STRATEGIC TRANSPORT PROJECTS REVIEW

PROTECTING OUR CLIMATE AND IMPROVING LIVES

Appendix I: Recommendation Appraisal Summary Tables

December 2022

Jacobs AECOM

1. Detailed Appraisal Summary

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

1.1. Recommendation 30 - Trunk road and motorway safety improvements to progress towards 'Vision Zero'

Recommendation Description

This recommendation builds on Transport Scotland's ongoing work relating to the improvement of the trunk road and motorway network, with a primary focus on addressing road safety concerns. This would also help to improve the reliability and resilience of the network through a reduction in the impact of accidents. This recommendation does not set out to provide additional capacity to meet unconstrained traffic growth.

The trunk road and motorway network is comprised of routes ranging from motorways and dual carriageways to single carriageways and single lane roads, and performs a variety of functions, connecting major urban centres and sites of national significance, providing cross-border connections for the movement of freight and people, as well as connecting communities and businesses across both urban and rural areas. It also serves ferry terminals on the mainland and Skye, which provide connections to island communities including the Inner and Outer Hebrides, Orkney, Shetland and the Islands of the Firth of Clyde.

The types of interventions considered include:

- Junction improvements (for example, right-turn priority; signalisation; at-grade roundabouts; grade-separation);
- Realignment / widening (for example, at carriageway 'pinchpoints' such as narrow structures or over stretches of older standard single carriageway); and
- Provision of overtaking opportunities (for example, Wide Single 2+1 carriageways and climbing lanes).

1.2. Relevance

Relevant to Scotland's Road Safety Framework to 2030

This recommendation is directly relevant to Scotland's Road Safety Framework to 2030[i]. The framework sets out the vision for Scotland to have the best road safety performance in the world by 2030 and the long-term goal of Vision Zero where there are zero fatalities and serious injuries on Scotland's roads by 2050 with ambitious interim targets for the number of people killed or seriously injured to be halved by 2030.

The framework is aligned with NTS2 and embeds the Safe System approach to road safety delivery, which consists of five key pillars focusing efforts not only on road traffic casualty reduction (vulnerability of the casualties) but also on road traffic danger reduction (sources of the danger). Safe Roads and Roadsides is one of the five pillars and directly relevant to this recommendation. Roads and roadsides in a Safe System are designed to reduce the risk of collision, and to mitigate the severity of injury should a collision occur

The interventions within this recommendation would support Vision Zero by addressing

road safety concerns at locations on the trunk road and motorway network. This includes locations where safety problems persist despite measures having been previously implemented.

1.3. Estimated Cost

£2,501 million - £5,000 million Capital

Capital costs for implementation of trunk road and motorway safety improvements would depend on local circumstances but would typically be in the range:

- At-grade junction improvement – up to £5 million per location;
- Grade-separation improvement – from £5 million - £10 million to £25 million - £50 million per location;
- Widening or realignment of routes – from £5 million to £10 million - £25 million per kilometre; and
- Overtaking opportunities (WS2+1 and climbing lanes) – from £5 million - £10 million to £10 million - £25 million per kilometre.

Major structures and specific local circumstances, such as difficult ground conditions, would increase the above figures.

The net cost of all potential interventions that are relevant to this recommendation is £2,501 million - £5,000 million.

The interventions would form part of the trunk road asset and require to be maintained within Transport Scotland's maintenance budget.

1.4. Position in Sustainable Investment Hierarchy

Maintaining and safely operating existing asset

This recommendation would contribute to five of the 12 NTS2 outcomes, as follows:

- Provide fair access to services we need;
- Get people and goods to where they need to get to;
- Be reliable, efficient and high quality;
- Use beneficial innovation; and
- Be safe and secure for all.

Details of the 12 NTS2 outcomes came be found in the National Transport Strategy[ii].

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	+	0	0
High Scenario	0	+	0	+	+++	-	0	+++	+	+	-	0	+	0	0

This recommendation makes a strong contribution to the STPR2 Transport Planning Objective (TPO) in relation to the safety and resilience of the trunk road and motorway network, with a less significant contribution to inclusivity of the public transport system

primarily in rural areas and sustainable inclusive growth, as well as related STAG Criteria. This assessment conclusion is based on evidence from previous projects delivered in Scotland, where similar improvements have been implemented successfully with considerable benefits realised. 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
▪ **Vision Zero** – reduce the number of fatal and serious accidents by 50% to 2030 and eliminate them by 2050. ▪ To have the best road safety performance in the world. ▪ **Safety and Security**: Scotland's transport system needs to be safe. Whilst the number of road accident casualties reduced by 11% between 2017 and 2018 [iii], the number of fatalities has increased[iv]. ▪ **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 more sustainable means. ▪ **Reliability:** 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. ▪ **Resilience**: When there are planned and unplanned incidents and events which result in network disruption, it is important that information is given to the public as early as possible so that they can act accordingly. ▪ **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 are tackled. ▪ **Adapting to Climate Change**: Climate change directly affects the transport sector through the increasing number of more severe and frequent extreme weather events and the disruption they cause to the transport system.

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

- Changing road user behaviour (7);
- Access to Argyll (A83) (29);
- Trunk road and motorway climate change adaptation and resilience (31);
- Trunk road and motorway renewal for reliability, resilience and safety (32);
- Future Intelligent Transport Systems (33);
- Traffic Scotland System renewal (34);
- Intelligent Transport System renewal and replacement (35);
- Improving active travel on trunk roads through communities (37);
- Speed Management Plan (38); and
- Access to Stranraer and the ports at Cairnryan (40).

Other areas of Scottish Government activity

- National Transport Strategy (NTS2);
- Revised Draft Fourth National Planning Framework (Revised Draft NPF4);
- Strategic Road Safety Plan (2016);
- Scotland's Road Safety Framework to 2030;
- Infrastructure Investment Plan 2021/22 – 2025/26 (IIP);
- Climate Change Plan 2018-32 Update; and
- Climate Change (Emissions Reduction Targets) (Scotland) Act 2019.

The types of interventions considered should incorporate provision to support sustainable travel. This would be further considered as the development and design of individual interventions progressed.

3. Appraisal

This section provides an assessment of the recommendation against:

- STPR2 Transport Planning Objectives (TPOs);
- STAG criteria;
- Deliverability criteria; and
- 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' Travel Behaviour Variant 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
0	0

The interventions within this recommendation related to widening / realignment and targeted overtaking opportunities are not anticipated to have a material impact on the capacity of the road network and are therefore not anticipated to increase traffic volumes. As such, they are expected to have a neutral impact on transport-based emissions.

Interventions included within this recommendation related to junction improvements are targeted at addressing road safety problems and have the potential to also achieve operational benefits on the network, particularly if interventions are located in, or within, the vicinity of urban areas where congestion can occur at certain times of the day. Improving operating conditions on the road network could potentially encourage car-based traffic. However, the introduction of other measures to promote public transport delivered in conjunction with any roads-based intervention would help to mitigate this. Therefore, junction improvements may therefore aid in the reduction of congestion at current hotspots on the network without inducing additional car-based traffic. Junction improvements located in predominantly rural areas are not anticipated to have a notable impact on traffic volumes or mode share and subsequently transport-based emissions.

While the types of interventions within this recommendation do not, on their own, prioritise a modal shift to more sustainable modes, they do help support the provision of a safe, efficient and reliable trunk road network which is integral to wider Scottish Government programmes relating to active travel and bus priority investment

Overall, this recommendation is expected to have a neutral impact on this objective in both the Low and High scenario.

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

Low Scenario	High Scenario
+	+

While the types of interventions within this recommendation related to widening/realignment and targeted overtaking opportunities would benefit local and longer-distance bus services that use the trunk road and motorway network, they are unlikely to have a direct impact on service frequency and coverage nor have an impact on fares. They are therefore not anticipated to have a notable impact on issues relating to the affordability and accessibility of public transport services, which are linked to wider issues related to the frequency and integration of public transport.

Interventions included within this recommendation related to junction improvements are targeted at addressing road safety problems. They also have the potential to achieve operational benefits, particularly if improvements are located in, or within, the vicinity of urban areas where congestion can occur at certain times of the day. This could support public transport services which operate on the trunk road and motorway network, particularly if bus priority measures, which are not part of this recommendation, are implemented in parallel with any improvements. Junction improvements may therefore provide the opportunity for bus operators to review timetables/frequency of services, should journey times become more reliable. In more rural areas, while such interventions would support public transport services which operate on the trunk road and motorway network, given the viability of services in the majority of areas, this is unlikely to encourage bus operators to review timetables/frequency of service or introduce additional services.

Given the potential impact of junction improvements in, or within, the vicinity of urban areas, these types of interventions are anticipated to have a minor positive impact on issues relating to the accessibility of public transport services through the potential to positively impact on journey time reliability. However, junction improvements located in predominantly rural areas are not anticipated to have a notable impact on these issues.

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

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

Low Scenario	High Scenario
0	0

A reduction in the number and severity of accidents as a result of the types of interventions in this recommendation would deliver health benefits to individuals by providing a safer environment to travel.

Depending on the location of a junction improvement, it may have the potential to positively impact on communities and support health and wellbeing where the intervention involves crossing facilities for those walking, wheeling and cycling. This is of particular relevance in, or within, the vicinity of urban areas, where current traffic volumes or junction layouts can create barriers to travel via active modes. Junction improvements in the most heavily congested areas of the trunk road and motorway network have the potential to result in an increase in traffic due to improved operational performance. However, bus priority and active travel measures, which are not part of this recommendation, should be included in conjunction with any junction improvement located in heavily congested areas, in order to provide enhanced infrastructure and thus operational performance for sustainable modes.

The majority of the benefits from the interventions in this recommendation are, however, likely to be felt most by people who have access to a vehicle and are unlikely to address the key barriers to sustainable travel, particularly in rural areas.

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

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

Low Scenario	High Scenario
+	+

The interventions considered within this recommendation could help to support sustainable inclusive growth through addressing road safety problems. Additionally, associated improvements in reliability and resilience from reducing the impact of accidents on the trunk road and motorway network would help to improve confidence in the network. This would provide benefits not only to businesses but also individuals in accessing employment opportunities and services, such as education and healthcare, particularly in rural areas, as well as improving road-based access to sites of national importance and key gateways.

In terms of the specific impacts of the interventions considered within this recommendation, junction improvements can aid in reducing delays by improving junction operation and reducing closures related to accidents. This is particularly relevant at locations where evidence suggests a safety issue is occurring or is likely to occur in the future, including in urban locations where congestion can occur during peak travel periods.

In addition to reducing accidents, realignment/widening and overtaking opportunities can help to improve the reliability and resilience of the network through the removal of existing sections with poor alignment or carriageway 'pinch points'. Furthermore, such interventions can help to contribute towards safer overtaking opportunities and removing the likelihood of platoons that can occur on single carriageways respectively. The latter are of particular relevance in locations where conflicts between road-based freight, tourist traffic and other road users can occur.

The interventions considered are expected to improve the safety of the network and therefore have a positive impact on route reliability and resilience. This may be significant in certain locations where operational conditions may currently act as a constraint on economic development, particularly within the vicinity of sites of national importance.

Overall, this recommendation is anticipated to have a minor positive impact on this objective in both the Low and High scenarios.

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

Low Scenario	High Scenario
+++	+++

In 2019, the cost of collisions in Scotland was estimated to be over £1.1 billion, of which approximately £830 million related to fatal and serious accidents[v]. Several trunk road corridors have sections with Killed or Seriously Injured (KSI) and Personal Injury Accident (PIA) rates[vi] higher than the national average for trunk roads of a similar standard[vii]. There are also perceptions in relation to safety on rural parts of the trunk road network, such as the impact of driver frustration resulting from a lack of safe overtaking opportunities. Furthermore, reliability and resilience are two issues that have been highlighted, particularly in more rural areas[viiiix]. In the event of road closures due to accidents as well as in other circumstances, such as other incidents and road maintenance, the diversion route can be significantly longer than the primary route.

The types of interventions within this recommendation would result in the safer operation of the network through a reduction in the number and severity of accidents. Based on an assessment of potential safety impacts using specialist modelling software, it is anticipated that the interventions considered could reduce accidents by up to 75%, depending on the type of intervention implemented and location-specific factors, such as traffic volumes. As such, the interventions are expected to contribute towards the casualty reduction targets as defined in Scotland's Road Safety Framework to 2030[x]. Achieving a 50% reduction in fatal accidents by 2030 could result in an accident cost saving of some £800 million, of which £250 million relates to the trunk road and motorway network. A further 50% of that figure could be achieved if serious accidents were reduced to target (the quoted monetary savings relate to achieving a 50% reduction in people killed and a 50% reduction in people seriously injured, by 2030, on a 2014-18 baseline) [xi]. The interventions considered are also expected to positively impact on the reliability and resilience of routes through reducing the impact of accidents and associated delays and/or lengthy diversions. The interventions may also address operational issues on some routes, such as conflicts between road-based freight, tourist traffic and other road users, helping to alleviate platooning due to slower moving vehicles, which can lead to driver frustration and unsafe overtaking manoeuvres.

Reducing the occurrence of road closures due to accidents is likely to have a minor positive impact on personal security, as a result of fewer instances when car users are required to stop, drive slowly or reroute on an unfamiliar diversion route. Where interventions are delivered in conjunction with facilities for walking, wheeling and cycling, there is potential for minor positive impacts for active modes.

Overall, this recommendation is anticipated to have a major 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 against this criterion in both the Low and High scenarios.

2. Climate Change

Low Scenario	High Scenario
0	0

The interventions in this recommendation related to carriageway widening / realignment and overtaking opportunities are unlikely to encourage a modal shift from car to sustainable modes as they are anticipated to be smaller in scale. Depending on the location, junction improvements could support a shift from private car for short journeys in urban areas, where the intervention is delivered in conjunction with active travel infrastructure for those walking, wheeling and cycling, which are not included as part of this recommendation.

However, junction improvements have the potential to achieve operational benefits, particularly if interventions are located in, or within, the vicinity of urban areas where congestion is more likely to occur. Improving operating conditions does provide the potential for additional car-based traffic, however, the introduction of measures to promote public transport, which are not included as part of this recommendation, delivered in conjunction with any intervention, could help to mitigate this. Should such measures be provided, junction improvements may aid in the reduction of congestion at current hotspots on the network without inducing additional car-based traffic.

The trunk road and motorway network can be considered vulnerable to the effects of climate change, particularly in certain coastal areas, areas of high risk of flooding and/or in locations where current or future ground stability issues are known or anticipated. Interventions in this recommendation located in such areas are likely to suffer the same vulnerabilities. However, such interventions could aid in the adaptation of the trunk road and motorway network to the effects of climate change. For example, enhanced drainage systems could be incorporated at locations deemed vulnerable to the risk of increased flooding. The requirement for such measures would be dependent on further assessment as individual interventions are progressed through the design and development process in order to assess the location and scale of specific environmental effects as well as to identify appropriate mitigation where required.

This recommendation is expected to have a neutral impact against this criterion in both the Low and High scenario.

3. Health, Safety and Wellbeing

Low Scenario	High Scenario
+++	+++

In 2019, the cost of collisions in Scotland was estimated to be over £1.1 billion, of which approximately £830 million related to fatal and serious accidents[xii]. The types of interventions in this recommendation would result in the safer operation of the trunk road and motorway network through a reduction in the number and severity of accidents. This is particularly relevant at locations where evidence suggests there is a safety problem or there is a potential safety risk. It is expected that the types of interventions in this recommendation would contribute towards the casualty reduction targets as defined in Scotland's Road Safety Framework to 2030[xiii]. Achieving a 50% reduction in fatal accidents by 2030 could result in an accident cost saving of some £800 million, of which £250 million relates to the trunk road and motorway network. A further 50% of that figure could be achieved if serious accidents were reduced to target (the quoted monetary savings relate to achieving a 50% reduction in people killed and a 50% reduction in people seriously injured, by 2030, on a 2014-18 baseline)[xiv]. A major positive impact on this sub criterion is anticipated.

Reducing the occurrence of road closures due to accidents is likely to have a minor positive impact on personal security, as a result of fewer instances when car users are required to stop, drive slowly or reroute on an unfamiliar diversion route. Where interventions are delivered in conjunction with facilities for walking, wheeling and cycling, which does not form part of this recommendation, there is potential for minor positive impacts for active modes.

Interventions included within this recommendation related to junction improvements within the vicinity of urban areas could result in an increase in the number of vehicles using the trunk road and motorway network. This could potentially increase noise levels and adversely impact air quality resulting in negative impacts on human health. The other interventions within this recommendation are unlikely to increase traffic volumes and would have no impact on noise and air quality and would subsequently have no impact on human health. Where complementary active travel measures, which are not part of this recommendation, are considered as part of the design of individual interventions, the localised nature of the interventions included within this recommendation mean there is unlikely to be a significant increase in active users and therefore health would be largely unaffected.

The interventions' impact on improved access to health and wellbeing infrastructure is dependent on location-specific factors. In the case of realignment/widening and overtaking opportunities, which are more likely to be located on sections of the trunk road network

located in rural areas, a neutral impact is anticipated. Where junction improvements are considered in, or within, the vicinity of urban areas and current traffic volumes or junction layouts create barriers to sustainable travel, complementary bus priority and active travel measures, which are not part of this recommendation, may be able to be included to enhanced access to health and wellbeing infrastructure, with a minor positive impact anticipated.

The impact of the interventions in this recommendation on visual amenity is dependent on location-specific factors. Detailed design of individual interventions would be required to ascertain the likely impact on visual amenity.

Overall, this recommendation is expected to have a major positive impact against this criterion in both the Low and High scenarios.

4. Economy

Low Scenario	High Scenario
+	+

Safety improvements could help support existing local and regional economies as well as support potential future growth in key industries, through a more reliable and resilient trunk road and motorway network. For example, certain areas of the country are well positioned to take advantage of substantial renewable energy resources from wind, wave and tidal, and with this have a key role in delivering green energy requirements for Scotland. With many renewable projects located in rural areas, the interventions within this recommendation, whilst focussed on addressing safety problems, could potentially help support growth in the renewables industry by improving the standard of carriageway at specific locations. Other sectors operating in these parts of the country that could benefit from this recommendation include the oil and gas and tourism industry. The offshore economy remains a key sector particularly in the north east of the country and a reliable, resilient trunk road network is important in maintaining access for future developments within this sector, including the decommissioning of Oil and Gas infrastructure. Tourism is a key sector for national, regional and local economies, with a growing number of visitors travelling to scenic areas across the country, and self-drive road trips on routes such as the North Coast 500 becoming increasingly popular with both domestic and international tourists.

The reliability and resilience of the trunk road and motorway network is integral to supporting opportunities to strengthen the reliability of supply chains locally, regionally and nationally. This is particularly important for routes providing access to sites of national importance and key gateways. Improving the resilience of the network through reducing the occurrence of accidents would provide direct benefits to businesses delivering goods and materials. This would be particularly relevant to industries operating with ‘just in time’ supply chains and to key cross-border freight corridors on which significant volumes of road-based freight are transported.

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

5. Equality and Accessibility

Low Scenario	High Scenario
+	+

Safety improvements and the associated reduction in disruption from accidents on the trunk road and motorway network would support enhanced access for all road users, particularly for those in rural areas where the road network is of vital importance in linking communities with key services, employment, healthcare and education. It is considered unlikely that the interventions within this recommendation would have a significant impact on public transport and active travel accessibility or network coverage. Furthermore, the interventions would not impact on the affordability of public transport, with fewer benefits provided to individuals who do not have access to a private car or are unable to drive.

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

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

3.3. Deliverability

1. Feasibility

The interventions within this recommendation would typically be taken forward by Transport Scotland and could be delivered on a project-by-project basis or potentially through the development of route action plans as part of a wider strategy. There is already significant experience of delivering the types of interventions in this recommendation within Scotland and elsewhere and they are largely readily feasible. However, the impacts on environmental, geotechnical and land use may affect the feasibility of individual interventions depending on location specific conditions.

The location and type of improvements on specific routes requires further detailed investigation. This would be informed by the route risk mapping process Transport Scotland is developing in addition to the more traditional reactive analysis of high accident cluster sites to assess the safety quality of the road network and to target investment. Public Local Inquiries may also be required, depending on the locations progressed and other local factors.

2. Affordability

Junction improvements, particularly at-grade interventions, are relatively inexpensive, reflecting the scale of schemes being anticipated to have lower associated costs. Large junction improvements, such as grade separation, are however likely to be more expensive.

Smaller scale realignment/widening interventions, such as those focussed on tackling localised pinch points, would also likely be relatively inexpensive. However, larger scale interventions could be potentially expensive due to specific local issues, such as the requirement for structures, the purchase of land or localised ground conditions.

The provision of overtaking opportunities is potentially expensive and costs can vary from location to location. Costs would be dependent on the scale and complexity of individual interventions and any specific local issues, such as the requirement for structures, the purchase of land or localised ground conditions.

3. Public Acceptability

Wider public support is anticipated for road safety focussed improvements on the trunk road and motorway network, however specific schemes may draw varied public opinion. For example, some potential negative perceptions can be expected from certain stakeholders regarding the perceived road-based focus as well as the impact of construction on communities. This potentially includes from landowners and others within communities directly impacted by improvements.

There is, however, likely to be support from stakeholders in the wider business community with there being a view that economic growth may in part be constrained in certain rural

areas as a result of the lack of reliable and resilient transport infrastructure and poor connectivity. Depending on the response to individual interventions, there may be the need for Public Local Inquiries.

3.4. Other Criteria Assessment

1. Strategic Environmental Assessment (SEA)

Low Scenario	High Scenario
-	-

The interventions within this recommendation would result in positive effects on safety (SEA Objective 7) due to its focus on improving the safety of the trunk road and motorway network.

Junction improvement interventions have the potential to increase road traffic volumes in some locations, as they may lead to operational benefits. Whilst this could cause a minor increase in transport-based greenhouse gas emissions, the introduction of other measures to promote public transport, delivered in conjunction with any roads-based intervention, would help to mitigate this. Any opportunity to employ methods for decarbonisation of construction, through innovation in design, procurement and construction methods, should be identified as part of the design and development process. Similar work undertaken to date in exploring interventions for decarbonising construction on other road schemes could be used as a basis for developing these methods.

Any increased traffic could also potentially adversely affect air quality and noise, however, overall the interventions included within this recommendation are expected to have a neutral effect against Population and Human Health (Objectives 3 and 5).

Depending on the source and type of materials/natural resources used in construction, there is the potential for negative effects on natural resources (Objective 9). There is a potential opportunity for interventions to improve surface conditions, and, alongside advancement in the types of materials used, reduce overall maintenance needs in the longer term.

The interventions within this recommendation would support connectivity to employment and other services, however, this would be primarily for road-based transport. As the trunk road and motorway network is important to the operation of local bus services and inter-urban services, the interventions could enhance accessibility (Objective 4) however, at a national level, it is anticipated that any benefits are likely to be negligible. Provision for non-motorised users would also be a consideration as part of the design of individual interventions to address any specific safety and/or severance challenges. Both negative and positive effects have been predicted in relation to quality of life and sustainable accessibility (Objective 4).

There is the potential for minor negative environmental effects during the construction and operation of the types of interventions in this recommendation on SEA objectives related to the water environment, biodiversity, soil, cultural heritage and landscape and visual amenity (Objectives 10 to 14). Some of these effects relate to the construction footprint locations and may be difficult to avoid if there are sensitive environmental receptors in the vicinity. However, the scale of the effects is uncertain at this stage and the location, design and timing of construction for the

interventions would have a strong influence on the magnitude of the environmental effects.

Many of the interventions associated with this recommendation are likely to be small-scale and have only localised and non-significant environmental effects. However, it is recommended that further environmental assessment is undertaken on a case-by-case basis as individual interventions are progressed through the design and development process in order to assess the location and scale of specific environmental effects as well as to identify appropriate mitigation where required. Design and construction environmental management plans would also be recommended to consider how to protect and enhance landscape, drainage, amenity, biodiversity and cultural heritage. It is also recommended that further cumulative effects assessment and environmental mitigation and enhancement measures proposed can be embedded in any interventions that are implemented.

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

2. Equalities Impact Assessment (EqIA)

Low Scenario	High Scenario
0	0

Although the interventions included within this recommendation would provide most benefit to those with access to private car, the increased safety and reliability and resilience of the trunk road and motorway network has the potential to improve the reliability of public transport in the immediate vicinity. However, at a national level, impacts are anticipated to be negligible.

Where junction improvements positively impact on the safety of road crossings, these could address mobility barriers and lead to an improved sense of road safety and security for those walking, wheeling and cycling. If these improvements were made where a trunk road passes through a community, this could help reduce severance issues and it could also improve sustainable access to employment, education and other services. This would provide some positive effects for protected characteristic groups who are more likely to walk, wheel or cycle, or who are more vulnerable to fear of road danger, including children, young people, women, disabled people and older people. However, these effects are anticipated to occur in a limited number of urban locations and are unlikely to be significant when considered at a national level.

Realignment/widening and overtaking opportunities could improve access to employment, education and health, particularly within rural areas. However, the nature of these types of improvements are anticipated to result in a disproportionate benefit to those with access to a private car and as such are likely to result in negligible benefits to those in protected characteristic groups.

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

3. Island Communities Impact Assessment (ICIA)

Low Scenario	High Scenario
+	+

The interventions in this recommendation focus on improvements to the trunk road and motorway network and, therefore, are not directly relevant to the island communities (with the exception of Skye). However, the improved resilience and enhanced connectivity provided on the trunk road and motorway network, which is used to access key ferry terminals to the Inner and Outer Hebrides, Orkney, Shetland and the Islands of the Firth of Clyde, may result in fewer accidents and associated delays and road closures occurring on the trunk road and motorway network. This could result in enhanced resilience and reliability for road users, including road based freight, travelling to and from islands, providing indirect benefits for island communities.

This recommendation is expected to have a minor positive impact against this criterion in both the Low and High scenarios.

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

Low Scenario	High Scenario
0	0

Improving road safety for trunk road and motorway users in general is likely to benefit children and young people who are travelling on or beside the network. The indirect improvements to the reliability of public transport services which utilise the trunk and motorway network could also provide some benefit for children and young people, who are more reliant on public transport services than other age groups. However, at a national level this is likely to be negligible.

Where junction improvements, particularly at locations where the trunk road network passes through communities, have a beneficial impact on the safety of road crossings, this could also benefit children and young people who are more vulnerable to fear of road danger. However, these effects are anticipated to occur in a limited number of urban locations and are unlikely to be significant when considered at a national level.

Effects on air quality are likely to be localised and emissions may increase or reduce depending on whether junction improvements influence an overall increase in car-based traffic, or whether the prevalence of congestion in urban areas is reduced. Children are more vulnerable to the adverse health effects from traffic pollution and therefore these effects could have a positive or negative effect on the health of children in particular. More detailed assessment work would be required to understand the impact for individual schemes.

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

5. Fairer Scotland Duty Assessment (FSDA)

Low Scenario	High Scenario
0	0

While all users of the trunk road and motorway network could be expected to benefit from the types of interventions in this recommendation, benefits would likely be felt to a lesser extent by individuals who do not own or have access to a private car, as well as those unable to drive. However, improvements to the reliability of public transport services using the network would potentially provide minor positive impacts for low-income groups who are more reliant on bus travel for journeys.

Similarly, where junction improvements, particularly at locations where the trunk road network passes through communities, have a beneficial impact on the safety of road crossings, this could have a positive impact on those walking, wheeling and cycling. This could potentially improve sustainable access to services, such as employment, education, health facilities and other transport services, particularly where trunk road severance issues are a current barrier within communities. With walking and cycling being lower cost forms of transport, this could have a positive effect on socio-economically disadvantaged groups. However, these effects are anticipated to occur in a limited number of urban locations and are unlikely to be significant when considered at a national level.

Implementing safety improvements on the trunk road network in conjunction with active travel and bus priority measures, which are not included as part of this recommendation, may provide similar benefits to those referenced above.

Junction improvements, realignment / widening and overtaking opportunities, through the improved resilience and enhanced connectivity provided for rural and remote communities, may also contribute towards addressing many of the structural challenges that rural communities face (such as attracting young families and retaining skilled workers). However most interventions within this recommendation are unlikely to have an impact on socio-economic disadvantaged groups in relation to the population overall.

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

References

[i] Transport Scotland, Scotland's Road Safety Framework to 2030, 2021, Scotland's Road Safety Framework to 2030 (transport.gov.scot)
[ii] Transport Scotland, National Transport Strategy (NTS2), 2020, national-transport-strategy.pdf
[iii] Transport Scotland, Key Reported Road Casualties Scotland 2018, 2019, https://www.transport.gov.scot/media/45015/sct05191903161.pdf
[iv] The latest road casualties statistics are reported in Key Reported Road Casualties Scotland 2020, 2021, Reported Road Casualties Scotland 2020 (transport.gov.scot)
[v] Transport Scotland, Reported Road Casualties 2019 - Table 11, 2020, Reported Road Casualties Scotland 2019 | Transport Scotland
[vi] Based on local accident rates derived from STATS19 Data and national rates obtained from https://www.transport.gov.scot/publication/reported-road-casualties-scotland-2019/
[vii] Transport Scotland, Reported Road Casualties Scotland 2019, 2020, https://www.transport.gov.scot/media/49474/reported-road-casualties-scotland-2019-publication-pdf-version.pdf
[viii] Transport Scotland, STPR2 Highlands & Islands Case for Change, 2021, https://www.transport.gov.scot/media/49100/initial-appraisal-case-for-change-highlands-and-islands-report.pdf
[ix] Transport Scotland, STPR2 Argyll & Bute Case for Change, 2021, https://www.transport.gov.scot/media/49099/initial-appraisal-case-for-change-argyll-bute-region-report.pdf
[x] Transport Scotland, Scotland's Road Safety Framework to 2030, 2021, Scotland's Road Safety Framework to 2030 (transport.gov.scot)
[xi] The quoted monetary savings relate to achieving a 50% reduction in people killed and a 50% reduction in people seriously injured, by 2030, on a 2014-18 baseline
[xii] Transport Scotland, Reported Road Casualties 2019 - Table 11, 2020, Reported Road Casualties Scotland 2019 | Transport Scotland
[xiii] Transport Scotland, Scotland's Road Safety Framework to 2030, 2021, Scotland's Road Safety Framework to 2030 (transport.gov.scot)
[xiv] The quoted monetary savings relate to achieving a 50% reduction in people killed and a 50% reduction in people seriously injured, by 2030, on a 2014-18 baseline