

Trans-Pennine Tunnel Study

Stakeholder Reference Group Conference

Tuesday 6 October 2015

Welcome

Welcome and introductions

Mick Noone, Transport for the North

Trans-Pennine Tunnel Study

Agenda for today:

- Progress update – interim report
- Exploration of initial strategic, economic, technical and operational factors to be addressed by the interim report
- Themed groups discussions
- Feedback on top issues and key questions
- Presentations – linking retail, accessing a wider workforce and connecting travellers with Manchester airport

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1st SRG – 20th July considered:

- Need for investment in the Northern Powerhouse
- Aims and objectives of the TPTS
- Role of SRG
- Benefits of improved transport connectivity
- Natural England's view on a cleaner, greener north

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1st SRG (cont.)

- Benefits of connecting our Northern Ports
- Economic impact of major infrastructure projects
- Challenges and opportunities
- Planning for freight
- Impacts of road traffic in the National park

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Objectives for today:

- Seek your advice and opinion in respect of the issues we will explore in the interim report
- Engage and build interest in the TPTS with a wide range of stakeholders
- Provide a status update on the study
- Identify and map with stakeholders the main issues and opportunities in relation to a range of sub-themes
- Identify additional people who might be involved
- Identify any further materials/background documents useful to the study team

Progress update

Ian Parker, Highways England

Q & A

Ian Parker, Highways England

Initial findings

Study consultants;

Lewis Atter, Socio-economist

Darren Oldham, Project director

Emerging Issues

Strategic and Economic Case

Lewis Atter, Socio-economist

Introduction

- Is there a Strategic Case?
 - What are the issues we are trying to address?
 - Policy drivers
- Economic Case – emerging analysis
- Next steps

Economic context

- The North accounts for around a quarter of the country's population and a fifth of its economy. It has abundant natural and physical assets, and hosts top educational institutions
- The Northern economies have been undergoing a process of economic change as it emerged from industrial decline
- However, while individual cities and their regions are strong, collectively the region is weaker than the rest of the country and much of its assets underutilised
- Meanwhile, the prosperous London and the South East face housing shortages and price pressures leaving the country's economy imbalanced as the productivity gap between North and South widens
- Central to this imbalance is that the Northern economies are poorly connected which limit the opportunities that come with scale and economic interactions which underpin London's success
- The link between connectivity, economic mass and productivity is well established

Connectivity across the Pennines

- The road connection between Manchester and Sheffield is one of the most significant gaps in the Northern transport network, the DfT has identified the following challenges:
 - Congestion and long journey times
 - High accident rates
 - Frequent road closures
 - Poor asset condition
 - Operational challenges associated with single carriage road
 - Limited choice of other modes given poor rail connections
- Challenges in the road connection between Manchester and Sheffield are expected to worsen given planned housing and commercial developments, and forecast traffic demand
- In turn, this will exacerbate pressures on other parts of the Northern road network – such as the M62

Policy response

- In August 2014, the Chancellor set out his vision for the Northern Powerhouse outlining the growth targets that realise the Government's ambition to rebalance the UK economy
- The DfT has outlined its plans for transforming connectivity in the North through "The Northern Powerhouse: One Agenda, One Economy, One North"
- As part of its strategy, the DfT is exploring a major new road link under the Pennines between Sheffield and Manchester
- The DfT's strategy and Government vision for a Northern Powerhouse follow from the 'One North' which presented a strategic proposition for transport in the North with the aim of transforming connectivity across the North of England and maximising economic growth
- Findings highlighted the necessity for a new Trans-Pennine route, and how the lack of high performance road and rail links between Manchester and Sheffield should be a matter of national concern

Policy response

- The ‘One North’ proposals, Government vision for the Northern Powerhouse and the DfT’s strategy for transport in the North are consistent with wider and regional policies, including:
 - Greater Manchester Transport Strategy 2040: Our Vision – aspirations for better Trans-Pennine road links;
 - HM Treasury’s “Fixing the Foundations” – centrally focused on productivity, with commitments to road investment;
 - HM Treasury’s “Reducing the Deficit and Rebalancing the Economy” – spatial rebalancing;
 - HM Treasury’s “Investing in Britain’s Future” – road network fundamental to the UK economy;
 - National Infrastructure Plan (2014) – on the linkage between infrastructure investment and economic growth; and
 - Peak District National Park: Local Development Framework – conserving the characteristics of the National Park.

Economic Case – Background

- The links between transport and the economy are now well established, and further reiterated in recent research carried out by the DfT – Transport Investment and Economic Performance (TIEP)
- TIEP outlined the mechanisms through which transport impacts on the real economy (productivity, investment and employment) and left no doubt over the linkages between connectivity and productivity
- In the context of connectivity between Manchester and Sheffield, the impacts on the real economy will come through one of these routes (with implications on the decision over timing of investment):
 - First, in the way it can contribute to the economic growth objectives of the Northern Powerhouse; and
 - Second, in the way it may be needed in the future to ensure that it does not hold back and constraint growth in the Northern economy.
- Either way, the economic approach used can account for both channels of impact and this will be considered further in the methodology used to assess risk and uncertainty

Economic Case – Initial Analysis

- To be clear, there has been no detailed transport modelling to date on the impact of enhanced road linkages between Manchester and Sheffield to enable a robust estimation of benefits – this is set to be carried out in stage 3 of this work
- At this stage, we sought to get some initial scale on the impacts using principles in TIEP. This initial analysis is based on a journey time savings of up to 30 minutes between Manchester and Sheffield, and on the relationships described in TIEP
- This suggests that the annual economic uplift (through only a boost to productivity) could be worth up to £3.4bn in 2031 – nearly a 1% permanent annual uplift in the economy of both cities
- The key point is that, based on the scale of real economic returns seen in other infrastructure investments, this is unlikely to be enough to make this attractive
- However, the scale of investment means that it has the potential to impact on the wider transport network. Reading across from the findings from the SERC work for the Northern Way on the links between Manchester and Leeds suggests that the economic impacts could increase to up to £8.4bn in 2031 – a 2.3% annual uplift
- There are of course other impacts, chiefly land use and freight, that are still to be assessed

Economic Case – Next Steps

- The key requirement for the next stage of the work is to determine in more detail the transport impacts, including on the wider transport network in the North – Mouchel work, PLANET (HS2), Manchester and Sheffield's strategic models
- Government and authorities in the North to determine the future scenarios for the Northern Powerhouse – specifically the counterfactual. This is especially the case if the scheme becomes focused on ensuring that growth is not held back by constraints in the transport network once the Northern Powerhouse proposals start to take shape
- Consult with authorities in the North to determine the specific land use interventions that are likely to be impacted directly by the scheme
- Determine the best option to address the land use impacts – HS2 National LUTI, simple connectivity/land use model, future DfT-developed models
- Establish the likely costs and construction timescales so that scenarios for a fiscal breakeven and cost-effectiveness are established.
- Consult with the other strategic studies, specifically the freight study, to start getting a sense of what the emerging conclusions are and how it can be integrated with this work

Strategic and Economic Case

- Questions?
- Views?
- Suggestions?

Emerging Issues

Technical and operational feasibility and
initial consideration of impacts

Darren Oldham, Project director

Introduction

- Can we build and operate a strategic route between Manchester and Sheffield (including a long section of tunnel under the Pennines)?
- Technical
 - Geology
 - Construction
 - Highways
 - Rail Synergies
- Operational
 - Standards and Behaviour
 - Management
 - Future Technologies

Introduction

- If we can we build and operate a strategic route between Manchester and Sheffield (including a long section of tunnel under the Pennines), what might be the impacts and benefits?
 - Traffic
 - Environment

Technical – Geology

- The geology of the region is predominantly Millstone Grit and Pennine Coal Measures. Historically rail tunnels in the area have been bored within the Millstone Grit and Pennine Coal Measures and show tunnel construction to be feasible
- Groundwater and local instability issues encountered during construction posed technical challenges that should be mitigated by modern tunnelling methods
- The geological issues anticipated within the study area are considered to be surmountable and from a geotechnical perspective, a trans-Pennine Tunnel is initially considered feasible.
- **Next stages:** Further work required to understand ground conditions and water courses (GIS mapping) to assist in considering potential route options

Technical – Tunnel Construction

- Initial research indicates that construction of a new strategic road link involving a substantial length of tunnel is technically feasible; modern tunnelling techniques can accommodate a dual carriageway tunnel
- The geology of the Pennines is generally suitable for constructing large diameter bores
- Tunnel lengths could range from 10km to 30km. Therefore if built it is likely to be longer than most other road tunnels in Europe
- **Next stages:** Future stages of the study will consider the potential location, cost and environmental impacts of each option

Technical – Highways Construction

- **Anticipated cross section** - dual carriageway, minimum of 2 lanes in each direction, this is based on existing traffic flows and also operational and safety aspects. For both the tunnel and the link either side.
- Any links to the M60 and also to the M1 may also need to be of a similar standard to avoid increasing flows on the existing Strategic road network



Doubling the number of emergency exits will mean a big difference if a fire breaks out.

- **Next stages:** of the study will review:
 - Cross section (based on forecast traffic flows)
 - Standards
 - Impacts on local roads (standards, need for a positive legacy)

Technical – Rail Synergies

- Integration of road and rail / light rail solutions within the same transport corridor is technically feasible
- However the initial thinking is that it may not be either practical or desirable to operate road and heavy rail in the same tunnel bore.
- Light rail (tram) systems could potentially operate in the same tunnel as road vehicles but this would mean limiting the speed of traffic under current legislation.
- Parallel road and rail bores would offer operational benefits in terms of service and emergency access and egress as well as the environmental benefits arising from an integrated multi-modal corridor.
- **Next stages:** Further consideration of other studies being undertaken to consider rail connectivity and freight movement in the North of England
 - Hope Valley and Calder valley (capacity)
 - HS2

Operational – Standards and Behaviour

- **Standards:** Feasible in principal, based on current standards. However current UK standards apply to much shorter tunnel sections. Therefore there may be a need to challenge some of the current standards for a proposed, much longer, tunnel section. For example the use of gaps in the central bore dividing walls to allow contra flow work to facilitate routine maintenance and the management of incidents.
- **Driver Behaviour:** Whilst some work has been undertaken (for this study) to understand the psychological aspects of travelling through a tunnel of this length (reduced visibility, poor orientation, monotony etc.) it is clear that is not fully understood; therefore we will undertake further work to better appreciate driver behaviours and to consider how advances in technology and appropriate tunnel design could help to mitigate this issue.
- Measures introduced in similar long tunnel sections across the world have been aimed at minimising anticipated practical and psychological difficulties:
 - Laerdal tunnel , Norway 17.5km (use of caverns)
 - Zhongnanshan tunnel, China (use of lighting and design)
- **Next stages:** Further work on understanding driver behaviour (talking to tunnel operators across the world and academics who have studied this topic in detail); and making recommendations of new standards that will be required

Operational – Management

- Considerations will include the way in which maintenance is carried out; the way in which incidents are managed; and the way in which traffic is controlled and monitored.
 - Fire safety; could need support facilities at tunnel portals
 - Incident management and security; use of new and emerging future technologies will be essential
 - Maintenance (routine and emergency); incorporation of design to minimise maintenance
 - Operational flexibility; ensure this is built into the design
 - Future role of technology
- **Prohibited vehicles** – It may be desirable for the strategic link, and the tunnel in particular, to be classed as a special road(s) under the Highways Act, part of which prohibits certain vehicles from using them.

Operational – Future Technologies

- Vehicle automation
 - automatic braking
 - ‘platooning’
- Connectivity of vehicles
 - Data sharing
 - Communication between vehicles and tunnel
- Robotics
 - Automation of maintenance functions
- Propulsion
 - Move away from oil
 - Wireless
 - Different approach's to ventilation
- Data
 - Real
 - Real time data, understanding of congestion, traffic movements
- **Next Stages:** Further consideration of future technologies as part of the selection of potential options

Impacts and Benefits – Traffic

- Three data sets being used to inform first stage
 - Trafficmaster;
 - Mobile phone data; (also being used for emerging regional model)
 - Planet; to help understand proportion of trips that are made by public transport
- Emerging conclusions for this first stage work are that:
 - only ten per cent of trips across the Pennines between Manchester and Sheffield use the M62, the remaining 90 per cent use the existing routes across the National Park.
 - Journeys between Sheffield and Leeds and between Leeds and Manchester are considerably shorter than those between Manchester and Sheffield and this results in significantly higher volumes of traffic between these centres of population and employment than between Manchester and Sheffield.
 - A new strategic link between Manchester and Sheffield is expected to change these travel patterns,. and have a wider impact on regional traffic conditions.
- **Next Stages:** Understand forecast flows, align with work on Northern Freight strategy, and consider impact on dispersal network

Impacts and Benefits – Environmental

- The Peak District National Park (PDNP) is heavily constrained ecologically, with Sites of Special Scientific Interest Special Areas of Conservation and Special Protection Areas covering most of the PDNP area.
- Many issues outside the National Park area (Local Nature Reserves and Air Quality Management Areas).
- Cultural heritage features and listed buildings present throughout the study area. Areas in the south and east of the study area are heavily constrained with Scheduled Monuments.
- Construction methods and programmes should aim to minimise the impact on sensitive areas including the Peak District National Park.
- One of the biggest environmental impacts could be what to do with the significant amount of waste/spoil arising from any tunnel boring works.
- **Next Stages:** More detailed assessment of potential impacts and opportunities for short-listed options.

Technical and Operational Feasibility and initial consideration of Impacts

- Questions?
- Views?
- Suggestions?

Break

Following the break, tables will be allocated according to themed groups. Please sit at your preferred table.

Themed groups

Mark Corbin, Highways England

Themed groups

1. Rail connectivity
2. Road connectivity
3. Non-motorised users and local access
4. Natural environment and heritage
5. Environmental and people
6. Tunnel operations
7. Business and tourism

Lunch

*Please feel free to add any comments
to other themed groups*

Feedback on top issues and key questions

Stakeholders

Presentation

Dawn Osborne – Meadowhall

Presentation

Emma Antrobus – Alstom

Presentations

Alistair Andrew – Manchester Airport



Department
for Transport

Closing remarks

Mick Noone, Transport for the North