were proposed where there was an existing transport, utilities or natural corridor.
Long listing	As with the main lines of route all options were progressed to the next stage as long listed options.
Short listing	The long listed options were developed in more detail from an engineering, sustainability, journey time and cost perspective. The short listing of approach options was driven both by the relative performance of approaches and on the fact that some connecting route and station options had not been progressed.
Selecting options for refinement	Some options did not progress further because of high demolition numbers, high cost and poor sustainability performance.
Finalising our options	A more detailed assessment was undertaken of the remaining options, including design optimisation and mitigation. Although it was clear that there are differences between the costs, journey time, complexity and sustainability performance, no options were parked at this stage. There were no clear all round better performers between the two approach options to Salford and the two approach options at Piccadilly.

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EXHIBIT 12a: Proposed Design Euston Station, 2010 (DfT Command Paper, 2010)

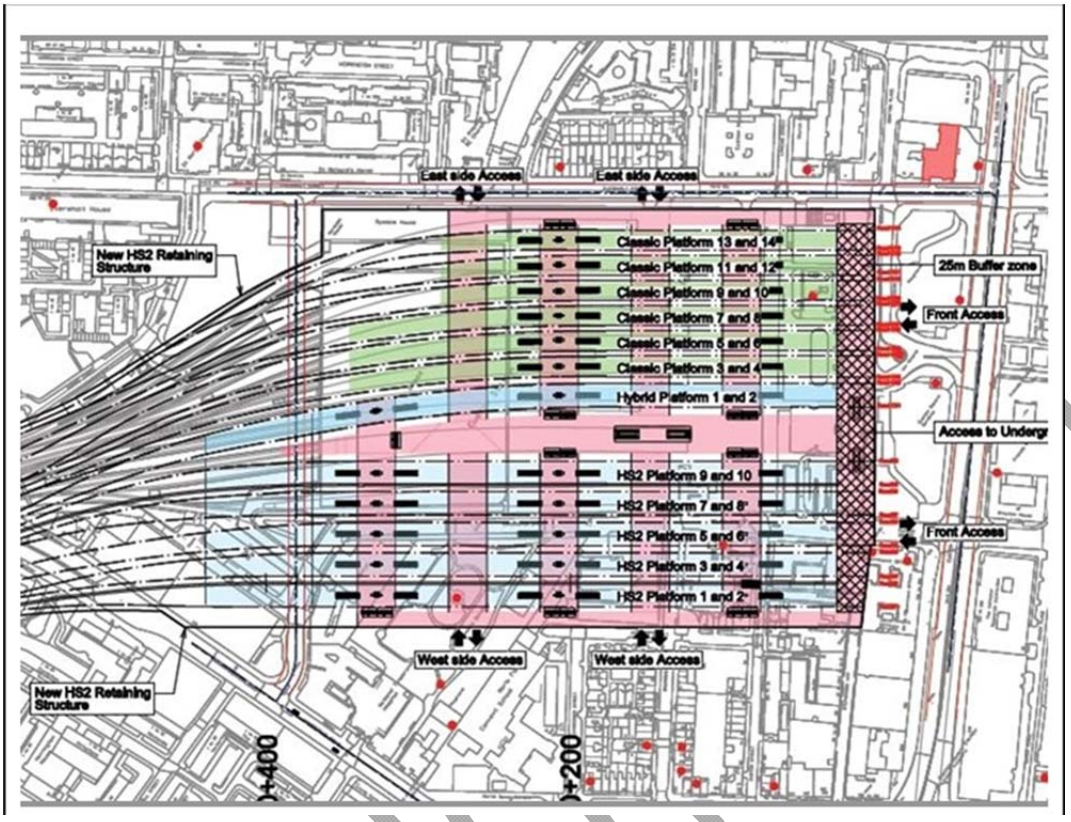

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EXHIBIT 12b Proposed Footprint for Euston Station, 2010 (DfT Command Paper, 2010)

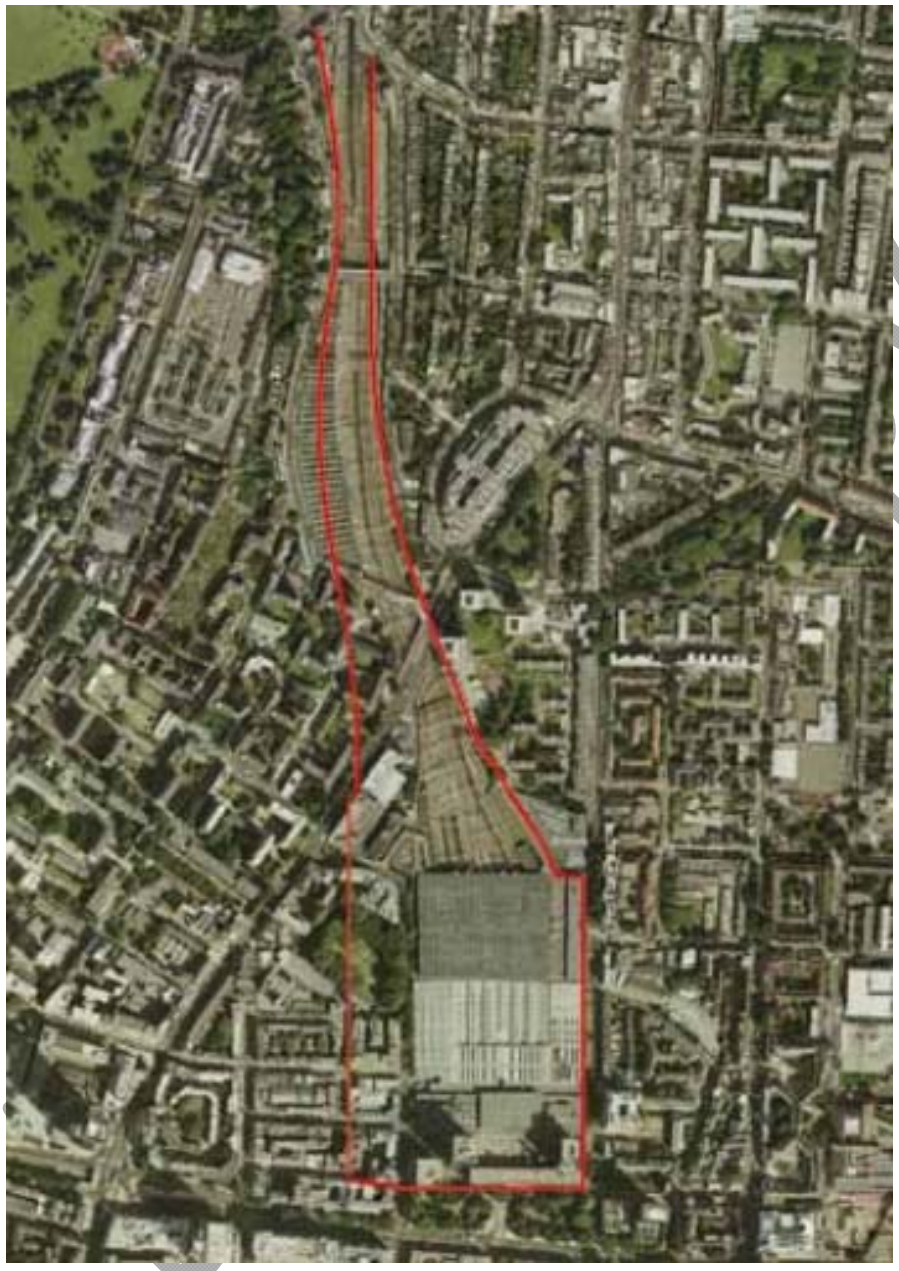

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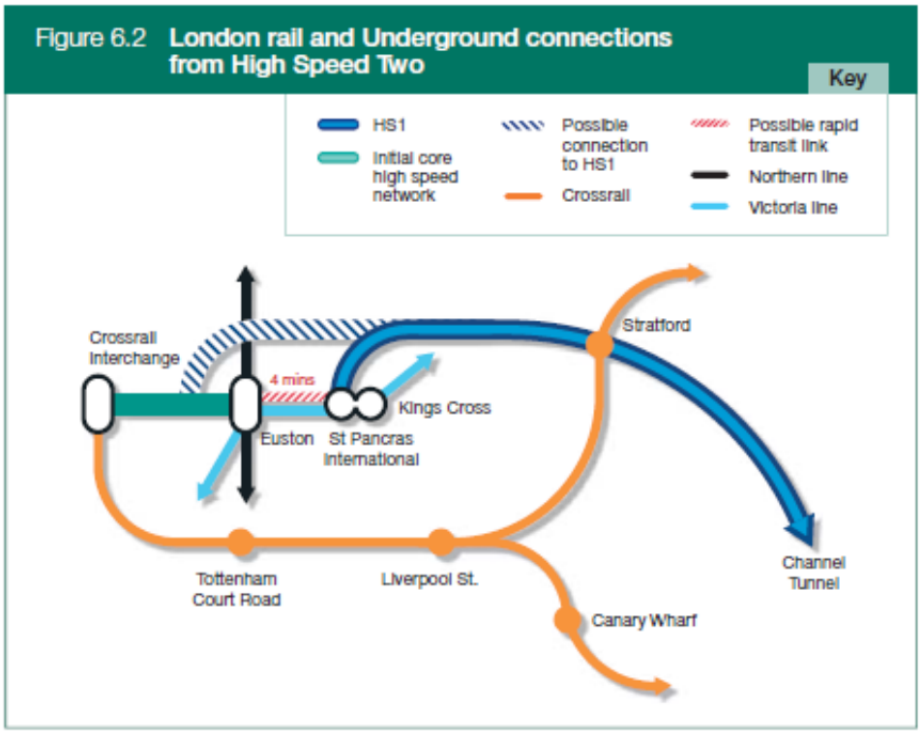
EXHIBIT 13: Euston and Crossrail interchange (DfT Command Paper, 2010)



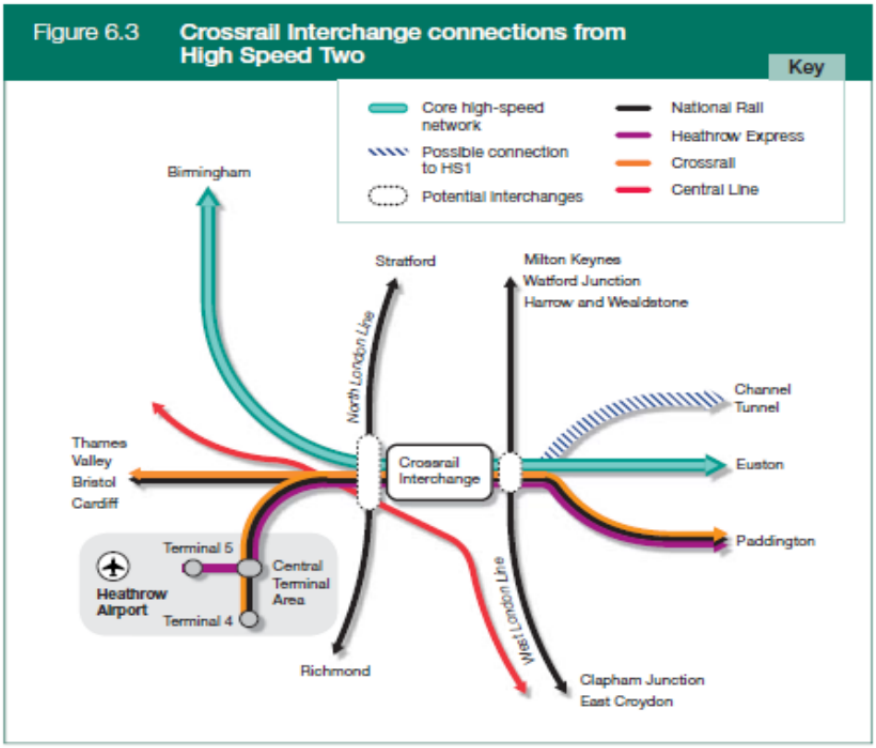


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EXHIBIT 14a: Crossrail 2 Route (urban option) (TfL, 2012)

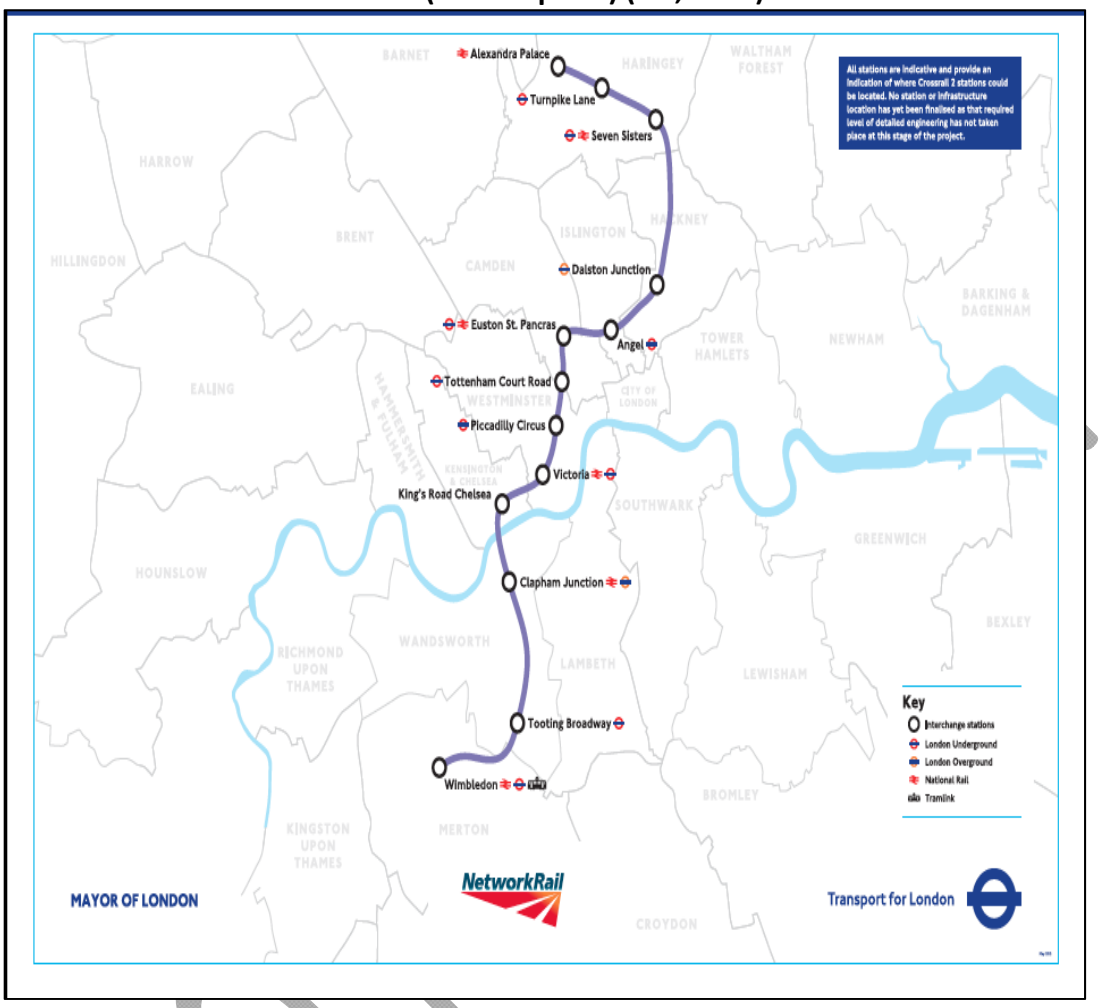

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EXHIBIT 14b: Crossrail 2 Route (regional option) (TfL, 2012)

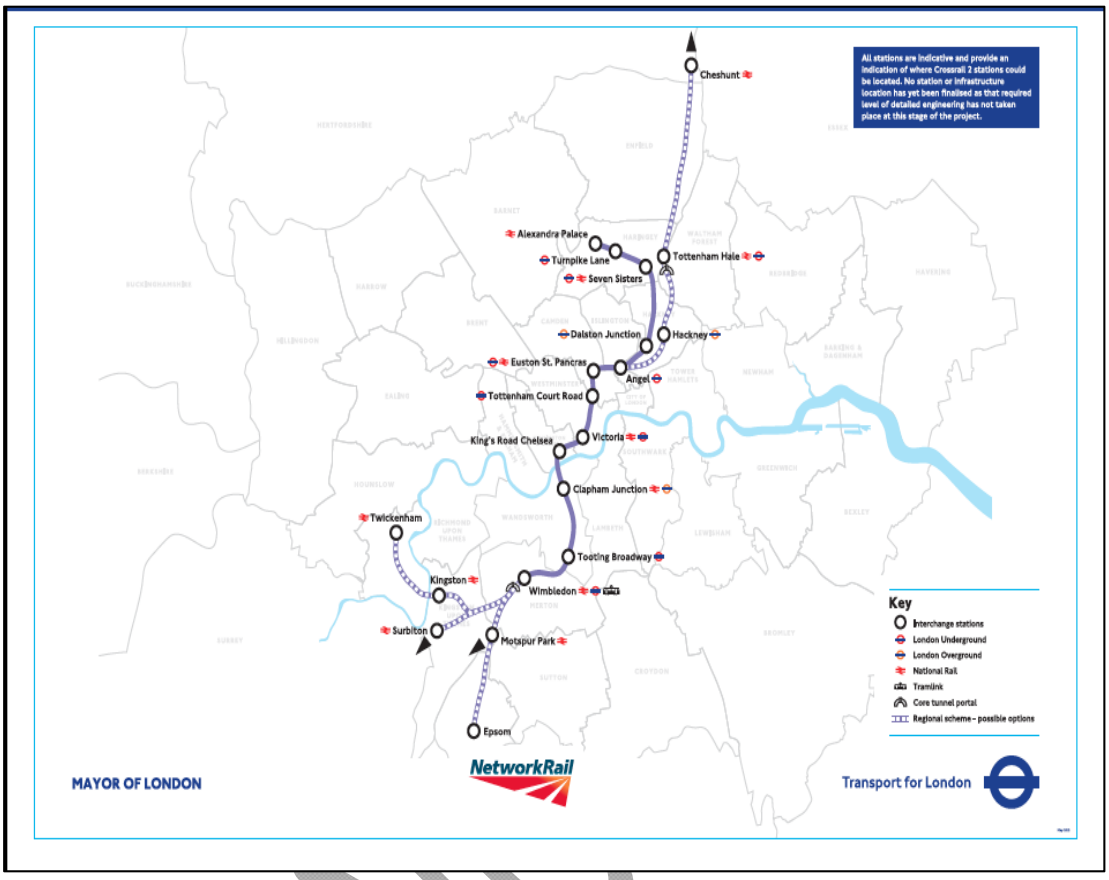

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EXHIBIT 15: A Scaled down Plan for the Euston Station (HS2, 2013)

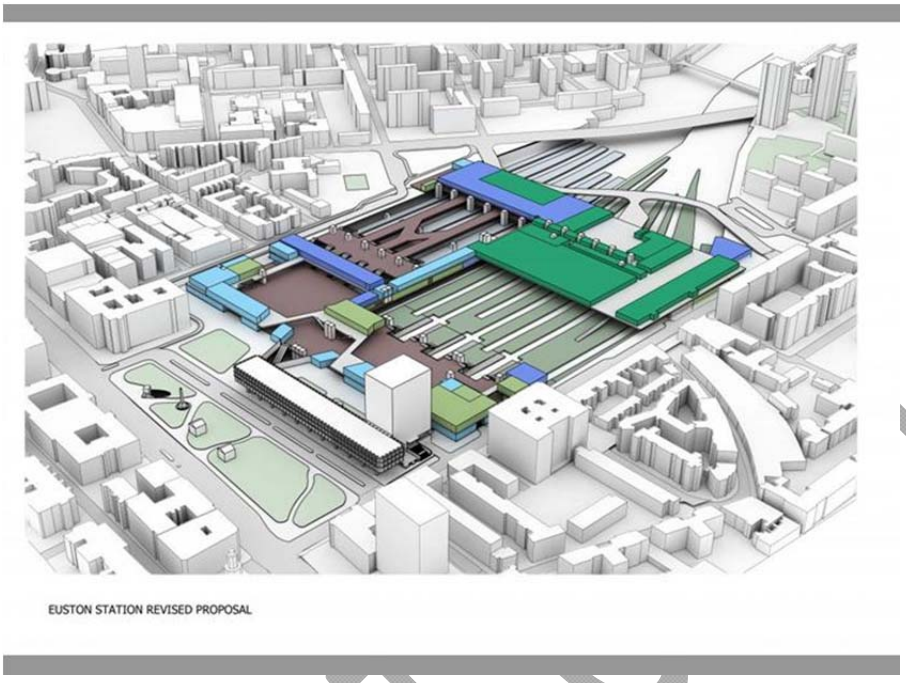

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EXHIBIT 16: Consultation Stakeholder Groups for the Four Remitted Stations in the second phase (HS2 Ltd, 2012. Record of stakeholder engagement for Phase Two of the high-speed rail network: A report to Government by HS2 Ltd)

2 Stakeholder groups

2.1.1 We established a number of formal working groups which met regularly during the course of the period. We also held ad hoc meetings with other stakeholders, either as a group or on a one to one basis. The main groups of stakeholders were:

- **station working groups - for the Leeds and Manchester Legs:** we met delivery partners in regular formal working groups. They contributed to the identification and assessment of options and comprised a small number of stakeholders with specific local transport and planning responsibilities for the four remitted station areas around Manchester, Leeds, South Yorkshire and the East Midlands. There was also bilateral contact with relevant district/borough authorities, where appropriate, to gather information on planning proposals, for example;

- **rolling stock and infrastructure maintenance depot stakeholders:** we drew on stakeholders' local knowledge to assist us with option generation for depots. These stakeholders were the upper tier local planning authorities of potential depot locations. This was not a formal group;

- **wider stakeholder groups:** these groups consisted of a wider set of local and regional planning authorities, business groups and other interests in the Midlands and North of England and in Scotland;

- **challenge panels**: these panels ensure that HS2 Ltd's approach to high speed rail is scrutinised at every stage. They are comprised of independent experts. The panels challenge and reinforce our strategic and analytical approaches; and

- **Appraisal of Sustainability (AoS) reference group:** This included stakeholders from central government departments and statutory agencies. It provided useful input and challenge of our sustainability appraisal methodology.

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EXHIBIT 17: Manchester Stations (HS2 Ltd, 2013. High Speed Rail: Investing in Britain's Future: Consultations on the route from the West Midlands to Manchester, Leeds and beyond)

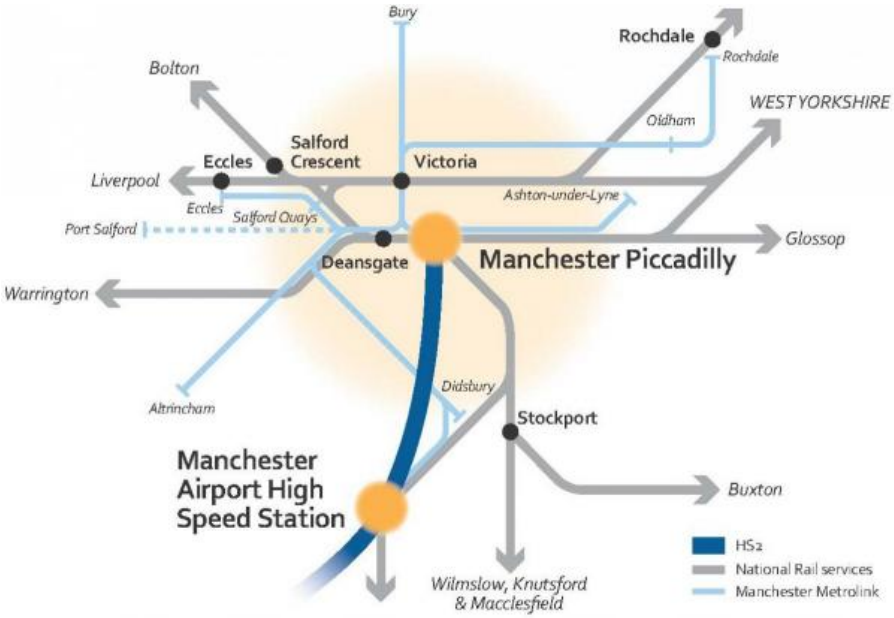

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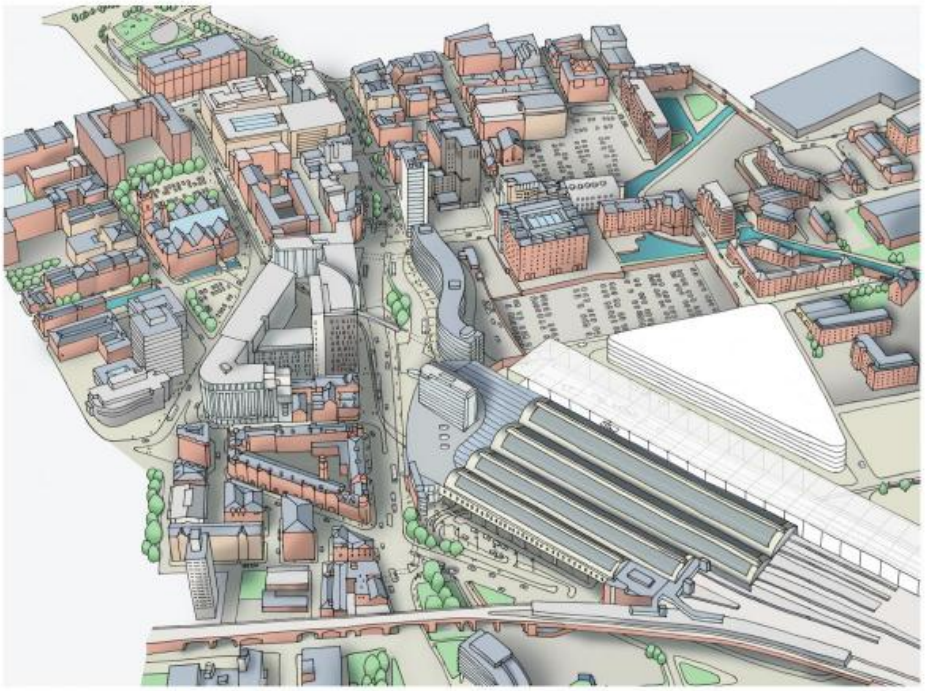
EXHIBIT 18: Manchester Piccadilly Visualization (HS2 Ltd, 2013. High Speed Rail: Investing in Britain's Future: Consultations on the route from the West Midlands to Manchester, Leeds and beyond)



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