



HS2 – Rail as a Catalyst for Growth

The wider regional development and social equity story of fast rail

Prof Andrew McNaughton FREng

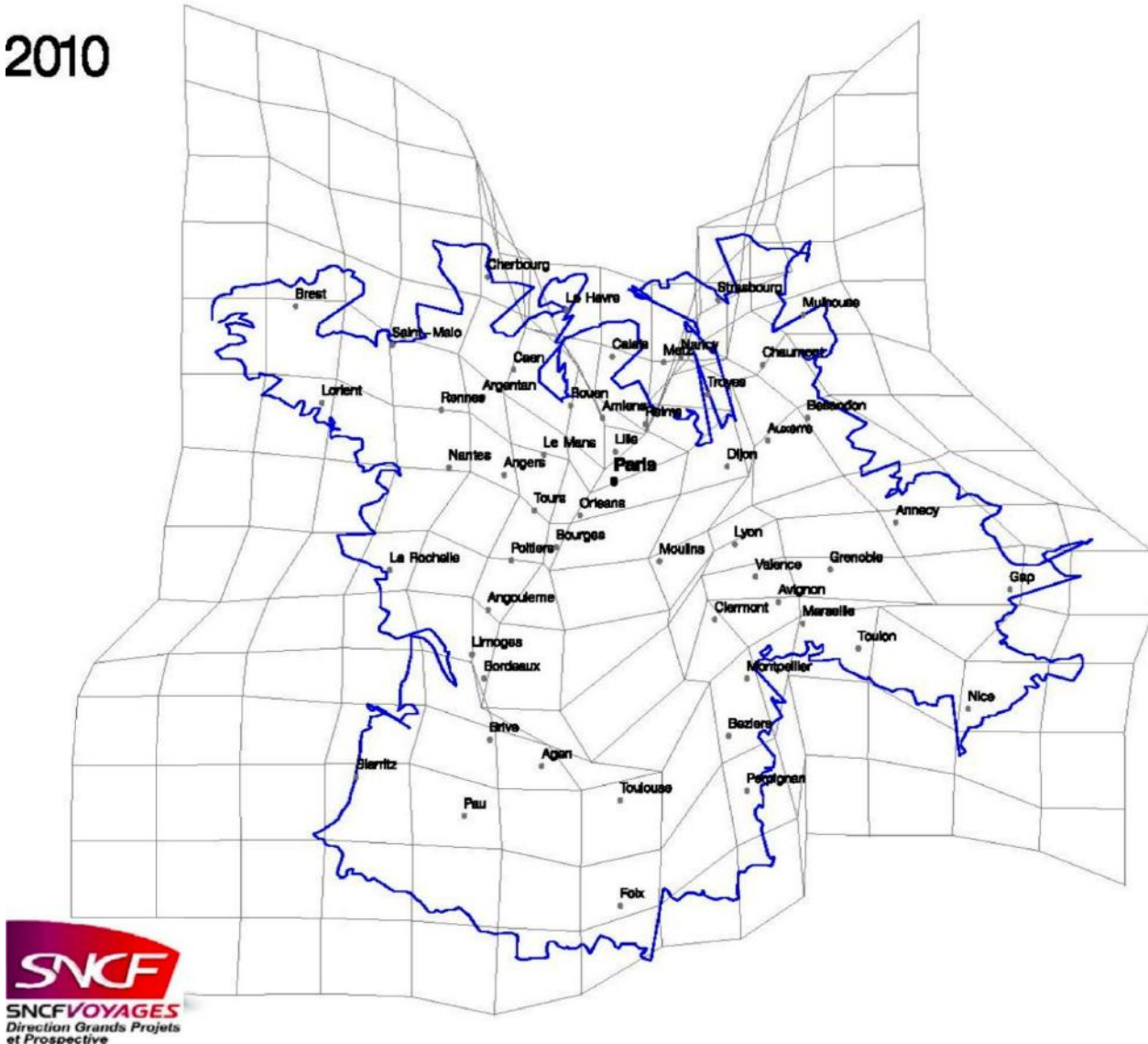
“Fast” or high speed rail is 55 years old



France describes it as “shrinking the country”

- Distance becoming defined by journey time rather than kilometres

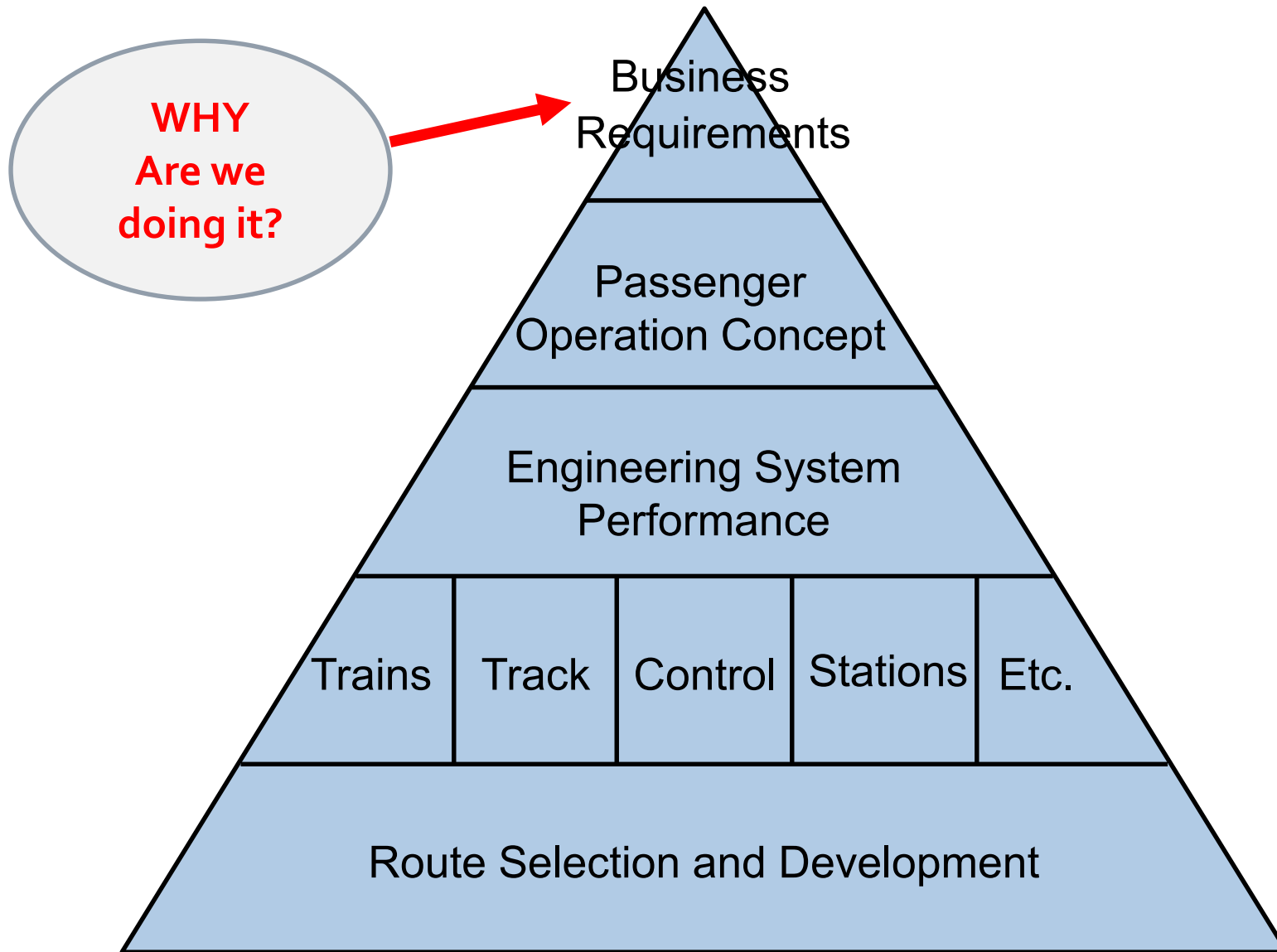
2010



It's not really about air substitution

- Rail needs high demand to be viable
- Very long distance / international services are glamorous but low volume
- Large flows between cities are the foundation (1-2 hours)
- Shorter distance fast regional services can use spare route capacity





4 Tiers of benefit – more than just a railway

- To the direct users
 - Time saved
 - Reliability / dependability
- To other transport users
 - Capacity released on existing infrastructure
- To cities served
 - Activating development potential for core employment sectors
- To the wider region surrounding the cities
 - Economic and social connectivity
 - Overcoming regional isolation

Three isochrones of time

Business dynamic

30 minutes

Behaves as a single city
Sufficient support resource

60 minutes

Common pool of skilled people
Merged supply and technology market

120 minutes

Ready access to non-routine specialist
resource eg finance and legal

Human dynamic

30 minutes

Spontaneous meeting, cultural and social
circles

60 minutes

Practical commuting
Easy maintenance of relationships

120 minutes

Practical radius for regular leisure
expeditions and visits to friends and
relations

Britain is a small but rapidly growing country

Population of England

- 2008 52m
- 2033 60m
- 2050 70m

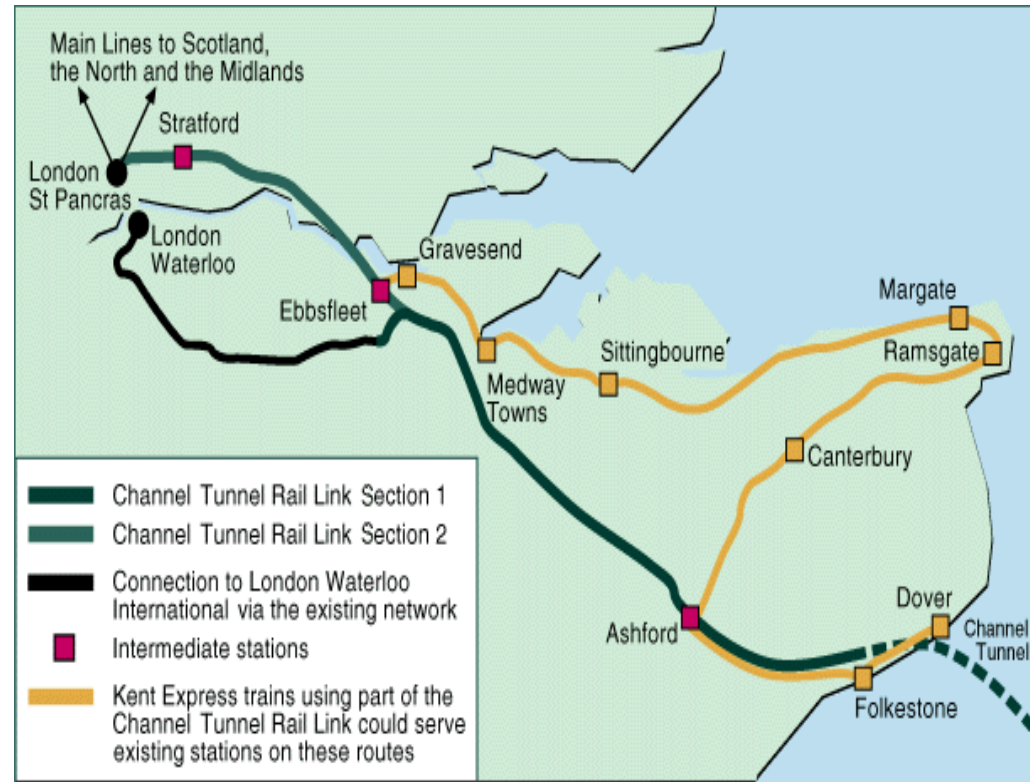
Living in city regions of typically 3-5 million around 150-200km apart

- Today 41m
- 2050 61m



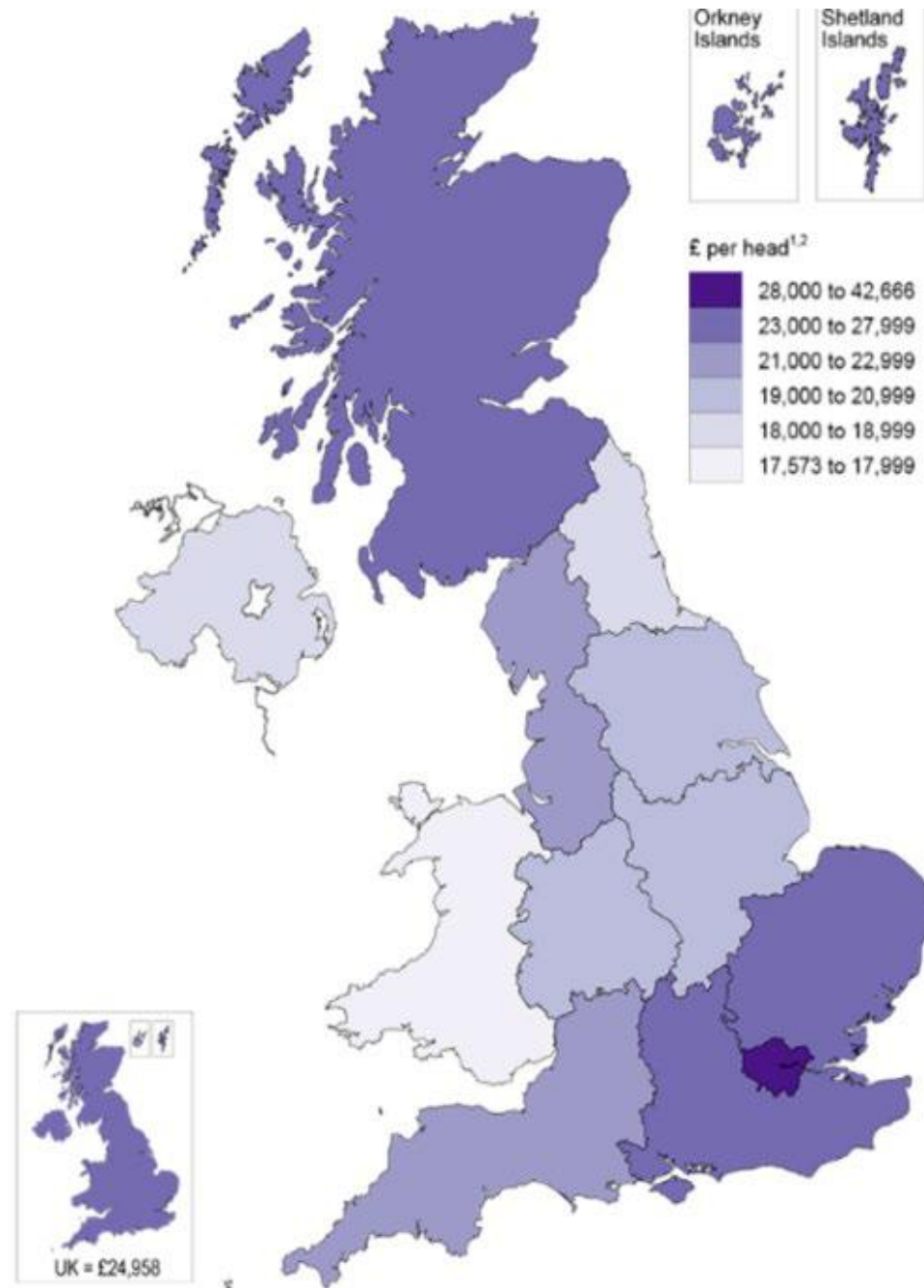
HS1 – impact of fast reliable commuter services

- Originally £5bn capital cost
- 1 or 2 long distance International services per hour
- 6+ 200km/h “commuter” trains per hour. East Kent brought within 1 hour
- Regional economic development worth £10bn over first 10 years
 - Access to London jobs
 - New businesses creating new local jobs
 - New tourism businesses
 - Land value rise



With wide variations
in prosperity

Regional Productivity in the
UK
(GVA per head, 2014)





HS2 Initial Network

- London to
 - Birmingham 1-24 to 0-49
 - Manchester 2-08 to 1-13
 - Leeds 2-12 to 1-20
- Birmingham to
 - Manchester 1-34 to 0-41
 - Leeds 2-05 to 0-49

Note

Red is HS2 new HS line

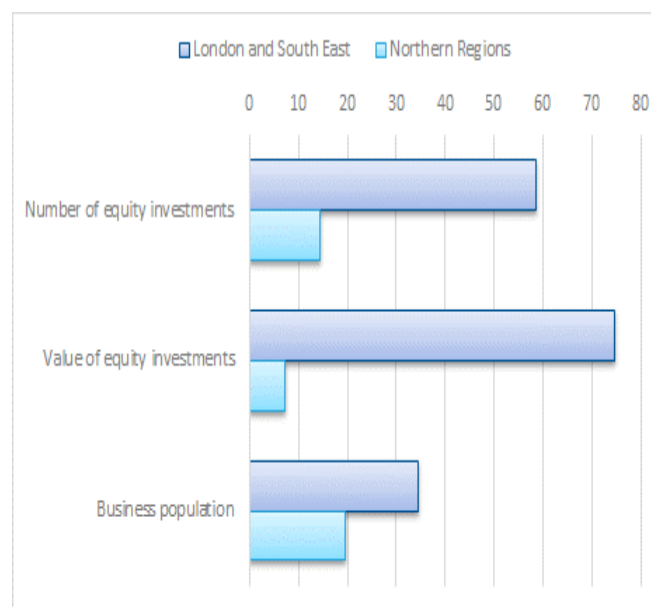
Blue is through HS2 services onto existing lines

Creating opportunities to drive up productivity

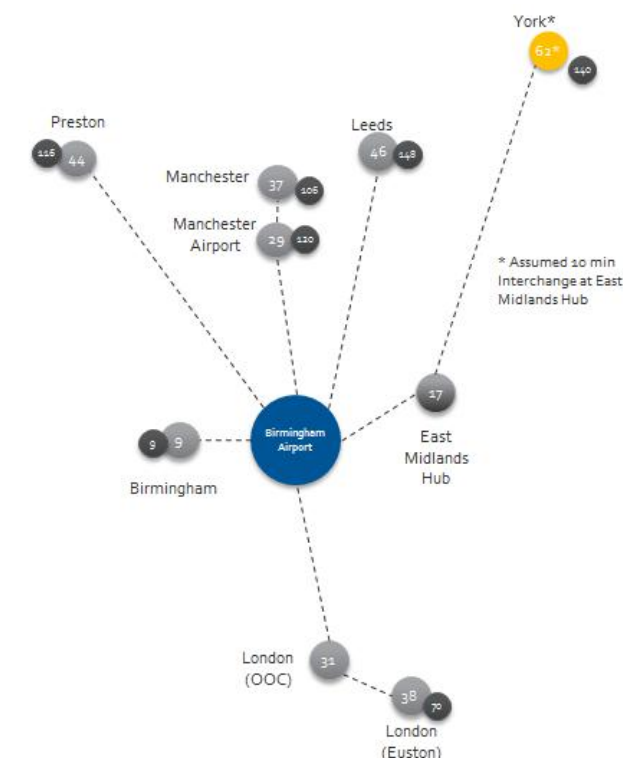
Lower costs

Office rents Regions	£/sq ft
- Birmingham	£30
- Leeds	£26
- Manchester	£34
- Newcastle	£24
- Nottingham	£20
London	
- City	£68
- Holborn	£69
- King's Cross	£80

Access to finance



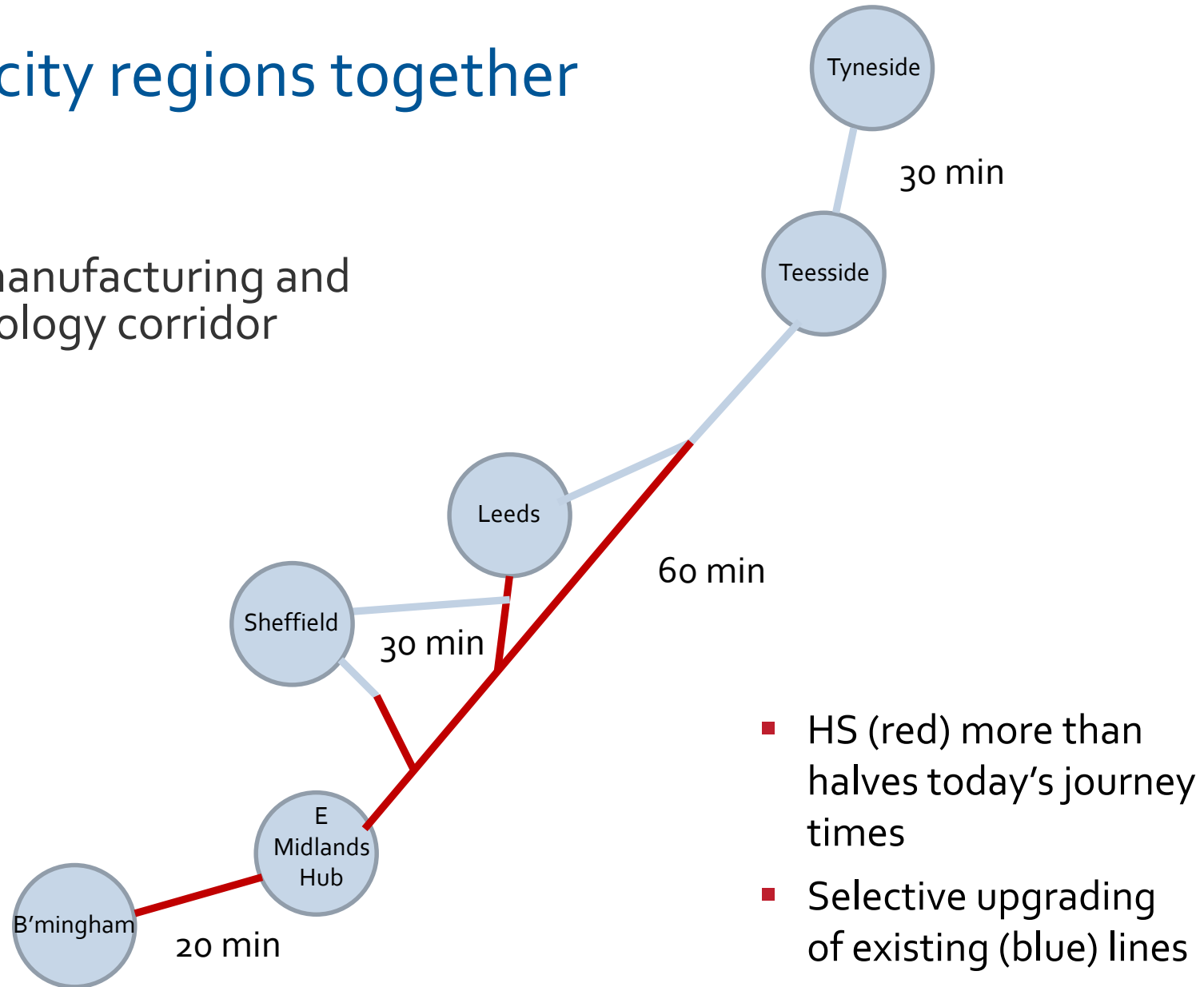
Access to markets



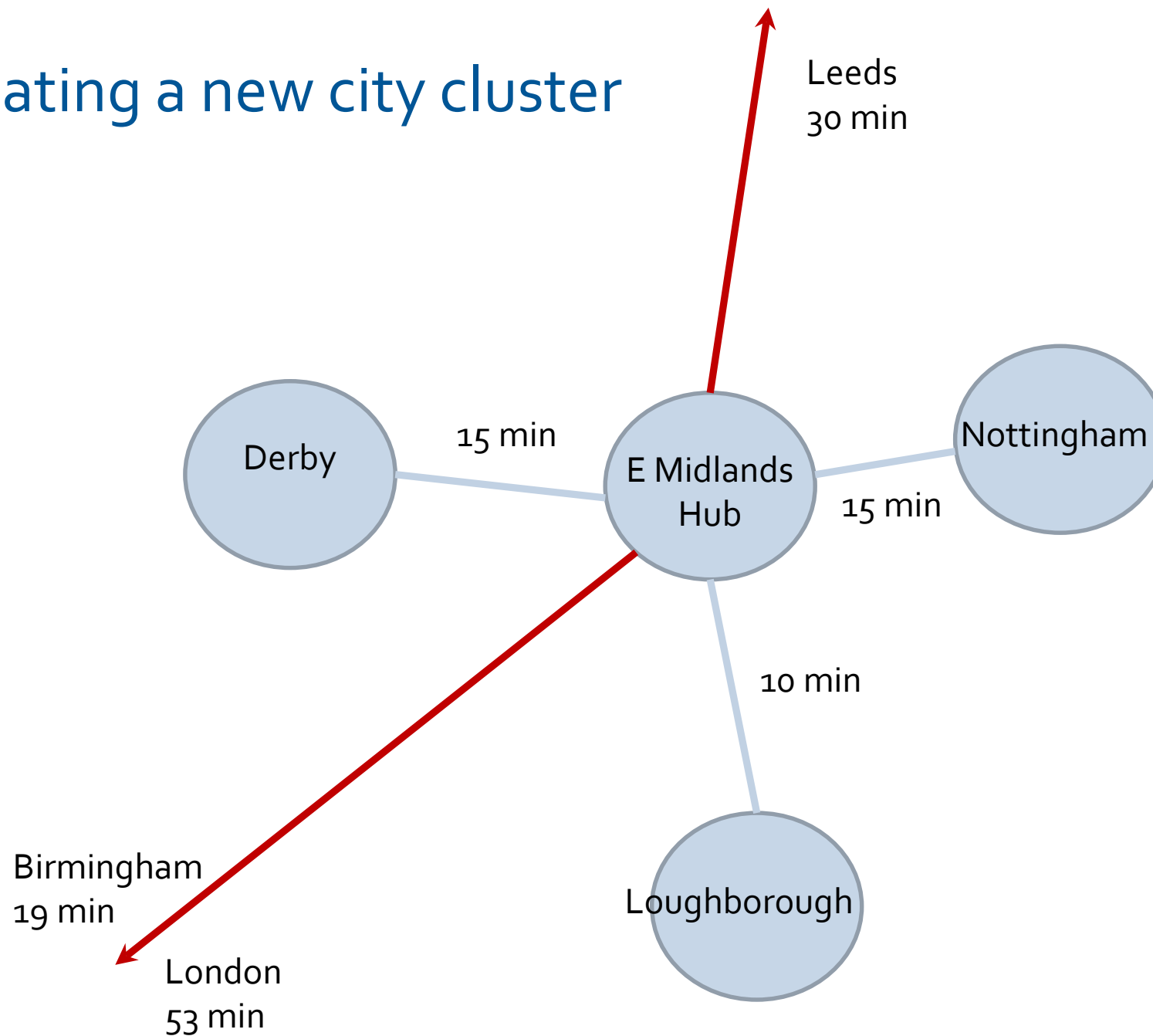
Source: Getting the best out of Britain, November 2017

Connecting city regions together

- The manufacturing and technology corridor



Creating a new city cluster



Czech Republic

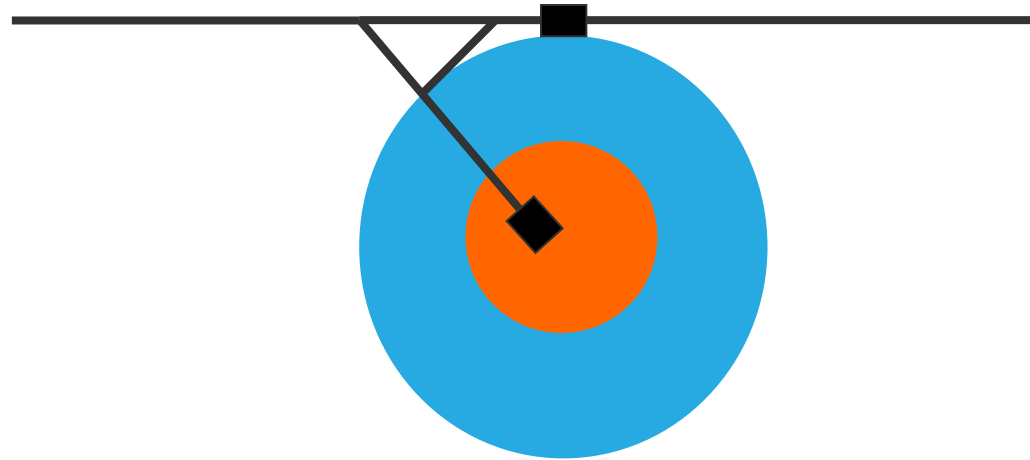


Station location is very important

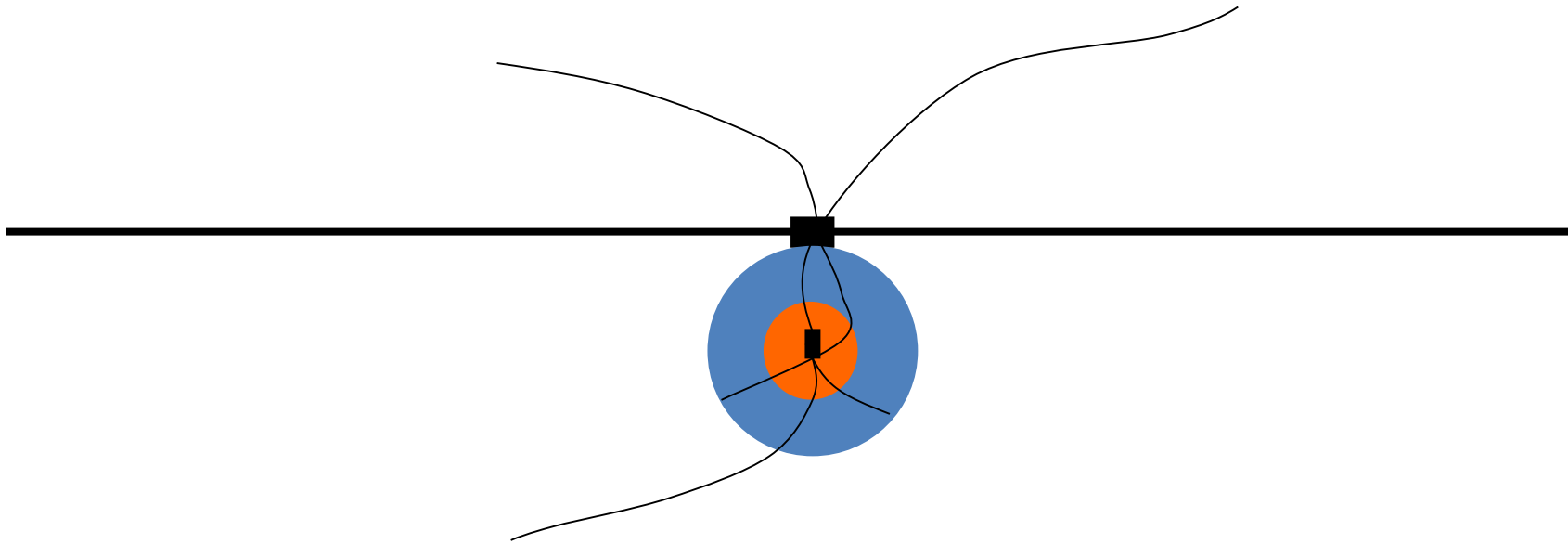


Large cities generate strong demand from city centre stations

But many passengers in suburbs prefer to use stations on the city fringe where they are quicker and more convenient to access



City fringe stations can be successful if there are good local transport links



Growth at and around stations

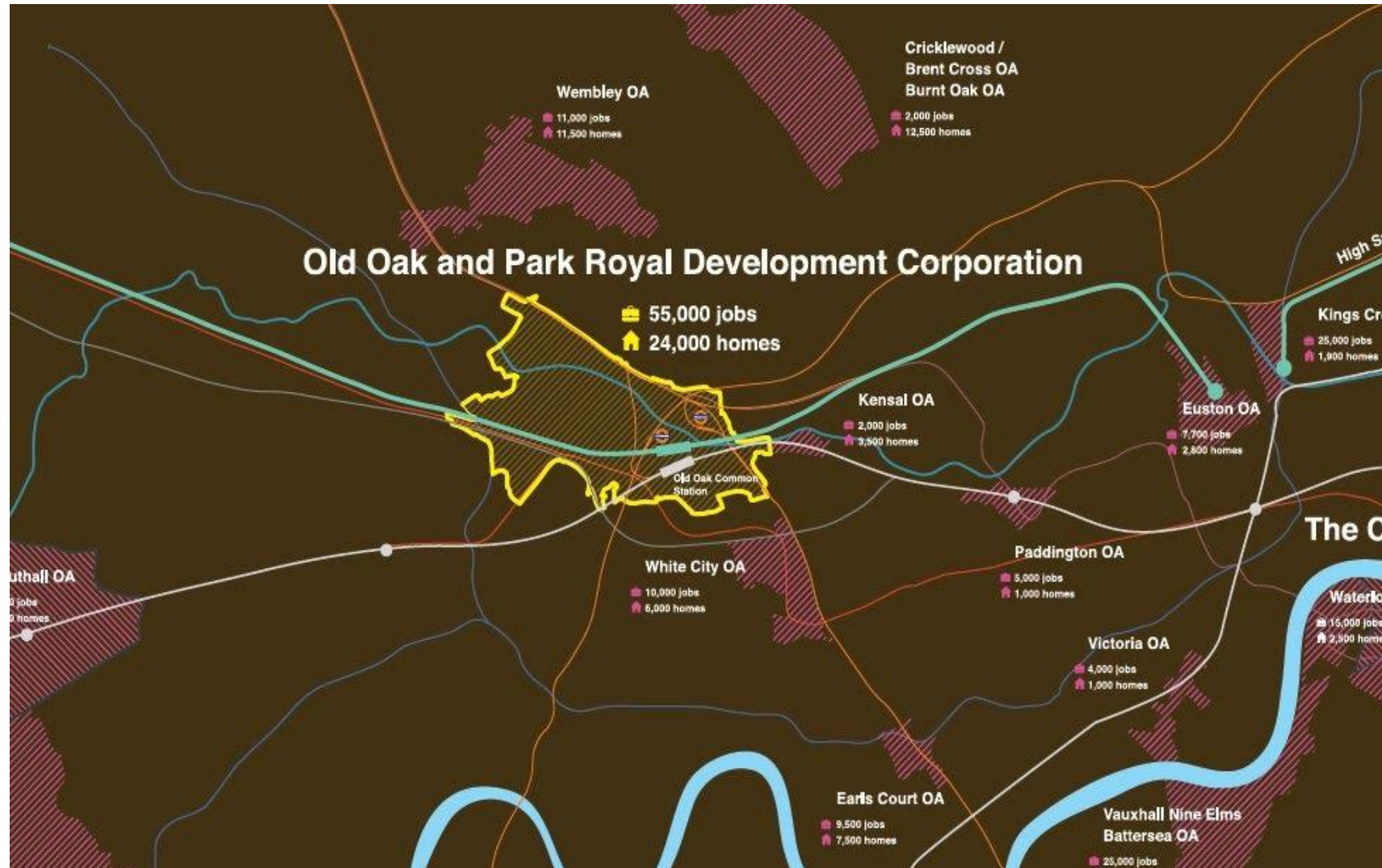
- Creating new business quarters
 - Lyon
 - Shinagawa
 - Old Oak Common
 - Birmingham
- Distance of high value development limited to around 500m
 - 10 minute “rule”
- Benefits extended with good connecting local transport
 - Eg Lille, Kassel
- Wider benefits to support service economy
 - Each new key industry job leads to 2-3 support jobs



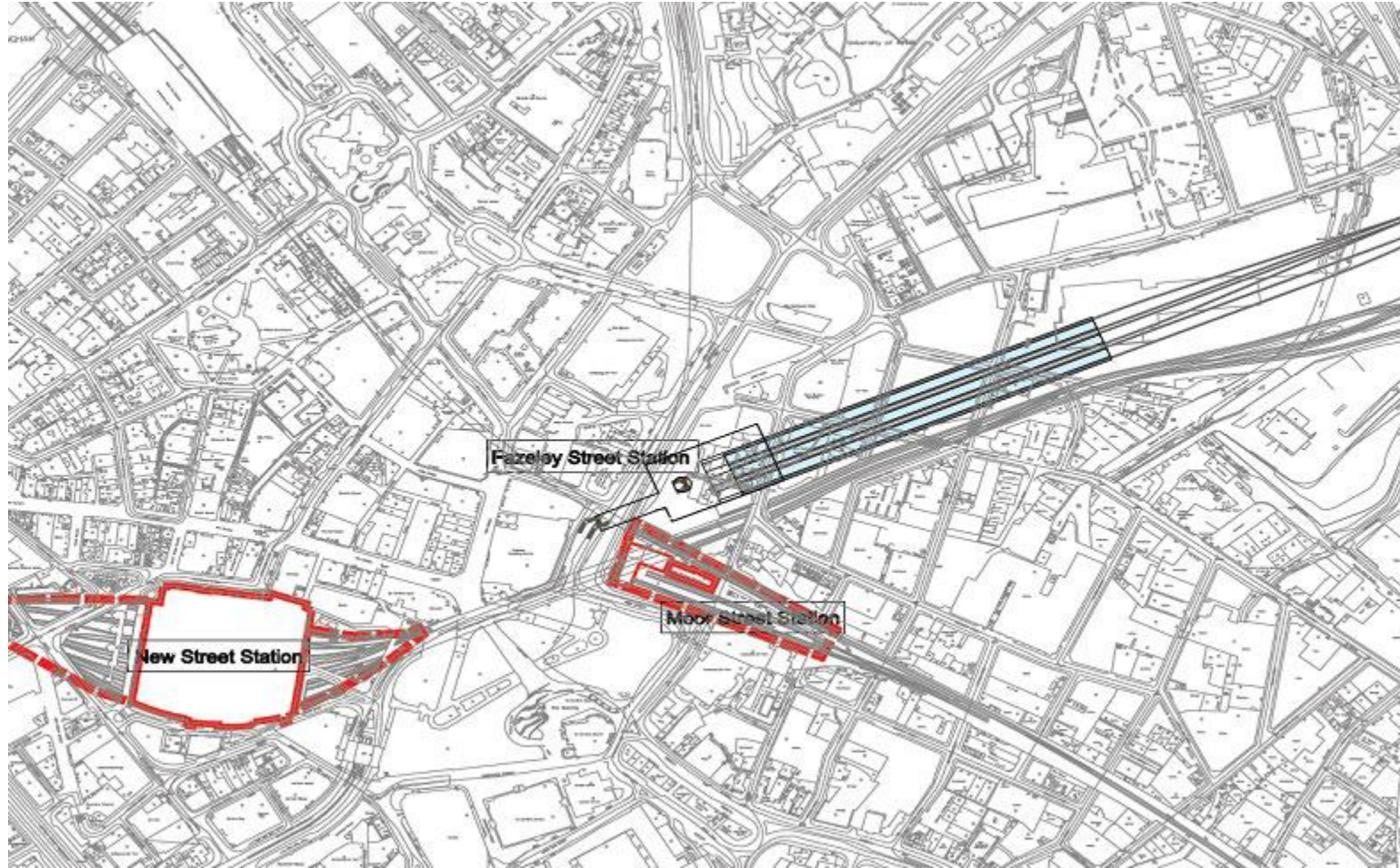
West London Old Oak Common Site



The catalyst for urban development



New Central Birmingham Station



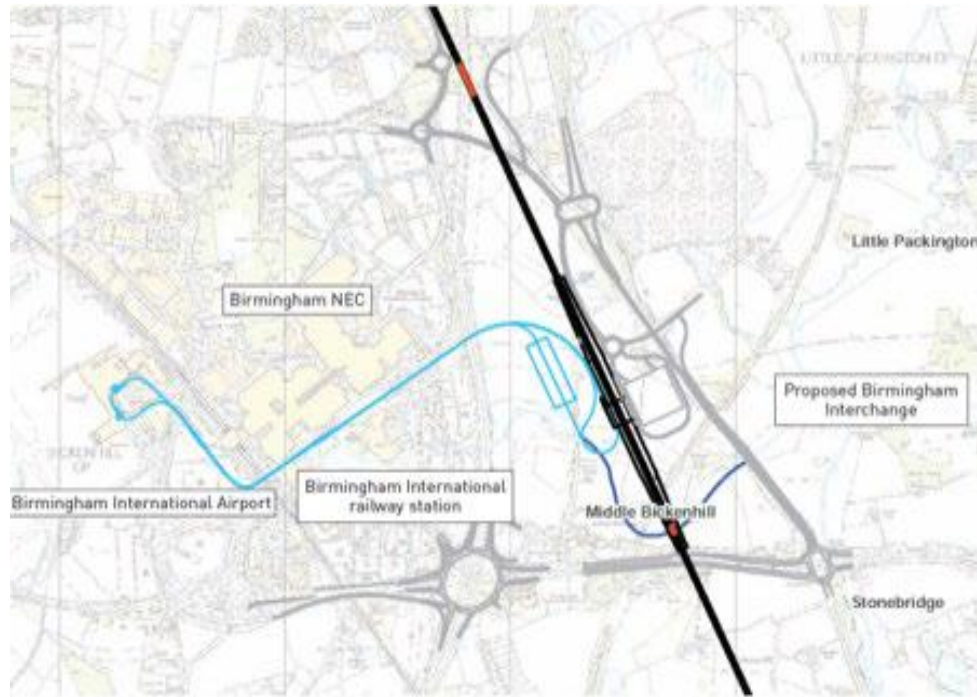
Central Birmingham

- HS2 is at the centre of a masterplan
- Potential for:
 - 36,000 jobs
 - 5m sq ft of employment space
 - 4,000 new homes
 - £1.4bn of economic benefit

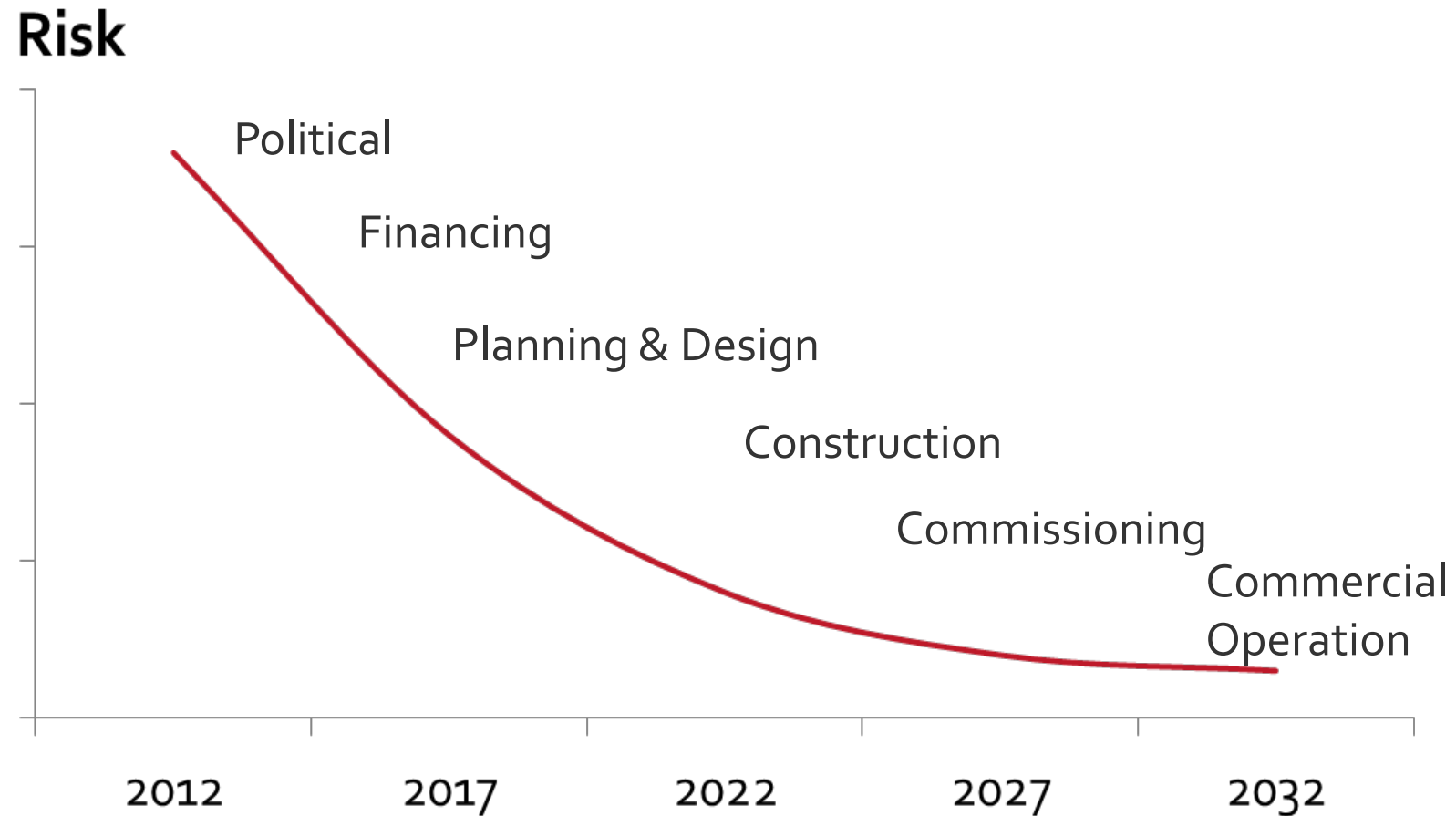


And Birmingham Interchange serving the wider city region

- Plans for new sustainable city “UK Central”



Public funding is a consequence of project risk



Consultation is a core competence

- Consultation on HS2 Strategy
- Consultation on preferred and alternative route options – 55,000 responses on first stage
- Property compensation consultations
- Consultation on the contents and methodology of an environment statement
- Environment Statement consultation
- Parliamentary scrutiny
 - 3200 petitions



EIA / Environmental Statement

- Key Policies
 - Sustainability Policy – balanced, proportionate and practicable
 - Environmental Design Aims
 - Code of Construction Practice
- 16 Technical Annexes
 - From Air Quality to Waste Materials
- How do you make 50,000 page Statement accessible?

A significant challenge is noise reduction

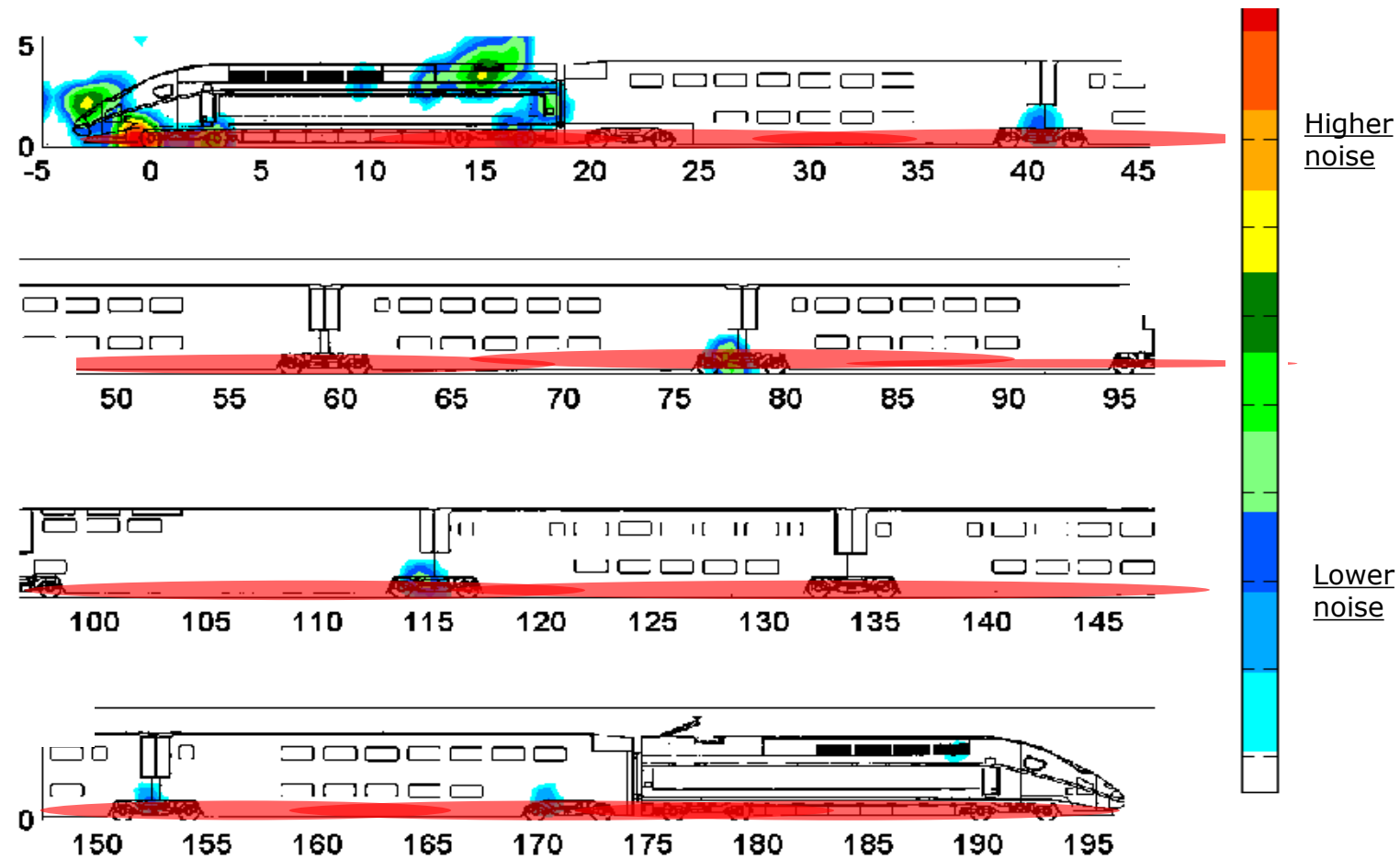
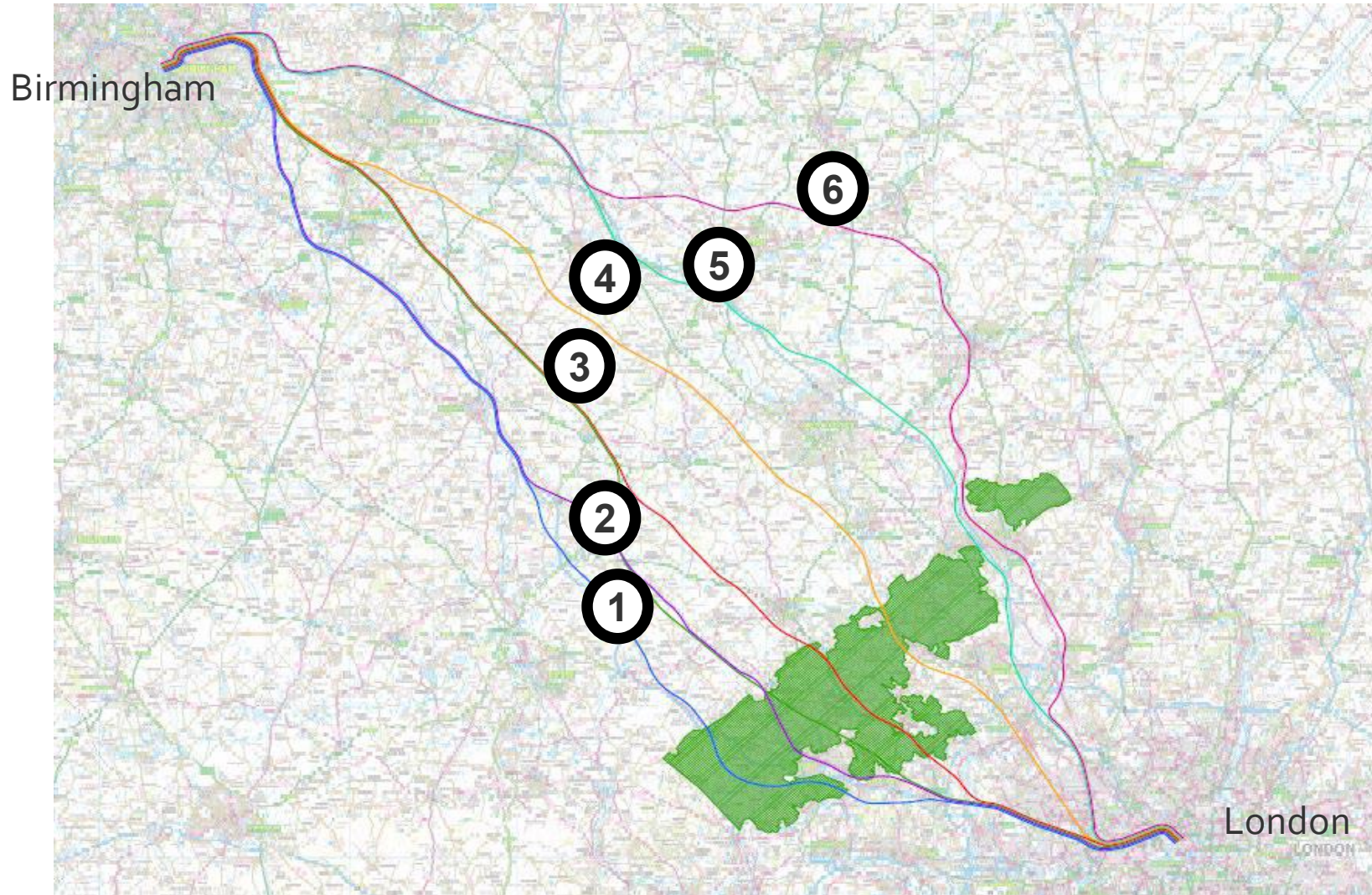


Image based on SNCF 1/3 Octave Noise Map of TGV at 360km/hr
modified to represent L_{pAeq} using output from TWINS modelling

Position in landscape is key



Evidence base for route selection – benefits, costs and impacts



Defending the evidence in public consultation



Using BIM to create a virtual railway



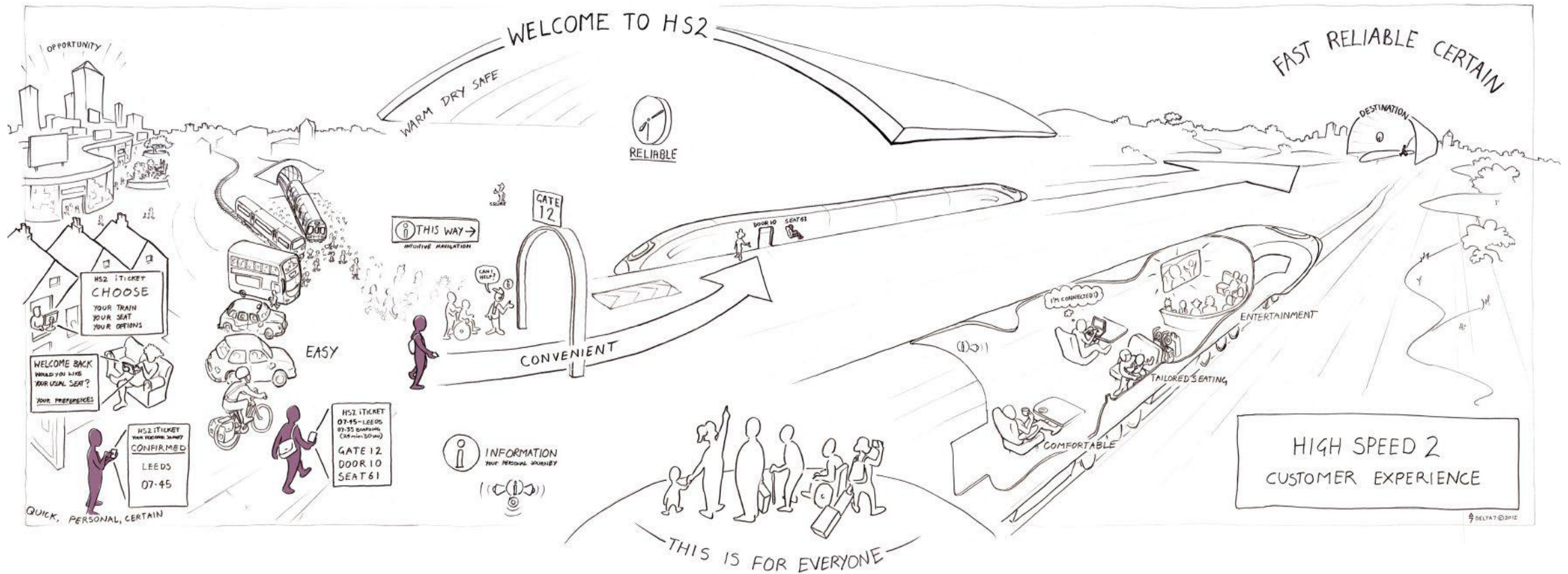
Interactive route viewer



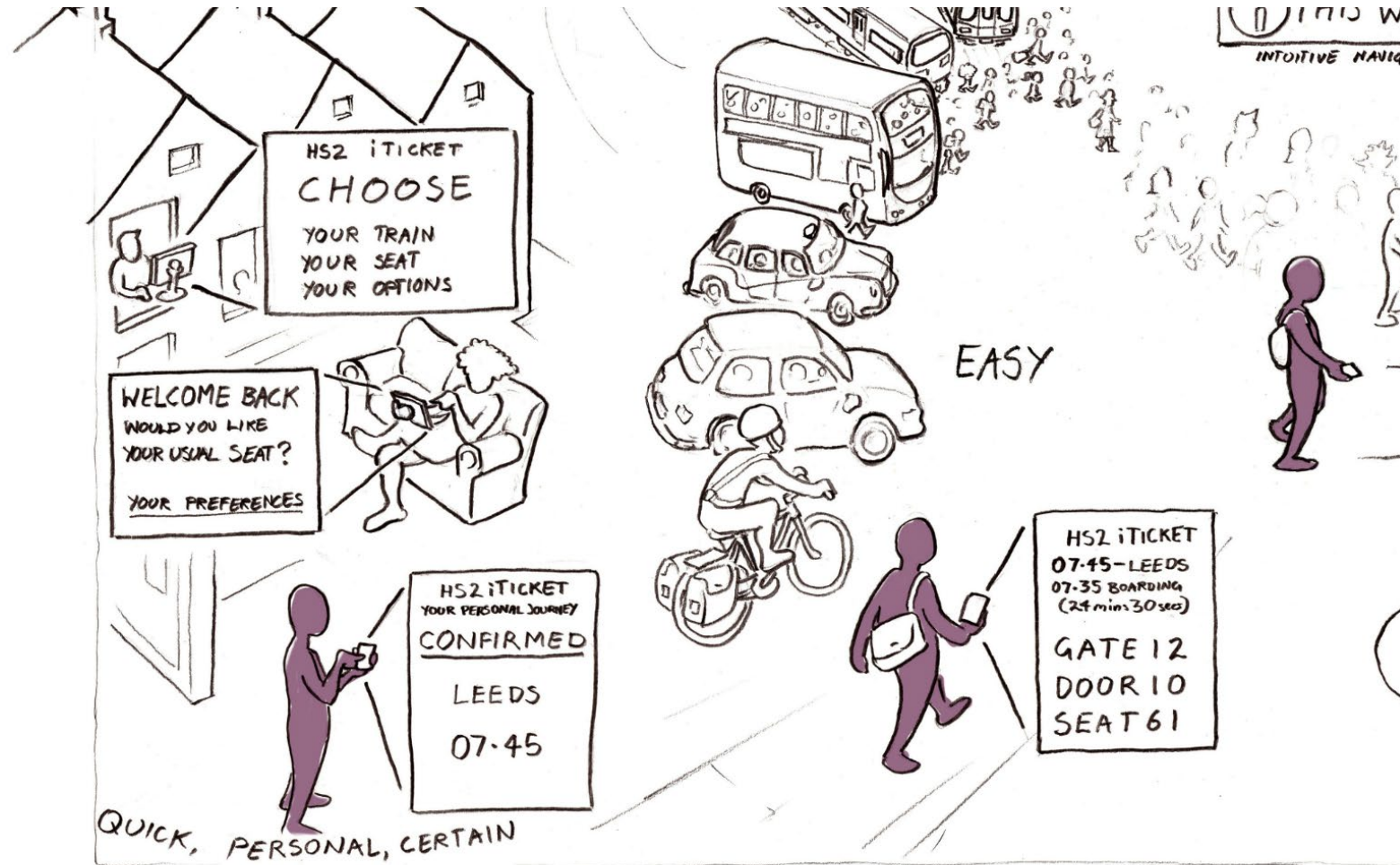
Outline design for sensitive environments



HS2 - a 21st century railway: the passenger experience



Personal travel on a public transport system





Judged by future generations