HSUK Proudly Presents

High Speed 2 Failure

22 Reasons why the Government's Experts have got it Wrong

HS2's Mission Statement

- In evidence to the House of Commons HS2 Select Committee on 30th November 2015, Prof. Andrew McNaughton (Technical Director of HS2 Ltd.) uttered the following 'Hostage to Fortune'
- **"The aim of the HS2 project is to deliver hugely enhanced capacity and connectivity between our major conurbations."**
- Good stuff could anyone disagree with that?
- The question is **DOES HS2 deliver it**?
- **Answering that question is our theme tonight taken from "High Speed to Failure"**

What should HS2 achieve (1)?

- **NB only applies within the HS2 Zone of Influence**
- Be accessible to the greatest possible proportion of the UK population
- Hugely enhanced connectivity and capacity between our major conurbations
- Give the greatest reductions in journey time for the least cost and environmental damage
- Improve links to UK's principal airports not just LHR (75.0) but also LGW (40.3), MAN (23.1), EDI (11.1), LTN (10.5), BHX (9.7 Millions of Passengers p.a.)

What should HS2 achieve (2)?

- Enable the development of 'Powerhouse Economies' in all UK regions
- Through good network design, maximise the opportunity for more freight to be transported on the existing network thereby reducing road congestion and pollution
- Offer a scheme with a Benefit to Cost ratio of at least 4.0 as in the Treasury Green Book
- Conform with all aspects of public policy e.g. the 80% target for reduction of CO_2 required by the 2008 Climate change act

Test 1 – Remit (1)

- So there were a few ideas about what you might expect HS2 to be told to achieve and which you might expect to see in the remit
- Get the remit wrong and, unless you have geniuses at the head of HS2, you will finish up with a very poor project
- Let us see what HS2 was remitted to do by the government

Test 1 – Remit (2)

1. **HS2's remit is to develop proposals for a new railway line from London to the West Midlands taking account of environmental, social and economic assessments.**
2. **It will also provide advice to Ministers on the potential development of a high speed line beyond the West Midlands on the level of broad corridors, considering in particular the potential to extend to Greater Manchester, West Yorkshire, the North-East and Scotland.**
3. **HS2 will make recommendations on options for a terminus station or stations serving London**
4. **and possible options for an intermediate parkway station between London and the West Midlands.**
5. **It will also provide a proposal for an interchange station between HS2, the Great Western Main Line and Crossrail with convenient access to Heathrow Airport.**
6. **HS2 will also provide suggested means of linking to HS1**
7. **and the existing rail network.**

The words above are the actual words of the remit – just those few poorly chosen words

HS2 will produce a confidential report to Ministers by the end of 2009 that should be sufficiently developed to form the basis for public consultation in 2010 should Ministers decide to take the project forward. The advice will also include financing and construction proposals as well as a proposition for how best to move through the planning process within an indicative outline timetable.

Test 1 – Remit (3)

- The HS2 remit is therefore very specific telling HS2 what to design not what to achieve

1. A line from Old Oak Common (for Heathrow) to the West Midlands (thus predetermining the route!)
2. Ideas about going further north and to Scotland
3. Pick a London terminus and a parkway station
4. Link to HS1 and the rest of the network

- AND THAT IS IT!!
- That is not remit to be taken seriously
- Let us have a look at the HSUK remit

Test 1 – Remit (4)

The original HSN/HSUK specification was summarised in Colin Elliff's article *High Speed Rail : Where are the Engineers?* published in the October 2008 edition of the Journal of the Permanent Way Institution.

HIGH SPEED UK REMIT (2016)

Starting with the existing rail network and existing service patterns, use the opportunity offered by the intervention of new build high speed railway lines linking London and the primary cities of the East and West Midlands, the North-West, Yorkshire, the North-East and Scotland to create an enhanced and fully integrated national rail network.

This network should be capable of performing as follows:

1. Provide direct services of intercity quality between all principal cities / major conurbations in the regions listed above;
2. Provide enhanced service levels to intermediate secondary cities, with frequent links from high speed lines to the existing network, and upgrades to existing routes, where necessary;
3. Integrate all existing intercity routes extending to other parts of the network with the new high speed (or upgraded) lines;
4. Maintain or enhance existing service levels;
5. Operate all intercity routes at hourly or better frequency;
6. Optimise network capacity through maximised segregation between high speed intercity services and local/freight services;

Test 1 – Remit (5)

7. Achieve major journey time reductions on all routes;
8. Achieve step-change transport CO_2 reductions through road to rail modal shift enabled by enhanced capacity & connectivity;
9. Offer 'easy transfer' between national (high speed) rail and local transport services (train, metro, tram, underground, buses and taxis) at existing city centre hub railway stations;
10. Develop proposals for a London terminus;
11. Optimise connections to London suburban rail services;
12. Offer direct services to Heathrow from all principal regional UK cities, and direct services to all major regional airports from within their own respective regions, with upgrades and/or local connections to achieve this;
13. Provide a link to HS1 without using the already overcrowded North London Line;
14. Develop supplementary proposals for a dedicated national freight network, linked to the Channel Tunnel, largely independent of major intercity passenger routes and capable of carrying trains of UIC-C loading gauge (in order to carry HGV trailers by rail and to allow larger 'Continental Gauge' wagons to enter the UK);

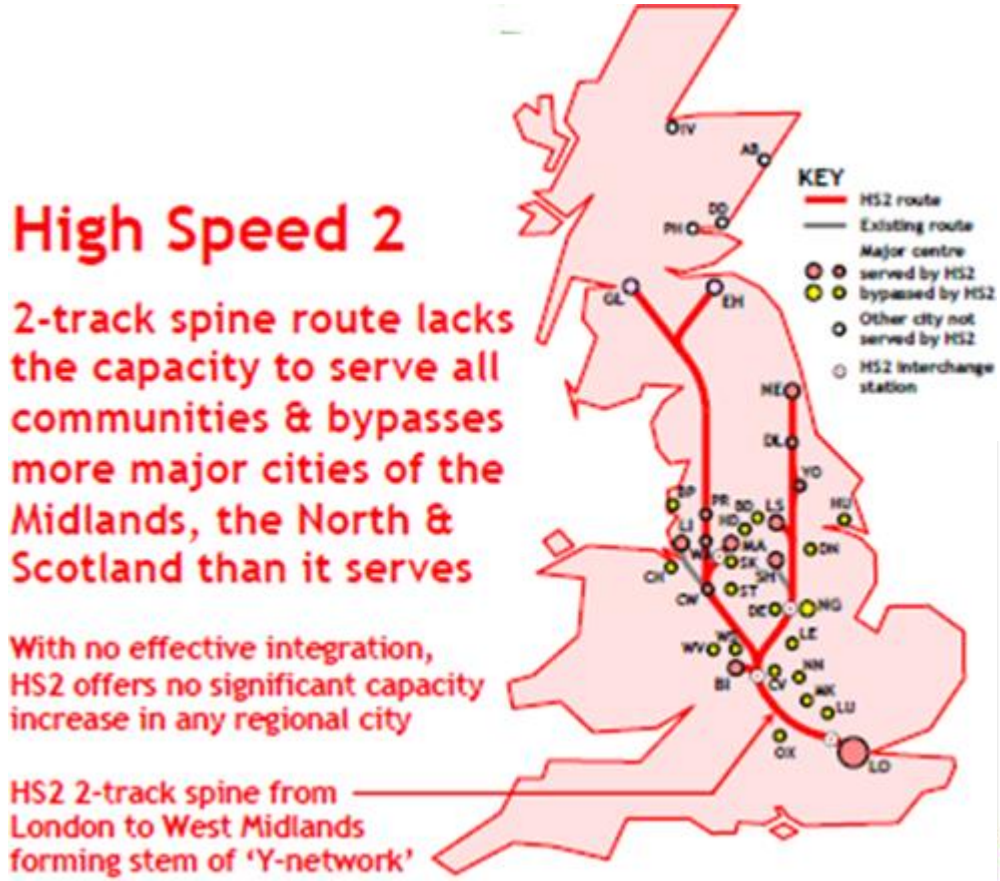
Test 1 – Remit (6)

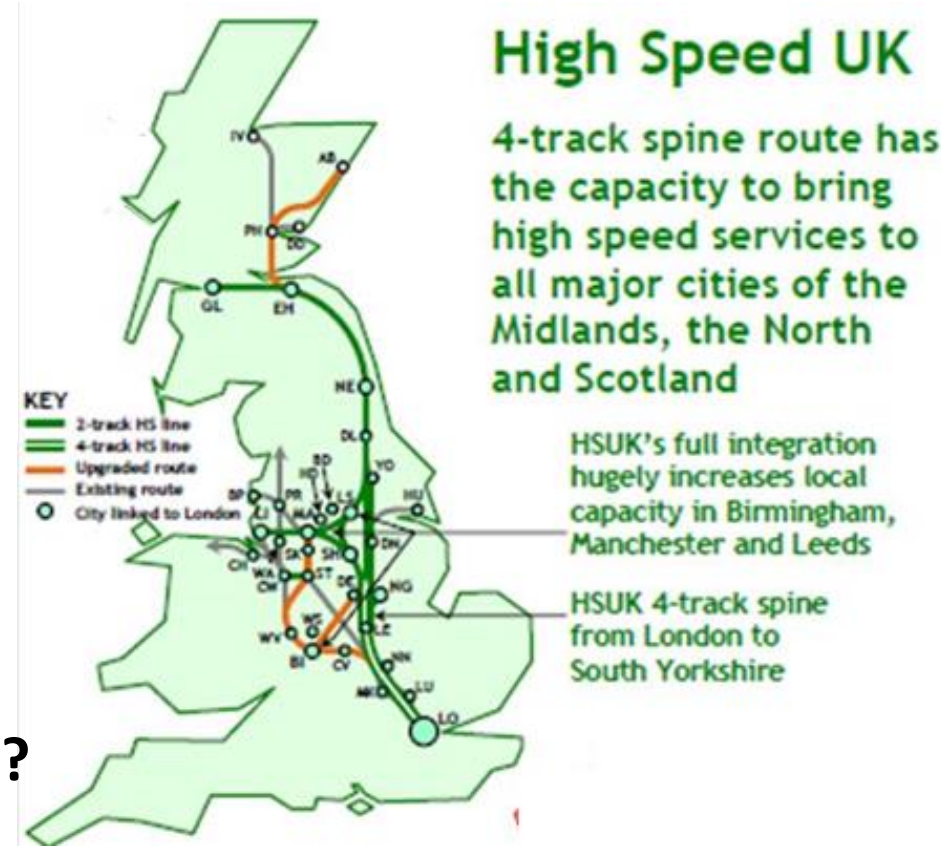
15. Be a 'Good Neighbour' to local communities by following existing transport corridors i.e. motorways, trunk roads and railways where there is already significant noise pollution and avoiding, as far as possible, all environmentally sensitive areas;
16. Develop a new national intercity timetable to identify capacity constraints and demonstrate exactly what connectivity benefits the HSUK design can deliver;
17. Design the new high speed line as a series of independent sections, each capable of being built as a separate stage to provide significant benefit to the local and national rail network. This would respond to local economic priorities, and not require high speed line construction to start in London.

Conclusion The HSUK remit is far more likely to produce the new railway system which the nation needs than the very limited and very limiting HS2 remit.

HSUK – High Speed UK – Connecting the Nation

And Here is the Result of Remit Wars





The problem is that the HS2 "Y" is not a network. How do you travel on a high speed train from Newcastle to Liverpool for instance?

Test 2 – Network Design

- HS2 Ltd's own reports confirm that the HS2 route from London to the West Midlands (i.e. Phase 1) was determined ***with no consideration of how it might develop into an optimised national network;***
- Unfortunately the route chosen, the design and the facilities of Phase 1 London stem are critical to the success of a an extended national network;
- We found an HS2 memo on their web site asking the "Should HS2 have 2 tracks or 4 tracks" question, but answer came there none.
- For Phase 1 the critical choices for good network design are:
  - Choosing a route which serves the communities which are large enough to support high speed services (Luton, Milton Keynes, Northampton, Coventry and Leicester)
  - Choosing a route which can be naturally extended to the larger communities further north
  - Deciding whether it needs 4 tracks rather than 2 tracks
  - Deciding whether the station in Birmingham should be a through station or a terminus and then choosing an appropriate site.

Test 3 – Speed

- Maximum Speed is not set in the Remits
- Journey time targets are not in either Remits
- Choice of Maximum Speed is critical
- The faster you go the more difficult it is to fit the railway into the landscape
- Result more environmental damage
- CO_2 emissions are proportional to energy use, though long term the expectation is that the energy supply can be "greened"
- Energy use is roughly proportional to the square of the speed
- Power draw from the distribution network is proportional to the cube (!) of the speed
- We are a small island – How fast is fast enough?
- Christian Sevestre, Technical Director , SNCF Infrastructure and Past President IRSE said, of HS2's 400km/h, "They are mad!"

Comparison of HS2 and HSUK performance between London and the West Midlands

Comparison		HS2	HSUK
Maximum operational speed		360km/h	360km/h
Design speed		400km/h	360km/h
Track type		Ballasted	Slab
Minimum curve radius		7800m	5700m
Route		Via Chilterns AONB	Via M1 corridor
Intrusion into Chilterns AONB?		Yes	No
No of Ancient Woodlands directly affected (between London & Birmingham)		34	0
No of tracks in London-Midlands spine		2	4 ¤
Tunnel length from London to Birmingham		50km	12km
Estimated first phase cost		£21.7 billion	£14.2 billion
Intercity Journey times via:	**Existing network**	HS2	HSUK
London-Birmingham	**84 mins #**	59 mins ##	56 mins #
London-Coventry	**59 mins #**	68 mins §	38 mins #
London-Walsall	**122 mins §**	92 mins *	67 mins #
London-Wolverhampton	**114 mins #**	86 mins *	74 mins #
Average journey time reductions across national intercity network		less than 10%	45%

HSUK – High Speed UK – Connecting the Nation

Test 3 – Speed – add journey time

	No of journeys (out of 31) with shortest journey time offered by			Journeys made worse by HS2
	HIGH SPEED UK	No difference	HS2	
London	18	6	7	7
Heathrow	24	1	6	1
Birmingham	24	2	5	2
M'ch'r Airport	25	1	5	0
Preston	24	3	4	7
B'ham Airport	27		4	4
Manchester	25	3	3	3
Crewe	25	4	2	1
Warrington	28	1	2	12
Leeds	26	4	1	5
Liverpool	27	3	1	1
Chester	28	2	1	3
Coventry	28	2	1	5
Bradford	26	5		4
Huddersfield	26	5		2
Hull	27	4		8
Peterborough	27	4		0
Doncaster	28	3		16
Oxford	28	3		5
York	28	3		10
Cheltenham	29	2		8
Milton Keynes	29	2		8
Stockport	29	2		4
Leicester	30	1		11
Luton	30	1		N/A
Sheffield	30	1		11
Derby	31			11
Northampton	31			5
Nottingham	31			1
Stoke	31			11
Walsall	31			10
Wolverhampton	31			6

Test 4 – Timetable (1)

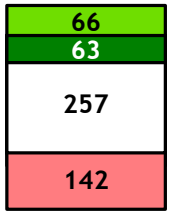
- The ultimate test of any rail scheme which is a major intervention in the network is to assess how journey times have been improved;
- To do this a timetable has to be compiled;
- HSUK has compiled a timetable between 33 principal stations one of which is Heathrow;
- HS2 has not published a timetable and for all we know does not have one!
- To make a fair comparison HSUK has assessed the journey times between the same 33 places as HSUK;
- To assess HS2 it has been necessary to add HS3 to the mix to cover journeys like Nottingham to Liverpool or Newcastle to Manchester;
- You would not expect the arrival of HS2 and HS3 to make any journeys worse than they are today and yet that is exactly what happens because;
  - 10 minute walking connection in Birmingham, Curzon St to New St;
  - Loss of services from the existing network (HS2 Published data);
  - Probable addition of extra stops to existing services;
  - Toton parkway instead of serving Nottingham and Derby

Test 4 – Timetable (2)

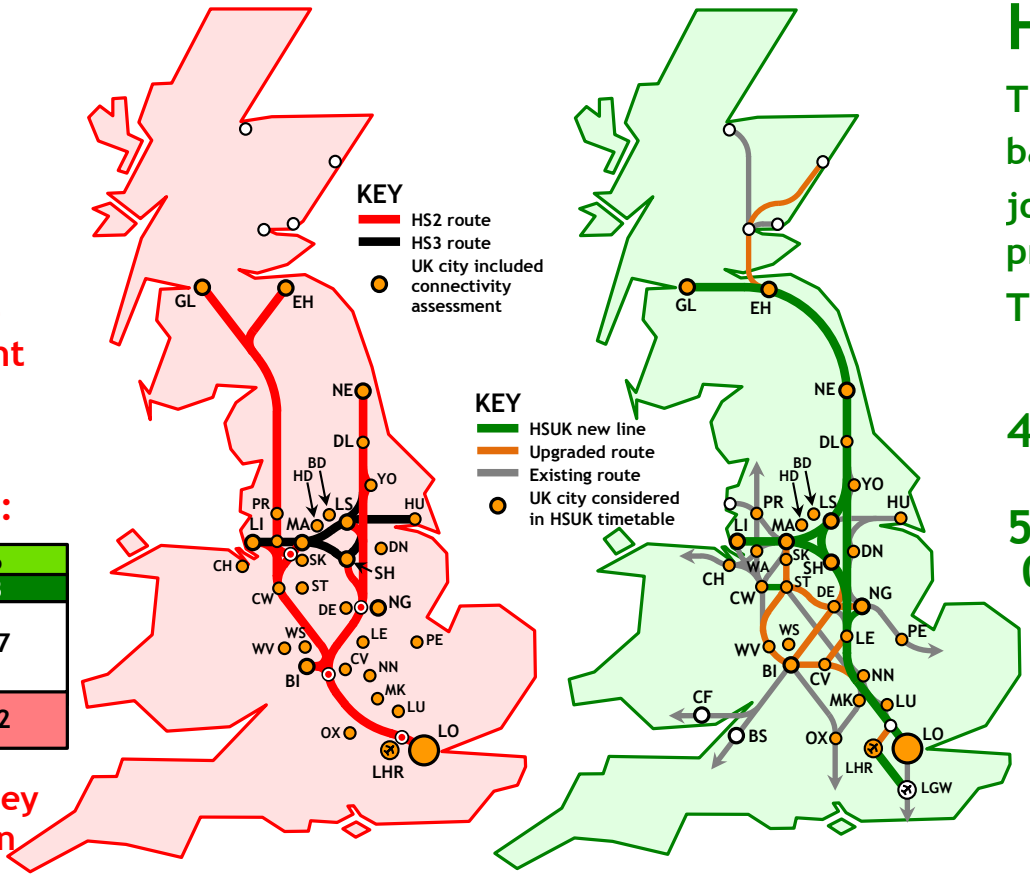
HS2 and HS3

HS2 Ltd has developed no timetable. Our assessment of 528 possible journeys based between 33 principal stations shows:

66 improved by HS2
63 improved by HS3
257 unimproved
142 made worse



Less than 10% average journey time reduction

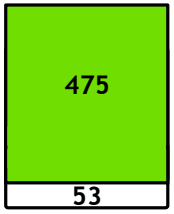


High Speed UK

The HSUK timetable is based on 528 possible journeys between 33 principal stations.

This timetable shows:

475 improved by HSUK
53 unimproved
0 made worse



45% average journey time reduction

Test 5 – City Centre Stations

Glasgow (GL)

HSUK Glasgow Central
HS2 No proposal currently defined

Manchester (MA)

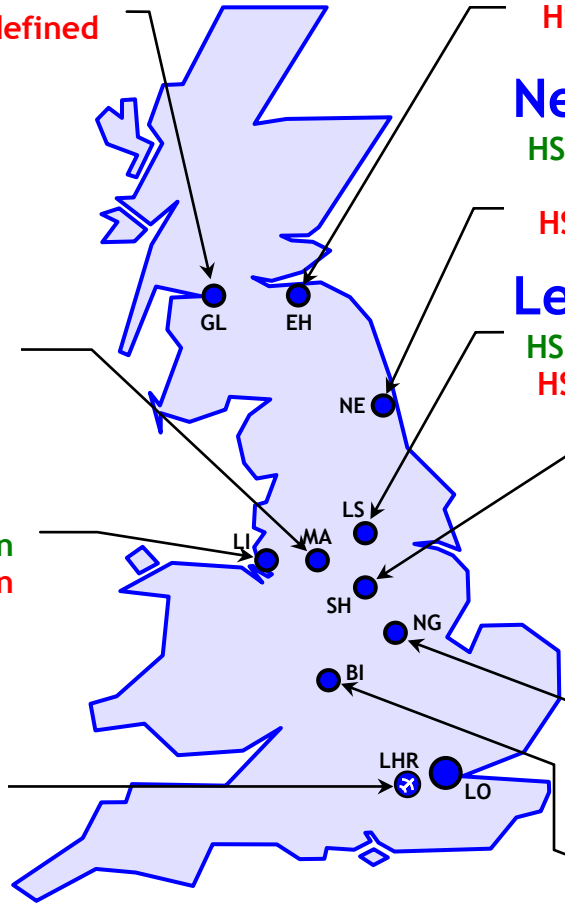
HSUK Underground through platforms at Manchester Piccadilly
HS2 New terminus platforms at Manchester Piccadilly

Liverpool (LI)

HSUK Liverpool Lime St station
HS2 Liverpool Lime St station

Heathrow (LHR)

HSUK Heathrow Express transformed into through system
HS2 Dedicated airport spur cancelled, no prospect of direct HS2 services



Edinburgh (EH)

HSUK Edinburgh Waverley
HS2 No proposal currently defined

Newcastle (NE)

HSUK Newcastle Central HS platforms on new Northumbria Bridge
HS2 No proposal currently defined

Leeds (LS)

HSUK Leeds City Station - through platforms
HS2 Leeds City Station - terminus platforms

Sheffield (SH)

HSUK Sheffield Victoria plus interchange platforms on Sheffield Midland approaches
HS2 Sheffield Midland on long spur

Nottingham (NG)

HSUK Nottingham Midland station
HS2 Toton, 9km from city centre

Birmingham (BI)

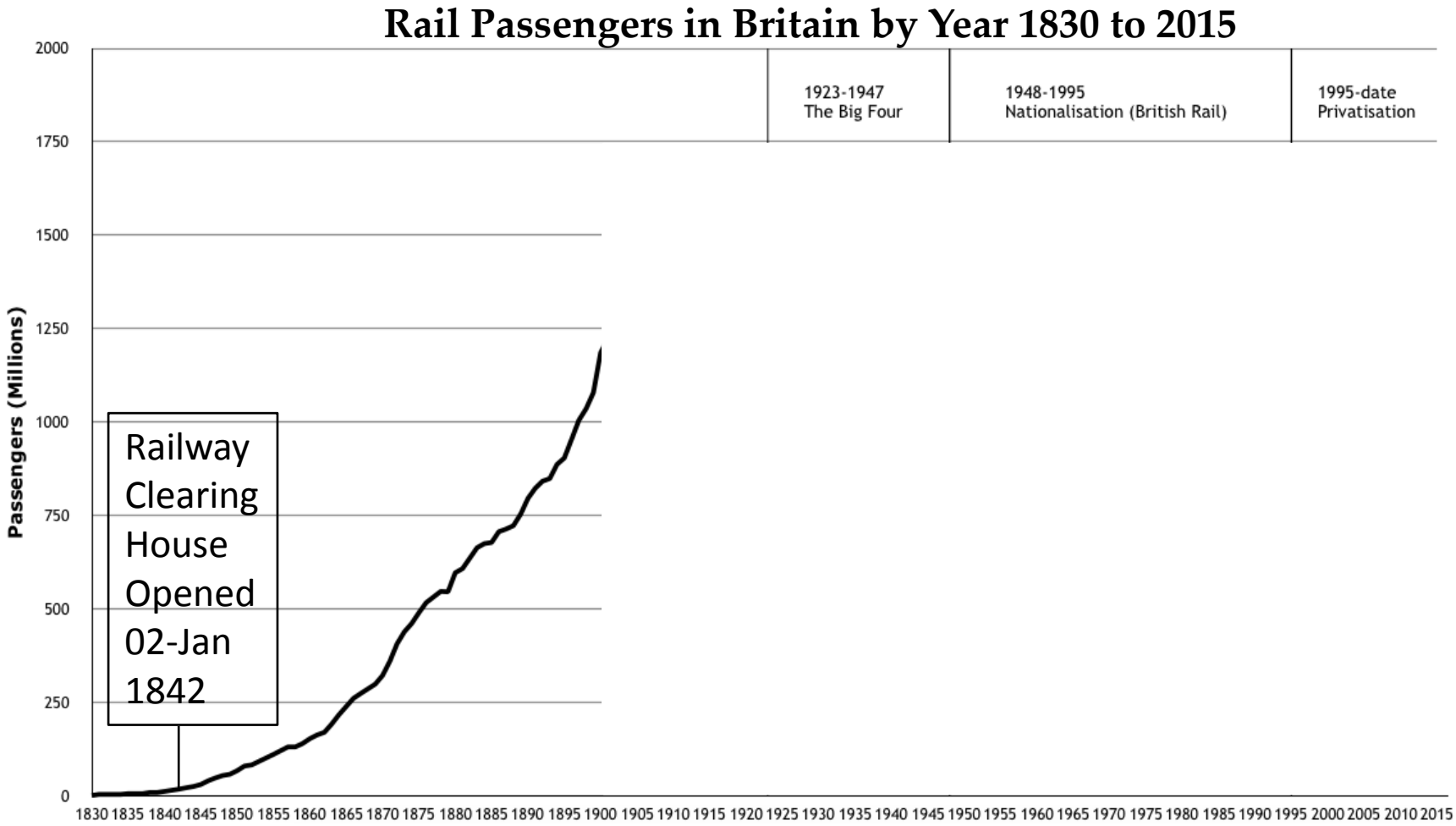
HSUK Birmingham New Street
HS2 Curzon Street terminus

What is passenger Capacity?

- Between any two places we will assume that there is an up line and a down line and that they can each carry the same number of similar trains;
- For some purposes the number of trains per hour will suffice for others seats per hour is needed;
- Trains per hour requires us to know the train characteristics, the design of the signalling system and, the speed restrictions and stopping patterns;
- For seats per hour add the internal train layouts;
- For tonight we will assume 18 trains per hour non stop at speeds over 300km/h and up to 24 trains per hour with a maximum speed of 160km/h. These figures just give a feel of what can be achieved.
- **BUT first do we need more capacity?**

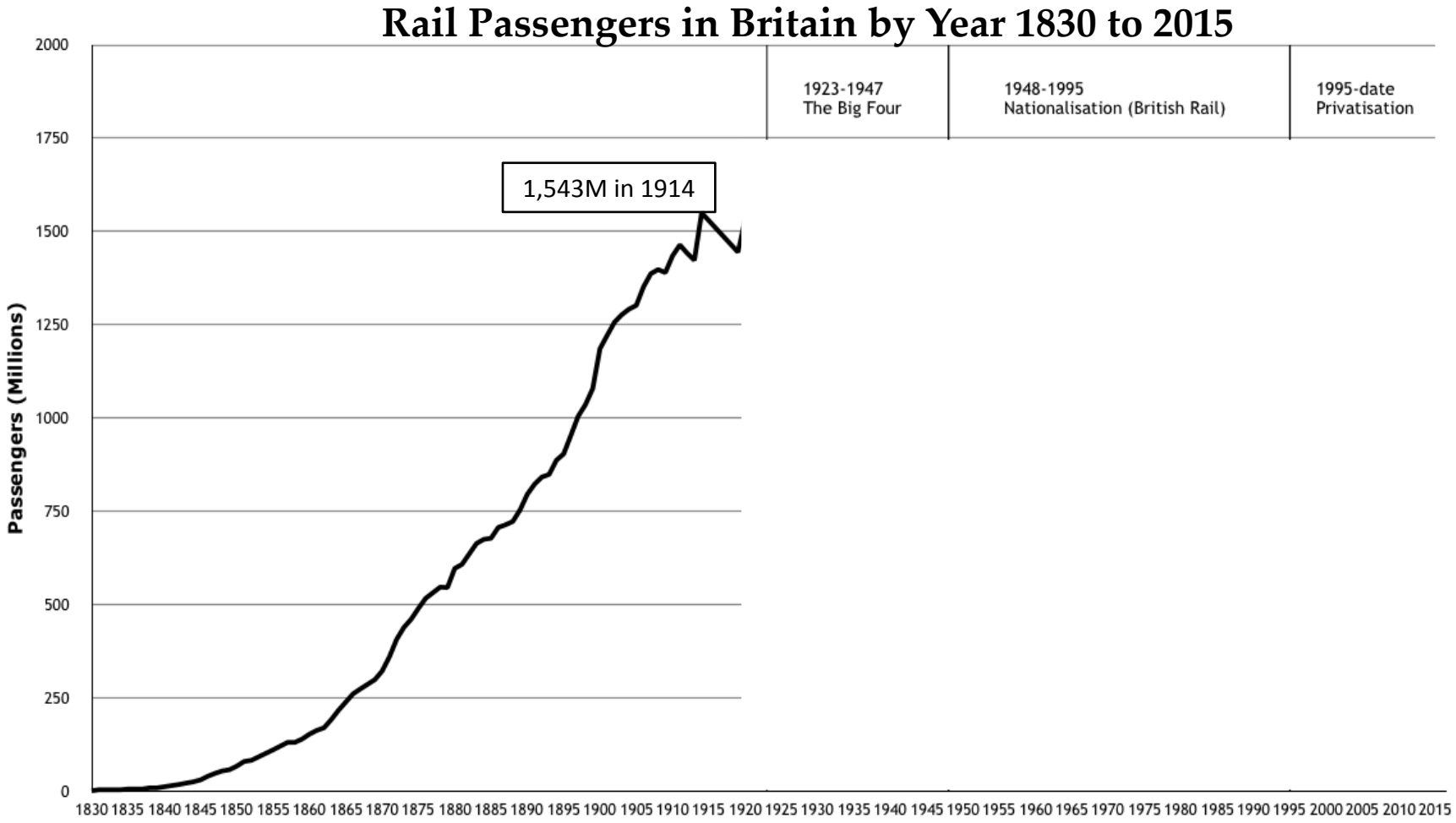
Do we need the Capacity (1)?

- An interesting question with a riveting answer!



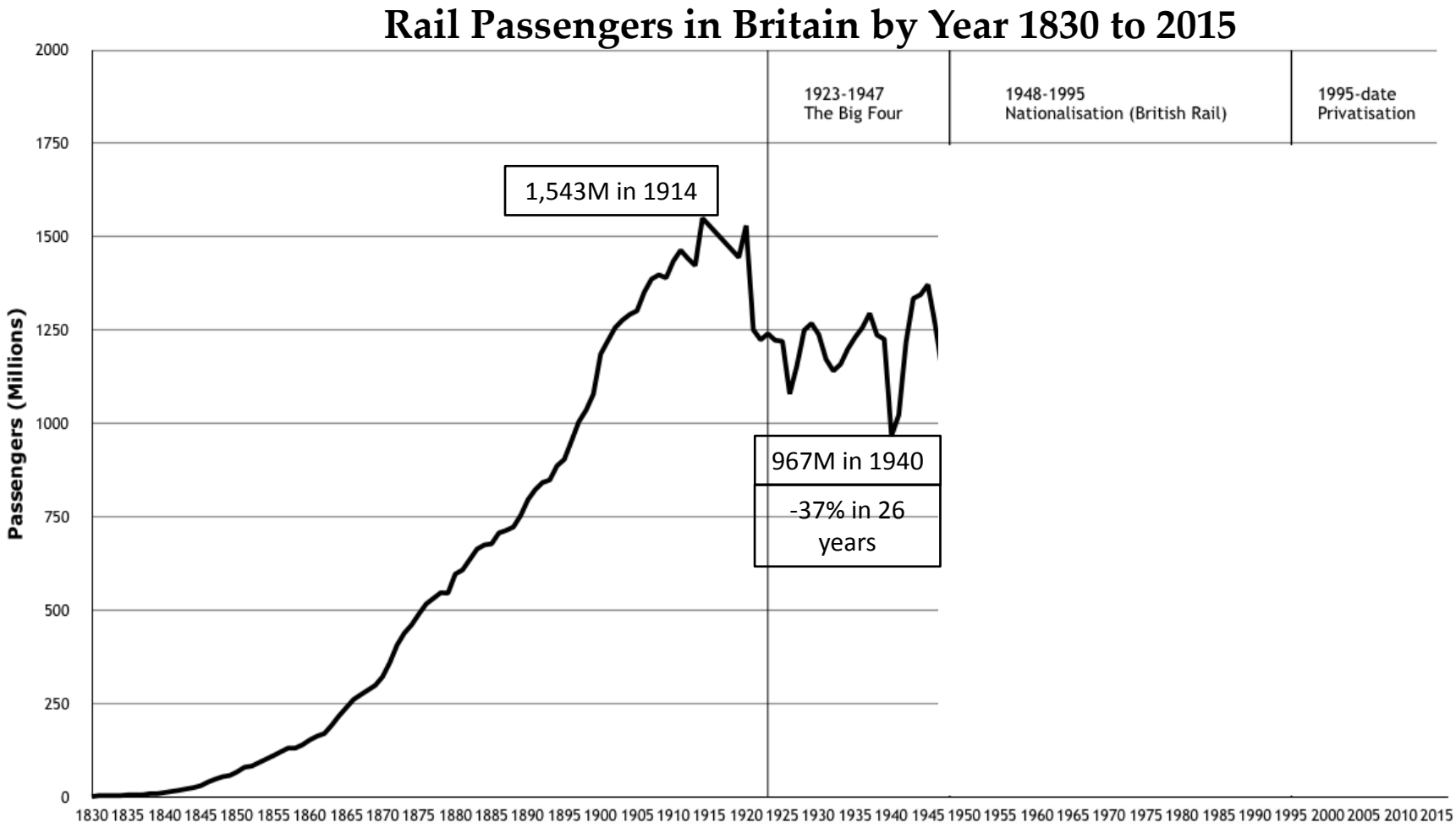
Do we need the Capacity (2)?

- The network was completed and people travelled like never before hitting an all-time peak of 1,543M



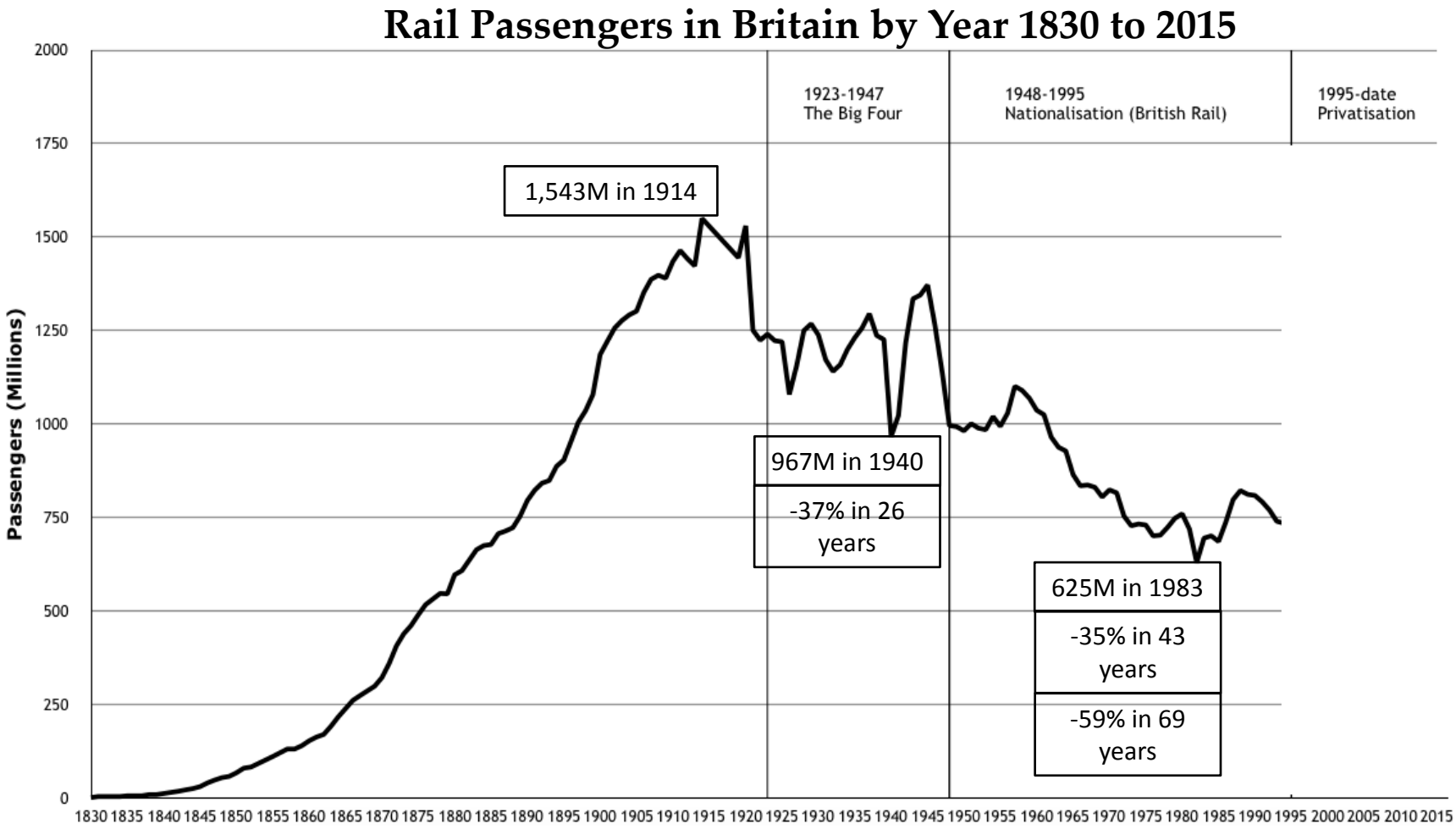
Do we need the Capacity (3)?

- Two world wars and the depression had their effect
- The private car and buses & coach networks arrived



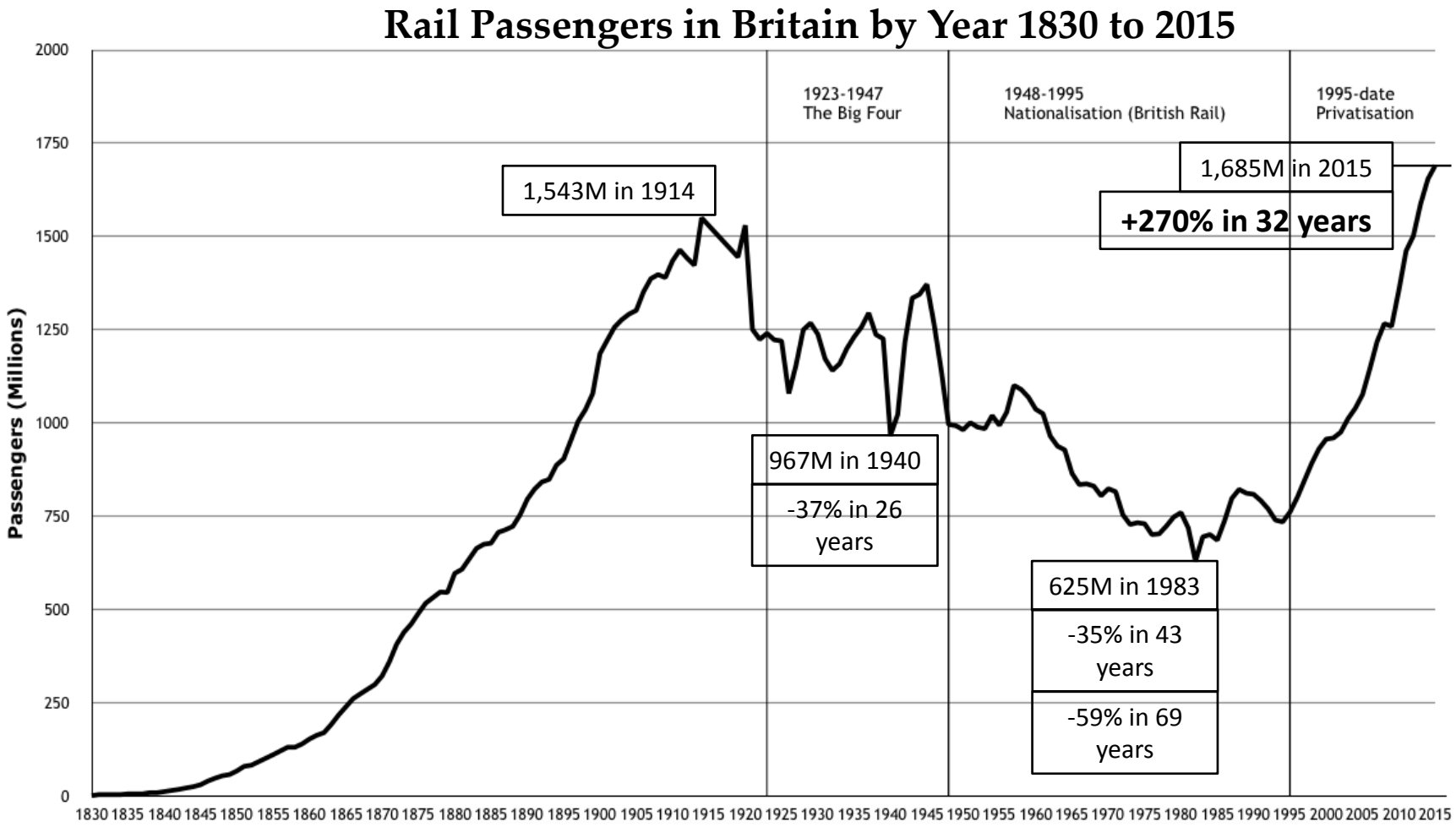
Do we need the Capacity (4)?

BR had to compete with car ownership and motorway building so Beeching was hired to slash the network.

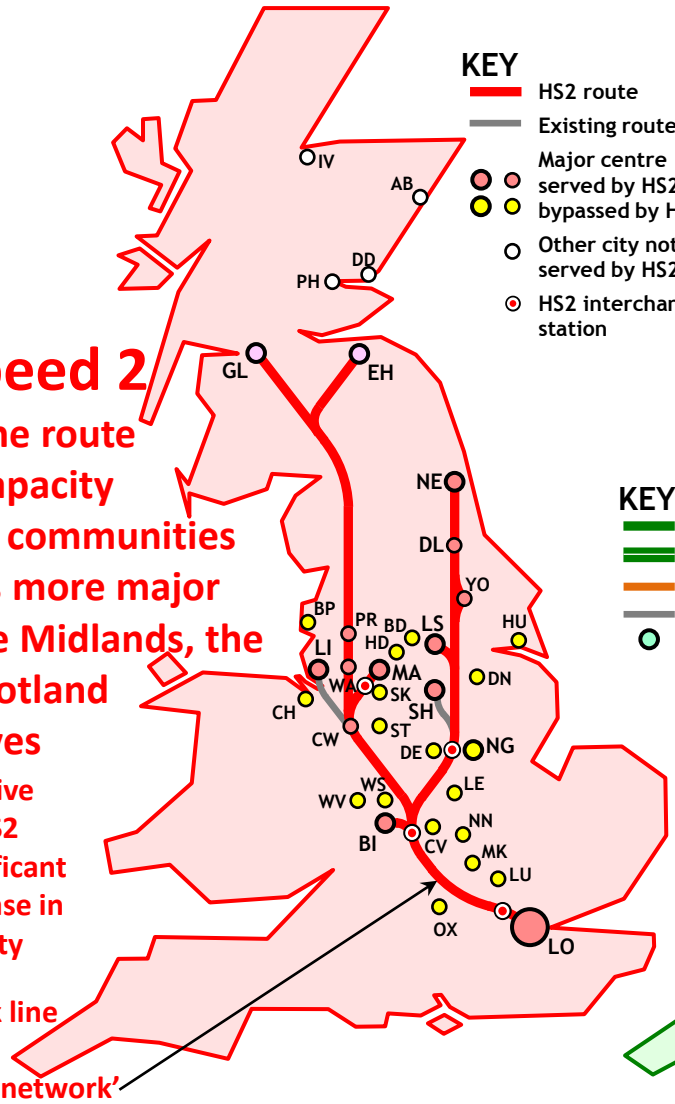


Do we need the Capacity (5)?

- So the answer to the question is, YES WE DO! ?
- Will it go on? Why is it happening? Who knows?



Test 6 – Capacity

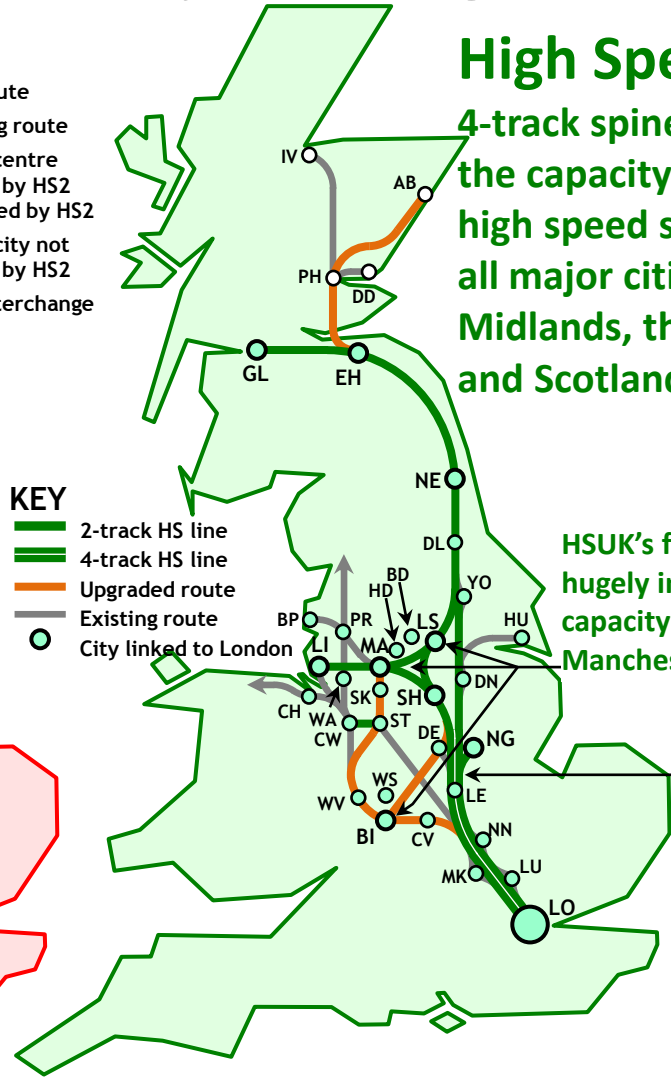


High Speed 2

2-track spine route lacks the capacity to serve all communities & bypasses more major cities of the Midlands, the North & Scotland than it serves

With no effective integration, HS2 offers no significant capacity increase in any regional city

HS2 2-track line forms the stem of 'Y-network'



High Speed UK

4-track spine route has the capacity to bring high speed services to all major cities of the Midlands, the North and Scotland

HSUK's full integration hugely increases local capacity in Birmingham, Manchester and Leeds

HSUK 4-track spine from London to South Yorkshire

What is connectivity?

1. Here's what Wiktionary said (uncountable noun or mass noun) **The state of being connected.** *Not much help really!*
2. (countable noun as used in mathematics) **In a graph, a measure of concatenated adjacency, i.e. the number of ways that points are connected to each other.** *Interesting; not much help either!!*
3. (countable noun as used in telecommunications) **The ability to make a connection between two or more points in a network.** *That's more like it but what we need is a railway definition.*

   We'll just have to write our own
4. (countable noun as defined by HSUK concerning railways) **The ability to make a journey between two stations on the rail network with the minimum number of changes of train; preferably none.**

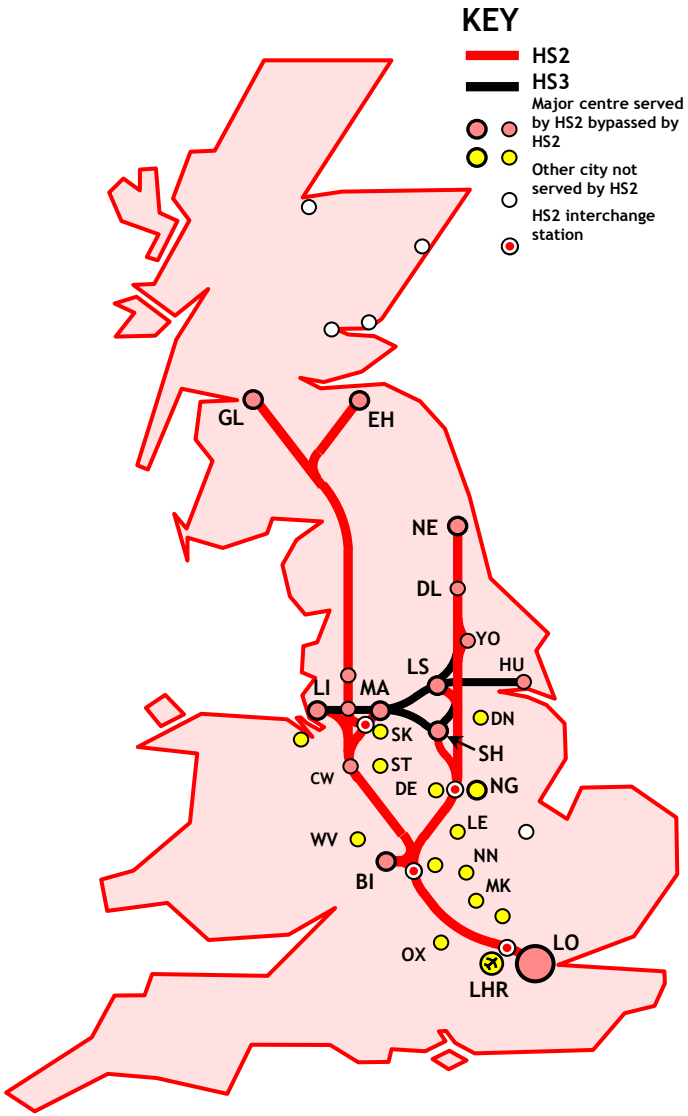
Should we design to achieve maximum connectivity providing the price is right?

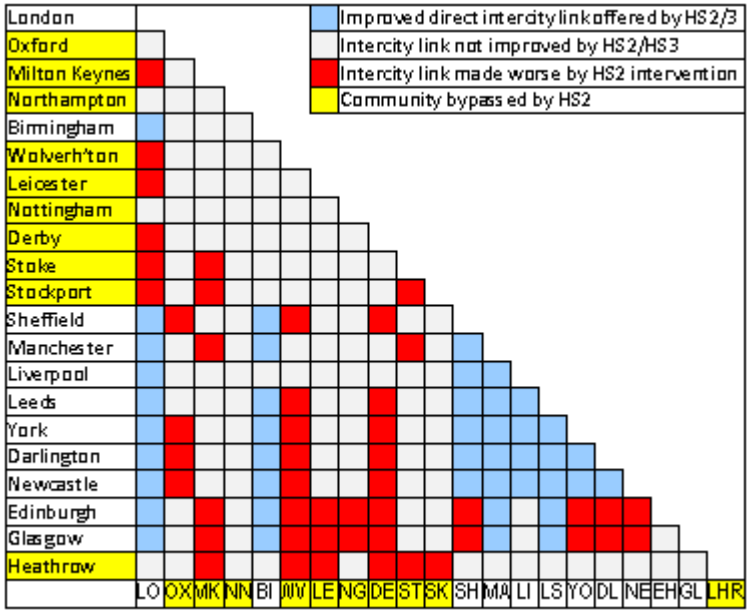
Yes we should, because more connectivity means better rail travel options fewer people in cars and less CO_2

Test 7 – Connectivity (1)

- We tested this by considering all the possible journeys between 20 major cities plus LHR;
- We looked to see how well HS2 + HS3 does and compared that result with HSUK
- The 20 cities are: London (LO), Oxford (OX), Milton Keynes (MK), Northampton (NN), Birmingham (BI), Wolverhampton (WV), Leicester (LE), Nottingham (NG), Derby (DE), Stoke (ST), Stockport (SK), Sheffield (SH), Manchester (MA), Liverpool (LI), Leeds (LS), York (YO), Darlington (DL), Newcastle (NE), Edinburgh (EH), Glasgow (GL), plus Heathrow Airport (LHR);
- This gives you 210 possible journeys;
- To be frank we think that the results for HS2 are appalling. No Government should spend even £1 on such a poor offering.

Test 7 – Connectivity (2)





Source info: Table 23, HS2 Regional Economic Impacts (2013)

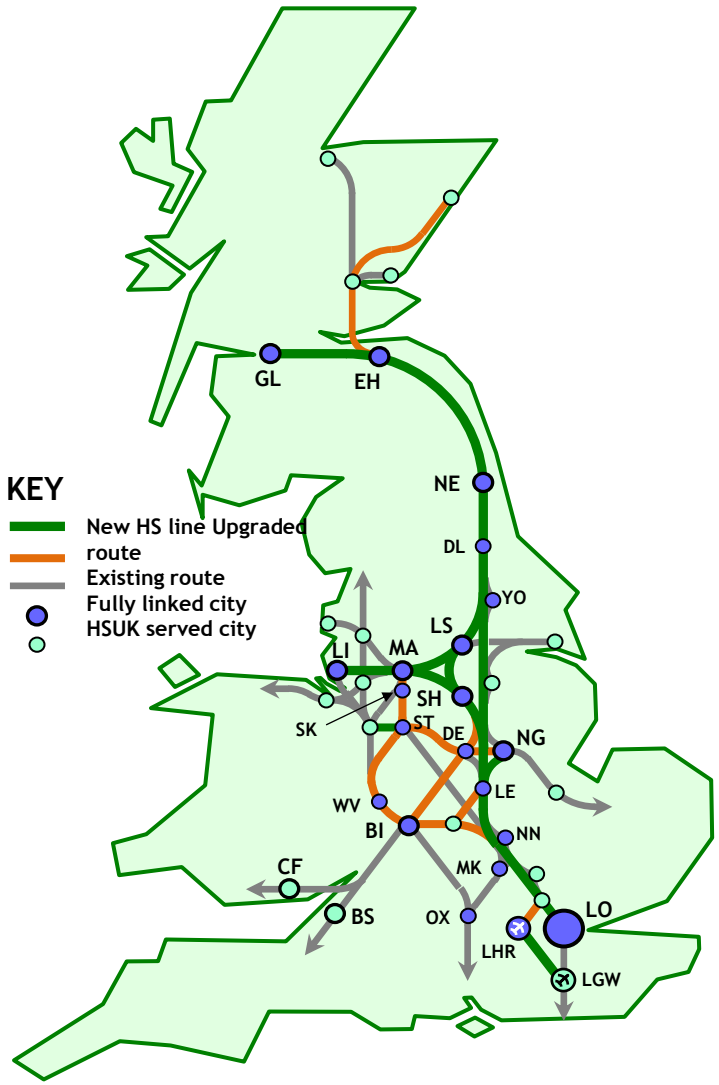
HS2 + HS3

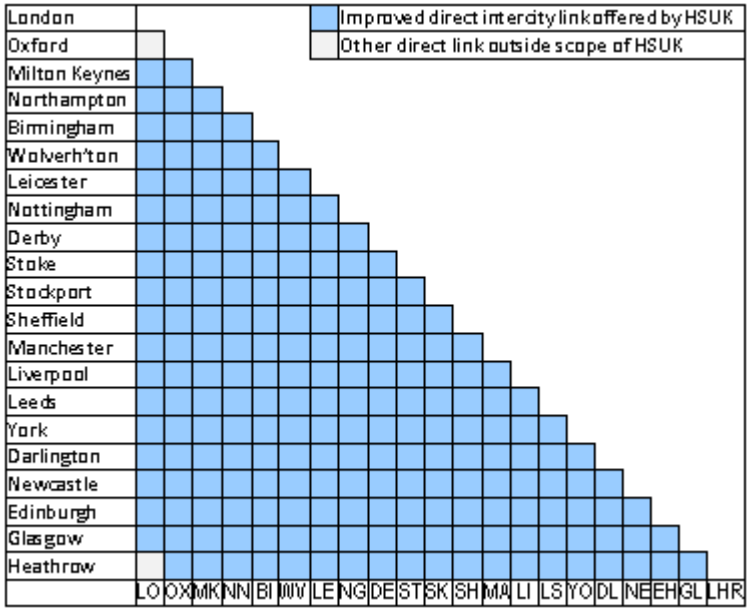
208 possible links

43 direct links created

21% network efficiency

Test 7 – Connectivity (3)





High Speed UK

208 possible links

208 direct links created

100% network efficiency

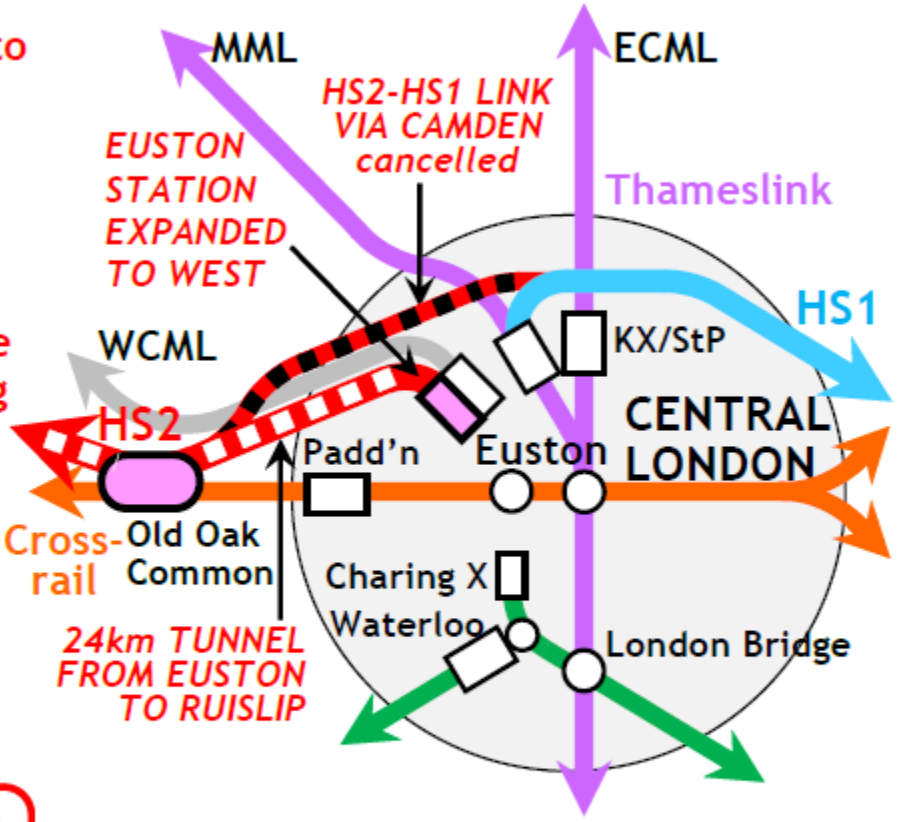
Test 8 – Euston (1)

- About the only thing that HS2 and HSIUK agree about is that Euston should be the principal London station for HS Rail;
- HS2 proposal for Euston expands what is already a large station, closing Melton St. demolishing 200 homes taking 20 years to construct and costing £4 Billion;
- Crossrail has 10 tph terminating at Paddington/OOC;
- HSUK will build a new 2km link line from Crossrail to WCML slow lines costing £100 Million. This will reduce the train flow at Euston by 36%;
- Importantly this gives WCML outer suburban services access to Crossrail
- Euston can then be rebuilt in two halves, **on its existing footprint**, taking 6 to 8 years, costing £2 Billion and **saving £2 Billion**.
- Which would you prefer

Test 8 – Euston (2)

HS2 Strategy for Euston Station redevelopment

1. Fail to develop a strategy to divert existing train flows away from Euston - *all construction activities alongside busy railway operating at full capacity*
2. Build new station alongside existing to avoid disrupting commuter & intercity services - *215 adjacent homes demolished.*
3. Continue rebuild for over 20 years - *causing huge community disruption*



MASSIVE COMMUNITY DISRUPTION DURING REBUILD

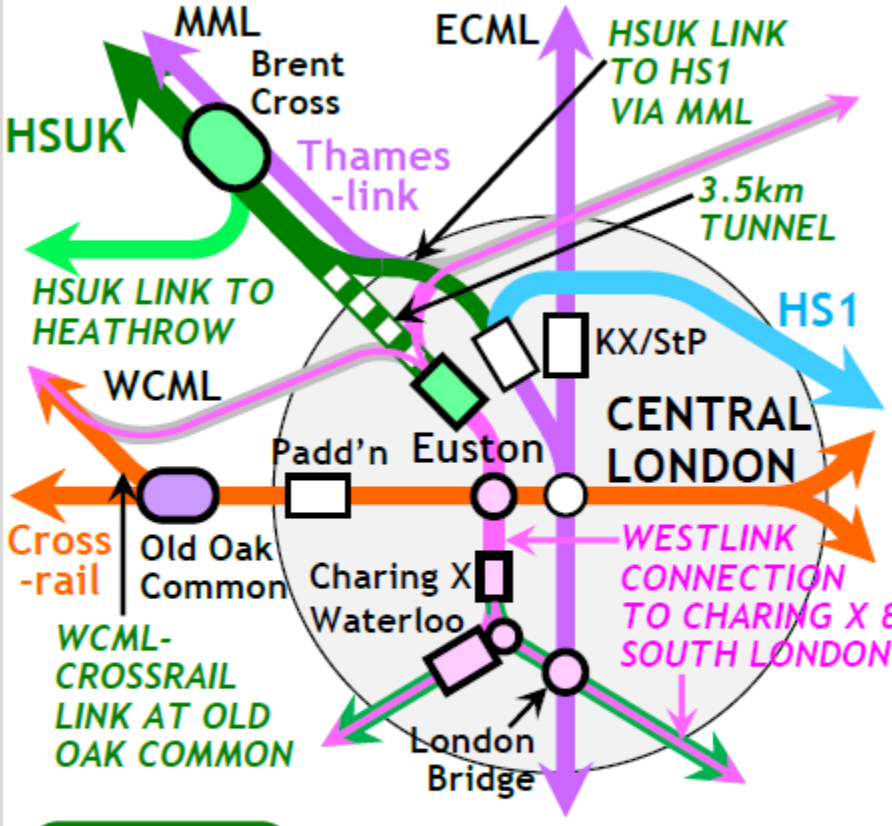
NO IMPROVE-MENT TO LOCAL RAIL NETWORK

HS2 STRATEGY FORCES EXPANSION INTO CAMDEN COMMUNITY

INCREASED TUBE CONGESTION AT EUSTON

Test 8 – Euston (3)

HSUK Strategy for Euston Station redevelopment



1. Link Crossrail to WCML at Old Oak Common.
2. Extend Crossrail services onto WCML, to divert LM commuter flows away from Euston - *reducing train/ passenger flows by ~36%.*
3. Fully rebuild Euston in simple 2-stage sequence - *minimising project costs & local community disruption*
4. Operate Euston as 18 platform high speed terminus with greatly reduced commuter flows.
5. Future Westlink project to divert increased WCML commuter flows.

MINIMISED COMMUNITY DISRUPTION DURING REBUILD

IMPROVED COMMUTER JOURNEYS VIA CROSSRAIL

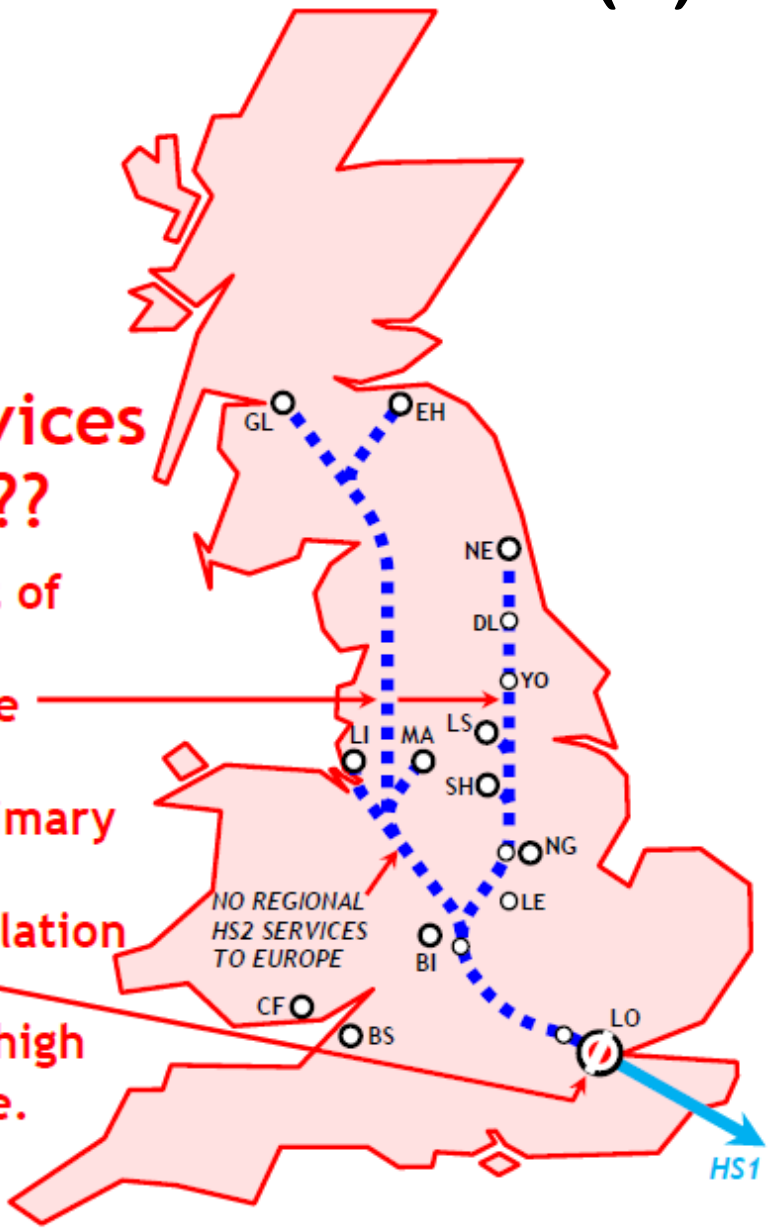
NO NEED TO EXPAND EUSTON INTO CAMDEN COMMUNITY

REDUCED TUBE CONGESTION AT EUSTON

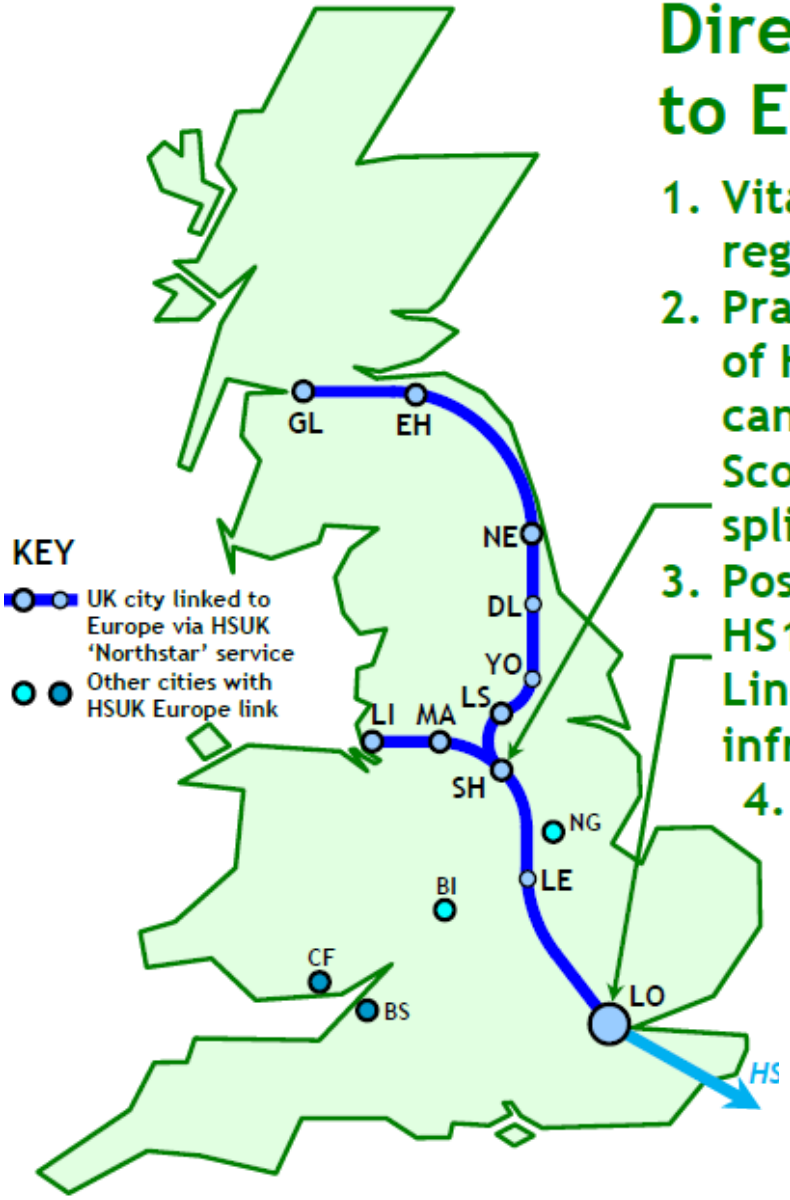
Test 9 – Link to HS1 (1)

No Direct HS2 services to Europe via HS1??

1. Link to HS1 key element of original HS2 remit.
2. Not practicable given the inefficiency of HS2's 'network', with each primary city on separate branch.
3. Not possible with cancellation of HS2-HS1 link.
4. No prospect of regional high speed services to Europe.



Test 9 – Link to HS1 (2)



Direct HSUK services to Europe via HS1

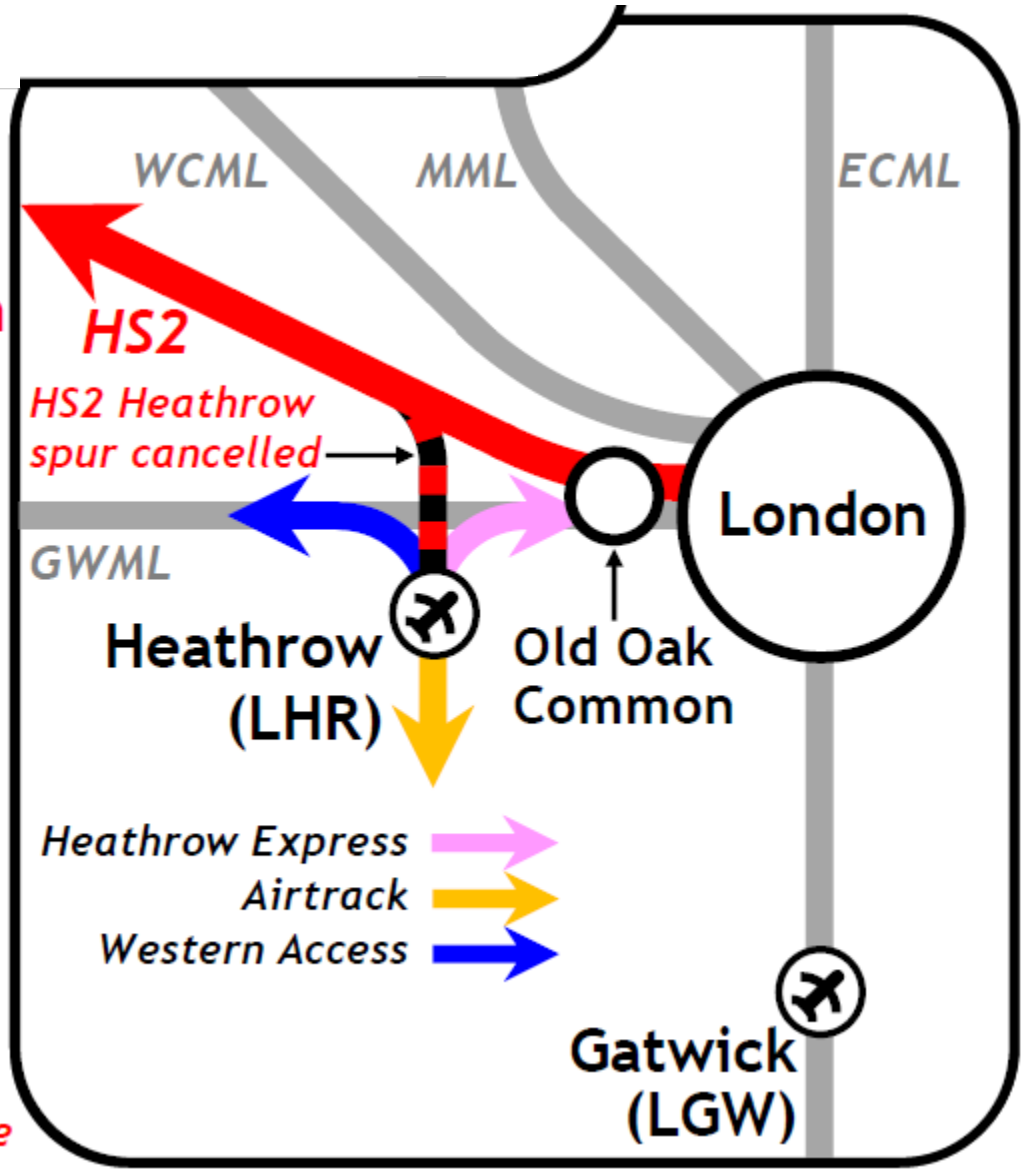
1. Vital for connectivity of UK regions to Europe.
2. Practicable with efficiency of HSUK network - one train can serve all Northern & Scottish cities, with single split at Sheffield.
3. Possible with direct HSUK-HS1 link via Midland Main Line requiring no new-build infrastructure.
4. Separate trains required for Bristol/Cardiff and Birmingham/Nottingham

Test 10 – London Hub Airport (1)

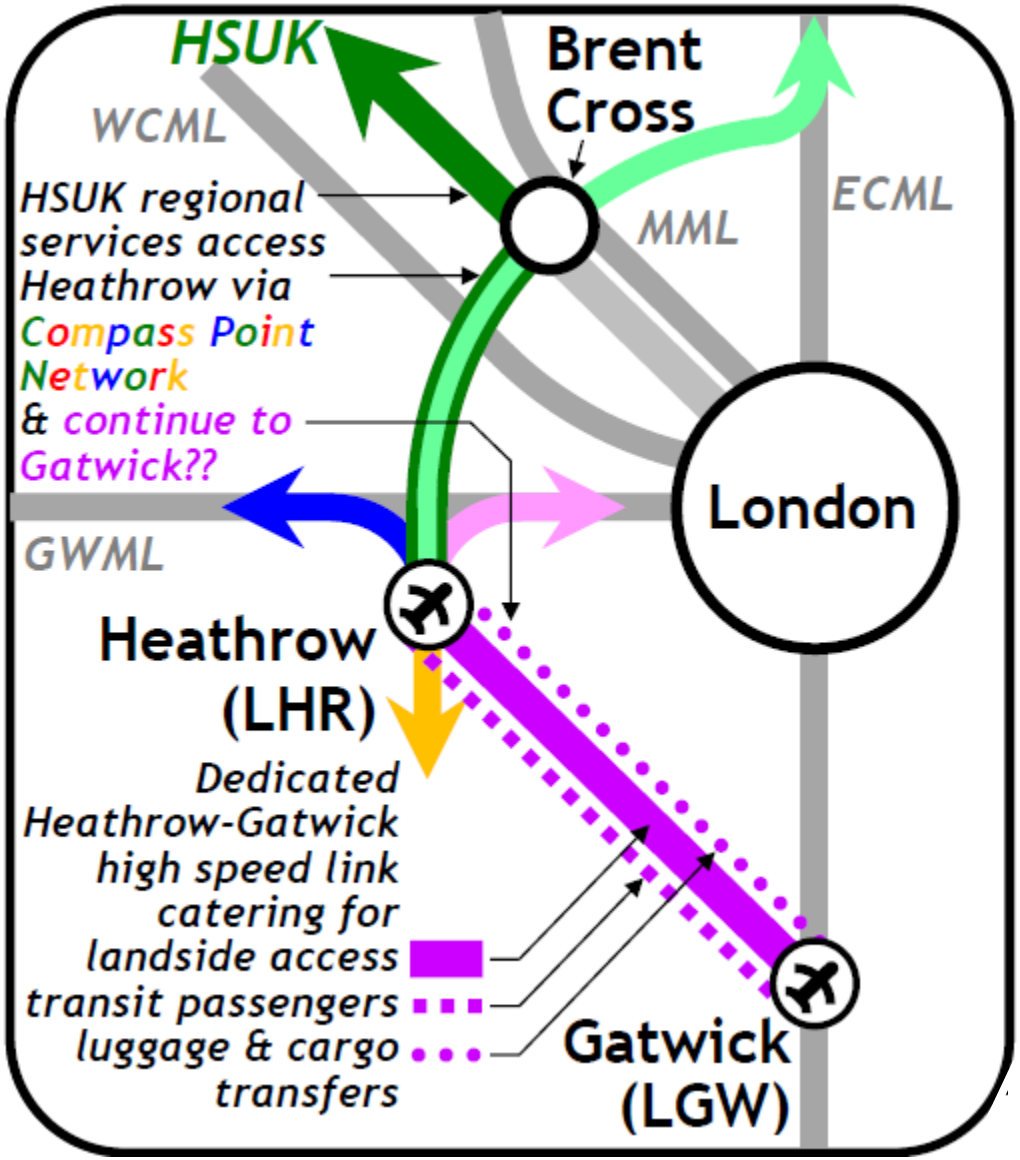
HS2 direct regional services from Heathrow to:

No other UK city

Services were planned to Sheffield, Leeds & Manchester, but were abandoned due to poor business case for dedicated single use spur and lack of capacity of HS2's 2-track spine



Test 10 – London Hub Airport (2)



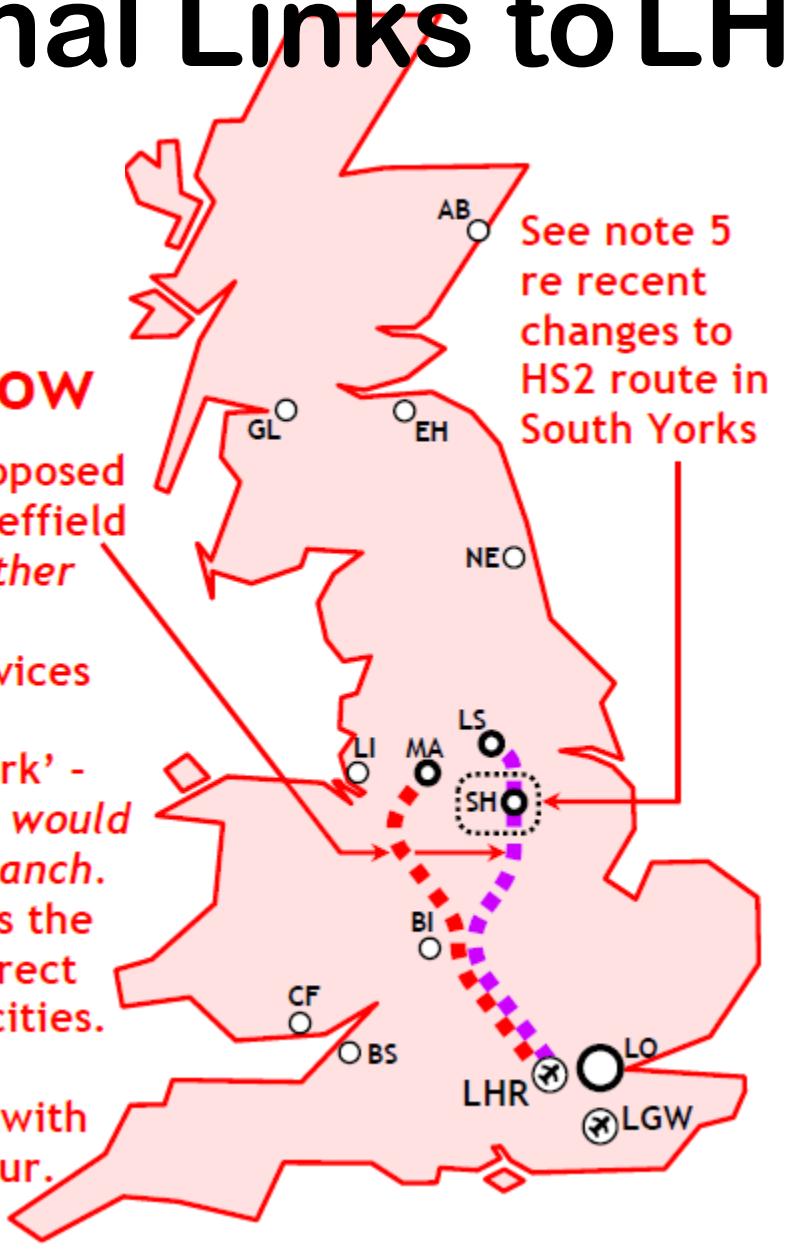
HSUK direct regional services from Heathrow to:

Luton, Milton Keynes Northampton, Coventry, Oxford, Birmingham, Wolverhampton, Stoke, Leicester, Nottingham, Derby, Sheffield, Stockport, Manchester, Liverpool, Leeds, York, Darlington, Newcastle, Edinburgh, Glasgow, Perth, Aberdeen

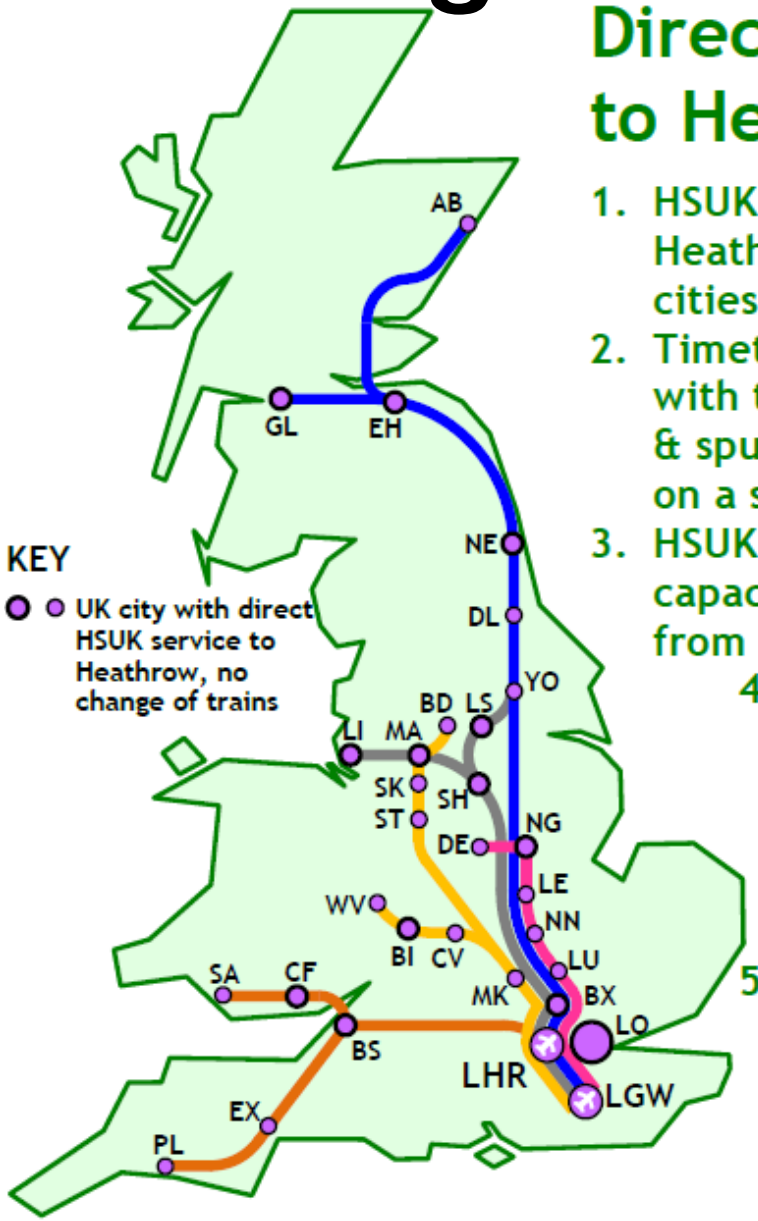
Test 11– Regional Links to LHR (1)

No Direct HS2 services to Heathrow

1. Direct services originally proposed from Heathrow to Leeds, Sheffield & Manchester - *but not to other regional cities.*
2. Comprehensive regional services never practicable given the inefficiency of HS2's 'network' - *note that each primary city would be located on a separate branch.*
3. HS2's 2-track stem also lacks the capacity to accommodate direct Heathrow services from all cities.
4. No prospect of regional high speed services to Heathrow with cancellation of dedicated spur.
5. Sheffield to LHR service not practicable with recent route changes



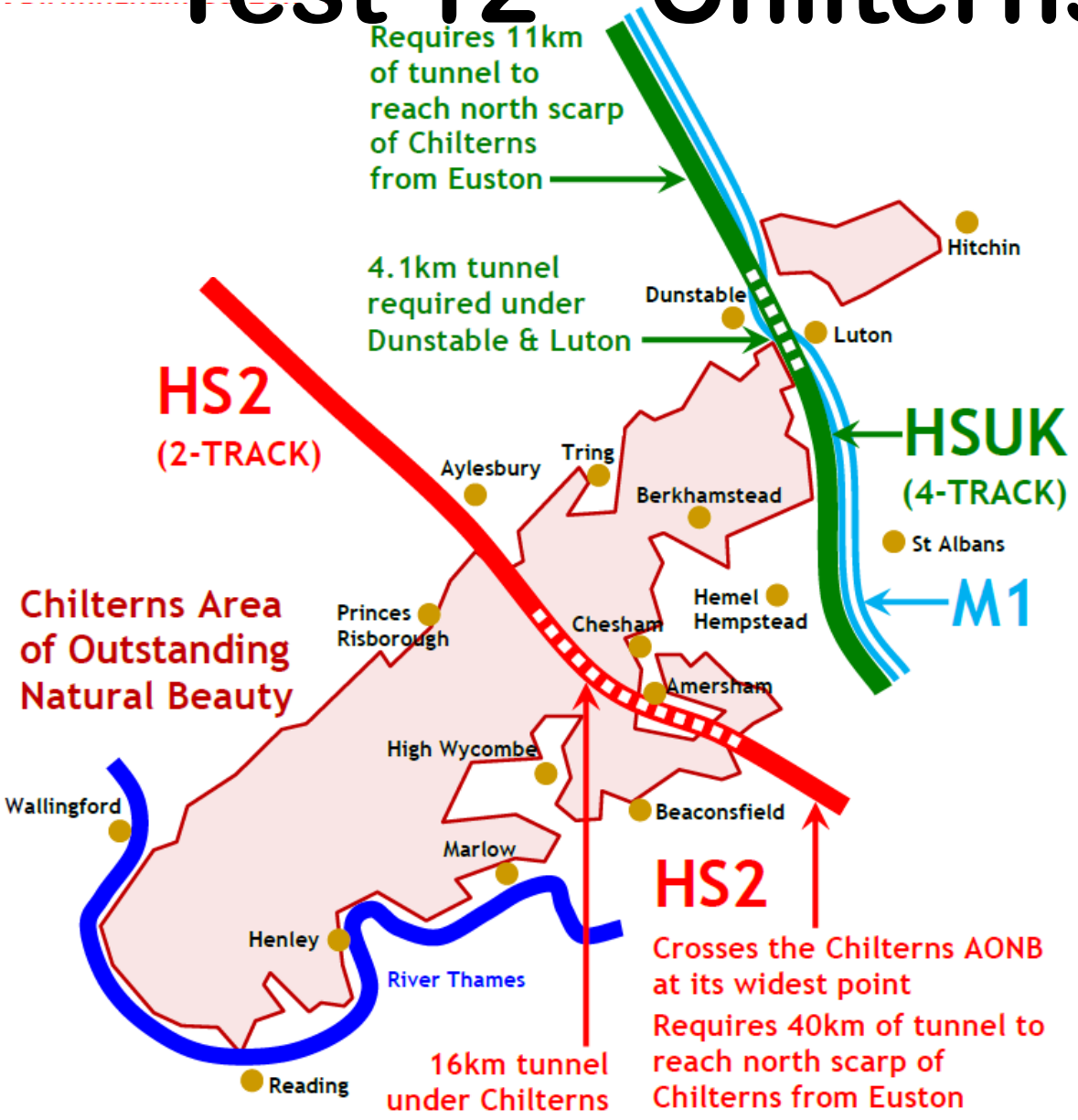
Test 11– Regional Links to LHR (2)



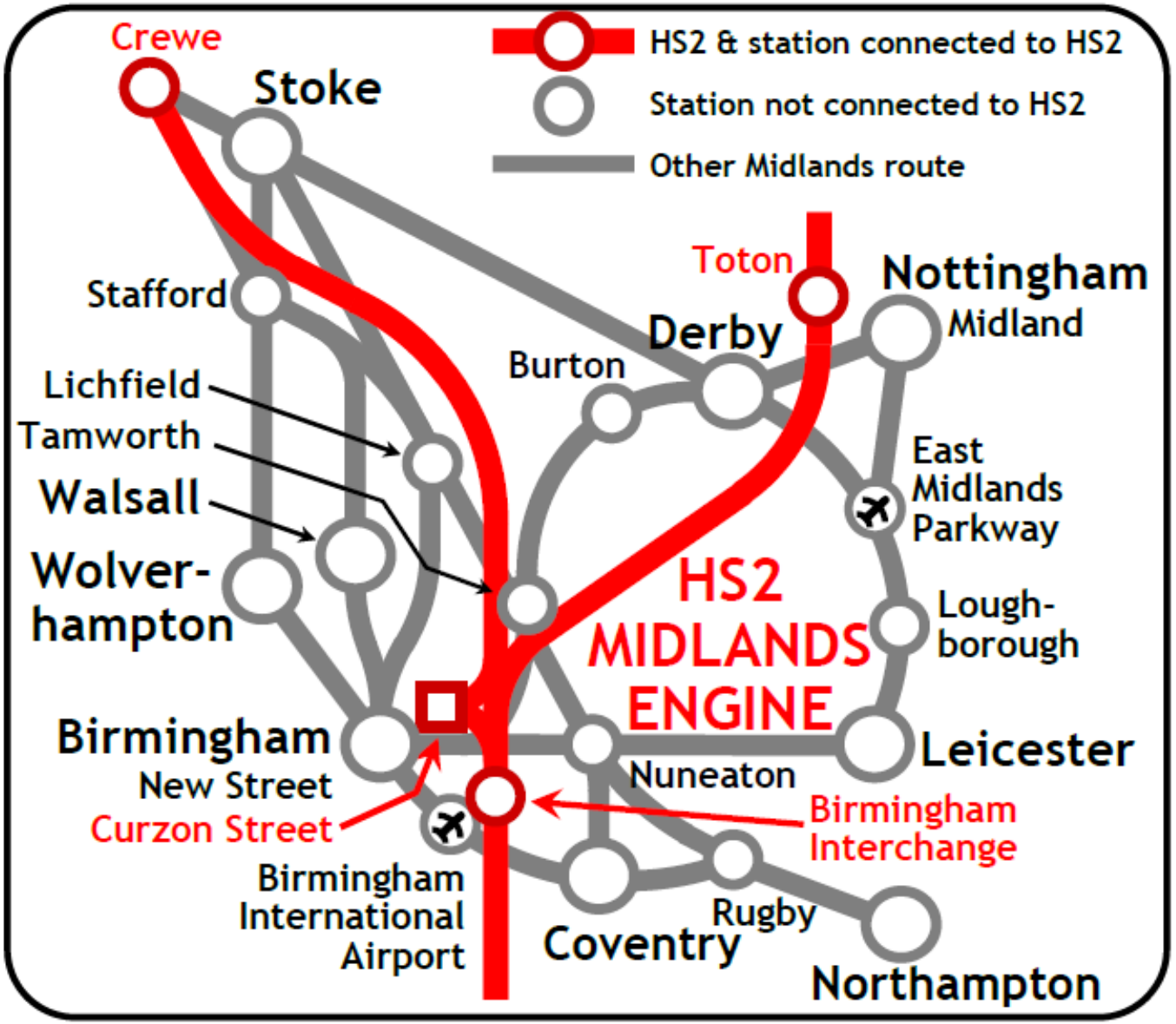
Direct HSUK services to Heathrow

1. HSUK direct services proposed from Heathrow to all primary regional cities.
2. Timetabled direct services possible with the efficiency of HSUK's 'spine & spur' network, with multiple cities on a single line of route.
3. HSUK 4-track spine has sufficient capacity for services to UK regions from Heathrow *and* from London.
4. HSUK Heathrow services to run from existing Heathrow Express platforms, with capacity hugely increased by transformation of Heathrow Express into through system.
5. Note onward link to Gatwick.

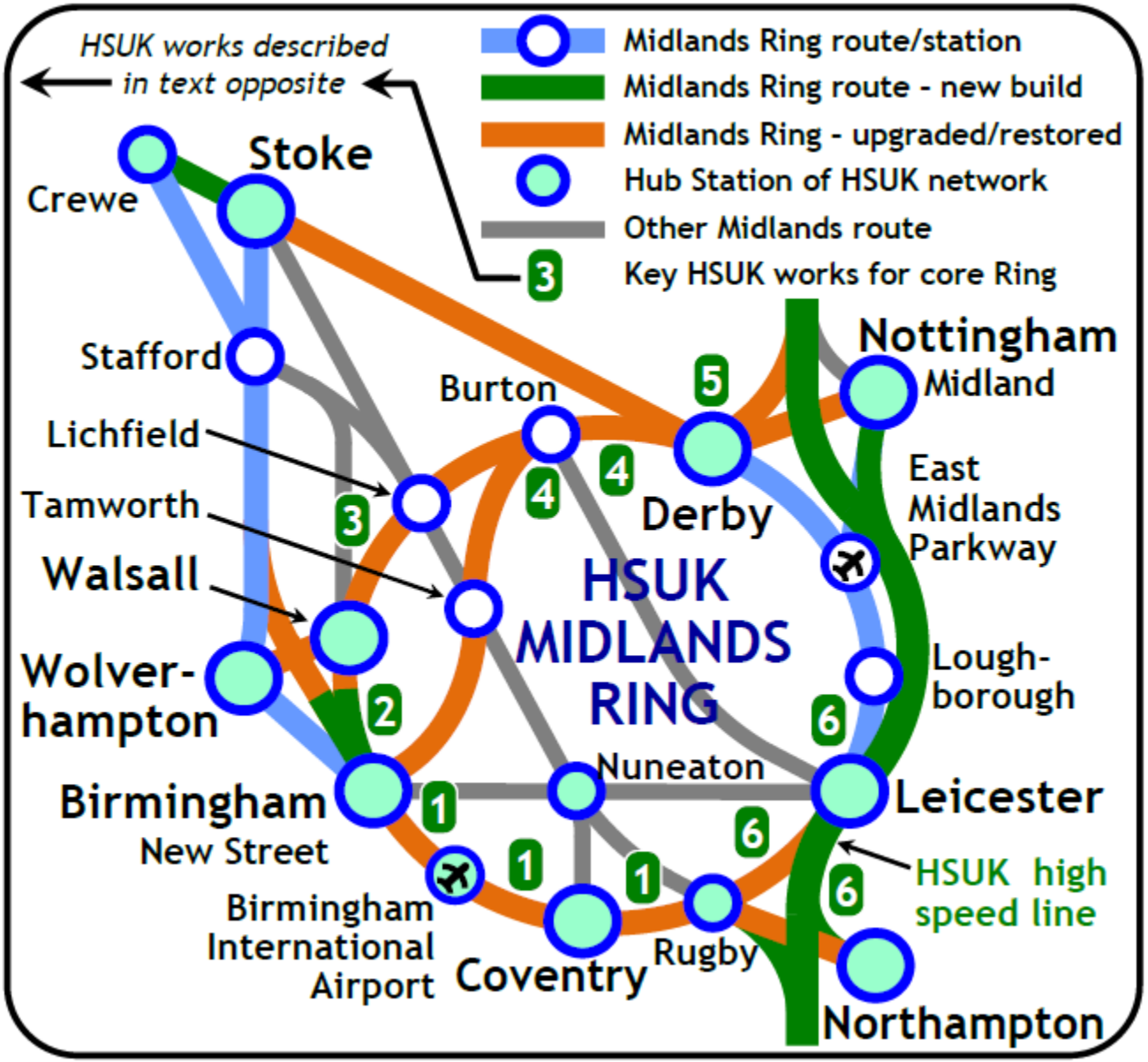
Test 12 – Chilterns



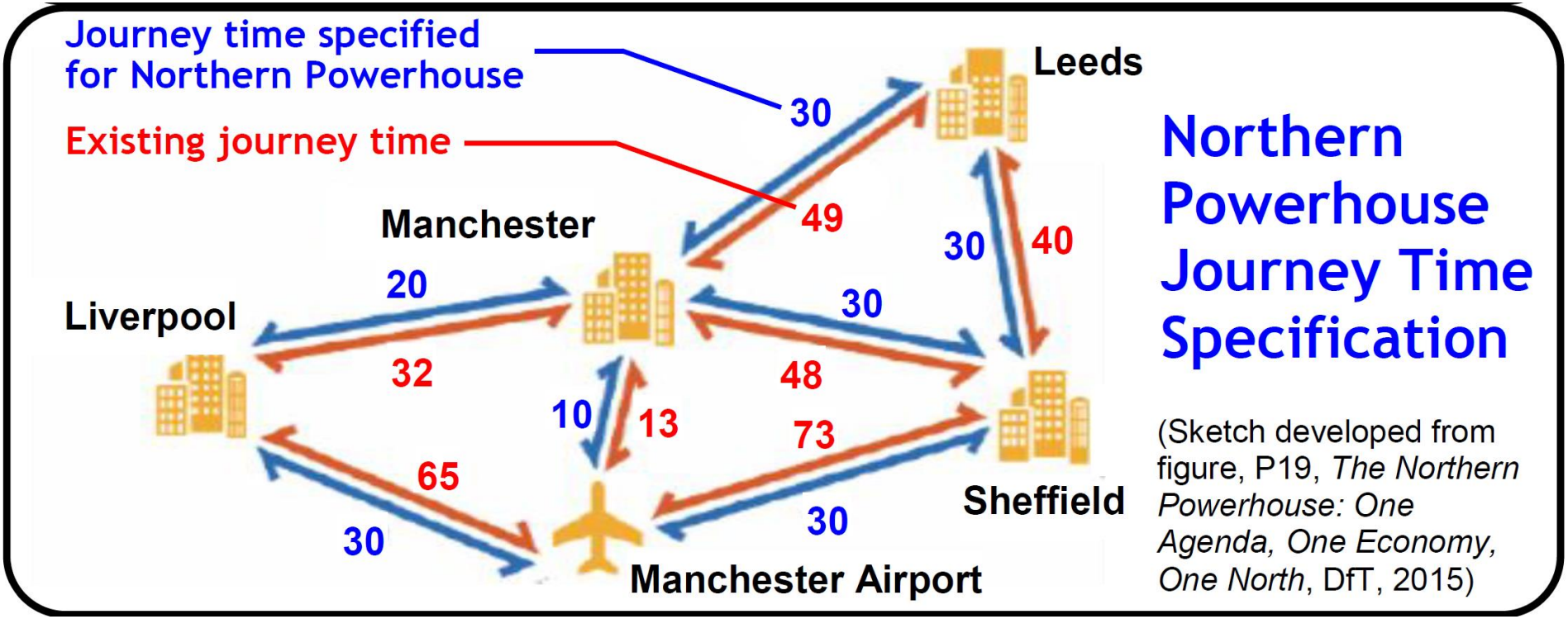
Test 13 – Midlands Engine (1)



Test 13 – Midlands Engine (2)



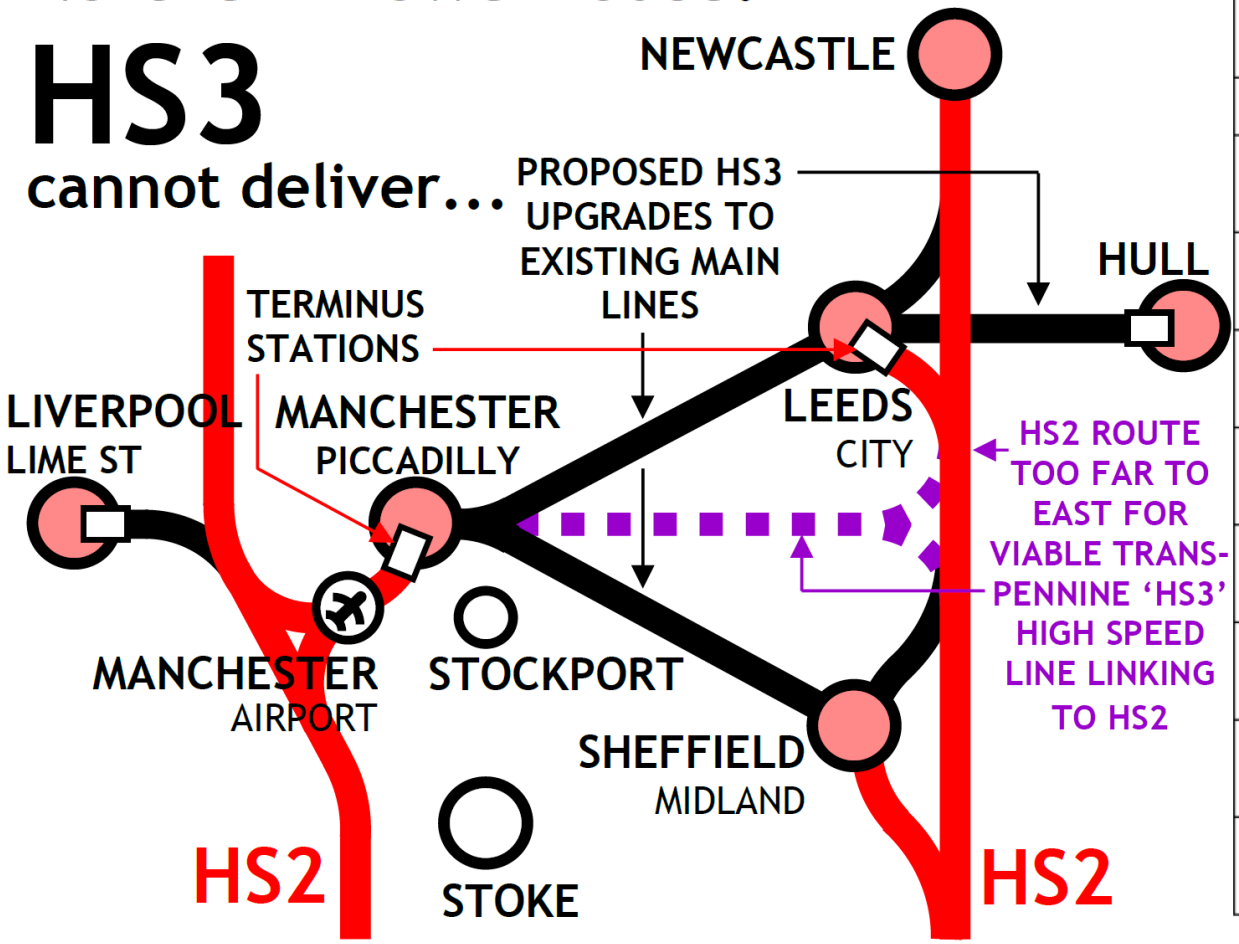
Test 14 – Northern Powerhouse (1)



Test 14 – Northern Powerhouse (2)

Northern Powerhouse:

HS3 cannot deliver...



HSUK calculated journey times (in minutes) vs Northern Powerhouse spec

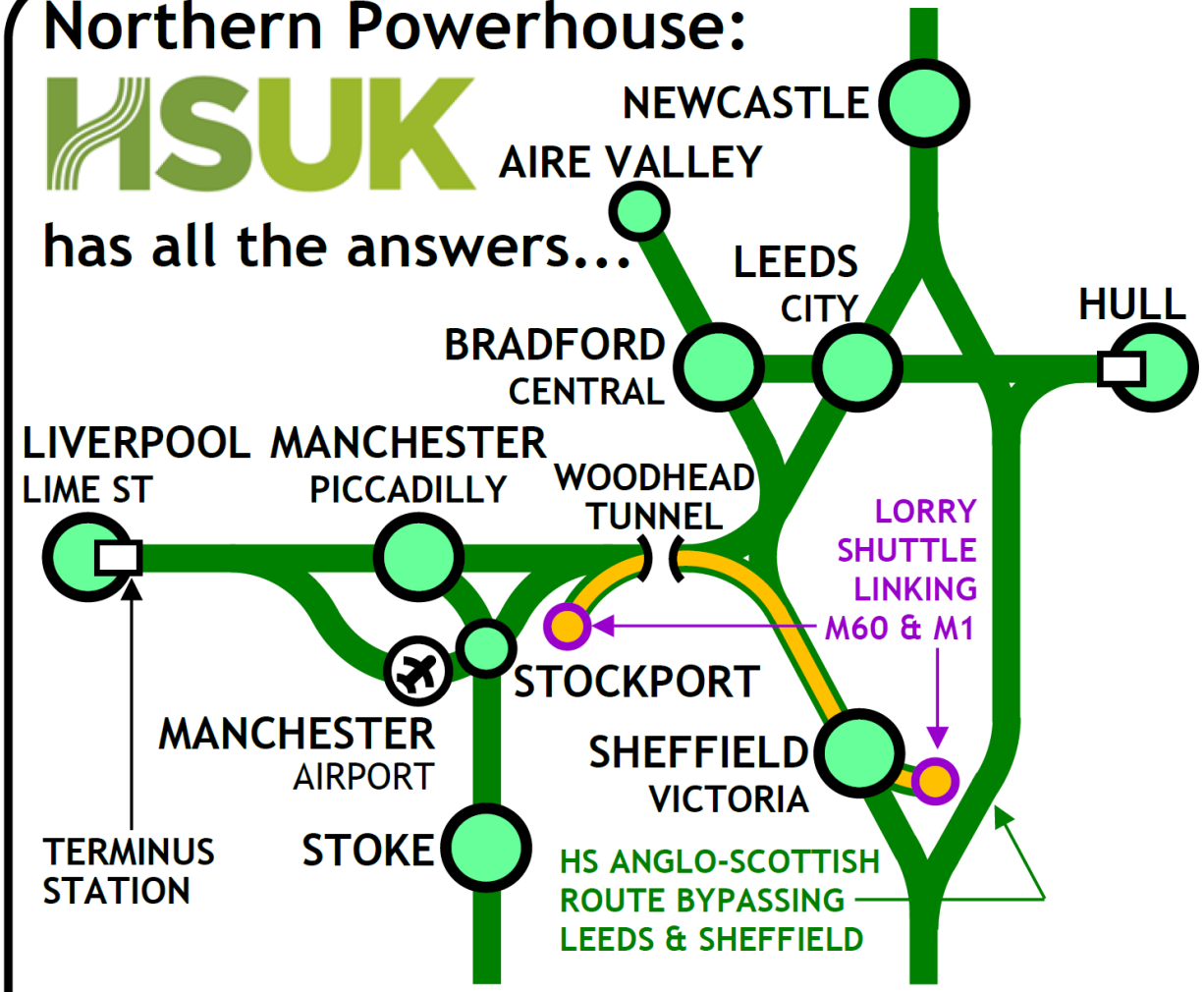
Between:	NP	HS3
Manchester - Leeds	30	30
Manchester - Sheffield	30	?
Manchester - Liverpool	20	?
Sheffield - Leeds	30	26
Leeds - Manchester Airport	40	?
Sheffield - Manchester Airport	30	?
Liverpool - Manchester Airport	30	?
Leeds - Newcastle	60	?

Cost of Manchester/Leeds/Sheffield links: £20.3 billion

Test 14 – Northern Powerhouse (3)

Northern Powerhouse:

HSUK has all the answers...



HSUK calculated journey times (in minutes) vs Northern Powerhouse spec		
Between:	NP	HSUK
Manchester - Leeds	30	25
Manchester - Sheffield	30	20
Manchester - Liverpool	20	19
Sheffield - Leeds	30	17
Leeds - Manchester Airport	40	36
Sheffield - Manchester Airport	30	30
Liverpool - Manchester Airport	30	29
Leeds - Newcastle	60	55
Bradford - Sheffield	N/A	26
Bradford - Manchester	N/A	33

Cost of Manchester/Leeds/Sheffield links: £13.7 billion

Test 15 – Scotland (1)

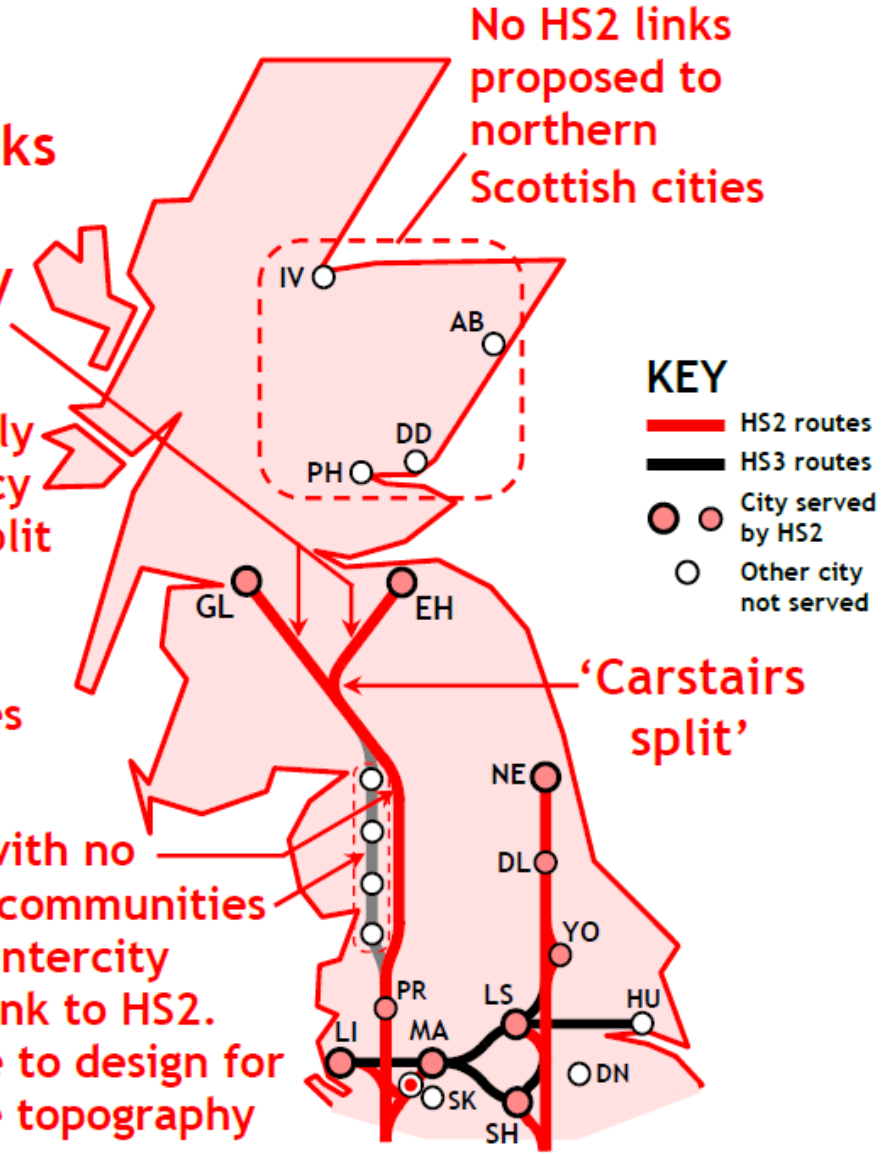
High Speed 2

West-sided spine route links Edinburgh & Glasgow with direct hourly services only to London

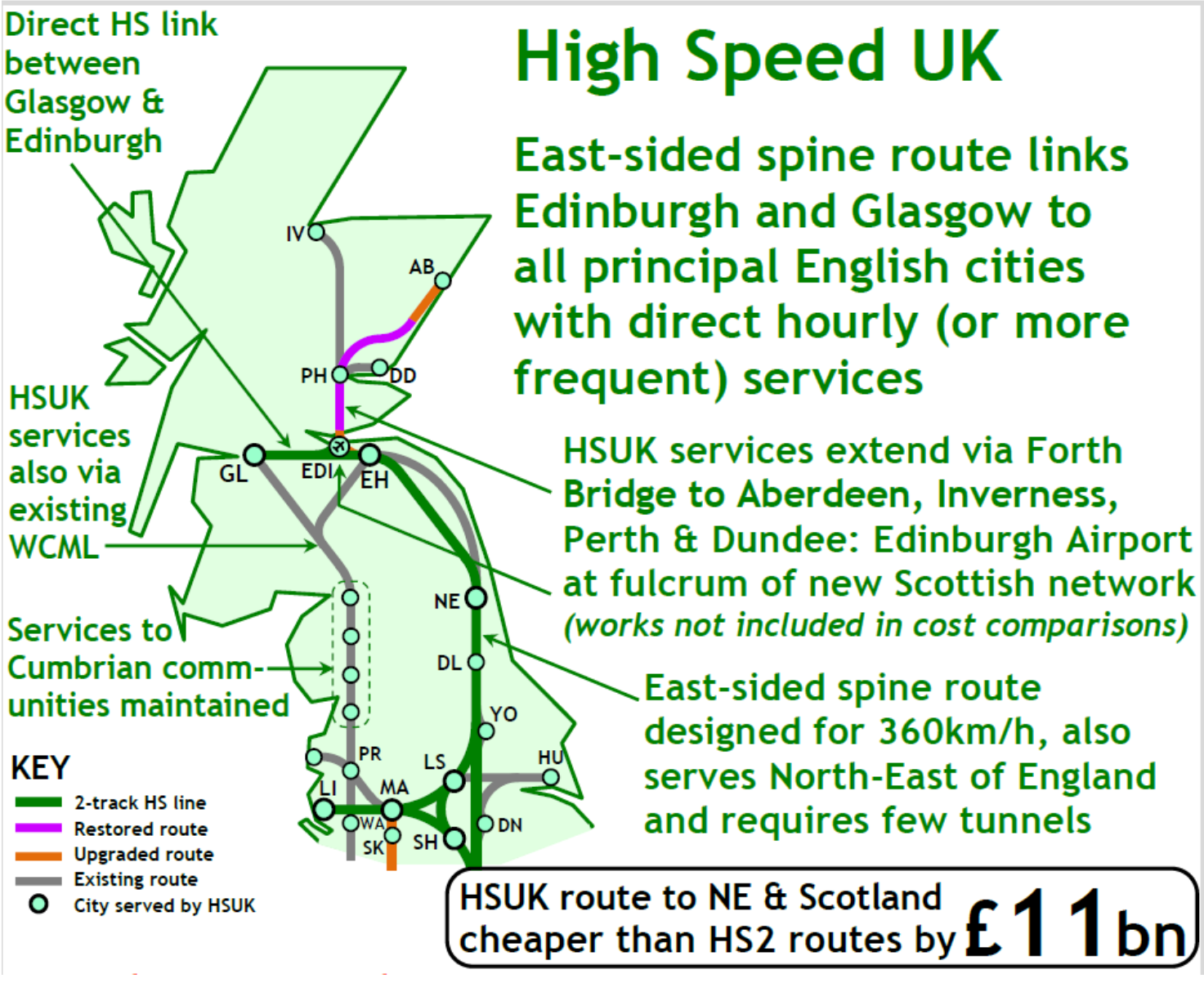
Services to Birmingham (& possibly Manchester) at 2-hourly frequency due to inefficiency of Carstairs split

No HS2 services from Scotland to other principal English cities - instead, existing intercity services likely to be reduced

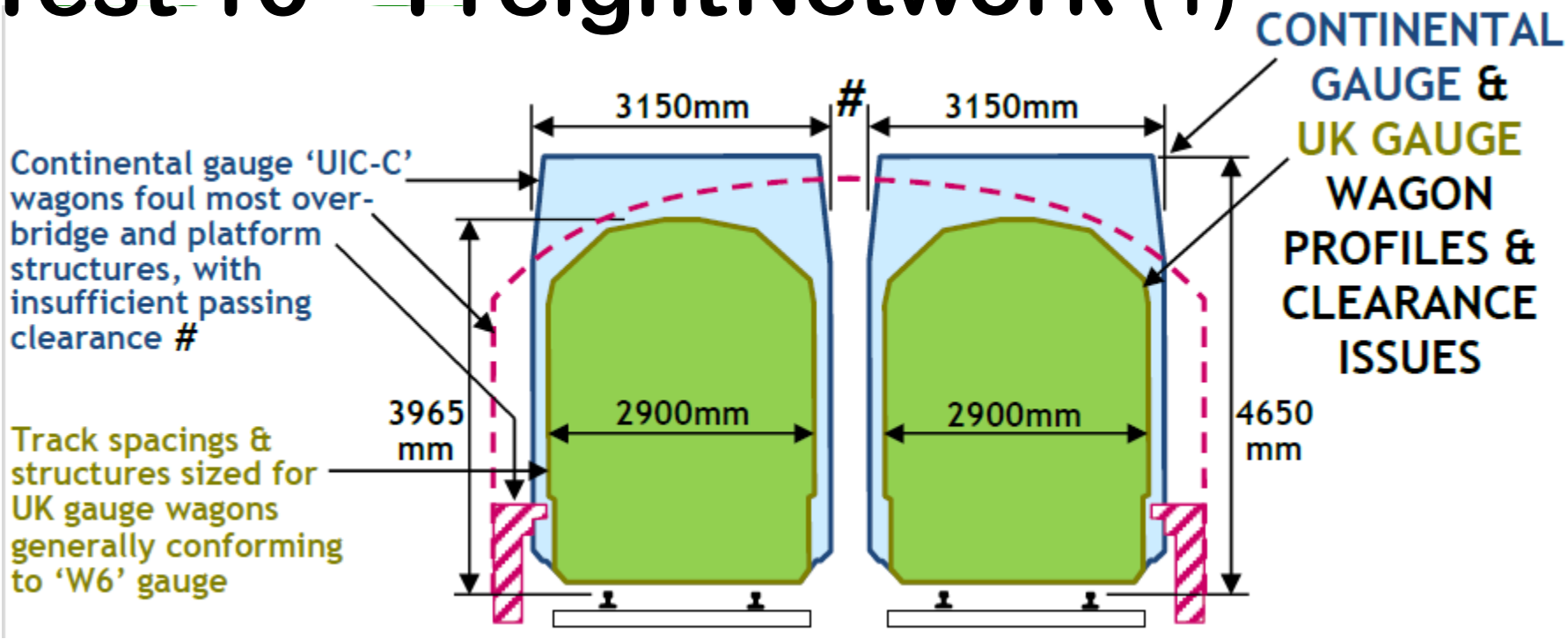
West-sided spine route possibly with no intermediate stations. Cumbrian communities on WCML likely to lose premium intercity services, with little prospect of link to HS2. Major environmental damage due to design for high speed in difficult & sensitive topography



Test 15 – Scotland (2)

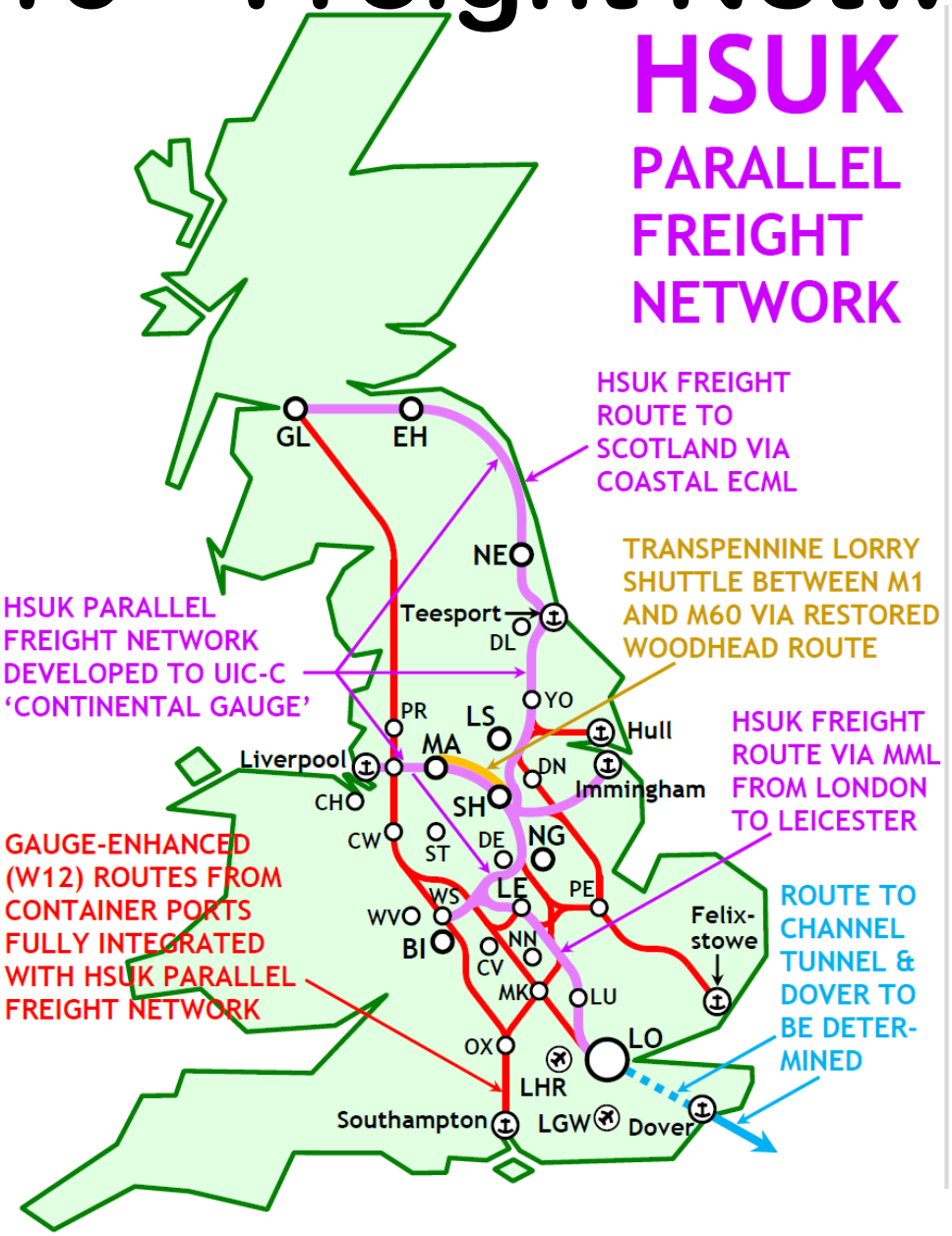


Test 16 – FreightNetwork (1)



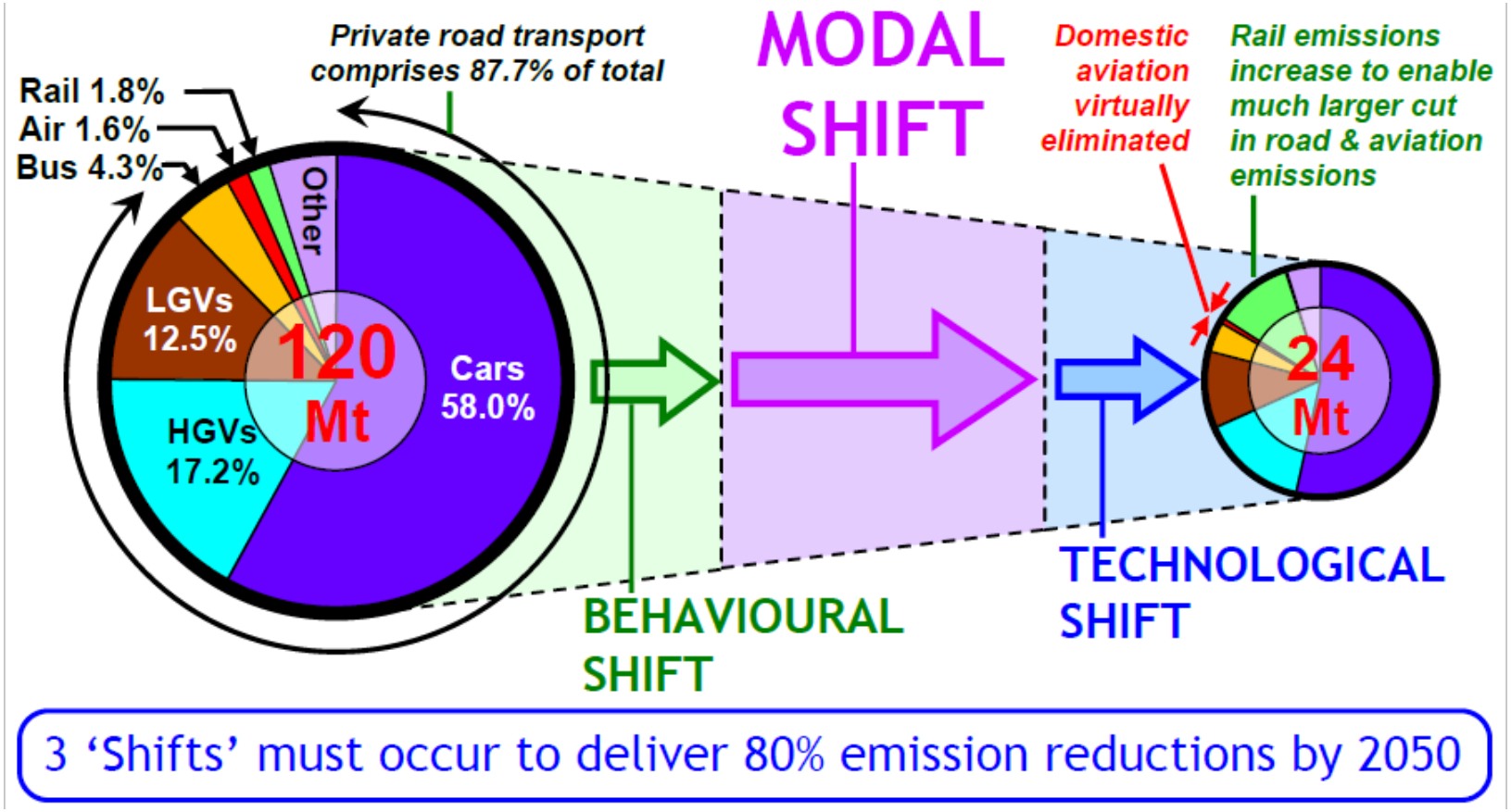
- Here is the essence of the UK Loading Gauge problem;
- HSUK Remit asks for a supplementary proposals for a dedicated freight network which is capable of being enlarged to UIC-C gauge;
- This network will have freight as its prime user diverting freight off some of the existing network where that is important and where HSUK parallels existing main lines they can take over the freight role.
- **HS2 has no such vision or strategy – not in the remit.**

Test 16 – Freight Network (2)



Test 17 – CO_2

- 2008 Climate change target is 80% cut in CO_2 by 2050;
- So, 120Mt pa transport CO_2 must be reduced to 24Mt pa – a tough call;
- HSUK modelling shows that its excellent connectivity will promote the necessary car to train modal shift to achieve a reduction of 600Mt of CO_2 over 40 years;
- **HS2 is just "carbon neutral", i.e. contributing no reduction at all.**



Test 18 – Option Selection(1)

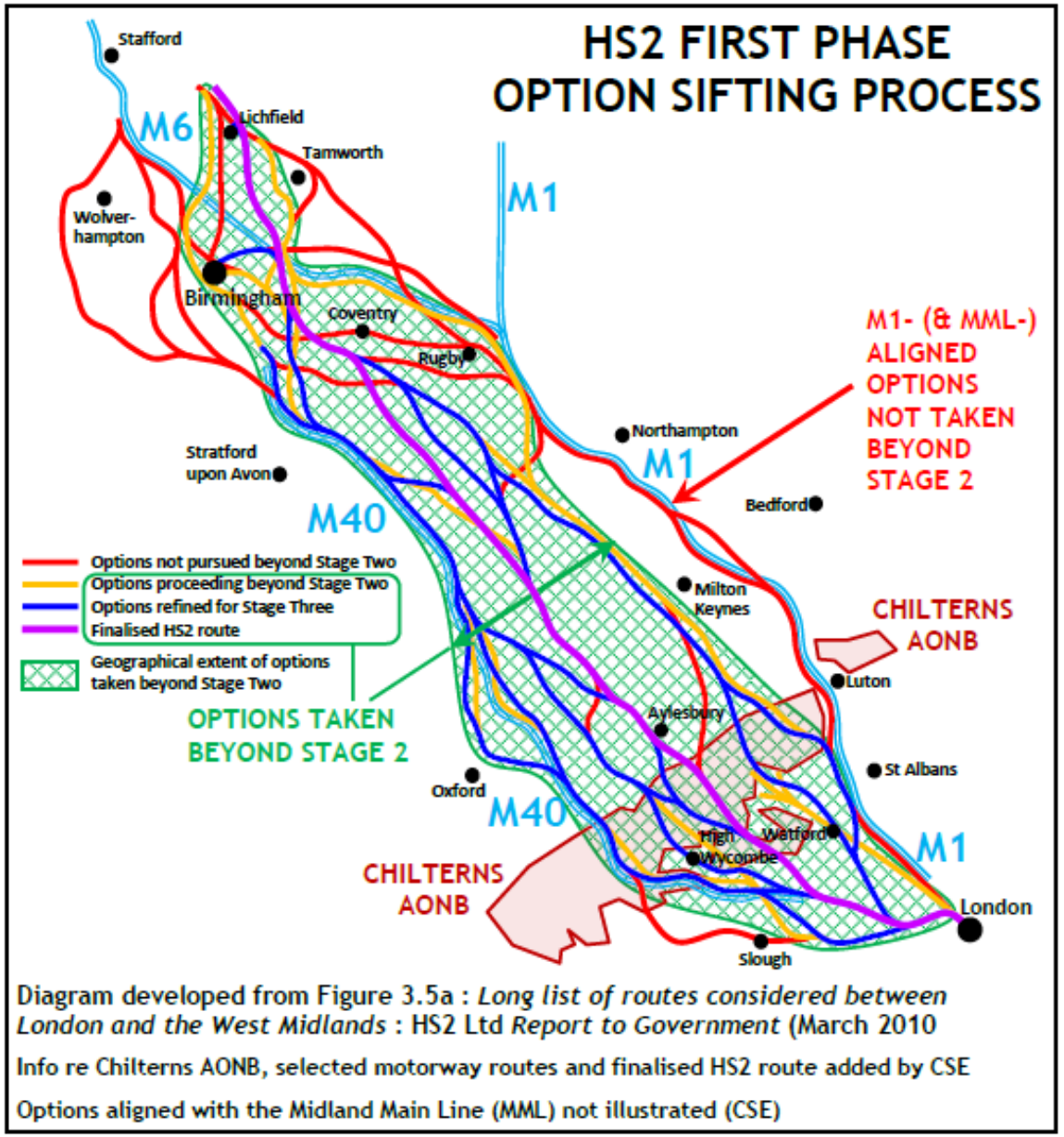


Diagram developed from Figure 3.5a : *Long list of routes considered between London and the West Midlands* : HS2 Ltd *Report to Government* (March 2010

Info re Chilterns AONB, selected motorway routes and finalised HS2 route added by CSE

Options aligned with the Midland Main Line (MML) not illustrated (CSE)

Test 18 – Option Selection(2)

- Clearly there are many possible ways of getting from Euston to Birmingham;
- HS2 adopted a sifting process to reduce the field;
- It seems that the only criterion which mattered was finding the shortest route and never mind the damage inflicted on the countryside;
- There is only one way of getting through does not involve trashing the Chilterns AONB;
- That way is by following the M1 which has been the transport corridor for at least 1,700 years;
- It has advantages, nobody lives near it (noise!) so nobody can complain about the trains, land is cheaper and you can follow it with a 360km/h alignment;
- Consequently there is no damage to the AONB and no Ancient Woodlands to worry about. Best of all the M1 itself can be used as a haul road.
- As we have already seen Luton and Dunstable are easy to avoid

Test 18 – Option Selection(3)

- A bit of history – “Following Watling Street”!
- Romans built a road and called it “Iter 2”;
- It became Watling St long after Romans left;
- The 1663 Turnpike Act allowed money to be raised to maintain the turnpike2;
- The Grand Union Canal built 1793 to 1805;
- The 1800 Act of Union brought Telford in to modernise the whole thing and take it to Holyhead;
- London & Birmingham Railway, todays WCML, built 1833 to 1838;
- After WW1 the road was improved and called the A5;
- In 1959 the first section of the M1 opened;
- Then in 2008 HSUK was proposed.
- Guess what? They all followed Watling St. **So why doesn’t HS2? Stupidity or what? Learn the lessons of History.**

HSUK – High Speed UK – Connecting the Nation

Test 19 – Impartial Assessment

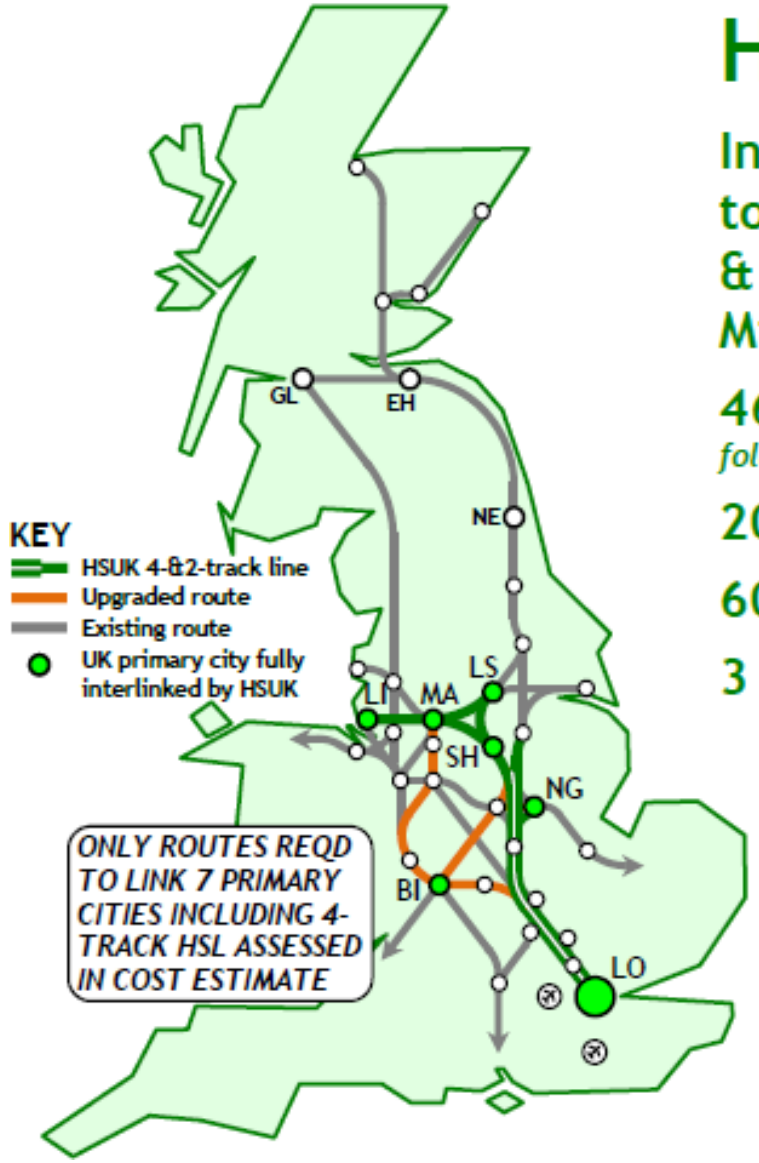
	Reasons offered by HS2 Ltd to dismiss high speed route via M1 corridor, *with HSUK rebuttals in italics*	Reference to HS2 report
1	The M1 corridor offers an insufficiently direct route from London to Birmingham. *The HSUK route from London to Birmingham via the M1 corridor and Coventry is 4.3km longer than the HS2 route, equivalent to 52 seconds extra at 300km/h.*	RTG Item 3.5.6, CMD Item 6.33, RRSS Items 3.1.16 & 3.1.22
2	A high speed line closely aligned with the M1 cannot sustain the desired 400km/h design speed specified for HS2. *The HSUK high speed line is designed for a maximum speed of 360km/h to enable it to closely follow the M1 and thus avoid the Chilterns AONB and other unspoilt areas.*	CMD Item 6.33
3	London-Birmingham journey times via M1 corridor compare poorly with the 49 mins timing via the preferred Chilterns route. *HSUK's journey time to Birmingham New St is 56 mins, but this gives access to entire West Mids conurbation - effectively faster than HS2's 49 mins to isolated Curzon St.*	RTG Item 3.5.6, CMD Item 6.33, RRSS Items 3.1.16 & 3.1.22
4	Any deviation from the alignment of the M1 would create unacceptable 'islands' of blighted land. *HSUK's route following the M1 will cause far less environmental damage than the HS2 route via the Chilterns AONB.*	CMD Item 6.33
5	Excessive lengths of tunnel are needed to avoid unacceptable demolition of property (if new line located on the surface). *HSUK's route to Birmingham following the M1 and the existing Rugby-Birmingham line requires 12km of tunnel. HS2's route via the Chilterns to Birmingham requires 50km.*	RTG Item 3.5.6, CMD Item 6.33, RRSS Item 3.1.16
6	An M1-aligned route would be too far from Heathrow to allow any regional high speed connection to the airport. *HSUK has the 4-track capacity to offer direct high speed services to Heathrow from all regional cities. HS2 lacks this capacity and its Heathrow spur is now cancelled.*	RTG Item 3.5.24, CMD Item 6.33, RRSS Item 3.1.15
7	Motorway junctions will block the route of an M1-aligned high speed line, with modifications too expensive and disruptive. *HSUK has undertaken a detailed study of all affected junctions. This demonstrates that all technical issues are relatively minor, and manageable at reasonable cost.*	RRSS Items 3.1.22 & 3.2.5

Table 20.1 : HS2 Ltd rationale to dismiss M1 corridor and HSUK rebuttals

Test 20 – Democracy

- Just because HS2 was consulting did not mean that HS2 was listening;
- *"Please don't confuse us with the facts"*
- There were 7 guideline questions for public response. HSUK (in the form of High Speed North) responded.
- 6 of the 7 questions began "Do you agree…."
- Unbelievable!!
- These are NOT open questions. They are designed to be put in two piles, Yes and No!!

Test 21 – Cost (1)



High Speed UK

Infrastructure required to fully interlink London & 6 primary cities of the Midlands and the North:

462km new railway - *mostly following existing transport corridors*

202km upgraded/restored

60km tunnel

3 new stations

Cost estimate £52bn

ALL COSTS INCLUDE ROLLING STOCK

Test 21 – Cost (2)

HS2 and HS3

Infrastructure required to interlink London & 6 primary cities of the Midlands and the North:

699km new railway - *mostly clear of existing transport corridors*

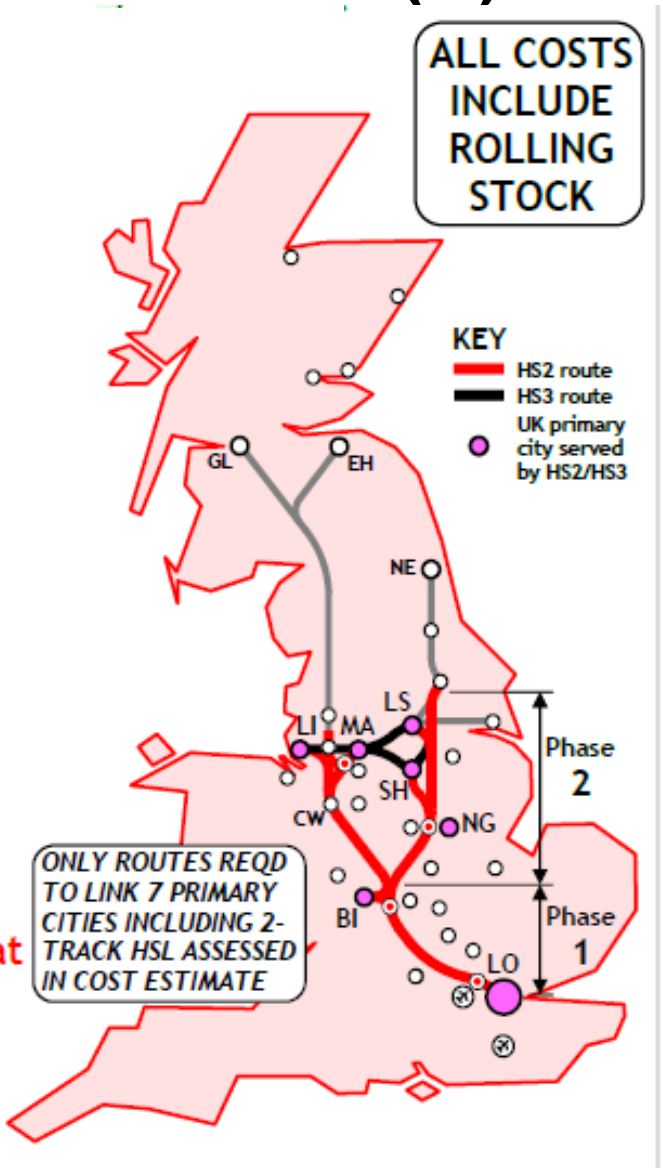
54km upgraded/restored

134km tunnel

8 new HS2 stations

Local integration projects at disconnected HS2 stations

Cost estimate £73bn



Test 21 – Cost (3)

- So what accounts for the £21 Billion difference?
- There are 5 key components which make up the difference;
- HSUK requires 227 route km less new railway than HS2 and HS3 combined;
- HSUK requires 74 route km less tunnel than HS2 and HS3 combined;
- HSUK requires 7 fewer new stations than HS2
- HSUK is generally built in more accessible , less sensitive and easier terrain with less costly earthworks and structures;
- HSUK needs no further development to achieve full integration with local networks.

Test 22 – "Six Principles" (1)

- HS2's "hugely enhanced capacity and connectivity" can only be delivered if a lot of things are put in place as part of the design;
- As a result we have grouped much of what has gone before into 6 basic principals of good design and asked which scheme does best;
- You will not be surprised by the conclusion we have come to.

Test 22 – "Six Principles" (2)

The High Speed Rail 'Six Principles' Tests

A high speed railway cannot be an end itself. It can only be worth the investment of more than £70bn of public money if it performs as a network, delivering the greatest possible benefit to the greatest possible population. The 'Six Principles' tests set out below enable the relative merits of competing proposals to be objectively assessed.

1. The Intercity Principle : Do the HSR proposals perform well as an intercity network?

1.1	12 UK primary cities *(incl. Bristol & Cardiff)* fully interlinked?	**HSUK *PASS***	**HS2 *FAIL***
1.2	Frequent interconnections with existing network?	**HSUK *PASS***	**HS2 *FAIL***
1.3	Inclusion of second-tier cities?	**HSUK *PASS***	**HS2 *FAIL***
1.4	10 further second-tier cities fully interlinked?	**HSUK *PASS***	**HS2 *FAIL***
1.5	Hourly (or better) frequencies on all routes?	**HSUK *PASS***	**HS2 *FAIL***

2. The Local Interchange Principle : Efficient interchange with local networks?

2.1	HS rail services to central stations in all major cities?	**HSUK *PASS***	**HS2 *FAIL***
2.2	Efficient harmonisation with local networks?	**HSUK *PASS***	**HS2 *FAIL***
2.3	Capacity increase to local networks in all primary cities?	**HSUK *PASS***	**HS2 *FAIL***

Test 22 – "Six Principles" (3)

3. The International Connections Principle : Efficient connections to airports and HS1?

3.1	Direct links to Heathrow from all UK primary cities?	HSUK *PASS*	HS2 *FAIL*
3.2	Comprehensive direct links to principal regional airports?	HSUK *PASS*	HS2 *FAIL*
3.3	Direct link to HS1 with minimal community impact?	HSUK *PASS*	HS2 *FAIL*

4. The Freight Principle : Potential for development of a parallel National Freight Network?

4.1	Associated strategy for parallel National Freight Network?	HSUK *PASS*	HS2 *FAIL*
4.2	Continental gauge (UIC-C) for 'piggyback' lorry traffic?	HSUK *PASS*	HS2 *FAIL*
4.3	TransPennine lorry shuttles to address road congestion?	HSUK *PASS*	HS2 *FAIL*

Test 22 – "Six Principles" (4)

5. The Performance Principle : Efficient construction, and future-proofed operation?

5.1	Buildability *(i.e. accessibility, sensitivity & easiest topography?)*	**HSUK *BEST PERFORMER***
5.2	Construction sequence *(can system be built in regions first?)*	**HSUK *BEST PERFORMER***
5.3	Capacity *(does system improve intercity, local & freight capacity?)*	**HSUK *BEST PERFORMER***
5.4	New journey opportunities *(to airports, & new regional links)*	**HSUK *BEST PERFORMER***
5.5	Operational viability *(has timetable been developed?)*	**HSUK *BEST PERFORMER***
5.6	Journey time reductions *(assessed between 33 key cities)*	**HSUK *BEST PERFORMER***
5.7	Resilience *(can system cope with planned/unplanned disruption?)*	**HSUK *BEST PERFORMER***
5.8	Network efficiency *(max no. of cities linked for fewest trains)*	**HSUK *BEST PERFORMER***
5.9	Future-proofing against demographic changes etc.	**HSUK *BEST PERFORMER***

Test 22 – "Six Principles" (5)

6. The Public Policy Principle : Compliance with all relevant aspects of public policy?

6.1 CO_2 emissions *(conformance with 2008 Climate Change Act?)* **HSUK *BEST PERFORMER***

6.2 Minimised Environmental Impact **HSUK *BEST PERFORMER***

6.3 Inclusivity *(accessibility/usefulness to greatest population?)* **HSUK *BEST PERFORMER***

6.4 Value for money/BCR *(greatest economic benefit/least cost?)* **HSUK *BEST PERFORMER***

6.5 Rebalanced economy *(regional 'Powerhouses' created?)* **HSUK *BEST PERFORMER***

6.6 Profitable railway *(considering entire national network)* **HSUK *BEST PERFORMER***

6.7 Minimised public expenditure *(lowest construction cost?)* **HSUK *BEST PERFORMER***

HS2 & HSUK go Head to Head

- We invite you to agree with us that HS2 fails every one of the 22 tests and is a very poor scheme which is not value for money;
- We also invite you to agree with us that HSUK is a work of sheer genius;
- Seriously, we invite all comments good and bad and unlike the Government and HS2Ltd. we promise that we will be listening;
- Thank you for coming to listen and questions please.