



STRATEGIC TRANSPORT PROJECTS REVIEW

PROTECTING OUR CLIMATE
AND IMPROVING LIVES



Appendix I: Recommendation Appraisal Summary Tables

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1. Detailed Appraisal Summary

An 'Appendix I: Recommendation Appraisal Summary Tables (ASTs) Explanatory Note' accompanies this AST.

1.1. Recommendation 45 - High speed and cross-border rail enhancements

Recommendation Description

Infrastructure upgrades to permit higher speeds on cross-border routes would enable air competitive journey times to London and other key destinations. This improved connectivity would encourage a shift from air to rail on longer-distance travel and support Scotland's net zero emission commitments. These improvements would also release capacity for additional regional passenger and freight services.

STPR2 recommends that Transport Scotland continues to work closely with the UK Government to take forward a programme of infrastructure on-line and off-line upgrades targeted at longer-distance cross-border routes. These would reduce long distance passenger service journey times and increase capacity and reliability for regional passenger and freight services.

This is likely to include the following routes:

- East Coast Main Line (ECML);
- West Coast Main Line (WCML); and
- Glasgow & South Western line (Glasgow to Carlisle via Dumfries).

The Glasgow & South Western route is considerably longer and would require significant upgrades to provide additional capacity and electrification, however since this route is considerably longer and geographically constrained, it is unlikely to ever achieve journey times equivalent to that currently offered by the other two routes but has value as a diversionary route. Cost effectiveness of new alignments should be judged against providing quadruple track on existing corridors, especially in respect of land acquisition. This would require further assessment at future stages of business case development.

1.2. Relevance

Relevant to existing and new rail users, users of other modes and rail freight.

Improvements to cross-border connectivity are likely to be relevant to:

- Business travellers, who would benefit from shorter travel times between major cities, making rail more competitive with air, supporting corporate climate agendas.
- Longer distance commuters, with journey time improvements delivered by HSR helping to widen employment catchments.
- Leisure travellers, who would benefit from a faster, more attractive service linked to England.
- Existing users (intercity), who would benefit from shorter travel times.
- Existing users (regional) would benefit with the movement of longer distance services to new lines, with the resulting additional capacity on existing lines potentially being used to improve network performance or introduce additional services.
- New users, who would benefit from the new journey opportunities created by HSR.
- Rail freight could also benefit as a result of released capacity on the existing West and East Coast Main Lines that could be used to improve performance or introduce additional freight services.
- Users of other modes could benefit as a result of the modal shift to rail delivered through HSR, which in turn could reduce congestion on the road network.
- Regional residents: there are option / non-use benefits for regional residents, as well as potential regional regeneration/development benefits associated with the step-change in connectivity associated with this recommendation.

1.3. Estimated Cost

>£5,000m Capital

The estimated capital expenditure for a scheme of this nature would be £5,000m+.

[Infrastructure options in both the north of England and Scotland to achieve a 3 hour journey time between London and Edinburgh/Glasgow via either a western or eastern route were previously priced at between £11bn and £20bn.](#)

1.4. Position in Sustainable Investment Hierarchy

Targeted Infrastructure Improvements

The recommendation would contribute to seven of the 12 NTS2 outcomes, as follows:

- Provide fair access to services we need
- Help deliver our net-zero target
- Promote greener, cleaner choices
- Get people and goods to where they need to get to
- Be reliable, efficient and high quality
- Use beneficial innovation
- Be safe and secure for all

1.5. Summary Rationale

Summary of Appraisal

	TPO					STAG					SIA				
	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
Low Scenario	+++	++	+	++	++	-	++	+	+++	+	-	0	0	0	0
High Scenario	+++	++	+	++	++	-	++	+	+++	+	-	0	0	0	0

The introduction of HSR and the associated released capacity on existing lines in Scotland performs well against the Transport Planning Objectives (TPOs). An HSR service offer and the opportunities to utilise released network capacity for additional regional passenger services and additional freight services provides a significant opportunity for modal shift from road to rail which is vital in achieving the [Scottish Government’s net zero emissions target](#).

The recommendation also performs positively against the STAG criteria, particularly with respect to the economy where the introduction of HSR in Scotland offers significant economic benefits through improved connectivity, reduced journey times and improved journey time reliability between major cities in Scotland and England and within Scotland due to the opportunities provided by released network capacity.

While there are potential engineering challenges with delivering a project of this magnitude, HSR construction is not a new activity in the UK. HS1, which was successfully delivered on time and on budget, sets a great example of what can be achieved.

The impact of the recommendation is anticipated to have a negative effect against the Strategic Environmental Assessment (SEA) criterion, and neutral for the other Statutory Impact Assessments.

Details behind this summary are discussed in Section 3, below.

2. Context

2.1. Problems and Opportunities

This recommendation could help to tackle the following problems and opportunities:.

Relevant Problem & Opportunity Themes Identified in National Case for Change

- **Productivity:** whilst Scotland's productivity level is not solely driven by the efficiency of its transport system, improvements in transport connectivity between businesses reduces costs and increases productivity, thus generating higher levels of economic growth.
- **Labour Markets:** people often need transport to access employment, education and training and therefore help reduce the numbers out of work and support Scotland's ambitions for growth. Transport can also ensure that the skills and experience of those in the labour force are effectively matched with the needs of businesses, helping to increase incomes and improve productivity.
- **Trade and Connectivity:** transport is crucial for trade and competitiveness, within Scotland, across the UK and internationally.
- **Freight:** whilst recognising the importance of freight within Scotland's economy, a key challenge will be to ensure that the negative impacts generated by the movement of goods vehicles, such as increased emissions from road freight, are tackled.
- **Tourism:** transport plays a vital part in supporting tourism. It enables people to get to, and travel within, Scotland and allows them to explore the many sights and experiences the country has to offer. Whilst tourism benefits are recognised, tourists should be encouraged to visit/travel using sustainable modes.
- **Global Climate Emergency:** the Scottish Parliament committed to an ambitious target of net zero emissions by 2045 and transport needs to play its part. Transport is currently Scotland's largest sectoral emitter, responsible for 37% of Scotland's total greenhouse gas emissions (greenhouse gas emissions encompass CO₂ emissions) in 2018 ([National Atmospheric Emissions Inventory 1990-2017](#)). Our transport system needs to minimise the future impacts of transport on our climate.
- **Reliability:** without intervention, forecast increases in traffic volumes on the road network will impact negatively on reliability through increased congestion and more roadworks as greater pressure is placed on the operational efficiency of the network. [Reliability can also be an issue on the rail network.](#)

2.2. Interdependencies

This recommendation has potential overlap with other STPR2 recommendations and would also complement other areas of Scottish Government activity.

Other STPR2 Recommendations

- Clyde Metro (11);
- Highland Main Line rail corridor enhancements (15);
- Perth-Dundee-Aberdeen rail corridor enhancements (16);
- Edinburgh/Glasgow-Perth/Dundee rail corridor enhancements (17);
- Decarbonisation of the rail network (25);
- Behavioural change and modal shift for freight (27);
- Sustainable access to Grangemouth Investment Zone (39);
- Major station masterplans (43); and
- Rail freight terminals and facilities (44).

Other areas of Scottish Government activity

- Climate Change Plan 2018-2032 Update (including car kilometre reduction target and net zero target) and;
- Revised Draft Fourth National Planning Framework ([Revised Draft NPF4](#))
National Development 18: High Speed Rail

A key interdependency for HSR is HS2. HS2 Phases 1 & 2a are currently under design and construction and the Bill for Phase 2b was deposited in the House of Commons at the start of 2022. These would introduce cross-border (between Scotland and England) HS2 services from the first day of operation of HS2 with HS2 services extending beyond the dedicated high speed lines along the WCML to Scotland, with an expected journey time from London to Glasgow and Edinburgh of 3 hours 40 minutes when complete.

3. Appraisal

This section provides an assessment of the recommendation against:

- STPR2 Transport Planning Objectives (TPOs)
- STAG criteria
- Deliverability criteria
- Statutory Impact Assessment criteria.

The seven-point assessment scale has been used to indicate the impact of the recommendation when considered under the ‘Low’ and ‘High’ Transport Behaviour Scenarios (which are described in Appendix F of the Technical Report).

3.1. Transport Planning Objectives

1. A sustainable strategic transport system that contributes significantly to the Scottish Government’s net-zero emissions target

Low Scenario	High Scenario
+++	+++

New and enhanced cross-border services, which would be electrified, provide the greenest option for cross-border travel, with analysis highlighting the [significant carbon emission savings achieved in recent years linked to an increase in the market share of rail relative to air for journeys between central Scotland and London](#). HS2 is being designed and built to be the most sustainable high-speed rail network in the world. The electricity to power HS2 trains would be procured from a zero emission generating source from the outset and from 2035 HS2 Ltd would either reduce their overall emissions to zero or make those emissions they cannot eliminate ‘net zero’ by using natural or technological methods, which is known as carbon offsetting. In addition, the benefits of reducing long distance journeys by car would be significant too. Released capacity from moving long distance passenger services onto a new high speed rail line within northern England and Scotland would release significant capacity on the existing west and east coast main lines that could be used for additional freight as well as additional regional and local passenger service provision, supporting modal shift. [For a current journey from Edinburgh to London, greenhouse gas emissions are just 29kg per passenger by rail compared to 144kg by air and 120kg by car.](#)

This recommendation is therefore expected to have a major positive impact on this objective in both Low and High scenarios.

2. An inclusive strategic transport system that improves the affordability and accessibility of public transport.

Low Scenario	High Scenario
++	++

HSR would encourage greater use of sustainable public transport for longer distance journeys. These would tend to favour business and leisure journeys the most as part of the cross-border travel market, but the reduced journey time would also provide wider employment catchment areas ([overall the UK Government estimates that the HS2 network would support over 100,000 jobs across Britain](#)). There would also be scope to generate employment opportunities within Scotland where HSR proposals can be developed during construction and operation and from the expected increase in economic activity arising from the additional journey opportunities. By its very nature HSR is not designed to directly improve local accessibility, however significant indirect benefits arising from additional regional and local passenger services making use of the large amounts of released capacity that would be generated on the existing lines when long distance services are moved to the new lines.

There is no anticipated impact on affordability.

This recommendation is expected to have a moderate positive impact on this objective in both Low and High scenarios.

3. A cohesive strategic transport system that enhances communities as places, supporting health and wellbeing.

Low Scenario	High Scenario
+	+

Investment in HSR stations would stimulate local economies, be designed as an integral multi-modal transport hub that would encourage sustainable land-use planning and travel. These transport hubs are often opportunities to seed re-development and sustainable growth (for example: St Pancras Business Park, Stratford and the substantial developments currently underway in Old Oak Common, Birmingham Curzon Street and [Manchester Piccadilly HS2 Hubs](#)) supporting place outcomes.

There is no anticipated impact on health and wellbeing.

This recommendation is expected to have a minor positive impact on this objective in both Low and High scenarios.

4. An integrated strategic transport system that contributes towards sustainable inclusive growth in Scotland.

Low Scenario	High Scenario
++	++

HSR would make a key contribution to the strategic transport system by increasing the competitiveness of rail for longer-distance travel by reducing journey times and improving journey time reliability between key cities in Scotland and England. [HS2 forecasts circa 50m additional cross-border rail journeys with the currently proposed HS2 network, with London flows circa 30% of these](#). This would improve access to jobs and labour markets and improve productivity.

Additional HSR infrastructure in the north of England and Scotland would contribute to providing additional capacity (where the transfer of a certain set of services on to the new infrastructure releases capacity on the existing infrastructure for new trains and/or performance improvements. Note that new HSR systems can usually accommodate 400 metre trains with at least 1000 seats) and operational resilience, as well as generating significant reductions in journey times between cities in the north of England and Scotland; for example, [halving the journey time between Edinburgh and Newcastle to 45 minutes and reducing the Glasgow to Newcastle journey time by approximately one hour to circa 90 minutes](#). It should be acknowledged that these benefits are likely to be experienced in locations where the existing transport offering is good.

This recommendation is therefore expected to have a moderate positive impact on this objective in both Low and High scenarios.

5. A reliable and resilient strategic transport system that is safe and secure for users.

Low Scenario	High Scenario
++	++

New HSR would add additional capacity to the rail network and release additional capacity on the existing rail network. Potential 4-tracking would create the ability to segregate fast and slow services (passenger and freight), which would significantly add to this additional capacity as the previously large gaps required to avoid fast trains catching slower ones can be reduced, enabling the frequency of trains to be increased on both the new and existing lines. This additional capacity would also improve network performance by adding reliability and resilience.

HSR would be designed to meet high performance and reliability standards noting that [HS1 has successfully beaten its target for minimising train delays in 2019-20 and 2020-21](#). New build infrastructure, built to modern engineering standards and using the latest technologies, is also more resilient to climate change.

Overall rail is considered a safe mode of travel, generally on a par with aviation (see Health, Safety and Wellbeing STAG criterion below). The removal of car kilometres through mode transfer to rail would generate safety benefits. In addition, [transfer of freight from road to rail, would significantly reduce HGV kilometres on the road network which would generate additional safety benefits](#).

Overall, this recommendation is expected to have a moderate positive impact on this objective in both Low and High scenarios.

3.2. STAG Criteria

1. Environment	
Low Scenario	High Scenario
-	-

See Strategic Environmental Assessment (SEA) below.

This recommendation is expected to have a minor negative effect on this criterion in both Low and High scenarios.

2. Climate Change	
Low Scenario	High Scenario
++	++

Encouraging modal shift from air to rail for longer distance trips would reduce greenhouse gas emissions and therefore this recommendation is anticipated to perform positively against the climate change criterion. Another benefit in terms of modal shift is the potential release of additional freight paths which would reduce emissions from road freight.

There is not expected to be any impact on vulnerability to effects of climate change or potential to adapt to effects of climate change.

This recommendation is expected to have a moderate positive impact on this criterion in both Low and High scenarios.

3. Health, Safety and Wellbeing

Low Scenario	High Scenario
+	+

Overall rail is considered a safe mode of travel. In [2015, the Department for Transport reported 24.1 passenger casualties and 0.2 fatalities per billion passenger kilometres, significantly better than private car usage, which reported 163 casualties and 1.1 fatalities per billion passenger kilometres](#). Encouraging modal shift from road to rail through development and promotion of a more resilient, attractive (faster journeys and enhanced rolling stock) and greener rail network would therefore be expected to have positive impacts on the safety criterion.

This recommendation is unlikely to have any particular impacts in terms of the security criterion.

It would however be anticipated to have a positive effect on Health as a result of encouraging modal shift from private to public transport for passengers, and from road to rail for freight, and a move away from diesel engines to alternatives which would also result in a beneficial impact on noise and vibration.

This recommendation may have a positive effect for people who have to travel long distances to access health and wellbeing infrastructure.

It is likely that visual amenity would be negatively affected by this recommendation due to the scale of construction and the likely impact on the local environment.

Overall, this recommendation is expected to have a minor positive impact on this criterion in both Low and High scenarios.

4. Economy

Low Scenario	High Scenario
+++	+++

HSR has the scope to generate significant benefits at the strategic level, depending on the nature of the HSR intervention. The majority of benefits put forward for HSR are those for leisure users – for example, [HS2 is predicting that more than 60% of forecast cross-border rail trips would be for leisure purposes, with the next biggest group being business users and a small share for commuting](#). HSR interventions within the north of England and Scotland, together with additional regional and local services taking advantage of released capacity, would be expected to deliver significant benefits, a higher proportion of which would be for business and commuting travel.

[Initial analysis by HS2 Ltd has indicated that moving to a 3 hour journey time between London and Glasgow/Edinburgh could generate circa £3bn in additional benefits, £3bn in additional revenue and £1 billion in additional wider economic benefits](#) compared to the current HS2 service proposition post Phase 2b. This does not include additional benefits that would arise from new journey opportunities and additional passenger and freight services utilising the significant capacity that would be created on the existing network when long distance services are moved to the new route.

This recommendation is expected to have a major positive impact on this criterion in both Low and High scenarios.

5. Equality and Accessibility

Low Scenario	High Scenario
+	+

While this recommendation would reduce journey times on the existing rail network, it would not be anticipated to change public transport network coverage. Due to its nature, the recommendation would not have any impact on Active Travel Network Coverage.

Upgraded HSR stations and rolling stock would be designed in line with current design standards and be fully accessible, therefore enabling people with mobility limitations (including disabled people, older people, pregnant people, and people travelling with young children) to travel by rail.

This recommendation may improve access to jobs, education and services by reducing journey times, but because no network changes are planned, benefits are likely to be limited to people who can already access the rail network. Accordingly, the overall impact of this recommendation in terms of improving access by geographic location is expected to be negligible.

In terms of affordability, no impact on rail fares is anticipated.

Also refer to EqIA/ICIA/FSDA/CRWIA Assessment in the next section.

Overall, this recommendation is expected to have a minor positive impact on this criterion in both Low and High scenarios.

3.3. Deliverability

1. Feasibility

HSR construction is not a new activity in the UK and HS1 which was successfully delivered on time and on budget sets an example of what can be achieved.

[An in-depth feasibility and environmental study of the HSR options in the north of England and Scotland, that would further reduce the HS2 journey time towards achieving a 3 hour journey time between Glasgow/Edinburgh and London as per the 2016 joint UK and Scottish Government commitment](#), was completed in 2018. This study confirmed that these options were technically feasible.

2. Affordability

Capital costs are significant for HSR; [as reported earlier previous estimates suggested an Edinburgh-Glasgow HSR scheme could have a capital cost of £5.4 billion](#), while options to achieve a [3 hour journey time between London and Edinburgh/Glasgow via either the WCML or ECML were priced at between £11 billion and £20 billion](#) respectively. Schemes of this nature would require Government funding, with cross-border schemes forming part of the wider UK National transport portfolio.

3. Public Acceptability

HSR schemes can generate both opposition and support in equal measures as is generally the nature of UK public opinion to large scale infrastructure projects. They can experience opposition due to their high costs to the public purse (the ‘opportunity cost’ of buying HSR) or because of the potential environmental impacts associated with constructing new railways through sections of countryside. The potential economic and environmental benefits associated with HSR, particularly in terms of its sustainable credentials versus the use of private car or air travel would likely stimulate support for the scheme, especially as a decarbonisation tool. [Research from 2014 into public attitudes to and perception of HSR in the UK](#) found that willingness to pay for HSR was low and may not exceed the utility of useful travel time. However, the [First Interim Evaluation of the Impacts of HS1](#) found that “[when asked directly, two thirds of respondents believed HS1 has had a positive impact locally](#)”.

3.4. Statutory Impact Assessment

1. Strategic Environmental Assessment (SEA)

Low Scenario	High Scenario
-	-

New HSR's encourage modal shift towards rail, which is substantially better for reducing operational greenhouse gas and air pollutant emissions in comparison to private car usage or domestic flights (SEA Objectives 1 and 3). National rail journeys produce 41g of CO₂/km, compared to 154g of CO₂/km for the sole driver of a small petrol car, or 255g of CO₂/km for domestic flights (UK BEIS). A [UIC study](#) on HSR in France and China concluded that the carbon footprint of HSR can be up to 14 times less carbon intensive than car travel and up to 15 times less than aviation travel, even when measured over the full life cycles of planning, construction and operation of the different transport modes.

A connected HSR network can provide a viable alternative to domestic flights. [UIC research](#) indicates that where rail travel time is less than three hours 30 minutes then rail is the dominant mode compared to air.

Construction of new HSR infrastructure would have a significant effect on the local environment. There is likely to be significant land take and impacts for climate change adaptation (Objective 2) and the objectives related to the water environment, biodiversity, soil, cultural heritage and landscape and visual amenity (SEA Objectives 10 to 14) that would need to be mitigated. The local environmental and cultural heritage sensitivities of any rail infrastructure upgrades need to be considered at the earliest stage. For example, the East Coast Mainline runs directly through protected Battlefields Inventory sites and the Glasgow and South-Western Line is adjacent to multiple protected sites of biodiversity or geological importance. There are also multiple heritage designations within and around stations on these routes, for example the Old and New Towns World Heritage Site designation in Edinburgh. There are also potential positive and negative effects on the objectives that relate to quality of life, noise and vibration, developing high quality places and the safety of the transport network (Objectives 4 to 7). Whether the effects are positive or negative will depend on the location of the construction footprint and route, location of sensitive receptors and the design. There are also likely to be positive and negative effects on the sustainability of the transport network (Objective 8) but the criteria for assessing this objective show that these effects are likely to be largely positive, for example through increasing the capacity of the public transport network. By contrast, the effects on Objective 9 are likely to be negative due to the natural resource requirements associated with large scale construction. The embodied carbon associated with new HSR infrastructure would also need to be calculated to accurately determine the effects on Objective 1 in relation to greenhouse gas emissions. Further environmental assessment would therefore be required as further detailed work is undertaken on developing this recommendation.

Overall, this recommendation is expected to have at least a minor negative effect against this criterion in both Low and High scenarios. This is primarily due to the

construction footprint and significant environmental effects that may be difficult to avoid or mitigate for.

2. Equalities Impact Assessment (EqIA)	
Low Scenario	High Scenario
0	0
<p>This recommendation could increase travel choice, improve connectivity and improve safety on the transport network particularly for those who are more reliant on public transport including older people, children, young people, women and people from certain ethnic minority groups. By encouraging modal shift from private car to rail, the recommendation could contribute to improving air quality. Improved health outcomes as a result of better air quality are of particular benefit to those who are more vulnerable to air pollution, including children, older people and disabled people.</p> <p>New or upgraded HSR stations and rolling stock would be designed in line with current design standards and be fully accessible, therefore enabling people with mobility limitations (including disabled people, older people, pregnant people, and people travelling with young children) to travel by rail.</p> <p>However, the extent to which groups with protected characteristics would benefit from this recommendation would depend on the location of stations, the affordability of HSR fares and ability for certain groups to access the rail network.</p> <p>Overall, this recommendation is expected to have a neutral impact on addressing this criterion in both Low and High scenarios.</p>	

3. Island Communities Impact Assessment (ICIA)	
Low Scenario	High Scenario
0	0
<p>This recommendation is not considered directly or indirectly relevant to island communities for either scenario.</p> <p>This recommendation is therefore expected to have no impact on this criterion in both Low and High scenarios.</p>	

4. Children’s Rights and Wellbeing Impact Assessment (CRWIA)

Low Scenario	High Scenario
0	0

By encouraging modal shift from private car to public transport, the recommendation could contribute to improving local air quality. This would benefit children and young people who are more vulnerable to the adverse health impacts of traffic related emissions. Furthermore, access to higher education may be improved. However, there is not expected to be any differential impacts for children or young people.

Overall, this recommendation is expected to have a neutral impact on this criterion in both Low and High scenarios.

5. Fairer Scotland Duty Assessment (FSDA)

Low Scenario	High Scenario
0	0

New HSR stations and services, together with enhanced local services enabled through the release of capacity, can support regeneration, economic development providing new employment opportunities. This could help to reduce inequalities caused by socio-economic disadvantage in deprived areas or areas lacking transport options.

However, the extent to which this recommendation would reduce inequalities of outcome would depend on the location of stations within proximity to deprived areas, and the affordability of HSR fares for those from deprived and disadvantaged communities.

This recommendation is therefore expected to have a neutral impact on this criterion in both Low and High scenarios.