

# HIGH SPEED NORTH

## The Railway Engineer's Alternative

presented by

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# Why do we need High Speed Rail?

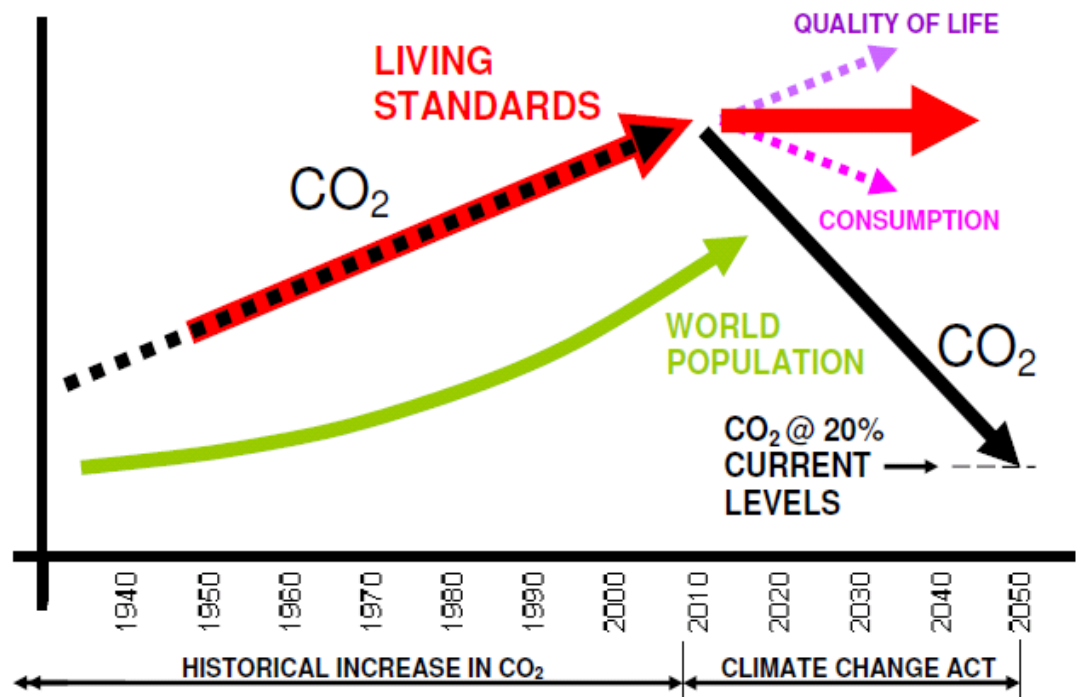
- An alternative to short-haul aviation?
- Improved intercity connections?
  - Quicker journey times?
  - More comprehensive rail network?
- Higher capacity network?
  - More people travelling?
  - To facilitate mode shift?
- A cleaner and greener transport system?
- Regional Regeneration?

# High Speed Rail : Attributes for Success

- Recognition of the past
- Meeting the requirements of today
- Addressing concerns for the future
- Relevance – meeting aspirations of all stakeholders
- Becoming part of the solution

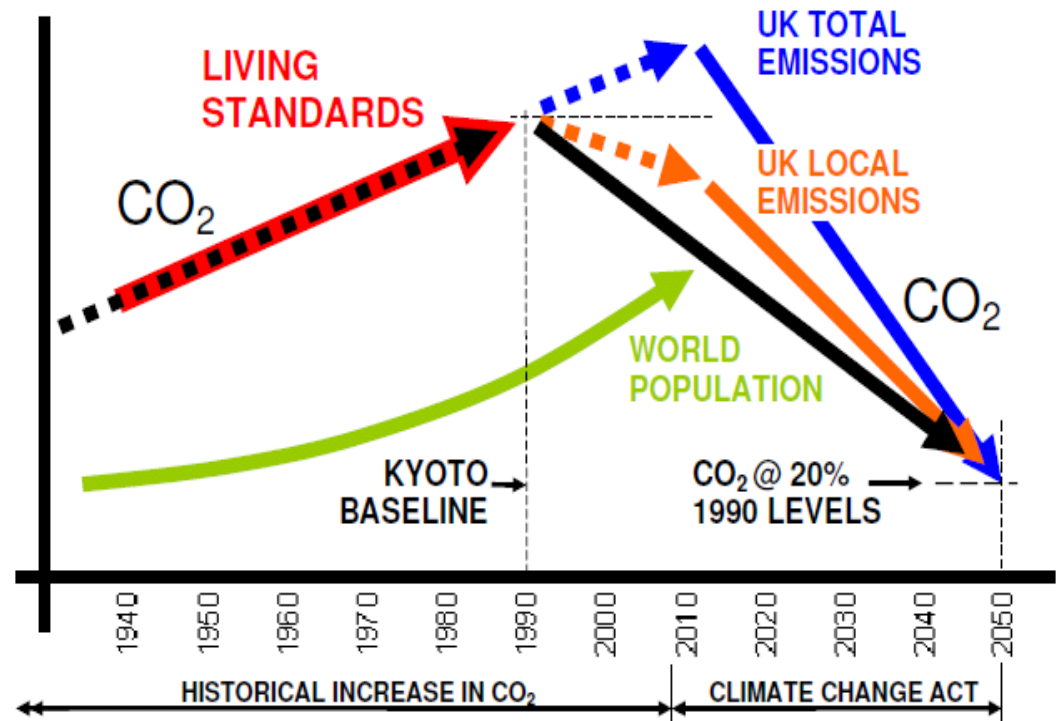
# 2008 Climate Change Act – the challenge

- 80% reduction in CO<sub>2</sub> emissions by 2050
- Maintain living standards??



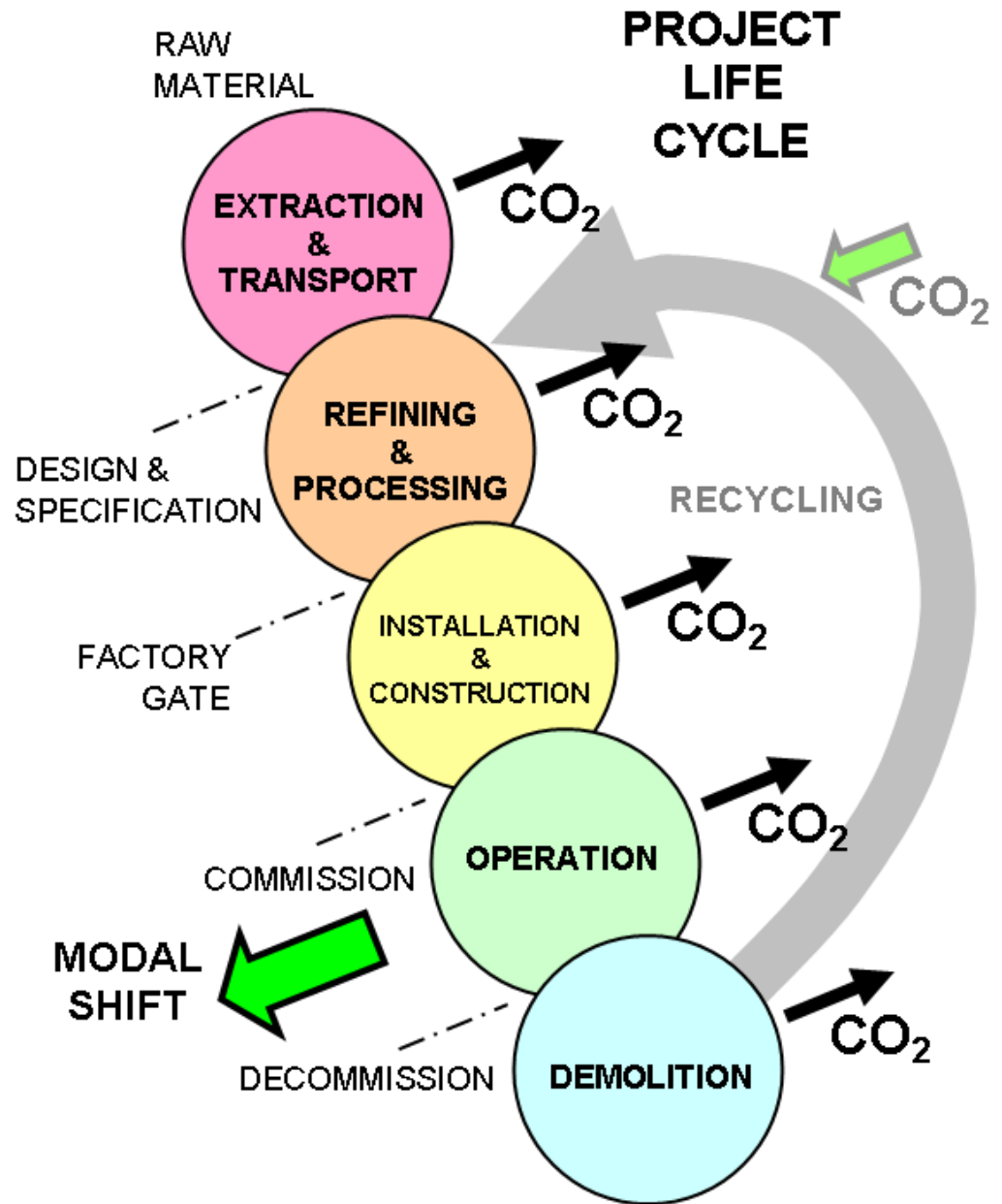
# 2008 Climate Change Act – the challenge

- Emissions trading via ETS or...
- environmental best practice??



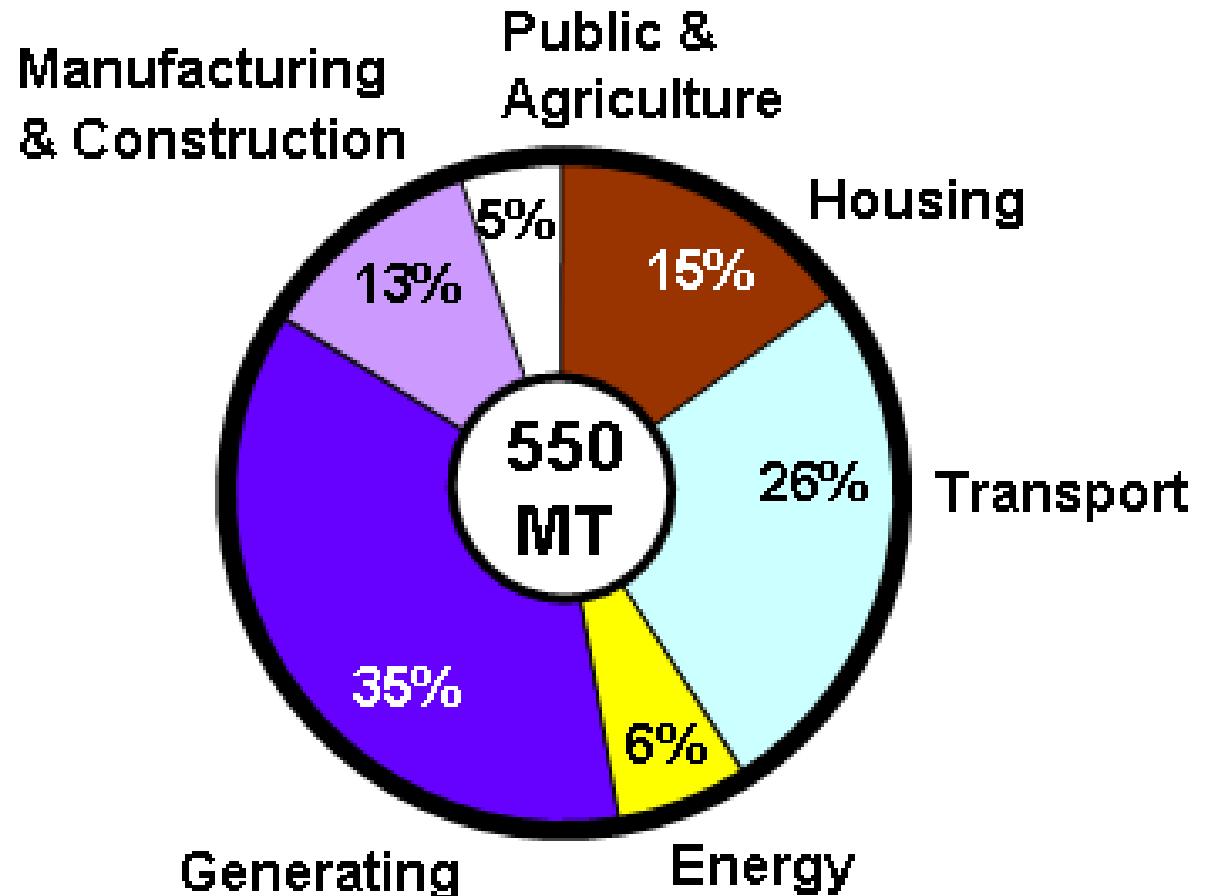
# Environmental Best Practice

- Any major project must prove net reductions in CO<sub>2</sub> emissions and use of fossil fuels



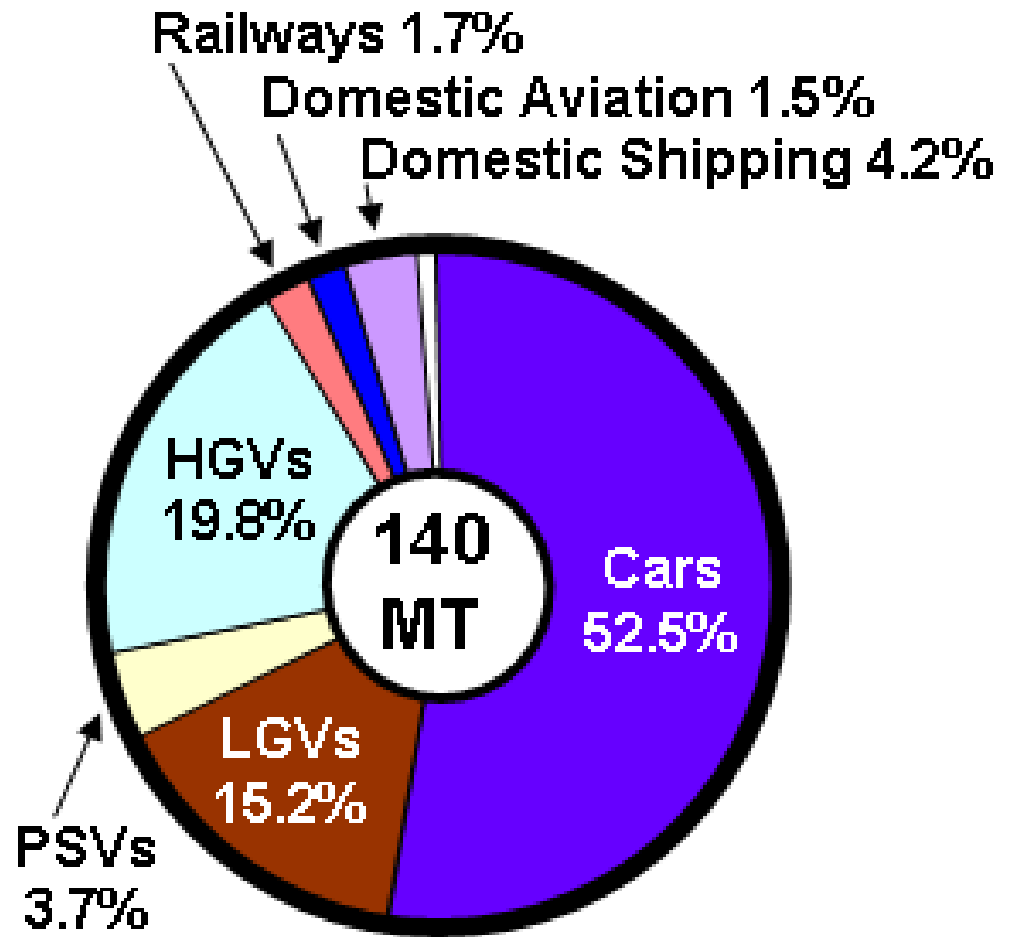
# CO<sub>2</sub> Emissions

- 28,000 MT pa worldwide
- 550 MT pa UK



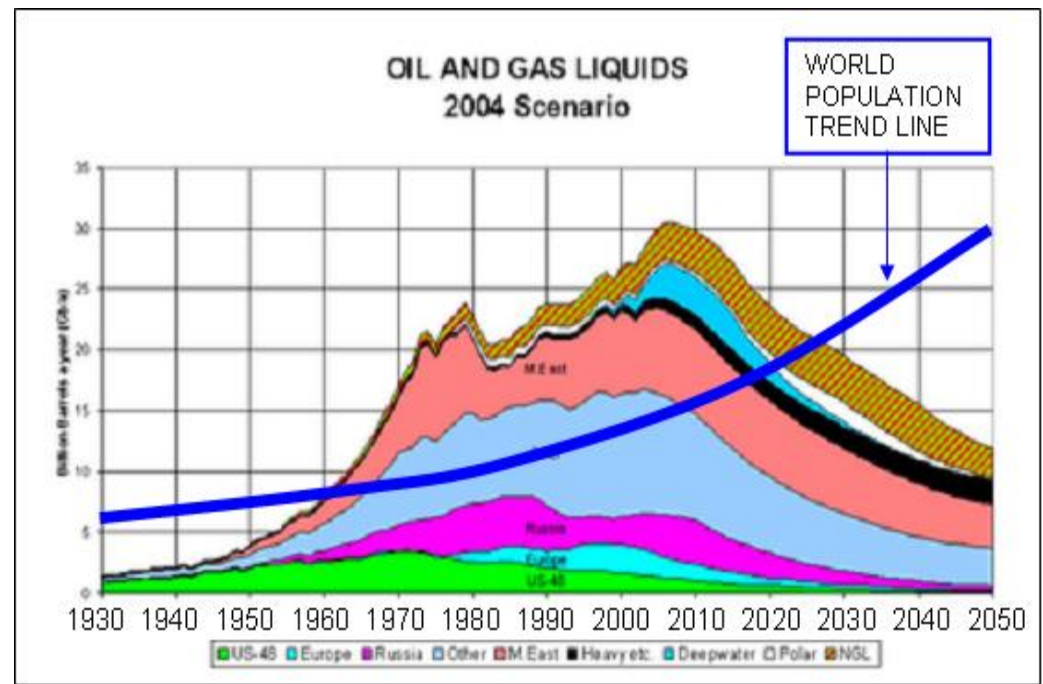
# CO<sub>2</sub> Emissions in Transport

- Total CO<sub>2</sub> ~140MT
- Rail CO<sub>2</sub> ~2.5MT
- Domestic Aviation ~2.2MT
- Roads ~128MT
- International Aviation ~40MT
- Expanded LHR ~12MT *increase*



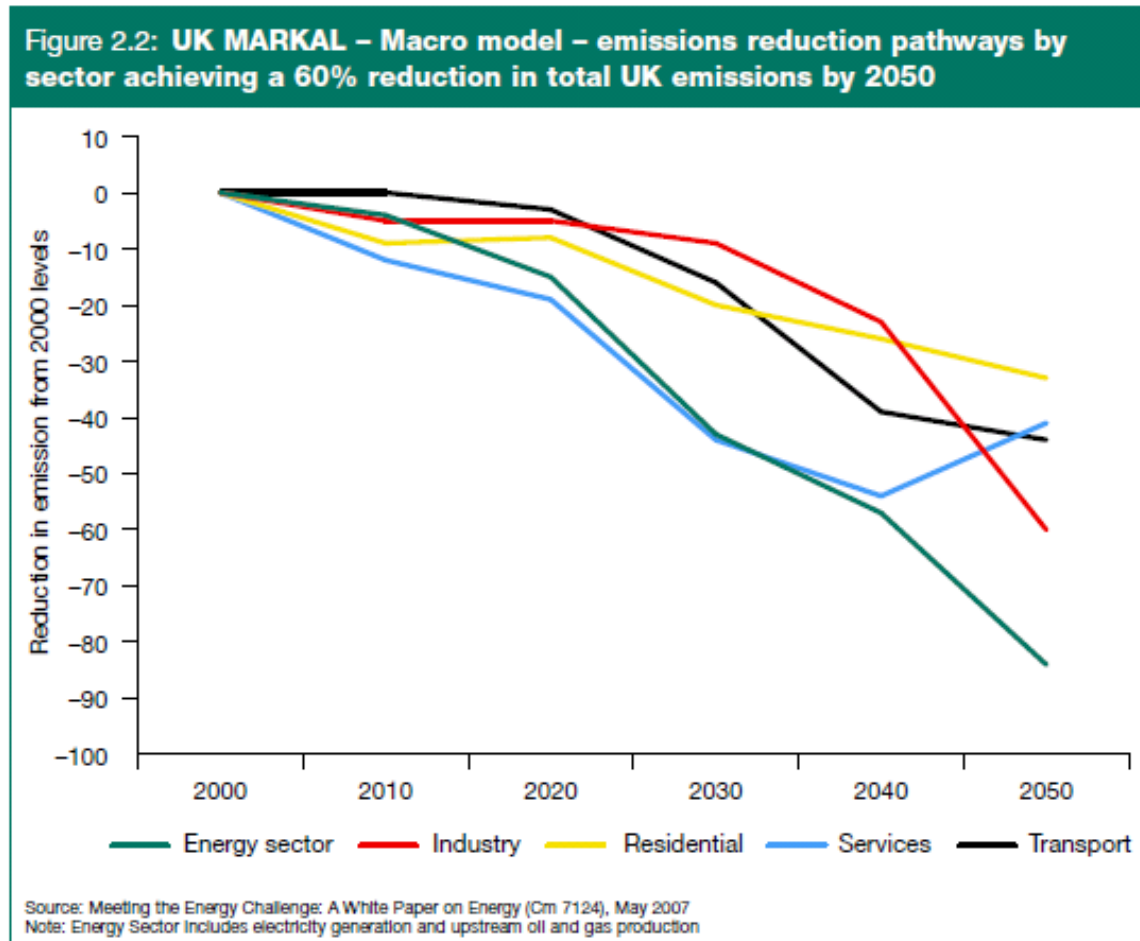
# Towards a Sustainable Transport System?

- Peak Oil??
- Transport needs oil – all except electric rail oil-dependent
- $\frac{2}{3}$  UK oil used for transport
- Government policy??



PROJECTED WORLD OIL PRODUCTION

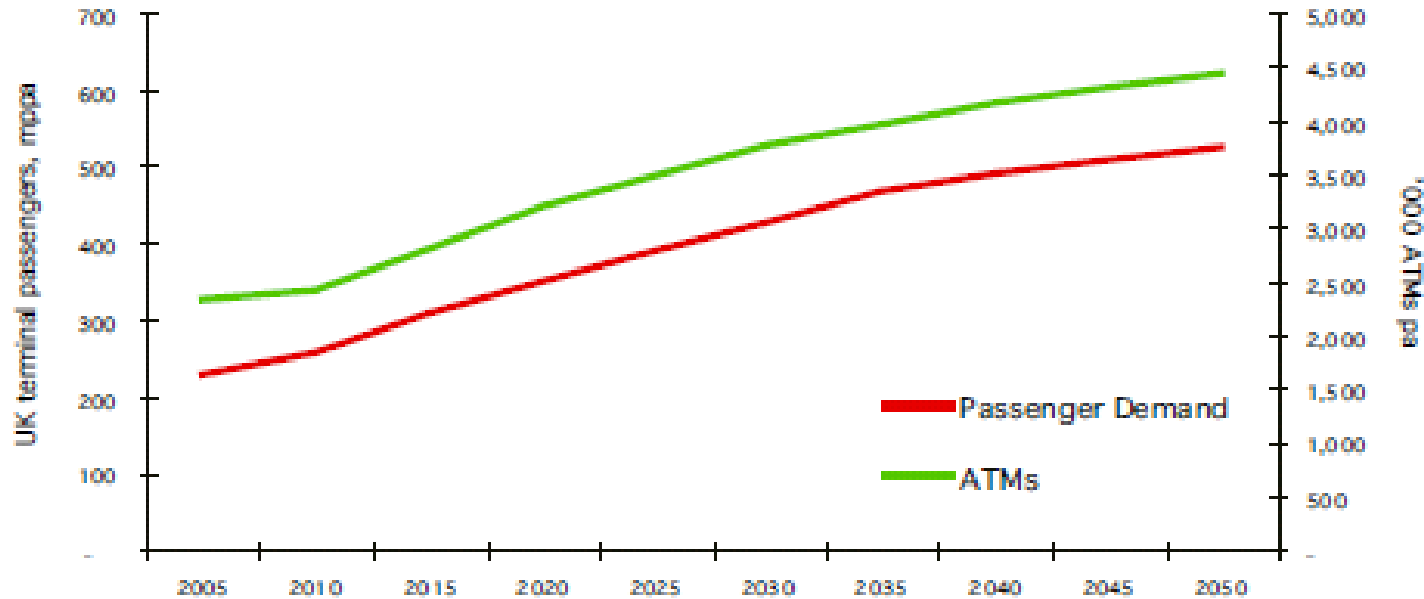
# Transport emissions: the DfT view...



*DfT Towards a Sustainable Transport System: 2007*

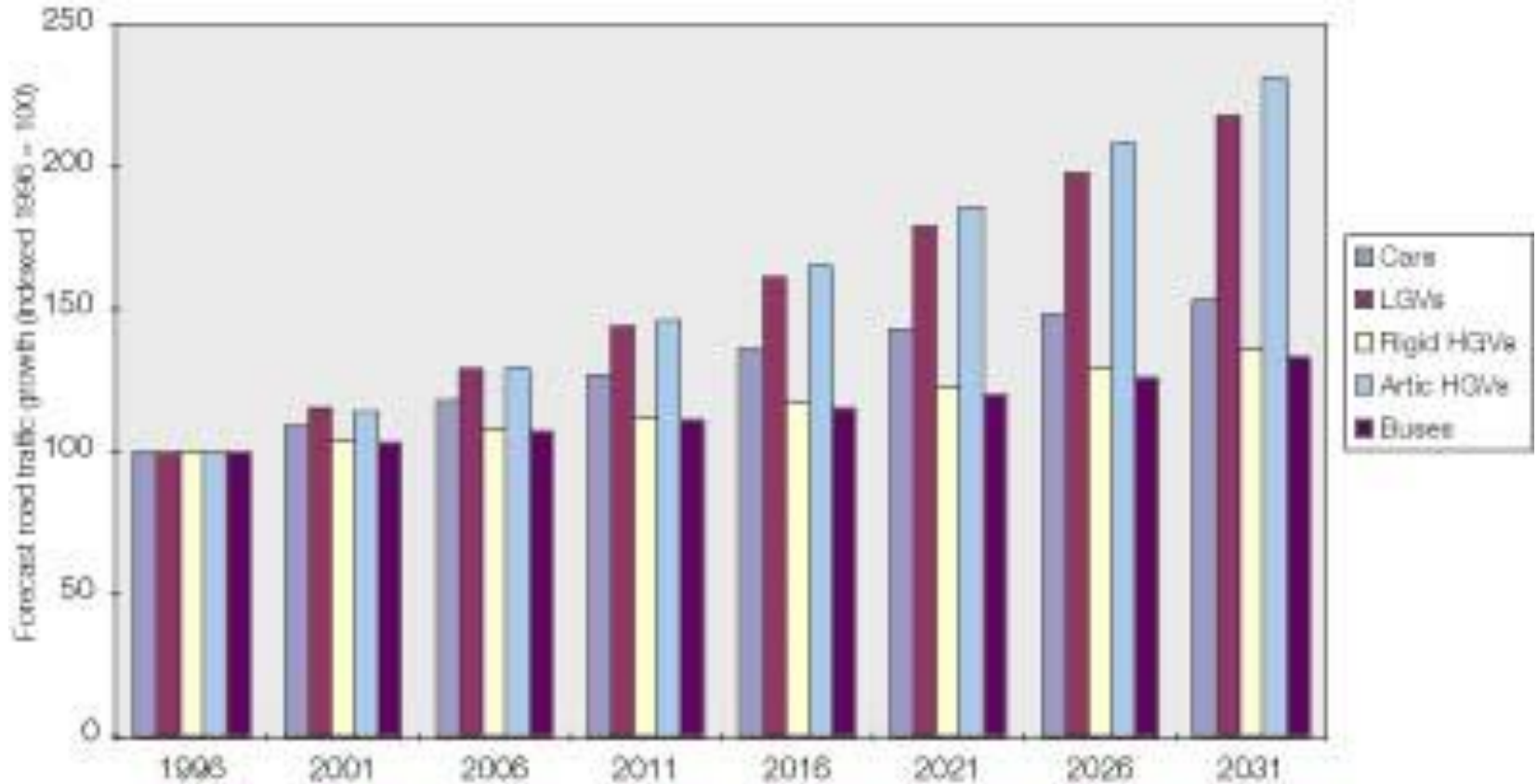
# Projected aviation growth...

Figure 2.16 Projected constrained passenger and ATM demand, to 2050



*Air passenger demand forecasts, DfT 2009*

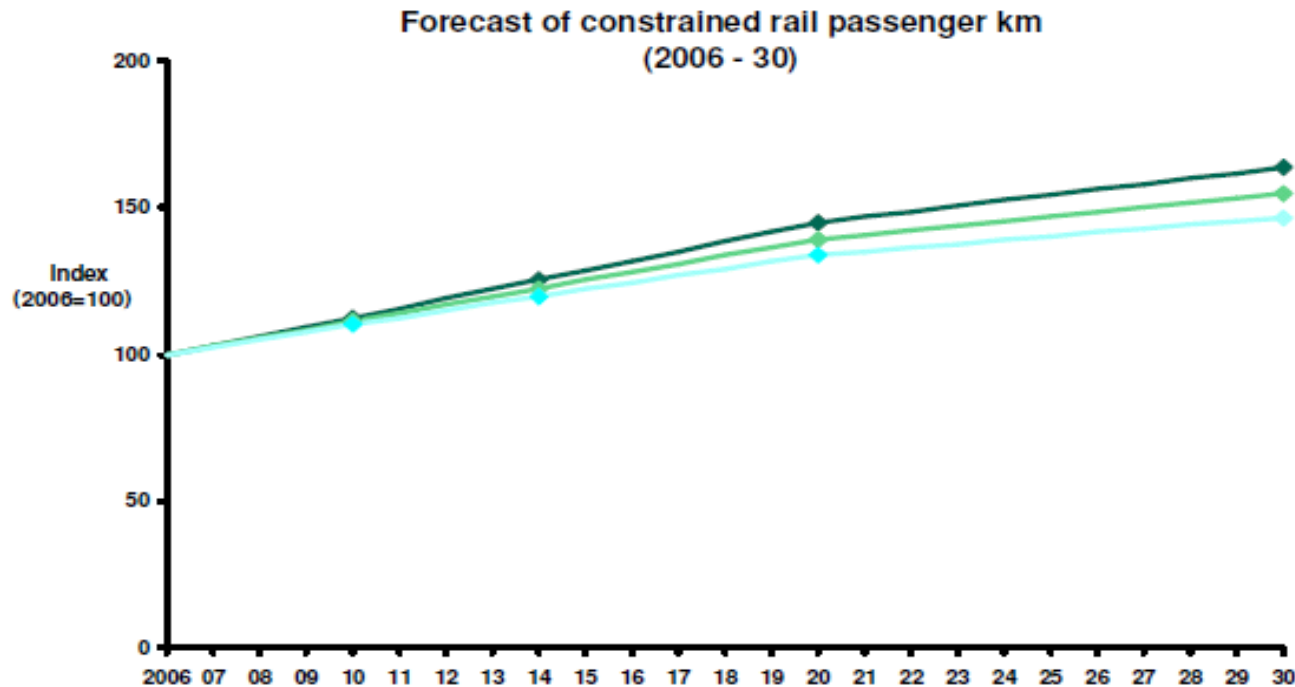
# Projected road traffic growth...



*Environmental impacts of road vehicles, DfT website 2009*

# Projected rail traffic growth...

*Rail passenger km are forecast to increase by 40-60% by 2027*



*DfT website 2009*

# The Impending Crisis?

- Global warming – or Peak Oil – “greatest crisis faced by civilisation”??
- Government policy predicated upon ‘business as usual’ – trading mechanisms – and very optimistic technology shift??
- Far more radical action required
- Cuts in consumption & emissions across all sectors
- Transport must play its part
- If we can’t make cuts...  
someone will do it for us

# Options to reduce CO<sub>2</sub>

- Don't travel (ultimate behavioural shift!!)...  
*or...*

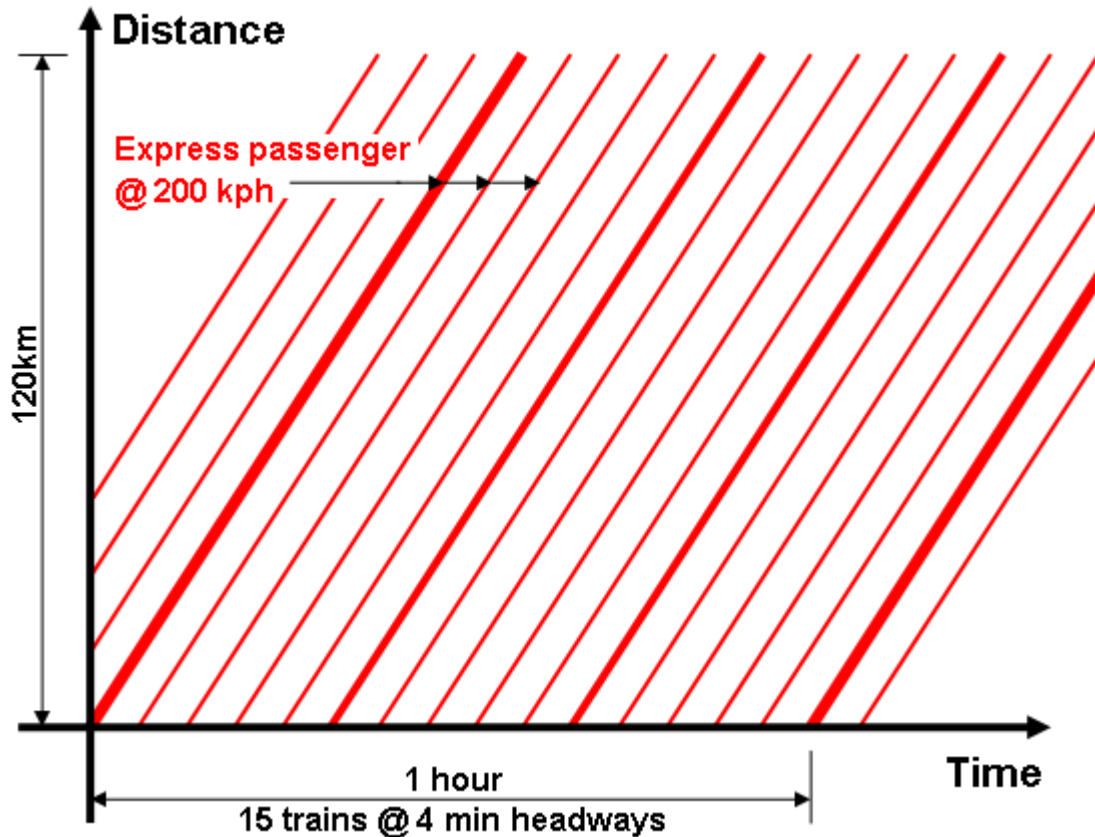
- Travel more efficiently through:
  - technology shift
  - mode shift
  - better load factor

*so...*

- Shift to most efficient mode ie rail
- And then fill the trains!!

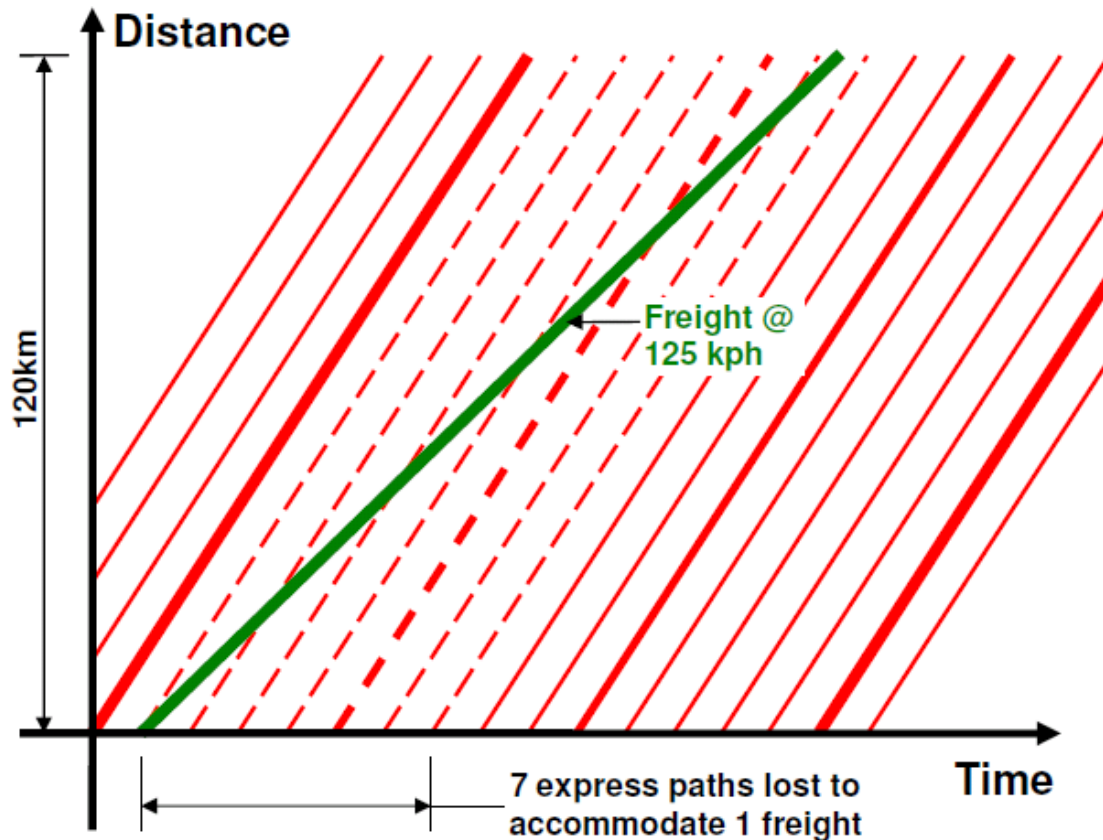
*Only possible with increased capacity –  
implemented ASAP*

# Optimum Railway Capacity



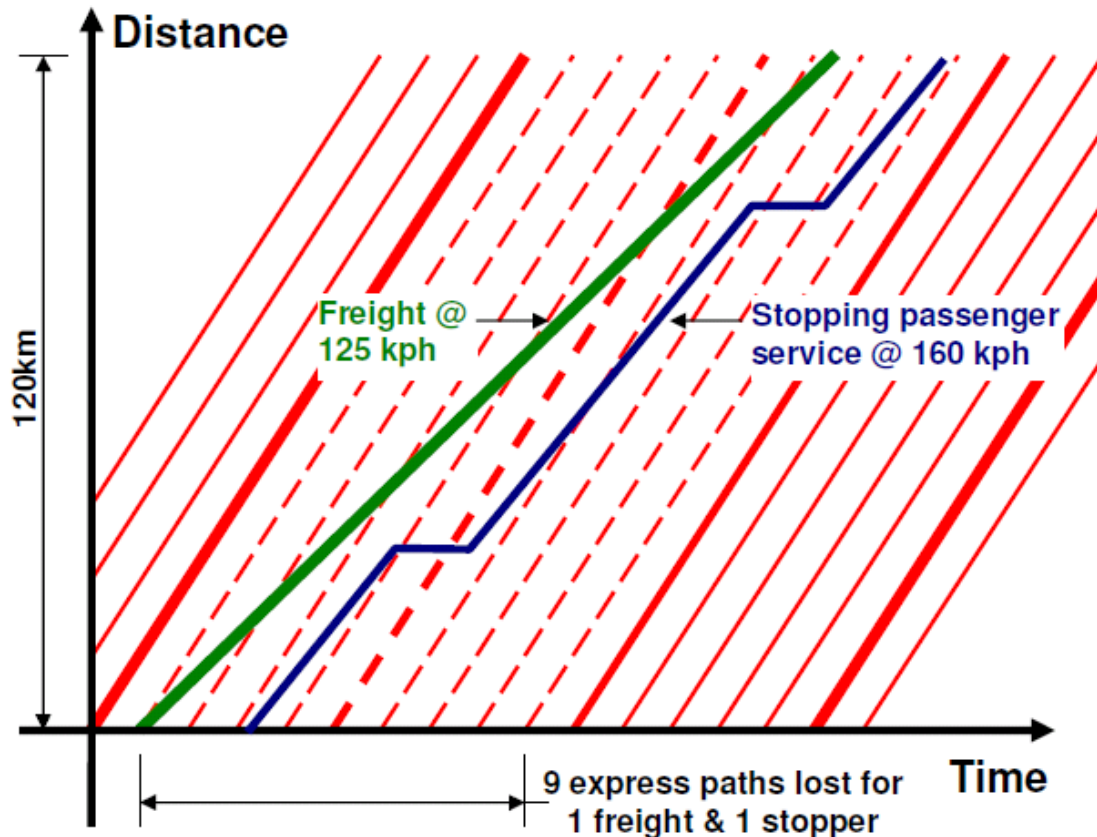
- All trains run at same speed
- All trains run full

# Capacity of Typical Railway



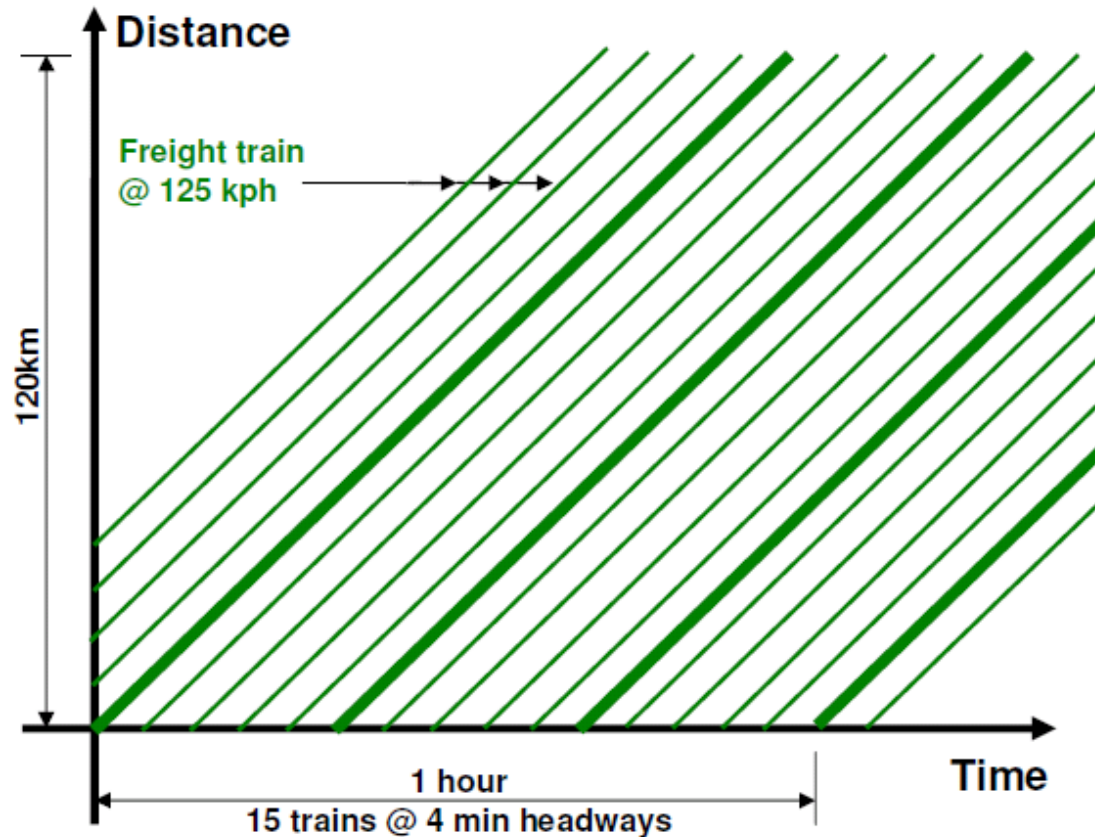
- Differential speeds compromise capacity

# Capacity of Typical Railway



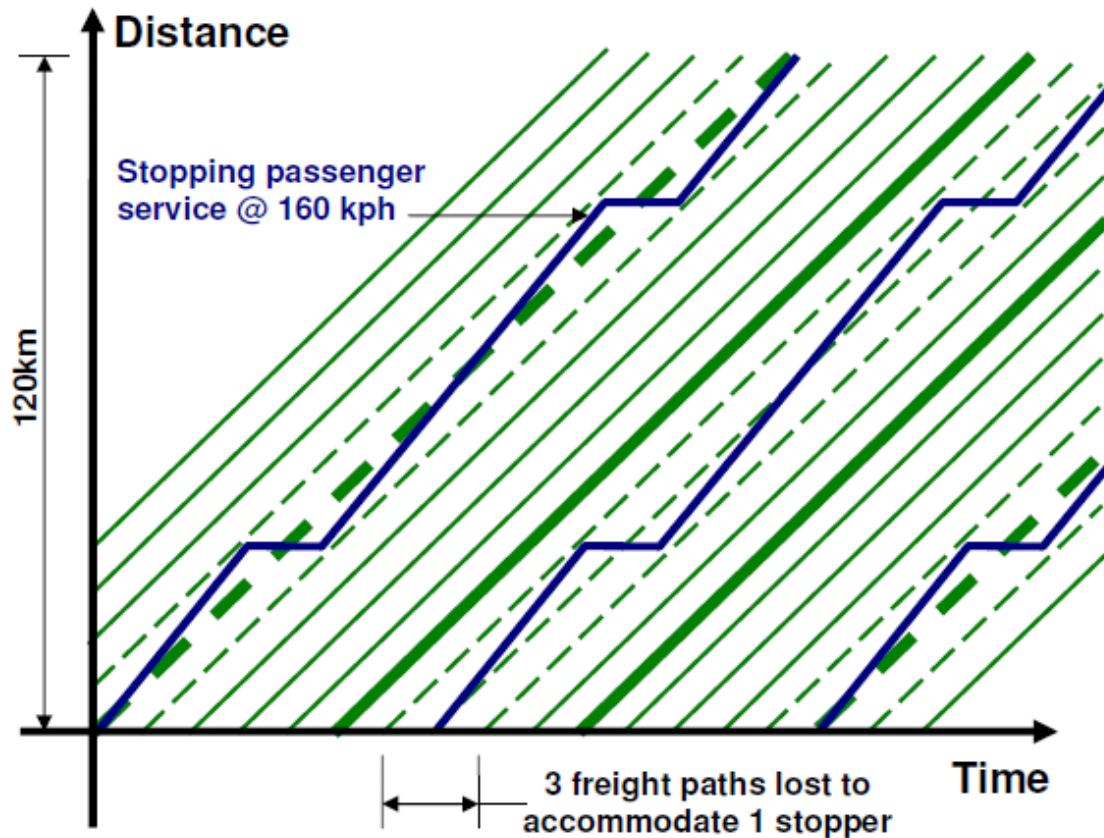
- Differential speeds compromise capacity

# Optimum Railway Capacity



- Capacity for freight maximised with express passengers migrated to high speed line

# Optimum Railway Capacity



- Capacity still enhanced as mixed traffic railway

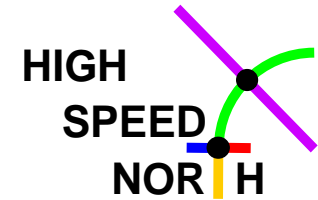
# High Speed Rail: What should it do?

- Deliver increased capacity to UK network & enable mode shift – ASAP!!
- Enhance UK rail network – all key cities @ < 3 hrs
- Link UK regions
- Extend European rail services to UK regions
- Bring Scotland & near Europe within 4 hrs of central London to convert 25% of LHR flights



# High Speed Rail?

## What is it?



- Like any other railway but...
  - Goes faster
  - Excludes slower freight & commuter traffic
- Railway equivalent of motorways
- Most energy-efficient form of mass mechanised transport – even at high speed (300kph)
- Best hope for low-carbon UK transport
- Primarily a high volume intercity railway
- Not suitable for 360° flows from airports

# High Speed Timeline

- Development so far



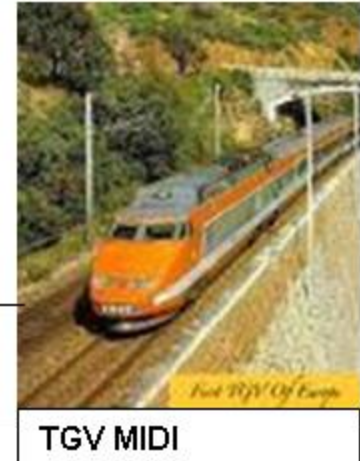
1964



1981

1993

1994



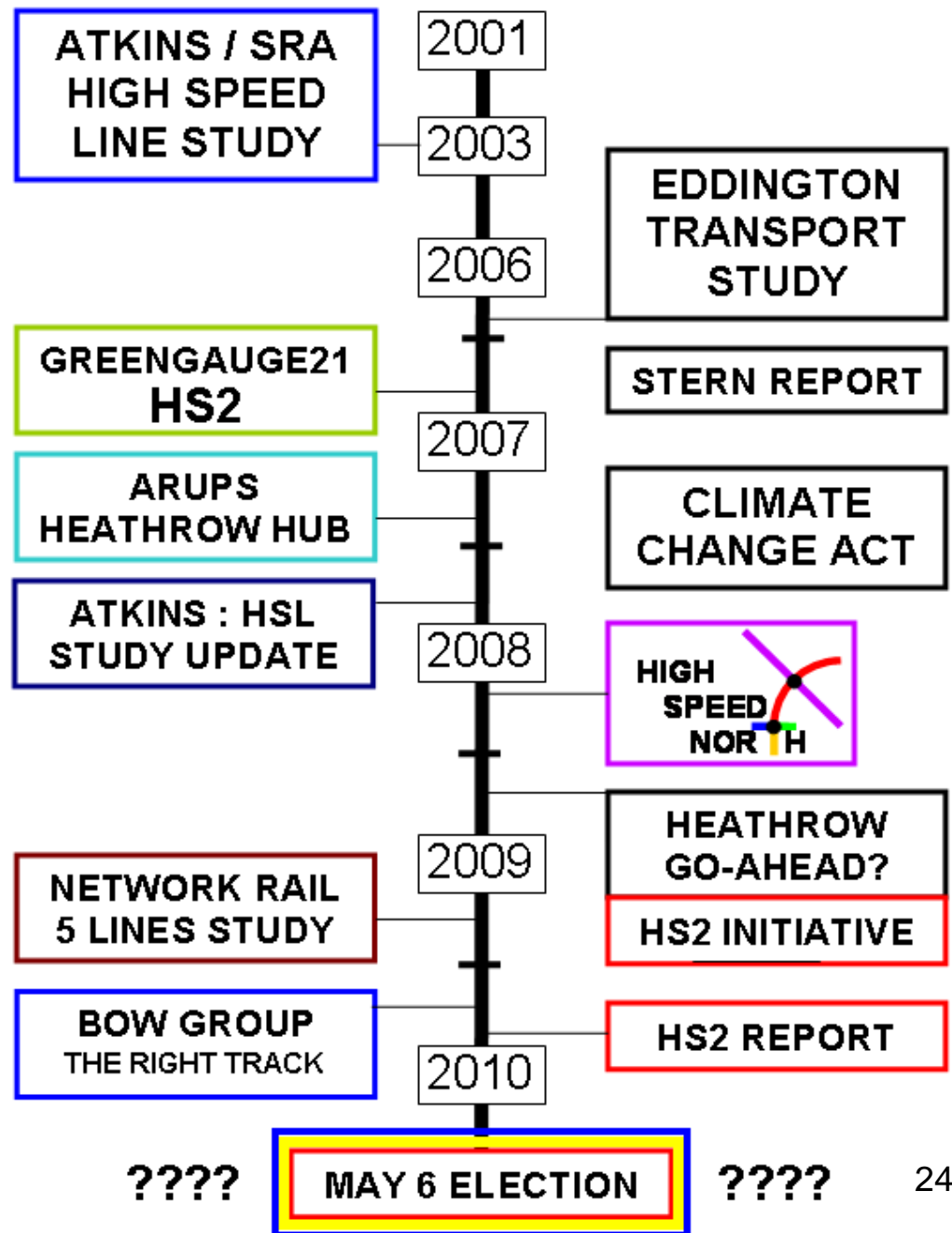
2003

2007



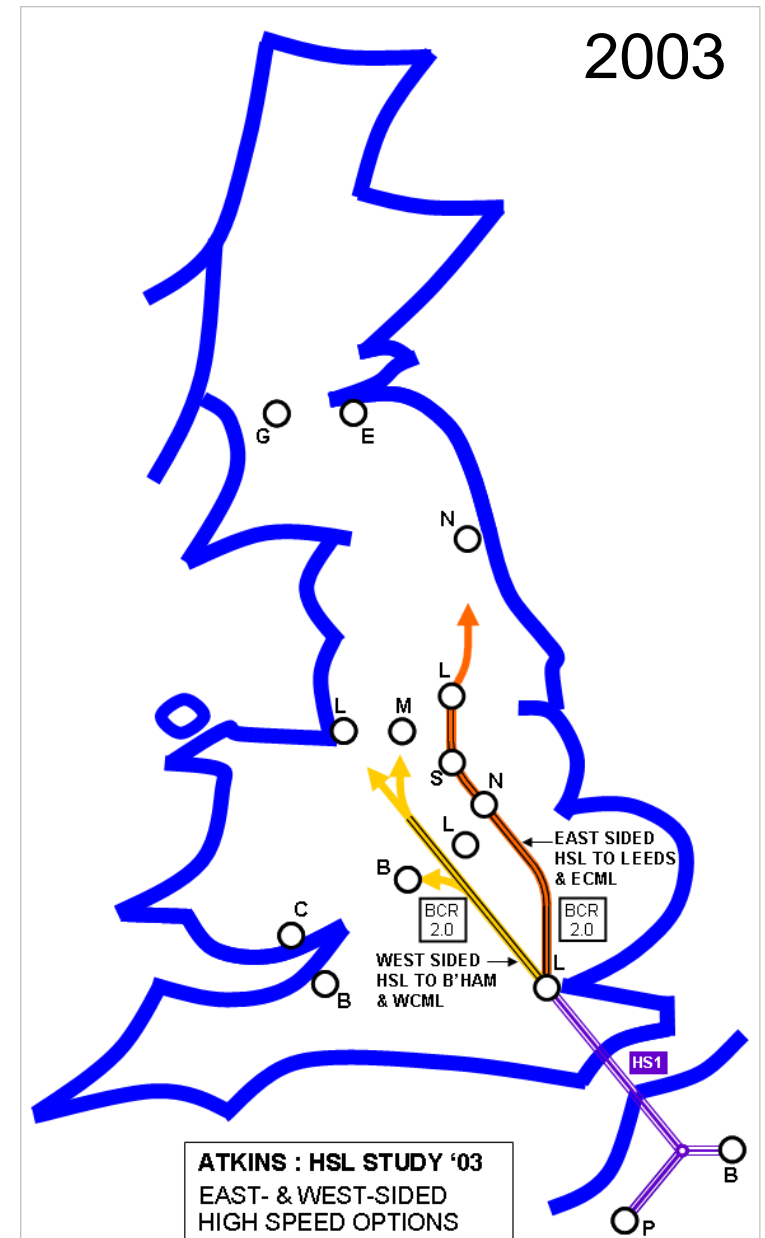
# High Speed Timeline

- The race to the North??



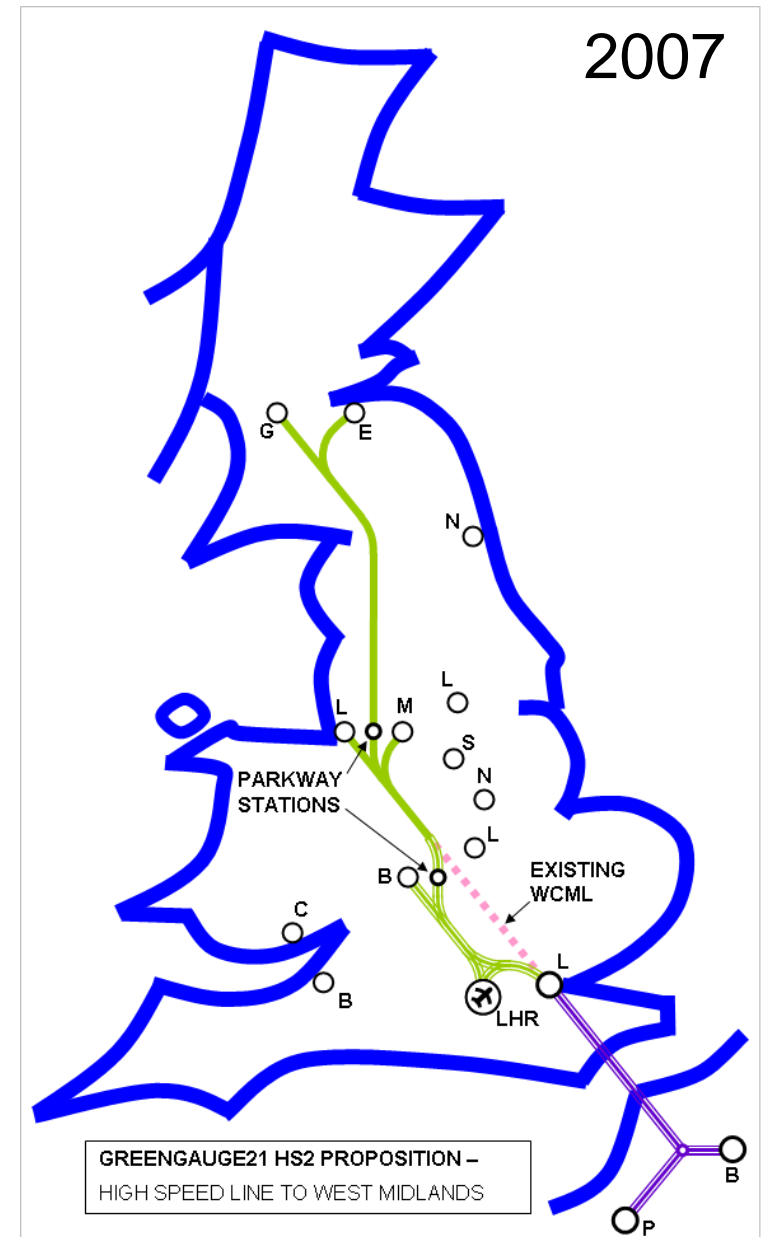
# SRA / Atkins HSL Study

- No definitive proposals emerging
- Basic case for UK high speed rail established
- BCR of 2.0 for west- & east-sided routes



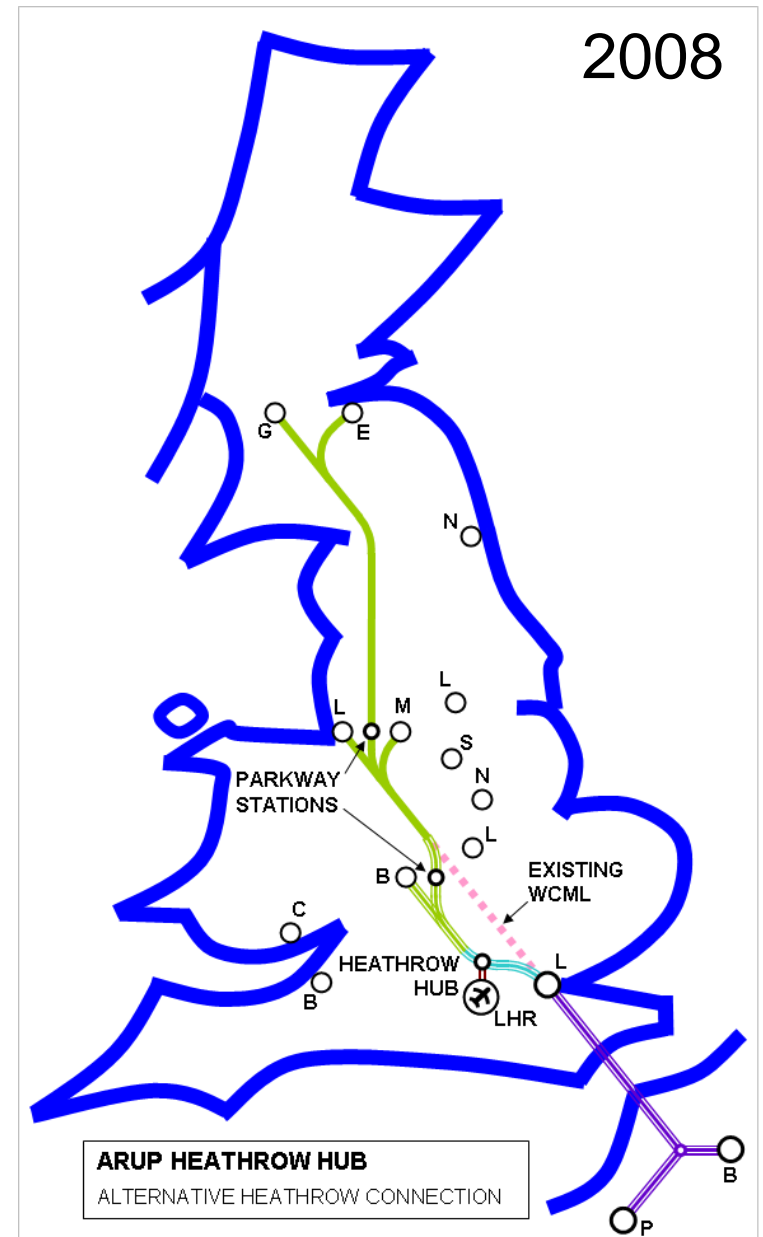
# Greengauge21 HS2 Proposition

- HSL to North-West Corridor
- Branch to Heathrow
- HSL through Chilterns
- Major controversy in Yorkshire & N.E
- Operational & viability concerns re LHR branch



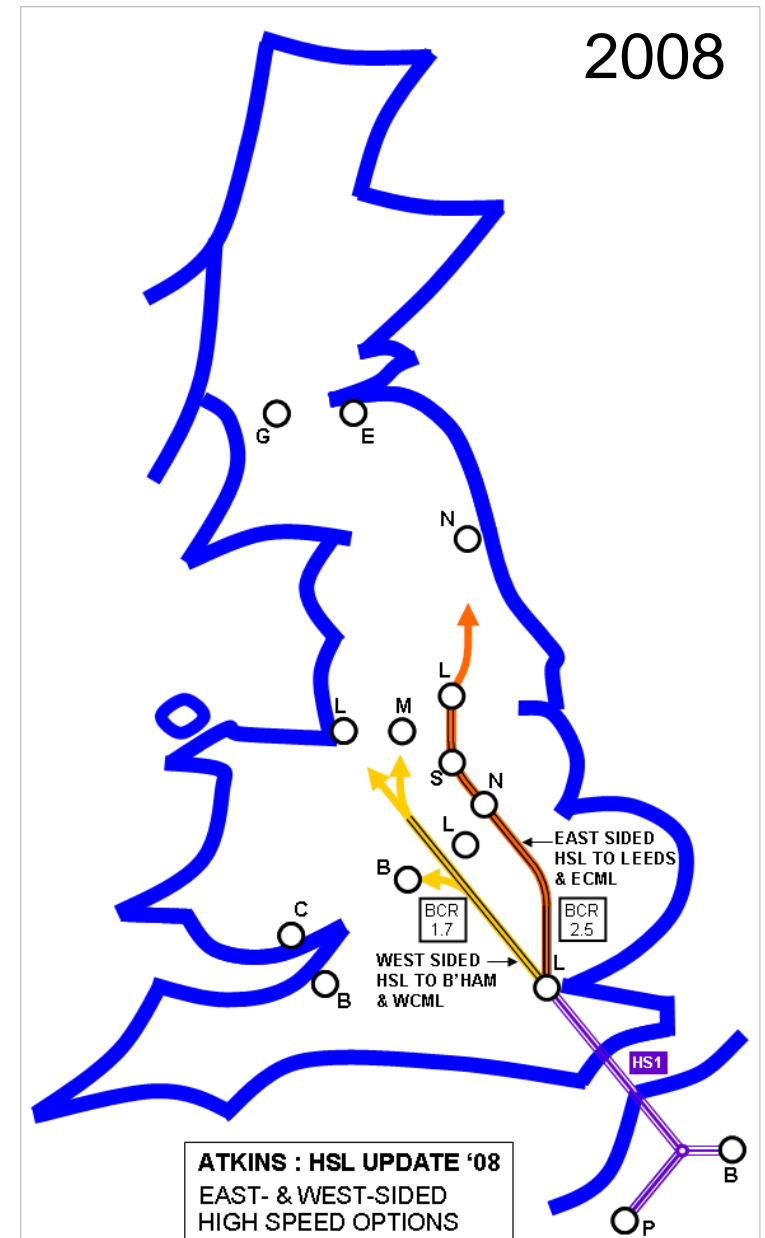
# Arup Heathrow Hub Proposal

- Similar to GG21 scheme
- Branch to LHR deleted
- 'Hub' station on GWML for LHR interchange
- 25km tunnel from central London
- More tunnelled links within airport
- Approx £5 billion – just within Greater London



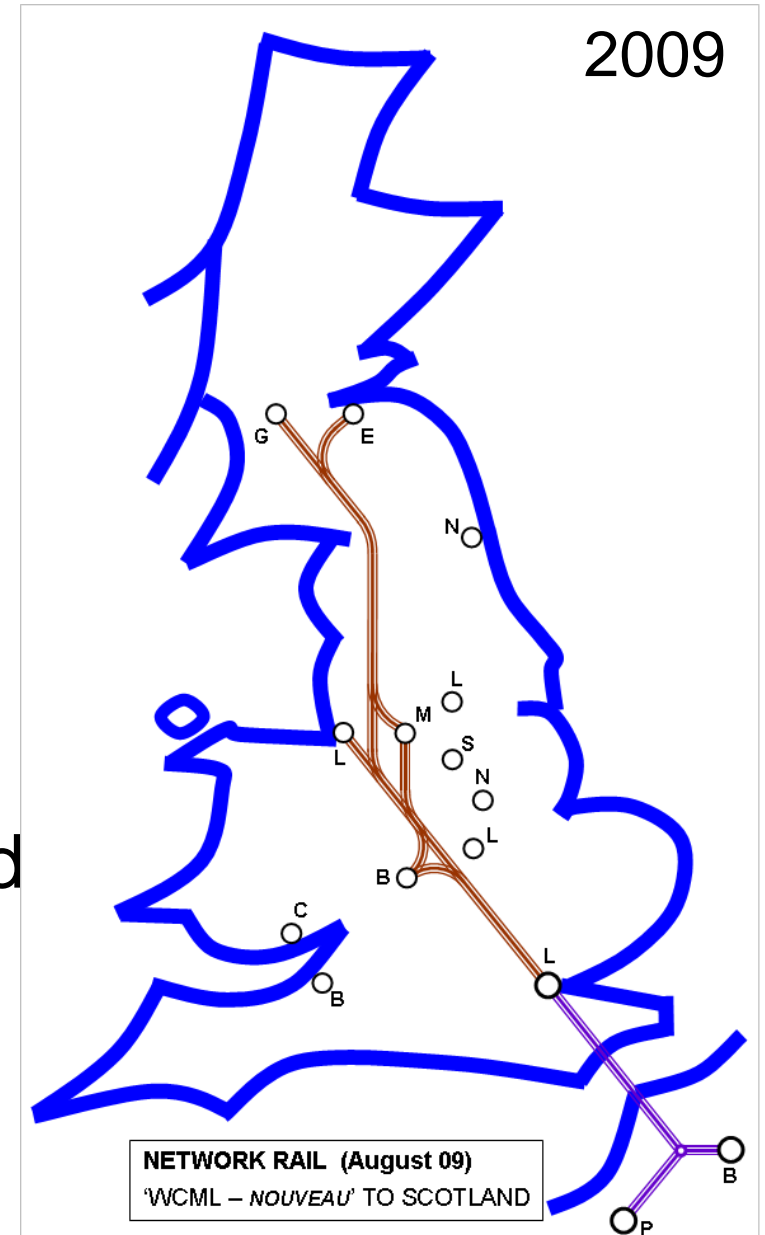
# Atkins : HSL Study Update

- Revisit of 2003 HSL Study
- BCR for east-side route improved to 2.5
- BCR for west-side route reduced to 1.7 due to implementation of West Coast upgrade



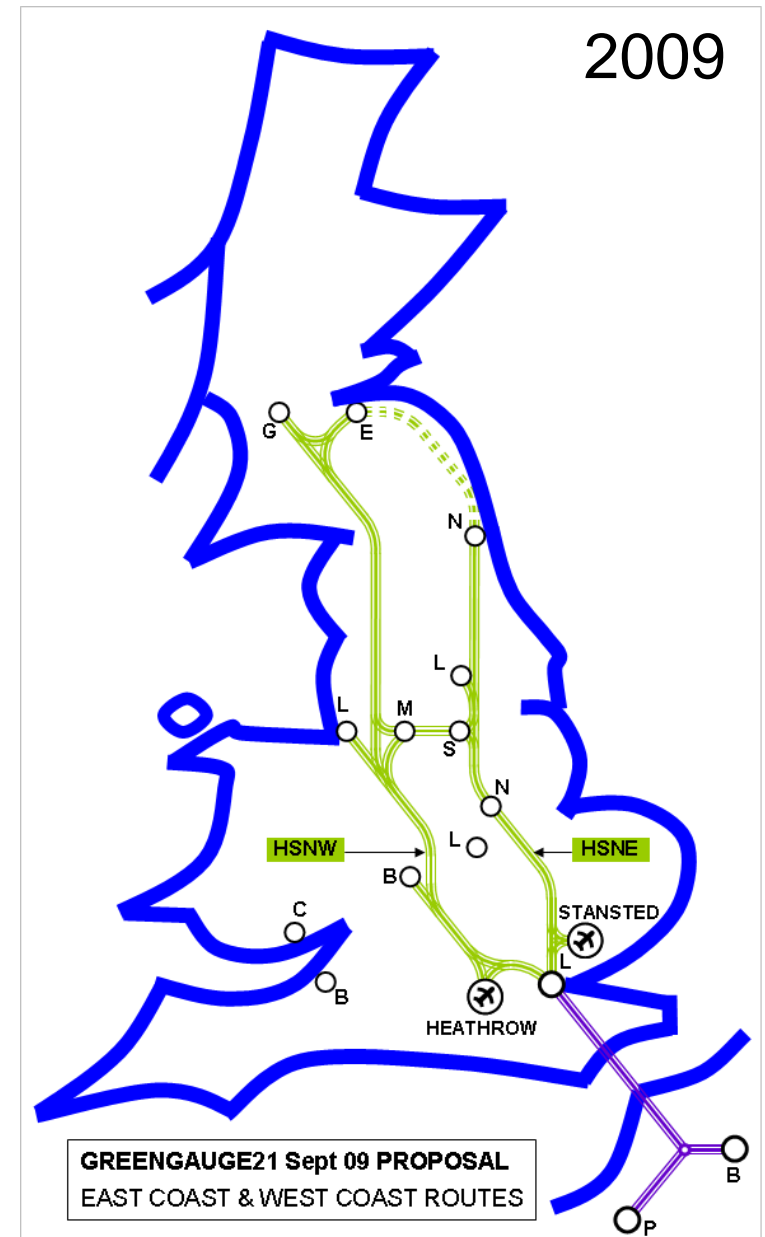
# Network Rail: New Lines Study

- Capacity key issue
- Reaction to HSL Update?
- Study of GWML, WCML, MML & ECML corridors
- WCML forecast to exceed capacity first
- Parallel HSL recommended
- No east side coverage
- No network enhancement
- Major travel volume – or load factor – concerns



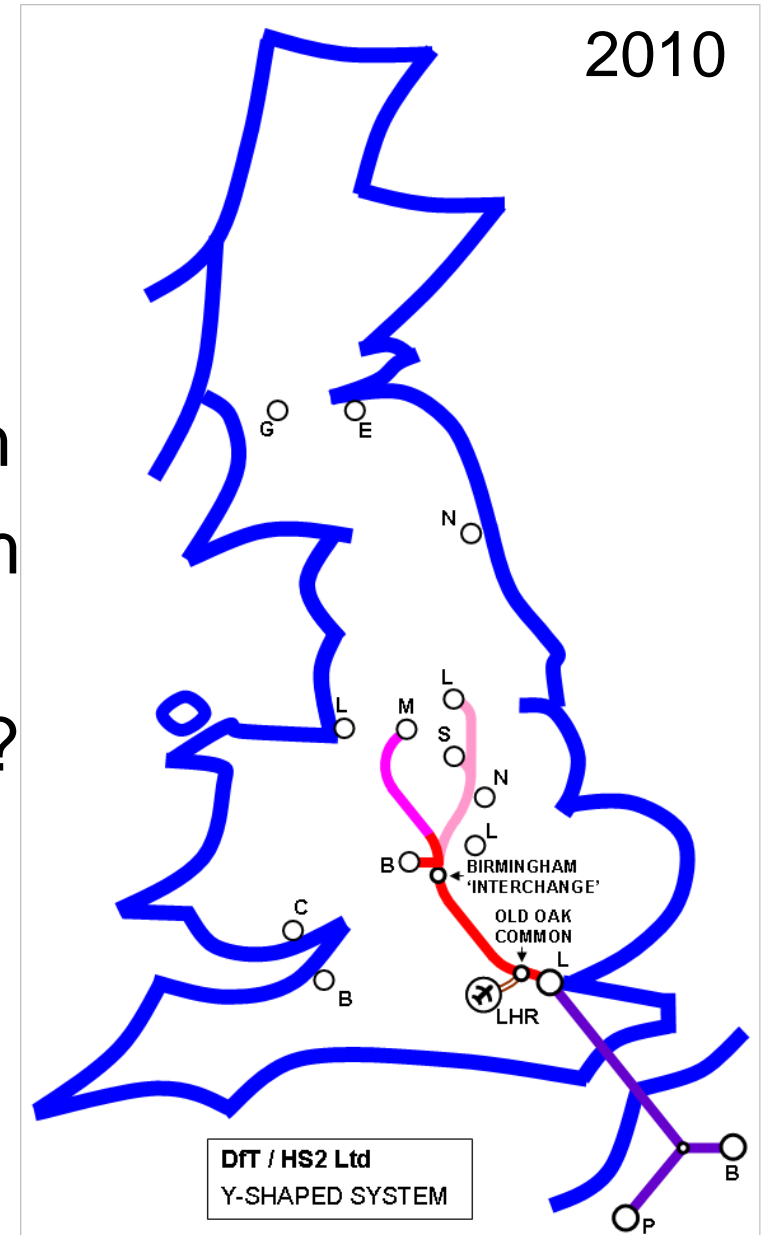
# Greengauge21: Fast Forward

- Based on 2007 HS2 Proposition
- 2 main lines to North?
- Transpennine link??
- HSNW to be built first
- Still predicated on LHR, same Chiltern issues
- Asymmetric airport access



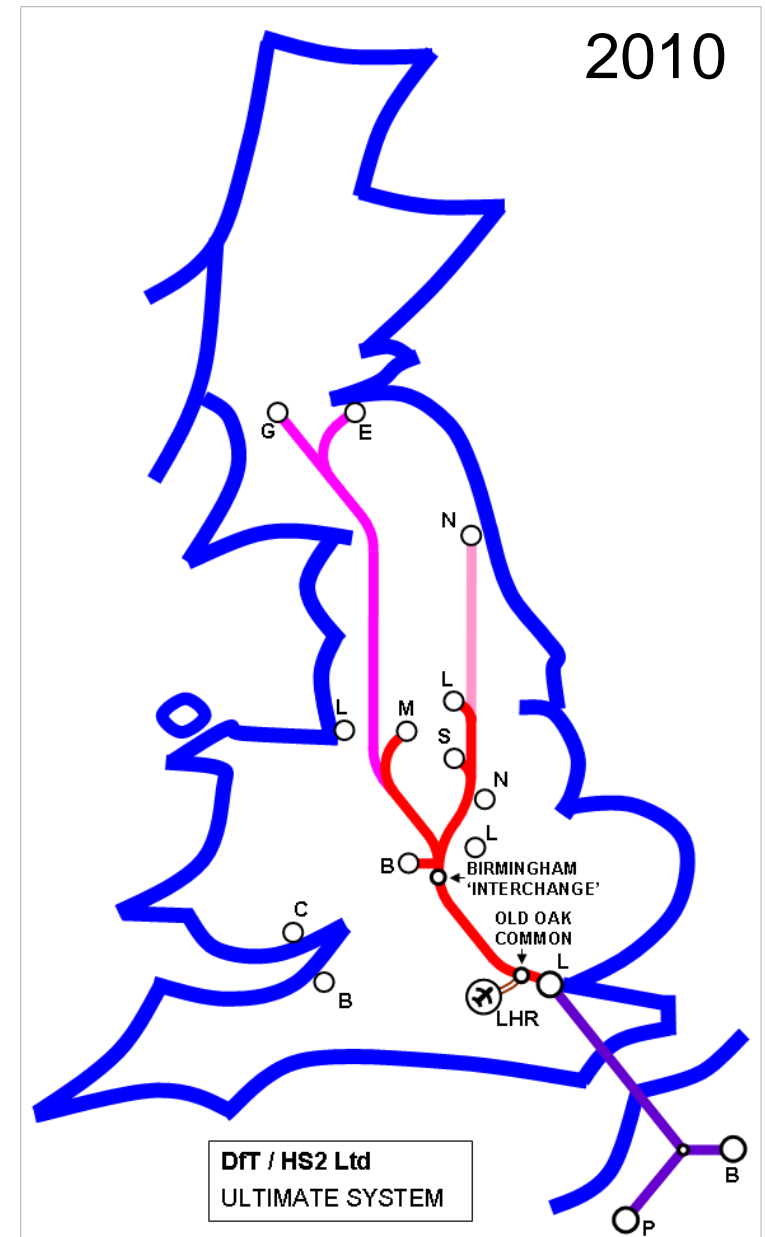
# DfT HS2 Ltd: Y-shaped System

- Primary West Coast focus
- Asymmetric rollout to North
- Uniaxial until Yorkshire arm constructed
- CrossCountry connectivity?
- No Transpennine link
- Chiltern issues
- 'Heathrow Hub' at OOC
- Highly London-centric



# DfT HS2 Ltd: Ultimate System

- Slow completion
  - Birmingham 2025
  - Manchester/Leeds??
  - Edinburgh/Glasgow??
- misaligned with 'green' transport agenda
- No further network development as 'Y' elongates
- No Transpennine route



# Concerns with existing proposals

- Incomplete & inefficient regional coverage
- No clear roll-out strategy – too slow
- Inefficient single corridor solutions
- Don't address environmental/sustainability issues
- Predicated upon Heathrow
- Initial focus upon Birmingham & Manchester gives poor ultimate network
- Too London-centric – little attempt to create interregional links
- Inadequate specification

# Specification Issues : Greengauge21

## *Where would High Speed Two go?*

### Specification for High Speed Two

In detail, to fulfil the objectives identified, High Speed Two is required to:

- London to W.Midlands & WCML →
  - Connect the stations at St Pancras and Stratford International with the centre of Birmingham and with the capacity-enhanced (four tracked, Trent Valley) section of the West Coast Main Line with a fully segregated route, capable of generally supporting 300km/h high-speed operation
- Interchange-free access to Heathrow →
  - From the route thereby created, provide in each direction for direct interchange-free access to Heathrow Airport capable of supporting high-speed services both to High Speed One and to the locations served by High Speed Two.

# Specification Issues : HS2 Ltd



- London to W.Midlands
- Limited development beyond
- London terminal(s)
- Intermediate parkway
- XRail/HEx interchange

## SUMMARY OF THE REMIT AND OBJECTIVES OF HIGH SPEED TWO

On 15 January 2009 the Secretary of State for Transport announced in 'Britain's Transport Infrastructure: High Speed Two', the setting up of a new company to look at a possible new railway line between London and the West Midlands.

HS2 was set up shortly after as a private company limited by guarantee. It is chaired by Sir David Rowlands and Alison Munro was seconded from the Department of Transport as Chief Executive. The rest of the HS2 team comprises further secondees from the DfT and from Network Rail

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. It will also provide advice to Ministers on the potential development of a high speed line beyond the West Midlands at the level of 'broad corridors, considering in particular the potential to extend to Greater Manchester, West Yorkshire, the North East, and Scotland.

HS2 will make recommendations on options for a terminus station or stations serving London and possible options for an intermediate parkway station between London and the West Midlands. 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. HS2 will also provide suggested means of linking to HS1 and the existing rail network.

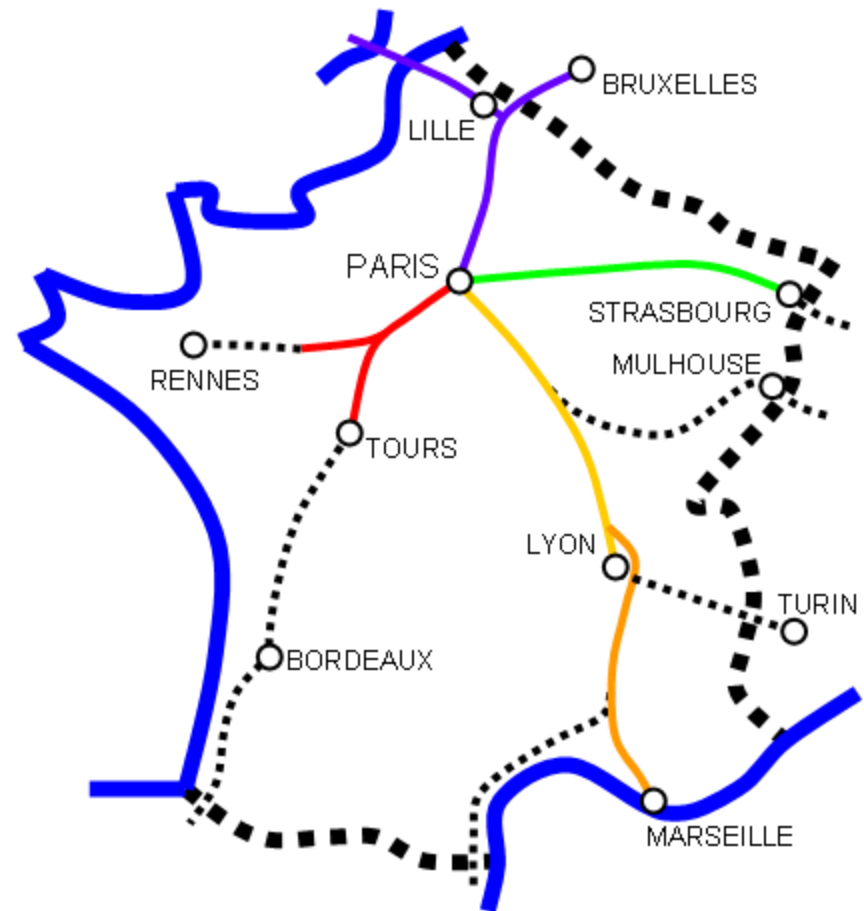
HS2 will produce a confidential report to Ministers by the end of 2009 that should be sufficiently developed to form the basis for public consultation in 2010 should Ministers decide to take this project forward. The advice will also include financing and construction proposals as well as a proposition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

# Concerns with existing proposals

- No balanced & comprehensive specification of aims & objectives
- Major environmental issues in Chilterns
- Carbon footprint issues re speed & route length
- Too focussed on BCR
- Insufficient attention to railway, engineering and environmental issues – hence too expensive
- Don't recognise UK geography or railway history

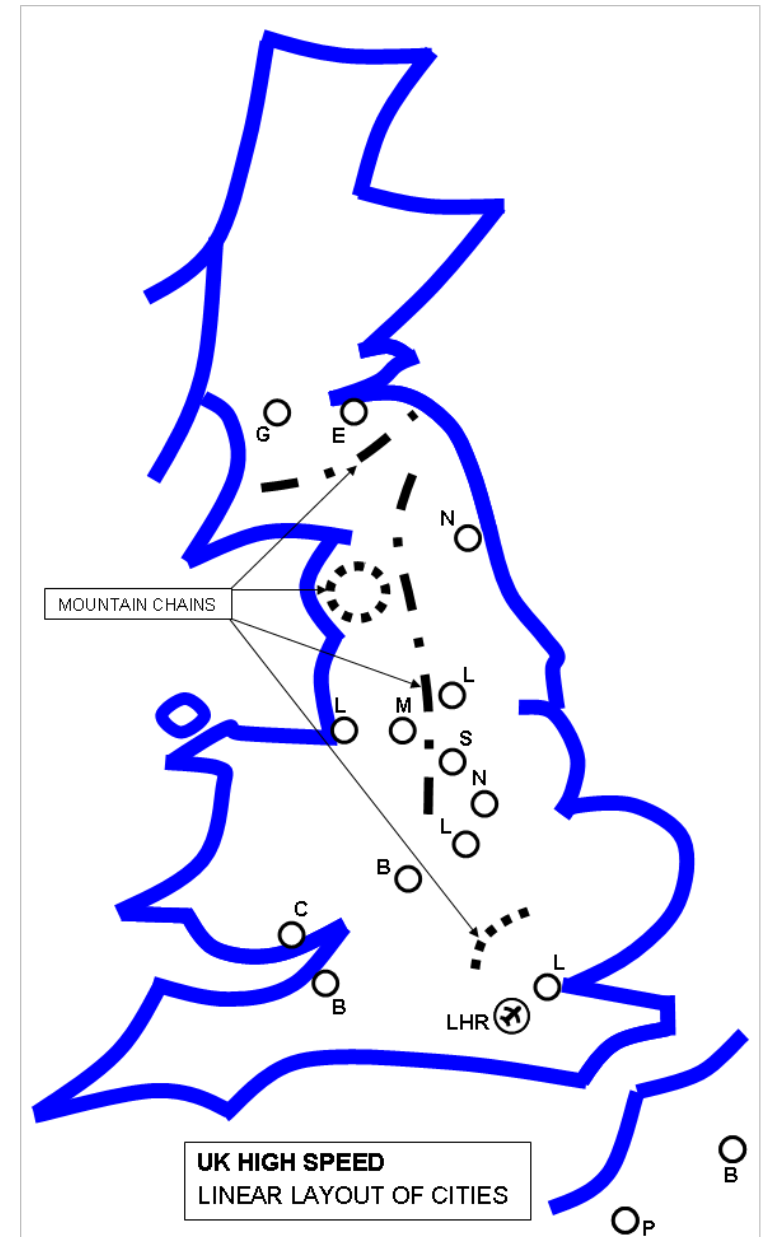
# High Speed Rail – la mode française

- Paris in central location, population centres on periphery
- Corridor-by-corridor approach
- Prioritisation only real debate

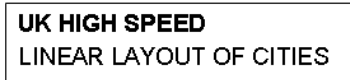


# High Speed Rail – à l'anglais

- UK much more linear
- Note orientation & proximity of key cities
- Clear prioritisation towards North
- Don't forget the Pennines & the Chilterns!!

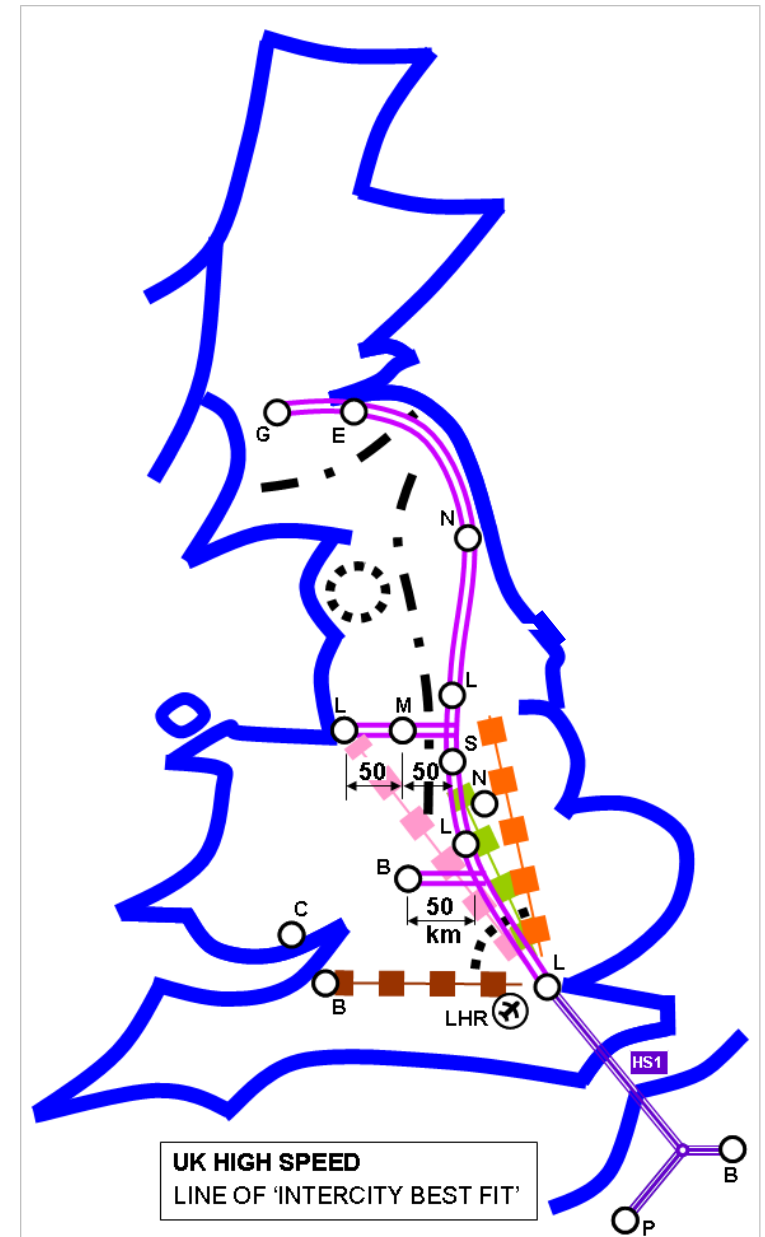


- Note close alignment of northern main lines
- ECML, MML & WCML separated by  $25^{\circ}$  bearing angle
- Need for new ECML & WCML??



# High Speed Rail – à l'anglais

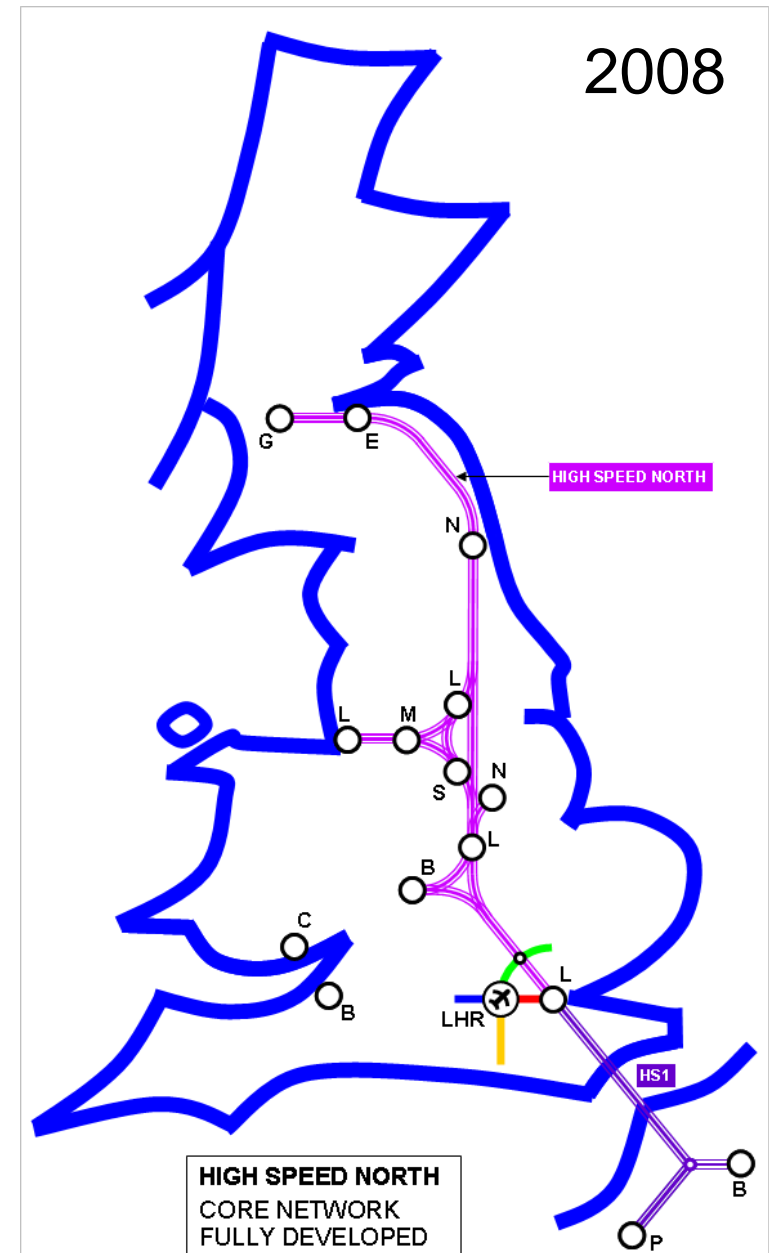
- Note alignment of key conurbations & main line corridors
- Line of intercity 'best fit'??



# The Solution?

## High Speed North

- High speed rail is an engineering issue
- So it needs a specification – just like any other project
- Any high speed system should:
  - achieve a specific set of aims
  - recognise its limitations



# Specification for High Speed Rail

- Network linking all principal conurbations
- Maximum network for minimum length of new build
- Enhanced high capacity UK rail network
- Inclusive incremental routeing
- Quick roll-out for low CO<sub>2</sub> UK transport
- Minimised environmental impact
- London terminal in prime location
- Efficient & inclusive links to Heathrow

# High Speed Misconceptions (1)

*Direct high speed access  
to Heathrow essential??*

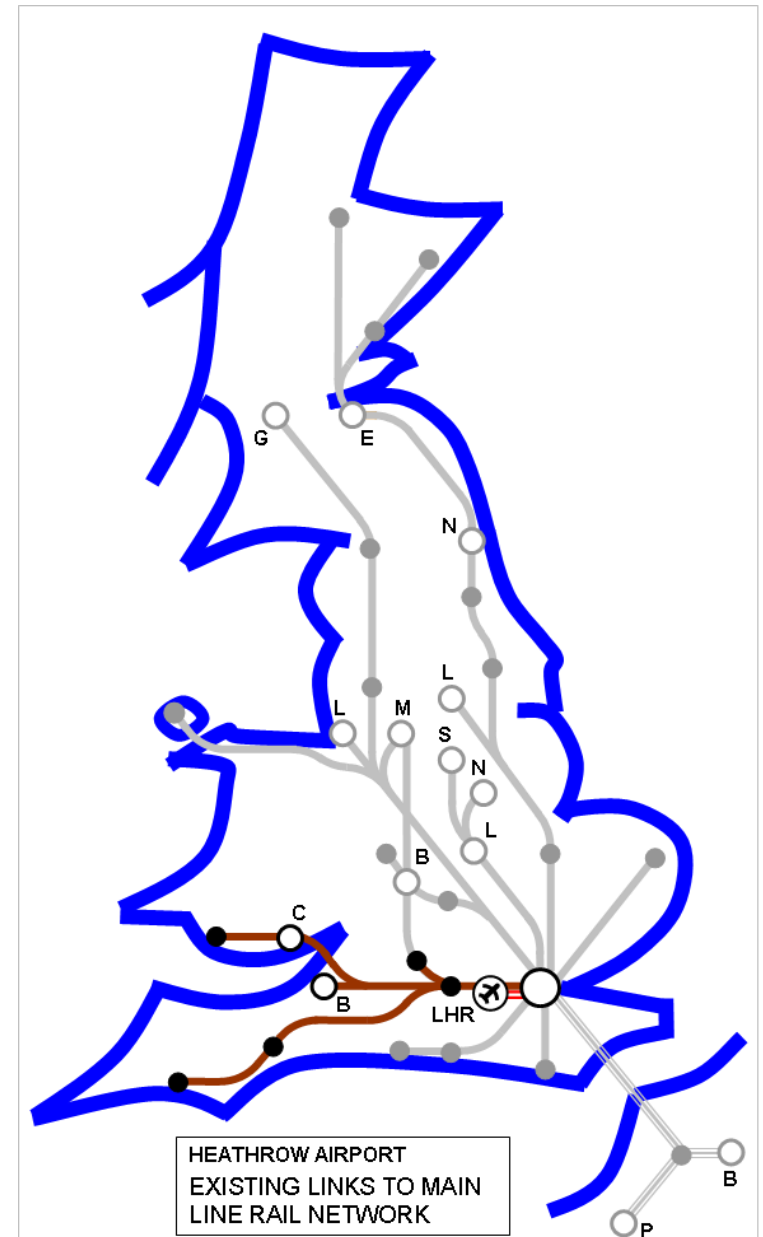
## Facts:

- 70,000 daily surface access flow + workers
- ~50% to central London
- ~50% to other destinations
- GG21 estimate ~1,000 daily B'ham-Heathrow

# Heathrow: Main Line Connectivity

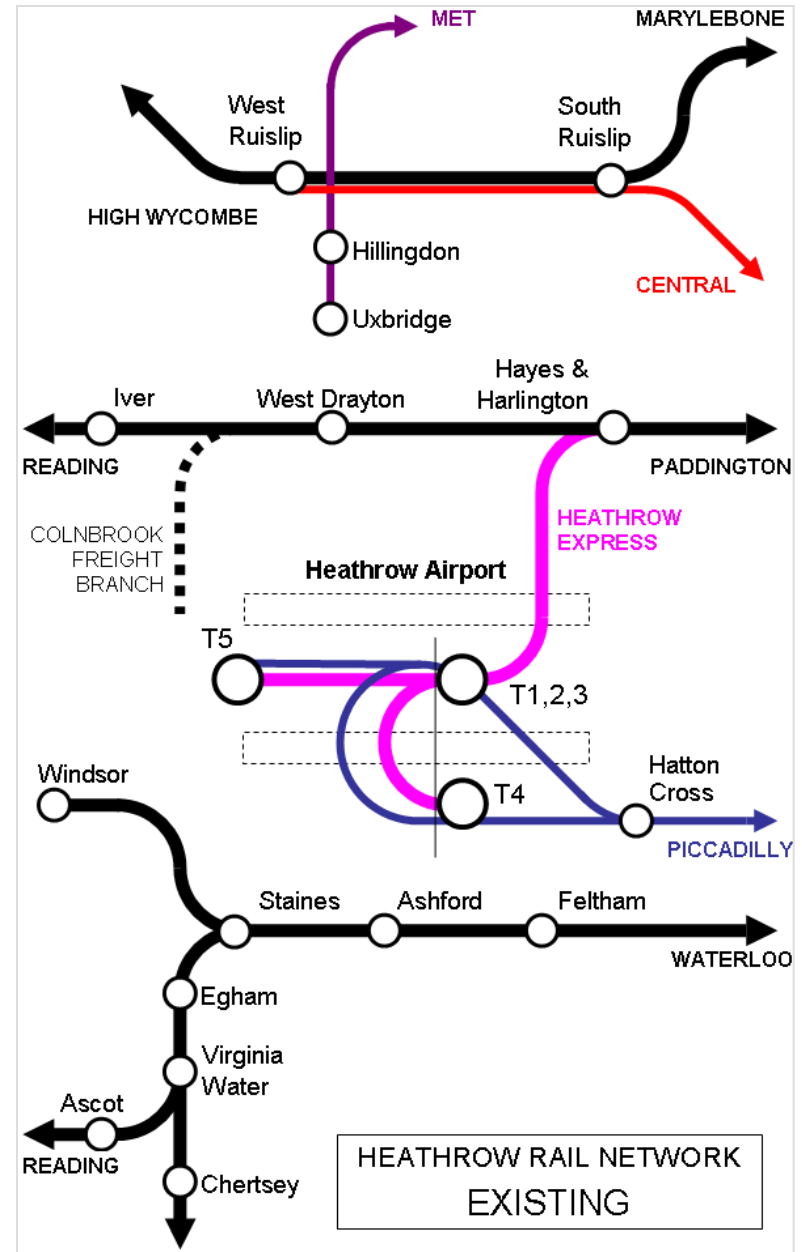
- Good connectivity??
  - Hourly main line service
  - 1 cross platform change
  - Airport terminal station
- Great Western link only available at Paddington
- Clear need for 'surface access improvements to key international gateways'

. *Eddington (2006)*



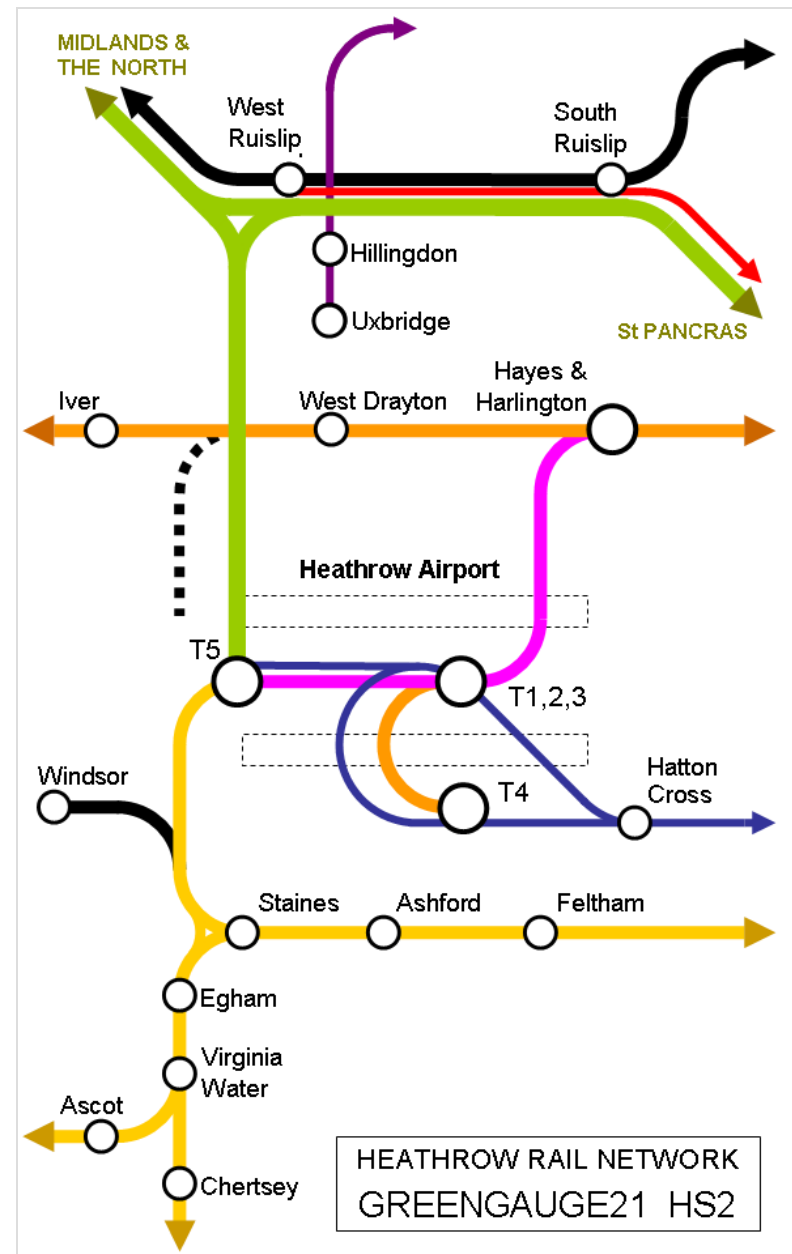
# Heathrow: Connections by Rail?

- Piccadilly Line first rail link to Heathrow (1977)
- Heathrow Express opened 1997
- Rail links only to central London
- Heathrow effectively disconnected from national network



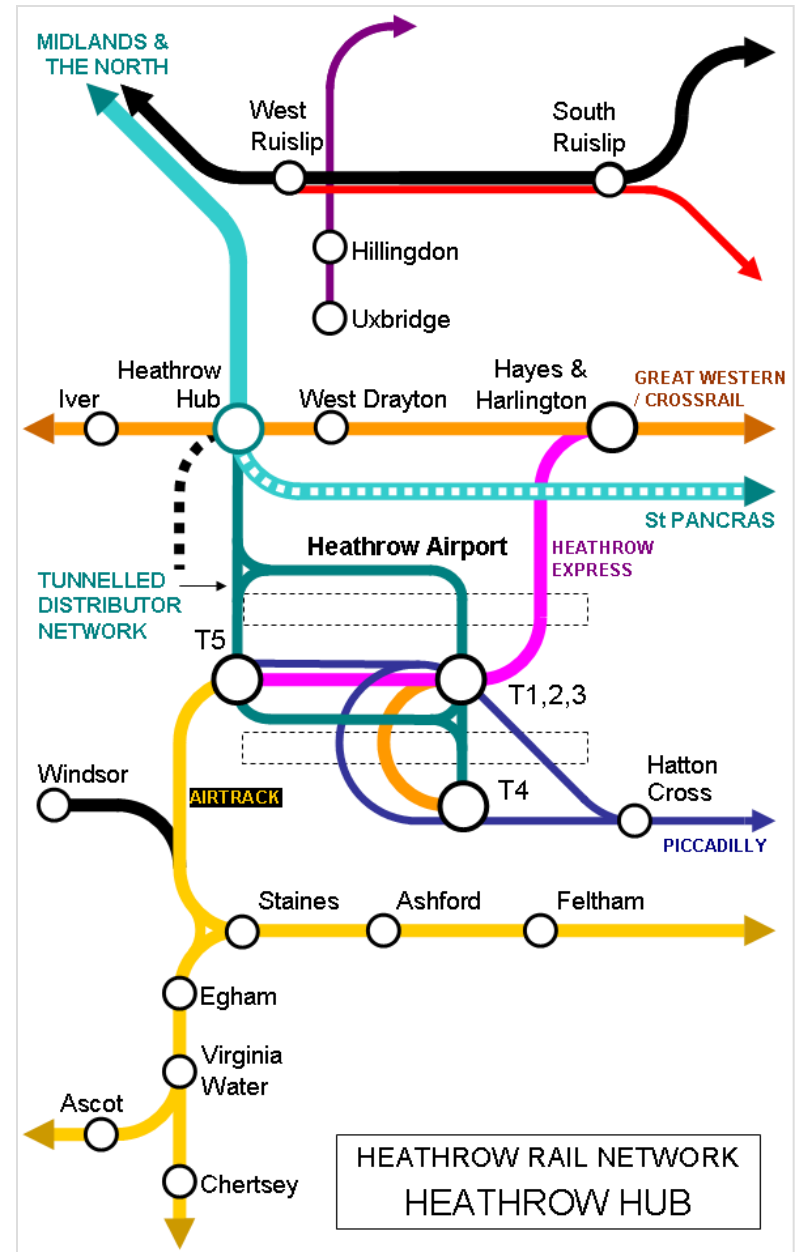
# Heathrow: GG21 Developments??

- Greengauge21 dedicated spur from high speed line
- No local links to North London
- Airtrack connection to Southern network
- CrossRail to T4 (& north of airport along GWML)
- Heathrow Express to T5
- Heathrow at the terminus of lots of branch lines!!



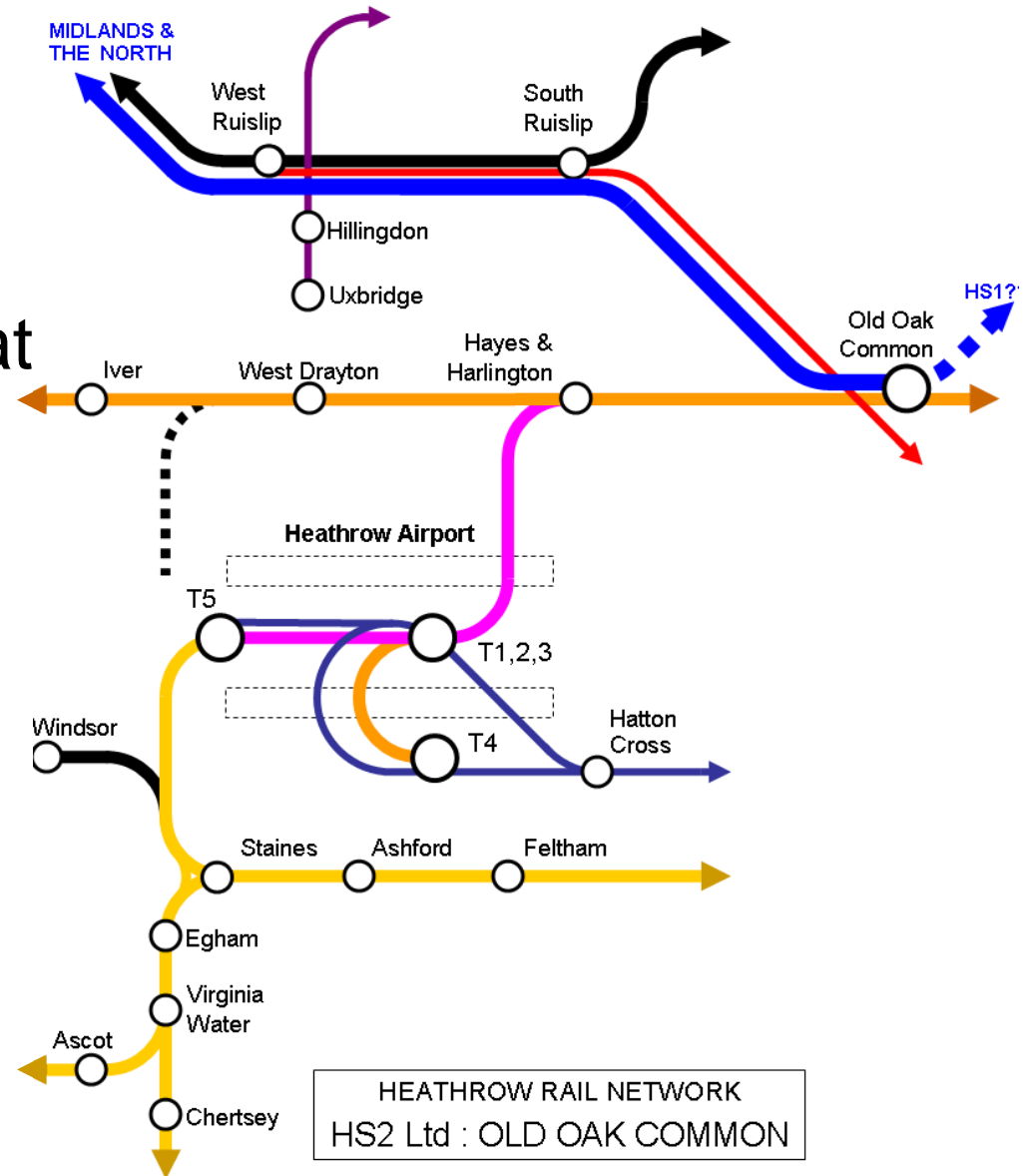
# Heathrow: Arup Developments??

- 'Heathrow Hub' link to Great Western and to high speed line - £5 billion!!
- Still no local links to North London!!
- Airtrack
- CrossRail
- Heathrow Express



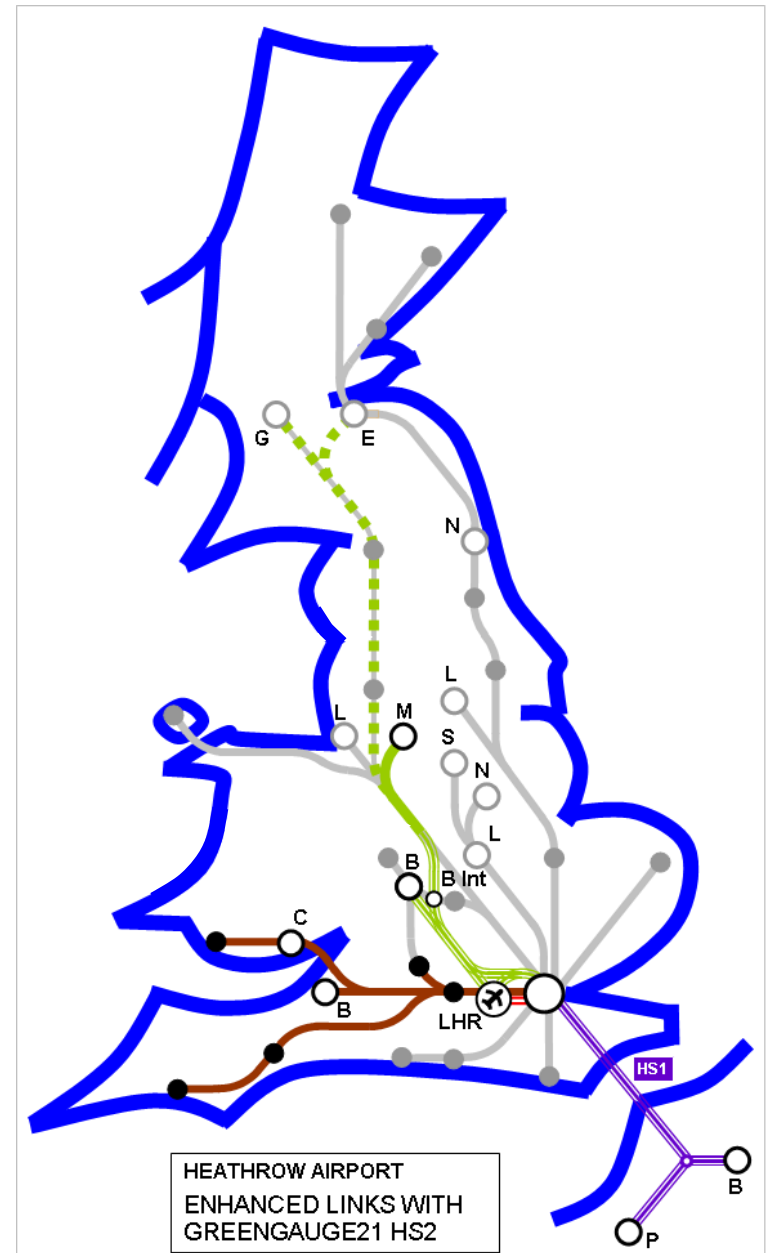
# Heathrow: HS2 Developments

- Connection to HS2 at Old Oak Common
- 'Heathrow hub' receding!!
- Old Oak Common also CrossRail interchange
- Airtrack
- CrossRail
- Heathrow Express



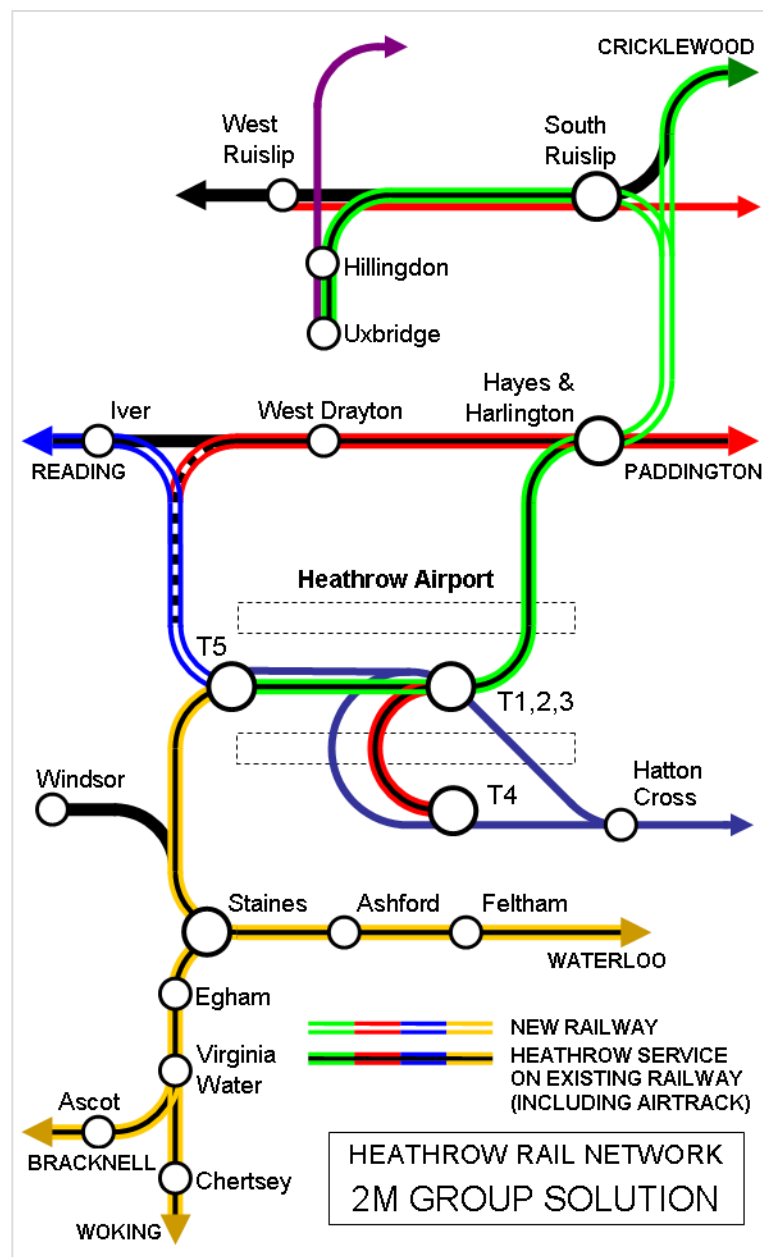
# Heathrow: Main Line Connectivity

- Airport high speed links along HS2?
- Change within Heathrow still required
- Dubious viability – most en route to central London
- Note Chiltern alignment
- Mostly west-sided
- Difficult to justify links east of Pennines
- East Coast HS3 to follow?



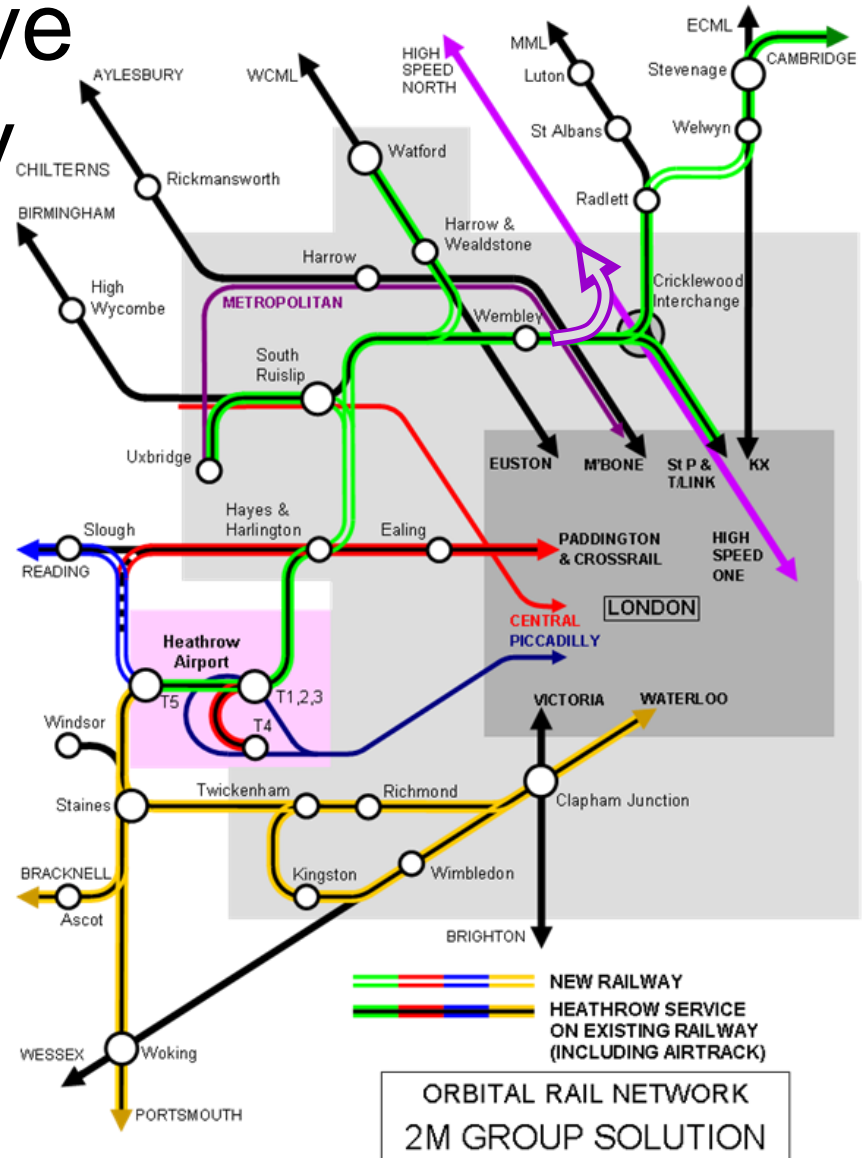
# Heathrow: Alternative Rail Access Strategy

- Integrated regional network focussed on Heathrow
- Heathrow Express provides central tunnelled infrastructure
- Airtrack to south ==
- Great Western link ==
- Northern orbital arm ==
- 'Compass Point Network'



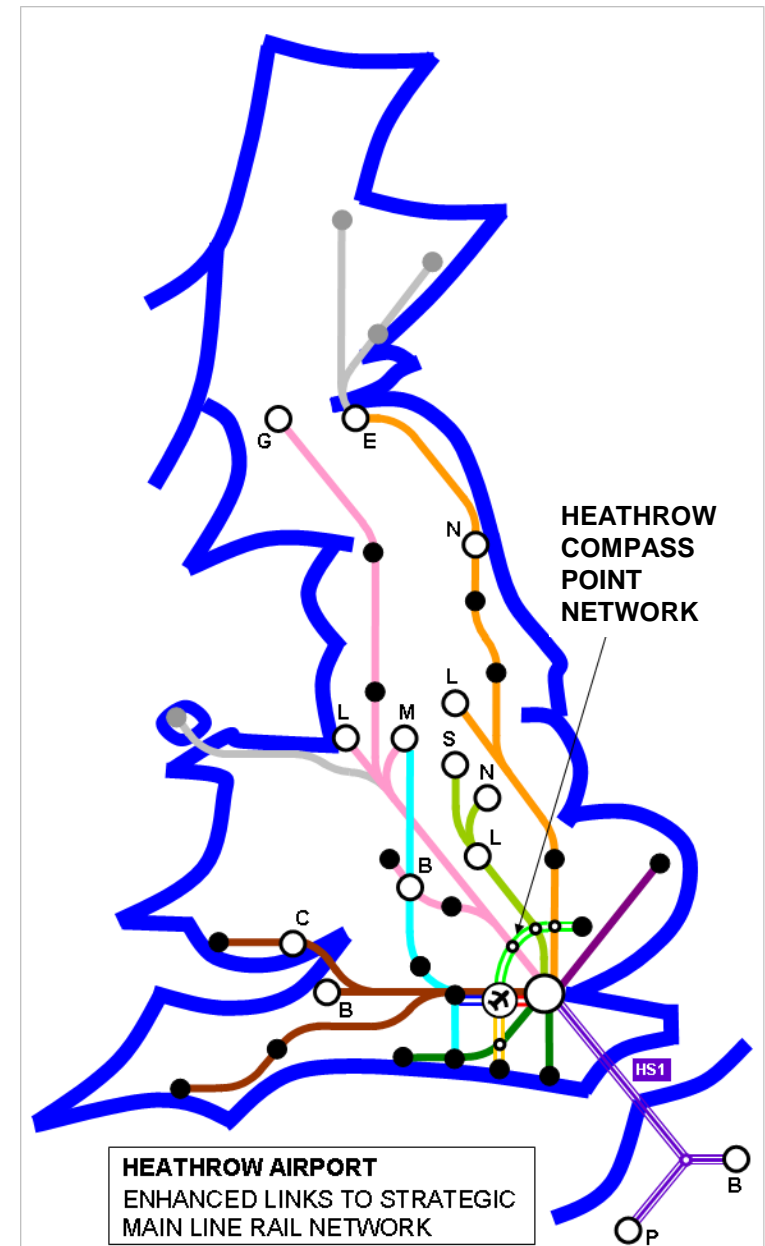
# Heathrow: Alternative Rail Access Strategy

- ‘Compass Point’ links to communities to east, south, west & north
- Links to radial main line network at outer-suburban hubs.
- Link to HSL??
- Direct services to North??



# Heathrow: Alternative Rail Access Strategy

- Rail access to Heathrow for most major UK communities via:
  - Hourly main line trains
  - Cross platform change at outer suburban hub
  - Compass Point network direct to terminals
- Totally independent of high speed rail!!



## High Speed Misconceptions (2)

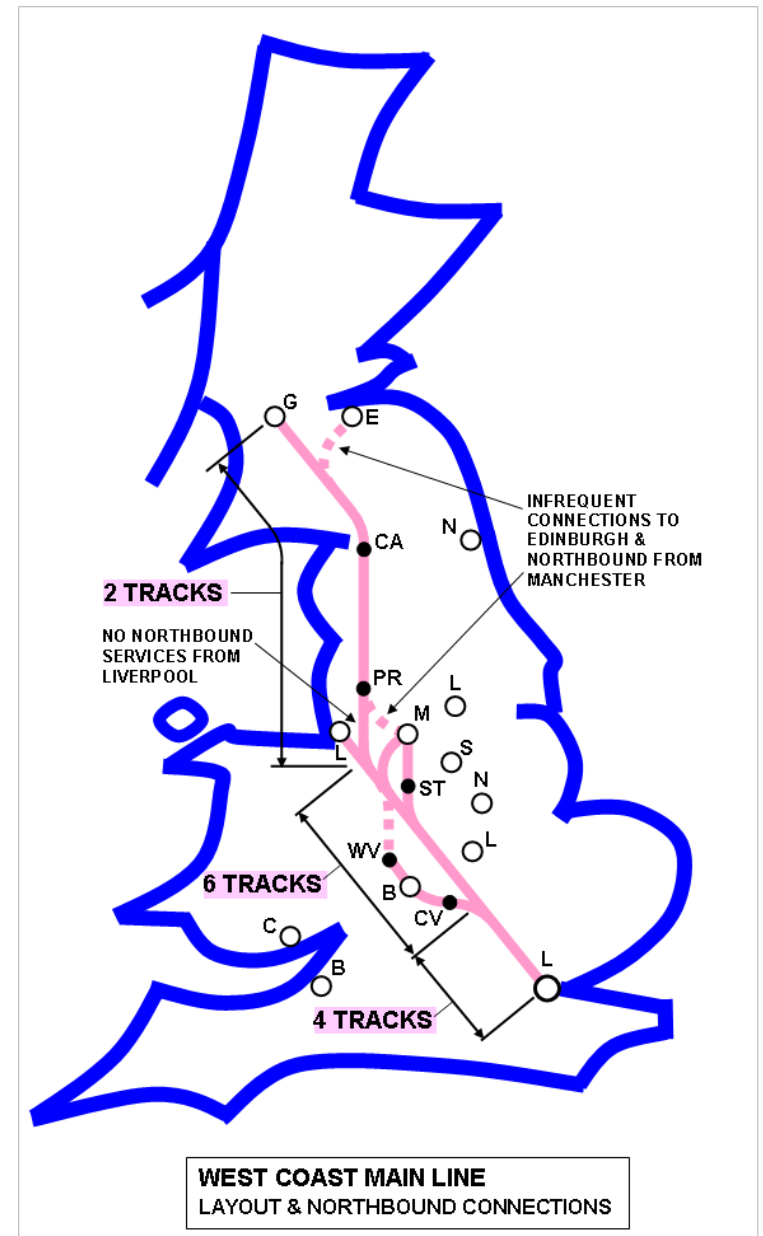
*First HSL required to follow WCML axis to Birmingham & Manchester to address capacity issues??*

### Facts:

- WCML forecast to reach capacity first
- Birmingham & Manchester 2<sup>nd</sup> & 3<sup>rd</sup> largest UK conurbations
- All studies show no practicable central route through Birmingham (or Manchester)

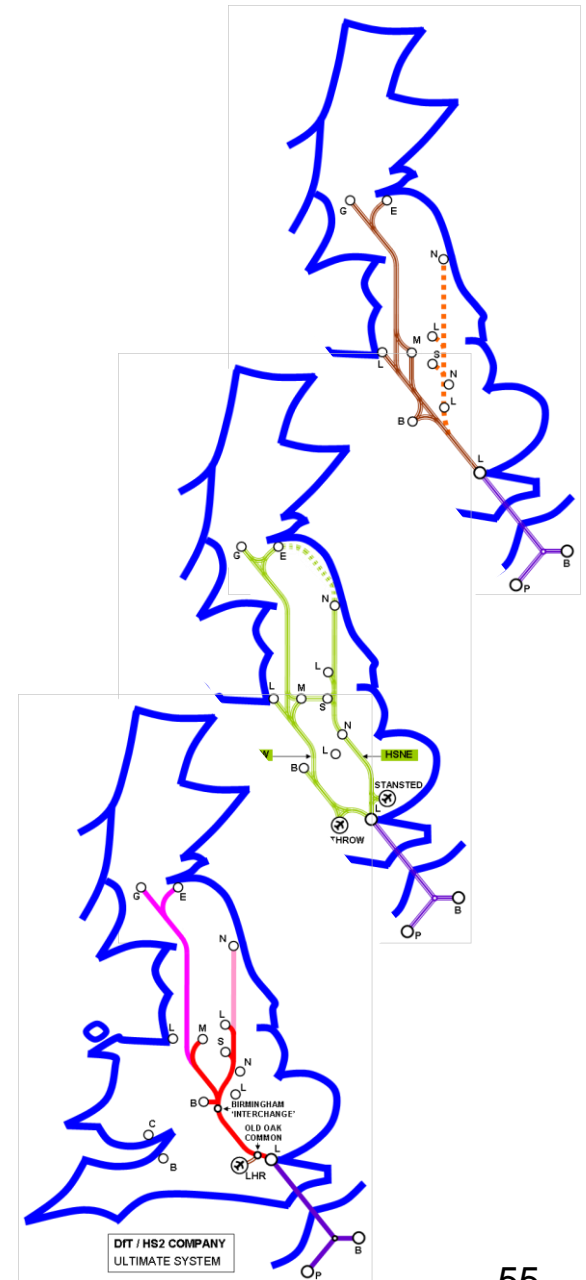
# WCML Capacity

- WCML braided main line
- No major city on route
- Poor northbound links
- All spurs London-facing
- Number of tracks:
  - 4 London – W.Midlands
  - 6 W.Mids – North-West
  - 2 North-West – Scotland
- Capacity critical on 4-track southern section



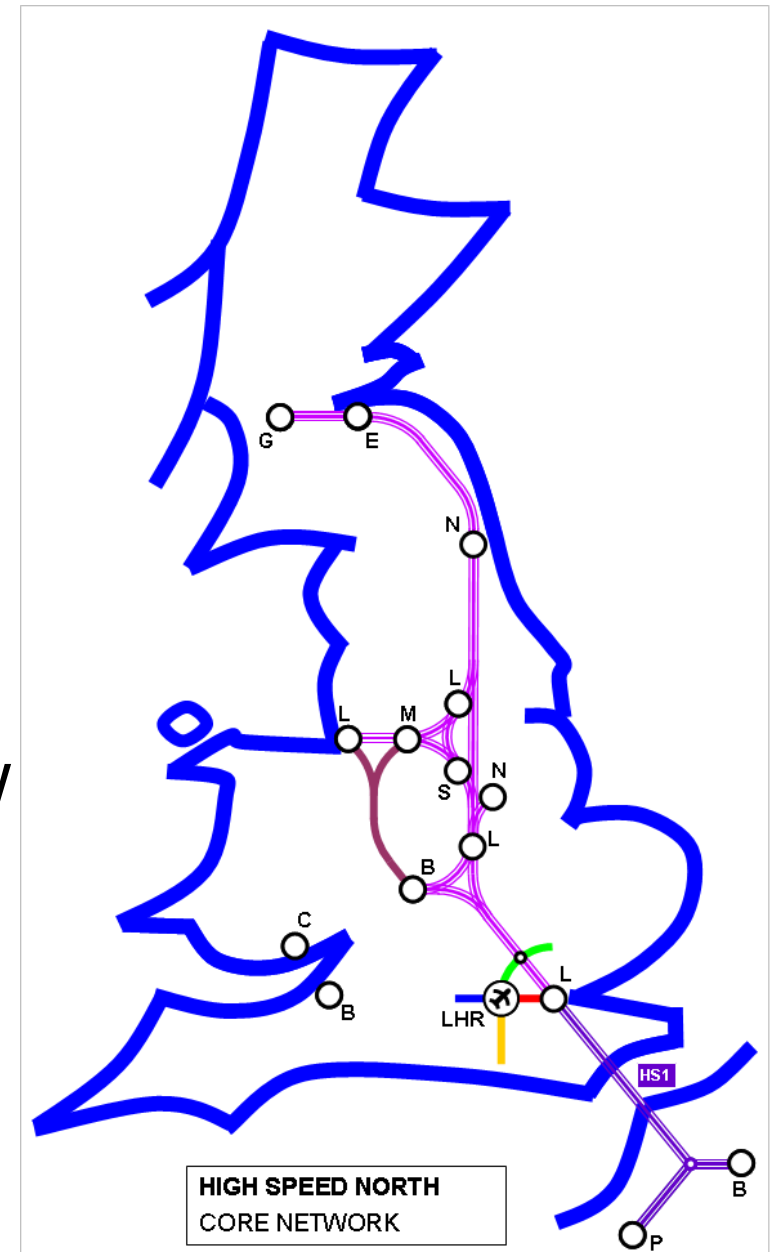
# HSL via WCML corridor?

- NR/GG21/HS2 Ltd replicate WCML only
- London – Birmingham & London – Manchester linked
- But not B'ham & Manchester
- So no need for HSL to Manchester to follow WCML
- Other solutions for Birmingham & Manchester??
- Likewise W.Mids & N.W to Scotland







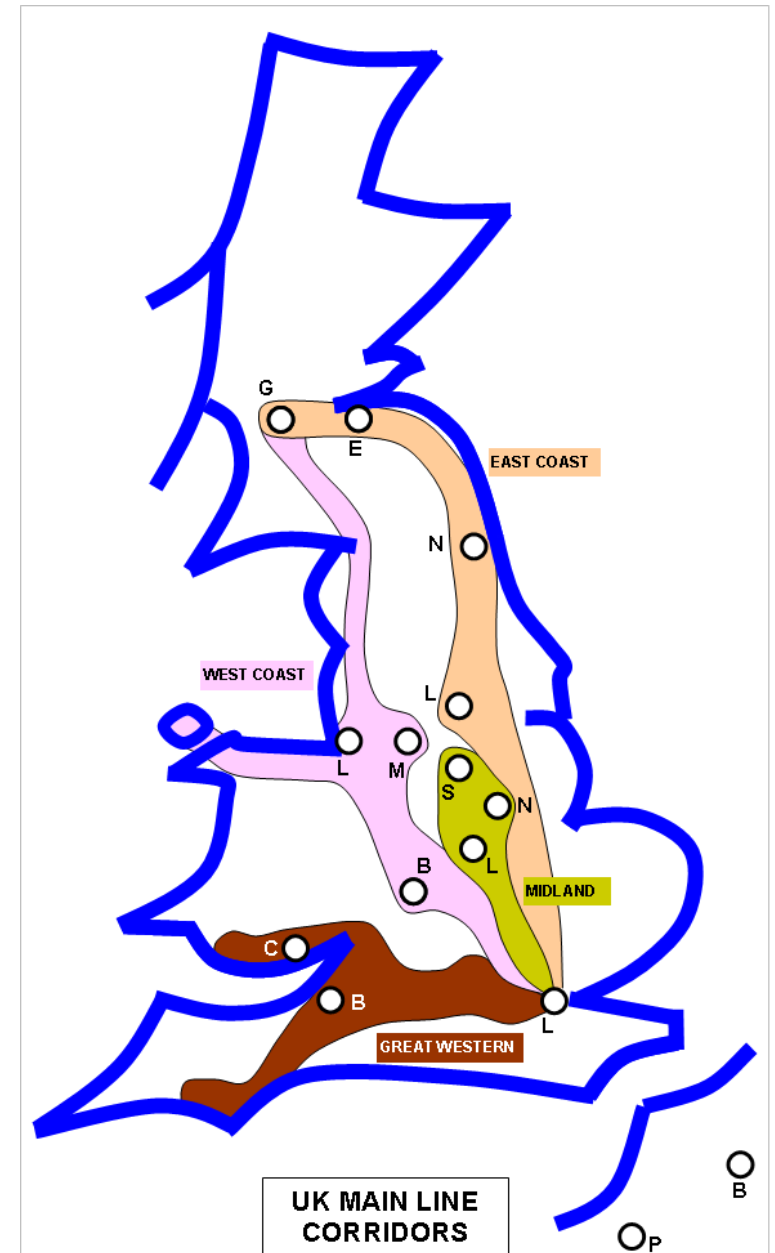
# HSN : Network & Construction Length

- All principal conurbations linked
- 930km ~ 10 cities linked
- Single spine & spurs
- Doesn't follow main lines
- Not distracted by Heathrow
- Aligned closer to M-ways
- Favourable topography
- Gives better network, following major population centres



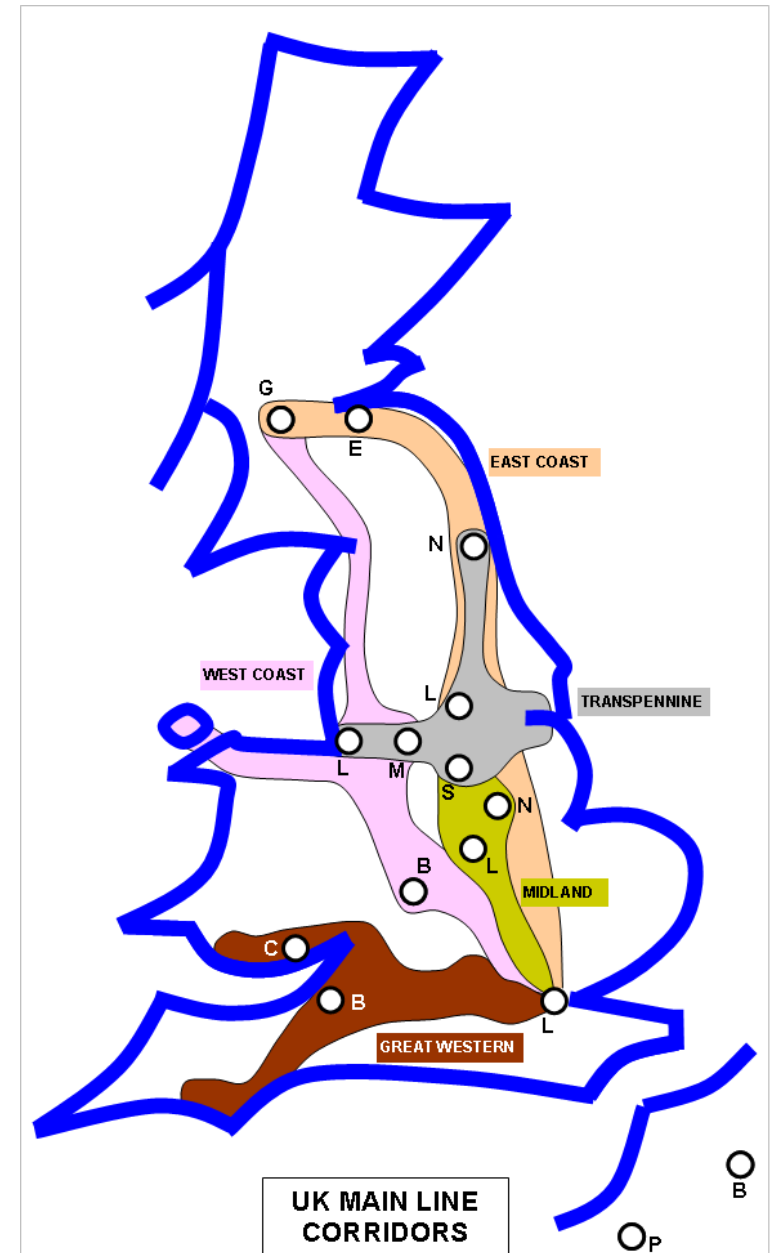
# Higher Capacity UK Network

- 4 key radial main line corridors
  - ECML 
  - MML 
  - WCML 
  - GWML 



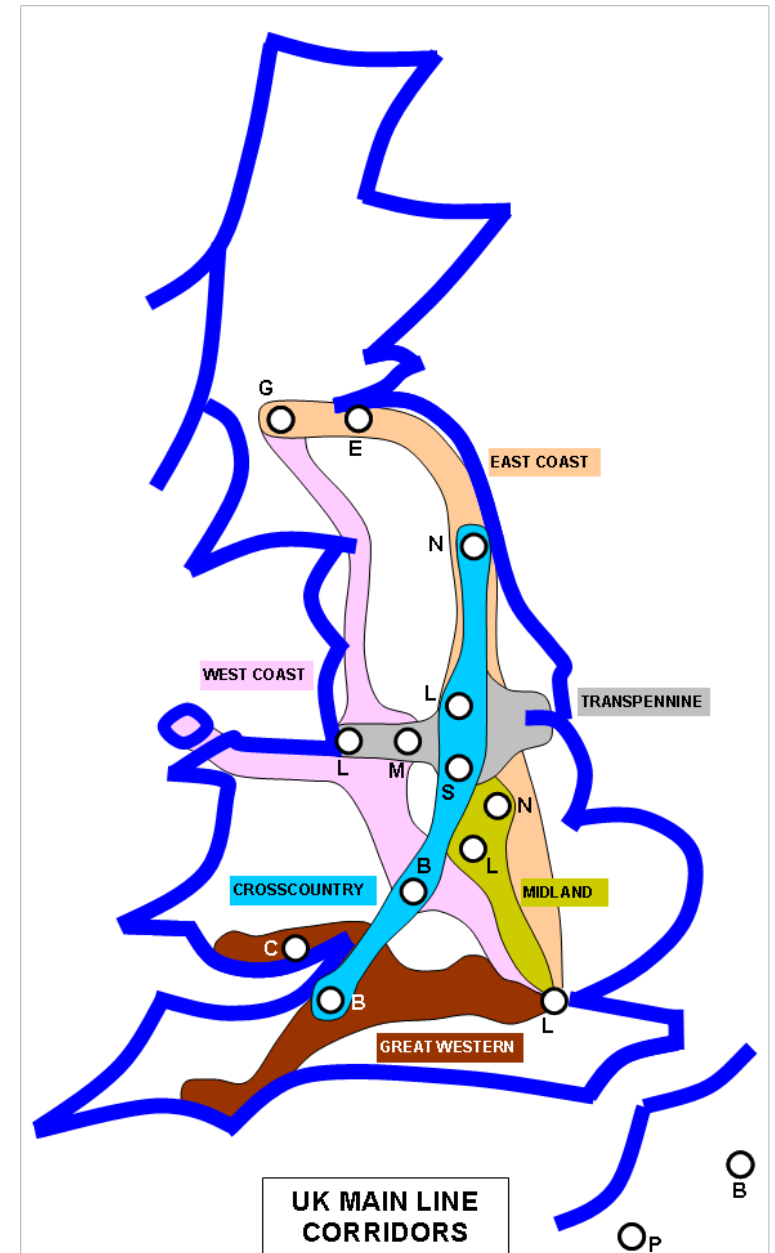
# Higher Capacity UK Network

- Additional interregional main line corridors
  - Transpennine



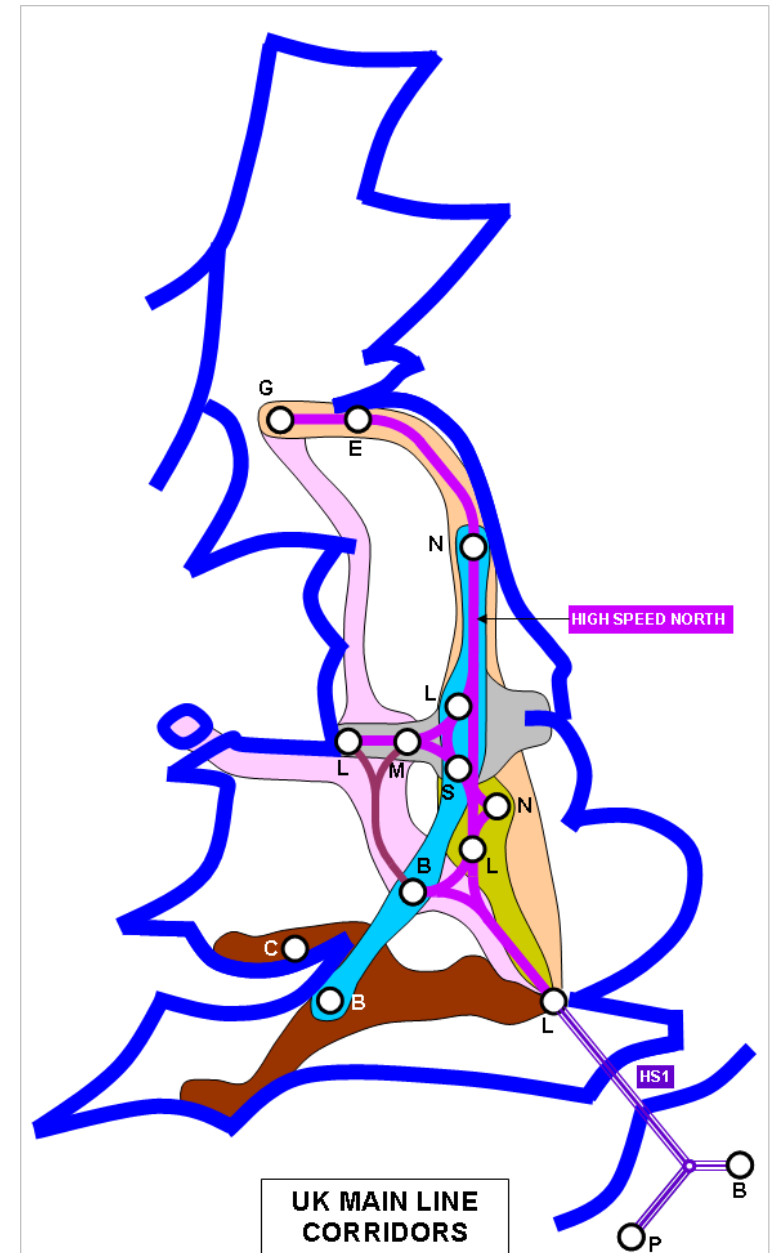
# Higher Capacity UK Network

- Additional interregional main line corridors
  - Transpennine
  - CrossCountry



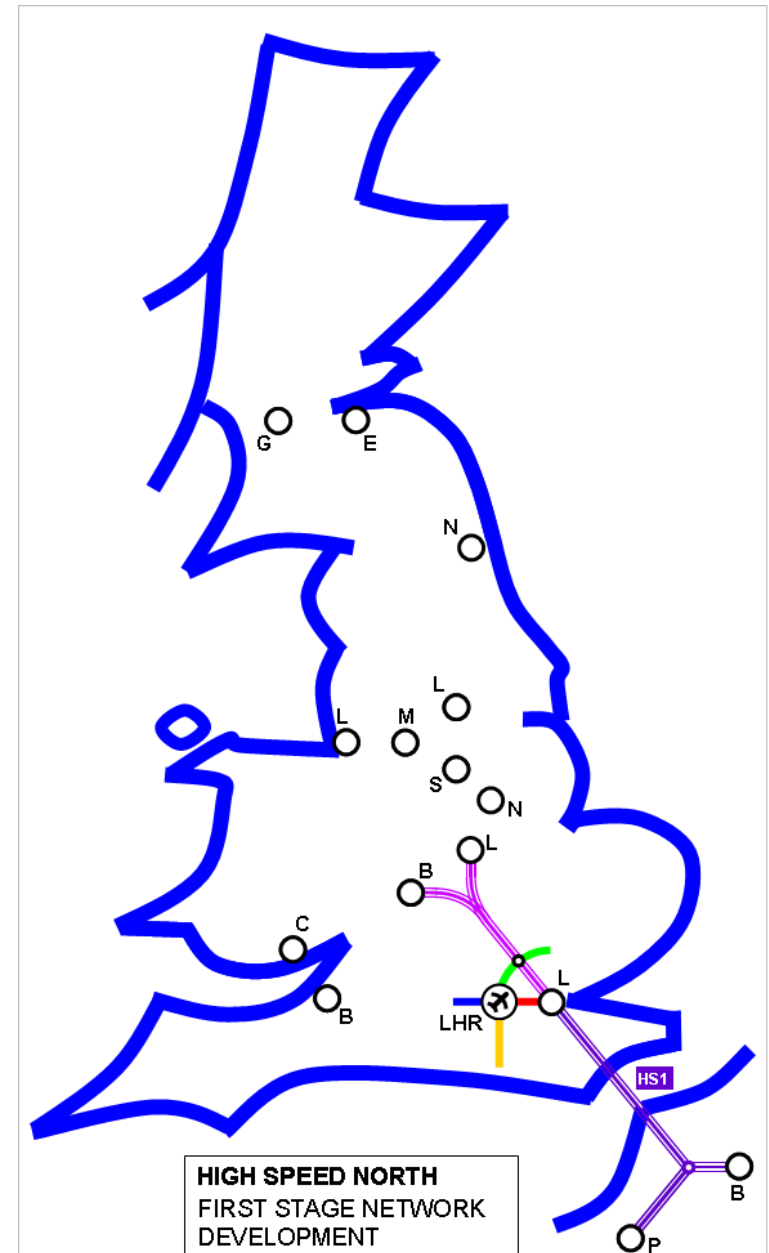
# Higher Capacity UK Network

- High Speed North covers 5 of 6 UK main line axes
- All except Great Western
- Congestion relief
- More paths for freight & passengers
- Better WCML
- Links north from MML
- Addresses GG21 / NR aspirations



# Inclusive & Incremental Network

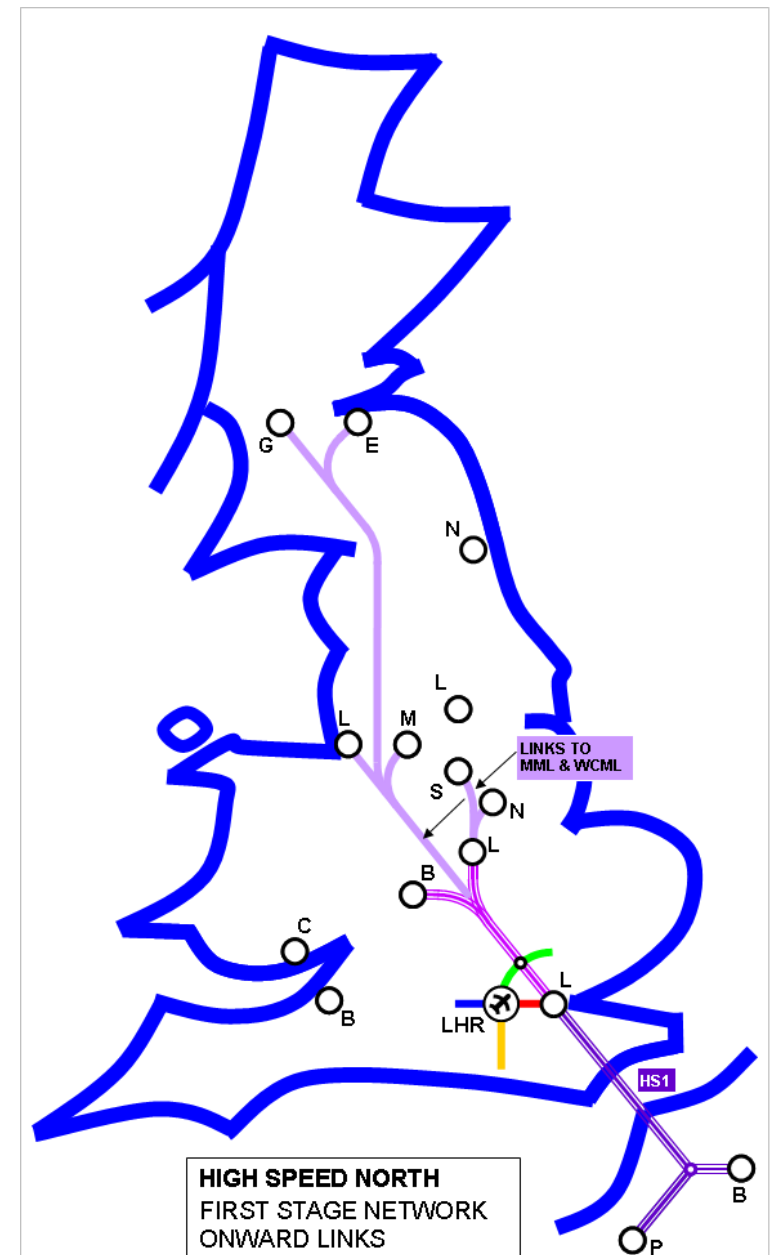
- First stage via M1/M6 to Leicester & Birmingham



# Inclusive & Incremental Network

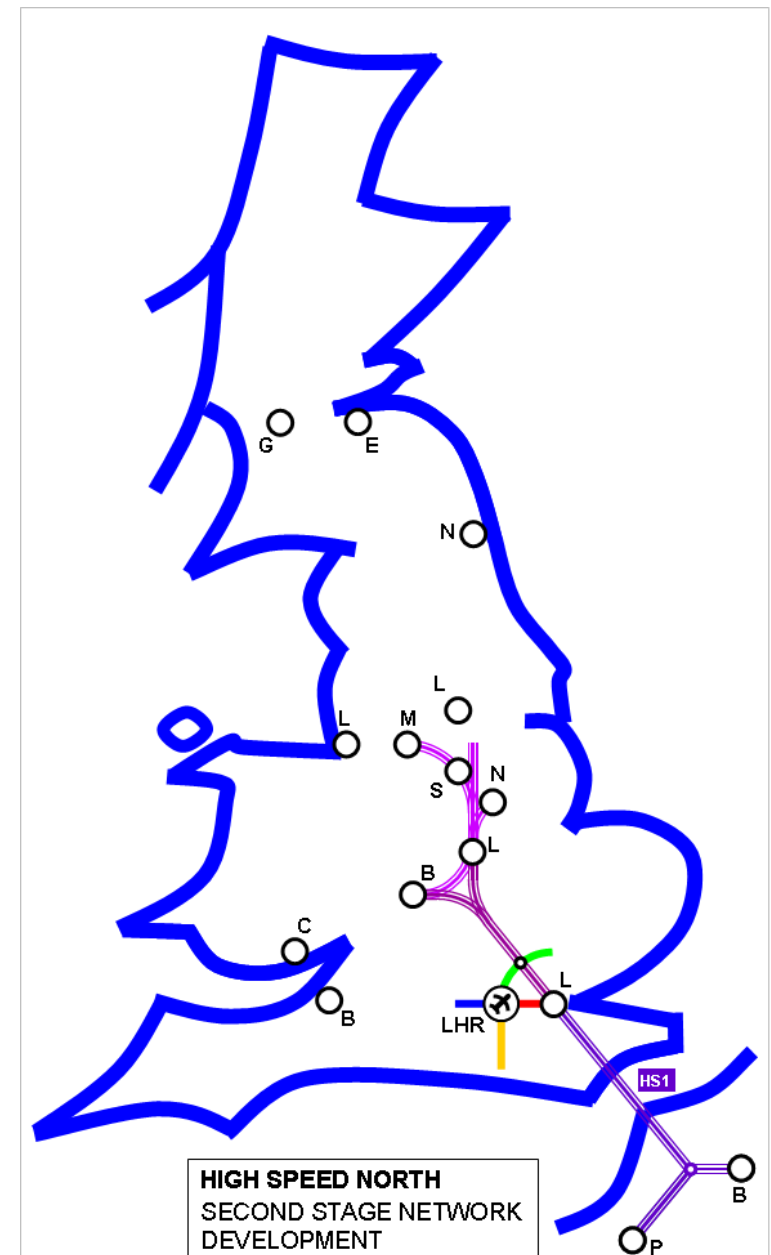
- Onward WCML & MML connections

Cities on network	2
Cities linked	6
Route-km so far	207
Corridors served	2



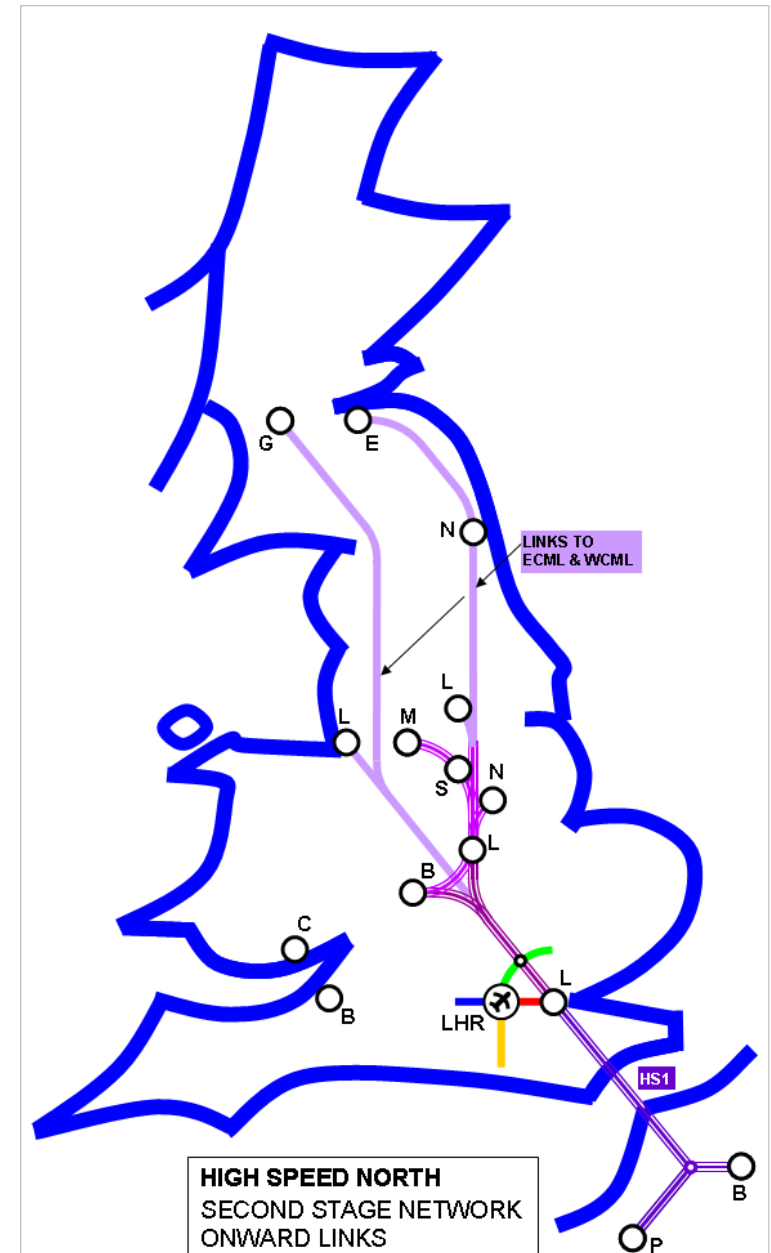
# Inclusive & Incremental Network

- Second stage via M1/MML corridor to South Yorkshire
- Over Woodhead to Manchester



# Inclusive & Incremental Network

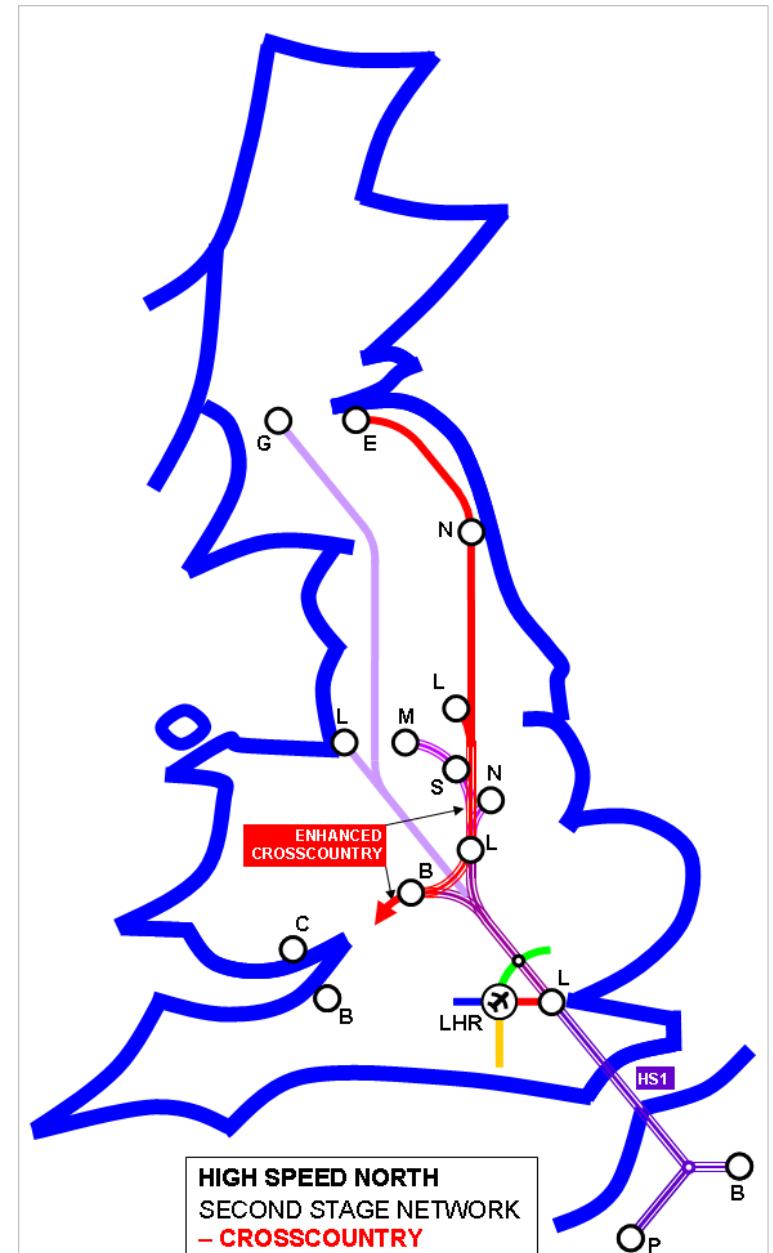
- Onward WCML & ECML connections



# Inclusive & Incremental Network

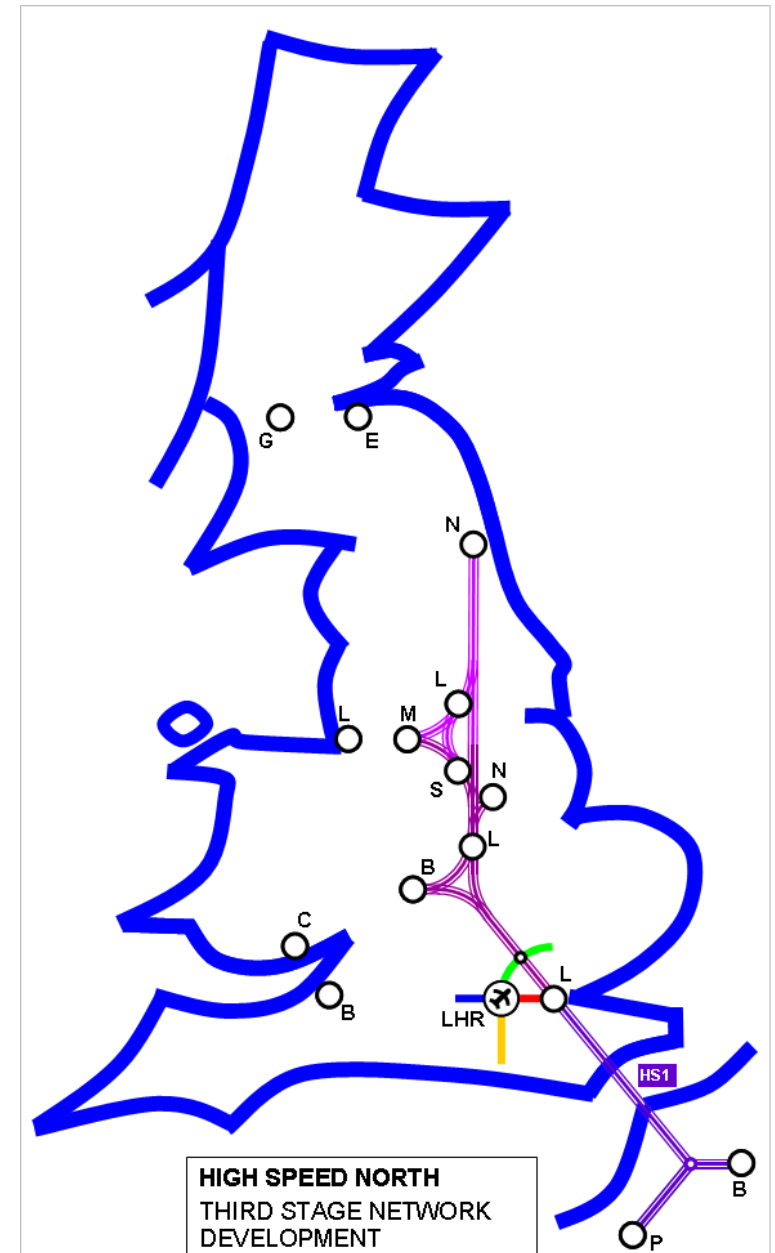
- CrossCountry high speed corridor established

Cities on network	5
Cities linked	5
Route-km so far	405
Corridors served	4



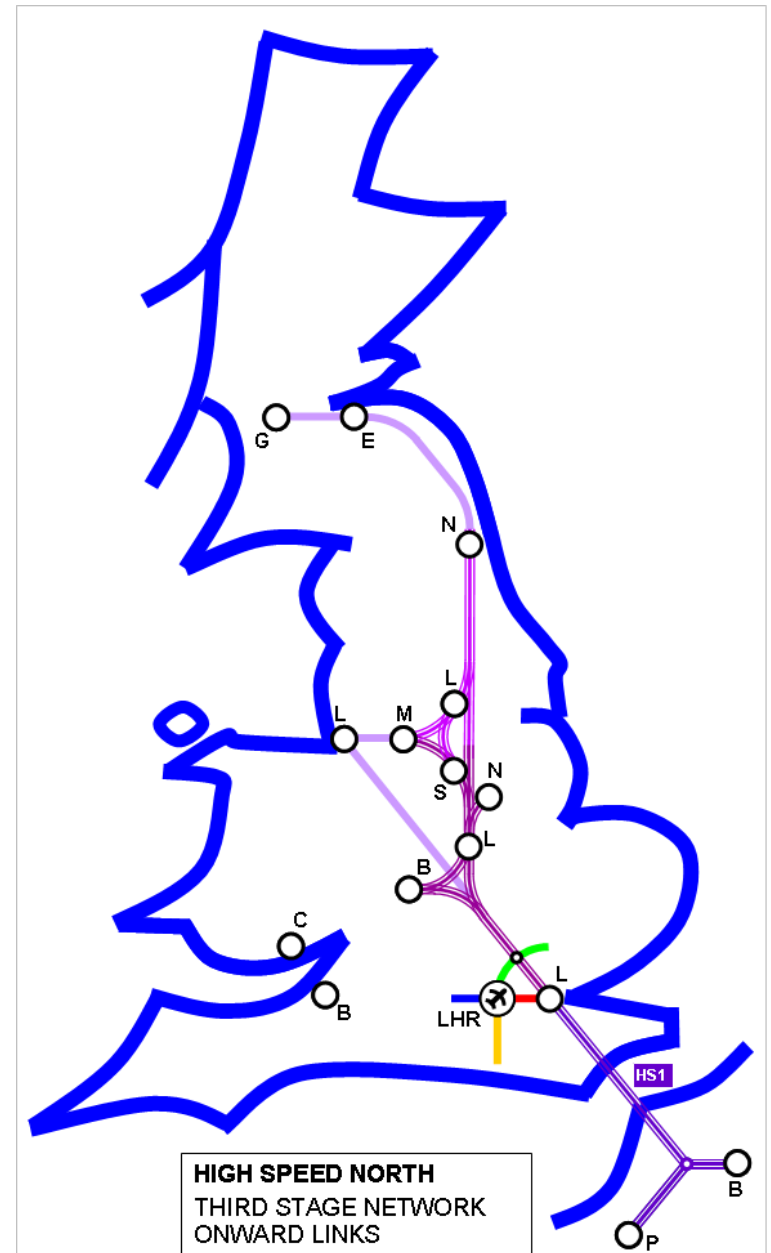
# Inclusive & Incremental Network

- Third stage via M1/ECML corridor to Newcastle
- 'Yorkshire triangle' completed



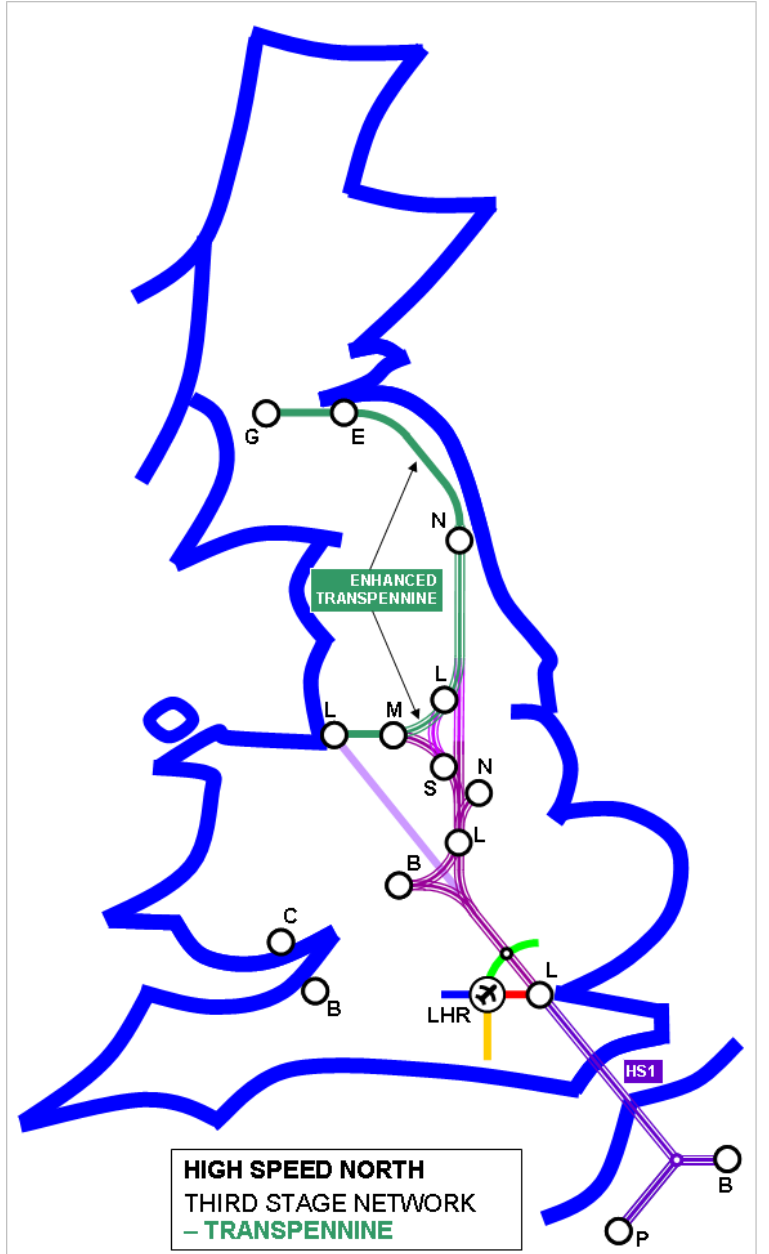
# Inclusive & Incremental Network

- Onward WCML & ECML connections
- Optimum route to Glasgow via Edinburgh??



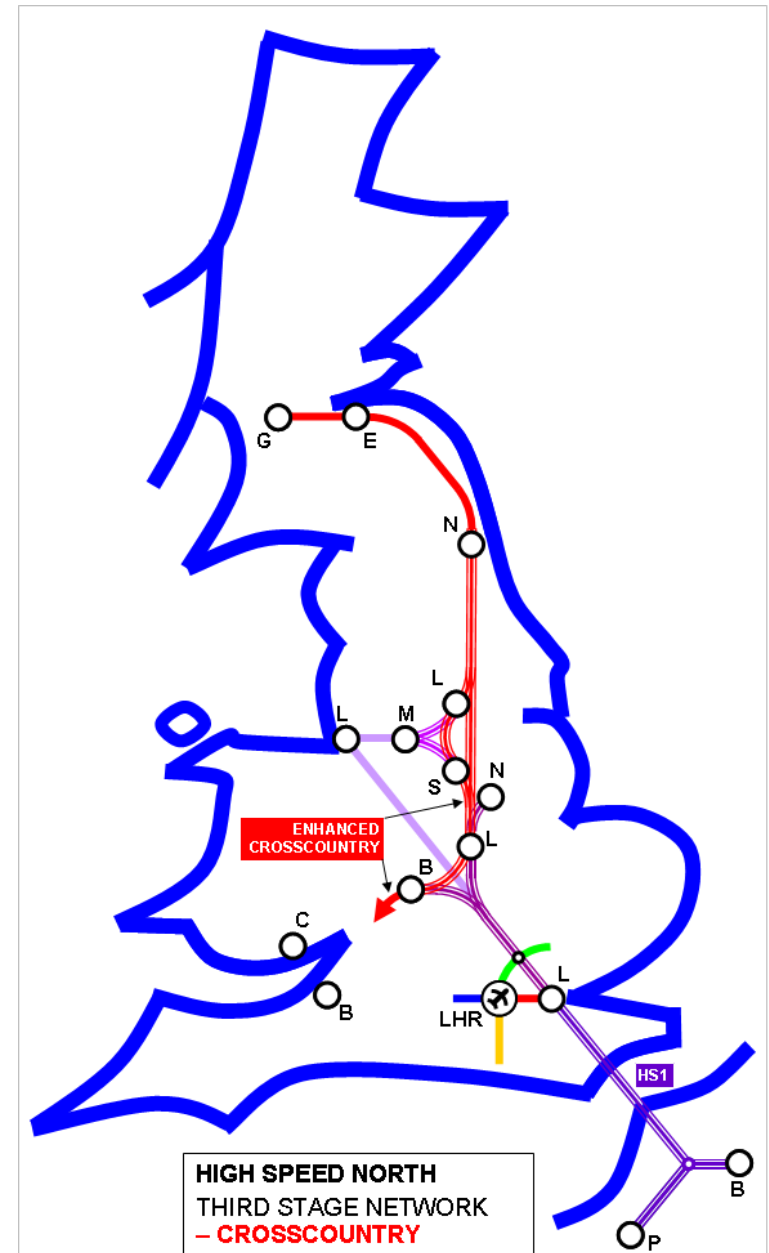
- Transpennine high speed corridor established

Cities on network	7
Cities linked	3
Route-km so far	631
Corridors served	5



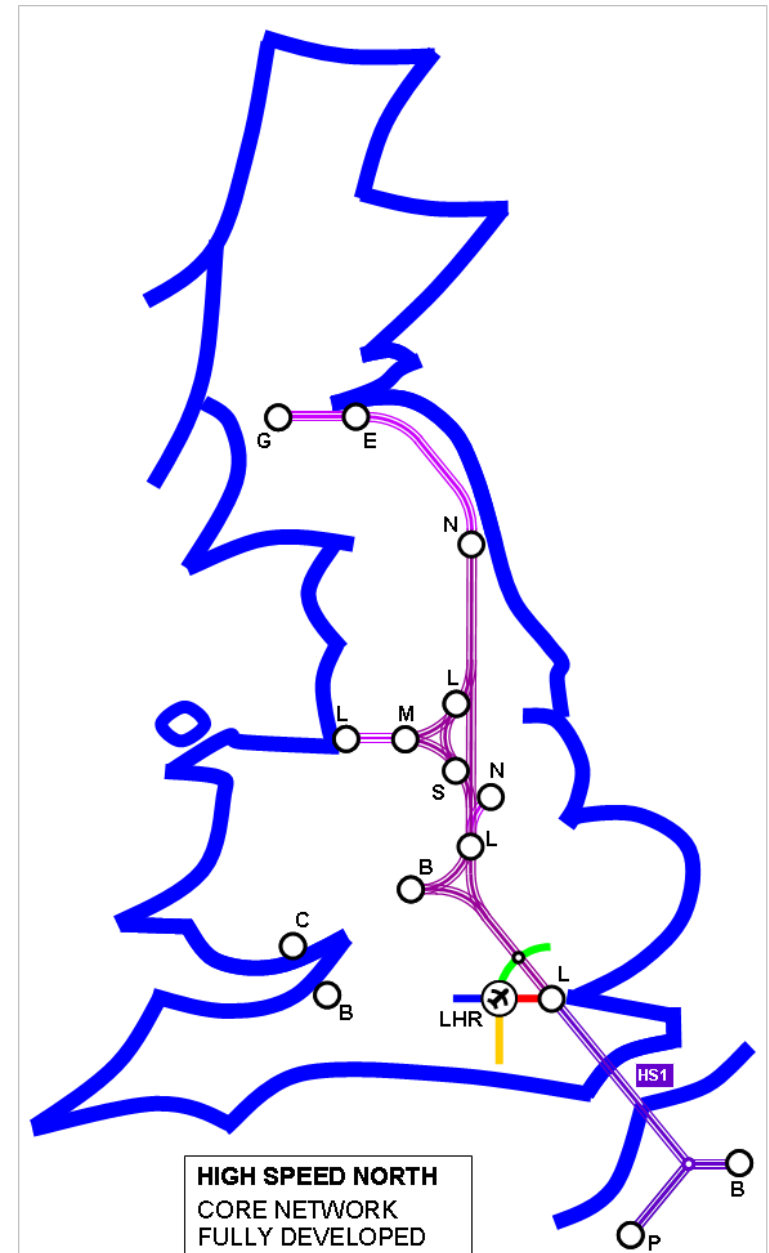
# Inclusive & Incremental Network

- CrossCountry high speed corridor enhanced, via Leeds & Sheffield



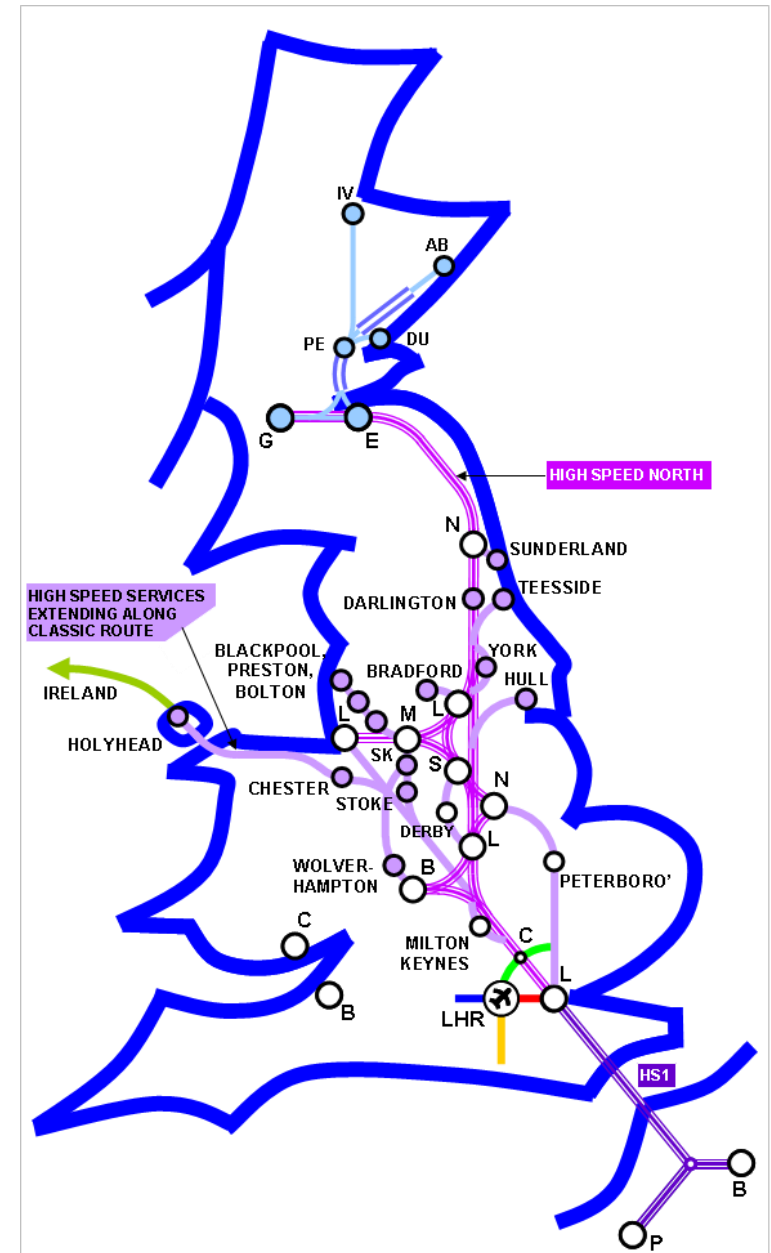
# Inclusive & Incremental Network

- Core Eurogauge network established
- Interregional links between 10 key cities of Midlands, North & Scotland – and to London
- All < 3 hours
- Onward connections to Europe
- All efficiently connected to Heathrow



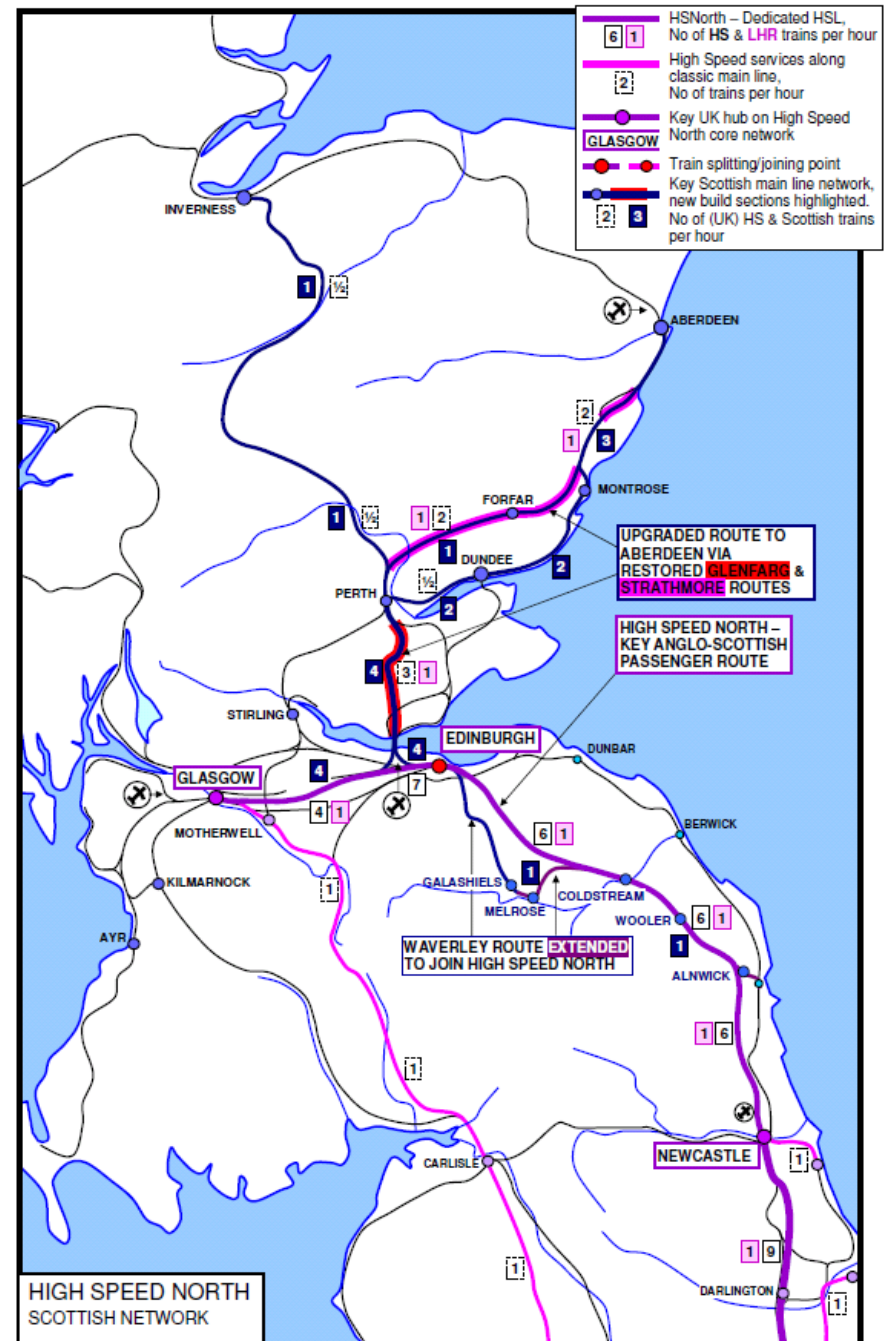
# Inclusive & Incremental Network

- High speed network extends beyond dedicated HSL to other principal centres
- Links to Ireland?
- Cricklewood the hub



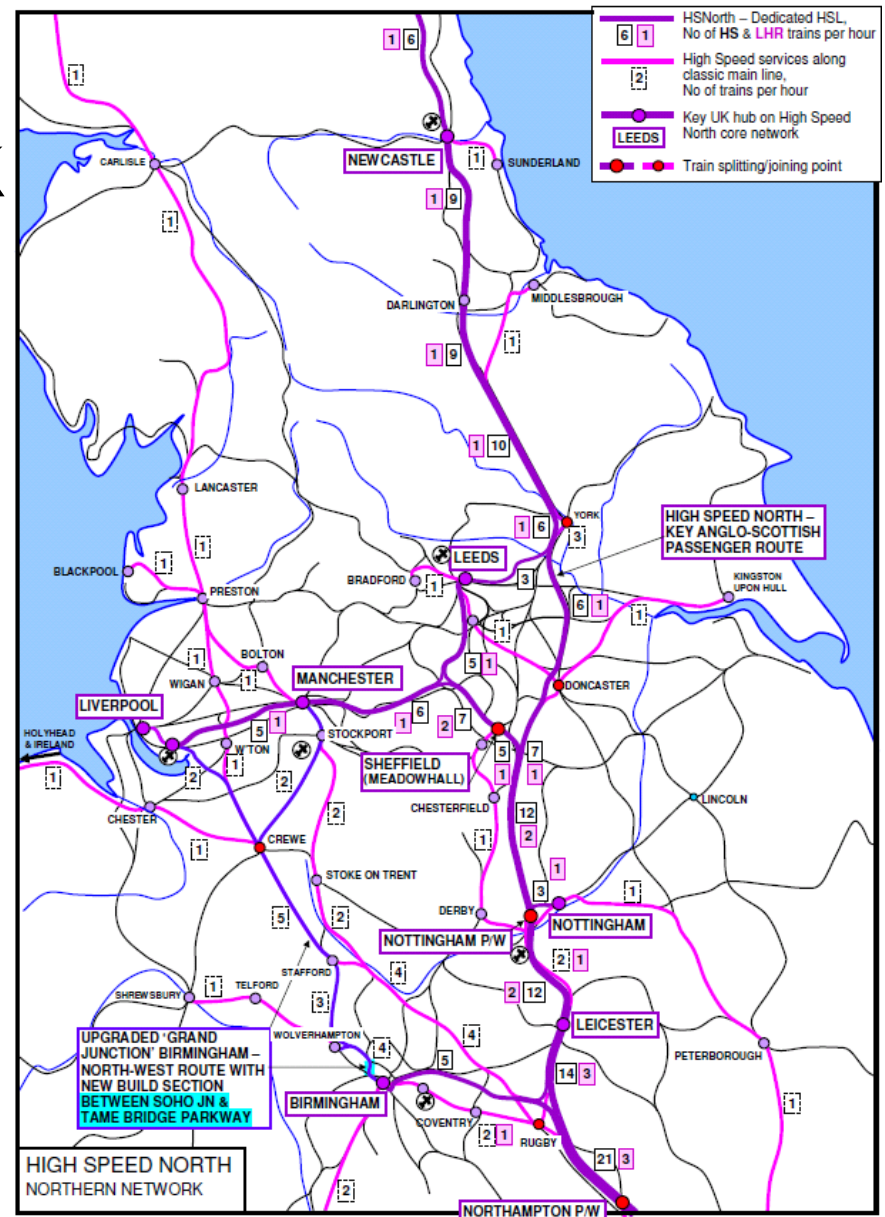
# Inclusive & Incremental Network

- Replicates & improves existing intercity network
- Scottish network



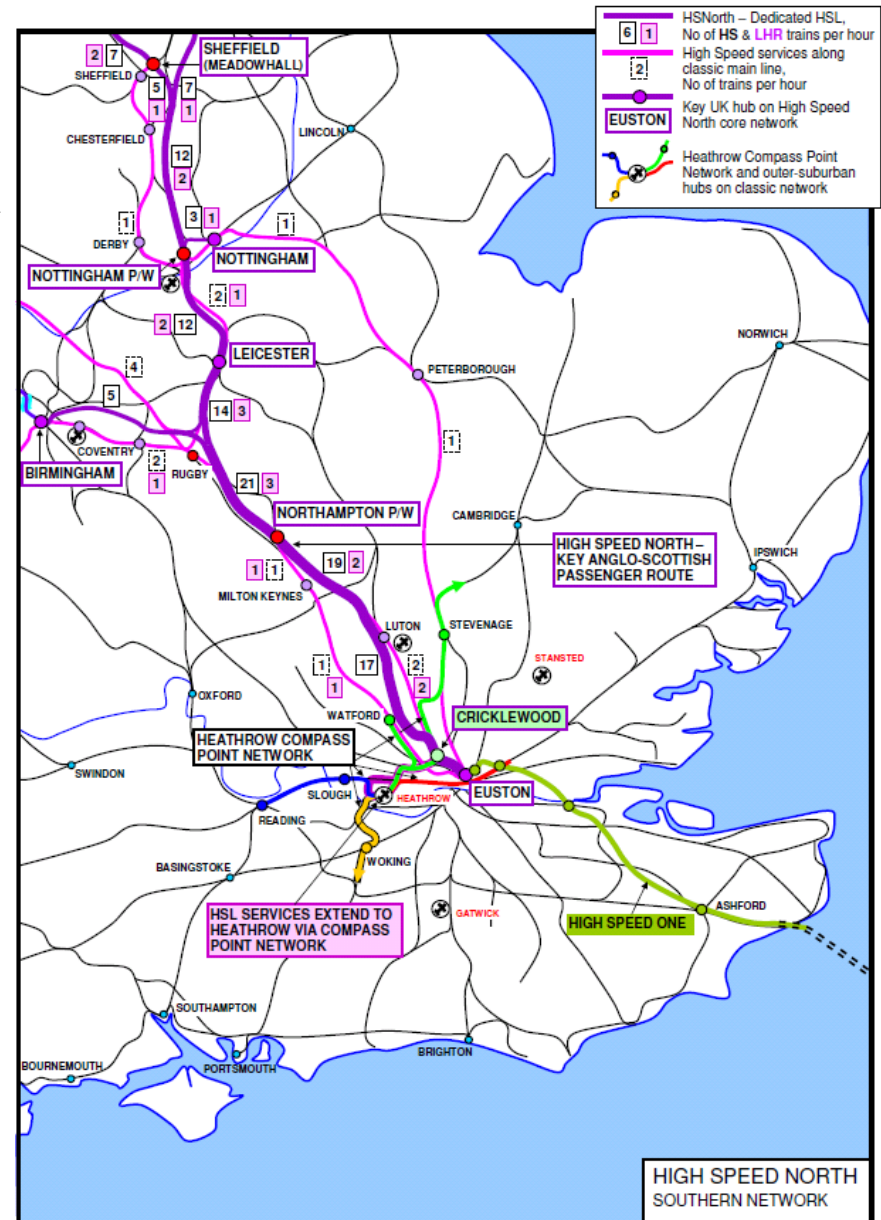
# Inclusive & Incremental Network

- Replicates & improves existing intercity network
- Northern network



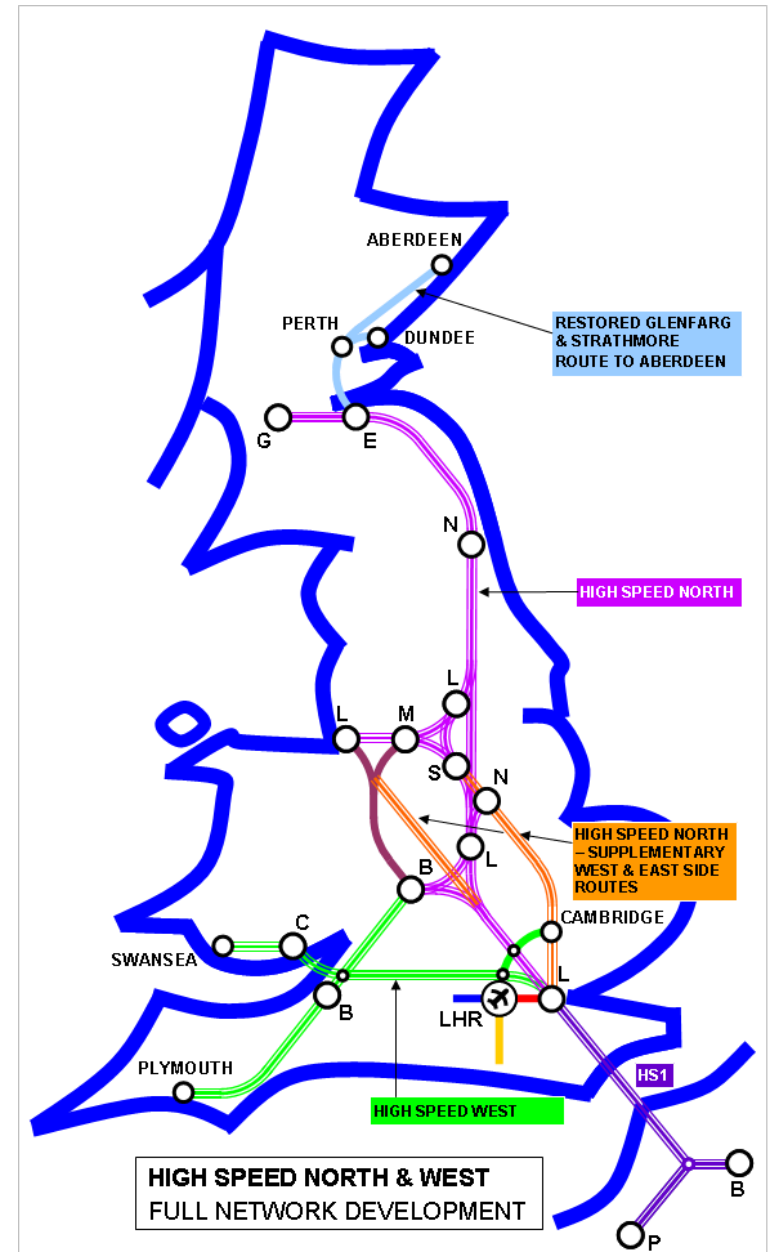
# Inclusive & Incremental Network

- Replicates & improves existing intercity network
- Southern network



# Inclusive & Incremental Network

- Staging up for debate
- Scottish perspective
- Construct from both ends?
- Further routes:
- Extension to Aberdeen?
- Grand Junction?
- Trent Valley & East Coast route?
- High Speed West?



# Regional Issues : Scotland

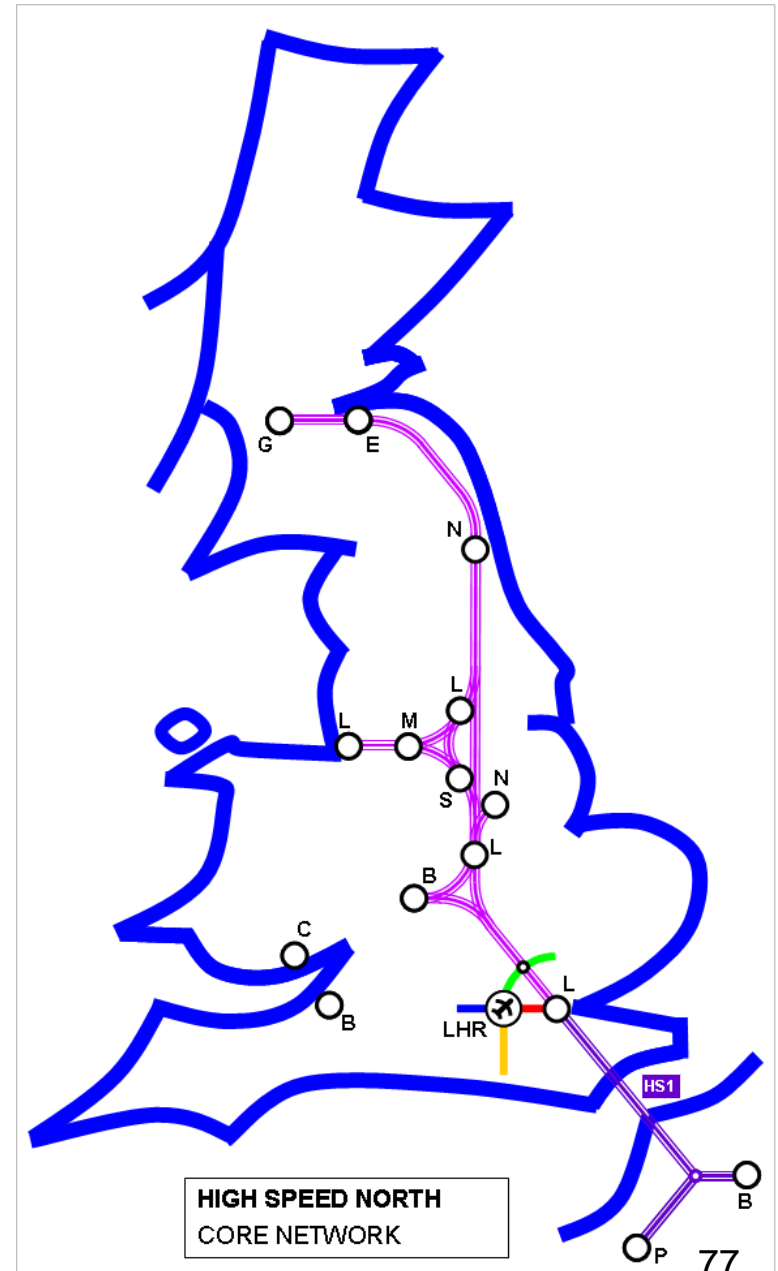
- Air dominant Anglo-Scottish mode
- Scottish economy at risk from CO<sub>2</sub> & oil supply restrictions
- Urgent need for improved surface transport

Selected flight & train frequencies to England / Europe from principal Scottish cities	London <sup>36</sup>	Manchester	Birmingham	Newcastle	Leeds	Liverpool	Leicester	Cardiff	Bristol	Southampton	Paris CDG	Amsterdam
<b>No of flights per day</b>												
Aberdeen	19	7	4	6	3	0	3	0	3	4	3	4
Edinburgh	56	13	8	0	3	0	3	5	3	6	5	5
Glasgow	40	8	10	0	3	0	3	3	3	5	3	5
<b>Rail Journey Time</b>												
<b>No daily direct trains</b>												
Aberdeen	7	#	#	4½	6	#	#	#	#	#	#	#
	3	0	0	4	1	0	0	0	0	0	0	0
Edinburgh	4¼	3½	4	1½	3	4	5½	7	5¾	6½	7½	9½
	18	10	19	34	13	0	0	0	9	0	0	0
Glasgow	5	3½	4	2¾	4	4	5½	7	5¾	6½	8	10
	8	4	8	11	2	0	0	0	2	0	0	0

Table 9.8.1 : Anglo-Scottish travel data, compiled September 2008 for inclusion in 2M Group submission<sup>37</sup> to Scottish Parliamentary Inquiry on high speed rail – but revised to reflect recent Manchester – Edinburgh/Glasgow service improvements.

# Regional Issues : Scotland

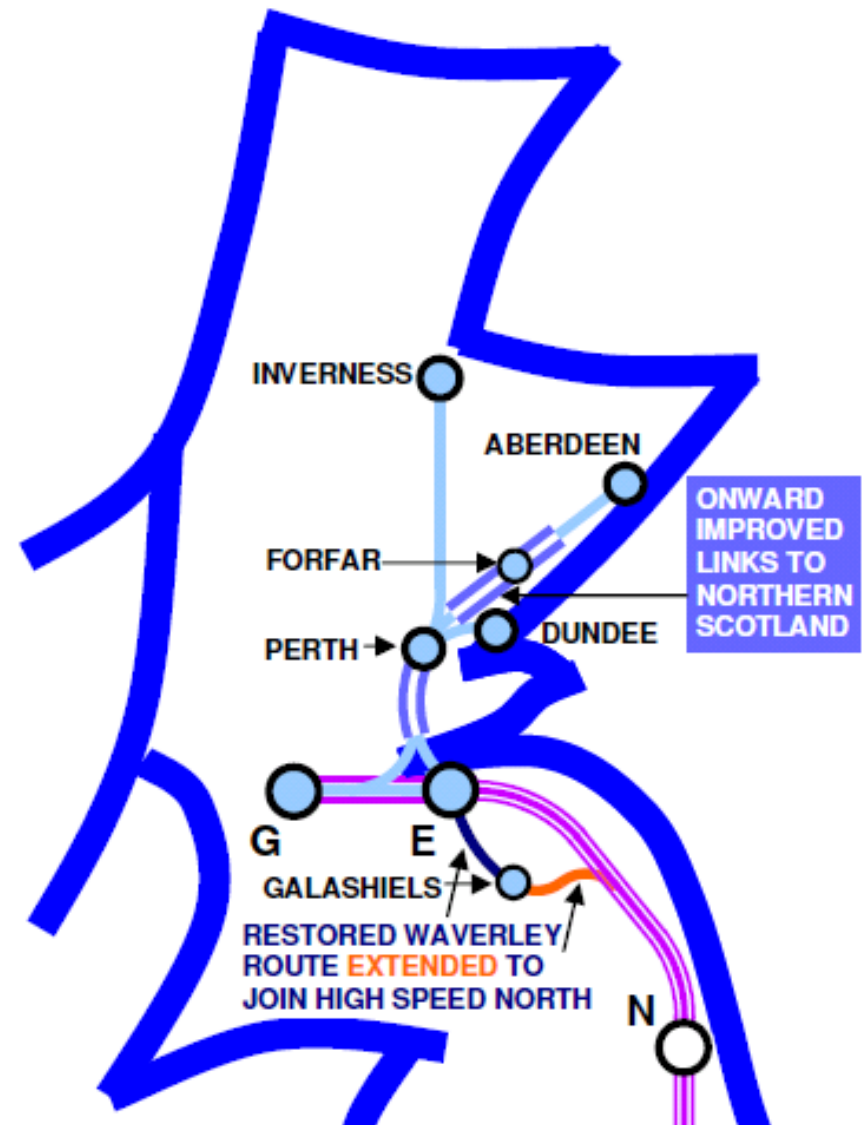
- Scotland needs quick roll-out of high speed rail
- London – Glasgow sub 3 hours
- One main line better than two
- Gives Edinburgh – Glasgow link



# Regional Issues :

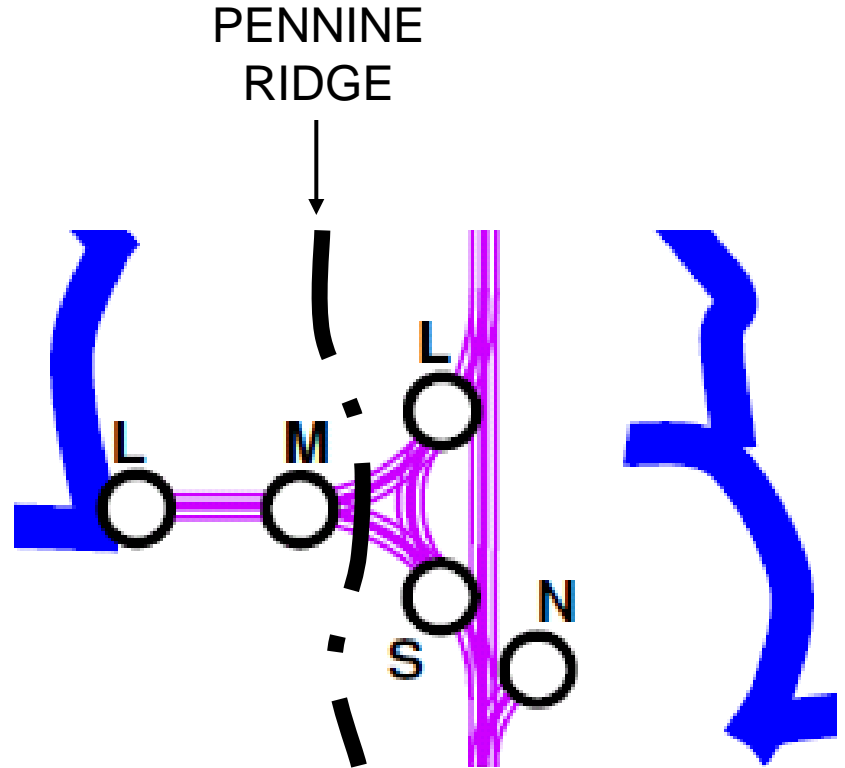
## Scotland

- Further links within Scotland
- Enhanced route to North via restored Glenfarg & Strathmore
- Aberdeen < 4 hours from London
- Waverley Route extension
- Edinburgh airport connection



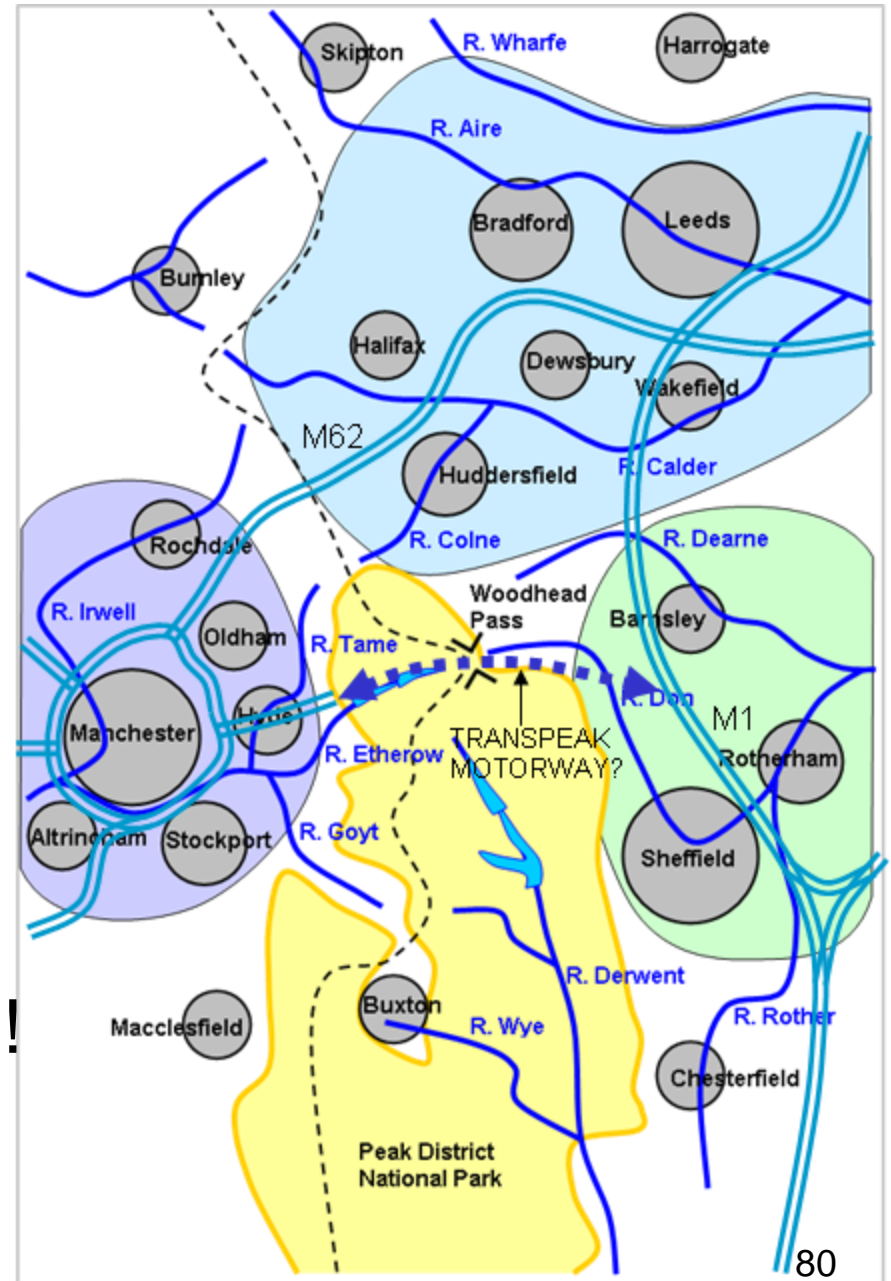
# Regional Issues : Transpennine

- Greater congestion Transpennine than north-south
- Clear need for improved links
- Independent financial case for T/P HSL??
- Other stakeholders!!



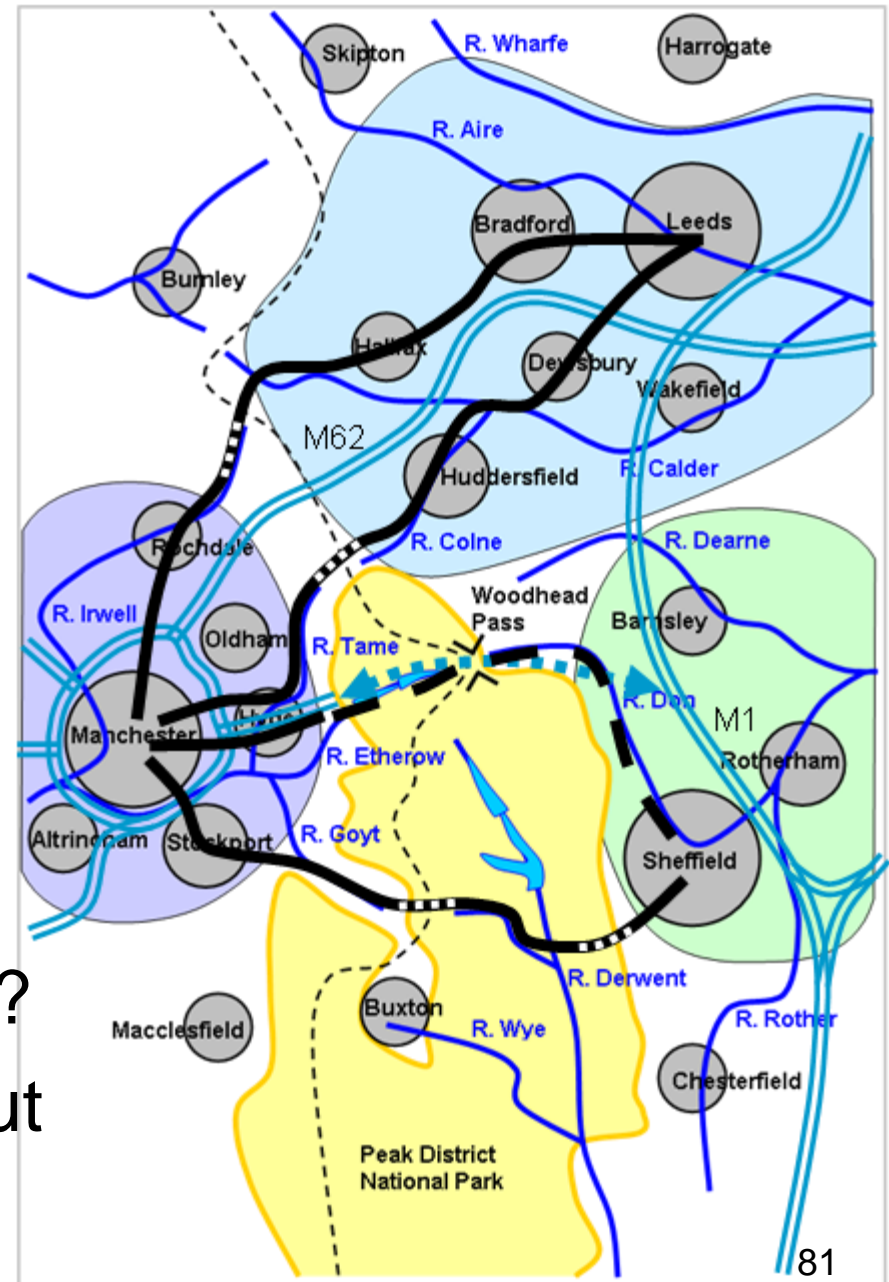
# Regional Issues : Transpennine

- M62 only modern Transpennine road link
- Single carriageway A628 main S.Yorks – Manchester link – via Woodhead
- Creeping pressure for Transpeak Motorway
- Environmental disaster!!
- Lorry shuttle alternative??



# Regional Issues : Transpennine

- Woodhead closed 1981
- Rail links now under pressure
- Long tunnels prevent W10 clearance
- NR plans for upgrading existing routes not practical. Northern Hub?
- Woodhead ignored – but no other feasible route



# Woodhead : Total Transport Solution

## Lorry Shuttles

- Essential for reduced road traffic & alternative to M-T
- Wider benefits across Peak District with HGV ban strategy
- Won't fit tunnels
- New alignment required alongside existing railway
- Major costs

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## Lorry Shuttles

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## High Speed Rail

- Woodhead key to cost-effective national network
- Environmental gains optimised
- Won't fit tunnels
- New alignment required alongside existing railway
- New construction in National Park

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## Local Passenger Services

- Essential for local support
- No major infrastructure requirements but...
- Safety case concerns in 1954 tunnel

# Woodhead : Total Transport Solution

## Lorry Shuttles

- Essential for reduced road traffic & alternative to M-T
- Wider benefits across Peak District with HGV ban strategy
- Won't fit tunnels
- New alignment required alongside existing railway
- Major costs

## Container / Railfreight

- Essential to meet wider transport/environment aims
- No major infrastructure requirements

## High Speed Rail

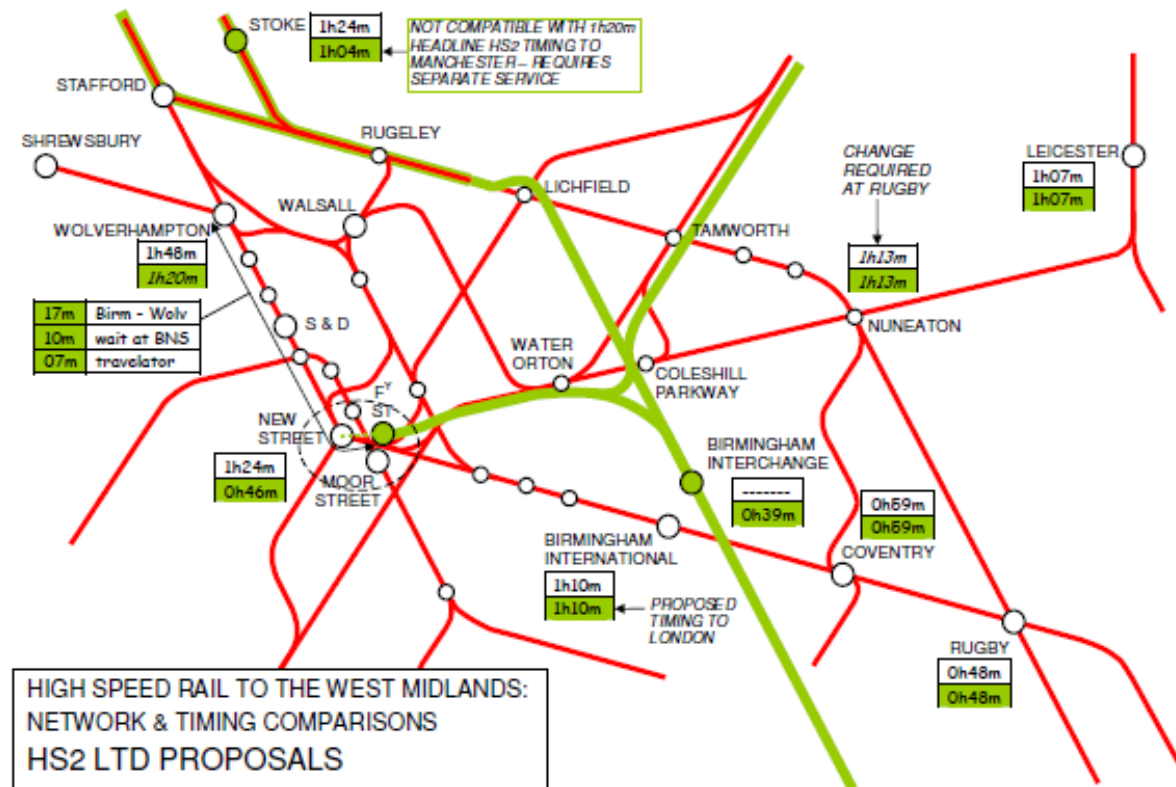
- Woodhead key to cost-effective national network
- Environmental gains optimised
- Won't fit tunnels
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- New construction in National Park

## Local Passenger Services

- Essential for local support
- No major infrastructure requirements but...
- Safety case concerns in 1954 tunnel

# Regional Issues : HS2 to West Midlands

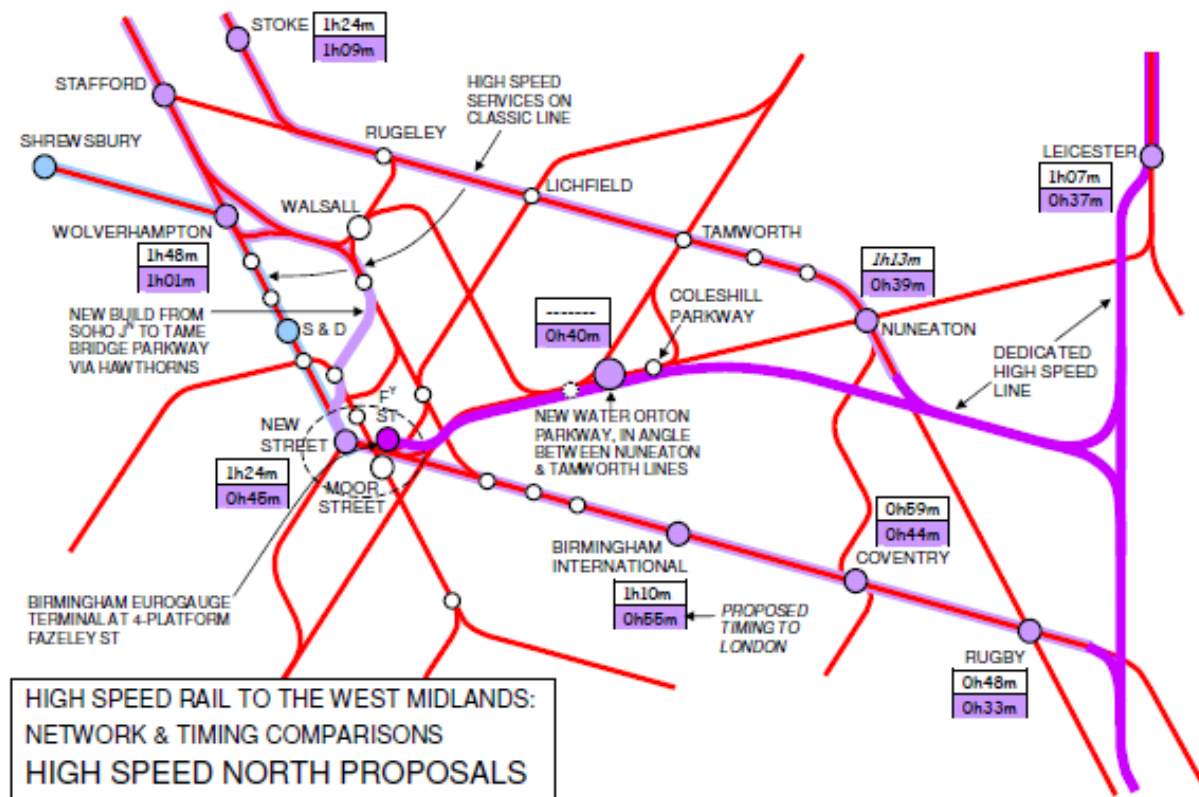
- West Mids poorly served by HS2
- HS links only to a car park & new B'ham mega-terminal
- HSL not integrated with existing railway



# Regional Issues :

## HSN to West Midlands

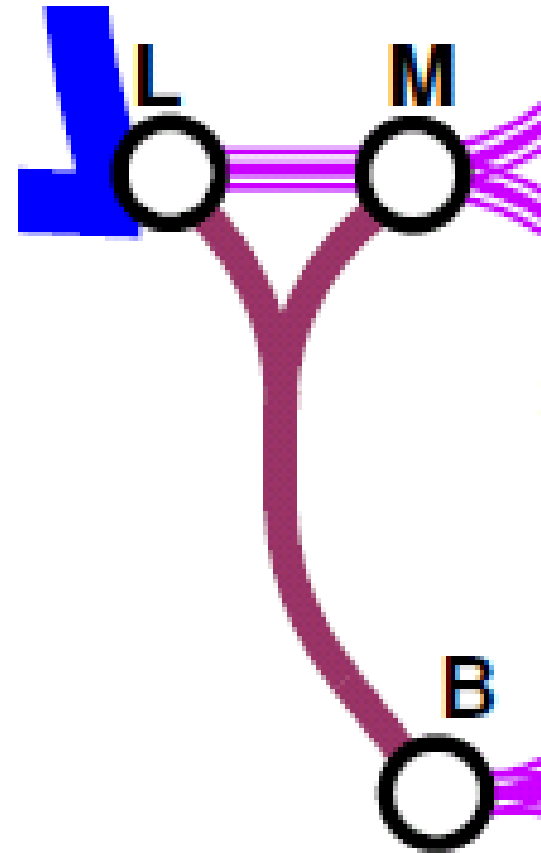
- West Mids better served by HSN
- Current inter-city network integrated with HSL
- Blight avoided
- New link to NW



# Regional Issues :

## Birmingham – North-West

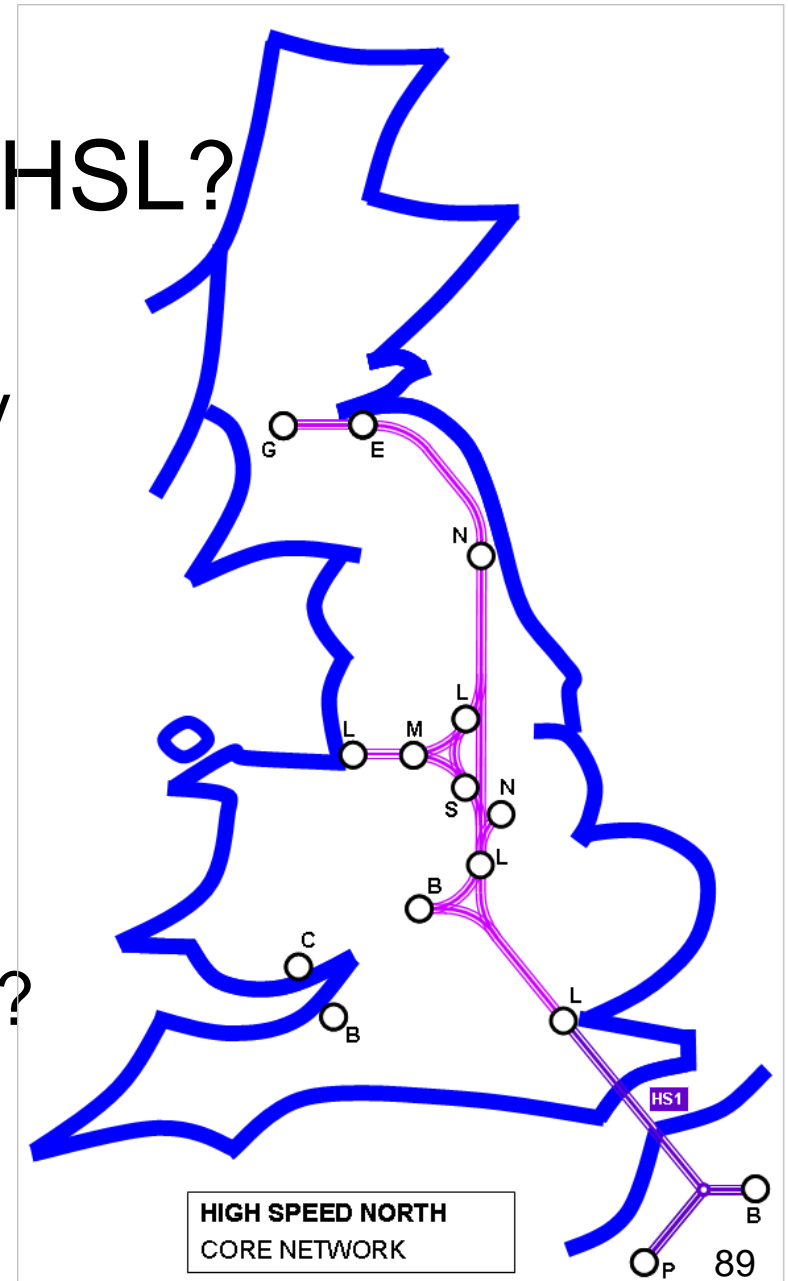
- ‘Grand Junction’ axis not addressed by HSN
- Only c. 130km apart
- High speed not necessary
- 1 hr B – M timing feasible along existing lines with limited new works (& with intermediate stops)



# Freight Issues :

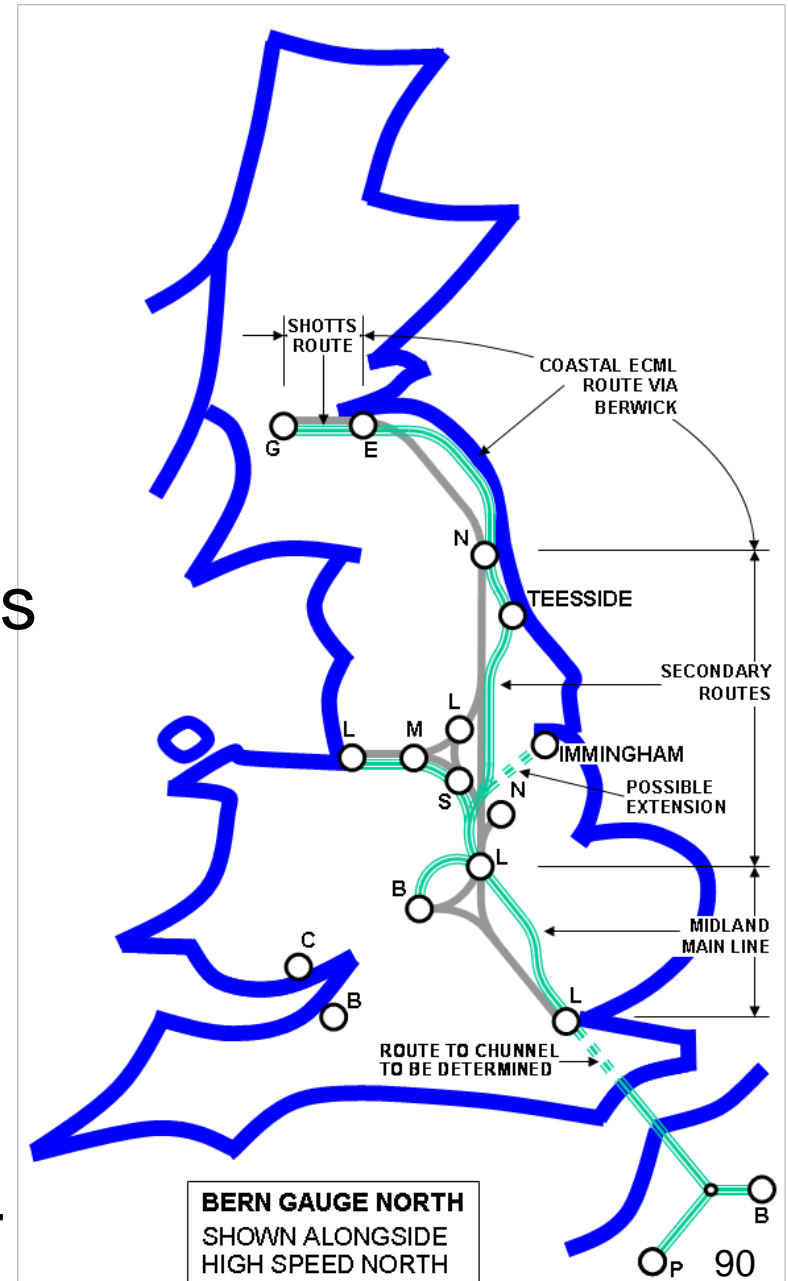
## Continental Gauge on HSL?

- Continental Gauge – ‘Holy Grail’ for UK railfreight??
- HSL clearances OK for larger European wagons
- High Speed North ideally configured??
- Gradients possible issue??
- Speed conflict is the showstopper



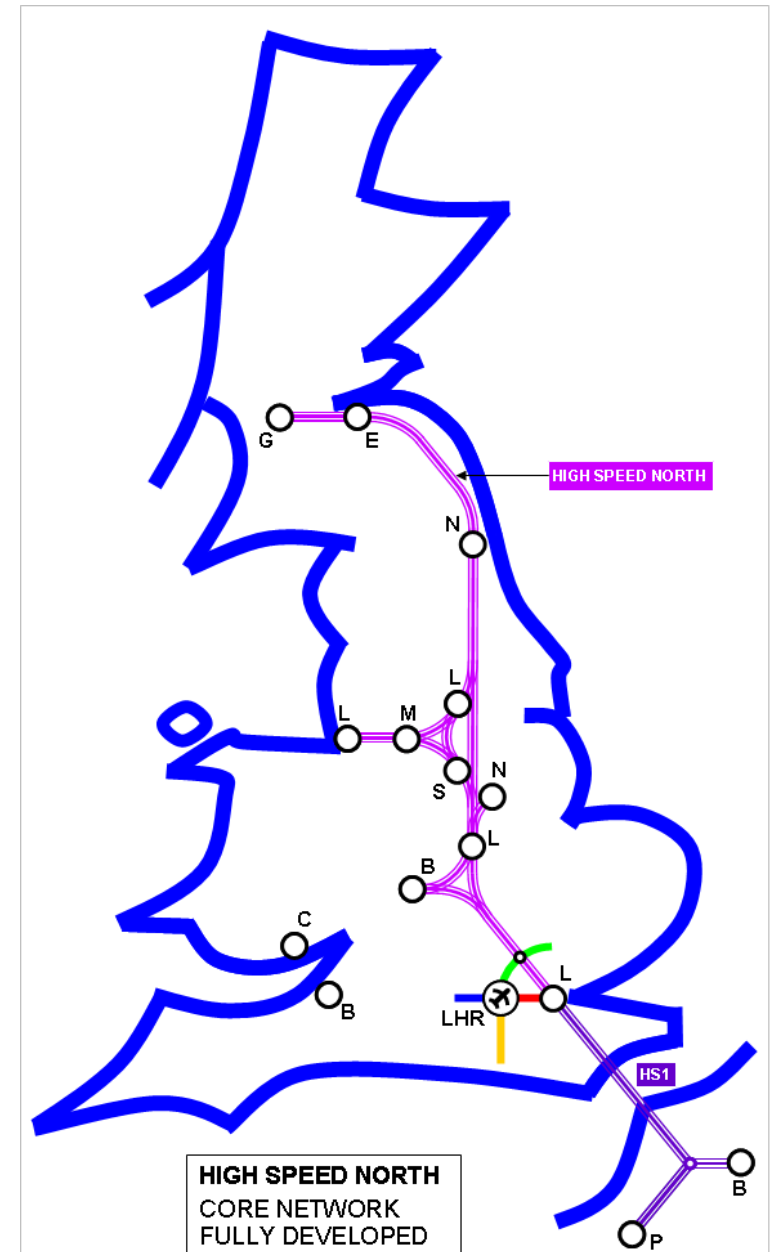
# Freight Issues : Continental Gauge on parallel route?

- Clearance issues to adj. tracks & structures
- Sixfoots, tunnels & stations particular problems
- Blockades & diversion strategy essential
- Feasible strategy along east side of Pennines
- Not possible along WCML corridor

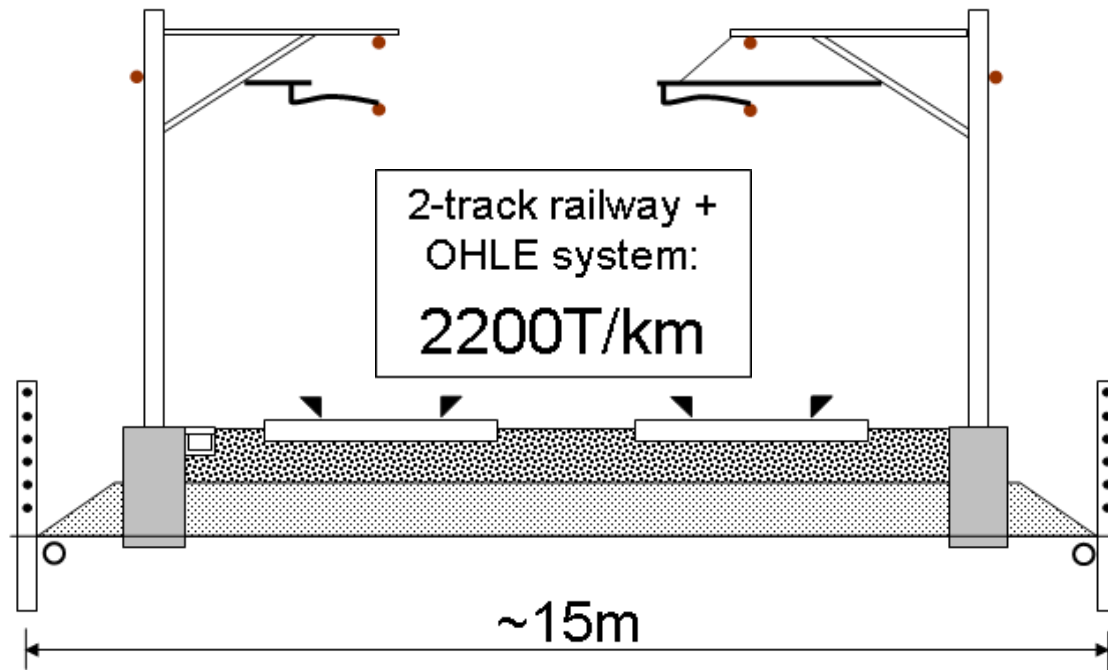


# Environmental Impact: High Speed North

- Routeing via existing transport corridors minimises impact
- Note L&B, M1 precedents
- M-way noise nuisance gives clear corridor
- Quicker & cheaper construction
- Optimised load factors
- Lower CO<sub>2</sub> in construction & operation

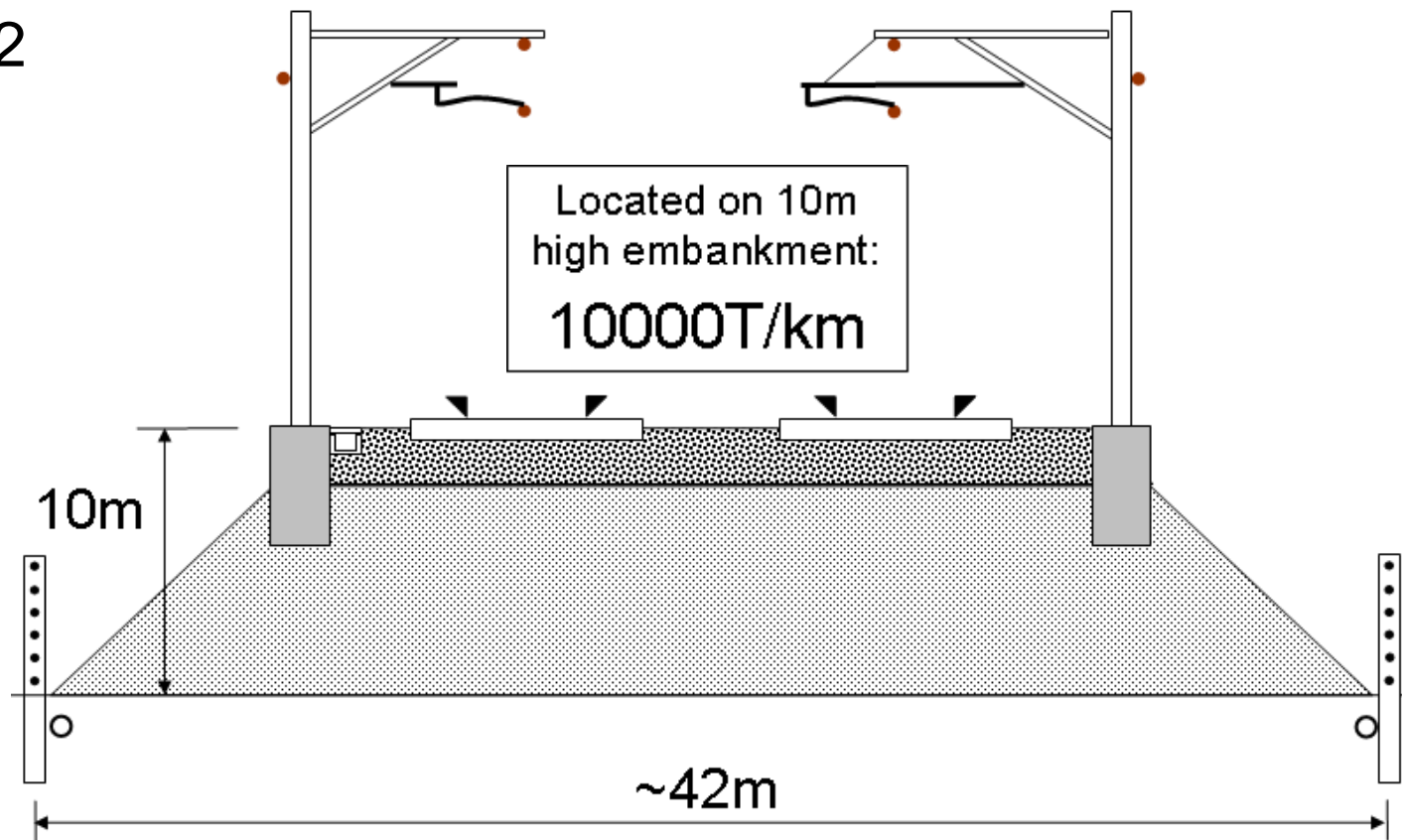


# Construction CO<sub>2</sub>



- Standard 2-track railway in level topography
- Allows for 2 bridges per km

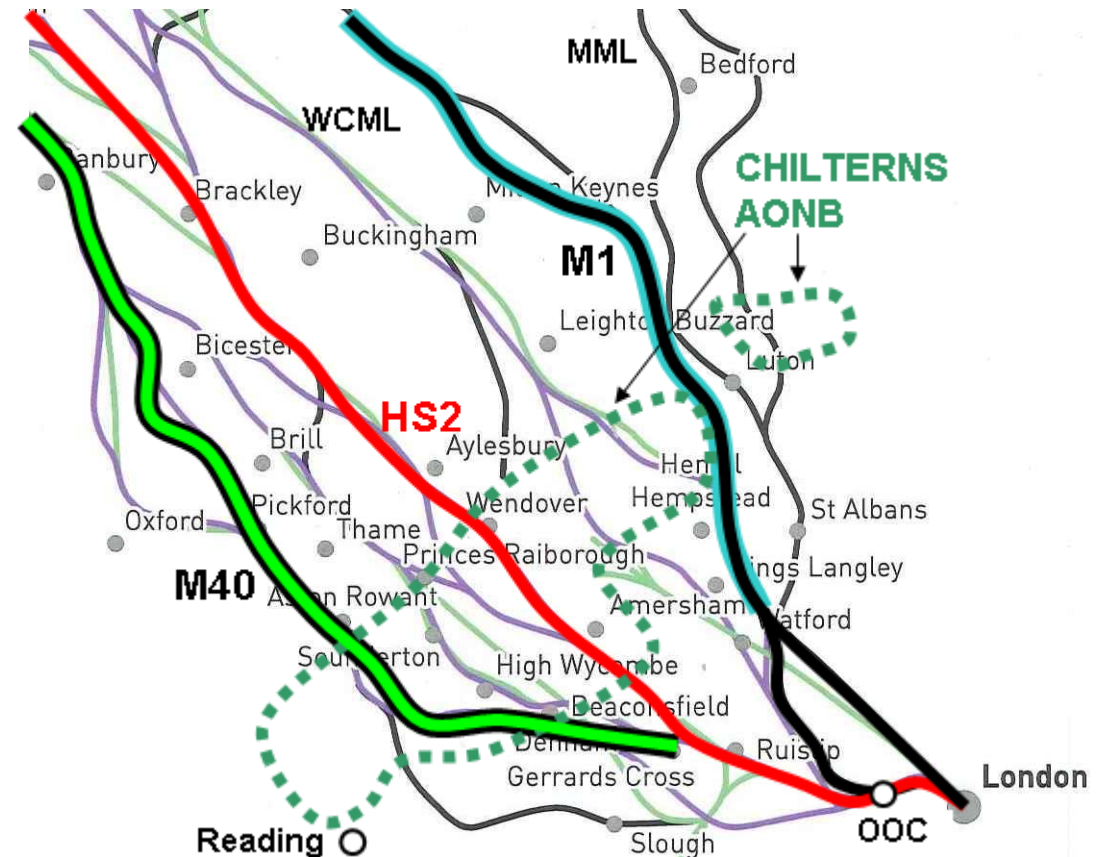
# Construction CO<sub>2</sub>



- Now fit the railway to the hills and dales!!
- Tunnels – 20000T/km    Viaducts – 15000T/km

# Environmental Impact: HS2 Chiltern route??

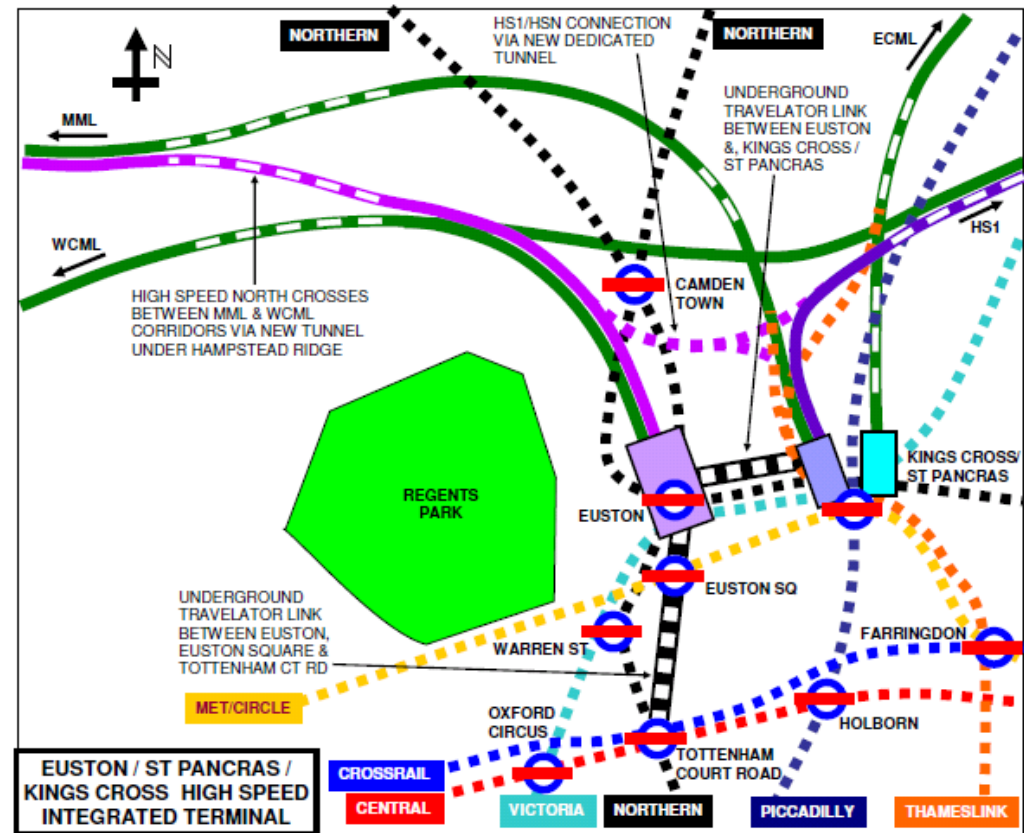
- All London-B'ham corridors considered??
- All M1 routeings dismissed v. early
- M40 & WCML given greater consideration
- HS2 routed via Misbourne Valley: >10km of tunnel
- Major rural intrusion further north



# Euston : HSN High Speed Terminal

## Why Euston?

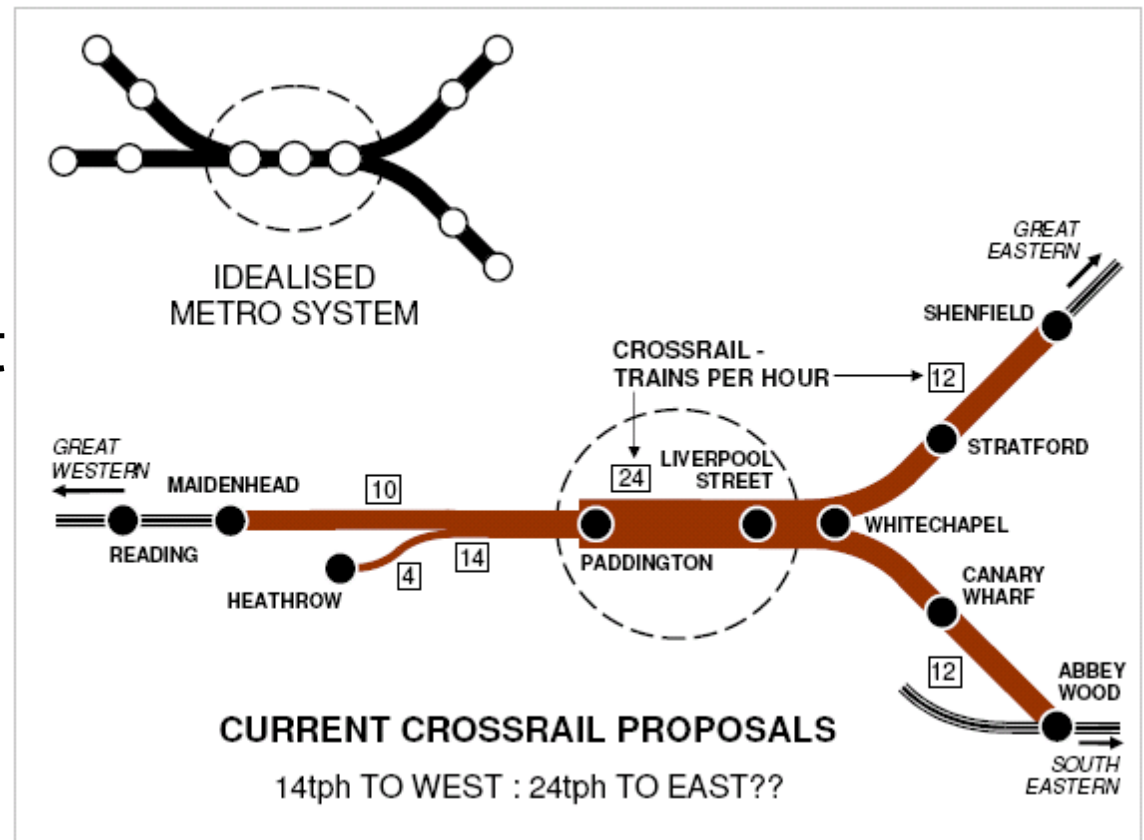
- Largest ground plan of north-facing London terminals
- Proximity to St P
- Good tube links – *but could be better*
- Soon to be redeveloped
- Existing commuter traffic diverted to CrossRail



# Euston : HSN High Speed Terminal

## CrossRail

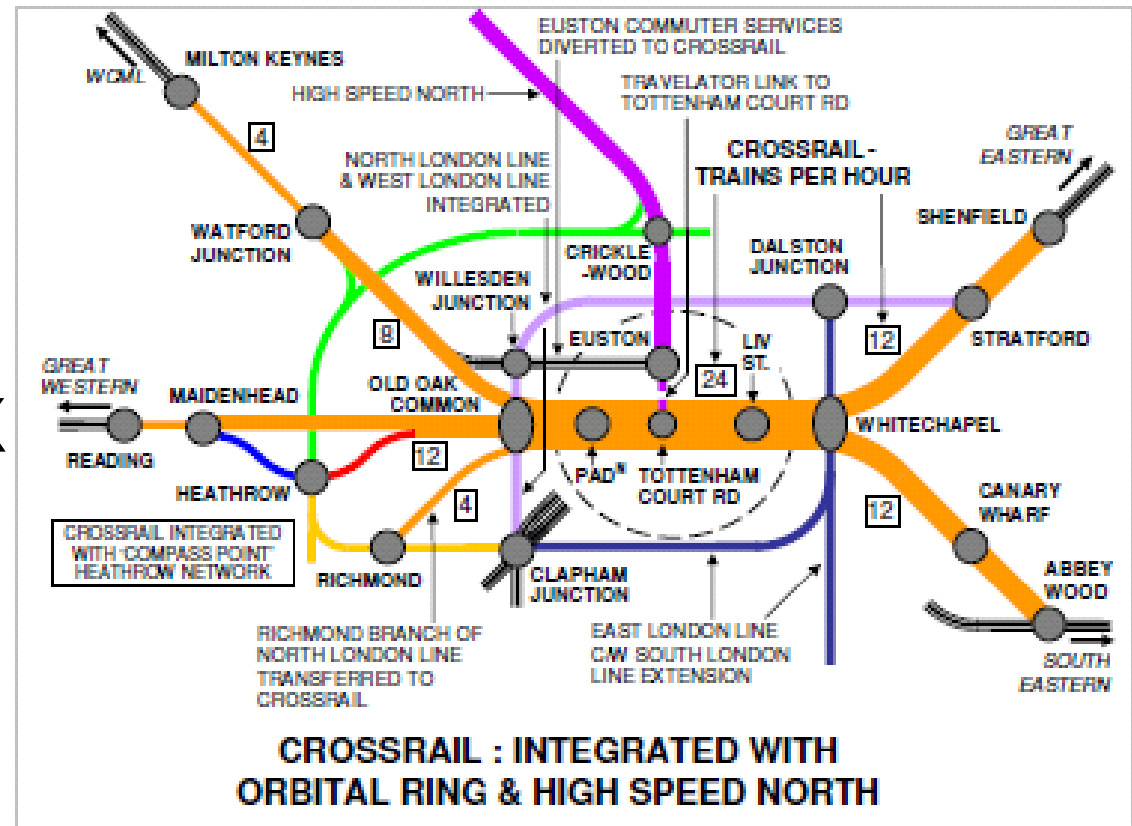
- 24 trains per hour from east
- 14 trains per hour from west
- Why?
- Poor value for money
- £16 bn lost opportunity



# Euston : HSN High Speed Terminal

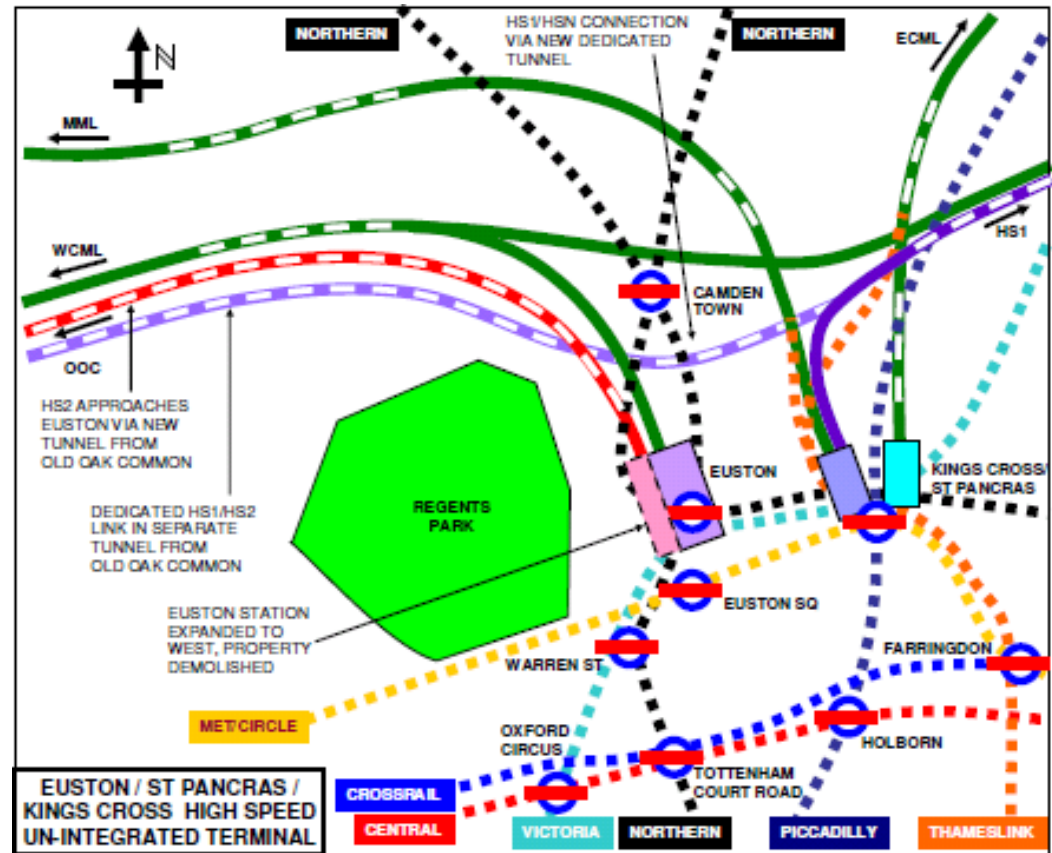
## HSN Solution

- Euston locals to CrossRail
- CrossRail now balanced
- Euston/StP/KX now integrated terminal
- HSN to MML/M1 corridor



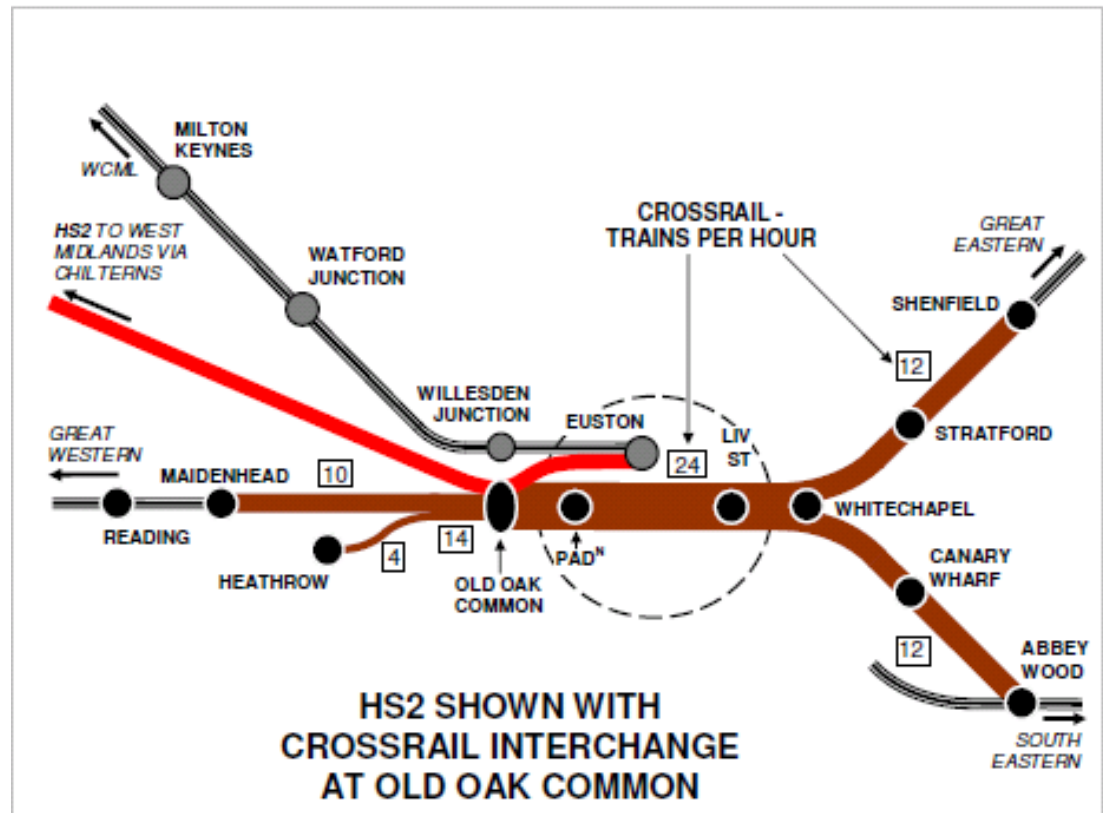
# HS2 London Terminal Strategy : Euston

- Euston chosen as terminal with long tunnelled approach
- No attempt to improve Tube links
- No attempt to divert commuter traffic
- Major demolition required

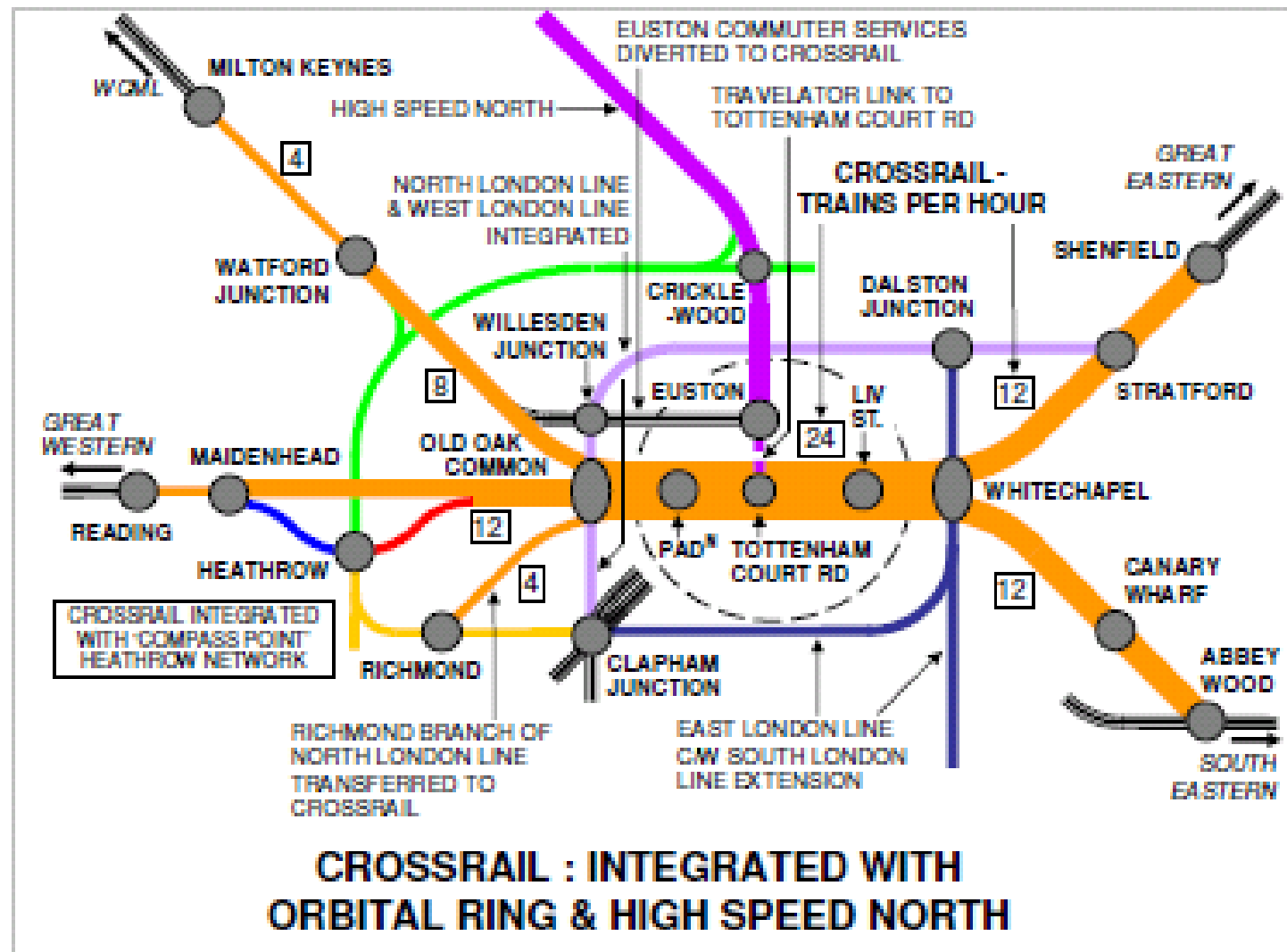


# HS2: Old Oak Common Solution

- Congestion at Euston compels 2nd terminal at OOC for CrossRail & Heathrow transfer
- Poorly connected
- Delays all trains to north by ~ 5 minutes?
- Forces HSL through Chilterns

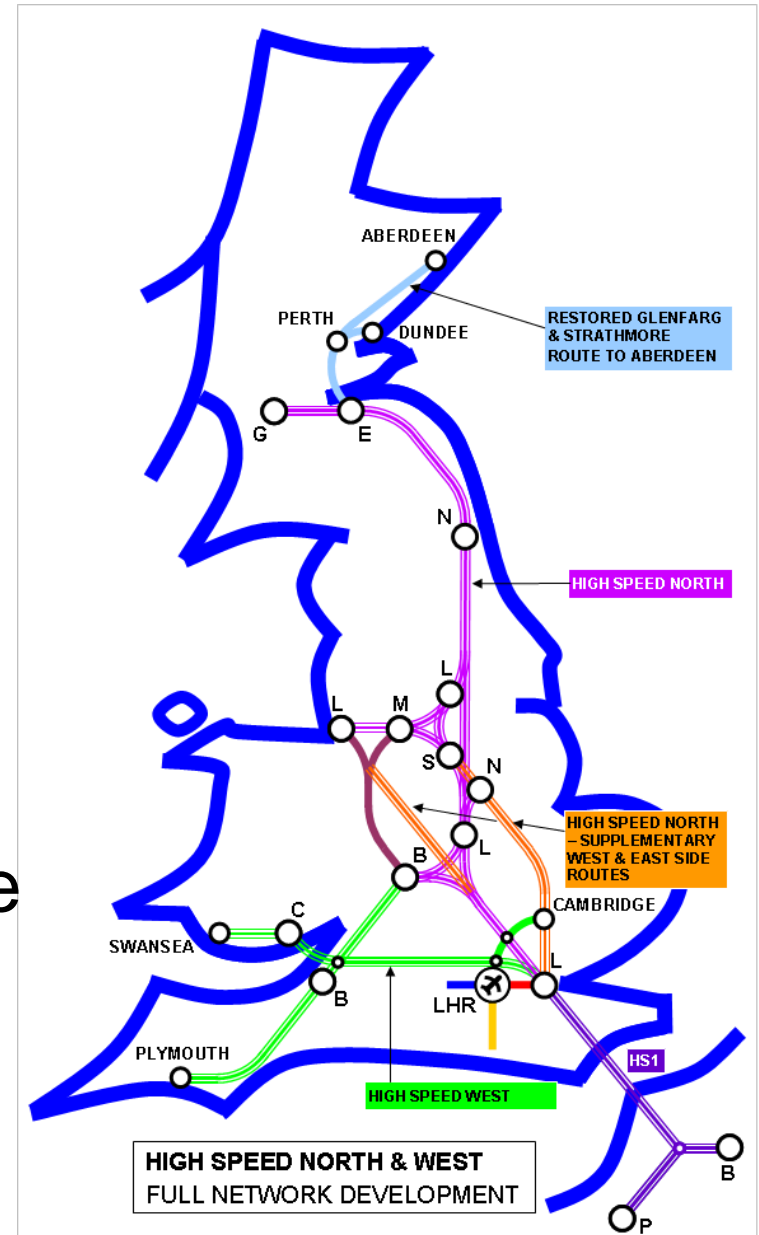


# London : Integrated Solution Required!



# UK : Integrated Solution Required!

- All major cities linked
- Economy of new build
- Addresses regional issues
- Better rail network
- Impact minimised
- Environmental best practice
- London terminal at Euston
- Regional links to Heathrow



# The European Dimension

- Services from North & Scotland through Chunnel to Europe
- Beyond Paris/Brussels
- Hourly to Amsterdam Cologne & Lyon
- Also to Schiphol & CDG
- Onwards to Spain, Italy Switzerland, Denmark
- Euro short haul reduced



## High Speed Misconceptions (3)

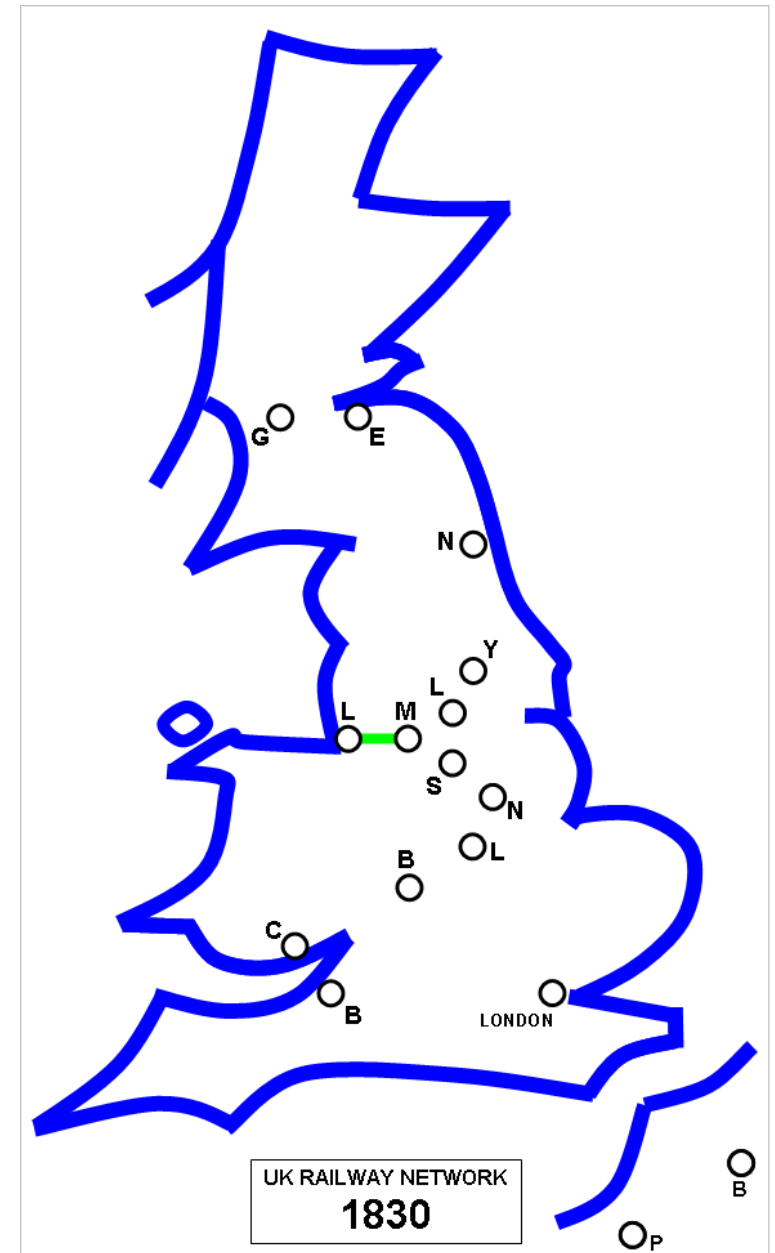
*West side HSL (HS2) must precede east side HSL (HS3)??*

### Facts:

- High Speed North initial spine strategy matches historical development of UK intercity railways
- Further HSL development migrates towards current 2-line system

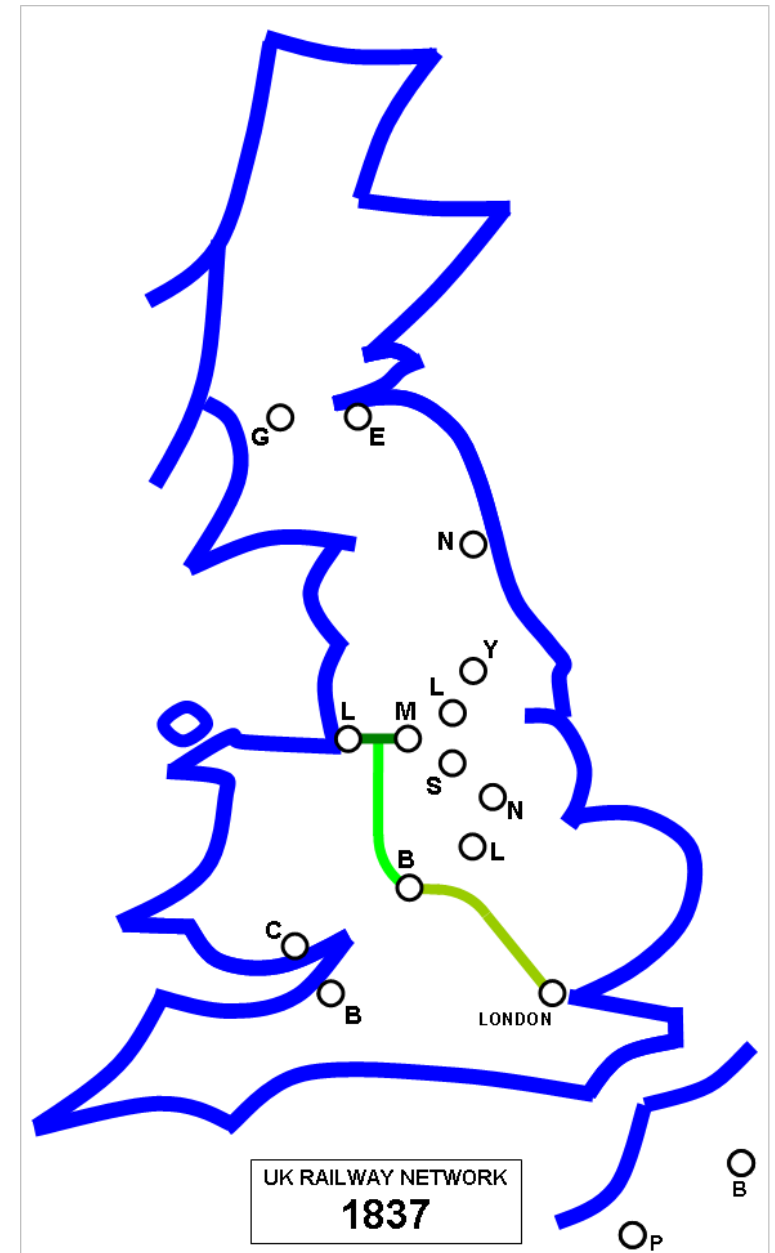
# High Speed North: Historical Parallels

- 1830: Liverpool & Manchester railway
- *World's first intercity railway*



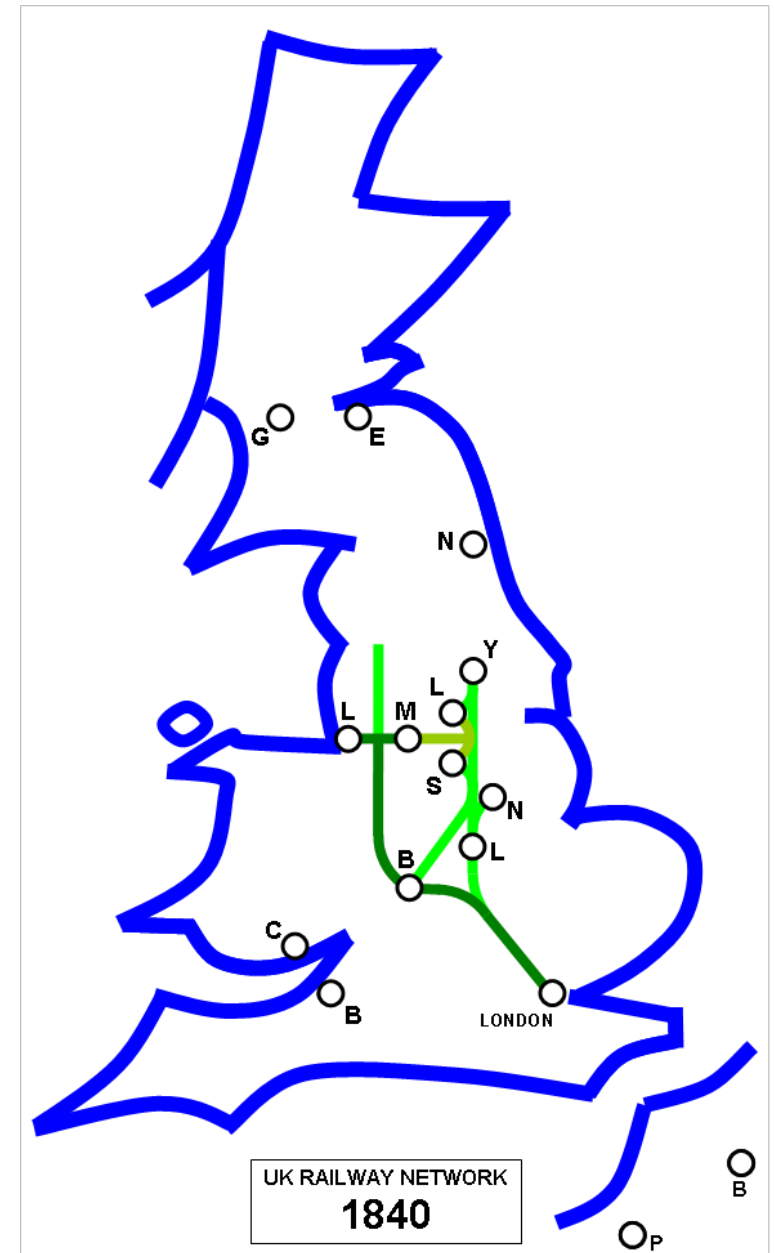
# High Speed North: Historical Parallels

- 1837: London & Birmingham railway
- 1837: Grand Junction railway
- *World's first intercity system*



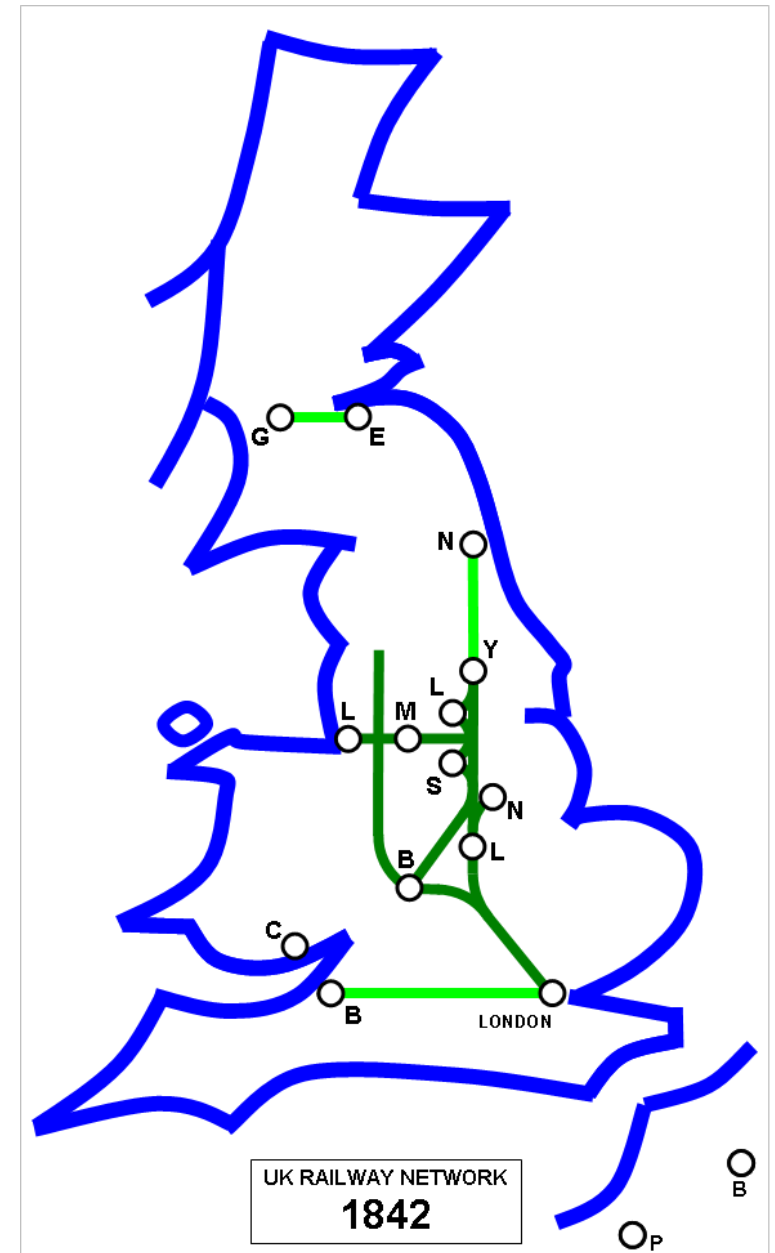
# High Speed North: Historical Parallels

- 1839: Lancashire & Yorkshire railway
- 1840: Midland Railway



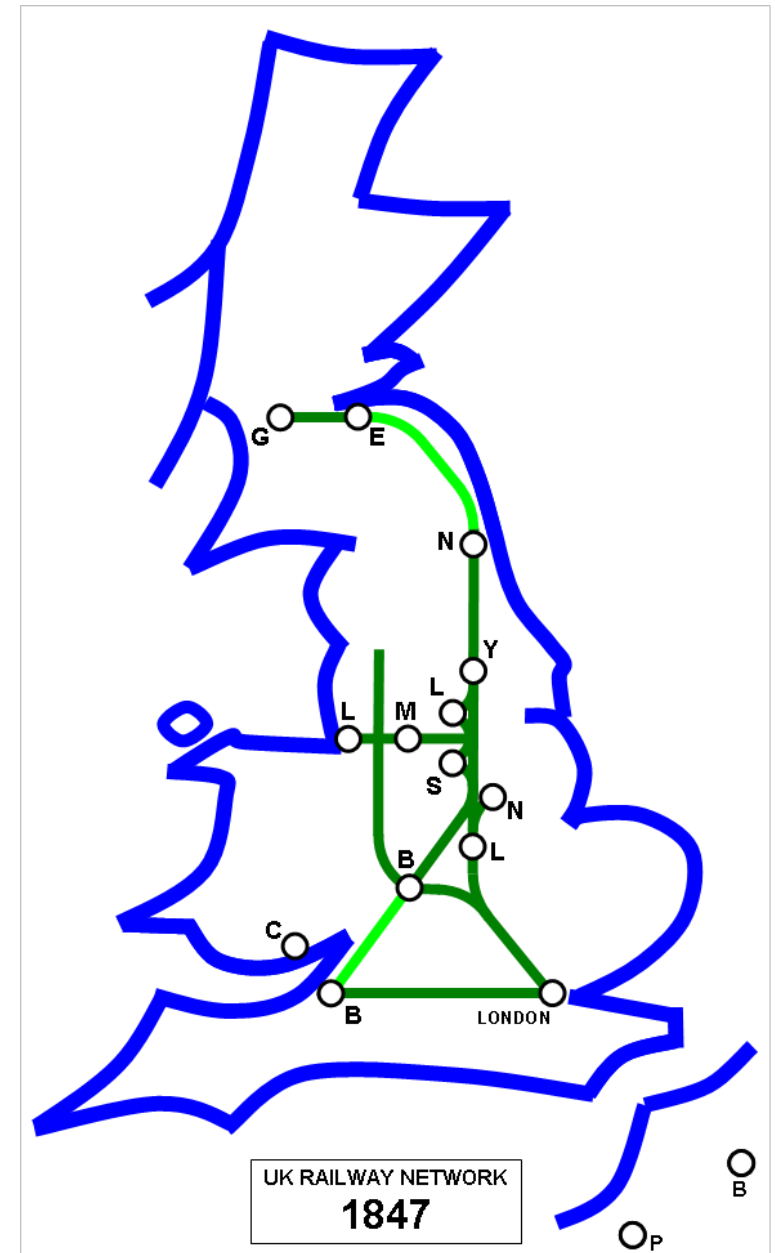
# High Speed North: Historical Parallels

- 1841: Great Western railway
- 1842: North-Eastern railway
- 1842: Edinburgh & Glasgow railway



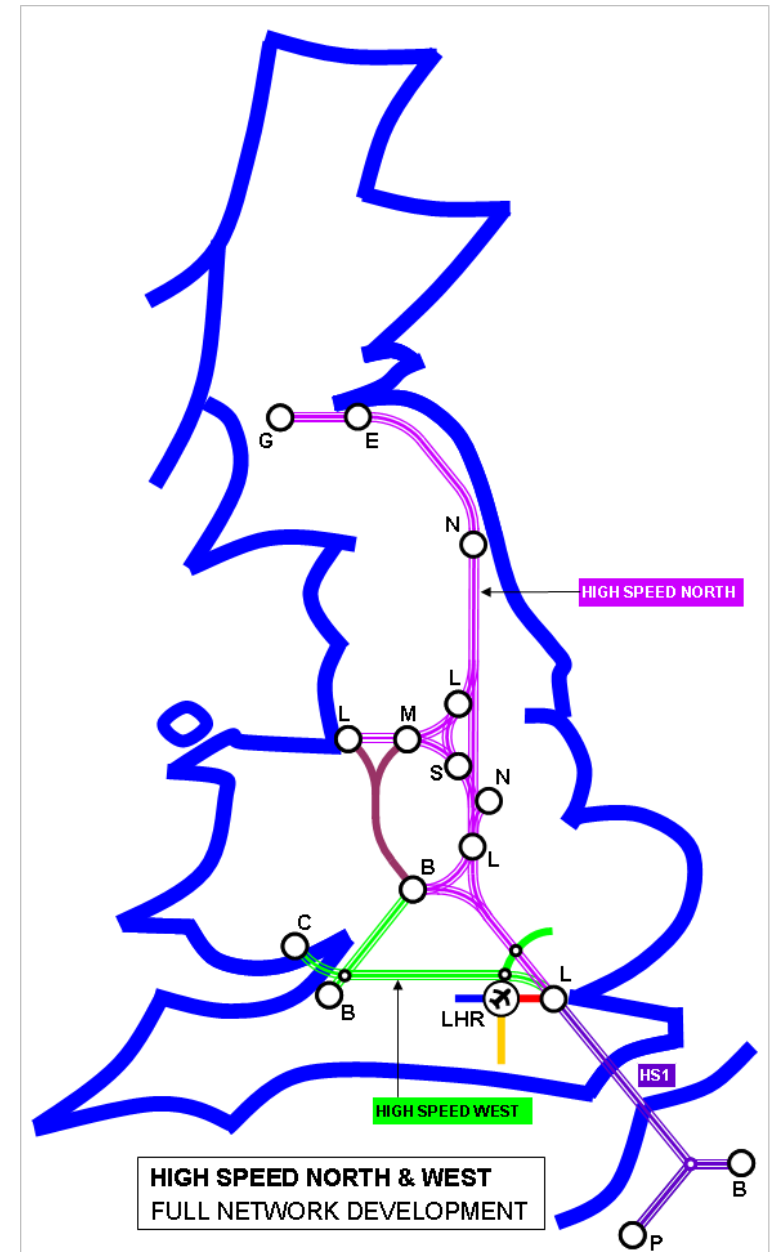
# High Speed North: Historical Parallels

- 1844: Midland railway extends to Bristol
- 1847: first link to Scotland via east coast



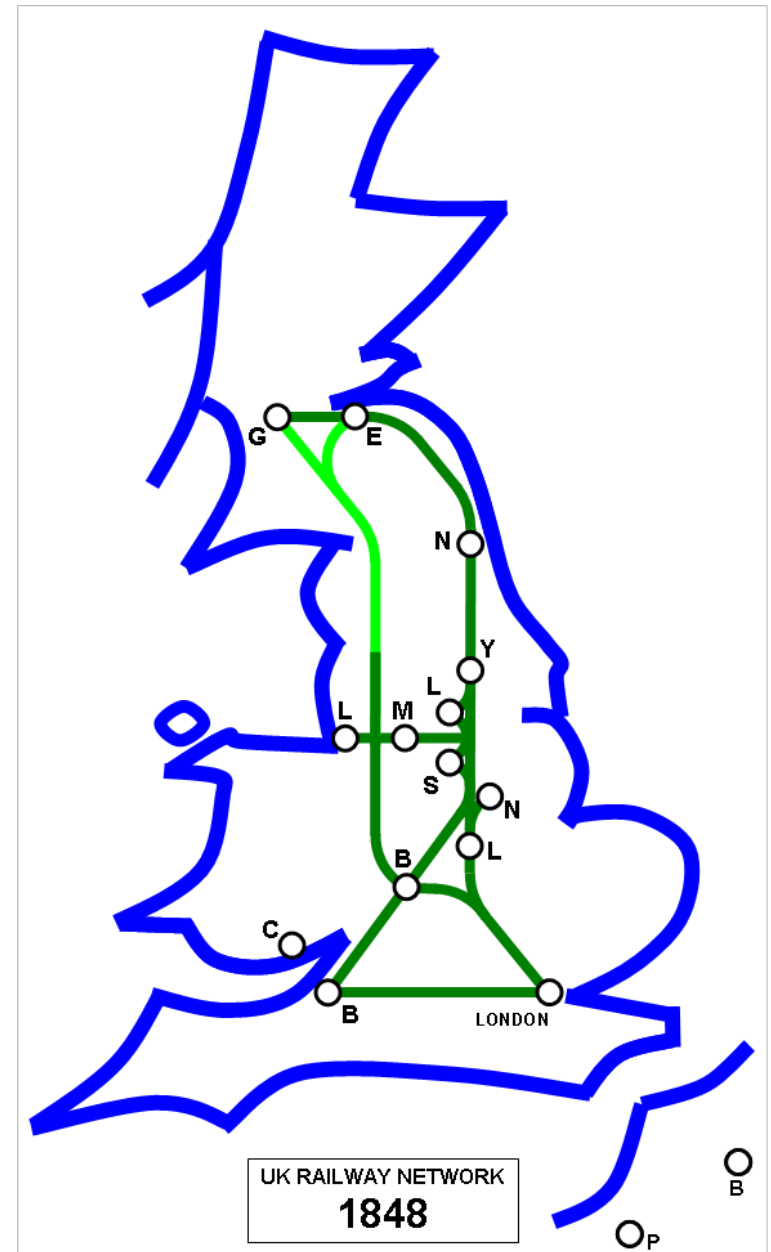
# High Speed North: Historical Parallels

- *Comparison with High Speed North (and the core elements of High Speed West)??*



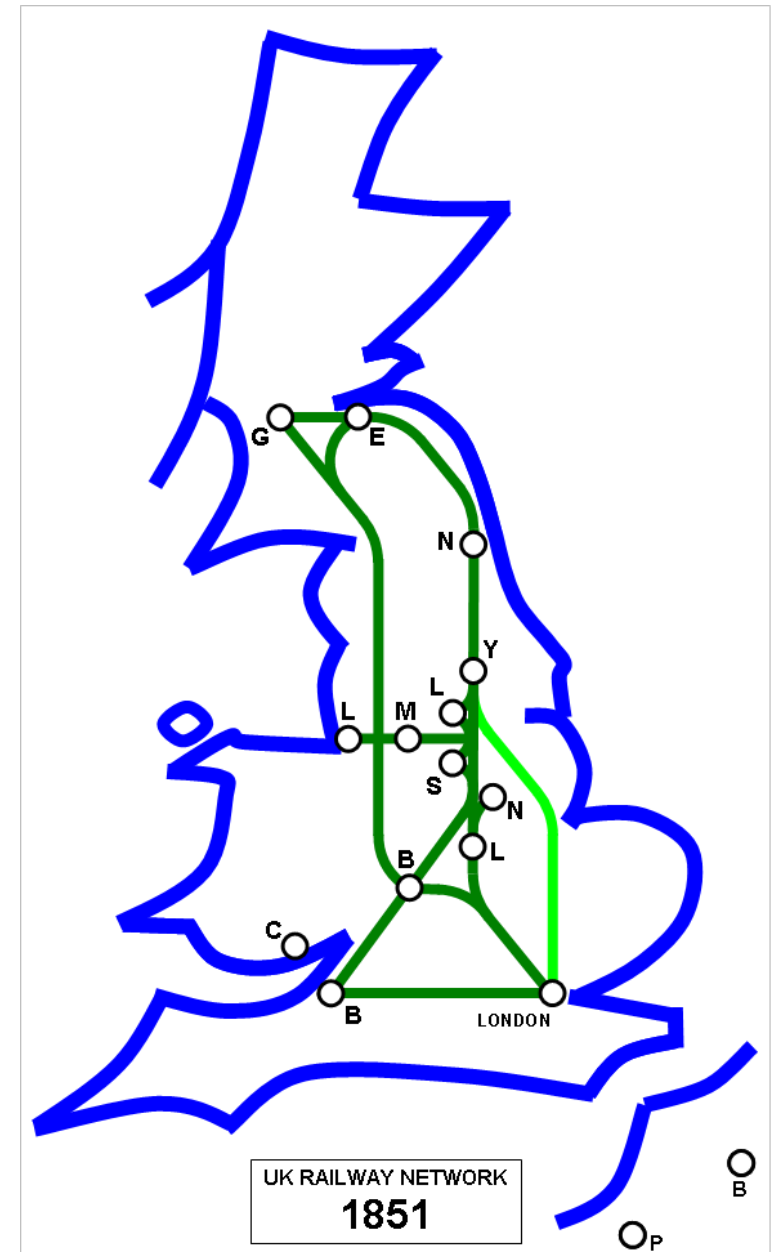
# High Speed North: Historical Parallels

- 1848: Lancaster & Carlisle railway
- 1848: Caledonian railway to Edinburgh & Glasgow
- *WCML complete*



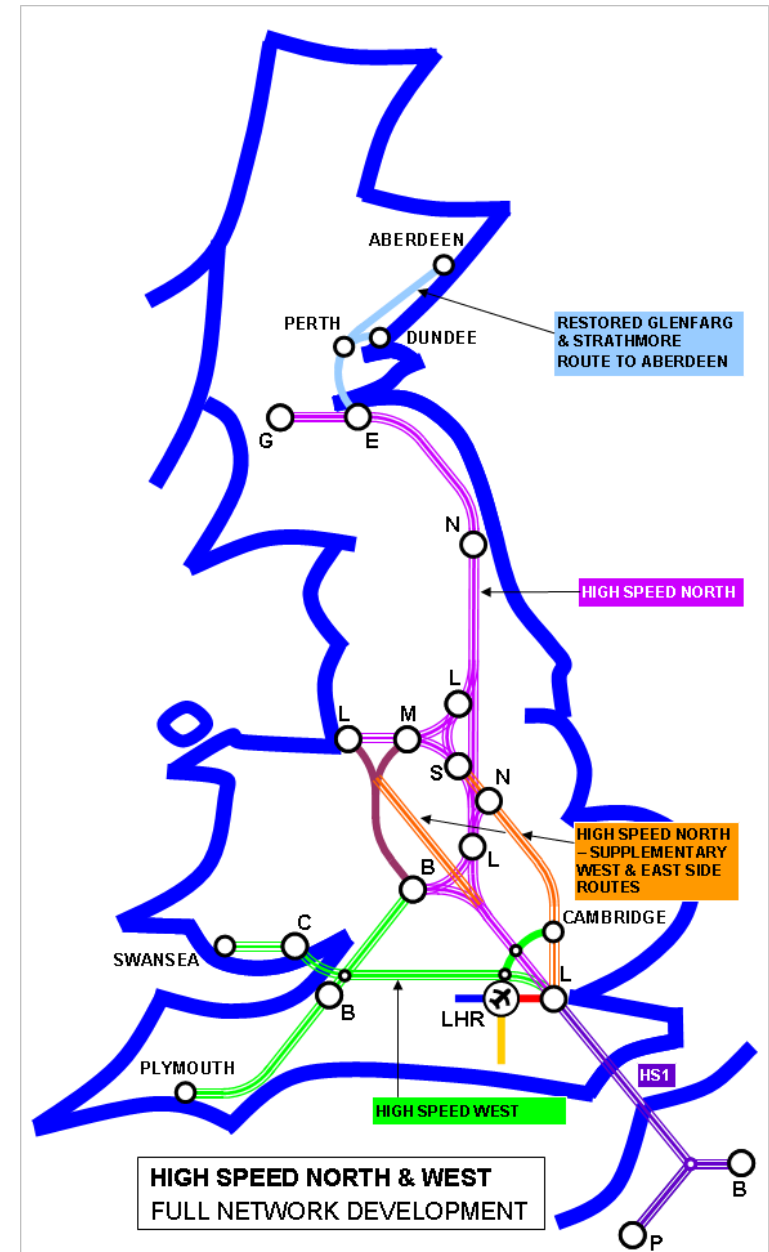
# High Speed North: Historical Parallels

- 1851: Great Northern railway from Yorkshire to London
- *ECML complete*
- *All achieved in 21 years!!*



# High Speed North

- Engineered solution
- Environmental best practice
- Basis for development of UK high speed rail
- Huge benefits to UK plc
- Outperforms its rivals
- Prove me wrong – or make it better!!

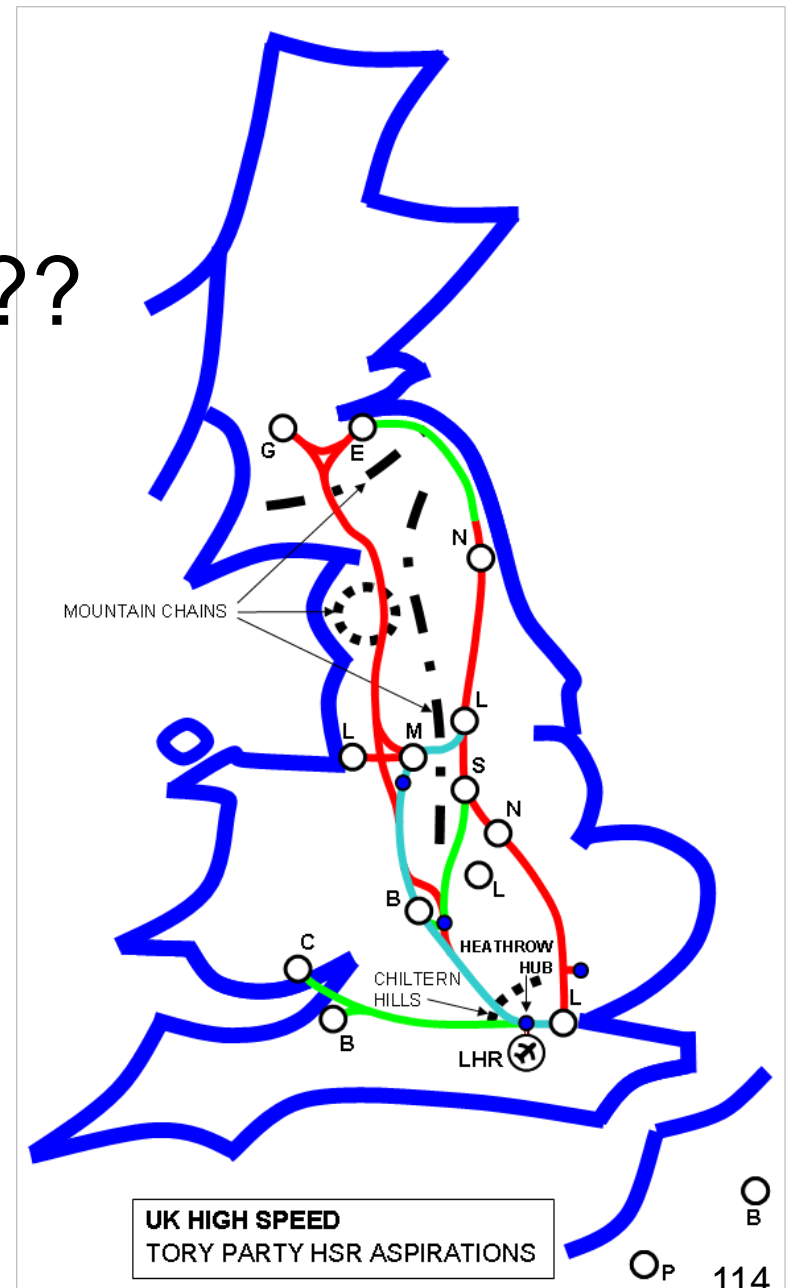


# High Speed Rail – Where Next?? Tory Party Proposals??



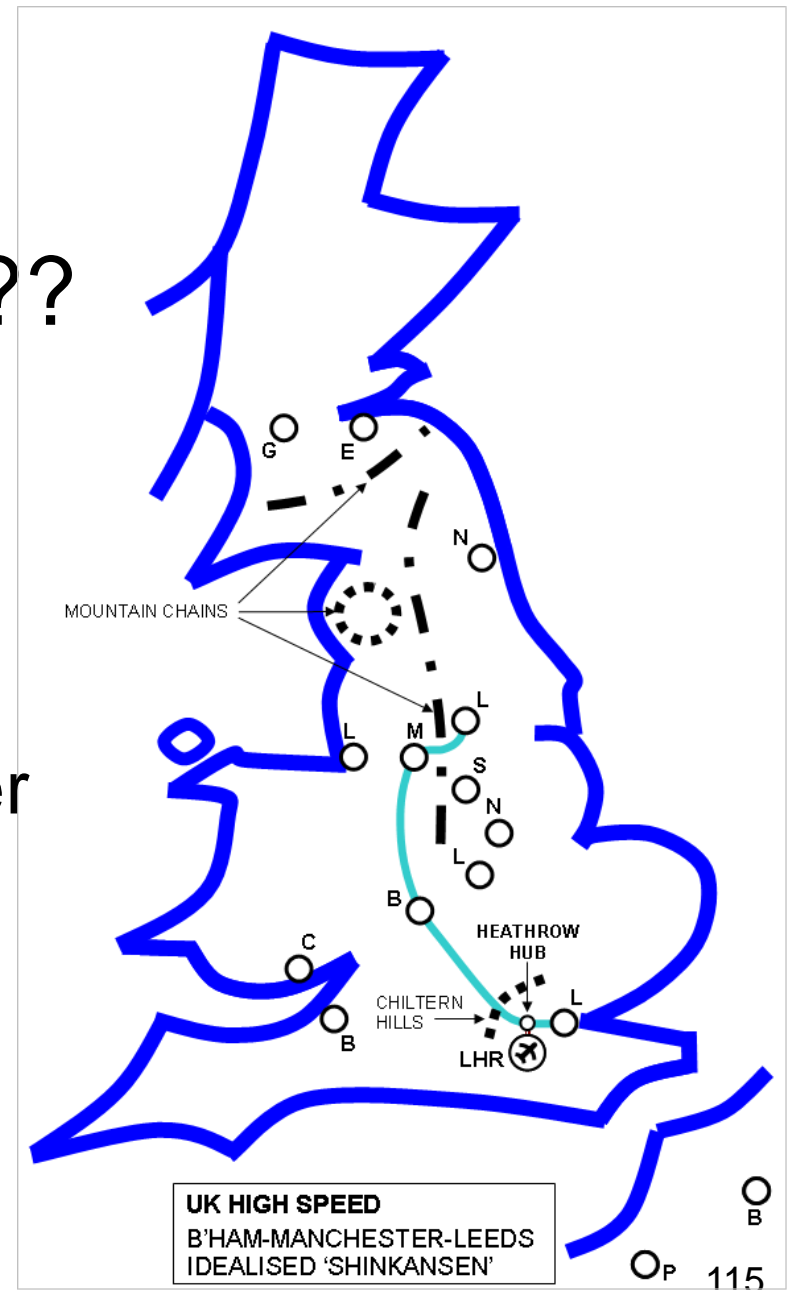
# High Speed Rail – Where Next?? Tory Party Proposals??

- Full network circa 1500km??
- Based on Heathrow Hub
- Heavy Arup influence
- Very airport-centric
- Core element – semi-circular Shinkansen to Leeds



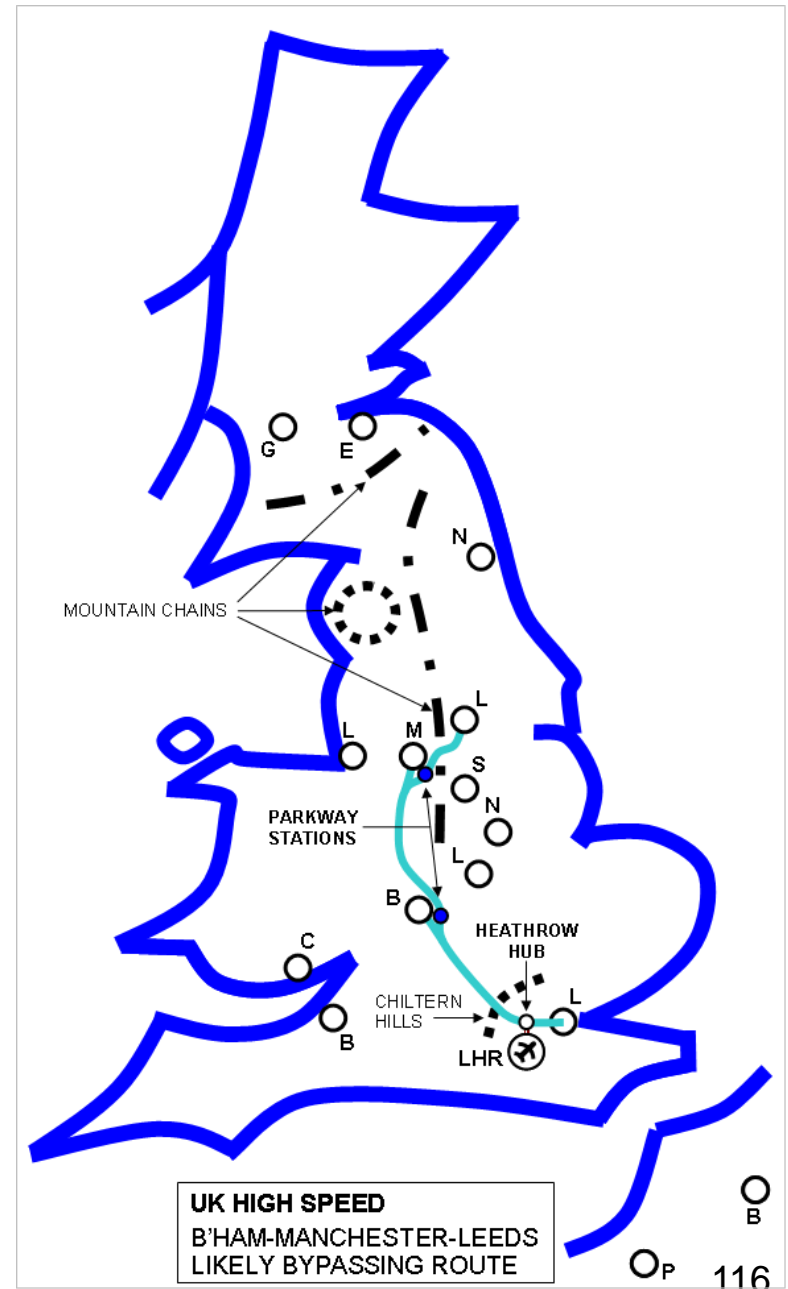
# High Speed Rail – Where Next?? Shinkansen to Leeds??

- Does it work??
- Requires time-sensitive route through centres of Birmingham & Manchester
- Feasible journey time to Leeds??
- Chiltern issues!!
- Low flows to Heathrow



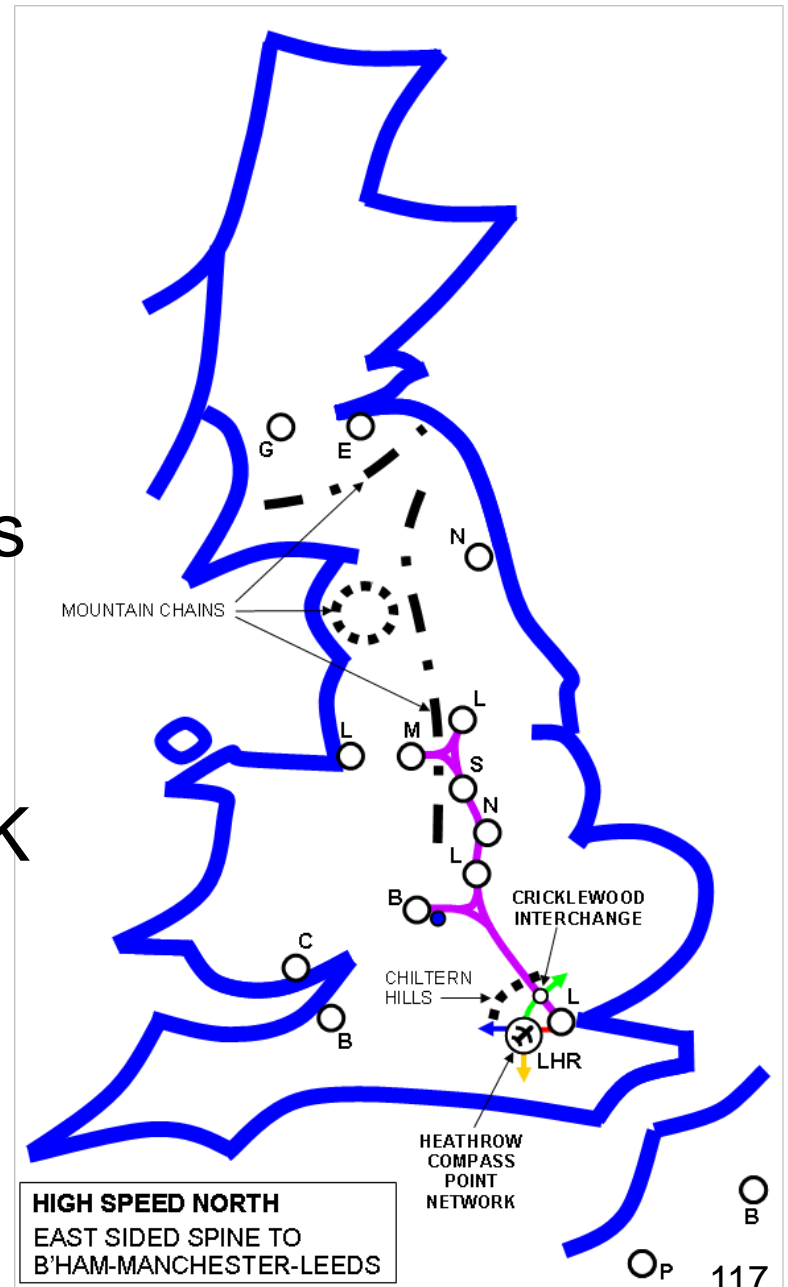
# High Speed Rail – Where Next?? Shinkansen reality??

- Bypassing alignments essential
- Functionally identical to High Speed North



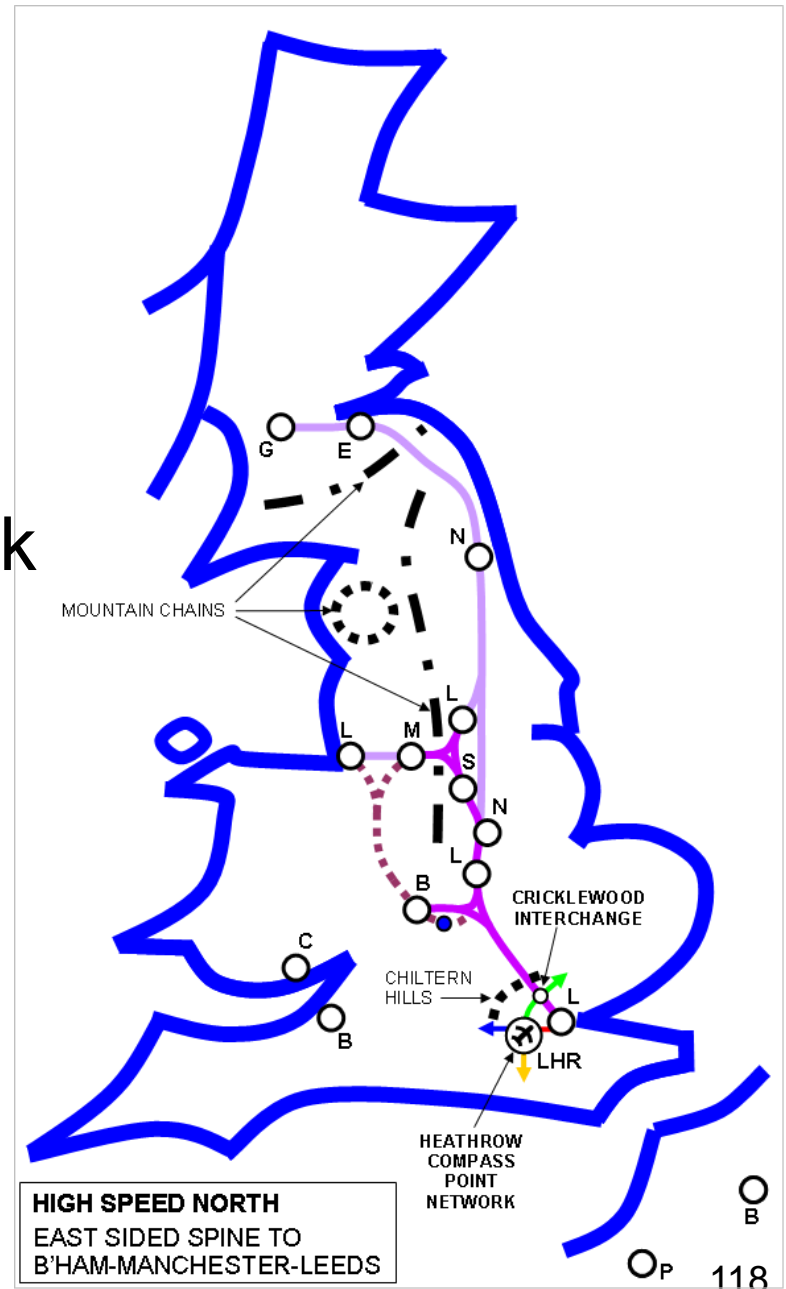
# High Speed Rail – Where Next?? HSN alternative??

- More direct route to Leeds
- Serving intermediate destinations
- Springboard for further UK high speed development



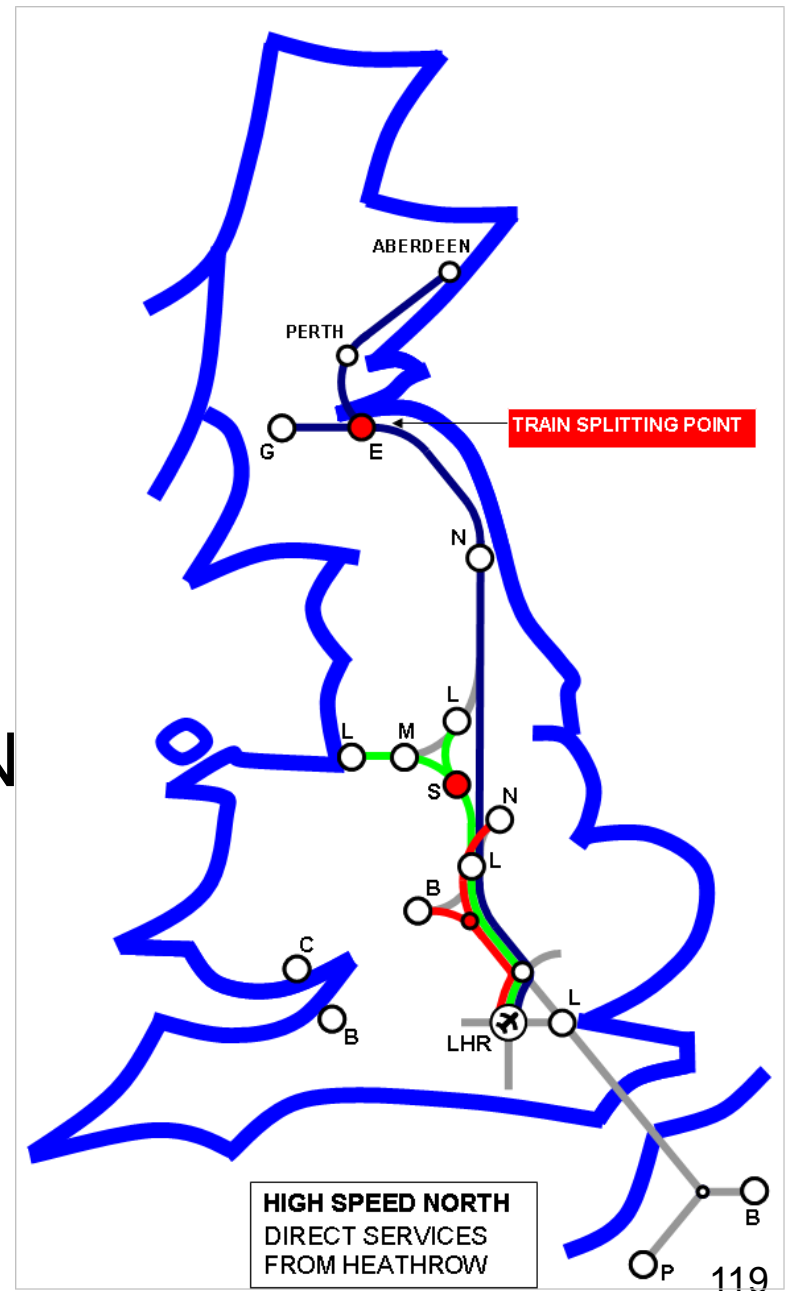
# High Speed Rail – Where Next?? HSN alternative??

- HSN develops more efficiently into true network
- 930km vs circa 1500km
- Quicker roll-out
- Functionally matches Bow Group Proposals
- Possibility of direct 'interlining' trains from North to Heathrow??



# High Speed Rail – Where Next?? Heathrow Access??

- Heathrow access crucial political issue
- Interlining trains essential
- Network efficiency of HSN permits dedicated airport trains without compromising capacity



# High Speed Rail – Engineered Solution Required!!

- Time to reassert the primacy of the railway engineer
- Fit for purpose integrated railway solutions required
- Do we want HSR to happen?? It's up to us.

