

THE FUTURE OF ROAD INVESTMENT IN WALES

Advice from the independent Panel appointed by the Welsh Government

THE **ROADS REVIEW** PANEL WERE APPOINTED BY LEE WATERS MS, DEPUTY MINISTER FOR CLIMATE CHANGE, IN SEPTEMBER 2021.



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FOREWORD

Deputy Minister Lee Waters MS set up the Roads Review Panel to review road schemes that are under development and to make recommendations for the future of road investment in Wales.

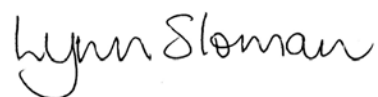
We were asked to review road schemes in the light of the Wales Transport Strategy ambitions and priorities, Programme for Government commitments and the second low carbon delivery plan, Net Zero Wales.

Our reviews of 51 individual road schemes applied criteria set out in our Initial Report, which were firmly based on the ambitions, priorities and commitments in current Welsh Government policy. In turn, our recommendations for the future of road investment build on evidence and insights from the individual scheme reviews.

The challenge of our time is to achieve a prosperous economy and a fairer society whilst protecting and enhancing the environment, for our own well-being and that of future generations. The Panel was mindful that all of these goals are equally important. To rise to this challenge requires preparedness to halt or redirect legacy schemes when they are no longer fit for purpose. But it is important to keep the best of what we have – and so the Panel has looked closely to determine which of the schemes under review are consistent with the aims of the Wales Transport Strategy, Programme for Government and Net Zero Wales.

This final report marks the end of the Roads Review Panel's work. We hope that our recommendations will be of assistance to Ministers in deciding which schemes to take forward, modify or cease to support. The Panel is optimistic about what comes next, in the important task of constructing a high-quality integrated transport network for urban and rural areas, across all regions of Wales.

We are very grateful to the stakeholders and scheme sponsors who aided our review, and to Welsh Government officials for their assistance. We would also like to thank our Secretariat and technical team for their invaluable support.



Dr Lynn Sloman MBE

Chair of the Roads Review Panel



The challenge of our time is to achieve a prosperous economy and a fairer society whilst protecting and enhancing the environment, for our own well-being and that of future generations.

SUMMARY

Road schemes take many years from first plan on a page to first shovel in the ground. This means that most of the road schemes currently in development in Wales were conceived before the stretching policy commitments made in the Wales Transport Strategy in March 2021, the Programme for Government in July 2021, and Net Zero Wales in October 2021.

The high ambition of those policy commitments is illustrated by the targets that accompany them: to reduce car mileage per person by 10% by 2030; and for 39% of journeys to be by sustainable modes by 2030, and 45% by 2040.

In June 2021, the Deputy Minister for Climate Change, Lee Waters MS, announced Welsh Government’s intention to pause road construction and appoint a Roads Review Panel to review road schemes that were already under development against the new policy commitments. The Panel began work in September 2021.

The climate and nature emergencies have formed the backdrop to our discussions. Our terms of reference make clear that in future, Welsh Government will avoid action that increases carbon emissions from constructing, operating, maintaining, and expanding the road network, especially in the next 15 years when most vehicles in use will be powered by fossil fuels.

We have made recommendations about the consistency of 48 road schemes in relation to Welsh Government policy. Our recommendations are based on consideration of appraisal reports, environmental assessments, economic assessments and data analysis; discussions with scheme sponsors; and, in some cases, site visits. We advise that 17 schemes are consistent with the new policy direction defined in the Wales Transport Strategy and 31 are not.

We have also reviewed a sample of three access roads associated with land development schemes, to enable us to advise on the interaction between planning, economic development and transport infrastructure.

In our assessments, we were struck by the significant carbon dioxide emissions from embodied carbon in the steel, concrete and other materials used in road construction.

The 34 road schemes for which a preferred scheme has been costed could cause 500,000 tonnes of carbon dioxide emissions, just from construction. To ‘pay back’ the 30,000 tonnes of carbon dioxide emitted from construction of one medium-cost road scheme, we found that it would be necessary for 2,700 average car drivers to give up driving for ten years.

Schemes that increase road or junction capacity may increase traffic flows. This happens in the short-term because faster journeys lead drivers to make more trips, longer trips to different destinations, or trips by car instead of by public transport or active travel. It also happens in the long-term if the increase in capacity facilitates retail, business or residential development in car-dependent locations. These effects, known as induced travel demand, further increase carbon dioxide emissions.



A **single large road scheme**, such as the Flintshire Corridor Improvement, may increase carbon dioxide emissions by over 400,000 tonnes as a result of induced traffic.



The effect of **schemes that increase speeds** (e.g. from 50mph to 70mph) may also be significant, potentially increasing average car emissions by around 25% as a result of lower fuel efficiency.



Our review of individual schemes has shaped our thinking about the future for road investment in Wales. This report sets out our conclusions about what investment in road infrastructure is appropriate in future, in light of the policy direction that has been set by the Welsh Government.

BASED ON THE SCHEMES WE REVIEWED, WE IDENTIFY THE FOLLOWING **PURPOSES & CONDITIONS** FOR FUTURE ROAD INVESTMENT:



This '4x4' of purposes and conditions for future road investment should provide a **first stage filter** for sponsors of potential schemes, when considering whether a road scheme is justifiable and appropriate. It does not remove or reduce the requirement for systematic appraisal, but will save significant abortive development work on inappropriate schemes. It will obviate the need for future retrospective exercises repeating the work of the Roads Review Panel.

Our scheme reviews also lead us to make recommendations about strategic investment, carbon and well-being, policy themes, and technical, appraisal and delivery themes. We make 51 recommendations in total, set out in full in this report. **Some highlights are that:**



The trunk road Pinch Points and Capital Upgrades Programmes should be replaced by other types of investment programme:

(Recommendations [3](#), [4](#), [5](#), [6](#), [12](#)) [↗](#)

- Regional multimodal programmes to reduce car use and achieve modal shift, using the approach adopted by the South East Wales and North Wales Transport Commissions;
- A Trunk Road Modal Shift Programme focussed on achieving the sustainable transport mode share aim of the Wales Transport Strategy;
- A Trunk Road Safer Speeds and Routes Programme.



Welsh Government should consider reducing speed limits on motorways and trunk A-roads to cut carbon emissions fast and compensate for embodied carbon in road schemes we have to build and assets we have to replace. *(Recommendation [16](#))* [↗](#)



Rather than seeking to 'upgrade' roads to match the relevant national speed limit, there should be national and local reviews of speed limits on A, B and C roads to match the speed limit to the safe speed for the road layout. Such a review should take account of impacts on all road users, and also consider effects on noise, air quality, severance and public realm. *(Recommendation [11](#))* [↗](#)



There should be coordination between the Department for Economy and Department for Climate Change to ensure that sites supported for economic development are in locations that can achieve a high sustainable transport mode share. This would ensure sustainable economic prosperity, and reduce the demand for more road construction. *(Recommendation [22](#))* [↗](#)



To reduce congestion and the perceived need for new road infrastructure, Welsh Government and local authorities should work together to deliver 'benefits-and-charges' packages at a regional level. Charges would influence whether and when people travel, while providing a revenue stream to finance improvements in public transport, active travel infrastructure and digital accessibility.

(Recommendation [27](#)) [↗](#)



To improve freight drivers' well-being and safety, greater attention should be given to construction of lay-bys, parking facilities and rest areas for HGV drivers. *(Recommendation [29](#))* [↗](#)



There should be a Zero-Base Review of road maintenance and renewal schemes, so critical schemes take place first and are not crowded out by less important schemes, as recommended by the Lugg Review.

(Recommendation [31](#)) [↗](#)



Welsh Government should consider a pilot programme applying global best practice to manage through-traffic in rural towns and villages. This would benefit many more communities than there is funding to help through construction of bypasses. *(Recommendation [34](#))* [↗](#)



Road scheme appraisal should use a range of traffic modelling scenarios, including a policy-consistent scenario in which car mileage per person falls nationally by 10% by 2030, in line with the Welsh Government target for traffic reduction. *(Recommendation [42](#))* [↗](#)



To create attractive career pathways for the skilled highway engineers we need to deliver road space reallocation, modal shift and carbon reduction, the professional institutions and supply chain should work with Welsh Government to develop a comprehensive set of continuing professional development requirements. *(Recommendation [50](#))* [↗](#)

INTRODUCTION

2.1. CONTEXT FOR THE REVIEW

On 22nd June 2021, the Deputy Minister for Climate Change, Lee Waters MS, announced in a statement to the Senedd that there would be a pause on all new road schemes while the existing pipeline of schemes was reviewed.

The context for the review is that Welsh Government, and many local authorities in Wales, have declared a climate emergency. Welsh Government has published Net Zero Wales Carbon Budget 2 (October 2021), which identifies the need to reduce carbon dioxide emissions across the whole economy by 63% by 2030. In the transport sector, Net Zero Wales sets an aim to reduce the number of car miles travelled per person by 10% by 2030 (from 2019), and to increase the proportion of trips by sustainable modes (public transport and active travel) to 35% by 2025 and 39% by 2030. Transport emissions accounted for 17% of Welsh carbon dioxide emissions and had declined by only 6% against the 1990 baseline in 2019, highlighting that meeting targets will be very challenging.

Llwybr Newydd, the Wales Transport Strategy (March 2021), sets out how Welsh Government plans to reduce the number of journeys taken by private cars and increase the number of people walking, cycling and using public transport. It adopts a Sustainable Transport Hierarchy to guide decisions on investment in infrastructure, which prioritises walking and cycling, then public transport, then ultra-low emission vehicles, and finally other private motor vehicles.

Planning policy, as set out in Future Wales (February 2021), sets an aim for people to live in places where travel has low environmental impact and low emissions, with reduced reliance on private vehicles.

Most of the road schemes currently in development in Wales were conceived before the adoption of Net Zero Wales, the Wales Transport Strategy and Future Wales. The Roads Review is intended to examine the current pipeline of road investment by Welsh Government to assess whether it is aligned with these new policies, and to make recommendations on future priorities for road investment.

The review is informed by the goals in the Well-being of Future Generations (Wales) Act 2015.

2.2. PANEL MEMBERS

The following members were appointed to the Roads Review Panel on 15th September 2021:

- **Dr Lynn Sloman MBE (Chair)**
- **Julie Hunt**
- **Professor Glenn Lyons**
- **Geoff Ogden**
- **Professor John Parkin**
- **Professor Andrew Potter**
- **Dr Eurgain Powell**
- **Helen Pye**

The Panel combines expertise in transport policy as it relates to climate change; delivery of highways engineering projects; freight logistics; transport planning and future mobility; and public engagement. It includes members from North, Mid, South-West and South-East Wales, and from both urban and rural areas. Further details of the Panel are included on the Roads Review web link <https://gov.wales/roads-review-panel/membership>.

The Panel has been supported by a small Secretariat of Welsh Government officials and Transport for Wales staff, and by technical specialists Arcadis.

2.3. STATUS OF INITIAL AND FINAL REPORTS

The Terms of Reference required the Roads Review Panel to produce an Initial Report, setting out how it proposed conducting the Review and the schemes that it considered to be in scope, for Ministers' approval. The report was submitted to the Deputy Minister for Climate Change and published on 10th February 2022.

The initial report identified the criteria for review and the process to be followed. It reported on the Llanbedr Access Road and the A55 Junctions 15 and 16 Improvements scheme.

The Terms of Reference also required the Panel to provide a Final Report to Ministers setting out its findings. This report fulfils that requirement.

2.4. OBJECTIVES AND TERMS OF REFERENCE FOR THE REVIEW

The objectives of the Roads Review are to:

- 01** Ensure road investment is fully aligned to the delivery of the Wales Transport Strategy ambitions and priorities, Welsh Government Programme for Government commitments and Net Zero Wales.
- 02** Develop a set of criteria which identify appropriate circumstances for expenditure of Welsh Government funds on roads.
- 03** Use these criteria to recommend which of current road projects should be supported, modified, or have support withdrawn.
- 04** Provide guidance on reallocating road space on parts of the road network which might in future benefit from enhancement.
- 05** Consider how any savings might be allocated, in order to ensure problems on the road network are addressed, and in particular to make recommendations on how to tackle the backlog of road maintenance.

Our Terms of Reference set out that, in future, in accordance with the Wales Transport Strategy, the Welsh Government's priority and focus for road investment will be on:



Avoidance of action which leads to increases in carbon emissions from operating, maintaining and improving the road network, especially in the next 15 years when most vehicles in use will still be powered by fossil fuels.



Reallocation of existing road space to achieve a shift to sustainable and accessible forms of transport.



Adaptation of existing road infrastructure to cope with climate change.



Investment which maintains the safety and serviceability of the existing road network in compliance with statutory duties.



Improvement of biodiversity alongside major transport routes.



The full Terms of Reference for the Review are available at <https://gov.wales/roads-review-panel/terms-reference>.

REVIEW PROCESS

3.1. REVIEW PROCESS

The scheme reviews were undertaken using a systematic process agreed by Panel members, with Secretariat and technical support. The process was set out in the Initial Report and agreed by Welsh Government Ministers.

Firstly, scheme information was requested and collated from the scheme sponsors (either Welsh Government officials or local authority officers). This generally comprised reports and studies (typically WelTAG Stage 1-3 reports), environmental assessments, economic assessments, and data analysis, as available.

Schemes were categorised for review depending on the availability of information and the stage of the studies undertaken. Whilst all schemes have been the subject of a consistent and thorough review, this enabled the Panel to first review schemes at a more advanced stage. The findings of the first reviews informed and supported the reviews of schemes at less advanced stages.

Following initial document review, Panel Members visited scheme locations where this was necessary to fully understand the problems, opportunities and issues. They also engaged with scheme sponsors to discuss queries.

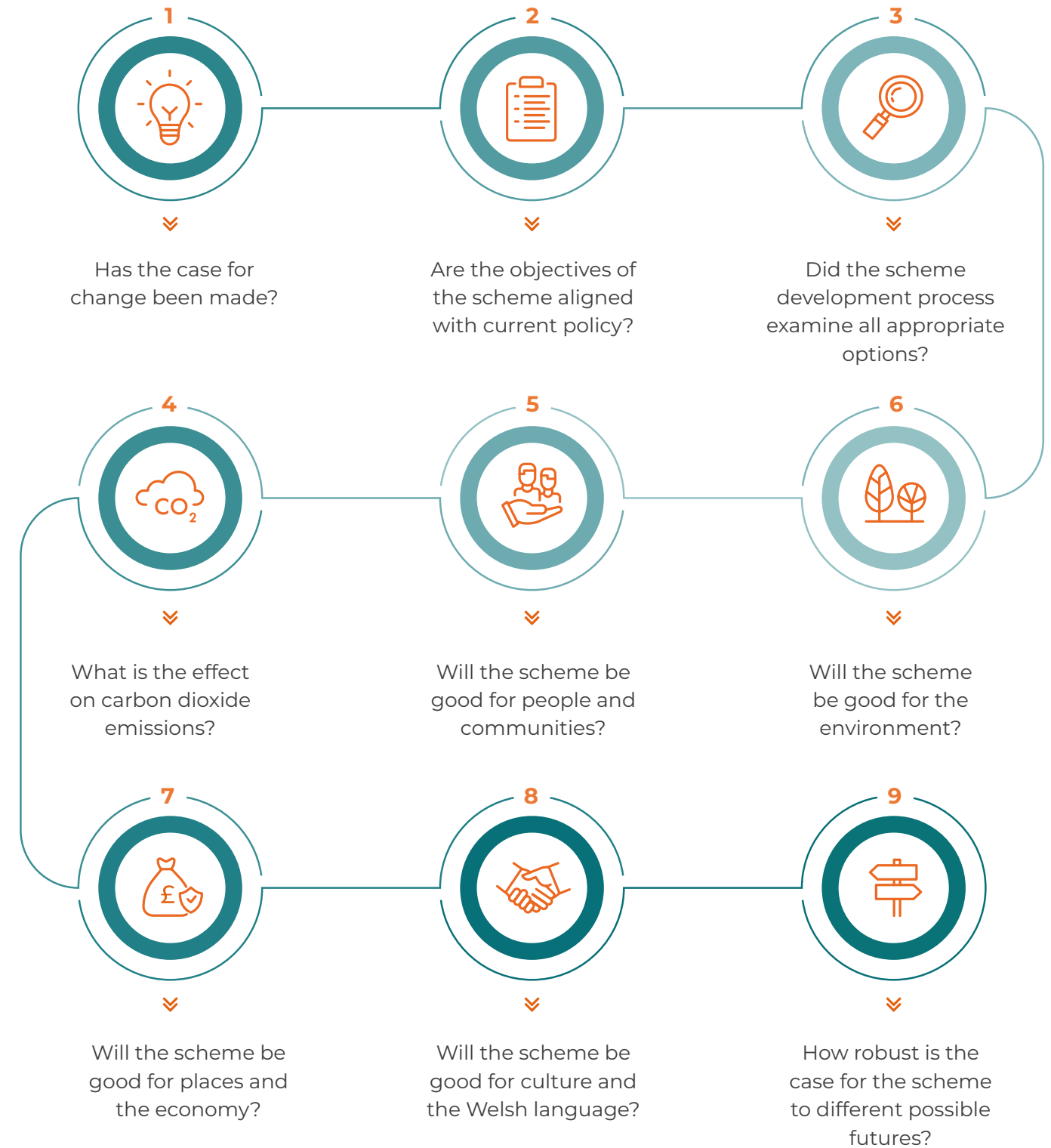
Panel Members reviewed schemes and, following discussion by the whole Panel, a scheme report with final recommendations was drafted and approved for inclusion in the final report.

3.2. CONSIDERATION OF CRITERIA

As set out in our Initial Report, the criteria for reviewing the schemes have enabled a structured consideration of how well each scheme aligns with Welsh Government policy and meets the national well-being goals. This was not a 'tick-box' approach: the Panel exercised judgement in making recommendations, reflecting the balance of evidence.

The nine criteria are presented on the right and the points covered by each criterion are in Appendix 2.

REVIEW CRITERIA



STAKEHOLDER ENGAGEMENT

The Panel was keen to carry out stakeholder engagement to involve those affected; ensure the Review was well informed; and hear ideas about future priorities and approaches for road investment.


For schemes being reviewed, Panellists generally met with the scheme sponsor, whether that be Welsh Government or a Local Authority. For some schemes, the Panel obtained information from Transport for Wales about other initiatives in the scheme area. Where stakeholders contacted the Panel regarding a specific scheme, we considered their representations. Our aim was to ensure the review had access to all relevant information about schemes.

Panellists are grateful to those they met regarding individual schemes for their hard work in providing information and answers to questions.

In addition to talking with scheme sponsors, seven stakeholder workshops were run online between March and April 2022 to discuss potential recommendations for future priorities and approaches to road investment. We talked with Local Authority and Welsh Government officials as well as representatives from tourism; business; freight and logistics; built environment professional institutions; the third sector; and young people.

Participants included:

- Blaenau Gwent County Council
- Bridgend County Council
- Cardiff Capital Region
- Ceredigion County Council
- Chartered Institution of Highways & Transportation Cymru
- Chartered Institute of Logistics & Transport Cymru
- Civil Engineering Contractors Association
- Confederation of British Industry
- Confederation of Passenger Transport
- Constructing Excellence Wales
- Construction Industry Council Wales
- County Surveyors' Society Wales
- Cycling UK
- Federation of Small Businesses
- Flintshire County Council
- Gwynedd County Council
- Institute of Directors
- Institution of Civil Engineers Cymru
- Logistics UK
- Powys County Council
- RAC
- Rhondda Cynon Taf County Borough Council
- Road Haulage Association
- Snowdonia Society
- Sustrans
- Torfaen County Borough Council
- Transport Action Network
- Transport Focus
- Transport for Wales
- Welsh Local Government Association
- Wildlife Trusts Wales
- Woodland Trust
- 20s Plenty
- Young people aged 11 - 17



The Panel is very grateful to everyone who took the time to engage with the review. Contributions helped inform the thinking of Panel members and their final advice to Welsh Government.

The Panel's stakeholder sessions covered matters including:

- the need for and benefit of roads investment;
- responses to the climate emergency and the need for decarbonisation;
- the problems and challenges of identification and development of road schemes;
- the specific needs of freight users of the road network in Wales;
- different policy priorities between urban and rural Wales;
- the changes in travel needs post-Brexit and post-Covid-19; and
- opportunities to improve the process for identifying transport problems and developing solutions.

Themes the Panel were keen to explore during our stakeholder engagement included:

- Regional working
- Decarbonisation
- Biodiversity
- Road safety
- Seasonality and tourism
- Freight
- Scheme appraisal techniques

PRINCIPLES FOR FUTURE ROAD INVESTMENT

5.1. INTRODUCTION

The Roads Review Terms of Reference asked the Panel to examine the circumstances in which it will be appropriate for Welsh Government to invest in road schemes in future, taking into account the Wales Transport Strategy ambitions and priorities, the 2021 Programme for Government commitments and Net Zero Wales.

In carrying out our review, we also took account of the well-being goals of the Well-being of Future Generations (Wales) Act 2015 (which are reflected in the Wales Transport Strategy ambitions) and planning policy as set out in Future Wales and Planning Policy Wales 11. The Wales Infrastructure Investment Strategy, which was published after we began our work, was also relevant.

This chapter sets out our recommended principles for future road investment, based on Welsh Government policy and drawing on what we learnt from our scheme reviews. The principles include:

- **Purposes of schemes that are appropriate for future investment;**
- **Conditions that should be met by all schemes, in order to align with Welsh Government commitments in relation to climate change and biodiversity.**

The suggested purposes and conditions for future road investment should provide a first stage filter for sponsors of potential schemes, when considering whether a road scheme is justifiable and appropriate. They do not remove or reduce the requirement for systematic appraisal, but could save significant abortive development work on inappropriate schemes.



RELEVANT GOVERNMENT PRIORITIES, AMBITIONS AND COMMITMENTS:

WALES TRANSPORT STRATEGY PRIORITIES:

- **Bring services to people to reduce the need to travel**
- **Allow people and goods to move easily from door to door by accessible, sustainable and efficient transport services and infrastructure**
- **Encourage people to make the change to more sustainable transport**

WALES TRANSPORT STRATEGY WELL-BEING AMBITIONS:

– **Good for people and communities:**

a transport system that contributes to a more equal and healthier Wales, that everyone has the confidence to use

– **Good for the environment:**

A transport system that delivers a significant reduction in greenhouse gas emissions, maintains biodiversity and enhances ecosystem resilience, and reduces waste

– **Good for the economy and places:**

A transport system that contributes to our wider economic ambitions, helps local communities, supports a more sustainable supply chain, uses the latest innovations and addresses transport affordability

– **Good for culture and the Welsh language:**

A transport system that supports the Welsh language, enables more people to use sustainable transport to get to arts, sport and cultural activities, and protects and enhances the historic environment



NET ZERO WALES TRANSPORT SECTOR AMBITION STATEMENT:

- Reduce emissions from passenger transport by 22% in 2025 (from 2019) and 98% in 2050 through demand reduction, modal shift and uptake of low carbon technologies
- Reduce the number of car miles travelled per person by 10% by 2030
- Increase the proportion of trips by public transport and active travel to 35% by 2025 and 39% by 2030

PROGRAMME FOR GOVERNMENT COMMITMENTS:

- Seek a 30% target for working remotely
- Work towards our new target of 45% of journeys by sustainable modes by 2040, setting more stretching goals where possible
- Develop a new major routes fund to improve the attractiveness and biodiversity of areas alongside major transport routes in Wales
- Make 20mph the default speed limit in residential areas
- Explore opportunities for multi-modal extensions to our Metro networks, such as an integrated transport system for the North Wales Corridor and across the South Wales Valleys
- With Transport for Wales, explore development of transport links between the north and south of Wales, including how to protect potential travel corridors on the western coast of Wales
- Invest in bus services and complete major new bus infrastructure projects
- Develop new Active Travel Integrated Network Maps
- Invest in travel options that encourage public transport and support walking and cycling
- Strengthen the protections for ancient woodlands.

5.2. PURPOSES OF SCHEMES THAT ARE APPROPRIATE FOR FUTURE INVESTMENT

The Panel does not consider that current Welsh Government policy requires an end to all road construction. However, we take the view that the significant carbon emissions from construction, operation, maintenance and use of new road infrastructure, and from renewal and modification of existing infrastructure, mean that schemes that might have been funded in the past may not be appropriate for investment in future.

From our scheme reviews, there are four main purposes that we identified as consistent with the Wales Transport Strategy, Net Zero Wales, the Programme for Government and other relevant policy, and for which the likely additional carbon emissions may be justified so long as the scheme meets certain conditions. In this and subsequent chapters, we refer to schemes that meet these purposes and conditions as being “consistent with current policy”.

The purposes are discussed in sections 5.3 - 5.6 below and the conditions in sections 5.9 - 5.12.

RECOMMENDATION

1. The Panel recommends that in future, schemes that modify the form of a road should only be for these four purposes:

- **Shifting trips to sustainable transport to reduce carbon emissions**
- **Reducing casualties where they are high, through small-scale changes**
- **Adapting roads to the impacts of climate change**
- **Supporting prosperity by providing access to development sites that will achieve high sustainable transport mode share**

These purposes relate to schemes that modify the form of the road, not routine maintenance or renewals. Our recommendations on necessary road maintenance and renewals are discussed in section 7.13.

The Panel also identified two issues for which road schemes have been seen to offer a solution in the past, but where the conventional solution is not consistent with the Wales Transport Strategy, Net Zero Wales, the Programme for Government and other relevant policy. We consider that these issues are important, and require development of a different set of solutions.

We discuss these issues in sections 5.7 and 5.8, and make recommendations in chapter 7. They are:

- Reducing the impact of traffic on communities
- Enabling efficient and reliable movement of freight

5.3. PURPOSE 1: SHIFTING TRIPS TO SUSTAINABLE TRANSPORT TO REDUCE CARBON EMISSIONS

Welsh Government has set a target of 39% of journeys to be made by public transport, walking and cycling by 2030 and 45% by 2040. These targets represent increases of 7%-points and 13%-points on the estimated current sustainable mode share of 32%. For these targets to be achieved, there must be a modal transfer from private cars.

New, modified or replacement road infrastructure will be necessary to achieve the modal share target. Examples of schemes that can help achieve the target include networks of separated cycleways that connect within and between settlements, dedicated busways, junction modifications to provide priority for active travel and buses, and schemes that provide active travel and bus access to railway stations.

There will be embodied carbon emissions associated with these schemes (that is, carbon dioxide emissions from manufacture of the materials used in construction and from construction processes). However, by enabling mode shift from car to active travel or public transport the schemes will reduce carbon emissions in use. This means that the net effect may be an overall reduction in emissions.

Schemes that involve provision of active travel routes should contribute to completing coherent, comprehensive, comfortable, attractive and safe networks of footways and cycleways in accordance with the Active Travel Act Guidance 2021. Schemes should be consistent with, and extend, the routes identified in Active Travel Integrated Network Maps.

Coordination and collaboration between the various sponsors and stakeholders will be necessary to create the active travel network required to meet modal shift targets. Schemes that deliver modal shift to active travel or buses will benefit freight operators and essential car and van users, by reducing congestion and improving journey time reliability.

Setting a modal shift objective would not, on its own, make a scheme consistent with current policy. An assessment is also needed of whether the scheme, in its entirety, is the most effective option to achieve modal shift, or whether there is another option of comparable cost that could achieve more modal shift.

5.4. PURPOSE 2: REDUCING CASUALTIES WHERE THEY ARE HIGH, THROUGH SMALL-SCALE CHANGES

The Panel considered that capital enhancements that change road or junction layouts may be appropriate where there are concerns in relation to safety, evidenced by a significantly higher rate of personal injury collisions than anticipated for the type of road, traffic volume or location.

However, before making changes to a road or junction layout, non-infrastructure measures to reduce casualties should be fully appraised, including lower speed limits; speed enforcement; enhanced road markings; and warning and other signs. These measures may achieve a sufficiently large reduction in casualties, and be more cost effective than changes to the road or junction layout. Speed limit reduction can provide a safety benefit over the length of a route, and may complement even lower limits at discrete locations. These measures also have low or zero embodied carbon emissions; and measures to reduce speeds have the added benefit that they reduce carbon dioxide emissions in use. Evidence should be provided that these non-infrastructure interventions are not as effective as required before beginning to consider more significant infrastructure interventions.

When appraising schemes that reduce speeds to improve safety, the Panel recommends that the resulting small increases in journey time should not be treated as a disbenefit in cost-benefit calculations. This will remove the possibility that safety is traded against journey time reductions in appraisal.

Where changes to road or junction layouts are necessary, the Sustainable Transport Hierarchy should be used to inform design development and decision-making. This means that priority must be given to changes to layout that reduce risk for people walking and cycling (who are at higher risk of death or serious injury) while providing more direct and convenient routes for these road users.

The above recommendations relate to capital safety enhancements, which change the form of the road asset, and not to routine maintenance and asset renewal which change its condition.

The Lugg Review of “Strategic Road Network Programmes in Relation to Meeting Statutory Duties” makes recommendations as to how the “safety-critical elements” of maintenance and asset renewal programmes should be prioritised and progressed¹.

Setting an objective to reduce road casualties does not, on its own, make a scheme consistent with current policy. An assessment is needed as to whether the scheme, in its entirety, is the most effective option to achieve that objective, and whether it may have the unintended effect of making other policy aims, particularly in relation to modal shift and carbon emissions, more difficult to achieve.

5.5. PURPOSE 3: ADAPTING ROADS TO THE IMPACTS OF CLIMATE CHANGE

There may be circumstances where a road is vulnerable to flooding, landslip, sea level rise or other impacts of climate change, and re-routing of the highway, or other works to the highway alignment (such as improved drainage or land stabilisation), are required to provide continued access to services for local communities. Climate change is already having an impact on the integrity of the road network and this is likely to become an increasing issue over the coming decades.

When designing a scheme to adapt to the effects of climate change, it is especially important that there is an early, full and transparent assessment of the carbon dioxide emissions arising from the scheme. Every effort should be made to minimise these emissions. In line with the Sustainable Transport Hierarchy, priority should be given to providing direct and convenient routes for people walking and cycling.

5.6. PURPOSE 4: SUPPORTING PROSPERITY BY PROVIDING ACCESS TO DEVELOPMENT SITES THAT WILL ACHIEVE HIGH SUSTAINABLE TRANSPORT MODE SHARE

Access roads play a necessary role in supporting local economic well-being by enabling the right sort of development to go ahead, in the right place.

Access roads to serve residential, business, industrial, retail, mixed-use or other development should only proceed where the site to which access is provided is an appropriate location for the proposed development. It should be demonstrated that the proposed development is consistent with Future Wales and Planning Policy Wales 11 (and thereby with Policy 34 of Net Zero Wales).

1. The Lugg Review defined “safety-critical elements” as works that, if not done, will expose highway users to significantly greater risk of damage, injury or fatality than they currently experience, as a consequence of the asset, in its current form, not being adequately maintained.

PPW11 says that major generators of travel demand, such as housing, employment, retail, leisure and community facilities should be located within existing urban areas or areas which are, or can be, easily reached by walking or cycling, and are well served by public transport. Sites that are unlikely to be well served by walking, cycling and public transport should not be allocated for development.

Access roads may also be needed to support modal shift for freight: for example, to a new rail freight or water freight distribution hub, or for freight consolidation centres. Access roads should not provide through-routes for private car traffic. The purpose of an access road is to provide for journeys that either start or finish at the development site. Access roads should not be designed in such a way as to provide a bypass or new road link and thus increase road capacity for vehicle trips that do not start or finish at the development site.

It is important that development sites are accessible by active travel and public transport. The layout of routes for active travel and public transport movement within the development site, and the manner of connection to the existing road network, should allow for full permeability of these modes. Access roads and junctions should provide for active travel and bus access as a priority over private cars. Where possible, there should be active travel and bus access to and within the development site via more direct routes than for private cars. The design of the access roads to accommodate heavy goods vehicles must not compromise active travel and public transport movement. Conflict points between HGV movements and cycle movements should be avoided.

Developments should have an Access and Movement Strategy that considers freight and is in line with the Sustainable Transport Hierarchy. Future Wales includes an outcome of a 'Wales where people live in places where travel is sustainable'. PPW11 requires sustainable transport infrastructure to be embedded within the development, and that development is focused on active travel and public transport, with a reduced reliance on private cars.

The core assumption should be that every development will have direct pedestrian routes and cycleways which connect into the wider active travel network, designed in accordance with the good practice set out in the Active Travel Act Guidance. The speed limit for residential areas should be 20mph.

5.7. REDUCING THE IMPACT OF TRAFFIC ON COMMUNITIES

Some schemes reviewed by the Panel were intended to reduce the negative impact of traffic (or predicted traffic growth) on communities, by construction of bypasses or other new road alignments. The Panel acknowledges the benefits of these schemes in reducing severance² and noise in villages and town centres. However, our scheme review found that construction of bypasses could have significant negative impacts in relation to carbon emissions, and sometimes also in relation to biodiversity.

We therefore do not consider that bypasses and similar schemes are consistent with the carbon and biodiversity commitments in the Wales Transport Strategy, Net Zero Wales, the Programme for Government and other relevant policy. We do not recommend that these types of schemes are appropriate for future investment.

Instead, we recommend a shift of emphasis towards strategies to manage through-traffic in towns and villages. This could include:

- **Traffic calming and 20mph speed limits.**
- **Public realm enhancements and reallocation of road space to reflect the 'place' function of roads through settlements.**
- **Public transport and active travel improvements.**
- **Traffic management, signage and HGV routing.**
- **Demand reduction measures.**

We consider that there is potential for a package of these measures to return villages and town centres to their local communities, making it easier and safer for people to walk and cycle, and supporting local shops and local economic well-being, while avoiding increases in carbon emissions and adverse impacts on biodiversity. In section 7.14, we recommend a pilot programme applying global best practice to manage through-traffic in towns and villages.

² Severance is defined in Department for Transport appraisal guidance as the separation of residents from facilities and services they use within their community as a result of transport infrastructure that presents a physical barrier to movement, or traffic flows that are significant enough to impede pedestrian movement. The term primarily relates to non-motorised road users, especially pedestrians.



The freight industry performs an important role for society, and the needs of commercial drivers should be taken into account in scheme development.

5.8. ENABLING EFFICIENT AND RELIABLE MOVEMENT OF FREIGHT

Freight traffic performs an important role for society and its priority needs to be properly and fully taken into account when developing objectives for a scheme. However, the Panel found that the needs of the freight industry receive relatively little attention in scheme appraisals.

We consider that a reduction in private vehicle mileage, a target of Net Zero Wales, will facilitate more efficient and reliable movement of road freight by reducing congestion. This is likely to be a more effective long-term strategy to support freight reliability than schemes that increase capacity of links or junctions.

We found that provision of lay-bys, parking facilities and rest areas for HGV drivers at an appropriate density would assist drivers in complying with their working hours requirements. This is good for well-being and road safety, and merits greater attention. In section 7.12, we recommend scheme development should seek more active engagement with the freight transport industry, with greater attention to construction of these facilities.

5.9. CONDITIONS FOR ALL ROAD SCHEMES

We noted in section 5.2 that some types of road scheme may be consistent with the Wales Transport Strategy, Net Zero Wales, the Programme for Government and other relevant policy, so long as they meet certain conditions. These conditions relate to the need to reduce carbon emissions and improve biodiversity – tackling both the climate emergency and the nature emergency – and are explored in more detail in sections 5.10-5.13 below.

All construction of road infrastructure gives rise to embodied carbon dioxide emissions. We discuss this further in chapter 7. The Panel found that embodied emissions are significant, especially for large road schemes. Some road schemes cause significant increases in emissions due to induced traffic and higher (less fuel-efficient) speeds. The Net Zero Wales emissions reduction targets are challenging, reflecting the need to act quickly to reduce the harm that will otherwise be caused by climate change. The Climate Change Committee advises that in addition to a shift to electric vehicles, we must reduce car mileage and maximise fuel efficiency when we do drive; road schemes that cause induced traffic or less fuel-efficient driving make this harder.

Welsh Government has recognised that there is also a nature emergency. Under the Section 6 duty of the Environment (Wales) Act, all public bodies have a requirement to maintain and enhance biodiversity in the exercise of functions in relation to Wales, and in so doing promote the resilience of ecosystems. The Wales Infrastructure Investment Strategy states that, alongside direct investment in habitats, we must consider how to preserve species and habitats that are declining or under threat.

RECOMMENDATION

2. The Panel recommends that road schemes that are consistent with current policy (i.e. schemes that achieve mode shift, reduce casualties, adapt roads to impacts of climate change, or provide access to development sites that will achieve high sustainable transport mode share) should meet four conditions:

- **The scheme should minimise carbon emissions in construction**
- **The scheme should not increase road capacity for cars**
- **The scheme should not lead to higher vehicle speeds that increase emissions**
- **The scheme should not adversely affect ecologically valuable sites**

5.10. CONDITION 1: SCHEMES SHOULD MINIMISE CARBON EMISSIONS IN CONSTRUCTION

The Panel recommends that schemes that have purposes that are consistent with current policy, as set out above, should only be taken forward if they minimise carbon emissions from construction.

Embodied carbon is lower for smaller-scale schemes: for example, a kilometre of single 2-lane carriageway has whole life emissions (including emissions from material production, material transport, construction, lighting and maintenance) that are less than half the emissions for an equivalent length of dual 2-lane carriageway³. At-grade roundabouts are likely to have lower embodied carbon emissions than grade-separated junctions. Minimising the scale of the scheme is the most important step that can be taken to minimise embodied carbon emissions. Embodied carbon emissions may also be significantly reduced by adopting lower design speeds, as this requires smaller or fewer embankments, cuttings, bridges and other structures.

3. Lokesh K, Densley-Tingley D and Marsden G (2021) *Infrastructure carbon: the 'critical' in transport's journey to net-zero*; and Marsden G, Lokesh K and Densley-Tingley D (2022) *Everything counts: why transport infrastructure emissions matter for decision makers*.

Design Manual for Roads and Bridges (DMRB) standards should be used appropriately with relaxations and departures from standards where these could reduce embodied carbon. Consideration should be given to whether lighting is necessary, as road lighting may be responsible for 12-15%⁴ of an asset's emissions.

The Panel recommends that embodied carbon emissions should be assessed both at the concept or early design stage and then again during detailed design.

5.11. CONDITION 2: SCHEMES SHOULD NOT INCREASE ROAD CAPACITY FOR CARS

An increase in road or junction capacity may increase traffic flows. This may happen in the short-term because it reduces congestion or enables overtaking of slower-moving vehicles, and hence makes journeys faster, leading drivers to make more trips, or make longer trips to different destinations, or make trips by car instead of by public transport or active travel. It may also happen in the long-term if the increase in capacity facilitates development (retail, business or residential) in a car-dependent location. These short- and long-term effects are known as 'induced travel demand'.

For the Net Zero Wales targets to be met at national level, it is essential that individual or combinations of road schemes do not cause induced travel demand. We therefore recommend that schemes should not increase road or junction capacity for private cars relative to the current capacity. In some circumstances, it may be necessary to re-route a road to address a safety issue or as an adaptation to impacts of climate change. Where this is proposed, we recommend capacity on the current route is reduced or removed for private cars (although it may be maintained or increased for public transport and active travel), so that capacity in the corridor is unchanged.

In the schemes reviewed by the Panel, increases in road or junction capacity were sometimes justified on the basis that they would improve journey time reliability. The Panel acknowledges the importance, particularly for freight transport and bus services, of journey time reliability. However, in the long term, induced travel demand is likely to mean that capacity increases are not an effective strategy to improve reliability. Instead, we recommend greater attention should be given to schemes that assist with demand management, coupled with improvements in public transport and active travel provision. This will help to reduce non-essential traffic and make capacity available for essential road users including freight operators.

4. Lokesh (2021) *Infrastructure carbon*. This will however become less significant over time, as decarbonisation of the grid will reduce carbon emissions from lighting.

Other schemes reviewed by the Panel justified increases in road or junction capacity on the basis that they would reduce journey times. These included schemes to enable overtaking. The Panel did not consider these schemes to be consistent with current policy under any circumstances. If a scheme results in shorter journey times for private cars it risks creating induced travel demand.

5.12. CONDITION 3: SCHEMES SHOULD NOT LEAD TO HIGHER VEHICLE SPEEDS THAT INCREASE EMISSIONS

Most vehicles on the road will be powered by petrol and diesel until the mid-2030s, even with the UK Government's commitment to end the sale of new fossil-fuel cars and vans after 2030, and hybrids (which are also partly fossil-fuelled) after 2035. Petrol and diesel cars and vans are most fuel-efficient at speeds of around 35 - 50mph. Above 50mph, fuel-efficiency reduces and carbon dioxide emissions per mile increase. The average car emits 12% more carbon dioxide per mile when travelling at 60mph, and 29% more at 70mph, than it does at 35-50mph⁵.

The Panel therefore recommends that road schemes should be designed so as not to lead to higher speeds that increase emissions. As well as improving fuel-efficiency, this is likely to mean that embodied carbon from construction will be reduced.

As well as carbon emissions per mile increasing at higher speeds, carbon emissions per mile also increase at speeds below 35mph. However, this does not necessarily mean that schemes in congested locations that increase speeds from, say, 20mph to 35mph are beneficial in terms of carbon emissions. This is because higher speeds result in shorter journey times and therefore potentially lead to induced travel demand.

5.13. CONDITION 4: SCHEMES SHOULD NOT ADVERSELY AFFECT ECOLOGICALLY VALUABLE SITES

A significant number of schemes reviewed by the Panel would potentially affect sites that are statutorily designated for their ecological value, such as Sites of Special Scientific Interest (SSSIs) and Special Areas of Conservation (SACs). Some schemes also potentially affected locally-designated sites (such as Sites of Importance for Nature Conservation) and habitats and species outside designated sites including ancient woodlands.

SSSIs are of national importance, and Planning Policy Wales states that development should be refused where there are adverse impacts on the features for which a site has been designated. SACs are of European importance; development that will have a significant effect on a SAC can normally only proceed if it will not adversely affect the integrity of the site, unless there is no alternative solution and there are imperative reasons of over-riding public interest.

Ancient woodland is not statutorily designated, but it is one of the most biologically valuable habitats in the UK and is considered irreplaceable on account of its longevity, biological complexity and uniqueness; Natural Resources Wales (NRW) advise that schemes that would result in the loss or deterioration of ancient woodland should be refused unless there are wholly exceptional reasons.

A key concern in relation to linear schemes, such as new road alignments, is that they may cause habitat fragmentation and degradation that undermines ecosystem resilience. This means that even if designated sites are protected, their increased isolation has a negative effect on biodiversity.

The Wales Transport Strategy represents a significant change to government policy and priorities, and this leads the Panel to consider that some schemes that previously would have passed the benchmark of 'imperative reasons of over-riding public interest', or would have had 'wholly exceptional' reasons to proceed, would not do so in future. In line with the Section 6 duty of the Environment (Wales) Act and PPW11, there should be a presumption against any impacts (direct or indirect) on sites with a national or international statutory designation; or loss from, or deterioration of, ancient woodland, veteran or heritage trees; and outside designated sites, biodiversity and ecosystem resilience should also be maintained and enhanced.

The Panel recommends that NRW should be consulted on ecological impacts at WelTAG Stage 1 to help avoid the development of options that are damaging to biodiversity. The involvement should be proportionate for this early stage. There would still be a need for full ecological assessment at a later stage. This would mean that effort would not be wasted developing schemes that were inconsistent with PPW11 and NRW advice.

SCHEME REVIEWS

6.1. INTRODUCTION

This chapter provides an overview of the recommendations of the Panel with respect to the schemes in the Review. A separate report has been prepared for each scheme setting out the Panel's reasoning and recommendations. These reports are included in Appendix 1.

The scheme reviews have been undertaken using the process outlined in chapter 3, as set out in the Initial Report and agreed by Welsh Government Ministers.

The Panel's Initial Report identified 55 schemes that were considered in scope for the review, including the Llanbedr Access Road and A55 Junctions 15 and 16 (which received rapid reviews). Reviews were subsequently requested of the A469 Troedrihwfuch scheme, which is a Local Transport Fund scheme in Caerphilly County Borough, and the Severn Tunnel Junction Access study, prepared for the Burns Delivery Unit. During the course of the Panel's review of schemes relating to the A55, two further schemes were identified (Junctions 29 - 33b and Junctions 32 - 33).

Eight schemes were not reviewed, either because there was insufficient information, or because the Panel or Welsh Government concluded on investigation that they were out of scope.

The final number of schemes that were reviewed was thus 51.

A 'scheme' may comprise a single measure or a package of measures. In some cases, the appraisal had not yet selected a preferred scheme and identified a number of possible options.

6.2. SCHEMES THAT COULD PROCEED

Of the schemes reviewed by the Panel, the Panel recommends that 17 could proceed, with modifications where appropriate to ensure close alignment with Welsh Government policy.

The schemes that could proceed are those that meet the principles for road investment set out in Chapter 5.

Appropriate schemes are those with the purpose of:

- Shifting trips to sustainable transport
- Reducing casualties where they are high, through small-scale changes
- Adapting roads to the impact of climate change
- Supporting prosperity by providing access to development sites that will achieve high sustainable transport mode share

And where for each scheme:

- The case for change for the scheme is demonstrated
- The objectives are in alignment with Welsh Government policy
- Appropriate options have been considered in line with the objectives and the Sustainable Transport Hierarchy
- The preferred option or options are an effective means of meeting the objectives and policy requirements
- The impacts of the scheme on carbon and the four well-being priorities (good for people and communities, the environment, economy and places and culture and the Welsh language) are considered on balance to be justified, subject to the full consideration that will take place through the scheme development and planning processes
- The need for the scheme and the impacts are likely to be robust to uncertain future changes in travel patterns and mode share and climate change.

The schemes are also consistent with the four conditions set out in Chapter 5. That is, their embodied carbon can be minimised; they will not result in an increase in private motorised vehicle capacity or speeds that will increase carbon emissions; and they will not adversely affect ecologically valuable sites.

While the Panel recommends that these schemes could proceed to the next stage, each scheme will need to be considered in relation to availability of funding and priorities for spending.

Each scheme would continue to be subject to consideration through the WeITAG process, as well as statutory processes such as planning consents, Habitats Regulations Assessments and Environmental Impact Assessment.

6.3. SCHEMES AND STUDIES NOT RECOMMENDED TO PROCEED

The Panel advises that 31 schemes and early-stage studies are not recommended to be taken forward as either the scope of the study was unsuitable to identify high-priority schemes; or a case for change has not been demonstrated; or the proposals are not aligned with Welsh Government policy.

For 9 early-stage studies, the Panel considered that a different approach, working at a regional level to prioritise the most important schemes to achieve the aims of the Wales Transport Strategy, would give a better result.

For 14 schemes, the Panel considers that a case for change has not been demonstrated sufficiently to take forward options.

For 8 schemes, the Panel recognises that there may be a case for change, but does not consider that the preferred scheme is the most appropriate solution or mix of solutions. For these schemes, recommendations are made as to how alternative and/ or supplementary solutions might be developed to address the need for the scheme. In some cases, subsidiary elements of the scheme may still be appropriate to progress, and these are identified in the Panel's scheme report.

The reasons why a scheme might not be the appropriate solution include:

- The objectives are poorly aligned with Welsh Government policy, so the wrong starting point has been taken for developing options;
- There has been insufficient consideration of sustainable travel options, demand management or speed and traffic management measures (and in some instances the objectives were well aligned but the options being considered are not well aligned);
- There would be significant impacts on carbon emissions or well-being priorities that give the Panel concern that the scheme is not justified;
- The scheme may not be robust to future uncertain changes in travel patterns and mode share and climate change, for example being predicated on significant traffic growth.

6.4. ECONOMIC DEVELOPMENT SCHEMES

The scope of the Roads Review, as set out in the Terms of Reference, includes access roads with the primary purpose of serving new residential, retail and light office / light industrial developments in which Welsh Government has an interest.

The Panel interprets this to cover the suitability of the site location to achieve a high sustainable travel mode share; the access road design; and the impact of use of the site on connecting roads and the wider transport network.

A small sample of three land development schemes were identified as specifically within scope for review due to Welsh Government involvement via land ownership or funding. Whilst some comments are made on these developments, the Panel does not make recommendations on whether or not these individual schemes should proceed. Instead, this sample has been used to inform the Panel's advice on future road investment, and its wider recommendations on the relationship between road investment and land use planning.

6.5. SCHEMES WITH INSUFFICIENT INFORMATION

There were six schemes where the Panel was not able to undertake a review and provide a recommendation. This was because the reports and studies were not available within the timescale of the Review programme. It is suggested that the project sponsors consider whether there is still merit in progressing these studies in the light of the recommendations of the Roads Review.

6.6. SCHEMES NO LONGER CONSIDERED IN THE REVIEW

Two schemes listed for review in our Initial Report were not reviewed by the Panel.

The Welsh Government decided that the A4119 Coed Ely dualling scheme should not be reviewed as Rhondda Cynon Taf County Borough Council planned to complete the scheme without further Welsh Government funding.

The Panel concluded that the Carmarthenshire Strategic Public Transport Corridors scheme was not within scope. This is because all the options relate to new or enhanced bus stop provision, increasing bus service frequency and developing integrated ticketing; and none involve new road infrastructure.

6.7. COSTS OF SCHEMES

Scheme cost estimates were available for 34 schemes and are reported in the individual scheme reviews. They are not directly comparable because WelTAG reports used different price years. Some WelTAG studies were at too early a stage for costs to be available.

6.8. SOUTH WEST WALES

In South West Wales, the Panel recommends that two trunk road schemes on the A40 between St. Clears and Carmarthen, and between Carmarthen and Llandeilo, could proceed to the next stage; and also a trunk road scheme on the A48 between Carmarthen and Cross Hands. These schemes are packages of small-scale measures that have potential to improve safety on roads with a poor collision record.

A package of measures to reduce trunk road congestion in Haverfordwest by encouraging modal shift is recommended to proceed.

The Panel also recommends that Welsh Government could continue to support two schemes in South West Wales for which the local authority is the sponsor. These are the Cymmer Carriageway Improvements, which will maintain access for rural communities in Neath Port Talbot, and the Newgale Coastal Adaptation scheme which will maintain connectivity for rural coastal communities and the local economy in the face of impacts of climate change.

In Swansea, the Northern City Link Sustainable Transport Corridor is not recommended to proceed as currently proposed, but further work could be supported to identify options for active travel and bus provision in line with the Sustainable Transport Hierarchy.

6.9. SOUTH EAST WALES

In South East Wales, the Panel recommends that a trunk road scheme on the A4042 between Pontypool and Cwmbran could proceed because it will encourage modal shift and improve safety.

The Panel also recommends that Welsh Government could continue to support four schemes in South East Wales for which the local authority or Transport for Wales is the sponsor. These are the Cardiff Eastern Transport Corridor and Severn Tunnel Junction schemes, which will both support modal shift; and schemes to stabilise roads that are vulnerable to extreme weather impacts and to ensure safe operation, on the A469 at Troedrhifwch north of Caerphilly, and on the A4046 south of Ebbw Vale between Cwm and Aberbeeg.

6.10. MID WALES

In Mid Wales, the Panel recommends that four trunk road schemes could proceed to the next stage. These schemes all have potential to improve safety. They are at the A489/A470 junction at Caersws; on the A487 at Comins Coch on the outskirts of Aberystwyth; on the A487 between Machynlleth and Dolgellau; and on the A40 east of Brecon.

There were three schemes that the Panel did not consider should proceed, but where some elements could be taken forward. These were active travel infrastructure associated with the A487 Llanrhystud and A487 North of Aberarth schemes; and low-cost small-scale safety measures, active travel infrastructure and bus infrastructure associated with the A44 Llangurig to Aberystwyth scheme.

There were no reviews of schemes for which the local authority was the sponsor in Mid Wales.

6.11. NORTH WALES

In North Wales, the Panel recommends that a trunk road scheme on the A487 north of Porthmadog at Llwyn Mafon could proceed to the next stage because it would improve safety.





A local authority-sponsored scheme to reduce congestion by encouraging modal shift in Llandudno is also supported.




There were four studies of sections of the A55 and A494 that were at an early stage and had not yet identified preferred schemes. These were the A55/A494 Network Resilience Study; A55 Junctions 23 to 24 Corridor Study; A55 Junctions 29 to 33b Corridor Study; and A55 J33b Ewloe to A494 Queensferry Interchange Corridor Study. The Panel considered that the studies themselves should not proceed because they were not an efficient way to identify high priority schemes. However, some elements of these studies, identified in the Panel's individual scheme reports, are aligned with the Welsh Government aims and the Sustainable Transport Hierarchy and could be taken forward in future as part of fresh studies, using the regional multi-modal way of working that we recommend in Chapter 7.






6.12. SUMMARY OF RECOMMENDATIONS

The recommendation of the Panel with respect to each of the schemes is provided in table below.

Key:




-  **Could proceed, in some cases with changes**
-  **Should not proceed (but some elements may proceed)**
-  **Should not proceed**
-  **Insufficient information, outside scope of the review, or the Panel issued advice but not a recommendation**






SCHEME NAME	RECOMMENDATION
STRATEGIC ROAD NETWORK	
SOUTH WEST WALES	
 A40 Carmarthen to Llandeilo Corridor	Welsh Government could continue to support the A40 Carmarthen to Llandeilo study but with changes to scope to exclude scheme elements that would increase capacity for private cars or increase vehicle speeds.
 A40 Carmarthen to St Clears Corridor	Welsh Government could continue to support the A40 Carmarthen – St. Clears scheme. Objectives should be revised to reflect the Sustainable Transport Hierarchy and the needs of freight users. A speed limit reduction for the whole route (with enforcement measures) should be considered. A grade-separated junction at Meidrim should not be progressed because the case for change is misaligned with Welsh Government’s aim to reduce car mileage.
 A4076 Haverfordwest	Welsh Government could continue to support the A4076 Haverfordwest Congestion scheme as it has the potential to deliver modal shift and a reduction in car use. The bypass options should not be progressed, and the Sustainable Transport Hierarchy must provide the foundation for the WeITAG Stage 2 appraisal.








SCHEME NAME	RECOMMENDATION
 A48 Cross Hands to Pensarn Corridor	Welsh Government could continue to support the safety elements of the A48 Cross Hands to Pensarn scheme. However, options that increase private car capacity and involve significant embodied carbon should not be taken forward, nor should the closure of pedestrian crossings unless alternative improvements to pedestrian routes are provided.
 A48 Nantycaws Junction Improvement	The A48 Nantycaws scheme should not proceed because it would have significant carbon impact and cost, and would not resolve the majority of safety issues. A reduction in the speed limit should be considered. Other changes to the road layout that would be lower cost and would have lower carbon impact whilst improving safety could also be considered.
 A487 Fishguard to Cardigan	Insufficient information to review
 M4 J38-43 Port Talbot	The scheme should not proceed. The case for change is not well-aligned with Welsh Government’s aim to reduce car mileage, and significant elements of the scheme would increase private car capacity and may therefore undermine the target to increase sustainable transport mode share.
 M4 J43-47 Swansea	The scheme should not proceed. The case for change is not well-aligned with Welsh Government’s aim to reduce car mileage, and the scheme would increase private car capacity and may therefore undermine the target to increase sustainable transport mode share.




SCHEME NAME	RECOMMENDATION
SOUTH EAST WALES	
 A4042 Southern Corridor, Pontypool	Welsh Government could continue to support the A4042 Corridor scheme. The objectives should be reviewed to fully accord with current policy and reflect the Sustainable Transport Hierarchy. Scheme elements that would increase capacity for private cars should not be progressed.
 Cardiff Eastern Transport Corridor	Welsh Government could continue to support the Cardiff Eastern Transport Corridor study, as it could reduce car mileage and support modal shift to active travel and public transport. Any highway works forming part of the packages going forwards should not increase private car capacity.
 M4 J32-35 and A470 Coryton to Merthyr Corridors	The scheme should not proceed. The case for change is not well-aligned with Welsh Government's aim to reduce car mileage, and the scheme would increase private car capacity and may therefore undermine the target to increase sustainable transport mode share.
 M4 J35-38 Bridgend	The scheme should not proceed. The case for change is not well-aligned with Welsh Government's aim to reduce car mileage, and the scheme is contrary to current policies because it increases private car capacity and may therefore undermine the target to increase sustainable transport mode share.
MID WALES	
 A40 Millbrook Farm, Brecon	Welsh Government could continue to support the A40 Millbrook Farm scheme, subject to more detailed development and subject to benchmarking against other safety schemes to demonstrate that the scheme is among the best of those waiting for funding. Regardless of the decision made about whether to proceed with the highway works, a reduction in the speed limit from 70mph to 50mph should receive further consideration.






SCHEME NAME	RECOMMENDATION
 A44 Llangurig to Aberystwyth	The A44 Llangurig to Aberystwyth study should not proceed to the next stage because the high-cost elements that increase road width and encourage overtaking would increase private motor vehicle use, speeds and carbon emissions. Asset renewals should be considered as part of the Zero-Base Review of all renewals and maintenance schemes. Medium-cost active travel and bus infrastructure enhancements should be taken forward independently.
 A470 Alltmawr (Chapel House Farm)	The scheme should not proceed because the case for change is weak. The safety of the junction should continue to be monitored. There should be investigation of low-cost options to reduce speed and improve safety on the A470 between Builth Wells and Erwood.
Mid Wales Safety Schemes: A470 Caersws	Welsh Government could continue to support the A470 Caersws scheme, subject to further development to improve provision for active travel, and subject to benchmarking against other safety schemes to demonstrate that the scheme is among the best of safety schemes waiting for funding.
 A470 Llangurig A470 Llanidloes A470 Pontybat A487 Llanrhystyd A487 Machynlleth A487 North of Aberarth	The A470 Llangurig, A470 Llanidloes, A470 Pontybat, A487 Aberarth, A487 Llanrhystud and A487 Machynlleth schemes should not proceed because the case for change is weak. However, consideration should be given to constructing shared use foot/cycleways between Llanrhystud and Aberarth. Personal injury collisions at A470 Pontybat Junction should be kept under review to establish whether there may be a case for a low-cost Local Safety Scheme or roundabout without differential acceleration lane.
 A487 Dorglwyd Comins Coch	Welsh Government could continue to support the A487 Dorglwyd Comins Coch scheme, subject to consideration of the Panel's advice on scheme design, and benchmarking against other safety schemes to demonstrate that the scheme is among the best of safety schemes waiting for funding.






SCHEME NAME	RECOMMENDATION
 A487 Rhiwstaerdywyll	Welsh Government could continue to support the A487 Rhiwstaerdywyll scheme, subject to more detailed consideration of the 30mph speed limit and barrier options. It is unlikely to be appropriate to progress the highway modification option. The safety benefit should be benchmarked against other safety schemes (including those in the Local Safety Schemes programme and on local authority roads), and the scheme should only proceed if it is among the best of schemes waiting for funding.
 A494 Maesgammedd Road Junction Improvement	The scheme should not proceed in its current form. The safety of the junction should continue to be monitored. Further options to reduce speed and improve the visibility splay at the existing junction should be developed if the collision record suggests that action should be taken.
NORTH WALES	
 A483 Wrexham Bypass Junctions 3 to 6	The A483 Wrexham Bypass Junctions 3 to 6 scheme should not proceed as the case for change is not well-aligned with Welsh Government's aim to reduce car mileage. The scheme would increase private car capacity and carbon emissions. Welsh Government could consider providing support for an alternative approach to create an exemplar residential and employment development with low levels of car use.
 A487 Llwyn Mafon	Welsh Government could continue to support the A487 Llwyn Mafon scheme, subject to more detailed development to ensure safety benefits to walkers, cyclists, equestrians and motorised road users; and subject to benchmarking against other safety schemes to demonstrate that the scheme is among the best of safety schemes waiting for funding. The road realignment element of Option 1 is not aligned with current policy and should be removed from the shortlist of options.

SCHEME NAME	RECOMMENDATION
 A494 Lon Fawr Ruthin/ Corwen Road	The scheme should not proceed because the case for change is weak. The safety of the junction should continue to be monitored, and further options to reduce speed, or divert traffic to reduce conflicting movements should be considered if the collision record suggests that action should be taken.
 A5/ A483 Halton Roundabout	The scheme should not proceed because the case for change is weak. The safety of the junction should continue to be monitored. Further options to reduce speed and improve safety should be developed if the collision record suggests that action should be taken.
 A55/ A494 Network Resilience Study	The A55 / A494 Network Resilience Study should not proceed. The case for change is not well-aligned with Welsh Government's aim to reduce car mileage. The scheme would increase private car capacity and result in a mode shift from public transport to car travel, and this would undermine the target to increase sustainable transport mode share.
	(Previously published as an early review) The scheme should not be supported to go forward in its current form. The scheme objectives should be reconsidered so they are aligned with the Wales Transport Strategy, Net Zero Wales and the North Wales Metro programme. Options to improve provision for active travel and public transport should be re-examined. These options should be at least as good as those included in the current scheme, and should be designed to support modal shift to active travel and public transport for both short and longer journeys along and across the A55 corridor. Proposals should be investigated to introduce a 50-mph speed limit over the whole length covered by the Junction 14 to Junction 16A scheme, and also the Penmaenbach and Conwy tunnels.
 A55 Junctions 15 and 16	
 A55 Junctions 23 to 24 Corridor Study	The A55 J23-24 Study should not proceed to the next stage because there are concerns surrounding this process being the most appropriate to deliver relevant safety and multi-modal transport benefits for this area.

SCHEME NAME	RECOMMENDATION
 A55 Junctions 24 to 29 Corridor Study	Insufficient information to review
 A55 Junctions 29 to 33b Corridor Study	The A55 Ewloe (J33b) to Rhualt (J29) Study should not proceed to the next stage because the case for change has not been made and there are concerns surrounding this process being the most appropriate to deliver relevant safety and multi-modal transport benefits for this area.
 A55 Junctions 30 to 32a Corridor Study	Insufficient information to review
 A55 Junctions 32 to 33	The A55 Northop (J33) to Holywell (J32) scheme should not proceed because the case for change is weak.
 A55 J33b Ewloe to A494 Queensferry Interchange Corridor Study	The A55 Ewloe (J33b) to A494 Queensferry Interchange Study should not proceed to the next stage because the case for change has not been made and there are concerns surrounding this process being the most appropriate to deliver relevant multi-modal transport benefits for this area.
 A55 Slow moving vehicle overtaking restrictions	Insufficient information to review
 A55 At grade crossing review	Insufficient information to review

SCHEME NAME	RECOMMENDATION
 Flintshire Corridor Improvement	The scheme should not proceed. The case for change is not well-aligned with Welsh Government's aim to reduce car mileage. The scheme would increase private car capacity and result in a mode shift from public transport to car travel, and this would undermine the target to increase sustainable transport mode share.
 Third Menai Crossing	The A55 Third Menai Crossing should not proceed. The case for change is not well-aligned with Welsh Government's aim to reduce car mileage. The scheme would lead to increased traffic and carbon dioxide emissions, and a mode shift from public transport to car travel, inconsistent with the target to increase sustainable transport mode share.
ECONOMIC DEVELOPMENT	
 Celtic Business Park, Fishguard (South West Wales)	Insufficient information to review
 Llanfrechfa, Cwmbran (South East Wales)	Welsh Government, working with Torfaen CBC, could use its leverage as landowner and funder to support an exemplar development at Llanfrechfa, and at other suitable sites. As part of this, Welsh Government could adopt legal agreements for conditions that are not easily applied or enforced as normal planning conditions.
 Warren Hall, Flintshire (North Wales)	Welsh Government is advised to consider whether development of this site, and similar sites within its portfolio, would be compatible with meeting its aims around modal shift and decarbonisation.

SCHEME NAME	RECOMMENDATION
LOCAL TRANSPORT FUND / RESILIENT ROADS FUND	
SOUTH WEST WALES	
 Carmarthenshire Strategic Public Transport Corridors	Outside scope of the Roads Review
 Cymmer Carriageway Improvements, Neath Port Talbot	The Cymmer Carriageway Improvements scheme could proceed, subject to quantification of the carbon impact of construction and evidence that it has been minimised, and evidence that the local community has been fully engaged and is supportive of the proposed scheme.
 Llanelli Urban and Coastal Belt Network Improvements	Insufficient information to review
 Newgale Coastal Adaptation and A487 diversion scheme	Welsh Government could continue to support the Newgale Coastal Adaptation and A487 Diversion scheme, subject to the scheme sponsor demonstrating a best practice approach to climate adaptation in accordance with the Panel's advice.
 Northern City Link Sustainable Transport Corridor, Swansea	Welsh Government should not support the Swansea Northern City Link Sustainable Transport Corridor scheme as currently proposed, because the Dyfatty Junction reconfiguration is not consistent with the Sustainable Transport Hierarchy and may increase car use. However, there is a case for change and further support could be provided for WeITAG Stage 1 work to identify options for active travel and bus provision on the corridor and at Dyfatty Junction in line with the Sustainable Transport Hierarchy.

SCHEME NAME	RECOMMENDATION
SOUTH EAST WALES	
 A4046 Aberbeeg Road, Blaenau Gwent	Welsh Government could continue to support the A4046 Aberbeeg Road scheme, if it is demonstrated that further work is necessary to stabilise the carriageway. The solution should be the minimum necessary to stabilise the carriageway, ensure drainage is satisfactory, and ensure vehicle safety, while minimising carbon emissions associated with construction.
 A4119 Coed Ely Dualling	Outside scope of the Roads Review
 A469 Troedrhifwuch	Welsh Government could continue to support the A469 Troedrhifwuch scheme, with consideration given to appropriate opportunities to enhance the active travel network in the area, and any necessary considerations given to issues in relation to the adjacent railway line.
 Cynon Gateway North	Welsh Government should not provide further support for the Cynon Gateway North scheme because its construction would result in substantial increased emissions of carbon; there would be impacts on sites that are protected for their environmental value; and it would facilitate a car-dependent approach to economic development.
 Llanharan Bypass	<p>Welsh Government should not provide further support to the A473 Llanharan bypass because it would be likely to increase car use. Other interventions to improve active travel and public transport, coupled with demand management, would provide a more sustainable basis for meeting future development aspirations.</p> <p>There should be a multi-agency approach to developing sustainable travel and demand management interventions in Llanharan to address the existing transport issues.</p>

SCHEME NAME	RECOMMENDATION
<p>Severn Tunnel Junction Access</p>	<p>Welsh Government could continue to support this scheme as it has potential to support modal shift to public transport. The scheme must be carefully designed to prioritise active travel and bus access and not increase private car mileage. Option 2, with the link road extending to the M48, should not be considered further due to its potential to induce private car traffic and its substantial embodied carbon in construction.</p>
NORTH WALES	
<p>Abergele Town Centre Congestion Improvement</p>	<p>The Abergele Town Centre Congestion Improvements scheme should not proceed in its current form. However, Welsh Government could continue to support development of a scheme for Abergele town centre, if justified against other transport priorities, with a focus on enhancing active travel provision for the whole town in line with the Sustainable Transport Hierarchy, and managing private car demand.</p>
<p>Llanbedr Bypass and Access Road</p>	<p>(Previously published as an early review)</p> <p>The scheme does not align well with new Welsh Government transport and climate policy, and the Roads Review Panel Chair recommended that it should not be progressed. It was recommended that there would be benefit in discussion between Gwynedd Council and Welsh Government about an alternative package of measures to reduce the negative impact of traffic in Llanbedr and in other villages on the A496, while also encouraging modal shift and reducing carbon dioxide emissions. If proposals for an appropriate scale of development of the Airfield become more defined, the Panel Chair recommended that access options for the site, better aligned with Welsh Government guidance in the Wales Transport Strategy and elsewhere, could be considered as part of that package of measures.</p>

SCHEME NAME	RECOMMENDATION
<p>Llandudno Congestion Improvement Phase 4</p>	<p>Welsh Government could continue to support the Llandudno Congestion Improvements scheme, subject to further development in line with the Sustainable Transport Hierarchy and consideration of the Panel's advice on the preferred approach at Links Roundabout.</p>
OTHER	
<p>Chester Broughton Growth Corridor</p>	<p>Welsh Government should not provide further support for the development of the highway schemes proposed for the Chester Broughton Growth Corridor. These schemes would increase road capacity for private cars and encourage dispersed land-use patterns.</p>

DISCUSSION AND RECOMMENDATIONS

7.1. INTRODUCTION

Chapter 5 set out our recommended principles for future road investment. In this chapter, we discuss other themes that have emerged from the Panel's discussion.

Our findings are drawn principally from the evidence-base of the 51 schemes, their appraisal documents, and the large volume of supporting material reviewed by the Panel. In reviewing such a large number of schemes, some common issues and opportunities have emerged. In considering these issues and opportunities, we have also drawn on evidence from helpful discussions with scheme sponsors, stakeholders, Welsh Government officials and external expert peer reviewers of our preliminary findings. The themes are organised into four groups:

Strategic investment themes set out our conclusions about what the future for road investment in Wales could look like. We suggest a much larger role for regional multimodal programmes, combined with some targeted programmes led by Welsh Government's Transport Department and Trunk Road Agents and focussed on achieving two key aims of the Wales Transport Strategy: modal shift and safer roads.

Carbon and well-being themes explain our conclusions about how the aims of Net Zero Wales and the environment, economy, social and cultural well-being ambitions of the Wales Transport Strategy can best be put into practice in future scheme development.

Policy themes explore overlaps between roads policy and other policy areas: demand management and the efficient functioning of the road network; the needs of freight users; maintenance and asset renewal; access in rural areas; and economic development and land use planning.

Technical, appraisal and delivery themes identify how scheme appraisal could be done better, with more thoughtful application of the Well-being of Future Generations Act; and with traffic forecasts and value for money assessments that reflect the Wales policy landscape. This section also considers how the scheme design process can be strengthened, and the role of the transport professions and supply chain.

Recommendations are listed at the end of the section to which they relate, and again in Table 7.2 at the end of the chapter.



STRATEGIC INVESTMENT THEMES

- 7.2 Strategic investment priorities
- 7.3 Regional multimodal investment
- 7.4 Allocation of road space to support modal shift
- 7.5 Making our roads safer
- 7.6 Opportunities for allocation of financial savings



CARBON AND WELL-BEING THEMES

- 7.7 Carbon emissions
- 7.8 Supporting biodiversity
- 7.9 Supporting economic well-being
- 7.10 Supporting social and cultural well-being



POLICY THEMES

- 7.11 Demand management
- 7.12 Freight
- 7.13 Maintenance and asset renewal
- 7.14 Rural areas
- 7.15 Economic development and land use planning



TECHNICAL, APPRAISAL AND DELIVERY THEMES

- 7.16 Application of the Well-being of Future Generations Act
- 7.17 Traffic forecasting
- 7.18 Scheme appraisal and the WelTAG process
- 7.19 Assessment of value for money
- 7.20 Scheme design issues
- 7.21 Role of the professions



STRATEGIC INVESTMENT THEMES

7.2. STRATEGIC INVESTMENT PRIORITIES

Issues and opportunities

- **Development of capital enhancement schemes on the trunk road network has not been (and is still not being) undertaken in a way that reflects the Sustainable Transport Hierarchy or the sustainable transport mode share target.**
- **The Roads Review provides the opportunity for a reset, stopping investment programmes that are not aligned with the Wales Transport Strategy, and starting new programmes that use Welsh Government, Trunk Road Agent and supply chain expertise to deliver modal shift and safer roads.**

Schemes affecting the trunk road network are initiated and overseen by Welsh Government's Transport Department or the North and Mid Wales and South Wales Trunk Road Agents (NMWTRA and SWTRA), driven by the policies and politics of the time.

In the past, schemes have mainly focused on improving the trunk road network for private cars. Schemes in the Capital Upgrades Programme and the Congestion Pinch Points Programme were designed to reduce journey times for drivers and reduce congestion at 'pinch points', thereby increasing private car capacity and speeds. They were defined in terms of a problem or opportunity on a section or sections of trunk road (e.g., 'Mid-Wales Overtaking Opportunities Programme', 'A48 Nantycaws Junction Improvement').

Since publication of the 2021 Wales Transport Strategy, this has started to change. The Panel reviewed some studies that were in their early stages (WelTAG Stage 1) where the focus had shifted. We also reviewed some more advanced studies (WelTAG Stage 2) where scheme sponsors had broadened the objectives from a focus on journey times and congestion to address the priorities of the Wales Transport Strategy. However, all these studies were still defined in terms of a section of the trunk road network, sometimes quite short, e.g. 'A55 Junctions 23-24'.



The Roads Review provides the opportunity for a reset: stopping investment that is not aligned with the Wales Transport Strategy and starting new investment to deliver modal shift.

The recent WelTAG Stage 1 studies typically identify a large number of scheme options, covering active travel, public transport, demand management, reducing the need to travel, road safety, environmental measures, highway capacity, resilience and asset renewal, all relating to the section of trunk road in question. These options are then reduced to what is called a ‘shortlist’ of 30-80 options. The Trunk Road Agent does not have a remit for delivery of most of the shortlisted options, which would be the responsibility of Transport for Wales or the local authority. There is no mechanism or funding to progress them and, viewed from the perspective of Transport for Wales and the local authority, they may not be a priority. The shortlisted options that are the responsibility of the Trunk Road Agents are mainly related to highway capacity for cars, resilience and asset renewal, sometimes accompanied by minor options related to active travel. The Panel’s assessment is that if these WelTAG studies were to proceed, it is the highway interventions that would be implemented.

The Panel does not think looking at such a wide range of options within a single WelTAG study for a limited length of route, and then progressing the options that principally benefit cars, is an effective strategy to deliver the aims of the Wales Transport Strategy. Any single section of road that is investigated closely enough will no doubt have problems that can be fixed – but whether it should be a priority to fix them (compared to other problems elsewhere) is a different matter.

Instead, the Panel suggests there is a need for the following:

- Work at a regional level to identify and prioritise the best schemes to achieve modal shift and reduce car use. This should span across the trunk and local road network and the rail network, and therefore should not be led by the Trunk Road Agents, although they would have a role in delivering elements of the resulting sustainable transport package that are on trunk roads. The South East Wales Transport Commission offers a model for this. We discuss this approach further in section 7.3.
- A refocusing of the work of Welsh Government’s Transport Department and their agents. The Capital Upgrades Programme and Pinch Points Programme should not progress further. Instead, capital works should take place through programmes that are focussed on achieving the aims of the Wales Transport Strategy. We suggest there should be a Trunk Road Modal Shift Programme, which should be as ambitious in scale and funding as the previous Capital Upgrades Programme and Pinch Points Programme. We also suggest there should be a smaller scale Trunk Road Safer Speeds and Routes Programme. We discuss these programmes in sections 7.4 and 7.5.

RECOMMENDATIONS

- 3. The Pinch Points Programme and Capital Upgrades Programme should not progress.**
- 4. Capital works on the trunk road network should from now on be identified and prioritised in one of two ways: (a) as part of regional multimodal programmes to reduce car use and achieve modal shift to active travel and public transport; and (b) through trunk road programmes focussed on achieving the aims of the Wales Transport Strategy: for example, a Trunk Road Modal Shift Programme and a smaller scale Trunk Road Safer Speeds and Routes Programme.**

7.3. REGIONAL MULTIMODAL INVESTMENT

Issues and opportunities

- **Delivery and governance of transport capital schemes has historically largely been in modal silos.**
- **Identification and prioritisation of transport capital schemes should be based on a strategic, evidence-based analysis of what action is needed to achieve a sustainable integrated transport system and modal shift, in line with Welsh Government’s top-level transport and decarbonisation objectives.**
- **This is best done at a regional scale by a multi-disciplinary team with effective delivery and collaborative governance.**

In 2020, Wales piloted a new way of working to address transport issues at regional level and across all modes (plus non-transport solutions), through the South East Wales Transport Commission chaired by Lord Burns. This recommended a package of measures to address congestion on the M4 in a sustainable way.

Some of the 58 measures recommended by the Burns Commission are road schemes, on both the trunk and local road network. These schemes are focussed on supporting modal shift to walking, cycling, bus and rail. The recommendations are being delivered by a dedicated ‘Burns Delivery Unit’ in Transport for Wales (TfW), in collaboration with Welsh Government, local authorities and other parties.

The recently established North Wales Transport Commission has a similar remit. It will draw on work by TfW on the North Wales Metro programme, but also look more widely. It has a brief to consider how modal shift can be achieved in both urban and rural areas.

The way of working of these Commissions, and the Burns Delivery Unit, is right for the times. They:

- Work from first principles of where trips are going to and from, using the latest regional transport models and movement data to understand people’s transport needs and the nature of freight flows;
- Consider all modes and apply latest policies;
- Co-develop schemes with local authorities and other stakeholders to ensure feasibility, reduce duplication and find solutions that meet national and local objectives;
- Are led by independent Chairs who ensure all parties with funding, powers and responsibilities work as one team with shared aims.

The Panel considers that these Commissions, and the subsequent approach to delivery, are the right way to identify and prioritise trunk road schemes and regionally-important local road schemes in the light of new policies. This way of working should be incorporated into the existing regional work of the TfW Metro Programmes, adding a proportionate level of support for mid-Wales to give complete coverage of the country.

The TfW Metro Programmes currently oversee WelTAG Stages 1-3 for regionally important rail, bus and active travel schemes. After this they pass schemes to delivery arms, either in TfW or local authorities.

The Panel recommends that schemes affecting trunk roads should also be identified and prioritised through this process. This would allow prioritisation of the best schemes within each region to achieve the Wales Transport Strategy aims across the whole transport network.

This method would ensure that investment:

- Is based on a strategic understanding of travel patterns and journey origins and destinations, by all modes, for freight and passenger travel;
- Is looking at the right geographical extent of studies from a transport planning perspective;
- Is aligned with the Wales Transport Strategy, in particular the modal shift target and Sustainable Transport Hierarchy;
- Reflects the regional and local context;
- Is informed by, and influences, Metro investment programmes and regional transport plans;
- Has robust scrutiny from a diverse, appropriately constituted and expert WelTAG Review Group.

These changes would lead to better decision-making, achieve an improvement in the standard of analysis and appraisal, and reduce the likelihood of costly and abortive work on studies that have no reasonable prospect of making it to delivery. They would also foster collaborative working between parties earlier in the problem identification and option identification stages. This is especially important in the context of limited budgets and limited resources.

Once the most important regional transport schemes (including schemes affecting trunk and local roads) have been identified, all the responsible bodies should collaborate to develop and deliver them.

RECOMMENDATIONS

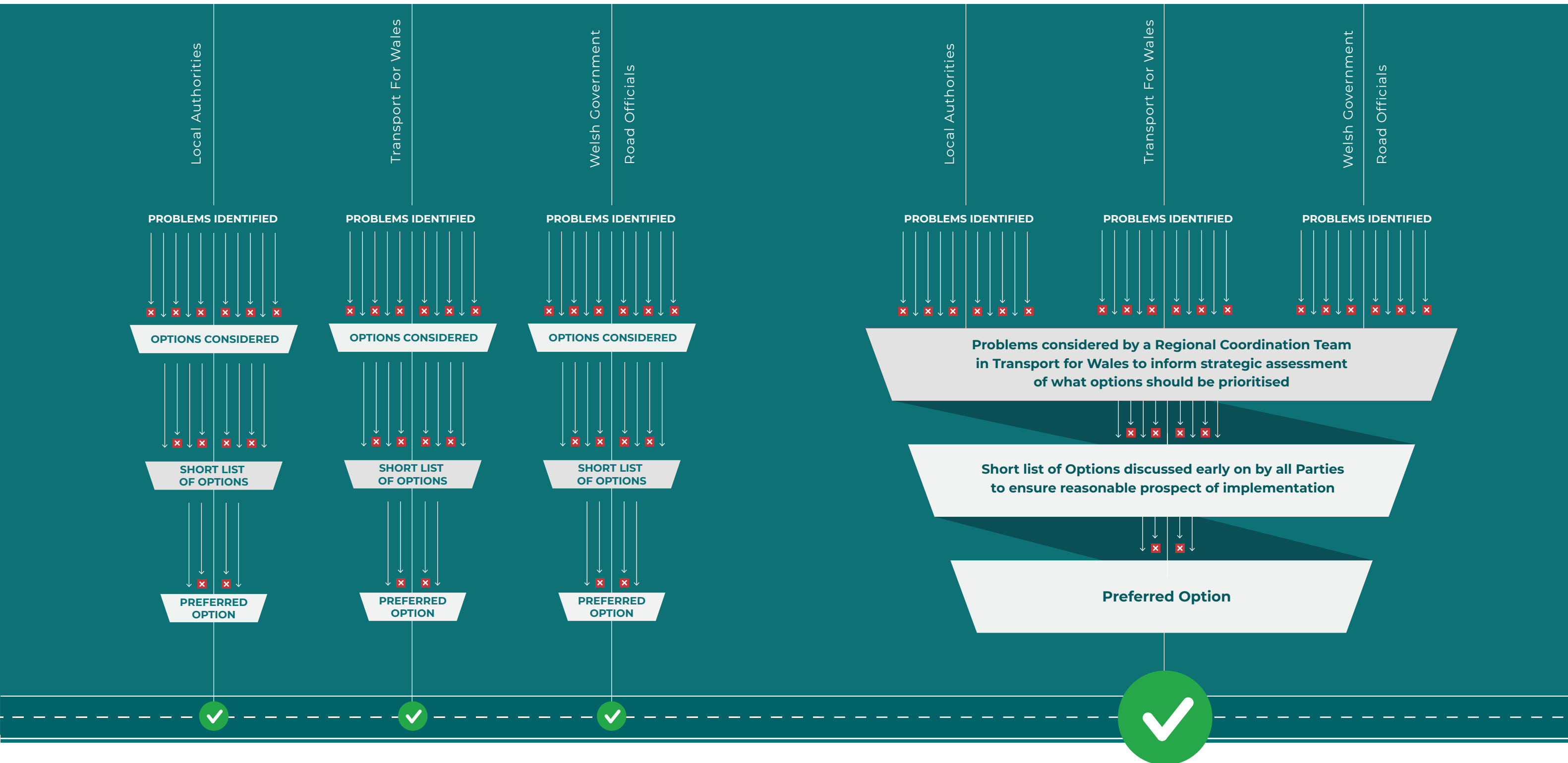
- 5. Building on the good work of the TfW Metro Programmes, the lessons learnt from the South East Wales Transport Commission, Burns Delivery Unit and North Wales Transport Commission should be applied to support all regions of Wales. This regional multimodal approach should be the primary means by which trunk and regionally important local road capital schemes are identified and developed in future.**

CURRENT INEFFICIENT WAY OF WORKING

Starts with local problems; jumps straight to options.
No strategic assessment.

PROPOSED REGIONAL MULTI-MODAL COORDINATED APPROACH

Local problems used to inform strategic assessment
of how to achieve sustainable integrated transport system.



**Some schemes built, but do not fit together as a whole.
Modal siloes result in poor outcomes, significant abortive
work and wasted expenditure**

**Sustainable, integrated solutions delivered that
meet both National and local objectives**

Road space reallocation to buses in urban areas can improve reliability and deliver modal shift.

7.4. ALLOCATION OF ROAD SPACE TO SUPPORT MODAL SHIFT

Issues and opportunities

- Although many schemes reviewed by the Panel had objectives to encourage modal shift to walking, cycling and public transport, these objectives were often treated as less important than other objectives and did not translate into significant improvements for sustainable modes.
- The active travel Integrated Network Maps and the Metro investment programmes provide a good starting point for major new trunk road investment to achieve modal shift.

Our terms of reference asked the Panel to provide “guidance about reallocating road space on parts of the road network which might in future benefit from enhancement spend”.

Road space reallocation is only one tool to develop comprehensive high quality active travel and bus networks. It is more important in built-up areas, where space is constrained, and less important in rural areas, where land purchase alongside an existing road corridor may be more appropriate. It is relevant for junctions (where reallocation of an approach lane to buses may improve bus reliability) as well as road links. To construct the best active travel and bus networks, we need a combination of road space reallocation and ‘new build’ on the right desire lines.

We therefore interpret our terms of reference as providing guidance about how to construct active travel and bus networks that are good enough to bring about significant behaviour change, leading to modal shift, using a combination of road space reallocation and construction of new routes.

More than half of the schemes reviewed by the Panel had objectives to encourage modal shift to walking, cycling and public transport. However, these objectives were often treated as secondary in the option development process. Although active travel and public transport interventions often featured in the longlist of options, any impactful and larger scale interventions typically dropped out at the shortlisting stage.

Where active travel and public transport interventions were retained as part of a scheme, they were generally unambitious. Examples include providing bus shelters, or providing a shared use path but only over a short distance without connecting to settlements. These interventions could provide small improvements for existing pedestrians, cyclists and bus users, but would not attract new users and deliver a modal shift from car to active travel or public transport.

The Walking, Cycling and Horse-riding Assessment and Review (WCHAR) process is a formal part of the appraisal for all trunk road schemes. It is intended to ensure that road schemes incorporate interventions to encourage active travel. However, it only identifies opportunities to improve provision for active travel within the pre-defined road scheme boundary, as an adjunct to the 'primary' purpose of the scheme, and it occurs too late in the appraisal process. WCHARs sometimes identified significantly more interventions than were incorporated in the scheme, but even where this was the case, recommendations were typically of limited scope. The interventions that were incorporated into the scheme were always small-scale and unlikely to lead to modal shift.

Amongst the most recent WelTAG Stage 1 studies that the Panel reviewed, we saw little evidence of efforts to progress the ambitions of the latest active travel Integrated Network Maps. Recent studies were still focussed on sections of road with a congestion or resilience problem for motorised traffic, rather than sections of road with a safety problem for pedestrians and cyclists. We also saw few examples of schemes that built on or supported Metro investment plans.

A significant change of approach is required to achieve modal shift to sustainable forms of transport. The case for change should shift from 'reducing congestion' and 'increasing resilience' to 'delivering modal shift in line with the Wales Transport Strategy target'. The focus should be on creating networks that provide attractive, efficient travel from main journey origins to main journey destinations for utility trips, including shopping, commuting and business.

We recommend an investment programme to provide active travel paths along or near the trunk and local A-road network where they are most needed. Complete routes that connect *between* settlements, as well as connecting main origins and destinations *within* settlements, are necessary. Routes should match desire lines. In rural Wales, the direct and flattest route between settlements is often along the A-road on the valley floor. Alternative routes via minor roads may be less direct and involve more gain in elevation, making them unlikely to deliver modal shift.

With the growing popularity of e-bikes, which can be used for longer journeys than conventional bikes, we recommend that active travel routes radiating out from significant settlements for distances of about 15km should be prioritised. This is a reasonable distance to travel on an e-bike, and on regional commuter cycleways in some European countries the high use of e-bikes means it is now the average journey length⁶.

In some locations, particularly in built-up areas, space is constrained and provision of active travel paths will require reallocation of road space. In other locations, particularly in rural areas, provision of active travel paths is more likely to require land purchase alongside or near the existing road. Construction will thus require similar actions to highway schemes for motorised traffic: land purchase, creation of new routes of appropriate widths, and re-configuring existing junctions.

We also recommend an investment programme to provide bus priority on congested routes and at congested junctions on the trunk and local A-road network, where it is most needed; and to provide guided busways on corridors where there is potential for high demand. Construction will again require similar actions to highway schemes for motorised traffic: land purchase, creation of new routes of appropriate widths and re-configuring existing junctions.

Road schemes that do not have a primary aim of providing for active travel (i.e., safety schemes, bus schemes, climate adaptation schemes and access roads, in line with our recommendations in Chapter 5) should always incorporate the aspirations of the latest Integrated Network Map. For these schemes, any active travel provision should always extend to the nearest settlement in both directions and should therefore be an early consideration in determining the extent of schemes. Road schemes that do not have a primary aim of providing for buses should be reviewed by the relevant TfW Metro team to identify opportunities to achieve Metro objectives as part of the scheme.

All these initiatives could be brought together in a Trunk Road Modal Shift Programme, which should be as ambitious in scale and funding as the previous Capital Upgrades and Pinch Points Programmes. Local authorities should be encouraged to adopt a similar approach, supported via the Local Transport Fund.

We note that in many parts of Wales, steep ground, steep gradients, and transport corridors that follow the river valley mean that there is not room for the ideal transport corridor layout. Design for active travel and buses, like highway design, may need to depart from standard to fit in. While all provision must be useable and safe, departures from standard may make sense to reduce cost and embodied carbon, particularly in locations where usage will be lower.


Schemes that reallocate road space from cars to cyclists and buses may increase overall capacity of a link or junction, because space is used more efficiently by these modes. Where reallocation of carriageway or junction capacity is required, modelling should seek to optimise the total capacity of the junction for moving people, as opposed to vehicle throughput.

6. Office for Cycle Superhighways (2018) Cycle superhighways in the Capital Region of Denmark.

A Trunk Road Modal Shift Programme will be relevant for all parts of Wales, but the nature of schemes will vary. For example, rural areas such as Mid Wales have less need for trunk road bus priority measures than urban areas, but greater need for trunk road active travel routes because often the trunk road is the only connection between small inter-dependent settlements.

RECOMMENDATIONS

- 6. A Trunk Road Modal Shift Programme should be delivered by Welsh Government's Transport Department and Trunk Road Agents. The case for change for this programme should be to deliver modal shift in line with the Wales Transport Strategy target.**
- 7. Local authorities should be encouraged to develop modal shift schemes for local A-roads, where these are most needed.**
- 8. The Walking, Cycling and Horse-riding Assessment and Review should be carried out earlier in the appraisal process, and all road investment schemes should incorporate the aspirations of the latest Integrated Network Map for the scheme area. Where active travel paths are identified as part of a scheme, they should extend in either direction to the nearest settlement and should therefore be an early consideration in determining the extent of schemes.**
- 9. All road investment schemes should be reviewed by the relevant Metro team to identify opportunities to achieve Metro objectives as part of the scheme.**



We recommend an investment programme to provide active travel paths along or near the trunk and local A-road network.

7.5. MAKING OUR ROADS SAFER

Issues and opportunities

- **Some schemes reviewed by the Panel were described as ‘safety schemes’ but were not a cost-effective means to reduce collisions.**
- **Lower speed limits are a low-cost and effective road safety intervention, and could be used to good effect to save lives and serious injury in many areas.**

Schemes categorised as ‘safety schemes’

Around half of the schemes reviewed by the Panel were described by the scheme sponsor as safety schemes. Of these, the Panel concluded that the following types of schemes had potential safety benefits and were compatible with Welsh Government’s aims to reduce carbon emissions and increase sustainable transport mode share:

- Conversion of a priority junction to a roundabout, or realignment of a priority junction to improve sight-lines;
- Whole route treatments of single-carriageway roads, including speed limit reductions and enforcement; adjustments to geometry of priority junctions and minor accesses to improve sight-lines; and other small measures;
- Whole route treatments of dual-carriageway roads, including speed limit reductions and enforcement; closure or adjustments to geometry of minor road junctions; restrictions on U-turns and closure of crossovers; and modifications to lay-bys;
- Replacement of safety barriers.

The Panel concluded that the following types of schemes were not primarily safety interventions, and that they were incompatible with Welsh Government’s aims to reduce carbon emissions and increase sustainable transport mode share:

- Differential acceleration lanes (additional lanes on the exits from roundabouts to enable faster vehicles to overtake slower vehicles);
- Climbing lanes;
- Grade-separated junctions;
- Realignment of the carriageway;
- Widening of the carriageway.

Some of the schemes in the latter group had been developed up to 15 years ago to meet previous policy aims. Although re-badged as safety schemes, and with refreshed objectives placing more emphasis on road safety, the schemes had not fundamentally changed. Their primary purpose was to reduce journey times rather than to improve safety.

Differential acceleration lanes reviewed by the Panel typically cost £3-8 million, and climbing lanes and grade-separated junctions about £15-20 million. These represent substantial investments in interventions with unproven or limited benefits for road safety.

In at least one case, the Panel noted that a proposed differential acceleration lane could worsen safety for pedestrians, as it would result in vehicles travelling at higher speeds at a location where public rights of way connect with the road.

Differential acceleration lanes and climbing lanes were said by scheme sponsors to be safety interventions because they may reduce driver frustration from slow-moving vehicles. The hypothesis is that driver frustration leads to risky overtaking behaviour, and that by providing formal overtaking opportunities, differential acceleration lanes and climbing lanes reduce this risky behaviour, and hence reduce collisions. The Panel did not find evidence to support this hypothesis. Research reviewed by the Panel suggests that the correlation between driver frustration and risky overtaking behaviour may be weak.

There is evidence that a systematic approach to enable overtaking and reduce head-on collisions can be effective, as in Sweden, where the Vision Zero strategy includes widespread use of ‘2+1’ lanes with a median barrier⁷. However, this approach is unlikely to be feasible in Wales, where carriageway space is more constrained, and it may have other drawbacks in relation to the mode share target. The Panel was not persuaded that isolated differential acceleration lanes and climbing lanes, especially in locations where there is not a safety concern, were comparable interventions.

7. Värnild A, Larm P and Tillgren P (2019) *Incidence of seriously injured road users in a Swedish region, 2003–2014, from the perspective of a national road safety policy*. BMC Public Health 19, 1576 (2019).

Scheme prioritisation

The Panel noted the lack of a decision-making process to prioritise the safety schemes with the largest safety benefits. This means that some less effective schemes may receive funding whilst more effective schemes may not. This manifests in several ways:

- Some schemes are being progressed at locations where the case for change is weak according to the collision data;
- Some schemes are in locations where the collision data demonstrates that intervention is required, but the chosen option is considerably more expensive than other interventions that might be equally or more effective: for example, a grade-separated junction where a roundabout and speed restriction might be sufficient or better;
- There is no process to prioritise between schemes on local authority-managed roads and trunk roads;
- There may be insufficient budget allocated to small-scale Local Safety Schemes, which can have high value for money in terms of their safety benefit.

These issues may partly reflect the lack of an up-to-date Road Safety Strategy. A more holistic view of safety scheme funding could assist in minimising fatal collisions across the transport network as a whole.

The Panel recommends that updating of the 2013 Road Safety Framework should review the funding arrangements, resources and mechanisms by which safety-related highway schemes are prioritised and delivered across the highway network as a whole.

Whole route safety treatments

In the context of limited budgets, a strategy of treating individual junctions and short sections of road can only make a limited contribution to road safety. Collisions occur at many locations on the trunk road network. Whole route safety treatments, involving small-scale interventions over extended sections of road, may have more potential to reduce death and serious injury than larger interventions at a single location.

Speed limits should be set to reflect the safe speed for the road layout.



Some schemes reviewed by the Panel took this approach, identifying a range of interventions including speed limit reductions and enforcement; closure or adjustments to geometry of minor road junctions; restrictions on U-turns or closure of crossovers; and modifications to lay-bys. These schemes cost about £1 million per kilometre for the dual-carriageway schemes reviewed by the Panel. The cost may be less than this for single-carriageway roads.

A ‘whole route’ approach will yield most benefit if it targets high risk routes where cost-effective interventions are available. Consideration should be given to how best to identify these routes; for example, through analysis of crash rates (the frequency of crashes resulting in death or serious injury, relative to the volume of traffic); or use of the iRAP star rating model (which estimates where collisions are likely in future, based on road inspection data that identify risk factors).

Whole route safety treatments should be implemented in a way that is consistent with the Sustainable Transport Hierarchy and Welsh Government’s aim to increase sustainable transport mode share. Improved provision for active travel should be part of a whole route safety treatment. Lower speeds, both within built-up areas (where 20mph limits are appropriate) and between them, should also be a key aim. Consistency of standards along the route is likely to be important (and by contrast, designing one section to a much higher standard than those following it can lead to increased collisions and casualties in the lower standard section).

Whole route safety treatments should not involve road realignment or widening, or high-cost interventions such as differential acceleration lanes, climbing lanes and grade-separated junctions, as these are unlikely to offer sufficient safety benefit for the cost and embodied carbon, and may be counterproductive.

Speed limits and speed enforcement

Evaluation evidence suggests that lower speed limits are a low-cost and effective road safety intervention, particularly when effectively enforced or supported by appropriate engineering measures⁸.

Lower speed limits were sometimes included as an option in the early stages of development of schemes reviewed by the Panel, but were almost always rejected at the shortlisting stage, even where the police or the local community considered the speed limit was too high. The rejection of lower speed limits may be due to:

- A perception that lower speed limits increase journey times and that an increase in journey times, even if marginal, is undesirable; coupled with concern that an increase in journey times reduces the Benefit to Cost Ratio;

- Concern that setting of speed limits must be done in a strategic way, and that variation in speed limits would cause driver confusion;
- Concern that lower speed limits would be ineffective if not enforced, and lack of certainty that enforcement would occur.

The disbenefit of slightly longer journey times is not reason to forego the important benefits of fewer collisions and lower severity collisions. As we note in section 7.19, although journey time savings are an established metric for assessing the benefits of transport infrastructure schemes, they are an unreliable measure of value for money in the context of current Welsh Government policy priorities. In addition to their benefits for road safety, lower speed limits on trunk roads also offer other benefits: greater vehicle efficiency leading to lower carbon emissions and lower fuel costs for drivers; better local air quality, which is an important public health consideration; reduced noise; and better route resilience. All these benefits are aligned with the Wales Transport Strategy priorities.

The Panel recognises that setting of speed limits must be done in a strategic way that is readily understood by road users. At present, this principle is interpreted by scheme sponsors to mean that road geometry should be modified to meet standards for the relevant national speed limit. Studies often include this as an objective: they aim to “improve road alignment to meet current design standards”. Our view is that the opposite approach is required. From a safety perspective, the greatest benefit would come from setting speed limits to reflect the existing road features and function. This could be done relatively quickly, and the principle would be understood by road users.

This suggests the need for a national and local review of speed limits on A, B and C roads to match the speed limit to the safe speed for the road layout. Such a review should take account of impacts on all road users, and consider effects on noise, air quality, severance and public realm.

There is also a need for adequate funding for effective enforcement of speed limits. However, it is incorrect to assume that lower speed limits are ineffective unless enforced. The effect on actual driving speeds is only a fraction of the change in speed limit (e.g. if the speed limit is reduced by 20km/h, with no other changes, the mean speed of traffic will reduce by about 8km/h), but even a small change in average speed has a large benefit for road safety⁹.

8. International Traffic Safety Data and Analysis Group (2018) Speed and crash risk. International Transport Forum / Organisation for Economic Cooperation and Development.

9. International Traffic Safety Data and Analysis Group (2018) Speed and crash risk indicatively suggests a 5km/h reduction in average speeds on rural roads (from 80 to 75km/h) would reduce fatal crashes by 28% and all injury crashes by 16%.

Driver assistive technology

Driver assistive technologies have an increasing role in vehicles. They will change the highway infrastructure modifications that are needed to reduce collisions, in ways that are not yet fully understood. Clear signing and lining are likely to become more important, as vehicles will rely on this for lane-keeping, speed limit compliance and hazard warnings.

The introduction of Intelligent Speed Assistance, which will help drivers to keep to the speed limit, is likely to strengthen the safety case for varying speed limits to match the safe speed for the road layout and use. The value for money of some infrastructure modifications over a 60-year appraisal period may diminish, if certain types of crashes, such as run-offs, become less common. In designing whole-route safety treatments, there should be consideration of the potential contribution from driver assistive technology.

RECOMMENDATIONS

- 10. Updating of the 2013 Road Safety Framework should review the funding arrangements, resources and mechanisms by which safety-related highway schemes are prioritised and delivered across the highway network as a whole, to ensure that funding is directed to the most effective schemes. Funding for speed enforcement should also be reviewed to ensure it is sufficient to achieve the safety benefits of lower speed limits.**
- 11. There should be a national and local review of speed limits on A, B and C roads to match the speed limit to the safe speed for the road layout. Such a review should take account of impacts on all road users, and also consider effects on noise, air quality, severance and public realm.**
- 12. A Trunk Road Safer Speeds and Routes Programme should be developed, focused on corridors with the worst safety records, and implementing small-scale quick wins along whole routes to cut road deaths and injuries.**
- 13. Differential acceleration lanes, climbing lanes, grade-separated junctions and carriageway widening or realignment should not be progressed, as they are unlikely to offer sufficient safety benefit for the cost.**

7.6 OPPORTUNITIES FOR ALLOCATION OF FINANCIAL SAVINGS

Issues and opportunities

- **Schemes cancelled as a result of this review may have exceeded available future budgets, so financial savings are less than the sum of the cost of cancelled schemes.**
- **The savings that are realised from cancellation of schemes nevertheless provide an opportunity to make better progress on the Wales Transport Strategy priorities.**

The recommendations of the Panel, if accepted by Welsh Government, would provide financial savings. Our terms of reference asked us to “consider how any savings might be allocated, in order to ensure problems on the road network are addressed, and in particular make recommendations on how to tackle the backlog of road maintenance”.

We are aware that budgetary pressures in relation to healthcare, education and the cost of living mean that insufficient funding is available to achieve all of Welsh Government’s aims for transport. This means that even if there were a wish to progress the schemes that we recommend should not proceed, some, especially the larger schemes, would be unaffordable for a number of years. The financial savings from accepting our recommendations are thus partly notional, and smaller than might be assumed by summing estimated costs of all the schemes we recommend should not proceed.

The Wales Transport Strategy and Net Zero Wales set out some ambitious aims. The Panel’s interpretation of current transport policy is that it places modal shift and car mileage reduction as the top priorities. Our judgement is that all financial savings that are available from cancellation of road schemes – and more – will be needed to deliver on the Programme for Government commitments in relation to transport. We therefore recommend that active travel and public transport schemes to deliver modal shift should be the main focus for investment.



Major asset renewals and maintenance should be prioritised within the available funding envelope, through a Zero-Base Review.

We also recognise the need for existing road assets to be maintained in good condition. We share the conclusion of the Lugg Review that major asset renewals and other maintenance expenditure should be prioritised within the available funding envelope, through a Zero-Base Review. We understand this to mean that rather than incrementally adjusting budget upwards or downwards based on expenditure in the previous year, all proposed expenditure for both new and ongoing maintenance and renewal activity should be evaluated in a systematic way, and prioritised so that the most urgent and important schemes are progressed. We do not recommend that financial savings from cancelled enhancement schemes should be diverted to undertake asset renewal schemes that would otherwise be unfunded because of lower priority.

Looking to the future, the Panel's recommendations for regional working would avoid the inefficient practice of commissioning appraisals for so many schemes that they collectively greatly exceed the funding available. WelTAG appraisals and scheme development can cost hundreds of thousands of pounds before a single spade is in the ground, and by commissioning fewer studies, there will be financial savings.

RECOMMENDATION

- 14. Financial savings from schemes not progressed as a result of the Panel's recommendations should be directed to deliver modal shift in order to achieve the aims of the Wales Transport Strategy, Net Zero Wales and the Programme for Government.**



CARBON AND WELL-BEING THEMES

7.7. CARBON EMISSIONS

Issues and opportunities

- **The carbon savings required to achieve Wales’ binding carbon budget for 2026-2030 will be extremely challenging to achieve. There is no carbon ‘headroom’. In this context, any road project that would increase emissions, either through its construction or use (such as through induced traffic), must be placed under heavy scrutiny.**
- **There is insufficient assessment of the carbon impact of individual road schemes, and no assessment of cumulative impacts.**
- **Where schemes are necessary, speed reduction or demand reduction could provide a means to compensate for unavoidable construction carbon.**

Whole-life carbon emissions from road schemes

Whole-life carbon dioxide emissions from road schemes include embodied carbon in the steel, concrete and other materials used in construction; transport of materials to site; loss of stored carbon from trees and vegetation when land is cleared; ongoing operational emissions (e.g. due to road lighting); emissions associated with maintenance; emissions in use as a result of induced traffic; and emissions in use from higher vehicle speeds.

Whole-life carbon assessment is currently difficult to undertake at an early stage when options are being developed. However, this is the time when whole-life carbon assessment is most needed to understand the implications of choices between options.

The Panel recommends that Welsh Government should strengthen its capability to undertake whole-life carbon assessment at an early stage in option development. This should take advantage of UK Government’s Shared Digital Carbon Architecture programme, and tools such as that currently being developed by Leeds Institute for Transport Studies to enable estimation of whole-life emissions of transport infrastructure projects at an early stage in the planning process¹⁰.

The Panel notes that all forms of transport infrastructure incur carbon emissions from construction. However, transport infrastructure that is designed to support modal shift (including road schemes such as guided busways and active travel paths, but also rail infrastructure) may offset that carbon impact.

The limited evidence available from the schemes reviewed by the Panel highlights the need for better information about whole-life carbon. We set out below the conclusions that we were able to draw from the information about emissions that was available to us, and from emerging best practice elsewhere.

Construction-related emissions

Calculations of construction-related emissions had only been made for 10 of the schemes reviewed by the Panel. These were three medium-cost schemes each costing £50-60 million, and seven smaller schemes each costing £2-20 million. There was no calculation of construction-related emissions for the highest-cost schemes reviewed by the Panel, which cost £300-400 million.

The embodied carbon associated with construction of these schemes is significant. For the three medium-cost schemes, carbon dioxide emissions associated with construction would be in the range 11,000-45,000 tonnes. For the smaller schemes, carbon dioxide emissions associated with construction would be in the range 200-9,000 tonnes.

Some examples are shown in Table 7.1. To put the construction carbon in context, the table shows the reduction in car mileage that would be necessary to ‘pay back’ or compensate for the construction carbon from these three schemes.

To pay back the construction carbon resulting from a small scheme such as the A470 Caersws roundabout (which the Panel has recommended could proceed because of its safety benefits), a reduction in car mileage of 0.3 million kilometres per year for ten years would be needed, equivalent to 25 average car drivers stopping driving for ten years.

To pay back the construction carbon resulting from a medium-cost scheme such as the A55 Junctions 15 and 16 grade-separated junctions, a reduction in car mileage of 32 million kilometres per year for ten years would be needed, equivalent to 2,700 average car drivers stopping driving for ten years.

10. Morgan M, Giesekam J, Phillips I, Anable J and Dixon J (2022) *Estimating the whole-life carbon emissions of transport infrastructure: challenges and opportunities* UTSG unpublished research paper.

Table 7.1: Reduction in car travel that would be required to offset construction carbon from three schemes:

Scheme & Description		Cost (2022 prices)	Construction CO ₂ (tonnes)	Car distance reduction* (million km per year)	Number of cars taken off road for 10 years
A470 Caersws	Replacement of priority junction with roundabout	£6M	300	0.3	25
A487 Aberarth	Climbing lanes over distance of 3 km	£19M	9,100	9.1	770
A55 J14-16A	Grade-separated junctions and slip roads	£57M	32,000	32.1	2700

* Assuming 10 year 'payback' period (2023-2032)

The Panel estimates that carbon dioxide emissions associated with construction of schemes reviewed by the Panel may be around 0.5MtCO₂. This assumes (a) embodied carbon emissions are proportional to scheme cost; and (b) the 10 schemes with embodied carbon data are representative of the 34 schemes with cost data (which have a combined cost of £1.7 billion). This estimate is likely to be a conservative figure for the construction carbon associated with the Welsh roads programme as a whole, for two reasons: first, carbon emissions per £million invested tend to increase with scheme cost, and our sample did not include the highest-cost schemes; and second, no allowance is made for construction carbon from 17 studies without, as yet, a preferred scheme.

Emissions in use

Calculations of the change in carbon emissions in use, from induced traffic and changes in vehicle speeds, had only been made for 17 of the schemes reviewed by the Panel. The Panel was not confident of the robustness of reported figures. The impact of smaller schemes may be systematically underestimated, because the modelling of their impact assumes that there is no induced traffic. From schemes where the effect of induced traffic was modelled, the impact may be large. For example, the Flintshire Corridor Improvement was estimated to increase emissions of carbon dioxide in use by 423,000 tonnes over the 60-year life of the scheme as a result of induced traffic.

The effect of schemes that increase speeds (e.g. from 50mph to 70mph) may also be significant, potentially increasing average car emissions by around 25% as a result of lower fuel efficiency. This is in addition to any induced traffic due to shorter journey times.

As we noted in section 5.9, the Climate Change Committee advises that a shift to electric vehicles will not, on its own, be sufficient to keep within carbon budgets, and a reduction in emissions from petrol and diesel vehicles is also necessary. Until the vehicle fleet is decarbonised (probably in the late 2030s), the Panel concludes that we must avoid construction of schemes that may lead to induced traffic, either from increases in private car capacity or reductions in private car journey times. Schemes that increase vehicle speeds (e.g. from 40-50mph to 60-70mph) are also likely to increase emissions as a result of lower fuel efficiencies, and should not be progressed.

This is why we recommend in Chapter 5 that future road investment should not increase road capacity for cars, or lead to higher vehicle speeds that increase emissions.

Compensation for construction carbon

The Panel concluded that carbon emissions from road construction may be justified for the purposes outlined in Chapter 5: to shift trips to sustainable transport to reduce carbon emissions in use; to reduce casualties; to adapt roads to the impacts of climate change; and to support prosperity by providing access to development sites that will achieve high sustainable transport mode share (which may also enable green growth and decarbonisation of the wider economy).

Where a scheme is justified for these purposes, there should be every effort to minimise construction carbon.

Consideration should also be given to ways to compensate for the remaining construction carbon. Measures such as lower speeds or demand management could help achieve this.


For example, Table 7.1 shows that 300 tonnes of construction carbon would result from the A470 Caersws roundabout scheme, and that this could be offset if 25 cars were taken off the road for ten years. Alternatively, it would be possible to compensate for this construction carbon within approximately one year by reducing speeds on the A470 between Caersws and Llanidloes (a distance of about nine miles) from 60mph to 50mph.

This reflects the significant carbon savings that may be achieved by reducing speeds. Assessments undertaken by TfW, based on GPS observed speeds on roads throughout Wales, show that if national speed limits were reduced to 50mph (from 60mph on most single-carriageway A-roads, and from 70mph on most dual carriageways and motorways), emissions from cars could be reduced by 113,000 tonnes per year (figure for 2025), equivalent to a 3% reduction in total annual emissions from cars. Reducing national speed limits to 50mph on single carriageways and 60mph on dual carriageways and motorways could reduce emissions from cars by 63,000 tonnes per year (figure for 2025), equivalent to a 2% reduction in total annual emissions from cars.

Carbon savings from speed reduction could be delivered more quickly and cheaply than demand reduction and modal shift measures.

A Wales-wide reduction in the national speed limit could provide the carbon 'headroom' needed to offset construction carbon. It could compensate for embodied carbon in road schemes that need to be built and assets that need to be replaced. Reducing the national speed limit to save carbon would be complementary to the speed limit review of individual A, B and C roads to improve safety that we recommend in section 7.5.

Well-managed speed reductions also increase the effective capacity of a road, since faster-moving vehicles effectively occupy more road space. Therefore, speed reduction on congested roads will improve network resilience and journey time reliability for drivers.



Embodied carbon emissions from concrete and other materials used in road construction can be significant.

Regional carbon assessment

Between now and 2030, we must halve carbon dioxide emissions from surface transport in Wales, to about 3 MtCO₂ per year, in order to achieve the Wales carbon budget for 2026 - 2030. Electrification will not achieve this cut in emissions (mainly because most vehicles on the road in Wales in 2030 will still be petrol and diesel-fuelled), so modal shift for passengers and freight, and car mileage reduction, are also needed¹¹. If road schemes continued at any scale larger than that implied by our recommendations, the resulting increase in carbon emissions would make an already challenging reduction target harder to achieve.

At present, we have no way of knowing the extent to which road schemes are undermining our ability to achieve Wales' carbon budgets. Even if carbon impacts are calculated for individual schemes, there is no assessment of the cumulative carbon impacts of multiple schemes. There is no guidance on what proportion of emissions from industry and construction in current and future carbon budgets may be available for road construction.

The Panel recommends that further analytical work should be undertaken to understand how transport carbon emissions must change at regional level in order to halve national surface transport emissions by 2030, and to model options to achieve this. This regional carbon assessment would use the regional transport models that TfW has already produced, to test out policy options, schemes and future scenarios. The analytical work should take place in parallel with action to reduce carbon emissions.

Regional non-legally-binding carbon reduction pathways would allow for an overview of transport needs alongside transport decarbonisation strategies. They would enable the carbon consequences of multiple schemes to be understood.

In England, the Transport for the North (TfN) Decarbonisation Strategy used a regional model to establish transport carbon reduction pathways for the region. The model has been used to develop four decarbonisation scenarios with different policies and behavioural patterns. TfN also took a view on the importance of green growth within the region, setting a strategy to take advantage of investment in decarbonisation for its economic benefits. At a regional level, TfN can provide guidance and input to Local Industrial Strategies and local authority decarbonisation plans. With knowledge of future emissions from use, and maintenance and operation of the transport network, it becomes possible for emissions from potential projects to be judged within the regional context.

RECOMMENDATIONS

- 15. Government should strengthen its capability to undertake whole-life carbon assessment at an early stage in option development.**
- 16. Consideration should be given to a reduction in the national speed limit on motorway and trunk A-roads to compensate for construction carbon from road schemes that are necessary to build and assets that need to be replaced.**
- 17. There should be regional carbon analysis to a) understand how transport carbon emissions must change at regional level between now and 2030; b) model options to achieve this change; and c) assess the carbon consequences of potential projects within the regional context.**

¹¹. Based on the evidence behind Net Zero Wales and the advice of the Climate Change Committee. Climate Change Committee (2020) *The Sixth Carbon Budget: the UK's Path to Net Zero*.



7.8. SUPPORTING BIODIVERSITY

Issues and opportunities

- **Road schemes should aim to avoid adverse impacts on biodiversity and achieve enhancements where possible, but scheme sponsors tend instead to focus on mitigation of impacts. This does not take proper account of legislative and policy requirements.**
- **Impacts on biodiversity and ecosystem resilience are considered too late in the appraisal process and should be given greater weight at an early stage.**
- **There is insufficient consideration of cumulative impacts on biodiversity and ecosystem resilience at a landscape scale.**
- **The ‘soft estate’ provides an opportunity to enhance ecological networks and resilience at a national scale.**

In June 2021 in a landmark moment for Wales, the Senedd declared a nature emergency. One in six (17%) of species in Wales are at risk of extinction, and at least 60% of protected sites are in an ‘unfavourable’ condition. We rely on nature for the air we breathe, our water, our food, for yet undiscovered medicines, for its intrinsic beauty and more. We as humans are interconnected with nature, we need nature to survive. The climate and nature emergency are intrinsically intertwined. By helping ecosystems recover we can tackle both climate change and the nature crisis. A quarter of woodland in the UK is made up of ancient woodland, but it holds 37% of all carbon stored in woodlands and trees. Peatlands cover just over 4% of Wales’ land area, but have the ability to store more carbon than any other habitat. Grasslands, in particular species-rich semi-natural grasslands, are also an (often-overlooked) important store of soil carbon.

At a UK level, mapping by the RSPB (Royal Society for the Protection of Birds) shows that two-thirds of natural stores of carbon sit outside sites protected for nature, highlighting the importance of thinking not just about designated sites, but all the ‘bits in between’. This landscape-scale approach to thinking about the protection of nature not only protects immense stores of carbon but enables ecosystems to be more resilient to future threats. We cannot protect nature in small pockets and islands and expect it to thrive.

LEGISLATION AND POLICY TO PROTECT BIODIVERSITY

In the context of transport schemes, biodiversity is protected through several key pieces of legislation and policy.



The Environment Act (Wales) 2016 places a duty on Ministers and public bodies to maintain and enhance biodiversity – the ‘Biodiversity and Resilience of Ecosystems Duty’ (Section 6 Duty).

Planning Policy Wales 11 (PPW11) says that development should not cause any significant loss of habitats or populations of species, locally or nationally, and must provide a net benefit for biodiversity. It identifies the importance of considering biodiversity and ecosystems at an early stage, and at a strategic level given that biodiversity is not confined to administrative boundaries.

The Well-being of Future Generations (Wales) Act 2015 places a duty on public bodies to contribute to achieving the well-being goals set out in the Act. The Resilient Wales Goal is ‘a nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change)’.

The Wales Transport Strategy commits to developing a transport system that ‘maintains and enhances biodiversity and increases ecosystem resilience’. The ambition is to achieve this through the soft estate associated with transport networks; and in the design and delivery of transport infrastructure schemes. The Wales Transport Strategy also sets out the intention to review guidance and policy in relation to biodiversity.

The Nature Recovery Action Plan (NRAP) for Wales (2020-21) commits to reversing the loss of biodiversity in Wales, and sets objectives for action. It sets out how the United Nations Environment Programme’s Convention on Biological Diversity’s Strategic Plan for Biodiversity (and the associated Aichi Biodiversity Targets for 2011-20 in Wales) is addressed in Wales.

Natural Resources Wales (NRW) Area Statements support local delivery of the national priorities for our natural resources. Area Statements provide the opportunity to take a strategic regional approach to provide a net benefit for biodiversity.

New Governance Framework: Since withdrawal from the European Union, Welsh Government has committed to legislate for new systems of governance, to replace the EU systems that held government to account on implementation of environmental law.

Impact of road building on biodiversity

Six of the schemes reviewed by the Panel had set objectives to enhance biodiversity, and were aiming to achieve biodiversity net gain. 25 had more limited objectives such as “not having a significant adverse impact” or “minimising impact” on the environment, or had no objective relating to environmental impact.

Planning Policy Wales 11 (PPW11) provides general guidance and principles on how development can maintain and enhance biodiversity. It outlines a stepwise approach of first avoidance of any adverse impacts; then minimisation; mitigation; and as a last resort compensation; and states that enhancements must be secured wherever possible.

For most of the schemes reviewed by the Panel, thorough environmental assessment did not happen until WelTAG Stage 3. As a result, schemes may progress to an advanced stage prior to proper consideration of the impacts on biodiversity and ecosystem resilience, making it difficult to then re-think and re-design. Some appraisals did undertake a broad assessment of impacts at WelTAG Stage 2 or even Stage 1, and the Panel saw a few where this led to a decision not to proceed with certain options because of the harm they would cause. This was the case with the A4076 Haverfordwest Congestion Study, which recommended at WelTAG Stage 1 not proceeding with two options for bypasses because of the likely impact on a Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI).

Whilst recognising the need for a proportionate approach, greater consideration of impacts on biodiversity at an earlier stage, along with collaboration and consultation with experts, would aid the avoidance of impacts and help identify habitats that could be maintained and enhanced. The recent British Standard for biodiversity net gain¹² provides a process for achieving gains including early consideration and goal setting.

Ecologists and environment teams should be able to exert influence over scheme development, rather than being sub-contractors to scheme designers whose advice can get filtered out. This could be achieved if the scheme sponsor, or their agent, appointed ecologists who were independent of the scheme design team.

A landscape-wide approach to ecosystem resilience

Road schemes may have a cumulative impact on biodiversity, both directly (due to habitat loss) and indirectly from air pollution and run-off of polluted water. This has the potential to lead to a decline in the condition and diversity of important ecosystems.

The Section 6 Duty under the Environment Act and PPW11 place a duty on public authorities to take account of the resilience of ecosystems. There are opportunities to do this both in the way new infrastructure is planned, and in the way we manage our existing road networks.

Connectivity is an important element in the resilience of ecosystems and in Wales it is at its lowest in lowland semi-natural habitats, where the landscape has been simplified and intensively-managed land dominates. This is precisely where much of our road network also exists. NRW’s 2020 State of Natural Resources Report for Wales identifies roadside verges (which account for 10,000ha of land in Wales) as a key opportunity for developing these ecological networks. Some local authorities have adopted policies to limit cutting of grass verges to certain times of year, and to encourage a reduction in frequency of hedge-cutting, and this should become national practice. The Panel recognises that there has been some good work on this matter, both nationally and locally, and this should be extended.

RECOMMENDATIONS

- 18. Scheme promoters should seek early consultation and collaboration with NRW and other stakeholders to co-create biodiversity objectives for schemes. This will aid the avoidance of impacts, as well as identifying habitats that could be maintained and enhanced, both locally and on a landscape scale. Funding of additional resource within NRW may be required to support this approach.**
- 19. The British Standard for biodiversity net gain (BS 8683) should be used as a foundation to develop detailed guidance and requirements on maintaining and enhancing biodiversity and ecosystem resilience, in line with the commitment in the Wales Transport Strategy. Revision of WelTAG guidance may be required to support this new approach.**

12. BS 8683: Process for designing and implementing biodiversity net gain – Specification

continued

- 20. The scheme sponsor, or their Employer’s Agent (the body overseeing the project on behalf of the sponsor) should appoint ecologists who are independent of scheme designers, to ensure effective oversight and independent challenge of scheme design. This should be clear in contracts for both contractors and agents.**
- 21. Roadside verges offer an opportunity to improve connectivity for nature. There should be a national policy decision to enable all local authorities to limit cutting of grass verges to certain times of year and to support the reduction in frequency of hedge-cutting to every three years where possible, whilst still meeting road safety requirements. The Trunk Road Agent should be provided with sufficient ring-fenced resources to protect and enhance the biodiversity and resilience of the soft estate.**

7.9 SUPPORTING ECONOMIC WELL-BEING

Issues and opportunities

- **A prosperous Wales requires a high-quality transport system. However, this cannot be achieved through substantial new road building. Sustainable transport measures and digital accessibility can deliver prosperity whilst also supporting other well-being goals.**

The economic action plan “Prosperity for All” sets out Welsh Government’s aims to grow the economy and reduce inequality. It highlights the importance of high quality physical and digital infrastructure to enable the Wales economy to function, and the need for modern sites and premises to allow businesses to grow and to attract investment.

The Panel supports investment in a modern high-quality transport network to make Wales – both urban and rural areas – an attractive place for businesses to invest, enable movement of freight from suppliers to customers, and enable people to access good quality jobs.

The Panel does not take the view that there is a trade-off between the economy and the environment. Whilst acknowledging that there are perceived tensions, we consider that it is entirely feasible to achieve economic prosperity alongside environmental (and social and cultural) well-being.

Through our scheme reviews and stakeholder discussions, it is evident to the Panel that economic well-being is sometimes seen as contingent on a good road network only, and there is less appreciation of how investment in sustainable transport modes can contribute to prosperity. Further, a ‘good’ road network is often conflated with a ‘new’ road network, without consideration of other ways to improve reliability and efficiency that may be lower cost and hence enable more widespread improvements.

There is a need to challenge these ways of thinking, with a particular focus on car traffic because freight is more limited on modal choice. For example, the aim in Net Zero Wales to reduce car mileage per person by 10% by 2030 could be transformative for the logistics sector, significantly reducing congestion and improving freight reliability.

In recent years, there has been a decoupling of the link between economic growth and traffic growth, with digitalisation appearing to be a key reason for slower growth in private car travel demand, although it is also an enabler of on-line shopping and hence higher growth in van traffic. There is a need for fresh thinking about the resulting opportunities for transport (and digitalisation) investment to support local and national prosperity.

The nature of economic well-being is also changing, due to the growth of services in the economy, the evolution of global supply chains (and recent counter trends of more localised supply chains) and changing consumer demands. The Covid-19 pandemic has brought about changes to working practices. It is not yet clear where these changes may lead, and the full implications for passenger and freight transport. Economic well-being will be further shaped by business and government initiatives in relation to remote working, the encouragement of concepts such as 20-minute neighbourhoods, and the desire of business and communities to breathe new life and purpose into town centres. These trends may particularly benefit small and medium-sized enterprises, which are important because they generate local wealth that stays in the community. The contribution of transport (and as part of that, road) investment to economic well-being must be alive to all these trends and opportunities.

There is growing evidence of the importance of public transport networks and population density in providing agglomeration benefits that increase productivity. Investment in the quality of public transport, the public realm and active travel infrastructure makes towns and cities more attractive places for people to live, and makes it easier for businesses to attract and retain a more productive workforce.

Increasing the amount, reliability, efficiency or speed of public transport increases the effective size (or ‘access to economic mass’) of an urban area and its rural surroundings, and this in turn influences productivity. Higher density development and mid-rise urban form in town and city centres also increases the effective size, and hence productivity, of urban areas. Rural areas, smaller towns and suburbs around main towns can benefit from the economic strength of the centre through walkable ‘button’ development around stations¹³. In this context, an approach to economic development that is overly focussed on road schemes to serve car-dependent locations feels anachronistic and risks holding our economy back.

In February 2021, Welsh Government established a vision for “a well-being economy which drives prosperity, is environmentally sound, and helps everyone realise their potential”. Where the case for change in a transport scheme includes unlocking economic development, the options shortlisting process should aim to be consistent with this vision. One element of this vision is integrated transport, a key theme of the Wales Transport Strategy.

Economic development schemes are rightly seen as more important in deprived areas. However, a strategy of building new roads to facilitate access and attract business may have unwanted impacts and entrench, rather than overcome, economic inequality and deprivation. There is longstanding evidence that poorer areas have lower car ownership and therefore attracting employment to car-dependent locations may preclude local people from accessing employment opportunities¹⁴. Further, while new roads may make it easier to access an area by car, they also make it easier to leave, thereby resulting in residents working or shopping elsewhere, and undermining the viability of local town centres, including market towns in rural areas.

There is a need for greater challenge to decisions about which locations are appropriate for economic development schemes, given the available transport infrastructure to support them. As we discuss further in section 7.15, some road schemes reviewed by the Panel were being promoted to address problems of congestion or lack of reliability caused in part by dispersed car-dependent economic development.

Previously, planning, transport and economic development were within the same Welsh Government department. With the increased focus on climate change, economic development and transport are in different departments. It is essential that there is joined-up thinking between departments, so that support from Welsh Government for developing sites to grow the economy is directed to locations with good connections to the transport network.



¹³ Rodrigues G and Breach A (2021) *Measuring up: comparing public transport in the UK and Europe's biggest cities* Centre for Cities.

¹⁴ Crisp R, Ferrari E, Gore T, Green S, McCarthy L, Rae A, Reeve K and Stevens M (2018) *Tackling transport-related barriers to employment in low-income neighbourhoods*. Joseph Rowntree Foundation.

Investment to enable active travel will bring public health benefits: less chronic ill-health, less obesity and better mental health.



RECOMMENDATIONS

22. There should be coordination between the Department for Economy and Department for Climate Change to ensure that sites supported for economic development are in locations that can achieve a high sustainable transport mode share.
23. Local and national government should explore approaches to economic regeneration and prosperity that are better aligned with the Welsh Government vision for a well-being economy. This may be more focussed on investment in the attractiveness and liveability of local town centres (including rural market towns); faster public transport and good active travel links to connect to main centres of economic activity; and digital accessibility including high-speed connections for rural areas and support for co-working spaces and remote working.

7.10 SUPPORTING SOCIAL AND CULTURAL WELL-BEING

Issues and opportunities

- Some types of road scheme have potential to support a fairer, more equal and healthier society. These were in the minority in the schemes we reviewed, but they provide examples of the type of road investment that is needed to achieve well-being ambitions for a more equal and healthier Wales.
- Scheme appraisals gave little consideration to how investment could support the Welsh language and culture, but schemes aligned with our recommended principles for road investment could in future serve an important function in enabling Welsh-speaking communities to thrive.
- Health impacts of our current transport system are significant and are not adequately considered in scheme appraisal.

In undertaking our review, we looked closely at how schemes could contribute to the four well-being ambitions in the Wales Transport Strategy. We discuss matters relevant to the well-being ambitions of being 'good for the environment' in sections 7.7 and 7.8 and of being 'good for places and the economy' in sections 7.9, 7.12 and 7.15.

This section sets out our findings in relation to the well-being ambitions that are about people, communities, culture and the Welsh language:

- **Good for people and communities:** a transport system that contributes to a more equal Wales and to a healthier Wales, that everyone has the confidence to use.
- **Good for culture and the Welsh language:** a transport system that supports the Welsh language, enables more people to use sustainable transport to get to arts, sport and cultural activities, and protects and enhances the historic environment.

Most of the road schemes we reviewed were unlikely to contribute to a more equal Wales. As noted in section 7.9, ironically, some road schemes were justified on the basis that they would attract jobs to deprived areas, but the sites where they aimed to stimulate development would be hard to reach for people who did not have access to a car.

However, road schemes to enable modal shift to active travel and public transport, of which there were a small number in the schemes we reviewed, could contribute to a more equal Wales. They make it easier for people who do not have access to a car to travel for work and education, and to play an active role in their community.

We found the main respect in which schemes were likely to contribute to a healthier Wales was in improving road safety. However, their focus was mainly on road safety for people in cars, and safety for pedestrians and cyclists received less attention. The most common cause of death for children and young adults aged 5-29 years is being hit by a vehicle, and children in deprived areas are four times more likely to be killed or injured on the road than those in wealthier areas. Safety schemes should, like all investment, be based on the Sustainable Transport Hierarchy, which means that they should include action to reduce risk to pedestrians and cyclists as the first priority.

A few road schemes had the potential to contribute to a healthier Wales by improving air quality. Toxic air contributes to 1,400 early deaths each year in Wales, and levels of air pollution are higher in more deprived areas. In some locations, such as the M4 around Port Talbot, the speed limit has been reduced to 50mph to reduce pollution in the nearby residential area. This is likely to bring significant air quality and health benefits to the community. We highlight elsewhere the carbon and safety benefits of schemes that reduce speeds; such schemes are also an effective health measure because of the improvement they deliver in air quality.

While the impact of each individual road scheme on population-level physical and mental health may be small, the cumulative impact of multiple schemes is significant. Multiple schemes that increase road capacity and stimulate more and faster traffic will result in lower levels of walking and cycling, higher levels of obesity and chronic ill-health, and increased pressure and costs for the NHS. Conversely, multiple schemes that enable active travel and public transport use will result in a more active population, with less obesity, fewer people suffering chronic ill-health, better mental health, and lower costs to the NHS.

The scheme appraisals we reviewed were largely unable to demonstrate impacts on culture and the Welsh language. However, some schemes included active travel routes that served Welsh-medium schools, and the Panel considered that this would potentially strengthen the role of these schools in their local communities. In future, schemes to adapt roads to the impacts of climate change, and to enable access to development sites that will achieve high sustainable transport mode share, may serve an important function in enabling Welsh-speaking communities to thrive.

RECOMMENDATIONS

- 24. Our proposed regional multimodal approach to prioritising transport investment should take the Wales Transport Strategy well-being ambitions as a starting point, and identify priority actions to increase equality, improve health and support the Welsh language and culture.**
- 25. Impacts on public health should be considered and reported in all WelTAG appraisals, covering road safety for all road users, air quality, noise pollution, physical inactivity, access to green space for mental well-being, severance, and health inequalities.**



POLICY THEMES

7.11 DEMAND MANAGEMENT

Issues and opportunities

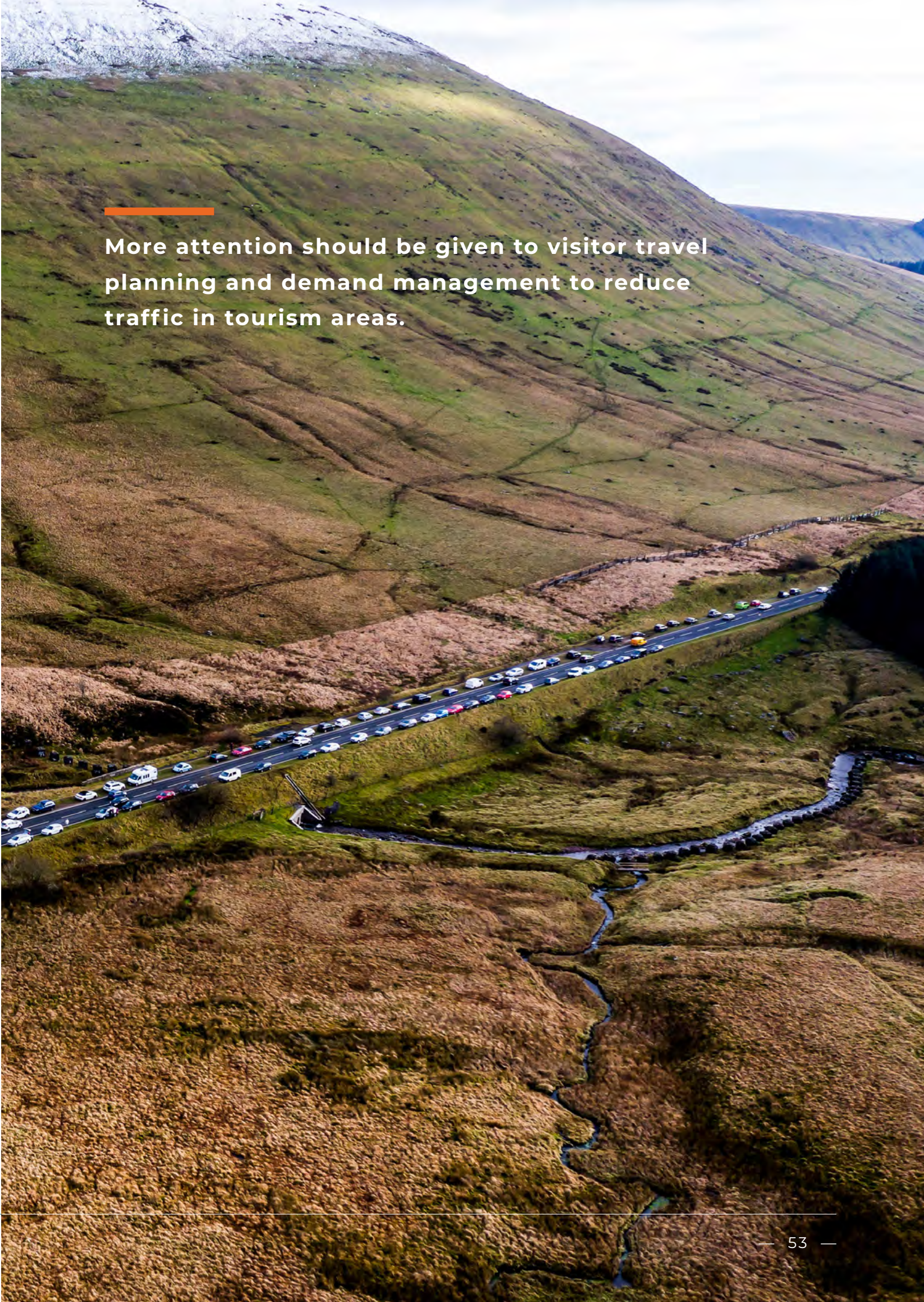
- Neither road construction nor traffic management provide long-term solutions to congestion and lack of reliability on the road network.
- Managing future demand has been given insufficient attention in scheme appraisals to date.
- Spatial proximity and digital connectivity can improve access and support economic activity and social well-being, with less reliance on car use.

The demand placed on the road network reflects a need or desire for people and goods to move from place to place. Fulfilment of that demand supports economic activity and social well-being, but it also has unwanted negative effects on road users and non-users.

Once demand translates into traffic movement on the road network, the level of service experienced by users (car and van drivers, freight operators and bus passengers) depends on the balance between road capacity and the flow of traffic. 'Demand management' interventions influence whether, when, how and by which route people and goods move. Effective demand management matches the flow of traffic to the available road capacity.

In the past, road construction to increase capacity and traffic management to increase the throughput of vehicles have been seen as the solutions to congestion. However, neither road construction nor traffic management provide a long-term solution to congestion and lack of reliability on the road network. Demand management can provide that long-term solution.

Managing the demand for travel is implicit in the Welsh Government's target to reduce car mileage per person by 10% by 2030, set against historic projections of increasing car traffic. Investment in making alternatives to the car (active travel and public transport) more attractive is important and necessary, but this alone is unlikely to bring about the level of car use reduction sought.



More attention should be given to visitor travel planning and demand management to reduce traffic in tourism areas.

The Covid-19 pandemic demonstrated that digital connectivity and spatial proximity can play an important role in providing access to employment, people, goods, services and opportunities. Welsh Government's target for 30% of people to work remotely on a regular basis shows how demand management can be seen as a 'triple access' re-balancing: that is, making more use of access as a result of spatial proximity and digital connectivity to reduce the need for access by car travel. The Panel's view is that access can (and should) be maintained while car use is reduced in order to reduce carbon dioxide emissions as quickly as possible. We note the important distinction between digital connectivity and digital accessibility. The former is necessary but not sufficient. The latter concerns having the digital literacy and quality of digital services available to be able to benefit from digital connectivity.

The Panel found that demand management receives little attention in road scheme appraisals. A small number of early-stage studies (WelTAG Stage 1) included remote working hubs in the option longlist, but this was never taken through as a shortlisted priority. This includes scheme appraisals that have taken place since the start of the Covid-19 pandemic and the adoption of the remote working target by Welsh Government.

Scheme appraisals also give little attention to measures such as car parking charges, workplace parking levies, workplace travel planning in urban areas, and visitor travel planning in tourism areas. These measures could manage demand and improve level of service on roads such as the M4 and A55, and in areas that experience high volumes of visitor traffic in holiday periods, such as Snowdonia.

In the Panel's opinion, greater insight and ambition is needed in relation to travel demand management. Insufficient data and analysis in scheme appraisals have been devoted to understanding the underlying determinants of travel demand affecting a particular road corridor. There appears to have been an unwillingness either to entertain the potential for a future downwards pressure on travel demand due to increasing digital accessibility in society, or to develop interventions with the potential to (further) reduce the need to travel.

The Panel supports the proposal in the National Transport Delivery Plan to explore a 'benefits-and-charges' approach in which road user charges to influence whether and when people travel provide a revenue stream to improve non-car options and influence people's choice of how to travel¹⁵. An example of such a package is the workplace parking levy in Nottingham, which provided the assured revenue stream to enable the city to finance construction of a tram network.

This approach would require coordinated action by Welsh Government and local authorities: Welsh Government would provide up-front capital funding to part-fund major improvements in public transport and active travel, and local authorities would implement workplace parking levies, road user charging or low emission zones to provide a revenue stream against which they could borrow to co-finance the same improvements.

Benefits-and-charges packages would benefit drivers. They would provide a more effective, long-term solution to problems of congestion and unreliability on the road network than either road construction or traffic management. This would particularly benefit freight operators, business, and essential car and van users, who would have greater certainty about the level of service that they could expect. They would also benefit people who currently have no option but to drive and are frustrated by the lack of positive alternatives. There would be significant health benefits, in terms of cleaner air and safer streets.

A package of this type would be socially progressive, as it would particularly benefit people on lower incomes, older people, younger people and women, all of whom use public transport more. Even so, design of a benefits-and-charges package would need to consider and be fair to people who face obstacles in life, such as having disabilities or being care-givers. It would also need to be fair to people who have less choice about how they travel: for example, this would mean that residents of urban areas with more public transport choices should pay more and residents of rural areas with fewer public transport choices should pay less.

Whilst the focus of such packages would initially be on larger urban areas, the Panel also recommends that rural local authorities in areas with significant congestion from visitor traffic should consider use of visitor levies, with income used to fund public transport improvements that would benefit both visitors and residents.

While careful design is needed for a benefits-and-charges package to yield the described benefits, experience in places that have implemented road user charging and low emissions zones, such as London, Stockholm and Milan, is that they command public support.

RECOMMENDATIONS

- 26. Where congestion and lack of reliability are identified as problems on the trunk or local road network, regional multimodal programmes should analyse the determinants of present and future demand; and develop demand management interventions.**
- 27. To achieve Welsh Government's aim to reduce car mileage per person, 'benefits-and-charges' packages of measures should be developed at a regional level. Charges would influence whether and when people travel, while providing a revenue stream to finance major improvements in public transport, active travel and digital accessibility.**

7.12 FREIGHT

Issues and opportunities

- **Most scheme appraisals make little or no reference to freight transport, and do not show a clear understanding of freight activity.**
- **Where freight interventions are proposed as part of a longlist, they often do not get taken forward for further development.**
- **Better understanding of freight activity would mean opportunities to improve provision for freight drivers would be identified; and could also facilitate modal shift to rail and respond to changing trends in logistics such as the rapid growth of parcel deliveries.**

In Wales, 90% of freight moves by road and, as a result, HGVs account for 6% of vehicle movements on the road network. Our scheme reviews showed often only a limited understanding of freight activity within the scheme area. Typically, WelTAG reports contain Annual Average Traffic Flow data with a breakdown by vehicle types. While this gives an indication of HGV traffic flows, there is often no comparison to a reference point and so it is difficult to determine the significance and nature of freight movements. In some instances, this is not a significant issue as the locations are away from key routes. But for schemes on the trunk road network, freight movements are more important.

Occasionally, freight-related solutions are proposed at the longlist stage, but then do not get taken forward. A number of appraisals suggest the development of a freight strategy for particular corridors or region, which reflects the existing lack of understanding of freight.

A more strategic consideration of freight during WelTAG Stage 1 would potentially lead to better longlist suggestions as more careful thought can be given to what might be useful in the context of the scheme area. Even where more specific measures are proposed, these often get dropped at WelTAG Stage 2.

If the option development process considers freight more effectively, there are opportunities both to address issues that are important to the road haulage sector and wider issues bringing changes to logistics operations. The sector has legitimate concerns around the provision of appropriate parking facilities for HGV drivers. Yet in many parts of Wales, drivers park their vehicles at the roadside or in lay-bys that are not suited to HGVs. Providing new or improved facilities will improve driver health and safety and help driver retention, an important issue given current workforce shortages.

There are also long-term trends that are affecting the movement of freight and need consideration in future transport schemes. For example, the pandemic has resulted in a significant growth in online shopping with van deliveries of parcels rising. This not only increases traffic movements but also leads to requirement for kerbside parking. Policy objectives such as the move towards 30% of people working remotely on a regular basis may generate altered consumer behaviours, with a consequence for delivery requirements. Land use planning concepts such as 20-minute neighbourhoods will not only change freight delivery requirements, but also need to be designed in such a way as to facilitate the efficient delivery of goods for both retail and public services.

In considering these concerns, the Panel identified some possible causes. In the stakeholder workshops, an issue raised was the extent to which those commissioning and undertaking appraisals suffered from 'freight blindness', through a lack of awareness of the freight transport sector and the data available. This is not a situation unique to Wales, being found elsewhere in the UK and internationally too.

Equally, it is unclear to what extent there is engagement with stakeholders from the industry. Consultation in identifying transport problems tends to involve local stakeholders who are focused on the movement of people. Bringing in representatives from the freight and logistics industry will assist in raising awareness of issues within scope of the scheme. There is also the need for the industry to reflect upon the findings from the Panel when championing future investments in road infrastructure.

RECOMMENDATIONS

- 28. A Wales National Freight and Logistics Plan should be produced, as identified in the National Transport Delivery Plan. Freight policy should be better integrated into transport policy and delivery, and considered in the appraisal of transport policies, programmes and projects at national and regional level, including Regional Transport Plans.**
- 29. Scheme development needs more active engagement with the freight transport industry, particularly in problem identification. Greater attention should be given to concerns of the road haulage sector in relation to provision of suitable lay-bys, parking facilities and rest areas for HGV drivers.**

7.13 MAINTENANCE AND ASSET RENEWAL

Issues and opportunities

- **New road infrastructure increases future maintenance and renewal liabilities.**
- **It will be necessary to prioritise investment in asset renewals within available budgets.**

The cost of maintaining the existing road network is high, and is placing pressure on Welsh Government transport budgets. New road infrastructure, especially where it involves construction of bridges, tunnels, major earthworks and retaining walls, or other complex and safety-critical structures, will increase maintenance and renewal liabilities in future. Maintenance and renewal liabilities will also be increased by construction of roads with higher design speeds. These additional costs are not captured in scheme appraisals.

The Panel agrees with the recommendation of the Lugg Review that there should be a Zero-Base Review of the Major Asset Renewal (MAR) programme and other maintenance expenditure, in order to prioritise safety-critical asset renewal and maintenance. The Lugg Review notes that the primary drivers for asset renewals are structural safety (as distinct from road safety), risk of flooding, earthworks and vehicle restraint system deficiencies.

For assets prioritised for renewal (both in the Zero-Base Review and in future), we recommend that the following conditions should be applied, consistent with our recommendations for future road investment in Chapter 5:

- Embodied carbon should be minimised;
- The asset renewal and any associated schemes should not result in an increase in road capacity for cars;
- The asset renewal and any associated schemes should not result in higher vehicle speeds that increase emissions;
- The asset renewal and any associated schemes should not adversely affect ecologically valuable sites.

Nine of the road schemes reviewed by the Panel combined a Major Asset Renewal scheme with other capital schemes. Because these schemes were mostly at WelTAG Stage 1, the cost of the combined preferred package was not known. However, the total cost of the package was likely to be much larger than the cost of the asset renewal. Wrapping many schemes into a package in this way reduces the funding available for higher priority safety-critical renewals.

In the schemes reviewed by the Panel that combined asset renewals and enhancements, the enhancements included interventions that we did not consider to be aligned with current policy. These options, if progressed, would have significant embodied carbon; could increase road capacity for private cars and increase speeds; and could reduce sustainable transport mode share. For example, the A44 Aberystwyth – Llangurig WelTAG Stage 1 study identified Major Asset Renewals costing £21 million, but also recommended taking forward to WelTAG Stage 2 a package of measures including construction of six wide single WS2+1 carriageway sections, two differential acceleration lanes, five modifications to the road radius and verge widening. These measures were identified as ‘high cost’ and from similar schemes reviewed by the Panel would be likely to cost tens of millions of pounds. Combining asset renewals with other high-cost measures in this way may result in the funding requirement for asset renewals appearing much larger than the funding that is needed for the high priority safety-critical schemes.

Nevertheless, the Panel recognises that there is some logic in combining asset renewals with other measures. It may achieve efficiencies in project management, and takes advantage of traffic management that is anyway required.

We therefore recommend that asset renewals should only be combined with other schemes if the schemes are consistent with current policy and are already high priority, such that they would anyway be likely to be implemented soon.

An example of this is that asset renewals, and potentially also maintenance, could take opportunities to improve provision for active travel and public transport.

RECOMMENDATIONS

- 30. Asset renewals should meet the Panel's four conditions for road investment: embodied carbon should be minimised; the asset renewal and any associated schemes should not result in an increase in road capacity for cars; the asset renewal and any associated schemes should not result in higher vehicle speeds that increase emissions; and the asset renewal and any associated schemes should not adversely affect ecologically valuable sites.**
- 31. The Panel supports the recommendation of the Lugg Review for a Zero-Base Review of Major Asset Renewals and other maintenance expenditure, in order to prioritise safety-critical asset renewal and maintenance.**
- 32. Asset renewals should only be combined with other schemes if the schemes are consistent with current policy (e.g., schemes to improve provision for active travel and public transport) and are already high priority, and hence likely to be implemented soon.**

7.14 RURAL AREAS

Issues and opportunities

- Different measures are needed to support modal shift and maintain access while reducing car use in rural areas.
- A regional multi-modal approach and the Trunk Road Modal Shift and Safer Speeds and Routes investment programmes recommended by the Panel will improve rural transport.



Car use is higher in rural areas, and the alternatives to driving are inadequate. In the context of the Wales Transport Strategy and the climate emergency, this points to the need for better public transport and active travel provision in rural areas; investment in digital connectivity to enable remote working; and support for local shops and services to reduce the need to travel long distances. Welsh Government's Rural Transport Offer, published at the same time as the Wales Transport Strategy, sets out just such an agenda.

The Panel's recommendations will help deliver some of the aspirations in the Rural Transport Offer.

Our proposed regional multimodal approach to prioritising investment (Section 7.3) would identify schemes to support modal shift and carbon reduction in rural areas, as is already happening with the North Wales Transport Commission. This approach would enable aspirations in the Rural Transport Offer to be progressed: for example, the aim for guaranteed public transport service frequency standards, with services to every village, every hour; and the aim for an integrated universal train – bus – taxibus network, timetabled to provide easy guaranteed connections from all villages. A regional multimodal approach could also build on and support existing community and voluntary sector initiatives such as Beics Ogwen rural e-bike sharing scheme and the Partneriaeth Ogwen / Co-Wheels electric car club in Gwynedd. Support for take-up of e-bikes and electric cars may be especially beneficial in rural areas, because of the greater distances people travel.

Under our recommendations for future road investment (Chapter 5), rural road safety schemes would continue to receive support. Rural single-carriageway roads are less safe than motorways and dual carriageways, so our recommendation for a Trunk Road Safer Speeds and Routes Programme (Section 7.5), focused on corridors with the worst safety records, would mean higher priority would be given to reducing deaths and serious injuries on rural roads. It would also mean that 20mph speed limits through villages on trunk roads would become more achievable, an important issue for many rural communities.

The Panel's recommended four conditions that all road schemes should meet (Chapter 5) will make sure that schemes do not damage sites and habitats that are important for nature, including irreplaceable ancient woodland. Many people in rural areas benefit from these special natural places every day.

Our recommendation for a Trunk Road Modal Shift Programme (Section 7.4) will increase the priority that is given to safe walking and cycling paths along or near the trunk A-road network in rural areas, radiating out from significant settlements.

This would help to progress the Rural Transport Offer aspiration for every village to have safe cycling access to the nearest town, and for 'hub-and-spoke' active travel corridors between market towns and other significant local centres and surrounding villages.

Our recommendations in relation to demand management are relevant for rural areas that experience high volumes of visitor traffic in holiday periods. We recommend that in these areas, a levy on visitors who are travelling by car would provide income that could be used to fund public transport improvements to benefit both visitors and residents (Section 7.11). The car-free tourism package now being developed in Snowdonia by the Snowdon Partnership is a good example of a rural 'benefits-and-charges' package: it offers the potential to manage car traffic, improve public transport, make the visitor experience a good one, and reduce impacts on residents. Our recommendations in relation to digital accessibility (Section 7.11) are also important for rural areas. Fast broadband provides opportunities for knowledge workers to remain in rural areas, and as these workers tend to be high-earning they can bring money into their local community, supporting economic well-being.

The Panel does not consider that road construction to open up rural land for non-specialist large-scale car-dependent economic development is consistent with current policy as set out in the Wales Transport Strategy, PPW11 and Net Zero Wales. However, it does consider that investment in sustainable transport infrastructure; digital infrastructure; development close to rural railway stations; and high-quality public transport services to connect rural areas to their nearest town offer significant economic benefits. It also recognises that in certain special cases it may be necessary to make changes to road infrastructure in rural areas to provide access for development that is appropriate to the location: an example might be to provide access for delivery of unusually large loads to sites for wind farms. The Panel does not envisage that this type of circumstance will arise often, and suggests that it is dealt with by exception.

We have not recommended that there should be Welsh Government support for construction of rural bypasses. We acknowledge the benefits of these schemes in reducing severance and noise in villages and town centres, but the bypass schemes we reviewed had significant negative impacts in relation to carbon emissions and biodiversity. We also note that a strategy of building bypasses could only benefit a small proportion of the hundreds of rural communities that are affected by traffic: the schemes reviewed by the Panel included only three rural bypasses, at a combined cost of just under £100 million.

However, the Panel does consider action is necessary to reduce and manage traffic through towns and villages in rural Wales. We recommend consideration is given to a pilot programme identifying and adopting international best practice to manage traffic in towns and villages. It should combine traffic calming and 20mph speed limits; public realm enhancements and reallocation of road space to reflect the 'place' function of roads through settlements; public transport and active travel improvements; traffic management, signage and HGV routing; and demand reduction measures. This approach could benefit many more communities than building the limited number of bypasses for which funding could feasibly be available.

Freight in rural areas is heavily dependent upon road transport, although recent developments such as the movement of timber from Aberystwyth to Chirk by rail show that modal shift is possible. HGV driver facilities can be worse in rural areas too. In recommending the development of a Wales National Freight and Logistics Plan, consideration of the different circumstances for rural and urban freight movements and the implications for road infrastructure will be essential.

RECOMMENDATIONS

- 33. Our proposed regional multimodal approach to prioritising investment should be used to understand the needs of rural areas and support modal shift and reduced car dependency, through measures such as access to e-bikes, demand responsive public transport, improved access to public transport and car clubs.**
- 34. Welsh Government should consider a pilot programme applying global best practice to manage and reduce the impact of through-traffic in rural towns and villages.**

7.15 ECONOMIC DEVELOPMENT AND LAND USE PLANNING

Issues and opportunities

- **Development of sites in car-dependent locations creates demands for significant extra road capacity and increases car use, and risks undermining achievement of the sustainable transport mode share target.**
- **There is good practice internationally and from the UK that Wales can apply – and there is interest in learning from this.**

The scope of the Roads Review, as set out in our Terms of Reference, included access roads with the primary purpose of serving new residential, retail and light office / light industrial developments in which Welsh Government has an interest.

The Panel interprets this to cover the suitability of the site location to achieve a high sustainable travel mode share; the access road design; and the impact of use of the site on local roads and the wider network.

The following sample of three access roads to economic development sites was provided to the Panel by Welsh Government for review:

- Warren Hall, Flintshire: a 76ha greenfield site near Broughton that has a mixed-use allocation in the Draft Flintshire LDP;
- Llanfrechfa: a mixed-use development on the edge of Cwmbran that would include a significant access road;
- Celtic Link Business Park, Fishguard: a 13.5ha potential employment site in the Pembrokeshire Local Development Plan (LDP) adopted in 2013.

The Panel's comments on these schemes are in Appendix 1.

Several other scheme reviews also informed our thinking about the interdependencies between economic development, planning, housing and highway schemes; and about the appropriate design of access roads (Chapter 5). In addition to the three schemes noted above, another six schemes had a case for change that rested on catering for increased transport demand due to planned expansion of housing, business, leisure, or retail development.

PPW11 states that good design involves avoiding the creation of car-based developments; minimising the need to travel; minimising reliance on the car; and maximising opportunity for sustainable and healthy travel.

PPW11 makes clear that the location, scale, density, mix of uses and urban design of new development are all relevant factors in achieving a good design. It suggests that good design should include sustainable transport links (including active travel networks) within and between developments; and that where new access infrastructure is necessary, it should be integrated within the development layout and beyond the boundary: for example, cycle routes within the site should be connected to the wider strategic cycling network, and bus priority measures should be provided on highway corridors serving a new development.

Technical Advice Note 18 (TAN18) on transport is now out of date, and the National Transport Delivery Plan includes a commitment to update it. The Panel consider that this needs to happen soon in order to stop continued pressure for carbon-intensive road construction to cater for car-dependent new developments.

PPW11 acknowledges the role of demand management, alongside network (traffic) management and provision of sustainable choices, but it is non-prescriptive about how demand management should be used. PPW11 pre-dates Welsh Government's targets for 45% of trips to be by sustainable modes by 2040 and car mileage per person to be reduced by 10% by 2030. The Panel considers that in the light of these new targets, there is a need for planning guidance from Welsh Government on demand management, that prescribes how all developments should use demand management to reduce private car use. It should take inspiration from European examples of best practice such as Vauban (an urban extension of Freiburg, Germany) and Houten (a self-contained small new town about 9km from Utrecht, The Netherlands).

From the schemes reviewed by the Panel, there is also a need to strengthen the application of the existing guidance in PPW11, with respect to decisions about what land to develop. Many sites have been allocated for many years based on historic land use policy. The Local Development Plan review process should take a bold stance on removing undeveloped allocations that are in the wrong place, as well as ensuring that new sites in suitable locations are identified.

Where Welsh Government owns a large portfolio of land, it should strategically review transport impacts and opportunities when selecting which sites to develop, and in which manner.



In Houten, the residential districts are only accessible to cars from the peripheral ring road. Within the town, streets are mainly for cyclists and pedestrians.

FEATURES OF AN EXEMPLAR RESIDENTIAL MIXED-USE DEVELOPMENT

Exemplar developments with these features would place less demand on the existing road network, and reduce the scale, cost and embodied carbon of access roads.



LOCATION

- Location within existing urban area or as an urban extension that can be fully integrated and connected to the town centre;
- Access to town centre and nearest railway station more direct and quicker by foot, bike or bus than by car;
- No direct access onto trunk road network or locally-managed A road dual carriageways.

ACCESS THAT REFLECTS THE SUSTAINABLE TRANSPORT HIERARCHY

- Comprehensive network of direct, comfortable and attractive walking routes and cycle routes from the development into town centre, with underpasses or bridges to overcome barriers such as major roads or railway lines;
- Public transport frequency to town centre and railway station at least every 10-15 minutes throughout the day, from 6am to midnight;
- Access road that has dedicated bus priority; separated cycle track; and 20mph speed limit;
- Access road does not provide a through-route for private cars (but may provide through-route for buses).

SITE DESIGN TO MINIMISE IMPACT ON CONNECTING ROADS AND THE WIDER TRANSPORT NETWORK

- Residential streets fully permeable for walking and cycling but access-only for motorised vehicles; no on-street car parking;
- 20-minute neighbourhoods: comprehensive range of local services within a 20-minute walk of all dwellings;
- All dwellings provided with secure street-level cycle parking for residents;
- Net housing densities of 90 dwellings per hectare or higher to ensure viability of frequent public transport;
- Residents provided with public transport pass as part of the 'package' for leasing a car parking space;
- Vehicle club (e.g. light vans and e-cargo bikes);
- Car-free or car-lite: no or low car parking provision apart from parking for people with disabilities;
- In car-lite developments, most car parking apart from provision for people with disabilities located in a separate secure parking area or garage at the edge of the settlement;
- Residents lease a parking space in the secure parking area, at a level reflecting the cost of providing the facility, unless they do not own a car.

There is a lack of recent exemplar low-car-use developments in Wales, including residential, mixed-use and employment sites. We recommend that Welsh Government, working with local authorities, should use its leverage as landowner and funder to create five to ten exemplar developments with high sustainable transport mode share and low car use.

The Panel acknowledges that the planning system cannot regulate the behaviour of people once a development has been completed and occupied. A further aim of the exemplar development initiative would therefore be to understand how local authorities can exert more influence over the masterplan and development process, to achieve the desired outcomes of PPW11.

This is necessary because developer-led masterplans with ambitious sustainable transport proposals are often compromised in eventual delivery.

For all development, the Panel encourages decision makers to specify stretching conditions for matters such as car parking ratios; car-free areas; off-site paid-for residents' parking (e.g. secure parking areas¹⁶); cycle parking standards; public transport provision; sustainable last-mile delivery of goods (e.g. consolidation hubs to allow use of e-cargo bikes); and implementation of a travel plan in order to achieve an agreed sustainable mode share target.

Planning obligations and conditions should specify measures to be triggered if sustainable mode share targets are not reached – for example, additional public transport services.

By adopting these recommendations, the requirement for road construction to enable economic or residential development would be reduced and potentially eliminated. Developments would place less additional demand on the existing road network. Road access would still be required, for example to allow the servicing of businesses, but the focus would switch from providing an 'access road' to providing access by sustainable modes. This would be in line with the recent recommendation of the Royal Town Planning Institute for all development to be located and designed to generate zero emissions from transport¹⁷.

The Panel recognises that from the perspective of those with responsibility for housing, regeneration and economic development, these recommendations would require significant changes to current practice, as well as having resource implications.

When creating exemplar developments:

Phased mode share targets should be set, and these should be significantly more ambitious than the national targets for 39% of trips to be by sustainable modes by 2030 and 45% by 2040.

Route assignment models should be used to demonstrate that if the target is met, substantial highway works to expand the capacity of the existing road network will not be required. Welsh Government should adopt legal agreements for conditions that are not easily applied or enforced as normal planning conditions.

These might include:

- Agreement of legally-binding phased sustainable transport mode share targets that the developer must achieve;
- Requirement for financial contribution from the developer, especially on an ongoing basis, for example for supporting bus services;
- Requiring detailed monitoring and specifying action needed if any inadequacy appears, such as failing to meet an agreed mode share target. This could ultimately include financial penalties equivalent to the cost of the highway works required to cope with traffic in excess of the target;
- Other requirements that may be difficult to enforce through planning conditions, such as charging for car parking.

To encourage local authorities and developers to come forward with sites that are suitable as exemplars, significant funding should be made available by Welsh Government. This will offset funding that would otherwise be sought from local authorities to build road schemes to cater for conventional car-dependent developments.

16. Christiansen P, Fearnley N, Hanssen J and Skollerud K (2017) *Household parking facilities: relationship to travel behaviour and car ownership* Transportation Research Procedia 25, 4185-4195. This research presents evidence that car owners who usually park at least 50 metres from their home are significantly less likely to use their cars, especially for shopping and leisure; they make a similar number of trips overall as car owners who have parking closer to home, but make more trips by active travel and public transport. In Vauban, Freiburg, spaces in secure car parks on the edge of the residential development are rented to residents at a cost that reflects the cost of providing the facility. They provide a safe location to park while also keeping cars away from amenity and play areas. The idea is starting to be adopted at exemplar developments in the UK.

17. Royal Town Planning Institute (2021) Net Zero Transport: the role of spatial planning and place-based solutions.

However, building houses in highly car-dependent locations is not consistent with PPW11 and will increasingly therefore be under challenge.

At Warren Hall, Flintshire, planning inspectors raised concerns regarding the residential element of the scheme, because its location is not sufficiently well-connected or close to a built-up area to be accessible by modes other than private car. The Inspector directed Flintshire Council to remove the housing element of the development from the allocation.

Torfaen County Borough Council expressed interest to us in making Llanfrechfa an exemplar development in relation to transport, and there are other locations in Wales where local authorities are keen to design exemplar developments. Advice received by the Panel also identified developments in the UK that are showing how this can be done, outlined in our report on the Llanfrechfa scheme. While recognising that change will be gradual, it is important that it starts now, in order not to jeopardise meeting our climate commitments.

RECOMMENDATIONS

- 35. Technical Advice Note 18 (TAN18) on planning and transport should be updated soon.**
- 36. Welsh Government should provide guidance on demand management to achieve modal share targets in new developments.**
- 37. The Local Development Plan review process should remove undeveloped allocations that are in the wrong place, as well as identifying new sites in suitable locations.**
- 38. Welsh Government should strategically review transport impacts and opportunities when selecting which sites from its own land portfolio to develop.**
- 39. Welsh Government, with local authority partners, should create five to ten exemplar developments with high sustainable transport mode share and low car use.**



TECHNICAL, APPRAISAL AND DELIVERY THEMES

7.16 APPLICATION OF THE WELL-BEING OF FUTURE GENERATIONS ACT

Issues and opportunities

- **Application of the Well-being of Future Generations Act to scheme appraisal needs to fully embrace the spirit of the legislation.**
- **Local well-being objectives are often poorly considered in scheme development.**
- **Full application of the legislation can assist in taking a different approach to solving transport problems to best achieve national well-being goals as well as local well-being objectives.**

The WellTAG Guidance was updated in 2017 to align with the Well-being of Future Generations Act (WFGA). This means the development of solutions to transport problems has to apply the five ways of working and consider the seven national well-being goals of the Act. It must also consider the well-being objectives agreed locally by Public Bodies (PBs) and Public Services Boards (PSBs).

WellTAG studies reviewed by the Panel acknowledged the Act to varying extents. Although the five ways of working are mentioned in appraisals, there is limited evidence they are used proactively.

Studies often discuss the seven national well-being goals but less often cover local well-being objectives. Within local objectives, some studies refer to the local authority's well-being objectives, others to the PSBs objectives, some neither.

Interpretation of these goals and objectives varies significantly, largely due to differences in individual interpretation, including whether scheme objectives contribute (positively or negatively) to the seven well-being goals or local well-being objectives.

Local well-being objectives agreed by all public bodies, including local authorities and national parks, can be found on their websites and these, along with the four well-being ambitions set out in the Wales Transport Strategy should be used as a basis for all appraisals. Development teams should consider local well-being assessments (updated by PSBs in 2021/22) as they may identify opportunities for transport and accessibility improvements.

Many appraisals present extensive assessment tables considering transport problems, or validating scheme objectives, against the well-being goals, but with limited interpretation of how this analysis is influencing the process or consideration of scheme options. Scheme appraisers should clarify the purpose of any tabulations, but better than that, more fully describe how the scheme's characteristics are being assessed against the goals.

Appraisal reports sometimes suggest that some scheme objectives relate to certain well-being goals, which may be at best not in the spirit of the Act, or at worst misapplying it. The goals that are most misunderstood or incorrectly applied are: Resilient Wales, Culture & Welsh language and Globally responsible Wales.

For example, an objective of creating a more resilient road network (which is often used to mean increasing road capacity) should not be seen as contributing to the Resilient Wales goal which is largely about protecting and improving biodiversity and healthy ecosystems and is legally defined as: "A nation which maintains and enhances a biodiverse natural environment with healthy functioning ecosystems that support social, economic and ecological resilience and the capacity to adapt to change (for example climate change)." The Panel noted an example of a scheme appraisal that classified an objective to "Improve highway resilience within the scheme area" as contributing positively to a Resilient Wales (through a '+') whilst the objective "Improve active travel connectivity" was classified as neutral ('0') for both a Resilient Wales and Prosperous Wales.

Value for money assessments are heavily influenced by monetised benefits of journey time savings, as we discuss in section 7.19. Whilst this is an established metric for assessing and comparing benefits of transport infrastructure schemes, it is poorly aligned with the definition of a more Prosperous Wales, which promotes moving towards a well-being economy.

RECOMMENDATIONS

- 40. Scheme development teams must ensure they understand and meaningfully apply the Well-being of Future Generations Act's five ways of working and seven national well-being goals.**
- 41. Local well-being objectives should inform and be integral to scheme development. This will improve delivery of cross-cutting benefits, for example in rural areas.**

7.17 TRAFFIC FORECASTS

Issues and opportunities

- **Use of traffic forecasts based on the Department for Transport (DfT) National Trip End Model and Road Traffic Forecasts is likely to be misaligned with policy aims in Wales to achieve modal shift and car mileage reduction.**
- **Different scenarios for traffic growth, including scenarios aligned with Welsh policy aims, would enable decision makers to assess whether schemes are robust to different futures.**

In the schemes reviewed by the Panel, it was normal practice to model impacts of options using background traffic growth assumptions based on the DfT National Trip End Model and Road Traffic Forecasts. This results in predictions of significant traffic growth, which push scheme promoters towards options that increase private car capacity, and away from options that reallocate space from cars to public transport and active travel.

DfT is developing a set of six Common Analytical Scenarios, which will allow consideration of uncertainty in trends over time. For example, the scenarios capture futures with higher or lower economic growth and population growth; changes in travel behaviour and greater use of remote working and online shopping; and rapid take-up of connected autonomous vehicles or electric vehicles. While potentially useful, these scenarios are unlikely to fully meet scheme appraisal needs in Wales. This is because policy aims in Wales to reduce car mileage per person by 10% by 2030, increase sustainable transport mode share, and increase remote working may be expected to lead to significantly different travel patterns and opportunities compared to those in England, over time. Policy commitments and programmes set out in the National Transport Delivery Plan show considerable differences from policies in England over just the next five years, and it seems likely over longer time periods these differences will manifest in significantly different outcomes.

The Panel recommends that traffic modelling for scheme appraisal should use scenarios, and that these should include a 'policy-consistent' scenario aligned with the aim for car mileage per person to fall nationally by 10% by 2030. This would enable decision makers to see impacts of options in a future in which policy aims are met, as well as in futures in which policy aims are not met, or are exceeded.

The Panel recommends that Welsh Government produces guidelines on how the targeted national 10% reduction in car mileage per person could be applied in rural and urban areas. Our recommendations on regional carbon assessment could facilitate an evidence-based approach to determine what level of reduction is appropriate in each region, taking account of factors such as rural/urban proportions and population density.

RECOMMENDATIONS

- 42. Traffic modelling for scheme appraisal should use scenarios, and these should include a ‘policy-consistent’ scenario in which car mileage per person falls nationally by 10% by 2030.**
- 43. Welsh Government should develop guidelines on how the targeted national 10% reduction in car mileage per person by 2030 could be applied in rural and urban areas.**

7.18 HOW WELTAG IS USED IN ROAD SCHEME APPRAISAL

Issues and opportunities

- **The WelTAG appraisal process is not being used in an efficient way.**
- **There are opportunities to streamline the way WelTAG processes are applied in practice, with more appraisal at programme level avoiding repeated effort at scheme level. Analytical and engineering resource would be used to better effect, reducing abortive work and better identifying cumulative benefits of programmes.**

The Panel was concerned at the volume of material that was commissioned in order to meet the requirements of WelTAG for individual schemes.

The appraisal process does not encourage strategic thinking at programme level about how to achieve policy aims, or maximise contribution to well-being goals and objectives, because too much work takes place at the scheme level, with a narrow geographical focus. Questions that would be more appropriately considered at programme level are instead addressed in a formulaic way, repeatedly, for individual schemes.

The Panel recommends that the following stages of appraisal should take place at the programme level, and should not be repeated for individual projects:

- WelTAG Stage 0: Case for change, including identifying strategic priorities and setting programme objectives;
- WelTAG Stage 1: Strategic Outline Case, including developing and filtering longlist of options, and early-stage whole-life carbon assessment, as outlined in section 7.7;
- WelTAG Stage 2: Outline Business Case, including assessment of how options contribute to well-being goals and programme objectives; and confirming shortlist of options;
- Part of WelTAG Stage 3: Business Case for preferred option, including integrated well-being appraisal.

This would mean that for individual schemes, so long as they were part of a broader programme that was aligned with the Wales Transport Strategy (such as our suggested Trunk Road Modal Shift Programme), the appraisal could start at WelTAG Stage 3, and could focus on:

- Detailed quantification of embodied carbon in construction, operation and maintenance, and consideration of how it could be minimised;
- Quantification of impact on carbon emissions in use;
- Social, environmental, economic and cultural impacts and opportunities;
- Value for money, and demonstration that the scheme is amongst the best schemes awaiting funding.

RECOMMENDATION

- 44. Early stages of appraisal should be undertaken at programme level, and should not be repeated for individual schemes.**

7.19 DEFINITION AND ASSESSMENT OF VALUE FOR MONEY

Issues and opportunities

- **Benefit to Cost Ratios (BCRs) do not provide a meaningful way to judge whether a scheme offers value for money in achieving Welsh Government priorities.**
- **Most of the monetised benefits for schemes reviewed by the Panel related to drivers' journey time savings, but schemes with large drivers' journey time savings have disbenefits in the context of Welsh Government policy.**
- **Value for money assessment should be used to prioritise between different schemes of similar type (such as safety schemes) but this requires better consistency of approach.**

Welsh Government is updating its transport appraisal guidance, WelTAG, in parallel with the work of the Roads Review Panel. The Panel welcomes the new guidance on assessment of value for money. We particularly welcome the statement that, in line with the UK Treasury Green Book definition, a scheme can only be considered to represent value for money if it supports the government policies and strategies of which it is a part. This means that, no matter how high the BCR, a scheme cannot represent value for money if it does not help to achieve Wales Transport Strategy priorities.

BCRs for the schemes reviewed by the Panel typically included monetised benefits in relation to carbon emissions, road safety, transport user benefits (drivers' journey time savings and vehicle operating costs) and effects on indirect taxation, as is standard practice in scheme appraisal in the UK. The Panel identified some issues in relation to the use of drivers' journey time savings and the way that road safety benefits are appraised.

Drivers' journey time savings benefits

In the schemes reviewed by the Panel, monetised benefits were dominated by estimated journey time savings to drivers. These usually accounted for 90% or more of the benefit. Drivers' journey time savings are a long-established metric for assessing and comparing the benefits of transport infrastructure schemes, but in the context of current Welsh Government policy, the Panel considers that they are an unreliable measure of value for money. This is because schemes that reduce journey times for drivers are likely to generate induced traffic and cause a shift away from sustainable modes, hence increasing carbon dioxide emissions, in direct contradiction to Welsh Government's policy aims.

The Panel therefore recommends that when reporting scheme benefits and BCRs, the BCR should be reported both with and without benefits from drivers' journey time savings. This will provide transparency for decision-makers about how much of the scheme benefit is aligned with policy aims.

The Panel notes that use of journey time savings for public transport users in scheme appraisal is not problematic: shorter public transport journey times would be expected to lead to modal shift from car to public transport, which is consistent with policy aims.

Road safety benefits

There are inconsistencies in the appraisal of road safety schemes, making it difficult for decision-makers to identify which schemes offer the greatest road safety benefit. Some appraisals assumed all collisions at a treated location would be averted by the scheme; or even that collisions that were remote from and irrelevant to the scheme would be averted; the Panel does not consider this approach to be credible. Other appraisals assumed, more plausibly, that only a proportion of collisions at a treated location would be averted by the intervention, with assumptions consistent with the approach used to calculate First Year Rate of Return for small-scale local safety schemes (such as changes to speed limits, signage, anti-skid surfacing etc). The Panel recommends that consultants undertaking scheme appraisal are provided with guidance on a consistent methodology for assessment of safety benefits.

The Panel also noted that Welsh Government has a separate annual budget of about £1 million for small-scale local safety schemes. These schemes can offer very much higher value for money than the road safety schemes reviewed by the Panel. The method used to prioritise small-scale local safety schemes is the First Year Rate of Return (FYRR). This is an estimate of the monetised benefits of the scheme in the first year after completion, as a proportion of scheme cost: thus, a scheme with a FYRR of 100% would be considered to pay for itself in safety benefits in one year. Welsh Government officials provided figures for the FYRR of eight small-scale local safety schemes on the A470 and A487 in Mid-Wales. These schemes had FYRR of between 104% and 461%, in other words all were expected to provide safety benefits in excess of the scheme cost in less than a year. By contrast, the FYRR for the A470 Caersws roundabout, reviewed by the Panel, is slightly above 1%.

This suggests that there would be a safety benefit in allocating more resource to small-scale local safety schemes, until such a point as all schemes with high FYRR have been implemented.

The Panel also noted that predictions of safety benefit from road schemes take no account of the realistic timescale over which benefits will accrue. In particular, vehicle technology may reduce the potential for driver error (for example through intelligent speed adaptation) over the next 10-20 years. This will make road infrastructure schemes less cost-effective, because the number of collisions will anyway fall, and so fewer collisions will be avoided by modification of a junction or closure of a dual carriageway crossover. Conversely, it will make lower speed limits more cost-effective, because drivers' compliance with speed limits will be better than at present. The Panel suggests that value for money appraisals should include sensitivity tests to reflect these future uncertainties.

RECOMMENDATIONS

- 45. BCRs should be reported both with and without benefits from drivers' journey time savings.**
- 46. Welsh Government should give guidance on a consistent method to assess safety benefits so that projects can be compared and the most effective ones, across different safety programmes, can be prioritised.**

7.20 SCHEME DESIGN

Issues and opportunities

- **Existing scheme design standards are not suitable for future road investment to achieve the aims of the Wales Transport Strategy.**
- **The starting point for scheme design should take account of all road users, in line with the Sustainable Transport Hierarchy.**

This section discusses matters in relation to the design of road schemes. Firstly, it is important to define what is covered by road scheme design. The Highways Act 1980 defines highways as rights of way. These include (in alphabetical order) the following: bridleway; byway open to all traffic (BOAT); carriageway; cycle track; footpath; footway; highway; restricted byway.

A road scheme includes the creation of, or changes to, any of the types of route over which there is a right of way, and is not limited to creation of, or changes to, carriageways.

Roads may often have additional descriptors applied to them, including 'streets' in urban areas or 'lanes' in rural areas. These come with connotations about their nature; for example, a street implies frequent access and egress from adjacent land uses (e.g. houses and shops). In addition, they may be described by their function, including a ring road, relief road or access road. An access road will usually be for heavy or light industry, offices or housing or mixed land uses.

Roads, or routes, can sometimes be defined as strategic, long distance, local, commute, leisure or freight. In reality, most roads carry traffic of various types, and these descriptions may be misleading, and should be used with care because they imply use for one function to the exclusion of all else.

The road user as a customer

The activities of highway authorities are in part directed to enhancing road users' experience. In the past, the main focus has been on enhancing the service offered to drivers (primarily car users), particularly in relation to journey times and journey time reliability. Driver stress and frustration is sometimes also cited as a reason for a scheme (although pedestrian, cyclist and bus user stress and frustration are never cited).

In future, highway authorities should consider how they can enhance the experience of all road users. This should include pedestrians, cyclists and bus users, and professional (freight, service vehicle and coach) drivers as well as car drivers. This perspective is likely to lead to different investment priorities. For example, it may result in a higher priority being given to maintenance and clearing of vegetation from pedestrian and cycle paths; shelter, seating and information at bus stops; provision of rest areas (a frequent feature of European roads, which encourage more stopping and assist in reducing driver fatigue, stress and frustration); rest facilities for goods vehicle drivers; and information so drivers can plan ahead and avoid travelling when there is likely to be congestion. It should also recognise that not all road users are alike: for example, the priorities of older car drivers may not be the same as those of younger drivers.

Active travel networks

Active travel is at the top of the Sustainable Transport Hierarchy. All road schemes should therefore have active travel at the top of the hierarchy of consideration, and should support active travel network development as a primary objective.

The key to increasing active travel is to have comprehensive networks of comfortable and attractive routes that cater for people of all abilities. Active travel connectivity is being improved in Wales through processes established as a result of the Active Travel (Wales) Act 2013. There remains a considerable amount of work to do to truly create comprehensive networks for walking and cycling.

All new roads must have appropriate provision for active travel. This will, as a minimum, be shared routes for pedestrians and cyclists separated from general traffic. As noted in the Active Travel Act Guidance, designers should be realistic about cyclists wanting to make adequate progress (para 11.16.6) and hence cycle traffic should preferably be separated from pedestrian traffic to avoid conflict and allow cyclists to travel at a comfortable speed (para 9.13.1).

The creation of active travel schemes alone is sufficient grounds for using the full extent of the powers in the Highways Act for the creation of, or changes to highways, including for example, compulsory purchase of land. The professionalism and scale of investment that has been applied to improving conditions for private car users should now be applied to improving conditions for active travel users. The aim should be for transformational changes in provision, sufficient to achieve significant modal shift.

Public transport

Public transport is the next priority after active travel in the Sustainable Transport Hierarchy. All road schemes should therefore have public transport network provision as a high priority consideration.

Delay of Public Service Vehicles (PSVs, i.e., local buses, long distance buses and coaches) disrupts timetables and reduces reliability. Regular congestion requires operators to add extra time to schedules, which may in turn mean that service frequencies have to be reduced.

Highway network planning should therefore be directed at creating better road layouts and traffic management measures that assist PSVs. This should be considered during asset upgrade, renewal and maintenance: for example, bus priority may be incorporated in maintenance schemes.





New design approaches such as Dutch style roundabouts are needed to reflect the Sustainable Transport Hierarchy and improve safety for pedestrians and cyclists.

Design of routes and junctions

There are many standards available for use by scheme designers. These include Design Manual for Roads and Bridges (DMRB); national application annexes to DMRB; housing and industrial estate design guidelines (created and used at individual highway authority level); Manual for Streets and Manual for Streets 2 (with Manual for Streets 3 to be issued in late 2022); and Active Travel Act Guidance.

At present, local highway authorities often use DMRB CD109 'Highway Link Design' for designing rural and urban roads, even though it contains 'requirements and advice relating to works on motorway and all-purpose trunk roads' (GG 101 Introduction to the Design Manual for Roads and Bridges, p4). Table 2.4 provides design speeds down to 60km/h for urban roads with a 30mph speed limit (and 70 km/h for a 40mph speed limit).

However, the guidance in Manual for Streets should be used in urban areas, especially with the introduction of 20mph as the default speed for urban areas from September 2023.

For new rural roads, current practice is for designers to seek to design to the national speed limit of 60mph for single carriageways and 70mph for dual carriageways. This results in design speeds of 100km/h for single carriageway roads and minimum horizontal curves (without very large super-elevation) having radii in the order of 700 metres.

Consequently, a new rural road may typically have a higher standard of alignment than an existing equivalent adjacent length of road. Instead of designing a new rural road to the national speed limit of 60mph (with a design speed of 100km/h) as the default, it would be appropriate for designers to optimise design speed with carbon dioxide emissions reductions in mind. Alignments that do not require as much land take or earthworks will have lower embodied carbon, and lower speeds will reduce emissions from vehicles using the road. Such lower design speed roads may then be signed with appropriate lower speed limits, and lower speeds will also create safer roads. In addition, there may be other benefits relating to less loss of habitat and biodiversity.

The national application annexes within DMRB provide for each of the devolved nations highway authorities to define policy in relation to design approaches to be adopted. Welsh Government should consider creating national application annexes which guide designers in the choice of design speed for rural roads and which avoid 60mph speed limits being always selected as the default.

There are many design guidelines used by local authorities for designing road schemes (including A, B and C class roads and unclassified roads). Welsh Government should consider providing guidance to local highway authorities on the selection of appropriate standards and guidance for designing non-trunk road schemes. This would result in non-trunk road design that is more aligned to Welsh Government's policies, as well as being more consistent across the country.

Roundabout design for cycle traffic is improving. The Active Travel Act Guidance outlines the layout for so-called 'Dutch style' roundabouts, albeit only for the circumstance where cycle traffic has priority across the entry and exit arms of a roundabout. This is suitable for urban areas with speed limits of 20 mph and 30 mph, but not for rural roundabouts with generally higher speed limits. Welsh Government should further develop roundabout designs in Active Travel Act Guidance for rural situations.

Section 7.7 notes the importance of early assessment of whole-life carbon emissions; and Chapter 5 recommends that it should be a condition for all road schemes that embodied carbon is minimised. Optimisation of scheme design is typically based on cut and fill balance for earthworks and major structural components, normally driven by cost. A component of that cost will relate to carbon. However, a 'cost optimal' solution may not be the same as a 'minimum carbon' scheme. The highway design profession should stimulate discussion amongst scheme designers to determine the appropriate design and assessment methods to estimate, and minimise, embodied carbon emissions in road infrastructure.

Changing types of vehicles and technology

There is an increasing rate of change of the vehicle fleet to being powered by electricity. This includes replacement of the internal combustion engine with battery powered vehicles, and also the addition of electrification to human scale mobility, including e-bikes, e-cargo bikes and e-scooters. There are many types of cycle that are adapted for use by disabled people, such as tricycles and hand-cranked cycles, which may have electric assistance.

As cycling becomes more common, there will be an increasing variety of cycles in use. For freight, batteries, overhead catenary or hydrogen may provide future power sources.

A further development is in relation to driver assistive technologies, and perhaps ultimately, automated vehicles. The technologies that such vehicles use to assist the driver, or replace the driver, may require adaptations to design. There are likely to be issues in relation to maintenance as well, for example the need for consistent lane line markings of a higher quality than is currently necessary.

The changing requirements of vehicles, and changes in the way vehicles may interact with each other, may have implications for road scheme design, and they should be kept under review.

RECOMMENDATIONS

- 47. Welsh Government should consider creating national application annexes for design speed selection that would then lead to more appropriate road layouts in line with policy.**
- 48. Roundabout designs for rural situations should be further developed in Active Travel Act Guidance.**
- 49. The highway design profession should stimulate discussion amongst scheme designers to determine the appropriate design and assessment methods to estimate, and minimise, embodied carbon emissions in road infrastructure.**



7.21 ROLE OF THE PROFESSIONS

Issues and opportunities

- **The skills and knowledge of the transport professions are a vital resource to deliver a sustainable transport system for Wales.**
- **The task being asked of the professions has significantly changed, refocussing around modal shift and decarbonisation.**
- **Clarity on the scheme pipeline will enable the supply chain to recruit and upskill to provide the necessary expertise**

Changes to Wales' roads (and wider transport network) involve many professionals with diverse skillsets. The Panel recognises that these professionals are committed to delivering the best solutions to meet society's needs. Their work must often balance competing demands and consider all benefits and disbenefits whilst operating within the laws, budgets and policies of the time.

It is clear that climate change fundamentally changes the task in hand for these professionals. Wales will require all of their skills and knowledge to develop a transport network that meet the challenges of our time. Climate change is undoubtedly an existential threat for humankind, but in the view of the Panel it is an opportunity – and a privilege – to be able to serve society by helping to address it. We feel sure that transport professionals will share that view, and want to play their part.

The Panel engaged with representatives of the professions in Wales to understand their experiences and their views associated with the Panel's work. We set out here some recommendations for the professional institutions, their members and Governments engaging them.

There is clear importance in providing long-term certainty of investment in transport to enable the supply chain to gear themselves to serve it. This includes both certainty with regard to the likely quantum of funding, and certainty in relation to policy priorities. A forward pipeline of opportunities helps the supply chain attract and retain the best talent, and helps individuals, whether at the point of choosing a career or looking to the next opportunity for professional development.

The professional institutions, and other representative bodies, can support their membership in developing and maintaining the skills, attributes and knowledge that are relevant to the modal shift and decarbonisation challenge ahead. This could include consideration of requirements for the accreditation of apprenticeships and university courses as well as for Continuing Professional Development (CPD). Increased awareness and capabilities in relation to the following would be beneficial:

- Key Welsh legislation and context (e.g. Well-being of Future Generations (Wales) Act, Planning Policy Wales, the Active Travel (Wales) Act, and supporting guidance); understanding of how that legislation should influence scheme design and appraisal;
- Early-stage whole-life carbon assessment; scheme design to minimise embodied carbon and whole-life carbon emissions;
- Supporting the establishment of WelTAG Review Groups with diversity of experience, to reflect a wider range of relevant perspectives;
- Establishing practical and meaningful objectives, with appropriate consistency and context to provide a ‘golden thread’ from the local setting to national strategy;
- Understanding of underlying causes of problems on the transport network;
- Familiarity with the potential role of non-transport solutions, e.g., digital connectivity and local neighbourhood services;
- Familiarity with principles for scheme design for active travel, reflecting its place at the top of the sustainable transport hierarchy; capability in design of comprehensive networks of comfortable and attractive walking and cycling routes that cater for people of all abilities; understanding of the potential role of new forms of human-scale mobility (e-bikes, e-cargo bikes, e-scooters, electric tricycles and hand-cranked cycles) and implications for design;
- Familiarity with needs and priorities of the freight and logistics sector, e.g., in relation to good quality rest facilities for drivers; location of future charging facilities for HGVs; surface maintenance to maximise fuel economy;
- Understanding of the role of demand management and behavioural change measures;
- Appropriate design characteristics for rural roads and schemes to support increased sustainable transport use.

Addressing the challenges of modal shift and decarbonisation requires a bold change in mindset by all involved. Based on the enthusiasm and energy of the professions we met, and the recommendations here, the Panel is confident that there are exciting and fulfilling challenges for everyone starting and growing their career, supporting the development of a sustainable transport network that will make the people of Wales proud.

RECOMMENDATIONS

- 50. Welsh Government should work with the relevant professional bodies to develop a comprehensive set of continuing professional development requirements to up- and re-skill the transport sector to deliver on the interventions discussed in this report.**
- 51. Government and Transport for Wales should publish details of the anticipated pipeline of work to deliver Wales’ sustainable transport network, to support the development of skills and resources within the supply chain.**

TABLE 7.2: SUMMARY OF RECOMMENDATIONS

PRINCIPLES FOR FUTURE ROAD INVESTMENT	
1	<p>The Panel recommends that in future, schemes that modify the form of a road should only be for these four purposes:</p> <ul style="list-style-type: none"> – Shifting trips to sustainable transport to reduce carbon emissions; – Reducing casualties where they are high, through small-scale changes; – Adapting roads to the impacts of climate change; – Supporting prosperity by providing access to development sites that will achieve high sustainable transport mode share.
2	<p>The Panel recommends that road schemes that are consistent with current policy (i.e. schemes that achieve mode shift, reduce casualties, adapt roads to impacts of climate change, or provide access to development sites that will achieve high sustainable transport mode share) should meet four conditions:</p> <ul style="list-style-type: none"> – The scheme should minimise carbon emissions in construction; – The scheme should not increase road capacity for cars; – The scheme should not lead to higher vehicle speeds that increase emissions; – The scheme should not adversely affect ecologically valuable sites

STRATEGIC INVESTMENT THEMES	
3	The Pinch Points Programme and Capital Upgrades Programme should not progress.
4	Capital works on the trunk road network should from now on be identified and prioritised in one of two ways: (a) as part of regional multimodal programmes to reduce car use and achieve modal shift to active travel and public transport; and (b) through trunk road programmes focussed on achieving the aims of the Wales Transport Strategy: for example, a Trunk Road Modal Shift Programme and a smaller scale Trunk Road Safer Speeds and Routes Programme.
5	Building on the good work of the TfW Metro Programmes, the lessons learnt from the South East Wales Transport Commission, Burns Delivery Unit and North Wales Transport Commission should be applied to support all regions of Wales. This regional multimodal approach should be the primary means by which trunk and regionally important local road capital schemes are identified and developed in future.
6	A Trunk Road Modal Shift Programme should be delivered by Welsh Government's Transport Department and Trunk Road Agents. The case for change for this programme should be to deliver modal shift in line with the Wales Transport Strategy target.
7	Local authorities should be encouraged to develop modal shift schemes for local A-roads, where these are most needed.

8	The Walking, Cycling and Horse-riding Assessment and Review should be carried out earlier in the appraisal process, and all road investment schemes should incorporate the aspirations of the latest Integrated Network Map for the scheme area. Where active travel paths are identified as part of a scheme, they should extend in either direction to the nearest settlement and should therefore be an early consideration in determining the extent of schemes.
9	All road investment schemes should be reviewed by the relevant Metro team to identify opportunities to achieve Metro objectives as part of the scheme
10	Updating of the 2013 Road Safety Framework should review the funding arrangements, resources and mechanisms by which safety-related highway schemes are prioritised and delivered across the highway network as a whole, to ensure that funding is directed to the most effective schemes. Funding for speed enforcement should also be reviewed to ensure it is sufficient to achieve the safety benefits of lower speed limits.
11	There should be a national and local review of speed limits on A, B and C roads to match the speed limit to the safe speed for the road layout. Such a review should take account of impacts on all road users, and also consider effects on noise, air quality, severance and public realm.
12	A Trunk Road Safer Speeds and Routes Programme should be developed, focused on corridors with the worst safety records, and implementing small-scale quick wins along whole routes to cut road deaths and injuries.

13	Differential acceleration lanes, climbing lanes, grade-separated junctions and carriageway widening or realignment should not be progressed, as they are unlikely to offer sufficient safety benefit for the cost.
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14	Financial savings from schemes not progressed as a result of the Panel's recommendations should be directed to deliver modal shift in order to achieve the aims of the Wales Transport Strategy, Net Zero Wales and the Programme for Government.
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 CARBON AND WELL-BEING THEMES

15	Government should strengthen its capability to undertake whole-life carbon assessment at an early stage in option development.
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16	Consideration should be given to a reduction in the national speed limit to compensate for construction carbon from road schemes that are necessary to build and assets that need to be replaced.
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17	<p>There should be regional carbon analysis to:</p> <ul style="list-style-type: none"> – understand how transport carbon emissions must change at regional level between now and 2030; – model options to achieve this change; and – assess the carbon consequences of potential projects within the regional context.
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18	Scheme promoters should seek early consultation and collaboration with NRW and other stakeholders to co-create biodiversity objectives for the scheme. This will aid the avoidance of impacts, as well as identifying habitats that could be maintained and enhanced, both locally and on a landscape scale. Funding of additional resource within NRW may be required to support this approach.
19	The British Standard for biodiversity net gain (BS 8683) should be used as a foundation to develop detailed guidance and requirements on maintaining and enhancing biodiversity and ecosystem resilience, in line with the commitment in the Wales Transport Strategy. Revision of WelTAG guidance may be required to support this new approach.
20	The scheme sponsor, or their Employer’s Agent (the body overseeing the project on behalf of the sponsor) should appoint ecologists who are independent of scheme designers, to ensure effective oversight and independent challenge of scheme design. This should be clear in contracts for both contractors and agents.
21	Roadside verges offer a significant opportunity to improve connectivity for nature. There should be a national policy decision to enable all local authorities to limit cutting of grass verges to certain times of year and to support the reduction in frequency of hedge-cutting to every three years where possible, whilst still meeting road safety requirements. The Trunk Road Agent should be provided with sufficient ring-fenced resources to protect and enhance the biodiversity and resilience of the soft estate.
22	There should be coordination between the Department for Economy and Department for Climate Change to ensure that sites supported for economic development are in locations that can achieve a high sustainable transport mode share.

23	Local and national government should explore approaches to economic regeneration and prosperity that are better aligned with the Welsh Government vision for a well-being economy. This may be more focussed on investment in the attractiveness and liveability of local town centres (including rural market towns); faster public transport and good active travel links to connect to main centres of economic activity; and digital accessibility including high-speed connections for rural areas and support for co-working spaces and remote working.
24	Our proposed regional multimodal approach to prioritising transport investment should take the Wales Transport Strategy well-being ambitions as a starting point, and identify priority actions to increase equality, improve health and support the Welsh language and culture.
25	Impacts on public health should be considered and reported in all WelTAG appraisals, covering road safety for all road users, air quality, noise pollution, physical inactivity, access to green space for mental well-being, severance, and health inequalities.
 POLICY THEMES	
26	Where congestion and lack of reliability are identified as problems on the trunk or local road network, regional multimodal programmes should analyse the determinants of present and future demand; and develop demand management interventions.
27	To achieve Welsh Government’s aim to reduce car mileage per person, ‘benefits-and-charges’ packages of measures should be developed at a regional level. Charges would influence whether and when people travel, while providing a revenue stream to finance major improvements in public transport, active travel and digital accessibility.

28	A Wales National Freight and Logistics Plan should be produced, as identified in the National Transport Delivery Plan. Freight policy should be better integrated into transport policy and delivery, and considered in the appraisal of transport policies, programmes and projects at national and regional level, including Regional Transport Plans.
29	Scheme development needs more active engagement with the freight transport industry, particularly in problem identification. Greater attention should be given to concerns of the road haulage sector in relation to provision of suitable lay-bys, parking facilities and rest areas for HGV drivers.
30	Asset renewals should meet the Panel's four conditions for road investment: embodied carbon should be minimised; the asset renewal and any associated schemes should not result in an increase in road capacity for cars; higher vehicle speeds that increase emissions; or adverse effects on ecologically valuable sites.
31	The Panel supports the recommendation of the Lugg Review for a Zero-Base Review of Major Asset Renewals and other maintenance expenditure, in order to prioritise safety-critical asset renewal and maintenance.
32	Asset renewals should only be combined with other schemes if the schemes are consistent with current policy (e.g., schemes to improve provision for active travel and public transport) and are already high priority, and hence likely to be implemented soon.

33	Our proposed regional multimodal approach to prioritising investment should be used to understand the needs of rural areas and support modal shift and reduced car dependency, through measures such as access to e-bikes, demand responsive public transport, improved access to public transport and car clubs.
34	Welsh Government should consider a pilot programme applying global best practice to manage and reduce the impact of through-traffic in rural towns and villages.
35	Technical Advice Note 18 (TAN18) on planning and transport should be updated soon.
36	Welsh Government should provide guidance on demand management to achieve modal share targets in new developments.
37	The Local Development Plan review process should remove undeveloped allocations that are in the wrong place, as well as identifying new sites in suitable locations.
38	Welsh Government should strategically review transport impacts and opportunities when selecting which sites from its own land portfolio to develop.
39	Welsh Government, with local authority partners, should create five to ten exemplar developments with high sustainable transport mode share and low car use.



TECHNICAL, APPRAISAL AND DELIVERY THEMES

40	Scheme development teams must ensure they understand and meaningfully apply the Well-being of Future Generations Act's five ways of working and seven national well-being goals.
41	Local well-being objectives should inform and be integral to scheme development. This will improve delivery of cross-cutting benefits, for example in rural areas.
42	Traffic modelling for scheme appraisal should use scenarios, and these should include a 'policy-consistent' scenario in which car mileage per person falls nationally by 10% by 2030.
43	Welsh Government should develop guidelines on how the targeted national 10% reduction in car mileage per person by 2030 could be applied in rural and urban areas.
44	Early stages of appraisal should be undertaken at programme level, and should not be repeated for individual schemes.
45	BCRs should be reported both with and without benefits from drivers' journey time savings.
46	Welsh Government should give guidance on a consistent method to assess safety benefits so that projects can be compared and the most effective ones, across different safety programmes, can be prioritised.
47	Welsh Government should consider creating national application annexes for design speed selection that would then lead to more appropriate road layouts in line with policy.

48	Roundabout designs for rural situations should be further developed in Active Travel Act Guidance.
49	The highway design profession should stimulate discussion amongst scheme designers to determine the appropriate design and assessment methods to estimate, and minimise, embodied carbon emissions in road infrastructure.
50	Welsh Government should work with the relevant professional bodies to develop a comprehensive set of continuing professional development requirements to up- and re-skill the transport sector to deliver on the interventions discussed in this report.
51	Government and Transport for Wales should publish details of the anticipated pipeline of work to deliver Wales' sustainable transport network, to support the development of skills and resources within the supply chain.

APPENDIX 1

SCHEME REVIEWS





1. A40 CARMARTHEN TO LLANDEILO CORRIDOR
2. A40 CARMARTHEN TO ST CLEARS CORRIDOR
3. A4076 HAVERFORDWEST
4. A48 CROSS HANDS TO PENSARN CORRIDOR
5. A48 NANTYCAWS JUNCTION IMPROVEMENT
6. M4 J38-43 PORT TALBOT
7. M4 J43-47 SWANSEA
8. A4042 SOUTHERN CORRIDOR, PONTYPOOL
9. CARDIFF EASTERN CORRIDOR
10. M4 J32-35 AND A470 CORYTON TO MERTHYR CORRIDORS
11. M4 J35-38 BRIDGEND
12. A40 MILLBROOK FARM, BRECON
13. A44 LLANGURIG TO ABERYSTWYTH
14. A470 ALLTMAWR (CHAPEL HOUSE FARM)
15. MID WALES SAFETY SCHEMES (15-21)
22. A487 DORGLWYD COMINS COCH
23. A487 RHIWSTAERDYWYLL
24. A494 MAESGAMMEDD ROAD JUNCTION IMPROVEMENT
25. A483 WREXHAM BYPASS JUNCTIONS 3 TO 6
26. A487 LLWYN MAFON
27. A494 LON FAWR RUTHIN/ CORWEN ROAD
28. A5 / A483 HALTON ROUNDABOUT
29. A55 / A494 NETWORK RESILIENCE STUDY
30. A55 JUNCTIONS 23 TO 24 CORRIDOR STUDY
31. A55 JUNCTIONS 29 TO 33B CORRIDOR STUDY
32. A55 JUNCTIONS 32 TO 33
33. A55 J33B EWLOE TO A494 QUEENSFERRY INTERCHANGE CORRIDOR STUDY
34. FLINTSHIRE CORRIDOR IMPROVEMENT
35. THIRD MENAI CROSSING
36. CYMMER CARRIAGEWAY IMPROVEMENTS, NEATH PORT TALBOT
37. NEWGALE COASTAL ADAPTATION AND A487 DIVERSION SCHEME
38. NORTHERN CITY LINK SUSTAINABLE TRANSPORT CORRIDOR, SWANSEA
39. A4046 ABERBEEG ROAD, BLAENAU GWENT
40. A469 TROEDRHIWFUWCH
41. CYNON GATEWAY NORTH
42. LLANHARAN BYPASS
43. SEVERN TUNNEL JUNCTION ACCESS
44. ABERGELE TOWN CENTRE CONGESTION IMPROVEMENT
45. LLANDUDNO CONGESTION IMPROVEMENT PHASE 4
46. CHESTER BROUGHTON GROWTH CORRIDOR



SUMMARY

A WelTAG Stage 1 study examined a 24km length of the A40 trunk road between Rhosmaen roundabout at Llandeilo to the east, and Pensarn roundabout at Carmarthen to the west.

The study identified packages of options to take forward to WelTAG Stage 2, relating to resilience of highway infrastructure to soil erosion and flooding; road safety; public rights of way; and active travel. Some of the options involve road widening and modifications to highway cross-section and alignment. The study also identified a package of measures for Pensarn roundabout, to develop as a separate WelTAG Stage 2 study. These included active travel measures and bus priority but also substantial additional private car capacity at the roundabout and a new link road.

The Panel considers that the case for change has been made in relation to road safety because some sections of the A40 have poor collision records. The case for change has also been made in terms of resilience of the highway infrastructure to soil erosion and flooding. There is also a case for intervention to improve provision for active travel and public transport. However, the Panel does not consider that the case for change to reduce congestion at Pensarn roundabout has been demonstrated.

Options that improve safety but do not increase capacity for private cars or vehicle speeds could proceed to the next stage of appraisal. These options include speed limit reductions, speed enforcement cameras and provision or improvement of vehicle restraint systems. These options would involve minimal embodied carbon from construction. They would be largely within the current A40 boundary and would therefore be unlikely to have significant adverse ecological impacts.

Options that improve provision for active travel and public transport could proceed to the next stage of appraisal. Options that improve resilience of existing highway infrastructure to soil erosion and flooding could also proceed, but should be focussed on keeping the existing highway asset in a state of good repair, rather than upgrades.

Options that would increase capacity for private cars or involve significant embodied emissions should not proceed to the next stage of appraisal. These are road widening to facilitate overtaking; potentially modifications of the highway cross-section; increases in capacity at Pensarn roundabout; and a new link road connecting White Mill 5km to the east of Carmarthen on the A40 with the A40 west of Carmarthen. Realignment of the highway at Wern Bends would only be appropriate if it proves impossible to protect the existing alignment of the road.

Consultation with the relevant bodies should be undertaken at an early stage to develop solutions that avoid ecological impacts as well as identifying opportunities for the maintenance and enhancement of biodiversity.

The Panel makes the following recommendation:

Welsh Government could continue to support the A40 Carmarthen to Llandeilo study but with changes to scope to exclude scheme elements that would increase capacity for private cars or increase vehicle speeds.

1. Study description

The 24km length of the east-west A40 between Rhosmaen roundabout at Llandeilo and Pensarn roundabout at Carmarthen is mainly single-carriageway, but with 3km of dual-carriageway at the western end near Carmarthen. The speed limit is predominantly 60mph on the single-carriageway sections but with a lower limit in places, and 70mph on the dual-carriageway.

A WelTAG Stage 1 study has identified five work packages to take forward to two proposed WelTAG Stage 2 studies. The first Stage 2 study would develop packages of options relating to resilience of highway infrastructure to soil erosion and flooding; road safety; public rights of way; and active travel. The options include road widening and modifications to highway cross-section and alignment.

The second Stage 2 study would develop a package of options relating to Pensarn roundabout. The options include provision for active travel and bus priority at the roundabout; increased capacity at the roundabout; and a new link road between the A40 east of Carmarthen and the A40 west of Carmarthen.

2. Information reviewed

The following information has been considered in evaluating this scheme:

- WelTAG Stage 1 Report: A40 Llandeilo to Carmarthen (October 2020)

A site visit also took place.

The Panel understands a WelTAG Stage 2 Report is in development but was not available for review.

3. Objectives

The objectives are:

- Improve safety for vehicle users, without having a significant adverse impact on the environment
- Improve highway resilience within the scheme area
- Improve active travel connectivity and / or minimise the safety risk for active travel users
- Improve the operational efficiency of the strategic highway network, without having a significant adverse impact on the environment
- Consider the future-proofing of the scheme area to enable delivery of emerging aspirational strategic and local schemes relating to public transport and electric vehicles

4. Has the case for change been made?

The 2020 WelTAG Stage 1 report identifies sub-standard infrastructure, different cross-sections (some below and some to standard), a lack of overtaking opportunities, absence of pedestrian crossing facilities, high traffic speeds and safety issues, and flooding and other resilience issues. There is currently limited active travel provision east of White Mill, approximately 5km east of Carmarthen.

In relation to safety, there were 63 personal injury collisions in the five-year period between October 2014 and September 2019, of which one was fatal, 17 were serious and 45 were slight.

Vehicle speeds are inappropriately high at five roundabouts, five crossroads and three groups of side road junctions; and highway vertical and/or horizontal alignment causes issues for visibility

throughout the route and at junctions. There is limited provision of vehicle restraint systems and some of it is sub-standard. Laybys are also sub-standard.

The collision rate, relative to traffic flow, is less than expected for this type of road, when taken across the whole length: 12.1 collisions per hundred million vehicle kilometres (HMKM), compared to the predicted 16.9 per HMKM from Department for Transport Cobalt software for a single-carriageway A road with a speed limit over 40mph. However, there are some sections where the collision rate is higher than expected. The most marked are between Pen-y-Banc and Dryslwyn (28.6 per HMKM) and between White Mill and Glangwili (24.0 per HMKM). Notably, the collision rate is significantly less than expected, and less than in adjacent sections, between Pontargothi and White Mill (6.6 per HMKM). This section has a 40mph speed limit, whereas elsewhere on the single-carriageway section the speed limit is 60mph. The Glangwili to Pensarn dual-carriageway section also has a higher collision rate than expected (17.9 per HMKM, which is greater than the Cobalt estimate for speed limits over 40mph of 7.5).

There are some resilience issues due to soil erosion caused by the River Towy. This is a particular issue at the Wern Bends, where the river is close to the road. In some areas, highway drainage and surfacing are poor and there is a flood risk.

There is inadequate provision for active travel, and the road causes severance in some settlements. Bus services are infrequent (less than one per hour in some locations) and bus stops are unmarked and do not have shelters or bus laybys.

The Panel considers that there is a case for change relating to safety, resilience of the highway, and provision for active travel and public transport.

The Panel does not consider that the case for change to reduce congestion at Pensarn roundabout has been made.

5. Are the objectives aligned with current policy?

The objectives relating to safety and active travel are well-aligned with current Welsh Government policies but others, and the approach taken to applying them, have resulted in identification, development and selection of options that would increase private car trips, which is counter to the modal shift targets of Wales Transport Strategy and to the car trip reduction requirements of Net Zero Wales.

The second objective, to improve highway resilience, appears to justifiably refer to resilience of the infrastructure to problems of soil erosion and flooding.

Should this study proceed further a quick refresh of the objectives would be necessary.

6. Did the scheme development process examine all appropriate options?

The study sets out a longlist of 66 options grouped under seven headings: active travel (7 options); public transport (9); vehicle infrastructure (32, note that these schemes are about highway rather than vehicle improvements); highway resilience (6), smart highways (6); freight (3); and managing demand (3).

At the shortlist stage 60 options were retained and regrouped into 10 work packages (WPs) as follows: WP1, road safety; WP2, highway resilience, drainage and surfacing; WP3, capacity at Pensarn roundabout; WP4, public rights of way; WP5, active travel; WP6, road taxation; WP7, electric vehicle strategy; WP8, South-West Wales Metro public transport; WP9, travel demand strategy; and WP10 freight strategy. Some options appear in more than one work package.

The review group recommended proceeding with two WelTAG Stage 2 studies. The first would be for the A40 Llandeilo to Carmarthen scheme area, and would include options to improve highway resilience (WP2), road safety (WP1) and active travel (implied, but not explicit, WP4 and WP5). The implication of the wording of the review group recommendation is that the highway resilience measures would be the primary focus. The second WelTAG Stage 2 study would consider capacity at Pensarn roundabout and its approaches (WP3), which has a relation with the Carmarthen Western Gateway WelTAG Stage 2 study.

There does not appear to be an intention for the Trunk Road Agent to take forward WP6-10.

The components of WP1-5 are as follows:

Work Package 1 – Road safety (35 schemes)

- AT2 - Improvements to crossing opportunities within key settlements
- AT6 - Improvements to active travel linkages to the bus stops
- AT7 - Introduction of signage warning drivers of active travel users
- PT3 - Improvements to the existing bus stop layby provision
- VI1 - Introduction of targeted speed limit restrictions along the A40
- VI2 - Introduction of speed enforcement cameras
- VI3 - Rationalisation and formalisation of laybys within the scheme area
- VI4 - Road safety improvement measures at the Rhosmaen roundabout
- VI5 - Road safety improvement measures at the Carmarthen Road crossroads
- VI6 - Road safety improvement measures at the Pen-y-banc crossroads
- VI7 - Road safety improvement measures at the Broad Oak crossroads
- VI8 - Road safety improvement measures at the Dryslwyn crossroads
- VI9 - Road safety improvement measures at the Llanegwad priority junctions
- VI10 - Road safety improvement measures at the Pontargothen priority junctions
- VI11 - Road safety improvement measures at the Nantgaredig crossroads
- VI12 - Road safety improvement measures at the White Mill priority junctions
- VI13 - Road safety improvement measures at the Abergwili roundabout
- VI15 - Road safety improvement measures at the Heol Llangynnwr roundabout
- VI16 - Road safety improvement measures at the Pensarn roundabout
- VI17 - Road safety improvement measures at the minor road junctions
- VI18 - Rationalisation of junctions
- VI19 - Rationalisation and improvements to the access and egress arrangements at the White Mill Filling Station
- VI20 - Rationalisation and improvements to the access and egress arrangements at the Cottage Inn
- VI21 - Introduction of highway safety features (such as vehicle restraint systems)
- VI25 - Targeted road widening to facilitate formal overtaking opportunities at appropriate locations within the scheme area
- VI27 - Introduction of street lighting, where appropriate

- VI29 - Improved road signage strategy within scheme area
- VI30 - Provision of a new service station facility adjacent to the A40
- HR3 - Improvements to the highway cross-section to align with current standards, where possible
- HR5 - Realignment of A40 at the Wern Bends
- SH1 - Introduction of vehicle-activated warning signs
- SH2 - Introduction of variable information boards
- SH6 - Introduction of a dynamic road user charging regime for visitors to the area
- FR2 - Improved signage relating to presence of heavy goods vehicles (HGVs)
- FR3 - Introduction of signage discouraging HGVs from utilising the scheme area

Work Package 2 - Highway resilience (5 schemes)

- HR2 - Improvements to highway safety features (such as vehicle restraint systems)
- HR3 - Improvements to the highway cross-section to align with current standards, where possible
- HR4 - Improved highway drainage and / or surfacing, where appropriate
- HR5 - Realignment of A40 at the Wern Bends
- HR6 - Protect the highway integrity of the existing alignment of the A40 at the Wern Bends

Work Package 3 – Pensarn roundabout (6 schemes)

- AT4 - Improvements to the Carmarthenshire County Council ERM routes, where appropriate
- PT6 - Introduction of bus priority infrastructure at appropriate locations within the scheme area
- VI16 - Road safety improvement measures at the Pensarn roundabout
- VI23 - Capacity improvement measures at the Pensarn roundabout
- VI24 - Strategic link road to the south and east of Carmarthen, linking White Mill (east) to the A40 west of Carmarthen, via the A48
- VI31 - Improved signage to the food and drink facilities accessed from the Pensarn roundabout

Work Package 4 – Public rights of way (4 schemes)

- AT1 - Rationalisation of PRoW network adjoining the A40 within the scheme area
- AT2 - Improvements to crossing opportunities within key settlements
- AT6 - Improvements to active travel linkages to the bus stops
- AT7 - Introduction of signage warning drivers of active travel users

Work Package 5 – Active travel provision (4 schemes)

- AT4 - Improvements to the Carmarthenshire County Council Existing Route Map (ERM) routes, where appropriate
- AT5 - Development of the Carmarthenshire County Council Integrated Network Map (INM) routes
- AT6 - Improvements to active travel linkages to the bus stops

- VI27 - Introduction of street lighting, where appropriate

The Panel's assessment of these options is set out below. We consider first the work packages that would form the basis for a WelTAG Stage 2 study of the A40 between Llandeilo and Carmarthen, in order of priority as viewed by the review group (WP2, WP1, WP4 and then WP5). We then consider WP3, which would form the basis for a WelTAG Stage 2 study for Pensarn roundabout.

In Work Package 2 (highway resilience), options HR2 and HR6 would be consistent with current policy, and option HR4 may be. Option HR5, realignment of the A40 at the Wern Bends, should be considered a last resort, as it would involve significant earthworks and embodied carbon, and should be pursued only if it is not possible to protect the existing alignment of the road at the Wern Bends. Option HR3, modifications of the highway cross-section to align with current standards, would have the effect of encouraging vehicles to drive faster, leading to greater carbon emissions, and could also involve significant embodied carbon in construction; the Panel recommends that it should not be considered further.

In Work Package 1 (road safety), the Panel considers that the following measures are well-aligned with current policy: AT2, AT6, PT3, VI1, VI2, VI3, VI21, VI29. In particular, speed limit reductions and enforcement (VI1 and VI2) may have significant safety benefit at low cost, as is demonstrated by the low collision rate in the section of the A40 with a lower (40mph) speed limit. The options for road safety measures at junctions (VI4-VI20) are in most cases unlikely to offer significant safety benefit relative to their cost, and any that are identified as potentially worthwhile should only proceed if they are among the best of safety schemes awaiting funding. There are three measures that the Panel recommends should not be considered further within this work package: they are road widening to facilitate overtaking (VI25); modifications of the highway cross-section (HR3); and realignment at Wern Bends (HR5). These three measures would have the effect of encouraging vehicles to drive faster, leading to greater carbon emissions, and could also involve significant embodied carbon in construction.

In Work Packages 4 and 5 (public rights of way and active travel provision), most options are well-aligned with current policy. Option AT1, rationalisation of the public rights of way network, appears to have the intention of re-routing public rights of way where they currently join the A40, unless there is already suitable provision for pedestrians. The Panel recommends that rather than making public rights of way less convenient, the aim should be to provide additional footways on the A40 where needed to facilitate use of the existing public rights of way network.

In Work Package 3 (Pensarn roundabout), options AT4 and PT6 would be consistent with current policy. Option VI6, which is described as a road safety improvement scheme but with no details, may be consistent with current policy. Options VI23 (capacity improvement) and VI24 (new link road) would increase private car capacity, resulting in induced traffic and increased carbon; the Panel recommends that these two measures should not proceed.

7. What is the effect on carbon dioxide emissions?

The effect of the scheme on carbon dioxide emissions has not yet been quantified. Carbon dioxide emissions due to land-clearance and construction would inevitably increase if the realignment at Wern Bends, road widening and link road were progressed.

The link road and increased capacity at Pensarn roundabout would result in increased carbon emissions from induced traffic.

8. Will the scheme be good for people and communities?

Options in Work Packages 4 and 5 focus on active travel and public transport and may make it easier for people who do not have access to a car to reach services. New crossing facilities within settlements may also reduce severance. Carmarthenshire County Council is currently developing a bus corridor improvement strategy for the county, and their assessment has identified the A40 between Carmarthen and Llandeilo as a corridor where bus stops are in poor condition. There would be efficiencies in working with the local authority to progress the bus stop improvements on the A40.

There would be some safety benefits, particularly from measures that reduce speeds. As noted above, the collision rate within the Pontargothi to White Mill section, which has a 40mph speed limit, is much lower than the collision rate in adjacent sections that have a 60mph limit. This provides valuable evidence within this corridor for implementing targeted speed limit reductions (VII). It indicates that the selection of the correct safety measures could have a significant effect on reducing risk.

The Llandeilo Air Quality Management Area (AQMA) and the Carmarthen AQMA lie adjacent to the scheme. Measures that increase private car capacity (the link road and increase in capacity at Pensarn roundabout) would potentially lead to induced traffic, which could worsen air quality at either end of the route in Llandeilo and Carmarthen.

9. Will the scheme be good for the environment?

Environmental impacts have not yet been assessed. This section of the A40 lies on the north side of the River Towy for its whole length and is always within approximately 2km of the river. The River Towy is a Site of Special Scientific Interest and Special Area of Conservation. There are a number of ancient woodlands adjacent to the A40 and these are of particular note near the Pen-y-banc Crossroads and White Mill. The WelTAG Stage 1 Report notes that there is a significant level of uncertainty relating to the potential interventions, and it appears as though it is for this reason that the WelTAG Stage 1 study has not considered these environmental constraints in more depth, even at this stage. However, there would be a risk of adverse impact on sites that are designated for their environmental value from road widening, the link road, and measures at Wern Bends.

A significant proportion of the scheme area is located within designated flood zones, with potential for impacts on flood risk.

The scheme does not affect any nationally or locally designated landscapes.

10. Will the scheme be good for places and the economy?

At this stage neither the costs nor the economic impacts of the options have been estimated.

11. Will the scheme be good for culture and the Welsh language?

No significant impacts on use of the Welsh language have been identified. There are six listed buildings and one registered park and garden close to the scheme. Approximately 600 metres of the scheme between the Glangwili roundabout and Heol Llangynnwr roundabout is within or close to the Carmarthen Town and North Carmarthen conservation areas.

12. How robust is the case for the scheme to different futures?

The scheme is in an area that is vulnerable to flooding and includes improvements to alleviate this. The case for these measures would be stronger if extreme weather events become more common in future.

Options that include larger-scale construction of new infrastructure would increase future maintenance costs.

13. Conclusion

Some of the options that have been shortlisted for further consideration at WelTAG Stage 2 would improve road safety whilst not increasing capacity for private cars or vehicle speeds. They would involve minimal embodied carbon and would be largely within the current A40 boundary and therefore unlikely to have significant adverse ecological impacts. The Panel particularly notes evidence from the section between Pontargothi and White Mill that a lower speed limit (40mph) may significantly reduce collisions and recommends that consideration is given to applying this measure elsewhere along the corridor.

While some road safety measures would be low cost, others (notably the road safety measures at junctions) may not offer significant safety benefit relative to their cost, and it would therefore only be appropriate to proceed with them if it is demonstrated that they are among the best of safety schemes awaiting funding.

Some of the highway resilience measures are, in essence, maintenance or renewals that would keep the highway asset in a state of good repair, as opposed to asset upgrades. However, another measure that is included in the highway resilience package, modification of the highway cross-section, could potentially represent a major change in the highway layout. It could encourage increased speeds, leading to greater carbon emissions.

Several measures should not be considered further because they could involve significant embodied carbon in construction, would encourage higher speeds, and could generate induced traffic. These are road widening to facilitate overtaking; modifications of the highway cross-section; realignment at Wern Bends (unless it is impossible to protect the existing alignment from erosion); increasing capacity at Pensarn roundabout; and construction of a new road between White Mill on the A40 east of Carmarthen and the A40 west of Carmarthen.



SUMMARY

The proposed scheme involves a set of measures on a 15km dual-carriageway section of the A40 between the Traveller's Rest Junction, west of Carmarthen, and the St. Clears roundabout. Most of the proposed measures are relatively small in scale. They include closure of minor road junctions; adjustments to geometry of minor road junctions; restrictions on U-turns; a speed limit reduction at the western end of the route; some enhancements to active travel and infrastructure for bus users; and modifications to laybys to meet DMRB standards. However, one option proposed is a more substantial grade-separated junction at Meidrim.

The proposed scheme is mainly seeking to improve safety. This length of the A40 has an overall collision rate comparable to the national average, but there are some sections where collision rates are significantly higher. There are five collision cluster sites, of which four are located at junctions. Twelve collisions (from a total of 66) over a 10-year period involved a cross-carriageway manoeuvre at a minor road junction. The Panel considers that there is a case for intervention to improve road safety, and that the proposed small-scale measures are appropriate to achieve this aim.

Although the layout of minor road junctions appears to be a factor in some collisions, the evidence also points to excessive speed, unsafe manoeuvres and driver error as more frequent contributory factors. The Panel therefore also considers that a speed limit reduction from 70mph to 50mph over the entire length of the road between Carmarthen and St. Clears, with accompanying enforcement, could achieve further safety improvements. This could also potentially avoid the need for some small-scale infrastructure measures.

The rationale for a grade-separated junction at Meidrim is to provide sufficient capacity for forecast traffic growth. Traffic forecasts and modelling carried out in 2017/18 predicted that by 2034, traffic flows on the minor arm of the junction would exceed DMRB standards. Given Welsh Government's aim to reduce car mileage per person by 10% by 2030, this forecast is now in doubt and a grade-separated junction is not an appropriate option.

If the scheme proceeds without the Meidrim grade-separated junction, embodied carbon from construction can be minimised. The scheme excluding the grade-separated junction is not likely to result in increases in carbon emissions from induced traffic, and if the speed limit is reduced there would be emissions savings. The scheme would be largely within the current A40 boundary and would therefore be unlikely to have significant adverse ecological impacts.

It would be beneficial to review and update the objectives to reflect the Sustainable Transport Hierarchy, and also to recognise the needs of freight users as this is an important corridor for freight from the Pembrokeshire ports. This should influence option selection and, through that, result in a scheme with more impact on modal shift and decarbonisation.

The Panel makes the following recommendation:

Welsh Government could continue to support the A40 Carmarthen – St. Clears scheme. Objectives should be revised to reflect the Sustainable Transport Hierarchy and the needs of freight users. A speed limit reduction for the whole route (with enforcement measures) should be considered. A grade-separated junction at Meidrim should not be progressed because the case for change is misaligned with Welsh Government's aim to reduce car mileage.

1. Scheme description

The A40 is part of the trunk road network in South Wales, carrying both local traffic and longer distance traffic to the Pembrokeshire ports. The WelTAG Stage 2 study focussed on the section between Carmarthen (Travellers Rest, listed as Junction 5 in the WelTAG Stage 2 Report) and the St. Clears roundabout (listed as Junction 41), a distance of approximately 15km. This section is dual-carriageway, with 37 junctions and accesses. While some of the minor road junctions and accesses only allow left-in / left-out vehicle movements, others allow all movements, and there are numerous crossovers between the A40 eastbound and westbound carriageways. Annual Average Daily Traffic is between 20,000 and 25,000 vehicles in each direction, with heavy goods vehicles making up around 5% of vehicles. Agricultural vehicles also regularly travel along this section of the A40.

The proposed scheme involves a range of interventions across the 37 junctions including junction closures, adjustments to geometry, restrictions on U-turns, and an option to provide a grade-separated junction at Meidrim (Junction 14). Layby closures and improvements have also been proposed as options, as has a speed limit reduction in St. Clears.

The scheme development process also considered active travel and public transport interventions. In terms of active travel, some sections already have shared use routes, and separate funding to extend these between St. Clears and the Bancyfelin Junction (Junction 19) is close to secured. The scheme includes proposals to complete the active travel route between Carmarthen and St. Clears by providing infrastructure between the Meidrim and Bancyfelin junctions (J14-19). Improvements to two locations where public rights of way cross the A40 are also proposed.

Public transport on the route is affected by the lack of adequate (and safe) bus stops, as well as the bus routes only passing eastbound through Bancyfelin. Safety concerns for westbound buses turning right out of the Bancyfelin Junction have led operators to route directly along the A40 instead. Bus stop improvements along the A40 are to be considered at WelTAG Stage 3, including a consideration of the potential for provision of additional signs activated when buses are waiting to turn across the A40.

A final scheme design has yet to be completed, but the selected options have been grouped in four ways defined as follows:

- No grade-separated junction at Meidrim, at-grade active travel crossings
- No grade-separated junction at Meidrim, grade-separated active travel crossings
- Grade-separated junction at Meidrim, at-grade active travel crossings
- Grade-separated junction at Meidrim, grade-separated active travel crossings

The estimated costs are £15-18 million for the options without a grade-separated junction at Meidrim; and £25-28 million for the options with a grade-separated junction at Meidrim.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- A40 Meidrim Junction Improvement: Investigations into Safety Improvements (Revised) (June 2018)
- Draft WelTAG Stage 1 IAR: A40 Carmarthen to St. Clears (May 2020)
- WelTAG Stage 1 Report: A40 Carmarthen to St. Clears (November 2020)
- WelTAG Stage 2 Report: A40 Carmarthen to St. Clears (November 2021)
- Carmarthenshire Well-being Plan: The Carmarthenshire We Want - 2018-2023

Points of clarification were addressed in written correspondence with the scheme sponsor. A site visit also took place.

3. Objectives

The objectives are:

- Improve safety for vehicle users, without having a significant adverse impact on the environment
- Minimise the safety risk for active travel users within the scheme area
- Improve access by all transport modes, without having a significant adverse impact on the environment
- Improve the operational efficiency of the strategic highway network, without having a significant adverse impact on the environment
- Consider the future-proofing of the scheme area to enable delivery of emerging aspirational strategic and local schemes relating to public transport and electric vehicles

4. Has the case for change been made?

The scheme is mainly seeking to improve safety. While this length of the A40 has an overall collision rate comparable to the national average, there are certain sections where collision rates are significantly higher. Further, there are five collision cluster sites, of which four are located at junctions; these cluster sites have resulted in fatalities in recent years. Twelve collisions (from a total of 66) over a 10-year period involved a cross-carriageway manoeuvre at a minor road junction. Although the layout of minor road junctions appears to be a factor in some collisions, the evidence also points to excessive speed, unsafe manoeuvres and driver error as more frequent contributory factors. Stakeholders have also highlighted safety concerns with turning agricultural vehicles, given their length and low speed.

The provision for active travel between St. Clears and Carmarthen is discontinuous, and infrastructure for bus services between Carmarthen and St. Clears is also inadequate.

The Panel also notes that the proposed West Wales Hospital could increase traffic flows along this section of the A40, adding increased weight to the case for change.

5. Are the objectives aligned with current policy?

There is reasonable alignment between the objectives and current policy, particularly in relation to safety and improving access by all modes. The scheme may be largely effective in meeting the safety objectives for motorised users and active travel users. It may only be partially effective in improving access by all modes: there would be improvements for pedestrians and cyclists, but less improvement for bus users.

The scheme (as currently proposed) does not address the last objective of future-proofing for schemes relating to public transport and electric vehicles.

Whilst it is intimated, the objectives do not specifically address the needs of freight users. A rail freight strategy was proposed at WelTAG Stage 1, but this has not been taken forward to WelTAG Stage 2, either as part of this scheme or as a separate study. The Panel suggests that the needs of freight users should be considered further at the next stage, should the scheme proceed.

The Panel suggests it would be beneficial to review and update the objectives, and to be explicit about applying the Sustainable Transport Hierarchy. This would influence option selection and, through that, result in a scheme with more impact on modal shift and decarbonisation.

6. Did the scheme development process examine all appropriate options?

A longlist of 70 options was identified and filtered (at WelTAG Stage 1 and WelTAG Stage 2) to a shortlist of 11. Although two non-transport options were included in the longlist, the shortlist options were all transport-related, comprising the following:

- Four active travel options: improvements to existing provision; completion of an active travel route between Carmarthen and St. Clears; and enhanced crossings for two public rights of way. The Panel's view is that this is sufficient consideration of active travel options, and that the options are complementary to active travel investment by Carmarthenshire County Council.
- Two public transport options: review and improvement of bus stops along the A40; and warning signs that activate when buses are waiting to turn across the A40. The Panel suggests greater consideration is needed of options to enable westbound buses to serve Bancyfelin, especially in light of the development of the Carmarthen Strategic Bus Corridors and South West Wales Metro.
- One option relating to speed limit reduction from 70mph to 50mph for westbound traffic between J37 and J41. Speed limit reduction for the whole route was ruled out because the appraisal found that speed was not a major factor in collisions, and because a lower speed limit would increase journey times and have economic journey time disbenefits. However, evidence from the WelTAG Stage 1 IAR and Meidrim Junction Improvement Study conflicts with this assessment on safety and therefore further work is required. Speed reductions would also improve the attractiveness of active travel routes where they lie adjacent to the carriageway, and reduce carbon emissions.
- Three vehicle infrastructure options: closure of minor junctions; adjustments to junctions; and changes to restrictions on cross-carriageway movements. As part of these options, a grade-separated junction at Meidrim is considered. The inclusion of this option was justified on the basis that it would provide sufficient capacity for forecast traffic growth. The Panel considers that this is counter to current policy aims to reduce traffic. Given this, plus the embodied carbon from construction, the view of the Panel is that a grade-separated junction at Meidrim is not an appropriate option.
- A final vehicle infrastructure option would close some laybys and provide improvements to the remaining laybys to current Design Manual for Roads and Bridges standards.

Although none of the above options explicitly tackle the resilience of the A40 when disrupted, it would be anticipated that there would be a reduction in the number of collisions, and therefore a reduction in the number of occasions when alternative routes are needed.

Whilst a range of measures have been considered, the Panel considers that objectives more aligned to current policies may have led to more measures associated with active travel and public transport being identified and taken forward. They would also likely have led to consideration of travel demand measures and non-transport measures that avoid or reduce the need to travel.

While acknowledging that there would be benefits in reducing cross-carriageway movements, a grade-separated junction at Meidrim would result in a significant increase in emissions from embodied carbon. With Welsh Government having an aim for a 10% reduction in car mileage per person by 2030, traffic volumes turning at junctions are unlikely to change in the future to the extent that significantly increased junction capacity is required.

Given the challenges with bus access to the community in Bancyfelin, an at-grade roundabout at Meidrim (as considered in a previous study of the junction) may be appropriate to include as an option. This would be likely to have lower embodied carbon than a grade-separated junction.

The Panel also encourages further development of options to allow westbound bus services to access Bancyfelin. This option development should be carried out in consultation with local stakeholders, Carmarthenshire County Council, and the South West Wales Metro team.

The Panel also notes that speed limit reductions are only proposed between J37 and J41 in St. Clears. Evidence from the Meidrim Junction study and WelTAG Stage 1 study found that speeds were higher and a more significant cause of collisions than demonstrated at WelTAG Stage 2. The Panel is also aware that local stakeholders are supportive of a lower speed limit for the whole route between Carmarthen and St. Clears. Therefore, the Panel consider the option of a speed limit reduction for the whole route between Carmarthen and St. Clears should be progressed if the scheme proceeds to WelTAG Stage 3. Measures for enforcement should also be re-evaluated. The Panel takes the view that the disbenefit of slightly longer journey times from a lower speed limit is not a sufficient reason to forego the benefits of fewer collisions; better overall route resilience; lower carbon dioxide emissions; and increased attractiveness of the active travel route for cyclists and pedestrians where it lies adjacent to the carriageway.

7. What is the effect on carbon dioxide emissions?

The effect on carbon dioxide emissions has not been fully assessed at this stage, with only a qualitative evaluation included in the WelTAG Stage 2 Report. The view of the Panel is that there would be a slight increase in embodied carbon emissions as a result of the scheme without the grade-separated junction at Meidrim, with more substantial embodied emissions if it were included.

The opportunities for carbon emissions reduction in use, from measures not yet considered such as a lower speed limit, should be considered at WelTAG Stage 3, if the scheme proceeds.

8. Will the scheme be good for people and communities?

The proposed scheme would bring some safety benefits for all users of the A40, by reducing the opportunity for unsafe cross-carriageway manoeuvres and providing a separated active travel route. A speed limit reduction along the route could offer further safety benefits. Proposed improvements to crossing points for public rights of way would help reduce severance.

The community in Bancyfelin would benefit from bus services in both directions routing through the village: infrastructure changes to assist this are not part of the current scheme but should be given further consideration. There are five noise priority areas, but the appraisal does not include an analysis of any effects of the scheme on noise: further analysis of this, including mitigation, would be appropriate at WelTAG Stage 3. Air quality is not an issue along this section of the A40, but the proposed reduction in the speed limit in St. Clears may result in a slight improvement.

9. Will the scheme be good for the environment?

No detailed environmental assessment has been undertaken, although most planned interventions (with the exception of the grade-separated junction at Meidrim) would be within the current A40 highway boundary. The Panel notes that a full assessment would occur during WelTAG Stage 3.

10. Will the scheme be good for places and the economy?

This section of the A40 has a strategic role in the Welsh economy, through servicing the ports in Pembrokeshire. Improvements in safety would lead to fewer collisions, improving the reliability of traffic flows and benefiting freight movements to and from the Pembrokeshire ports. This may be a slight benefit to the national economy.

Improvements to layby provision may give better opportunities for HGV drivers to take their statutory breaks, as existing sites do not safely accommodate HGVs. WelTAG Stage 2 highlights

an ongoing study by Carmarthenshire County Council on lorry parking facilities across the county, and the A40 scheme should ensure it is consistent with this wider strategy.

The value for money of the scheme has not yet been calculated.

11. Will the scheme be good for culture and the Welsh language?

The Panel notes that the Welsh-medium primary school at Bancyfelin could potentially benefit from the active travel improvements through the village. No impact on culture has been identified.

12. How robust is the case for the schemes to different futures?

The introduction of a lower speed limit could reduce the requirement for engineering interventions at some locations, hence reducing the cost of the scheme.

A grade-separated junction at Meidrim would create future maintenance liabilities which are larger than current liabilities.

13. Conclusion

There is a case for intervention to improve road safety on the A40 between Carmarthen and St. Clears, and the small-scale interventions that are proposed as part of this scheme are appropriate to achieve this aim. However, a speed limit reduction from 70mph to 50mph, ruled out at the shortlisting stage, could deliver further safety benefits. It could also improve route resilience (both by reducing the risk of disruption caused by collisions, and by improving vehicle flow at peak periods); reduce carbon emissions; and make the active travel route alongside the A40 more attractive. A lower speed limit was ruled out because it would have journey time disbenefits. The Panel consider that in the context of current Welsh Government policy, greater weight in scheme appraisal should be placed on the multiple benefits of lower speeds.

The rationale for a grade-separated junction at Meidrim is to provide sufficient capacity for forecast traffic growth. Traffic forecasts and modelling carried out in 2017/18 predicted that by 2034, traffic flows on the minor arm of the junction would exceed DMRB standards. Given Welsh Government's aim to reduce car mileage per person by 10% by 2030, this forecast is now in doubt and a grade-separated junction is not an appropriate option. However, given challenges with bus access to the community in Bancyfelin, a roundabout at Meidrim may be an appropriate option to consider.

If the scheme proceeds without the Meidrim grade-separated junction, embodied carbon from construction can be minimised. The scheme excluding the grade-separated junction is not likely to result in increases in carbon emissions from induced traffic, and if the speed limit is reduced there would be emissions savings. The scheme would be largely within the current A40 boundary and would therefore be unlikely to have significant adverse ecological impacts.



SUMMARY

The WelTAG Stage 1 A4076 Haverfordwest Congestion Study has recommended online highway modifications and active travel and public transport improvements, mainly within Haverfordwest, to take forward to WelTAG Stage 2. Two options for a bypass of Haverfordwest were considered in the WelTAG Stage 1 study but were not recommended to proceed.

The case for change is based on congestion arising from local traffic flows and seasonal traffic due to tourism. There are also concerns around air quality, noise and pedestrian safety. Committed developments may, without effective improvements in sustainable transport, increase car use in Haverfordwest. Current sustainable transport options are generally not attractive.

The Panel considers that the case for change has been made.

The Panel agrees with the WelTAG Stage 1 Report recommendation not to progress the two bypass options, and considers the remaining options are consistent with the Wales Transport Strategy. The remaining options would potentially be aligned with the Sustainable Transport Hierarchy, so long as priority is given to modifications to active travel and public transport. Online modifications to the road network should be focused on improving traffic flow for buses and provision for pedestrians and cyclists. Consideration should also be given to demand management.

The scheme would support a shift to sustainable modes of travel. The carbon emissions associated with construction are likely to be small. There is the potential for reductions in carbon emissions in use, due to modal shift from car to sustainable modes and also due to smoother traffic flow, which would improve vehicle efficiency. No adverse ecological impacts have been identified at this stage for the options taken forward to WelTAG Stage 2.

The Panel makes the following recommendation:

Welsh Government could continue to support the A4076 Haverfordwest Congestion scheme as it has the potential to deliver modal shift and a reduction in car use. The bypass options should not be progressed, and the Sustainable Transport Hierarchy must provide the foundation for the WelTAG Stage 2 appraisal.

1. Study description

The WelTAG Stage 1 Haverfordwest Congestion Study identified options to reduce congestion on major routes around the town centre. The options included do-minimum; construction of a bypass; sustainable transport measures; and online modifications at junctions. The WelTAG Stage 1 Report recommended that all options except a bypass should be progressed to WelTAG Stage 2.

Haverfordwest is one of the main towns in Pembrokeshire, and an important retail centre. Withybush District Hospital lies on the north side of the town. Haverfordwest is at the junction of the A40 which connects Carmarthen in the east with Fishguard to the north, the A487 west

to St David's and the A4076 south to Milford Haven. The River Cleddau flows south through the town and there are three bridge crossings: the A487 bridge to the north; the original bridge, now one-way access westbound into the centre for local access; and the A4076 bridge to the south. There are both daily and seasonal peaks in traffic. Traffic flows on the major roads in the town are typically between 10,000 and 17,000 vehicles per day, although 21,000 vehicles per day travel over the A487 northern bridge. The main Heavy Goods Vehicles (HGVs) flows are on the A40 between Fishguard and Carmarthen, and the A4076 to Milford Haven.

2. Information reviewed

The following information has been considered in evaluating this scheme:

- WelTAG Stage 1 Report: Haverfordwest Congestion Study (March 2018)
- WelTAG Stage 1 IAR: Haverfordwest Congestion Study (March 2018)

3. Objectives

The objectives are:

- Reduce network congestion and improve highway resilience and road safety on the trunk road network within Haverfordwest, principally the A40, A4076, A487 and other connecting roads.
- Support health and well-being by improving and promoting active travel, both recreation and necessary trips.
- Support local and strategic economic growth, promoting inclusive and integrated access to key services and employment.
- Protect the historic, built and natural environment including the landscape and townscape character of the study area.
- Minimise impacts on communities and support social inclusion and health and well-being.

4. Has the case for change been made?

The main roads in the town, particularly in the south-east part of the town, are congested during the morning, afternoon (end of school day) and late afternoon peak periods. There are also high traffic flows during the holiday season. There is concern that committed development may lead to an increase in car traffic. There is an Air Quality Management Area (AQMA) in central Haverfordwest and there are also noise action planning priority areas. Between 2012 and 2016, there were 178 collisions in the town, of which 15% involved pedestrians. Public transport is relatively low frequency, with trains every two hours and many bus routes operating an hourly frequency. Cycling levels are low, with only 1% of residents cycling to work.

The Panel considers that the case for change has been made. However, the appraisal dates from 2017/2018 and draws on data back to 2011. Current national policy and other changes (such as increasing visitor numbers) need further consideration. More detailed assessment of traffic flows is required to fully understand local resident and tourist travel patterns. The Panel has concerns that, without suitably thorough and extensive improvement of infrastructure for active travel and public transport, planned developments may further encourage car use.

5. Are the objectives aligned with current policy?

The objectives demonstrate good alignment with current policy, particularly where there is a focus on everyday active travel, promoting inclusive access, protecting the historic, built and natural environment, minimising impacts on communities, and increasing road safety.

The objective of reducing network congestion is neutral with respect to current policy, and in alignment only if the proposed schemes do not increase capacity for the private car. Potentially absent from the list of objectives are ones concerned with assisting public transport (although the options include public transport measures), and demand management.

The current WelTAG Stage 1 Report provides a starting point for greater emphasis on the Sustainable Transport Hierarchy during WelTAG Stage 2.

6. Did the scheme development process examine all appropriate options?

Six packages of options were considered for future development:

- A: Do-minimum;
- B: Online highway improvements at the main junctions;
- C: Bypass option: Dredgeman Hill to A40 (south-east of Haverfordwest);
- D: Bypass option 2: Withybush – A487 – B4341 Haven Road (north-west of Haverfordwest);
- E: Sustainable transport measures including active travel, public transport and rail service improvements;
- F: Online highway improvements plus sustainable transport (i.e. options B and E combined).

The WelTAG Stage 1 Report recommends Options A, B, E and F are progressed to WelTAG Stage 2. The two bypass options (C and D), which would have significantly increased the capacity of the road network, are not recommended to be progressed. The Panel agrees with this recommendation.

Option B would mainly be focussed on three roundabouts and would aim to improve road safety and traffic flow. Scheme elements include new lane configurations, signalisation of roundabouts, crossings for pedestrians and cyclists, and signage.

Option E includes improved walking and cycling infrastructure within the town between residential, employment, educational and commercial centres, and between the railway station and town centre; active travel crossings of trunk roads; safe routes to schools; and active travel paths along trunk roads to neighbouring settlements. It also includes local bus service improvements to the hospital, retail park and college, and improvements to bus services to employment destinations such as Milford Haven and Pembroke Dock. Bus infrastructure elements of the package include park and ride, bus priority measures, better bus waiting facilities, and reconfiguration of the bus station.

Options B, E and F are consistent with the Wales Transport Strategy, Net Zero Wales and Future Wales.

The Panel suggests that in the next stage of appraisal, further consideration should be given to demand management, and to online highway modifications to support sustainable transport, for example, bus lanes to avoid queuing traffic at roundabouts. Since congestion in the town centre is partly related to tourism traffic, consideration of options for sustainable travel by visitors (probably looking at a larger area than the town) could be beneficial.

7. What is the effect on carbon dioxide emissions?

Estimates of carbon dioxide emissions have not been made in the WelTAG Stage 1 Report.

The rejected bypass options would involve significant carbon emissions from construction and would potentially increase emissions in use.

The sustainable transport measures have the potential to reduce carbon dioxide emissions if they are sufficiently ambitious to generate modal shift; the benefit would be greater if the sustainable transport improvements are combined with demand management measures.

The Panel suggests that the next stage of appraisal should develop a package of sustainable transport and demand management measures that is sufficiently ambitious to increase sustainable transport mode share and reduce car mileage per person, in order to reduce carbon dioxide emissions.

8. Will the scheme be good for people and communities?

The main benefits for people and communities are likely to come from the sustainable transport package (Option E).

Better bus services and active travel provision could improve access to employment and services for people who are socially excluded. Planned housing developments include an indicative 25% social housing allocation, and it will be important for the sustainable transport package to include provision for these new housing areas.

There is an AQMA on High Street, Dew Street and Victoria Place, through the centre of Haverfordwest. The current proposals do not significantly affect traffic movements along these routes. This should be explored further in the WelTAG Stage 2 Report, with a focus on demand management and limiting access for more polluting vehicles.

Active travel modifications have the potential to improve road safety for pedestrians.

There should be further consideration of interventions to improve air quality and road safety, especially for pedestrians and cyclists, in the next stage of the appraisal.

9. Will the scheme be good for the environment?

The Panel agrees with the decision not to proceed with the options involving bypasses (C and D), which would have had a significant impact on sites that are protected for their environmental value. Cleddau Rivers Special Area of Conservation (SAC) and Western Cleddau River Site of Special Scientific Interest (SSSI) would potentially have been affected.

The other options (B, E and F) are unlikely to affect protected sites or biodiversity because most interventions would be within the existing highway boundary.

The scheme does not affect any nationally or locally designated landscapes. Haverfordwest is a gateway to the Pembrokeshire Coast National Park and any efforts to manage visitor traffic through sustainable transport options could have a positive knock-on impact on the National Park.

10. Will the scheme be good for places and the economy?

There may be benefits for local placemaking and liveability, depending on the package of sustainable transport measures adopted. Improvements to traffic flow may improve the reliability of freight transport. The value for money of the options has not yet been assessed.

11. Will the scheme be good for culture and the Welsh language?

There is potential for active travel infrastructure to improve access to a Welsh-medium school to the north-east of Haverfordwest.

The scheme may enable more people to travel sustainably for arts, sports, recreation or cultural activities.

There are six Scheduled Monuments and 324 Listed Buildings within the study area, of which 17 are near junctions where changes are proposed. Haverfordwest town centre is a Conservation Area. The Milford Haven Waterway Historic Landscape covers the majority of Haverfordwest including six of the eight main junctions. The sustainable transport package provides the opportunity to protect these heritage assets more effectively, by reducing car use.

12. How robust is the case for the scheme to different futures?

The online highway changes in response to congestion might be less relevant in a future scenario of reduced car use, but the sustainable transport packages would still be as, or more, relevant.

There are risks relating to flooding from the River Cleddau, but these exist regardless of whether or not the scheme progresses.

13. Conclusion

The Panel agrees with the WelTAG Stage 1 Report recommendation not to progress the two bypass options, and considers the remaining options are appropriate.

The Sustainable Transport Hierarchy must provide the foundation for the WelTAG Stage 2 appraisal. This would require active travel, and then public transport, to be the main focus. Online modifications to the road network should be focused on improving traffic flow for buses and provision for pedestrians and cyclists. Further consideration should also be given to demand management.

The scheme is aligned with the Panel's recommendations for future road investment because it would support a shift to sustainable modes of travel. The carbon emissions associated with construction are likely to be small. There is the potential for reductions in carbon emissions in use, due to modal shift from car to sustainable modes and also due to smoother traffic flow, which would improve vehicle efficiency. No adverse ecological impacts have been identified.



SUMMARY

The 2020 WeITAG Stage 1 A48 Cross Hands to Pensarn Corridor Study covers 18km of the A48 trunk road between Cross Hands roundabout and the Pensarn roundabout on the outskirts of Carmarthen.

The scheme seeks to improve safety on the A48 corridor and reduce congestion at the Pensarn and Cross Hands roundabouts. This section of the A48 has a collision rate that is higher than the average for dual-carriageways. This is partly due to cross-carriageway manoeuvres and inadequate layout of minor road junctions, but there is also evidence that significant contributory factors are excessive speed, unsafe manoeuvres, and driver error. Collisions occur at locations all along the road, not only at junctions.

The Panel considers that there is a case for intervention to improve road safety and provision for active travel and public transport. The case for change in relation to congestion at the roundabouts has not been demonstrated.

Options that improve safety but do not increase capacity for private cars could proceed to the next stage of appraisal. These are speed limit reductions and enforcement; closure of minor junctions and crossovers between the carriageways; vehicle-actuated bus warning signs at junctions; and changes to the layout and location of laybys. The Panel recommends that speed limit reduction should be considered along the full length of the scheme, not just at some locations. These options would involve minimal embodied carbon from construction. Lower speeds would be likely to lead to lower carbon emissions in use. The measures would be largely within the current A48 boundary and would therefore be unlikely to have significant adverse ecological impacts.

Once the scheme has been developed further, its safety benefits should be benchmarked against other safety schemes (including those in the Local Safety Schemes programme and on local authority roads), and the scheme should only proceed if it is among the best of schemes waiting for funding.

Schemes that would increase private car capacity or involve significant embodied emissions should not proceed to the next stage of appraisal. These are climbing lanes, increases in capacity at Cross Hands and Pensarn roundabouts, a link road south and east of Carmarthen, a westbound off-slip near Pensarn roundabout, a relief road west or east of Cross Hands, and diversion routes.

The Panel recommends that closure of public rights of way crossing the A48 should only proceed if accompanied by improvements in convenience, directness and journey quality for pedestrians.

The Panel makes the following recommendation:

Welsh Government could continue to support the safety elements of the A48 Cross Hands to Pensarn scheme. However, options that increase private car capacity and involve significant embodied carbon should not be taken forward, nor should the closure of pedestrian crossings unless alternative improvements to pedestrian routes are provided.

1. Study description

The A48 connects Carmarthen and the western end of the M4 motorway at Pont Abraham, a distance of about 25km. It is a dual-carriageway with a 70mph speed limit, with numerous crossovers between the carriageways to provide for right turns into and out of minor roads and accesses. The section considered in this study is between Pensarn roundabout on the outskirts of Carmarthen and Cross Hands roundabout, a distance of 18km.

Two work packages for the section of the A48 between the two roundabouts have been prioritised to take forward to WelTAG Stage 2. The main options within them are speed limit restrictions and speed enforcement; closure of minor junctions and modifications to crossovers between the eastbound and westbound carriageways; bus priority infrastructure at two junctions; closure or changes to laybys; climbing lanes; a hard shoulder; restrictions on pedestrian crossings; and modifications to diversion routes.

Two more work packages contain measures related to the two roundabouts. The main options in these work packages are three new sections of road to take traffic away from the roundabouts; and measures to increase roundabout capacity.

The costs for the options have not been estimated.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- WelTAG Stage 1 Report: A48 Cross Hands to Pensarn (August 2020)
- WelTAG Stage 1 IAR: A48 Cross Hands to Pensarn (April 2020)
- Walking, Cycling and Horse-riding Assessment and Review: A48 Cross Hands to Pensarn (March 2020)

A site visit also took place.

3. Objectives

The objectives are:

- Improve safety for vehicle users, without having a significant adverse impact on the environment
- Minimise the safety risk for active travel users within the scheme area
- Minimise impact on access, without having a significant adverse impact on the environment
- Ensure no significant adverse impact on the operational efficiency of the strategic highway network
- Consider the future-proofing of the scheme area to enable delivery of emerging aspirational strategic and local schemes relating to public transport and electric vehicles

4. Has the case for change been made?

This section of the A48 has a collision rate that is higher than the average for dual-carriageways. In the period 2013-18 there were 53 personal injury collisions between Cross Hands and Pensarn, excluding the roundabouts at either end, of which three were fatal, 10 were serious, and 40 were slight.

The WelTAG Stage 1 Report identifies the main safety problems as being related to cross-carriageway manoeuvres and inadequate layout of minor road junctions. However, the evidence also points to significant contributory factors being excessive speed, unsafe manoeuvres and driver error. Four of the 13 serious or fatal collisions between 2013-2018 were related to use of crossovers, with the remaining nine serious or fatal collisions attributable to other factors, mainly driver error, such as vehicles attempting to overtake in the outside lane and losing control. The slight injury collisions were evenly spread along the A48 (that is, not concentrated at junctions) and were also typically caused by driver error.

The study also identifies peak period congestion at the Pensarn and Cross Hands roundabouts as a problem, and suggests it increases the likelihood of collisions. In the period 2013-18, there were 28 personal injury collisions at Cross Hands roundabout, and 12 at Pensarn roundabout. The WelTAG Stage 1 Report was prepared in August 2020 and may not reflect recent changes in travel behaviour because of the Covid-19 pandemic; reductions in commuting may reduce peak congestion at the roundabouts. Welsh Government's aim to reduce car mileage per person by 10% by 2030 may also reduce congestion. The Panel notes that no evidence is provided to demonstrate that congestion increases the likelihood of collisions, although higher flows will increase risk.

The WelTAG Stage 1 Report suggests that there are also sub-standard laybys; a lack of safe and convenient bus infrastructure; and inadequate provision for public rights of way crossings.

The Panel considers that there is a case for change for the scheme relating to safety and better provision for active travel and public transport. The case for change in relation to congestion at the roundabouts has not been demonstrated.

5. Are the objectives aligned with current policy?

The objective of improving safety for vehicle users without having a significant adverse effect on the environment is aligned with current policy. The schemes in Work Package 1 may be largely effective in achieving the safety objective, but some elements would have adverse environmental impacts.

The objective of minimising safety risk for active travel users is aligned with current policy. It may be met by schemes in Work Packages 1 and 2. However, if public rights of way are closed (as intended in Work Package 2) and alternative routes are longer, severance will be increased. It is not clear from the collision record how many of the injury collisions relate directly to the public rights of way crossings.

6. Did the scheme development process examine all appropriate options?

The study sets out a longlist of 55 options grouped under six headings: active travel (9 options); public transport (13); vehicle infrastructure (21, note that these schemes are about highway rather than vehicle improvements); smart highways (7); freight (3); and managing demand (2).

At the shortlist stage 46 options were retained and regrouped into 10 Work Packages (WPs) as follows: WP1, A48 Cross Hands to Pensarn; WP2, safety for pedestrians; WP3, Cross Hands roundabout; WP4 Pensarn roundabout; WP5 active travel; WP6, electric vehicle strategy; WP7, South-West Wales Metro; WP8, travel demand strategy; WP9, lorry parking; and WP10 rail freight strategy.

The review group recommended proceeding to a WelTAG Stage 2 study for the A48 Cross Hands to Pensarn scheme area. This would prioritise WP1 and WP2. There is ambiguity as to whether

WP3 and WP4 would be included. There does not appear to be an intention for the Trunk Road Agent to take forward WP5-10.

The components of WP1-4 are as follows:

Work Package 1 – Cross Hands to Pensarn

- PT5: New bus priority infrastructure at the Nantycaws Junction
- PT6: New bus priority infrastructure at the Llanddarog Junction
- PT7: Bus vehicle-actuated warning signs at the Nantycaws and Llanddarog Junctions
- PT10: Improvements to the existing bus stop infrastructure provision
- SH1: Introduction of Vehicle Actuated warning signs
- SH3: Introduction of variable information boards
- SH6: Introduction of autonomous vehicle infrastructure
- VI1: Introduction of targeted speed limit restrictions along the A48
- VI3: Introduction of speed enforcement cameras
- VI4: Re-configuration of cross-carriageway manoeuvre opportunities at minor junctions
- VI5: Closure of minor arm junctions (J2-14)
- VI7: Closure of, or amendments to, the laybys within the scheme area
- VI10: New climbing lanes for heavy duty vehicles at steep gradients
- VI19: Improvements to alternative and diversion routes
- VI20: Introduction of a hard shoulder

Work Package 2 - Safety for pedestrians

- AT3: Closure of public rights of way crossing the A48 and identification of suitable alternative routes
- AT4: New grade-separated crossing opportunities for pedestrians and cyclists within the scheme area
- AT8: Introduction of a traffic regulation order prohibiting the use of A48 by pedestrians
- AT9: Introduction of signage warning drivers of pedestrians

Work Package 3 - Cross Hands roundabout

- AT6: Improve the existing shared use path at the Cross Hands roundabout
- PT4: New bus priority infrastructure at the Cross Hands roundabout
- VI9: Improved signage to the food and drink facilities accessed from the Pensarn and Cross Hands roundabouts
- VI13: Congestion improvement scheme at the Cross Hands roundabout
- VI14: Road safety improvement scheme at the Cross Hands roundabout
- VI17: Relief Road to the west of Cross Hands, between the north and south, linking to the A476
- VI18: Relief Road to the east of Cross Hands, linking to the new Cross Hands Economic Link Road

Work Package 4 - Pensarn roundabout

- AT5: Improve the existing shared use path at the Pensarn roundabout
- PT2: New bus priority infrastructure at the Pensarn roundabout
- VI9: Improved signage to the food and drink facilities accessed from the Pensarn and Cross Hands roundabouts
- VI12: Congestion improvement scheme at the Pensarn roundabout
- VI15: Strategic link road to the south and east of Carmarthen, linking White Mill to the west of Carmarthen, via the A48
- VI16: New westbound off-slip linking to the Pibwrlwyd College development site, in the vicinity of the Pensarn roundabout)

Within WP1, some measures would improve road safety: these are localised changes in speed limits (VI1); speed enforcement cameras (VI3); reconfiguration of cross-carriageway manoeuvres (VI4); closure of minor arm junctions (VI5); and modifications to laybys (VI7). Vehicle-actuated bus warning signs at junctions (PT7) would also have safety benefits, as they would raise drivers' awareness of buses making turns onto the dual-carriageway.

One option that was not shortlisted could have significant safety benefits (and carbon benefits) and should be considered further. This is speed limit reduction along the full length of the scheme (VI2).

WP1 includes two measures that would increase capacity and have significant embodied carbon: climbing lanes (VI10) and improvements to diversion routes (VI19). The Panel recommends that these should not proceed.

WP1 includes closure of, or amendments to, laybys (VI7). If laybys are closed, it will be important to consider how parking provision and facilities for heavy goods vehicles (HGV) drivers can be improved.

WP2 could have the effect of restricting pedestrian access. In the related WelTAG Stage 2 appraisal of A48 Nantycaws Junction, it is proposed to close at-grade pedestrian crossings associated with public rights of way and divert pedestrians via a new grade-separated junction; this would involve a diversion of over 1km which, in practice, walkers may choose not to take. The Panel recommends that closure of public rights of way crossing the A48 should only proceed if accompanied by improvements in convenience, directness and journey quality for pedestrians.

Within WP3, some measures would improve road safety or support sustainable travel: these are improvements to the shared use path (AT6); bus priority infrastructure (PT4); and possibly VI14, which is described as a road safety improvement scheme, but for which no details are given. Other measures would increase private car capacity, resulting in induced traffic and increased carbon: these are VI13; VI17 and VI18. The Panel recommends that these three measures should not proceed.

Similarly, within WP4, some measures would improve road safety or support sustainable travel: these are improvements to the shared use path (AT5); and bus priority infrastructure (PT2). Other measures would increase private car capacity, resulting in induced traffic and increased carbon: these are VI12; VI15 and VI16. The Panel recommends that these three measures should not proceed.

There were some measures in the longlist with potential to deliver modal shift that are not in any of the Work Packages to be carried forward. These include improvements to active travel links

between Carmarthen and Cross Hands, either adjacent to the carriageway (AT1) or via National Cycle Network route 47 (AT2); and bus priority measures along the A48 (PT3).

In general, the Panel's view is that the scheme development process resulted in the more ambitious sustainable transport options being progressively filtered out, first at the shortlisting stage (which still retained 46 options), and then by sorting the options into seven packages and progressing packages that are focussed on private motor vehicles (WP1, WP3 and WP4) and restricting pedestrian access (WP2)..

7. What is the effect on carbon dioxide emissions?

The effect of the scheme on carbon dioxide emissions has not yet been quantified. Carbon dioxide emissions due to land-clearance, construction, operation and maintenance would inevitably increase if the climbing lanes, changes to diversion routes, relief roads and link road were progressed.

Speed-related changes in carbon dioxide emissions have not been quantified. Within WP1, scheme options VI1 and VI3 have the potential to reduce carbon dioxide emissions through localised reductions in the speed limit and effective enforcement. Speed limit reduction along the full length of the scheme (VI2) would achieve a larger reduction in emissions. Climbing lanes (VI10) could increase or reduce carbon dioxide emissions, depending on the resulting changes in traffic speed: if HGVs currently slow other traffic to about 50mph on hills, and a climbing lane releases vehicles to travel at higher speeds, the effect of climbing lanes would be to increase carbon dioxide emissions.

The measures designed to reduce congestion by increasing capacity at Cross Hands and Pensarn roundabouts, and the link and relief roads, would result in increased carbon emissions from induced traffic.

8. Will the scheme be good for people and communities?

The scheme would have some safety benefits. Bus improvements may have a marginal effect on access to employment and services for people who do not drive a car. The scheme would not resolve the severance caused by the A48 and could make it worse as the active travel measures include closure of at-grade pedestrian crossings and diversion of public rights of way.

9. Will the scheme be good for the environment?

Environmental impacts have not yet been assessed. There is the potential for a climbing lane (VI10), hard shoulder (VI19), modifications of diversion routes (VI20), and relief and link roads (VI15, VI17, VI18) to affect sites that are designated for their environmental value, depending on where these scheme elements are located. There are four locations where ancient woodlands adjoin or intersect the A48, also with the potential for impact from scheme elements VI10 and VI19.

The WelTAG Stage 1 IAR identifies four areas of the A48 that are located within a flood zone, but it is not known whether the schemes could increase flood risk.

10. Will the scheme be good for places and the economy?

This section of the A48 provides access to the ports in Pembrokeshire. Improvements in safety would lead to fewer collisions, hence improving the reliability of traffic flows and benefiting freight movements to and from the Pembrokeshire ports. This may create a slight benefit to the national economy.

Improvements to layby provision may give better opportunities for HGV drivers to take their statutory breaks, because existing sites do not safely accommodate HGVs. Carmarthenshire County Council has been undertaking a study of lorry parking facilities across the county, and the A48 scheme should be consistent with this wider strategy.

The value for money of the scheme has not yet been calculated.

11. Will the scheme be good for culture and the Welsh language?

The scheme would have no significant impact on use of the Welsh language. No impact on culture has been identified. The WelTAG Stage 1 IAR notes that Brigwallt y Coed listed building is 70 metres south of the road, and Ring Cairn Scheduled Monument is 100 metres south of the road.

12. How robust is the case for the scheme to different futures?

The case for a climbing lane, modifications of diversion routes, and relief and link roads would be weaker in a future scenario in which there is less car use..

13. Conclusion

The A48 Cross Hands to Pensarn WelTAG Stage 1 Report identifies interventions to improve safety and reduce congestion. The Panel considers that there is a case for change for the scheme relating to safety. The objectives are generally aligned with current policy, but an objective of ensuring no significant adverse impact on operational efficiency may lead to schemes that would increase capacity and this would not be in alignment with policy.

Measures that reduce vehicle speeds would reduce carbon emissions as well as offering a safety benefit.

Although the Panel recommends that the study could proceed to the next stage, it should be refocused on the safety elements, while also aiming to make improvements for active travel and buses. Options that increase private car capacity should not be considered further.



SUMMARY

The proposed scheme would involve construction of a grade-separated junction; merge and diverges and slip roads; a roundabout; and access roads. These would replace five closely-spaced minor junctions along the A48 dual carriageway 5km east of Carmarthen at Nantycaws.

The scheme is intended to address road safety issues, but the case for a grade-separated junction has not been demonstrated. Most collisions near Nantycaws (as elsewhere on the A48), are attributable to driver error and do not occur at junctions. These issues would not be resolved by the proposed junction.

A current WelTAG study of the A48 corridor between Cross Hands and Carmarthen (which includes Nantycaws) is examining other options to improve safety, such as a lower speed limit and speed enforcement cameras. These options would also be relevant for Nantycaws.

Smaller-scale changes to road layout at Nantycaws may offer safety benefits, and these could be considered as part of the Cross Hands to Carmarthen study. They could include: discouraging drivers from using a less suitable route to avoid congestion at Pensarn Roundabout; constructing an at-grade roundabout; closing crossovers that have low use; and bringing laybys and merges and diverges up to standard. These options would improve safety whilst avoiding an increase in road capacity that could give rise to induced traffic; have lower embodied carbon emissions than the proposed scheme; and avoid creating new structures that would have significant ongoing maintenance liabilities.

The Panel makes the following recommendation:

The A48 Nantycaws scheme should not proceed because it would have significant carbon impact and cost, and would not resolve the majority of safety issues. A reduction in the speed limit should be considered. Other changes to the road layout that would be lower cost and would have lower carbon impact whilst improving safety could also be considered.

1. Scheme description

The A48 connects Carmarthen and the western end of the M4 motorway at Pont Abraham, a distance of about 25km. It is a dual-carriageway with a 70mph speed limit, with numerous crossovers between the carriageways to provide for right turns into and out of minor roads and accesses.

The A48 Nantycaws scheme is 5km east of Carmarthen. It would involve construction of a grade-separated junction; merge and diverges and slip roads; a roundabout; and access roads. These would replace five closely-spaced minor junctions. At-grade pedestrian crossings of the A48 associated with public rights of way would be closed, and pedestrians would be diverted via the grade-separated junction. The preferred option would cost £16.5 million.

Three of the five minor road junctions near Nantycaws have very low use. The junction between the A48 and Heol Llangynnwr (Nantycaws Junction) has high use, with 2,400 right turn movements per day from the A48 into Heol Llangynnwr. Heol Llangynnwr is used by drivers travelling to east or north Carmarthen, partly in order to avoid congestion at Pensarn Roundabout. The Carmarthen Landfill Site Junction has moderate levels of use, with around 300 right turn movements per day in or out of the minor road.

The Nantycaws scheme has been progressed independently of a wider A48 Cross Hands to Pensarn (Carmarthen) study, which is currently at WelTAG Stage 1.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- WelTAG Planning Stage Report: A48 Carmarthen to Pont Abraham Junction Study (2008)
- WelTAG Planning Stage and Stage 1 Report: A48 Nantycaws Junction Improvements Feasibility Study (2011)
- Walking, Cycling and Horse-riding Assessment and Review: A48 Cross Hands to Pensarn (March 2020)
- WelTAG Stage 1 IAR: A48 Cross Hands to Pensarn (April 2020)
- WelTAG Stage 1 Report: A48 Cross Hands to Pensarn (August 2020)
- A48 Nantycaws Road Safety Review (February 2021)
- Walking, Cycling and Horse-riding Assessment and Review: A48 Nantycaws (May 2021)
- WelTAG Stage 2 & 3 Interim Report: A48 Nantycaws (September 2021)

A site visit also took place.

3. Objectives

The objectives are:

- Improve safety for vehicle users, without having a significant adverse impact on the environment
- Minimise the safety risk for active travel users within the scheme area
- Minimise impact on access, without having a significant adverse impact on the environment
- Ensure no significant adverse impact on the operational efficiency of the strategic highway network
- Consider the future-proofing of the scheme area to enable delivery of emerging aspirational strategic and local schemes relating to public transport and electric vehicles

4. Has the case for change been made?

The A48 between Cross Hands and Carmarthen has a poor safety record. In the period 2015-19 there were 14 personal injury collisions in the Nantycaws area, of which four were at junction crossovers.

The proposed grade-separated junction originated in a 2011 Junction Improvement Study. Both the 2011 study and the current study focussed on road layout options to tackle the poor safety record at Nantycaws. Whilst it is clear there are safety issues associated with the junctions and

crossovers at Nantycaws, it has not been demonstrated that a scheme of the scale proposed is necessary to address them. Other lower cost and lower carbon options are described below.

Collision data in the Nantycaws area show that most personal injury collisions are due to driver error and do not occur at junctions. This is also true for the whole A48 Cross Hands to Carmarthen corridor. Particular issues are excessive speed, lapses in concentration, and drivers attempting to overtake and losing control. These issues would not be resolved by the scheme.

5. Are the objectives aligned with current policy?

The objective of improving safety for vehicle users is aligned with current policy, but there may be more effective and lower carbon means to achieve it.

The objective of minimising risk to active travel users is aligned with current policy. However, the proposed means to achieve this lower risk is to require pedestrians to make a long detour via the proposed grade-separated junction to cross the A48, and this is not aligned with current policy. The objective of future-proofing for public transport and electric vehicles is consistent with current policy but there is no evidence provided about how the scheme will achieve this objective.

6. Did the scheme development process examine all appropriate options?

The only options considered at Nantycaws at WelTAG Stage 2 & 3 were eight design options for a grade-separated junction, with minor differences between the options.

The corridor-level A48 Cross Hands to Pensarn study considered a wider range of options to address safety issues, including targeted speed limit restrictions, a lower speed limit over the full distance between Cross Hands and Carmarthen, and speed enforcement cameras. The Panel considers that the effect of a lower speed limit and speed enforcement cameras (either along the full distance between Cross Hands and Carmarthen, or over a shorter distance), should be examined at Nantycaws.

There has been insufficient consideration of other road layout changes that could improve safety with lower carbon impact and at lower cost than the proposed scheme. These include:

- Discouraging use of Heol Llangynnwr by drivers seeking to avoid congestion at Pensarn Roundabout, through minor changes to road layout and speed limits;
- An at-grade roundabout at Nantycaws. This option was included in the 2011 study but rejected by the current study because it would increase journey times along the A48. The Panel does not consider a small impact on journey times justifies rejection of this option;
- Closure of crossovers at the three junctions where there are no, or very few, right turns;
- Changes to laybys and merges and diverges to bring them up to standard.

The scheme development process should also have considered in greater depth improvements for pedestrians, cyclists and bus users.

7. What is the effect on carbon dioxide emissions?

The effect of the scheme on carbon dioxide emissions has not been quantified. Construction of the scheme would increase emissions due to land clearance and embodied carbon in construction materials. The scheme would increase road capacity (because it makes it easier for drivers to use Heol Llangynnwr as a route into Carmarthen) and may therefore also increase emissions because of induced traffic.

8. Will the scheme be good for people and communities?

The scheme would have some safety benefits. It would not have a significant impact on air quality; or on access to employment and services for people who suffer social exclusion. If it results in more traffic using Heol Llangynnwr, the impact on residential noise receptors could be worse. The severe community severance caused by the A48 at this location would not be addressed: two public rights of way would be routed via the grade-separated junction but this would involve a substantial diversion (over 1km) which, in practice, walkers may choose not to take.

9. Will the scheme be good for the environment?

Environmental impacts have not yet been assessed. The Panel's review used the available information from WelTAG reports and other sources, but some impacts may not yet be known. The WelTAG Stage 2 & 3 Report notes that ancient woodland has been identified within the scheme area (although not near the proposed grade-separated junction), and that there is potential for protected species such as bats, great crested newts, or dormice to be present in the area. The scheme does not appear to affect nationally or locally designated landscapes, or sites that are protected for their environmental value.

10. Will the scheme be good for places and the economy?

The scheme may facilitate the development of Carmarthen Landfill site for uses that may be appropriate to the location. A scheme of this nature is unlikely to have any benefits for national economic well-being. The scheme would not improve reliability for freight transport, because congestion is not an issue at this location.

A cost-benefit analysis has not yet been carried out, but the WelTAG Stage 2 & 3 Report anticipates that the scheme would not achieve good value for money.

11. Will the scheme be good for culture and the Welsh language?

The scheme has no significant impacts on use of the Welsh language. The scheme is in the Tywi Valley Registered Historic Landscape. It may affect the setting of a listed building at Brigwallt y Coed.

12. How robust is the case for the scheme to different futures?

In a future with less car use, the case for the scheme would be weaker. The scheme increases long-term maintenance liabilities because of the additional structures associated with grade-separation.

13. Conclusion

The case for a grade-separated junction at Nantycaws to improve road safety has not been demonstrated.

Most collisions on the A48, at Nantycaws and elsewhere, are attributable to driver error. Particular issues are excessive speed, lapses in concentration, and drivers attempting to overtake and losing control. These issues will not be resolved by the scheme.

The ongoing WelTAG study of the A48 corridor between Cross Hands and Pensarn (which includes Nantycaws) is examining other options to improve safety, such as a lower speed limit and speed enforcement cameras. The Panel considers that these options are relevant for Nantycaws.

Smaller-scale changes to road layout at Nantycaws may offer safety benefits, and these could be considered as part of the ongoing WelTAG study of the Cross Hands to Pensarn corridor. They include discouraging drivers from using a less suitable route to avoid congestion at Pensarn Roundabout; constructing an at-grade roundabout; closing crossovers that have low use; and bringing laybys and merges and diverges up to standard. These options would improve safety whilst avoiding an increase in road capacity that could give rise to induced traffic; have lower embodied carbon emissions than the proposed scheme; and avoid creating new structures that would have significant ongoing maintenance liabilities



SUMMARY

A WelTAG Stage 2 appraisal identified a number of possible interventions on the M4 between Junction 38 and Junction 43. A preferred scheme has not yet been selected by Welsh Government as Sponsor. The interventions are:

- Additional traffic officer crew, and communication, incident response and data collection enhancements;
- Measures to reduce use of the M4 by local traffic in Port Talbot, including active travel and public transport measures; changes to signs and signals on the Port Talbot Peripheral Distributor Road; and changes to the configuration of Junction 41;
- Potential closure of slip roads at Junctions 40 and 41 and possible introduction of selective vehicular access (e.g. buses, taxis and emergency vehicles);
- Additional lanes in each direction between Junctions 42 and 43, on new structures adjacent to an existing bridge;
- Smart motorway (using the hard shoulder as an extra running lane) between Junctions 38 and 43, with one running lane used at defined periods for High Occupancy Vehicles and/or Ultra Low Emission Vehicles.

The rationale for the scheme is to reduce congestion and increase resilience. The appraisal assumes that the M4 will become more congested in future due to traffic growth. This assumption is not consistent with Welsh Government's aim of reducing car mileage per person by 10% by 2030.

Some of the proposed interventions are not well-aligned with current policy, particularly the additional lanes and smart motorway. They risk undermining the Wales Transport Strategy target for modal shift. Improvements to active travel and public transport are secondary features.

The Panel makes the following recommendation:

The scheme should not proceed. The case for change is not well-aligned with Welsh Government's aim to reduce car mileage, and significant elements of the scheme would increase private car capacity and may therefore undermine the target to increase sustainable transport mode share.

1. Scheme description

The scheme covers a 13km section of the M4 between Junction 38 at Margam and Junction 43 at Llandarcy. It also affects the A48 and the Port Talbot Peripheral Distributor Road (A4241 / Harbour Way). It is located in the County Borough of Neath Port Talbot and Swansea Bay City Region.

The M4 at this location has substantial lengths elevated on viaducts. It is located very close to properties and has closely-spaced junctions allowing use of the motorway for short journeys.

A Preliminary WelTAG Stage 2 Report identified the following interventions to take forward to the next stage of appraisal:

Intervention 1 (total cost estimate £2-£4 million): An additional Traffic Officer crew and communication, incident response and data collection enhancements, to increase resilience and improve incident recovery.

Interventions 1, 2a and 2b (total cost estimate £13-£21 million)

- Intervention 1 as above
- 2a – Port Talbot Transport Enhancements: a package to reduce use of the M4 by local traffic, including active travel and public transport measures; changes to signs and signals on the Port Talbot Peripheral Distributor Road; and changes to the configuration of M4 J41 with provision of a new westbound on-slip to replace the existing westbound on-slip.
- 2b – Junctions 40 and 41: Closure of some or all slip roads and/or selective vehicular access (e.g. for buses, taxis and emergency vehicles), dependent on modelling to identify the optimum arrangement.

Interventions 1, 2a, 2b and 3b (total cost estimate £263-£371 million)

- Interventions 1, 2a and 2b as above
- 3b – Additional lanes between Junctions 42 and 43: an additional lane and hard shoulder in each direction on two new structures running parallel to the existing bridge; shared pedestrian and cycle path to replace existing walking and cycling bridge; updated signs.

Interventions 1, 2a, 2b, 3b and 4b (total cost estimate £563-£770 million)

- Interventions 1, 2a 2b and 3b as set out above.
- 4b – Smart motorway with sustainable transport measures between Junction 38-43: all-lane running (i.e. convert hard shoulder to a running lane; widen or rearrange existing carriageway where hard shoulder is too narrow to be a running lane); allocation of one lane at defined periods for specific vehicles such as High Occupancy Vehicles and/or Ultra Low Emission Vehicles, leaving two running lanes for general traffic.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- Swansea Bay City Region Economic Regeneration Strategy (2013-2030)
- Neath Port Talbot Public Services Board Well-being Plan 2018-2023
- WelTAG Stage 1 Report: M4 J35 Pencoed to J49 Pont Abraham: Strategic Outline Case (July 2019)
- WelTAG Stage 1 IAR: M4 J35 Pencoed to J49 Pont Abraham (July 2019)
- WelTAG Stage 2 Preliminary Study: M4 J38-43 (February 2020)
- WelTAG Stage 2 Study Proposal: M4 Junctions 38 to 43 (February 2021)

3. Objectives

The objectives are as follows:

- Improve highway efficiency and resilience of the motorway, interchanges and connecting road network
- Improve road safety and journey time reliability

- Improve multi-modal travel options on and around the motorway
- Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity
- Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being
- Improve health and the local and global environment, including reducing air and noise pollution
- Improve communication and information to users and management of the motorway

4. Has the case for change been made?

The M4 J38-43 Preliminary Stage 2 Report followed an earlier WelTAG Stage 1 assessment of M4 J35-49 in 2019, which was aimed at tackling congested locations on the trunk road and motorway network.

This section of the M4 carries 70,000-73,000 vehicles per day. The appraisal assumes that it will become more congested in future due to traffic growth. This assumption is not consistent with Welsh Government's aim of reducing car mileage per person by 10% by 2030, or the Wales Transport Strategy target for modal shift.

There are several development sites for employment in the Port Talbot Waterfront Enterprise Zone and more widespread smaller housing allocations. However, no evidence is presented on development-related travel demand.

In the context of current Welsh Government policy, the case for the scheme is weak.

5. Are the objectives aligned with current policy?

The first objective of improving highway efficiency and resilience of the motorway, interchanges, and connecting road network is poorly aligned with current policy, but achievement of this objective appears to have been prioritised in option identification and selection. The resulting scheme risks undermining mode shift targets by increasing car dependency.

Objectives to improve road safety, improve multi-modal travel options, and reduce air and noise pollution, are aligned with current policy. However, if interventions that provide additional capacity (3b and 4b) were progressed, air quality and noise problems could become worse.

6. Did the scheme development process examine all appropriate options?

The proposals have been put forward in the context of the existing 50mph speed limit on a significant proportion of the motorway, with average speed enforcement being retained.

In the Panel's judgement, the consideration given to sustainable transport options was sufficient at WelTAG Stage 1, taking account of the full range of interventions reviewed in that study. However, the options considered in the Preliminary WelTAG Stage 2 appraisal are focused on motorway capacity increases. These are more clearly defined than other interventions, such as the active travel and public transport measures within the Port Talbot Transport Enhancements (Intervention 2a). The Panel is therefore concerned that sustainable transport options have not been sufficiently considered. Further consideration of active travel and public transport improvements is likely to have merit in its own right.

The Panel considers that insufficient attention has been given to options that do not increase private vehicle capacity, and in particular to demand management.

There was little to no consideration of non-transport options at the longlist stage, but some non-transport options, such as restricting development at car-dependent locations, and supporting remote working, may be relevant.

7. What is the effect on carbon dioxide emissions?

The effect of the scheme on carbon dioxide emissions has not yet been quantified.

Some interventions (particularly Intervention 3b) would involve significant construction, and this would increase emissions due to embodied carbon in construction materials.

It is likely that the interventions that increase road capacity would incur additional carbon dioxide emissions. Some elements that improve traffic flow and reduce speeds could reduce user emissions.

8. Will the scheme be good for people and communities?

There is an Air Quality Management Area around Junctions 39 and 40 (designated as a result of industrial emissions rather than road traffic emissions), and the section of the M4 between Junctions 41 and 42 has been identified as exceeding limits of nitrogen dioxide. In order to reduce emissions between Junctions 41 and 42, a 50mph speed limit was introduced in 2018 and average speed enforcement was introduced in 2019. It is not clear how the proposed interventions would affect air quality, and there is a risk that additional capacity would worsen air quality.

The scheme could worsen noise levels, particularly on an elevated section of Harbour Way (Port Talbot Peripheral Distributor Road).

The interventions proposed for Harbour Way could have a detrimental impact on community severance, although elsewhere there would be opportunities to reduce community severance through the improvement of walking and cycling routes associated with some of the interventions.

9. Will the scheme be good for the environment?

The scheme is at an early stage of development, and environmental impacts have not yet been fully assessed.

Some of the interventions have potential environmental impacts. There is a Site of Special Scientific Interest adjacent to Junction 42 and ancient woodland adjacent to Junction 43: both could be affected by Intervention 3b. In addition, interventions that increase road capacity could incur additional emissions from induced traffic, and therefore could result in deterioration of ancient woodland adjacent to the road.

10. Will the scheme be good for places and the economy?

There is no information on the effect of the scheme on local or national economic well-being.

The Benefit to Cost Ratio (BCR) of the different options has not yet been estimated. However, the costs of packages 3b and 4b are substantial, and their lack of alignment with Welsh Government policy means that they cannot be considered to represent value for money.

If the scheme reduces peak period congestion, it may also then improve reliability for freight vehicles, although this benefit would be eroded over time in the absence of demand management measures. The WelTAG Stage 1 IAR recognised opportunities for improved freight facilities along the M4 corridor, but these are not part of the recommended interventions.

The public transport and active travel interventions may contribute to local place-making and liveability.

11. Will the scheme be good for culture and the Welsh language?

The Panel does not consider there to be materially significant impacts on the Welsh language or sustainable travel for arts, sports, recreation or cultural activities.

12. How robust is the case for the scheme to different futures?

Given that this scheme is aimed at addressing congestion on the M4 motorway, the case would be weakened under a scenario in which travel by private motor vehicle was lower. Some proposed interventions involve significant additional structures associated with the motorway widening and these would create increased maintenance liabilities in future.

13. Conclusion

The rationale for this scheme is to reduce congestion and increase resilience. The appraisal assumes that the M4 will become more congested in future due to traffic growth. This assumption is not consistent with Welsh Government's aim of reducing car mileage per person by 10% by 2030.

Scheme development started before the publication of the Wales Transport Strategy in March 2021 and does not take account of the Sustainable Transport Hierarchy. Some of the interventions are not well-aligned with current policy, particularly the additional lanes and smart motorway, which risk undermining the Wales Transport Strategy target for modal shift.



SUMMARY

The scheme would involve modifications to Junctions 43, 44, 45 and 47 of the M4. The main changes are widening of slip roads at J43, J45 and J47; and changes to road markings and signs at J44. There are some improvements for buses and active travel, including a 150-metre long bus lane and an at-grade toucan crossing.

The case for change is that there are vehicle delays at the junctions, and that traffic growth may cause delays to worsen in future.

The evidence about vehicle delays suggests that they do occur, but only to a limited extent. Traffic is forecast to increase by 10-20% between 2019 and 2027, but this is not aligned with Welsh Government's aim to reduce car mileage per person by 10% by 2030, and if there is less traffic growth (or an absolute reduction in traffic), the rationale for the scheme is weak.

To the extent that the proposed increases in junction capacity are effective in reducing delays, they may make car travel more attractive, hence undermining the Wales Transport Strategy target to increase sustainable transport mode share.

The WelTAG Stage 2 Report identifies other problems: this area has high levels of deprivation and residents are less active and more likely to be obese than is average for Wales; there are road safety, air quality and noise issues; and public transport is poor. These problems are unlikely to be addressed by the scheme. The Panel considers that non-transport options, demand management and sustainable transport options may offer greater benefits.

The scheme would have a moderate to large adverse effect on biodiversity, including causing loss of an area of ancient woodland.

The Panel makes the following recommendation:

The scheme should not proceed. The case for change is not well-aligned with Welsh Government's aim to reduce car mileage, and the scheme would increase private car capacity and may therefore undermine the target to increase sustainable transport mode share.

1. Scheme description

The scheme would involve modifications to Junctions 43, 44, 45 and 47 of the M4. Estimated costs are £16 million, £160,000, £9 million, and £6 million for Junctions 43, 44, 45 and 47, respectively. The proposed modifications are:

- Junction 43: widening of slip roads, and a bus lane of approximately 150 metres along the A465 westbound
- Junction 44: revised road markings and traffic signs, and active travel improvements to reduce severance across the junction and to link into existing active travel routes (these modifications were not appraised at WelTAG Stage 2)

- Junction 45: widening of slip roads (and, with alteration of road markings, one additional lane on the northern arc of the roundabout circulating carriageway); improvements to footbridges (including one replacement); conversion of Clydach Road (B4603) as a junction approach to a bus-only route; and potential for a cycle route alongside the bus route through the junction
- Junction 47: widening of slip roads; removal of traffic signals from the service station exit and minor changes to the road markings; and at-grade toucan crossing on the line of Old Llangyfelach Road to facilitate a cycle route along Old Llangyfelach Road giving access to the A483

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- WelTAG Stage 1 Report: M4 J35 Pencoed to J49 Pont Abraham: Strategic Outline Case (July 2019)
- WelTAG Stage 1 IAR: M4 J35 Pencoed to J49 Pont Abraham (July 2019)
- WelTAG Stage 2 Report: M4 J43-47 (May 2021)
- WelTAG Stage 2 Executive Summary Note: M4 J43-47 (undated)
- WelTAG Stage 2 IAR: M4 J43-47 (May 2021)
- M4 J43-47 IAR including appendices (September 2021)
- WelTAG Stage 2: M4 J43-47 Delivery Plan (February 2022)

3. Objectives

The objectives are as follows:

- Improve highway efficiency and resilience of the motorway, interchanges and connecting road network
- Improve road safety and journey time reliability
- Improve multi-modal travel options that reduce dependence on the motorway
- Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity
- Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being
- Improve health and the local and global environment, including reducing air and noise pollution
- Improve communication and information to users and management of the motorway

4. Has the case for change been made?

The M4 J43-47 WelTAG Stage 2 Report followed an earlier WelTAG Stage 1 assessment of M4 J35-49 in 2019, which was aimed at tackling congested locations on the trunk road and motorway network.

The case for change is that there are vehicle delays at the junctions, and that if traffic grows as forecast, delays may worsen in future.

Analysis of 2016 journey time data (pre-dating the Covid-19 pandemic) suggests that vehicle delays were occurring at that time, but that it was largely a peak-hour problem. It was worst in the afternoon peak, for westbound traffic, and in the summer. The data also points to traffic speeds that were normal and/or excessive (i.e. with median speeds above the speed limit) at and between some junctions, even at peak times and seasons.

The appraisal suggests that forecast growth in jobs and households will increase traffic demand. Traffic forecasts, using the South-West and Mid-Wales Transport Model, are that peak-period traffic will increase by 10-20% between 2019 and 2027; and by 23-53% between 2019 and 2042. However, these forecasts do not take account of the implications of the Covid-19 pandemic (including changes to patterns of working and work-related travel) or Welsh Government's goal to reduce car mileage per capita by 10% by 2030.

In the context of current Welsh Government policy, the case for the scheme with respect to congestion is weak.

The WelTAG Stage 2 Report identifies other problems: this area has high levels of deprivation and residents are less active and more likely to be obese than is average for Wales; there are road safety, air quality and noise issues; and public transport is poor. These problems suggest that there is a case for change, but they are unlikely to be addressed by the scheme.

5. Are the objectives aligned with current policy?

The first objective of improving highway efficiency and resilience of the motorway, interchanges, and connecting road network is poorly aligned with current policy, but achievement of this objective appears to have been prioritised in option identification and selection. The resulting scheme risks undermining mode shift targets by increasing car dependency.

Objectives to improve road safety and improve multi-modal travel options are aligned with current policy. However, the analysis of road safety shows that this section of the M4 has lower collision rates than other roads in Wales, and it is unclear how the scheme would improve road safety. The modification of the junctions in support of sustainable modes is a secondary feature of limited extent.

6. Did the scheme development process examine all appropriate options?

The longlist at WelTAG Stage 1 considered a wide range of sustainable transport options, including strategic bus corridors, rail improvements, active travel networks and travel planning. The Panel considers that these interventions may offer greater benefits, in the context of current Welsh Government policy, than the junction modifications that became the focus of WelTAG Stage 2.

Given the problems of physical inactivity and obesity identified in the WelTAG Stage 2 Report, options that improve provision for active travel are relevant. A large proportion of traffic using the M4 in this area is making short journeys, again pointing to the relevance of active travel. There are several National Cycle Network routes within the wider study area, and Junction 43 and Junction 45 should accommodate active travel because they are located on the desire line between residential and employment areas separated by the M4. The Walking, Cycling and Horse-riding Assessment and Review at WelTAG Stage 2 identified 29 opportunities to improve provision for active travel, but only a subset of these are proposed to be taken forward. Improvements to these junctions for active travel and bus

users have been limited by concerns about impeding general traffic flow or the safety risk of high traffic speeds. The Panel's view is that measures to increase active travel in this area merit greater priority.

Non-transport options (e.g. remote working hubs or strengthening development control to avoid new development close to existing junctions) were not considered but may be relevant. The Panel also considers that demand management merits more attention.

While some of the junction modifications are problematic because they would increase road capacity, and potentially cause induced traffic, this is not the case for all the measures. However, the measures that do not increase road capacity are less well defined, and given lower priority, than the capacity increases that accompany them. The Panel's view is that measures that do not increase road capacity have been given limited consideration, and this weakens the WelTAG Stage 2 recommendations.

7. What is the effect on carbon dioxide emissions?

The carbon emissions associated with construction have not been quantified.

WelTAG Stage 2 analysis suggests a very low reduction in carbon dioxide emissions in use. This is on the basis that the junction modifications would increase average speeds and/or reduce congestion. However, induced traffic is not considered, and this may increase emissions.

8. Will the scheme be good for people and communities?

The proposed active travel measures could improve access to employment sites and services for people who do not have access to a car. However, the nature and extent of benefit is not addressed in the WelTAG analysis.

The junctions are not within an Air Quality Management Area and at WelTAG Stage 2 the air quality impact is judged as neutral. Junctions 43, 44, and 45 are in Noise Action Planning Priority Areas for Roads. However, any increase in noise due to the modifications to the junctions would not be noticeable above existing levels of M4 mainline road traffic noise.

Although the scheme has an objective to improve road safety, the proposed junction modifications do not address road safety as a primary concern.

Modifications to Junctions 43 and 45 are unlikely to reduce existing severance. The provision of a new toucan crossing at Junction 47 would help to reduce existing severance for cyclists and pedestrians. Severance could be further reduced through additional crossing points on the other arms of the junction, to create a complete network of safe crossings: this is highlighted in the WelTAG Stage 2 Walking, Cycling and Horse-riding Assessment and Review.

9. Will the scheme be good for the environment?

There would be a moderate adverse effect on the water environment. Junction 45 is in an area of flood risk and the design would need to ensure the proposed junction modifications do not result in an increased risk of flooding.

There would be a moderate to large adverse effect on biodiversity. The proposals for Junction 43 would result in the loss of an area of ancient woodland. There is also a risk of loss of ancient woodland at Junction 47, but this could potentially be avoided by amending the scheme design. Crymlyn Bog RAMSAR / Special Area of Conservation / Site of Special

Scientific Interest and Tennant Canal Site of Importance for Nature Conservation are downstream of the proposed works at Junction 43 and could be indirectly impacted by the scheme.

Depending on the findings of protected species surveys, the proposed junction modifications could have negative impacts on a variety of species because of vegetation clearance.

The scheme does not affect any nationally or locally designated landscapes.

10. Will the scheme be good for places and the economy?

Heavy Goods Vehicles (HGVs) account for around 4% of traffic through the junctions. According to WelTAG analysis, the junction modifications would improve efficiency and reliability of freight transport. However, the extent of the problem and hence case for change, specifically relating to HGVs, has not been made: the journey time savings for HGVs at Junction 43, Junction 45 and Junction 47, at peak periods, are predicted to be between 40 seconds and 2 minutes.

There may be some small positive effects on local economic well-being. A toucan crossing at Junction 47 will connect a residential area with footpaths leading to Penllergaer Business Park. Other benefits to local economic well-being have not been demonstrated.

Benefit to Cost Ratios (BCRs) for modifications at Junction 43, Junction 45 and Junction 47 are more than 8, representing very high value for money. In most scenarios modelled, over 90% of the benefits are attributable to journey time savings. The BCRs assume significant traffic growth, which is not consistent with the Welsh Government aim to reduce car use; if traffic levels fell or were less than forecast, the BCRs would be reduced.

11. Will the scheme be good for culture and the Welsh language?

The Panel did not consider there to be materially significant impacts on the Welsh language or sustainable travel for arts, sports, recreation or cultural activities.

12. How robust is the case for the scheme to different futures?

The WelTAG Stage 2 appraisal notes that Junction 45 is in a location associated with fluvial and tidal flooding. Further assessment would be required to address flood risk and management of surface water.

The case for the scheme would be weakened under a scenario in which travel by private motor vehicle was lower.

13. Conclusion

The case for change is that there are vehicle delays at the junctions, and that traffic growth may cause delays to worsen in future. However, vehicle delays only occur to a limited extent. Traffic is forecast to grow, but this is not aligned with Welsh Government's goal to reduce car mileage, and if there is less traffic growth (or an absolute reduction in traffic), the rationale for the scheme is weak.

To the extent that the proposed increases in junction capacity are effective in reducing delays, they may make car travel more attractive, hence undermining the Wales Transport Strategy target to increase sustainable transport mode share.

The WeITAG Stage 2 Report identifies other problems: this area has high levels of deprivation and residents are less active and more likely to be obese than is average for Wales; there are road safety, air quality and noise issues; and public transport is poor. These problems are unlikely to be addressed by the scheme. The Panel considers that non-transport options, demand management and sustainable transport options may offer greater benefits.

The scheme would have a moderate to large adverse effect on biodiversity, including causing loss of an area of ancient woodland.



SUMMARY

The A4042 Corridor Scheme would involve works on and adjacent to the dual-carriageway A4042 between Little Mill north of Pontypool and Llantarnam, south-east of Cwmbran, and on the A472 west through Pontypool.

The scheme would include a 2.5km cycleway; modifications of five roundabouts; and minor active travel and public transport measures. A temporary 50mph speed limit would be made permanent at approaches to roundabouts and could be extended.

The case for change is based on reducing the severance caused by the A4042; reducing delays at junctions in peak periods; and potential safety concerns at junctions. The Panel considers the case for change is partly made:

- The assessment of severance is appropriate. There are limited pedestrian footways and a number of uncontrolled crossings that are unsuitable due to high traffic speeds.
- There is peak-hour congestion at some junctions, notably Rechem Roundabout on the A4042 and a roundabout on the A472, but other junctions are less congested.
- There may be a safety case for intervention at one roundabout (Crown Roundabout), but elsewhere measures already taken may have solved identified safety issues.

Severance would be reduced by the proposed cycleway, signalised active travel crossings at roundabouts, improved crossing provision elsewhere, and speed limit reductions. The proposed measures at roundabouts would improve safety. Signalisation of the A472 roundabout would improve vehicle flow.

At two roundabouts (Croesyceiliog and Llanfrechfa) the preferred scheme would increase capacity. The Panel does not consider this is appropriate: these are not congested junctions, and the scheme may increase traffic and worsen congestion elsewhere including at Rechem Roundabout. However, the alternative Do-Minimum schemes at Croesyceiliog and Llanfrechfa Roundabouts would be beneficial: they would reduce severance and improve safety.

The Panel considers that the scheme offers benefits in supporting modal shift and improving safety.

If the capacity increases at Croesyceiliog and Llanfrechfa Roundabouts do not proceed, the embodied carbon emissions associated with the remaining construction would be small and the scheme would not result in induced traffic. The lower speed limit would potentially reduce carbon emissions in use. The scheme is mainly within the existing highway boundary but further work will be required to establish any effects on biodiversity.

The Panel makes the following recommendation:

Welsh Government could continue to support the A4042 Corridor scheme. The objectives should be reviewed to fully accord with current policy and reflect the Sustainable Transport Hierarchy. Scheme elements that would increase capacity for private cars should not be progressed.

1. Scheme description

The WelTAG Stage 2 Study covers 12km of the A4042 dual-carriageway trunk road between Little Mill, 4km north of Pontypool, and Llantarnam, south-east of Cwmbran, and 2.7km of the A472 west through Pontypool, managed by Torfaen County Borough Council.

The main elements of the scheme are construction of a 2.5km cycleway between Mamhilad Roundabout on the A4042 north of Pontypool and Pontypool & New Inn Railway Station; significant (Do-Something) modifications of two roundabouts on the A4042 (Croesyceiliog and Llanfrechfa Roundabouts); and smaller (Do-Minimum) modifications of two roundabouts on the A4042 (Rechem and Crown Roundabouts) and one roundabout on the A472. There are small-scale active travel and public transport measures. A temporary 50mph speed limit would be made permanent at approaches to roundabouts and could be extended.

The Mamhilad Cycleway is estimated to cost £9 million and the roundabout modifications £2.5 million - £3.9 million.

There are seven roundabouts on the A4042, as follows and moving from the north to the south:

- J2: Mamhilad four-arm roundabout at junction of A4042 and Old Abergavenny Road
- J3: Three-arm roundabout at junction of A4042 and Usk Road
- J4: Heron Road six-arm roundabout at junction of A4042, A472 and three access roads to services, industrial and retail land uses
- J7: Rechem four-arm roundabout at junction of A4042, A4051 and Newport Road
- J8: Croesyceiliog four-arm roundabout at junction of A4042, Tre-Herbert Road and Edlogan Way
- J9: Llanfrechfa four-arm roundabout at junction of A4042, Caerleon Road and Turnpike Road
- J10: Crown five-arm roundabout at junction of A4042, Crown Road, Newport Road and Llanfrechfa Way

Other junctions within the scheme area are:

- J1: Little Mill restricted movements signal-controlled junction of A4042 and A472, and the two junctions on the A472
- J5: Grade-separated junction of A472 with Rockhill Road in Pontypool
- J6: Three-arm part-time signalised roundabout at junction of A472 and A4043 west of Pontypool

North of Heron Roundabout (J4), the A4042 Annual Average Daily Traffic (AADT) is less than 20,000 vehicles. The length between Heron Roundabout and Rechem Roundabout (J7) carries more than 40,000 AADT, and the other sections of route carry between 30,000 - 40,000 AADT. The year for the flow data is not given, and the flows of heavy goods vehicles, while not quoted, are noted as being typical.

There is a temporary 50mph speed limit on the A4042 between Usk Road Roundabout (J3) and Croesyceiliog Roundabout (J8), and a 70mph limit from there south. The speed limit on the A472 to the west is 50mph; at the A472/A4043 roundabout junction it is 40mph.

2. Objectives

The objectives are:

- Improve the operational efficiency of the A4042 Corridor, without having a significant

adverse impact on the environment

- Reduce severance along the A4042 Corridor, while ensuring the safety of active travel users
- Improve safety for all road users
- Support the implementation of emerging Cardiff Capital Region, Transport for Wales and Welsh Government schemes and strategies, as well as the relevant measures identified by the South-East Wales Transport Commission

3. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- WelTAG Stage 1 Report: A4042 Corridor (December 2020)
- WelTAG Stage 1 IAR: A4042 Corridor (December 2020)
- Draft WelTAG Stage 2 Report: A4042 Corridor (March 2022)
- Draft WelTAG Stage 2: A4042 Corridor Junction Options Technical Note (March 2022)

Points of clarification were addressed in a meeting with the scheme sponsor.

4. Has the case for change been made?

The case for change relates to severance and poor provision for pedestrians and cyclists to cross the A4042; vehicle delays in peak periods; and safety concerns at junctions. The Panel considers the case for change is partly made.

The assessment of severance is appropriate. There are limited pedestrian footways and a number of uncontrolled crossings that are unsuitable due to high traffic speeds.

In relation to vehicle delays, the WelTAG Stage 1 Report notes that the following four junctions are not congested: Little Mill (J1); Mamhilad Roundabout (J2); Usk Road Roundabout (J3); and Rockhill Road (J5). Inrix analysis of GPS data is used to illustrate the degree of congestion at five of the remaining six junctions. The analysis, using 2019 data, shows relatively little congestion at three roundabouts on the A4042 (Croesyceiliog J8, Llanfrechfa J9 and Crown J10). The A4042 northbound approach to Rechem Roundabout (J7) is congested in peak periods, and the analysis suggests this can extend back to Croesyceiliog Roundabout. There is congestion on the east-west arms of the A472/4043 Roundabout (J6).

Congestion at some junctions is also assessed using the South-East Wales Transport Model. This indicates what is described as 'moderate delay, between 4 and 10 seconds' in the morning peak period at two roundabouts (Heron J4 and Croesyceiliog J8); and 'notable delay, more than 10 seconds' in the morning peak period at three roundabouts (Rechem J7, Llanfrechfa J9 and Crown J10). The modelling predicts little change between 2015 (the base year) and 2026, but worse congestion by 2036.

The WelTAG Stage 1 IAR notes that Transport for Wales does not consider there are significant bus pinch-points within the A4042 Corridor, although buses are affected by queueing at Rechem Roundabout (J7) during peak periods. The WelTAG Stage 1 Report summarises vehicle speed data from four count sites on the A4042 between Little Mill (J1) and Llanfrechfa (J9); only the site south of Rechem Roundabout (J7) shows significantly lower speeds on weekdays than at weekends.

Taking all evidence together, the Panel's judgement is that the main locations where a congestion issue has been demonstrated are the A472/A4043 Roundabout (J6) and Rechem Roundabout (J7).

In relation to safety, the WelTAG Stage 2 Report presents personal injury collision counts for the junctions for five years of October 2014 - September 2019, and in addition provides totals for the two years of 2019 and 2020. These data cannot be combined because of the unknown number in 2019 (however, the WelTAG Stage 2 Report does add these two totals together). There were no fatalities recorded at any of the junctions. The totals in the earlier five- and later two-year periods at each junction are as follows:

	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10
2014-19	4	0	2	22	3	4	6	4	6	7
2019-20	5	1	1	5	2	1	0	1	2	2

The Welsh Government criterion for a collision cluster site is four collisions in the most recent three-year period. Factoring to a five- and a two-year period, this is equivalent to 6.7 and 2.7 collisions respectively. This suggests there may be a collision problem at Little Mill (J1), Heron Roundabout (J4) and Crown Roundabout (J10). The severity ratio at Little Mill (J1) was 50% in the five-year period and 60% in the two-year period. Safety schemes have been constructed at Little Mill and Heron Road since completion of the WelTAG Stage 1 Report, and so it is proposed to monitor the junctions and not to take further action until sufficient data are available to evaluate the effect.

The WelTAG Stage 2 Report also suggests that there may be safety issues at three other junctions: Rechem (J7); Croesyceiliog (J8); and Llanfrechfa (J9) Roundabouts, but this is not substantiated by the data. The Panel reviewed collision data for individual years for these three junctions, and found that collisions have been declining at Rechem Roundabout since 2013 and there have been no collisions there since 2018; collisions have been low at Croesyceiliog for the last five years; and were higher for one year (2019) at Llanfrechfa but otherwise low.

The Panel's conclusion is that there may be a safety case for intervention at Crown Roundabout (J10), but the safety case for intervention elsewhere is not strongly evidenced.

5. Are the objectives aligned with current policy?

The objectives are generally aligned with Welsh Government policy. They could be more explicit in applying the Sustainable Transport Hierarchy, which may better influence option selection and result in greater impact on modal shift to active travel and public transport.

The first objective, to improve operational efficiency, would not be a priority objective in relation to the Wales Transport Strategy. Rather than being expressed in terms of reducing severance and improving safety, the second objective may be better expressed in terms of completing attractive and comfortable networks for active travel. Public transport is not directly mentioned within any of the objectives.

6. Did the scheme development process examine all appropriate options?

Interventions proposed at WelTAG Stage 2 are as follows:

Active travel

- Rationalisation of crossing opportunities (AT1, AT2); introduction of, or improvements to existing, active travel route signage (AT5); signage warning drivers of active travel

users (AT6); improvements to active travel linkages to bus stops (AT7) (under £500,000).

- **Mamhilad Cycleway** linking the 900-home urban village development at Mamhilad with Pontypool & New Inn Railway Station (AT9/15/16) (£9 million).

Public transport (under £500,000)

- Improvements to the existing bus stop layby provision (PT1).
- Improvements to the existing bus stop facilities (PT2).

Vehicle infrastructure

- Rationalisation of laybys (VI1) (£20,000).
- **Junction 6 A472/A4043 Roundabout (Do-Minimum):** Full signalisation of the roundabout, minor modifications to road markings, and introduction of stop lines at each roundabout entry (VI5) (£600,000 - £650,000).
- **Junction 7 Rechem Roundabout (Do-Minimum):** Introduction of a footway on the northbound side of the A4051 arm to connect the existing footway to proposed signal-controlled crossing to the south, and an extension of the existing footway on either side of the A4042(S) arm. Implementation of a permanent 50mph speed limit (VI8) (£300,000 -£350,000).
- **Junction 8 Croesyceiliog Roundabout (Do-Something):** Introduction of spiral road markings on the circulatory carriageway; a third lane on approach to the roundabout which requires widening into the central reserve on both A4042 arms. Introduction of a signalised pedestrian crossing to the south of the roundabout along the existing pedestrian desire line and implementation of a permanent 50mph speed limit (VI8) (£1 million - £1.1 million).
- **Junction 9 Llanfrechfa Roundabout (Do-Something):** Minor carriageway widening into the central reserve of the A4042(N) to increase the entry width, as well as carriageway widening into the central reserve and verge of the A4042(S) arm to accommodate an additional lane. Introduction of a signal-controlled crossing between the Grange Hospital and settlements to the west of the A4042 (including new section of footway to link to the Accident and Emergency Department at the hospital and existing footways to the west of the A4042). The implementation of a permanent 50mph speed limit (VI26) (£0.9 million - £1 million).
- **Junction 10 Crown Roundabout (Do-Minimum):** Signal-controlled crossings on the A4042(N) and A4042(S) arms in place of the existing uncontrolled crossing points. A permanent 50mph speed limit would be implemented to accommodate the pedestrian crossings (VI28-32) (£650,000 - £750,000).
- **Rationalisation of minor junctions:** Private and agricultural accesses at six locations (VI44) (less than £400,000).
- **Smart highways:** Introduction of Variable Message Signage throughout the corridor (SH2) (less than £500,000).

The Panel's assessment of the interventions is as follows:

Mamhilad Cycleway (AT9, AT15, AT16) would be a 2.5km route along the A4042 between Mamhilad Roundabout (J2) and Pontypool & New Inn Railway Station, north of Heron Road Roundabout (J4). Outline planning permission was granted in 2020 for development of 900 dwellings at Mamhilad. The Propensity to Cycle Tool was used to estimate the potential daily commuter cycle trips on this route as 475 per day, once the Mamhilad development is complete.

If other trip purposes are included it is estimated that the route could cater for over 1,000 trips per day. Given that AADT on this section of the A4042 is reported to be under 20,000, the Panel agrees with the assessment in the WelTAG Stage 2 Report that the scheme could bring significant benefit to the transport network. It would reduce severance for residents of the Mamhilad development.

At the **A472/4043 junction (J6)**, the proposed signalisation may enable traffic to flow more freely, and reduce carbon emissions.

At **Rechem Roundabout (J7)**, the proposed footway improvements, signalised pedestrian crossing and permanent 50mph speed limit would reduce severance. This is the most congested junction on the A4042, and signalisation of the main arms was modelled but does not resolve the traffic delay. The WelTAG Stage 2 Report rules out a larger scale intervention, such as a through-about, because it would significantly increase capacity and so does not align with the Wales Transport Strategy; the Panel agrees with this conclusion.

At **Croesyceiliog (J8)** and **Llanfrechfa (J9) Roundabouts**, signalised pedestrian crossings and a permanent 50mph limit would reduce severance. The Panel does not consider that the proposed increases in capacity are appropriate: these are not congested junctions, and there is a risk that an increase in capacity will lead to increases in traffic, worsening congestion elsewhere on the corridor, including at Rechem Roundabout. The Do-Minimum option identified at WelTAG Stage 2 may be more appropriate. This includes pedestrian crossings and a 50mph limit. The Junction Options Technical Note states that at both locations, the Do-Minimum option could improve legibility and traffic management.

At **Crown Roundabout (J10)**, the proposed road markings, signalised pedestrian crossing and permanent 50mph speed limit would reduce severance and may improve safety.

The small-scale active travel measures (AT1, AT2, AT5, AT6, AT7), public transport measures (PT1, PT2), rationalisation of laybys and minor junctions (VI1, VI44), and variable message signs (SH2) may have a minor benefit for road safety and reduction of severance.

The Panel also has the following observations:

The current **50mph speed limit** between Usk Road (J3) and Croesyceiliog (J8) Roundabouts is temporary, and was introduced due to safety concerns in relation to the central reservation barrier. The interventions described above include a permanent 50mph limit at four junctions. The WelTAG Stage 2 Report proposes that a reduced 50mph speed limit along the entire corridor should be explored at the next stage of appraisal, as it could have benefits for air quality and noise. The Panel agrees, and notes that it could also have benefits for safety and carbon emissions.

The WelTAG Stage 1 IAR noted that the Marches Rail Line lies parallel to the A4042 corridor, and the WelTAG Stage 1 Report notes that proposals to increase service frequency to every 15 minutes would be progressed within the South Wales Metro programme. These measures would have potential to reduce congestion where it occurs on the A4042 corridor.

The WelTAG Stage 2 Report notes that some measures within AT1 and AT2 would implement active travel facilities that are identified in Torfaen County Borough Council's Existing Route Map (ERN) and Integrated Network Map (INM). Since the case for change for the A4042 Corridor scheme relates in part to the poor provision for pedestrians and cyclists, the Panel suggests that all locations identified in the ERM or INM as requiring active travel crossings or sections of active travel path along the A4042 should be reviewed, and where possible included in the scheme. Emphasis should be placed in subsequent appraisal stages on working with Torfaen

County Borough Council and Newport City Council to ensure full connection from the trunk road crossings to the wider active travel network.

The WelTAG Stage 1 appraisal focussed on the same study area as the WelTAG Stage 2 appraisal, but also the 3.7km length of A4042 south of Crown Roundabout (J10) as far as the M4, and the 2.5km length of the A4051 that parallels the A4042 at its southern end and that lies to its west through Malpas. Four work packages were identified at WelTAG Stage 1 in order of priority:

- WP1: A4042 Corridor – Pontypool to Llantarnam (the WelTAG Stage 2 study covered by this scheme report)
- WP2: A4042/A4051 Malpas (from Llantarnam to the M4)
- WP3: Pontypool to Usk Cycleway
- WP4: Managing demand

The WelTAG Stage 1 Report recommended that WP1 and WP2 be taken forward to WelTAG Stage 2. The Panel considers that if WP2 is progressed, it should seek to deliver modal shift, and should be aligned with work by Newport City Council and the Burns Delivery Board to improve bus and cycle provision on radial corridors into Newport. Similarly, the focus for WP3 (Pontypool to Usk Cycleway) should be to support modal shift for travel between main journey origins and destinations. The two elements of WP4 were road user charging and a travel demand strategy. The Panel notes that the Burns Delivery Board and Newport City Council are developing travel demand management initiatives in Newport.

7. What is the effect on carbon dioxide emissions?

The carbon impacts of scheme options have not yet been assessed. There would be a slight increase in embodied carbon from construction at Croesyceiliog and Llanfrechfa Roundabouts, and a risk of greater carbon emissions in use if the increase in capacity at the roundabouts led to induced traffic. There would be a slight increase in embodied carbon from construction of Mamhilad Cycleway. There are opportunities for carbon reduction from a lower speed limit plus enforcement and from modal shift, and these should be estimated in subsequent stages of the appraisal.

8. Will the scheme be good for people and communities?

The Mamhilad Cycleway would improve accessibility north of Pontypool, increase physical activity, reduce severance, and enhance journey quality. The improvements to crossing facilities at and between junctions would improve safety and reduce severance. Public transport interventions are limited to minor improvements to bus stop laybys and facilities, but they would improve journey quality and accessibility. If the temporary 50mph speed limit is made permanent, it could improve safety and air quality, and reduce noise pollution.

The Panel notes that the extent of the Llanfrechfa site, to the east of the A4042, is now likely to be larger than the appraisal studies anticipated. Like Mamhilad, Llanfrechfa has good opportunities to design-in a high proportion of active travel and public transport, particularly given the proximity of Grange University Hospital. Changes to the A4042 corridor should facilitate and complement such developments.

If the capacity of Croesyceiliog (J8) and Llanfrechfa (J9) Roundabouts were to increase, there is a risk of increased traffic which could worsen air quality along the A4042 corridor and potentially in Newport where there are Air Quality Management Areas.

There are noise priority and proximity areas on the A4042 between Mamhilad (J2) and Usk Road (J3) Roundabouts; and between Croesyceiliog (J8) and Crown (J10) Roundabouts. Increased capacity at the roundabouts could increase noise in these areas.

9. Will the scheme be good for the environment?

The environmental impact has not yet been assessed. Planned interventions are within or immediately adjacent to the current highway boundary. There are areas of ancient woodland adjoining the A4042 Corridor, and the road intersects ancient woodland at Heron Roundabout (J4) and Rechem Roundabout (J7). There is a risk that increased capacity at Croesyceiliog (J8) and Llanfrechfa (J9) Roundabouts could result in increased traffic and pollution, leading to indirect impacts on ancient woodland.

The scheme would not affect any nationally-designated landscapes.

10. Will the scheme be good for places and the economy?

No effects on local or national economic well-being, or on local place-making and liveability, have been identified. The WelTAG Stage 1 Report set out committed and proposed developments in the area. However, not all development, such as the full extent of the large strategic development around the Grange University Hospital, has been considered.

The value for money of the scheme has not been calculated.

11. Will the scheme be good for culture and the Welsh language?

There is unlikely to be impact on the historic and cultural environment or the Welsh language. Five heritage assets have been identified within the vicinity of the scheme, including listed buildings or heritage parks and gardens. The WelTAG Stage 2 appraisal anticipates no positive or negative effects.

12. How robust is the case for the scheme to different futures?

Sections of the A4042 corridor are in a location identified by Natural Resources Wales as vulnerable to flooding from rivers. In the scheme documents there is limited consideration of potential flooding impacts and resilience to climate change, but the A4042 is at an elevated location for most of its route.

13. Conclusion

The Panel considers that the case for change has been made in relation to severance and safety, and most of the proposed measures are appropriate.

The Panel does not consider that the increases in capacity at Croesyceiliog and Llanfrechfa Roundabouts in the preferred Do-Something scheme would be appropriate: these are not congested junctions, and the increase in capacity may lead to increases in traffic and congestion elsewhere on the corridor, including at the more congested Rechem Roundabout. However, the alternative Do-Minimum schemes at Croesyceiliog and Llanfrechfa Roundabouts would be beneficial.

Emphasis should be placed in the following appraisal stages on working with Torfaen County Borough Council and Newport City Council to ensure full connection from the trunk road crossings to the wider active travel network. Development of other work packages identified in the WelTAG Stage 1 Report should support modal shift, aligning with Burns Delivery Unit

initiatives with Newport City Council in Newport (6km to the south) to support modal shift to buses and cycling.

The objectives could be more explicit in applying the Sustainable Transport Hierarchy which may better influence option selection and have more impact on enhancing modal shift to active travel and public transport.

If the increases in junction capacity at Croesyceiliog and Llanfrechfa Roundabouts do not proceed, the embodied carbon emissions associated with the remaining construction would be small and the scheme would not result in induced traffic. The lower speed limit would potentially reduce carbon emissions in use. The scheme is mainly within the existing highway boundary and so unlikely to have significant effects on biodiversity, but further work will be required to establish this.



SUMMARY

The Cardiff Eastern Transport Corridor study identifies five packages of interventions to take forward to WelTAG Stage 2. These are: active travel routes; cycle facilities; strategic bus enhancement corridors; a highway scheme known as the Eastern Bay Highway Corridor 'lower' intervention; and a package of active travel, public transport and public realm measures on Newport Road described as an Integrated and Smart Strategic Corridor.

The case for change is that local transport problems in south-east Cardiff are constraining economic activity and land development. The study aims to improve connectivity and enhance active travel and public transport provision to reduce car-dependency. The Panel agrees there is a case for change.

Four of the five packages of interventions that the study identifies to take forward (numbered 1.1, 1.2, 2.1, 5.1) would support modal shift to active travel and public transport. They would not increase road capacity for private motorised vehicles, or lead to higher speeds resulting in higher carbon emissions in use. There are no concerns in relation to impacts on protected sites or ancient woodland for these schemes. The Panel considers that they could proceed, so long as the construction carbon in the larger schemes is minimised.

One of the five packages, the Eastern Bay Highway Corridor 'lower intervention' affects Rover Way, a single-carriageway road in an industrial area that carries a large amount of freight traffic. The scheme is not yet fully developed and so it is difficult to make a judgement about whether it would be consistent with current policy. It could involve realignment of the road to accommodate extension of existing developments; junction modifications to prioritise strategic east-west traffic movements; and provision of an active travel route. The Panel considers that realignment to cater for existing land uses, minor changes to junction layout, provision for active travel, and measures to improve Heavy Goods Vehicle safety could be consistent with current policy. However, there is also potential for the scheme to lead to increased demand, and hence increase carbon emissions. Any highway or junction modifications should not increase capacity for private cars, as this would not be consistent with Welsh Government's aim to reduce car mileage per person.

The study overlaps and has interdependencies with other programmes and schemes in the area. Three packages that are identified for delivery with other partners (Cardiff Metro Crossrail, new railway stations, and electric vehicle charging infrastructure) are aligned with current policy.

The Panel makes the following recommendation:

Welsh Government could continue to support the Cardiff Eastern Transport Corridor study, as it could reduce car mileage and support modal shift to active travel and public transport. Any highway works forming part of the packages going forwards should not increase private car capacity.

1. Scheme description

The WelTAG Stage 1 study identified 12 multi-modal intervention packages in south-east Cardiff. Five packages were proposed for further study at WelTAG Stage 2 as follows: active travel routes (1.1); cycle facilities (1.2); strategic bus enhancement corridors (2.1); the Eastern Bay Highway Corridor 'lower' intervention (4.2.1); and Newport Road integrated and smart strategic corridor (5.1).

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- Improving prosperity for all to the south-east of Cardiff: case for change report (October 2018) (included as Appendix A of the WelTAG Stage 1 Report)
- WelTAG Stage 1 Report: Cardiff Eastern Transport Corridor (March 2021)

3. Objectives

The objectives are:

- People and businesses are more connected:
 - Reduce severance and increased local travel connections between local communities
 - Increase strategic transport connections from the east into the city centre, Cardiff Bay and into Newport
 - Improve public transport network resilience, road safety and journey time reliability
- People are healthy and more active:
 - Improve and promote active travel (commuting, school, services, recreation and other necessary trips)
- People and the city region are more prosperous:
 - Improve accessibility to employment and education opportunities
 - Facilitate regional economic growth and development to bring enhanced prosperity
 - Improve business to business connectivity
- Tackling climate change and the environment:
 - Protect and enhance the natural and built environment
 - Reduce air quality and noise impacts on local communities and the city centre
 - Reduce carbon impacts of travel, working to achieve the net zero emissions target for eastern Cardiff before 2050.

4. Has the case for change been made?

The case for change is that local transport problems in south-east Cardiff are constraining economic activity and land use development. The problems include poor active travel connectivity and permeability, unattractive active travel provision, varied bus frequency, intermittent bus priority measures and bus infrastructure, lack of rail stations, and highways issues (congestion and unreliable journey times).

It is suggested that addressing these localised transport problems will support economic prosperity, and improve access to employment for deprived communities of East Cardiff and

connections between businesses. The study recognises the potential to reduce reliance on modes of travel that emit greenhouse gases and have other negative environmental disbenefits. The Panel considers that the case for change has been made.

5. Are the objectives aligned with current policy?

The objectives demonstrate good alignment with current policy, particularly where there is a focus on public transport, active travel including its health benefits, increased prosperity, enhancing the environment and reducing carbon impacts.

However, some options (4.2.1, 4.2.2, 4.3.1 and 4.3.2, described in section 6) are identified in the appraisal as having a negative impact on the objective of tackling climate change.

6. Did the scheme development process examine all appropriate options?

The study area overlaps with and has interdependencies with other programmes including South Wales Metro schemes, Burns Delivery Unit schemes, and the introduction of urban 20mph speed limits from September 2023.

The 12 intervention packages are listed below with their estimated cost and the WeITAG Stage 1 Report recommendation to progress, deliver with others, defer or reject. Five of the 12 schemes are recommended for progression, one of which would be partly delivered by others; three are recommended to be taken forward as part of wider delivery; three are deferred; and one is rejected.

Active travel and streets for people

- 1.1 Active travel routes (5 million - £25 million; progress)
- 1.2 Cycle facilities (up to £5 million; progress)

Bus growth

- 2.1 Strategic bus enhancement corridors (£25 million - £100 million; progress / delivery with others)
- 2.2 Bus interchange and park & ride (£5 million - £25 million; defer)

Cardiff Metro

- 3.1 Cardiff Metro Crossrail (£100 million+; delivery with others)
- 3.2 New railway stations (£25 million - £100 million; delivery with others)

Future of the car

- 4.1 Electric vehicle charging infrastructure (up to £5 million; delivery with others)
- 4.2.1 Eastern Bay Highway Corridor – ‘lower’ intervention (£5 million - £25 million; progress)
- 4.2.2 Eastern Bay Highway Corridor – ‘higher’ intervention (£25 million - £100 million; reject)
- 4.3.1 Accessing key employment areas – Cypress Drive to Wentloog Avenue (£25 million - £100 million; defer)
- 4.3.2 Accessing key employment areas – A48(M) to Wentloog Avenue (£25 million - £100 million; defer)

Integrated Strategic Corridor

- 5.1 Newport Road Integrated and Smart Strategic Corridor (a package of active travel,

public transport and public realm measures) (£5 million - £25 million; progress)

Four of the five options to be progressed (1.1, 1.2, 2.1, 5.1) and two to be delivered with others (3.1, 3.2) would encourage modal shift to active travel and public transport, and are therefore consistent with the Sustainable Transport Hierarchy and current policy. Option 4.1, to provide electric vehicle charging infrastructure and switch to a zero-carbon bus fleet, is also consistent with current policy.

The remaining scheme to be progressed (4.2.1 Eastern Bay Highway Corridor 'lower' intervention) is acknowledged by the WelTAG Stage 1 Report to potentially increase travel demand. The scheme affects Rover Way, a single-carriageway 40mph road carrying a high proportion of freight traffic, that serves industrial and commercial sites and a local authority-licensed residential caravan site for gypsies, Roma and travellers. Rover Way has no provision for pedestrians and cyclists. The scheme is at an early stage of development, but the WelTAG Stage 1 Report indicates that it would involve the following:

- Realignment of Rover Way between the A4232 Southern Way Roundabout and the Ocean Way / A4232 Eastern Bay Link Roundabout to accommodate extension of existing development;
- Modification of five junctions along Rover Way to prioritise strategic east-west movements: Ffordd Pengam (access to a Tesco store); Seawall Road; Tide Fields Road (access to Cardiff East waste treatment works); Darby Road (access to Tremorfa Industrial Estate); and Ocean Way (access to Cardiff Docks);
- Provision of an active travel route and crossing facilities.

Because the Rover Way scheme is not yet fully developed, it is difficult to make a judgement about whether it would be consistent with current policy. The Panel considers that highway or junction modifications that increase capacity should not go forwards, as they could increase car travel demand (as acknowledged in the WelTAG Stage 1 Report) and would not therefore be consistent with Welsh Government's aim to reduce car mileage per person. Realignment of the road to cater for existing land uses, minor changes to junction layout, provision for active travel, and measures to improve Heavy Goods Vehicle safety could be consistent with current policy.

Two road schemes are deferred (4.3.1 Cypress Drive to Wentloog Avenue and 4.3.2 A48(M) to Wentloog Avenue). These would both include new highway links. Neither of these schemes would be consistent with Welsh Government's aim to reduce car mileage per person. Although described as schemes to access employment areas, they would both provide through-routes and thus increase private motorised vehicle capacity.

The Panel notes that two elements within options 2.2 and 3.2 could encourage car use, although they are not road schemes. Within option 2.2 (bus interchange and park & ride), one element would involve construction of a park & ride site adjacent to the A48 / Cypress Drive Roundabout, combined with highway modifications. Within option 3.2, the large number of parking spaces (approximately 2,000) proposed for Cardiff Parkway railway station may also encourage car use. The remaining elements of options 2.2 and 3.2 are consistent with current policy.

The Panel considers it appropriate that some options are deferred, only to be considered in the long term and because of being dependent on other interventions. It is also appropriate to reject option 4.2.2, which would involve dualling of Rover Way and would be likely to have a significant adverse carbon impact.

The Panel considers that the WelTAG Stage 1 Report examined a sufficiently wide range of options.

7. What is the effect on carbon dioxide emissions?

The impact on carbon dioxide emissions has not yet been assessed.

The interventions in the larger infrastructure packages could have significant embodied carbon emissions from construction. Highway interventions that increase capacity for private motorised vehicles may also increase carbon dioxide emissions in use.

Active travel and public transport options could reduce carbon dioxide emissions in use as a result of modal shift, potentially offsetting carbon dioxide emissions from construction.

8. Will the scheme be good for people and communities?

The study identified problems that adversely affect local communities, including deprivation, severance, noise, poor air quality, poor quality pedestrian and cycling provision, poor public transport provision (including no railway station between Cardiff and Newport), road congestion and road safety.

The active travel and public transport improvements would provide better access to employment and services for people who do not have access to a car. There is an Air Quality Management Area on Newport Road (A4161) near Wordsworth Avenue, and prioritisation of buses and active travel on Newport Road could improve air quality, especially if combined with zero-carbon buses. Measures on Newport Road could also reduce severance for the communities of Old St Mellons, Rumney, Newport Road and Splott that are bisected by the corridor, through better crossing facilities, speed reduction measures and reallocation of road space.

If highways schemes led to private car capacity increases, there is a risk that air quality could be worsened.

9. Will the scheme be good for the environment?

The options that the local authority proposes to progress would not have impacts on environmentally-protected sites.

Two deferred options (4.3.1 and 4.3.2) are in the Wentloog Levels area and could have adverse impacts on biodiversity due to their proximity to the Severn Estuary Special Area of Conservation, Special Protection Area, Ramsar site and Site of Special Scientific Interest (SSSI), and Gwent Levels SSSI. These options could also have direct or indirect impacts on an area of ancient woodland east of Cypress Drive. The possible park & ride site adjacent to the A48 / Cypress Drive Roundabout (part of option 2.2, also deferred) could have an indirect impact on ancient woodland.

Within the study area, the Gwent Levels are a Registered Landscape of Outstanding Historic Interest. The park & ride site (part of option 2.2, deferred) and option 4.3.1 (deferred) could have a visual impact on this landscape.

10. Will the scheme be good for places and the economy?

The study is seeking to address economic disadvantage in south-east Cardiff. The WeITAG Stage 1 Report states that the proposed options could provide regeneration benefits to the communities of east Cardiff and more widely, resulting from the provision of access to development sites and the city centre. The report also suggests there may be benefits from the proposed public transport interchanges and railway stations in encouraging development. Options improving sustainable transport could have benefits for place-making and local economic well-being. Highway interventions may improve journey time reliability for businesses and freight.

11. Will the scheme be good for culture and the Welsh language?

The scheme has the potential to improve sustainable transport access to Welsh-language schools and to local and wider city cultural facilities. Other than the Gwent Levels, mentioned above, there are no impacts on heritage.

12. How robust is the case for the scheme to different futures?

Options involving highway changes in response to congestion may not be robust to future-year scenarios with significant reductions in car use. Active travel and public transport packages, however, would support future-year scenarios with significant reductions in car use.

There are flood risks relating to climate change impacts in parts of the study area.

This corridor scheme overlaps and has interdependencies with wider programmes, e.g. the South Wales Metro programme, Burns Delivery Unit schemes, and the introduction of urban 20mph speed limits from September 2023. Collaboration will therefore be required with other scheme sponsors.

13. Conclusion

The WelTAG Stage 1 study considered multi-modal options for improving local and strategic connectivity in south-east Cardiff. The Panel considers that the case for change has been made. A suitably wide range of options was considered. Four of the five packages proposed to be progressed to WelTAG Stage 2 would support modal shift to active travel and public transport, as follows: active travel routes (1.1); cycle facilities (1.2); strategic bus enhancement corridors (2.1); and Newport Road Integrated and Smart Strategic Corridor (5.1). These packages would not increase road capacity for private motorised vehicles, or lead to higher speeds and higher carbon emissions. The Newport Road Corridor will be a large construction scheme and it will be important that the construction carbon is minimised. There are no concerns in relation to impacts on protected sites.

The Panel considers that the Eastern Bay Highway Corridor 'lower' intervention (4.2.1) has the potential to increase capacity and hence increase carbon emissions. Any highway or junction works should not increase private car capacity, as this would not be consistent with Welsh Government's aim to reduce car mileage per person. The scheme would not impact on protected sites. If it proceeds, it will be important that the construction carbon is minimised.



SUMMARY

The scheme covers a 4.5km section of the A470 north of M4 Junction 32 (Coryton); and a 19km section of the M4 between Junction 32 and Junction 35. It includes increases in capacity at Nantgarw Junction on the A470 and Junctions 33 and 34 on the M4; additional lane capacity on the A470 and M4 between Junctions 33 and 34; and traffic management measures. The speed limit would be reduced to 50mph on the A470 between Pontypridd and Coryton, to improve air quality; and active travel routes would be improved at A470 junctions.

These sections of the A470 and M4 carry high flows of traffic and are of significance for the Cardiff city region. The roads are operating within capacity, but queuing and weaving at the junctions can result in variability in journey time of 25-50%, and potentially contribute to collisions. The scheme is intended to reduce delays and improve journey time reliability.

The development of the scheme predates the Wales Transport Strategy and the Covid-19 pandemic, raising doubts over the case for change and the chosen options. The scheme would increase private car capacity, which is inconsistent with Welsh Government's aim to reduce private car trips.

The Panel considers that journey reliability issues on the A470 and M4 would be better addressed at a regional level, looking at the whole Cardiff City Region. In the context of the Wales Transport Strategy, this would take account of changing patterns of work and commuting; changing connectivity requirements for people and goods; and opportunities to reduce the need to travel. It would be likely to result in a package of active travel and public transport improvements (in line with the Sustainable Transport Hierarchy); engagement with employers to reduce car commuting and support remote working; and demand management. Some elements of the current scheme that do not increase private car capacity might be retained: lower speed limits (which offer air quality and safety benefits and would reduce carbon dioxide emissions); active travel improvements; junction signalisation; overhead gantries with variable message signs for speed limit and lane allocations; network management plans and lane reallocation.

The Panel makes the following recommendation:

The scheme should not proceed. The case for change is not well-aligned with Welsh Government's aim to reduce car mileage, and the scheme would increase private car capacity and may therefore undermine the target to increase sustainable transport mode share.

1. Scheme description

The A470/M4 Corridor Congestion Study covers a 4.5km section of the A470 north of M4 Junction 32 (Coryton); and a 19km section of the M4 between Junction 32 and Junction 35. It involves nine highway schemes, costed at between £44 million and £124 million in total.

On the A470 there is a preferred package of five schemes affecting the Nantgarw and Taffs Well Junctions; the A470 link between these junctions; and northbound and southbound A470 carriageways south of the Taffs Well Junction to Coryton (M4 Junction 32). On the M4 there is a preferred package of four schemes affecting Junctions 33 and 34, and the westbound and eastbound carriageways of the M4 between these junctions.

Junction measures on both the A470 and M4 include additional approach lane capacity (for queuing), increased gyratory capacity and signalisation. For the A470 junctions, there are also improvements for active travel routes.

Carriageway measures on the A470 include additional lane capacity, 50mph speed limits, overhead gantries with variable message signs, and Expressway Network Management Plans with Intelligent Transport Solutions (ITS) and traffic officer deployment. Carriageway measures on the M4 include increased lane capacity (westbound), reallocation of lanes (eastbound), overhead gantries with variable message signs, and Network Management Plans with ITS and traffic officer deployment.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- WelTAG Stage 1 Report: A470 Corridor Transport Study Strategic Outline Case (July 2017)
- WelTAG Stage 2 Study Technical Note No.1: A470/M4 Corridor Problems (State of the Nation), Objectives and Emerging Strategy - Appendices DRAFT/FINAL 1 (June 2018)
- WelTAG Stage 2 Report: A470/M4 Corridor Congestion Study Outline Business Case Report (July 2019)
- WelTAG Stage 2 IAR: A470/M4 Corridor Congestion Study (July 2019)
- WelTAG Stage 2 Report: A470/M4 Pinch Point Scheme Delivery Plan (November 2019)
- M4 and A470 Transport Connectivity DRAFT (produced at time of finalising Stage Two)

Points of clarification were addressed in written correspondence with the scheme sponsor. A site visit also took place.

3. Objectives

The stated priority was to identify well-defined, financially feasible schemes deliverable in the short term that can tackle congestion on the M4 and A470 trunk roads.

Objectives and assessment criteria are identified under four headings:

Transport objectives

- Reduce delays
- Improves journey time reliability for road vehicles and buses
- Provides opportunity for public transport interchange (stops, stations, Park & Ride)
- Provides benefits for bus services
- Provides benefits for pedestrians and/or cyclists
- Improves safety for all road users
- Reduces the transport contribution towards poor air quality

Operational effectiveness

- Improves network resilience for highway and public transport networks
- Improves overall traffic management capability

Engineering and safety objectives

- Is potentially feasible within existing highway corridor
- Is geometrically feasible within existing road space or with limited road widening
- Can be implemented with limited construction impact on traffic conditions
- Provides a safe facility for all road users
- Impacts on utilities and roadside facilities/infrastructure

Deliverability

- Cost
- Buildability

4. Has the case for change been made?

The six lanes of the M4 carry between 79,000 (J32-J33) and 85,000 (J33-34) vehicles per day (including about 7,000 heavy goods vehicles). The southern end of the A470 carries 70,000 vehicles per day (including about 4,000 heavy goods vehicles).

At the time of latest appraisal (WelTAG Stage 2), road links in the two corridors were deemed to be operating within capacity (well within, in the case of the M4). However, congestion and delay were found to arise due to queuing on slip roads and weaving interactions at merges and diverges. These result in journey time variability of 25-50% for both roads, and potentially contribute to collisions. Visitor traffic also affects the highway network on major event days in Cardiff.

Do-Minimum forecasts (including South Wales Metro) indicate that traffic volumes could increase by 10% by 2026. This compares with Metro Phase 2 rail patronage growth of 12-14%.

Collision rates are below the national average on the A470 within the study area and vary from being below to substantially above the national average for the M4 (with J33-J34 eastbound having the highest rate for the overall study area). However, at the time of WelTAG Stage 2, collision rates had been declining during the previous three years.

The WelTAG Stage 2 appraisal (carried out before the Covid-19 pandemic) indicates that the A470 and M4 corridors faced network performance problems. The problems are proposed to be addressed by increasing road capacity. However, the extent of the problems may be reduced as a result of Welsh Government’s aim to reduce car mileage per person by 10% by 2030 and the growth of remote working (which may reduce peak-period traffic in particular). The Panel considers that the case for increasing road capacity has not been made, and increases in capacity would reinforce car-dependence, thus undermining Welsh Government policy. However, there may be a case for better traffic management to improve reliability.

5. Are the objectives aligned with current policy?

The first transport objective of reducing delays is poorly aligned with current policy. Achievement of this objective appears to have been prioritised in option identification and selection, leading to a set of schemes that are centred on private motorised transport. The focus on private motorised transport is inconsistent with the Sustainable Transport Hierarchy.

The transport objectives related to public transport, pedestrians and cyclists are well-aligned with current policy, but the preferred package is unlikely to be effective in meeting these objectives.

The transport objectives of improving safety for all road users and reducing transport's contribution to poor air quality may be achieved, due to better network management, the proposed lower speed limit on the A470 and active travel infrastructure at A470 junctions.

6. Did the scheme development process examine all appropriate options?

Across the nine schemes, the following measures involve road capacity increase, and the Panel does not consider that they are appropriate:

- Additional exit lanes from the mainline carriageway to junctions: scheme 1 – A470 Nantgarw interchange; scheme 6 – M4 J33; and scheme 7 – M4 J34
- Additional gyratory capacity at junctions: scheme 1 – A470 Nantgarw interchange; and scheme 7 – M4 J34
- Additional mainline carriageway lanes: schemes 2 and 4 – A470 (additional auxiliary lanes, potentially within existing highway boundary using narrow lane widths); scheme 8 – M4 westbound J33-J34

Meanwhile the following measures do not directly increase road capacity, and may manage traffic more efficiently and improve safety:

- Signalisation of junctions: scheme 1 – A470 Nantgarw interchange; scheme 3 – A470 Taffs Well interchange; scheme 6 – M4 J33; and scheme 7 – M4 J34
- Overhead gantries with variable message signs for speed limit / lane allocations: schemes 2, 4, 5, 8 and 9 – all A470 and M4 link schemes
- Network management plans, with ITS and traffic officer deployment: schemes 2, 4, 5, 8 and 9 – all A470 and M4 link schemes
- Lane reallocations: scheme 5 – A470 southbound Taffs Well to Coryton; and scheme 9 – M4 eastbound J33-J34

The study assumed that non-transport options were not realistic, as it was focused on short-term delivery. It suggested that “mitigation of transport problems by changing land use policies, or altering commuting patterns (e.g. working from home) would only be feasible over the long-term.” This could not have foreseen the working from home consequences of the Covid-19 pandemic. Non-transport options such as remote working hubs and flexible working practices now seem more relevant. These issues are referenced in the November 2020 recommendations of the South East Wales Transport Commission.

Public transport options were considered, and several were judged to be likely to have significant impact, but the appraisal considered them deliverable in the medium-term rather than more immediately. These included bus priority, bus rapid transit services, park and ride, and rail station provision.

Further examination of measures to enable medium-distance cycle commuting may have merit, including infrastructure near to but not necessarily directly associated with the two trunk roads. The example of the cycleways between Cardiff and Newport (on A48 and NCN88) recommended by South East Wales Transport Commission may be relevant.

In the light of changed circumstances and Welsh Government policy, all options have not been examined sufficiently. This includes options that have medium-term deliverability. The Panel considers that an approach to tackling congestion closer to that adopted by the Burns Delivery Board would be more appropriate.

7. What is the effect on carbon dioxide emissions?

The effect of the scheme on carbon dioxide emissions has not been quantified.

Some construction is involved and this would increase emissions due to embodied carbon in construction materials.

User emissions may be lowered on the A470 if the 50mph speed limit and speed management lead to smoother traffic flow at fuel-efficient speeds. User emissions could go up or down on the M4: a variable speed limit is proposed and this may result in smoother flow at fuel-efficient speeds, hence reducing emissions; but induced traffic as a result of the increase in road capacity may increase emissions.

8. Will the scheme be good for people and communities?

There would be little positive change for people and communities.

Implemented in their entirety, the nine schemes would reinforce reliance upon car-based connectivity. This would offer no significant benefit in terms of addressing social exclusion and be of little or no significance in terms of noise or severance.

Slight to moderate beneficial impacts on road safety for motor vehicle users could result from managing traffic speeds and improving traffic flow. Improved active travel connections on the A470 interchanges could improve safety for cyclists and pedestrians.

Significant improvement in air quality is achievable on the A470 as a result of the proposed 50mph speed limit. A slight beneficial impact on air quality may be possible for the M4 as a result of the introduction of variable speed limits.

9. Will the scheme be good for environment?

Environmental impacts have not been fully assessed.

There is ancient woodland adjacent to both the A470 and M4, and Cardiff Beech Woods Site of Special Scientific Interest is adjacent to the A470 at Taffs Well Roundabout. The nine schemes are largely confined to the existing highway boundary, and there is unlikely to be any land-take from ancient woodland or sites that are protected for their environmental value. However, any induced traffic and consequent increase in emissions could have an indirect impact on any ancient woodland directly adjacent to the site. There are no impacts on protected landscapes. There are no impacts on the water environment.

10. Will the scheme be good for places and the economy?

Taken together, the set of schemes may be beneficial for the local and national economy, although the scale and distributional effect is unclear. The A470 and M4 are used by high numbers of commuters from surrounding local authorities to access work in city centres, predominantly Cardiff. The appraisal also notes that growth around Cardiff is focused along the M4 corridor. The appraisal suggests that the schemes may help ensure that adverse traffic conditions are not a barrier to local economic activity.

There would likely be benefits for freight movement, in terms of efficiency and reliability, although the highway modifications have the potential to draw more traffic onto the A470 and M4, reducing the benefit for freight.

There is no assessment of value for money. The appraisal suggests that there may be large monetised benefits from journey time savings and reliability improvements.

11. Will the scheme be good for culture and the Welsh language?

The Panel does not consider there to be materially significant impacts on the Welsh language or sustainable travel for arts, sports, recreation or cultural activities.

12. How robust is the case for the scheme to different futures?

The case for the scheme is not robust to different futures.

The case for the scheme, made before the Covid-19 pandemic, relies upon assumptions about present and future levels of traffic that have been and will be affected by changed norms in working practice. With the scope for increased remote working, a policy aim of reduced car mileage per person, and Metro developments, it is plausible that travel demand on the two corridors could be diminished. This may be particularly likely if new means of managing demand are introduced in the Cardiff city region.

No account is taken of future disruption due to climate change though this is likely to exacerbate existing concerns over network resilience.

Although the case for the scheme as a whole is not robust to different futures, the case for individual scheme elements such as speed management measures and improved active travel connections is likely to be more robust to different futures, in terms of their effect and policy alignment.

13. Conclusion

The scheme seeks to reduce delays and improve journey time reliability on the A470 and M4, two routes with high flows of traffic. The A470 and M4 operate within their mainline carriageway capacities, but queuing and weaving interactions at merges and diverges at the junctions can result in journey times varying by 25-50%. Pre-Covid-19 forecasts suggest traffic levels could increase by 10% by 2026.

The scheme includes increases in highway capacity as well as traffic management measures to control speed and flow.

The extent of the problems and the appropriateness of the proposed solutions may be in doubt in light of Covid-19 effects on flexible working, aims to encourage remote working, and a goal to reduce car mileage per person by 10% by 2030. There is a case for managing movement on the two corridors, but not a case for enabling an increase in motorised traffic flows.

The following measures across the nine schemes would increase road capacity:

- Additional exit lanes(s) from main carriageway to junction: scheme 1 – A470 Nantgarw interchange; scheme 6 – M4 J33; and scheme 7 – M4 J34
- Additional gyratory capacity: scheme 1 – A470 Nantgarw interchange; and scheme 7 – M4 J34
- Additional mainline lane: schemes 2 and 4 – A470 (additional auxiliary lanes, potentially within existing highway boundary using narrow lane widths); scheme 8 – M4 westbound J33-J34

The Panel considers that journey reliability issues on the A470 and M4 would be better addressed at a regional level, looking at the whole Cardiff City Region. In the context of the Wales Transport Strategy, this would take account of changing patterns of work and commuting; changing connectivity requirements for people and goods; and opportunities to reduce the need to travel. It would be likely to result in a package of active travel and public transport improvements (in line with the Sustainable Transport Hierarchy); engagement with employers to reduce car

commuting and support remote working; and demand management. It could draw on 'concept' work on public transport schemes undertaken as part of the current study. The following elements of the current scheme, which do not increase private car capacity, may remain relevant:

- Lower speed limits or variable speed limits: schemes 2, 4, 5, 8 and 9 – all A470 and M4 link schemes
- Improved active travel connection: scheme 1 – A470 Nantgarw interchange; scheme 3 – A470 Taffs Well interchange
- Junction signalisation: scheme 1 – A470 Nantgarw interchange; scheme 3 – A470 Taffs Well interchange; scheme 6 – M4 J33; and scheme 7 – M4 J34
- Overhead gantries with variable message signs for speed limit/lane allocations: schemes 2, 4, 5, 8 and 9 – all A470 and M4 link schemes
- Network management plans, with Intelligent Transport Solutions and traffic officer deployment: schemes 2, 4, 5, 8 and 9 – all A470 and M4 link schemes
- Lane reallocation: scheme 5 – A470 southbound Taffs Well to Coryton; and scheme 9 – M4 eastbound J33-J34



SUMMARY

The scheme would involve reconfiguration of Junction 36 of the M4. The existing Junction 36 lies above the motorway mainline and is a so-called dumbbell junction with a roundabout to the north and south sides to which the eastbound and westbound on- and off-slips connect. The A4061 crosses the motorway. The northern roundabout also connects to the A4063.

The principal changes proposed are additional lanes to the A4061, A4063 and eastbound off-slip; a second bridge over the M4; additional traffic signals; and reconfiguration of footways and crossings. Further options are considered to provide a separate footbridge over the eastbound on-slip and the M4 mainline.

The scheme assessed at WelTAG Stage 2 also examined the option of average speed enforcement and a reduction in the speed limit to 50mph between M4 J35 and J38. It recommended that this should not be taken forward.

The rationale for the reconfiguration of Junction 36 is to increase junction capacity. It is suggested that the junction is already at capacity during peak hours, and that this may worsen with anticipated traffic growth.

The Panel considers that the link is weak between the problems and opportunities identified at WelTAG Stage 2 and the proposed scheme. The scheme is focused on reducing queuing and delays, but does not address the identified problems of poor public transport integration, deprivation, obesity, lack of opportunities for active travel, and road safety. It is predicated on traffic growth assumptions that are inconsistent with Welsh Government's aim of reducing car mileage per person by 10% by 2030.

The scheme risks undermining the mode share target by increasing car dependency. It is unclear why the importance of public transport improvement identified in the M4 J36 WelTAG Stage 1 Report has not resulted in the development of a scheme with dedicated public transport provision; nor why the integration of active travel proposals into the wider network does not feature more strongly.

The Panel makes the following recommendation:

The scheme should not proceed. The case for change is not well-aligned with Welsh Government's aim to reduce car mileage, and the scheme is contrary to current policies because it increases private car capacity and may therefore undermine the target to increase sustainable transport mode share.

1. Scheme description

The scheme would involve reconfiguration of Junction 36 of the M4, at a cost of £48.5 million.

M4 Junction 36 is located in the County Borough of Bridgend. It serves journeys between the local area (via the A4061 and A4063) and locations along the M4 motorway, such as Cardiff and Newport to the east and Port Talbot and Swansea to the west. It also provides a link between the

valley communities in the north of the county borough and Bridgend town centre and strategic regeneration areas to the south.

Several major trip attractors are located at Junction 36: the McArthur Glen Designer Outlet, which had around four million visitors in 2017; a Sainsbury's supermarket; other retail and hospitality facilities including a cinema and restaurants; Sarn Park Services; and HM Prison Parc.

The junction is used by 15 bus services per hour, some of which have frequencies of every 15-20 mins. There are footways adjacent to the carriageways, but no cycle infrastructure except for a toucan crossing across the M4 westbound off-slip. There has been little analysis of active travel desire lines, but employers in the vicinity of the junction have expressed concerns that staff have no safe walking routes to access their place of work.

The existing junction lies above the east-west motorway mainline, and is a so-called dumbbell junction with a roundabout to the north and south sides to which the on- and off-slips connect. The north-south A4061 crosses the motorway. Both roundabouts have five arms. At the southern roundabout, the fifth southern arm lies south of the westbound on-slip and connects to the designer shopping outlet. The southern roundabout is not complete because it is not possible to travel from the designer outlet around the roundabout to travel south on the A4061, and traffic must travel north over the motorway bridge, around the northern roundabout and back across the bridge to proceed southwards. The entry to the southern roundabout from the westbound off-slip is provided with a route through the central island of the roundabout, creating a so-called hamburger roundabout. At the northern roundabout, the fifth northern arm is the A4063, which lies to the north of the eastbound off-slip.

The reconfiguration comprises the following changes:

- A second bridge would be constructed crossing the M4 approximately 30 metres east of the existing bridge to carry southbound traffic.
- The A4061 northbound would be widened on the existing bridge to provide two additional lanes.
- The A4063 southbound would be widened to provide an additional lane where it joins the northern roundabout. An additional lane for the A4063 northbound would also be provided as far as the junction with Sarn Park Services.
- The M4 eastbound off-slip would be widened to provide two additional lanes. Re-alignment of these lanes would provide the following: a dedicated left turn lane to the widened A4063; a signalised lane entering the northern roundabout circulating carriageway; and two signalised lanes routing traffic through the central island and south over the M4 to the southern roundabout. This last arrangement would create a so-called hamburger roundabout.
- The existing lanes from the M4 westbound off-slip which take traffic north through the central island would be re-aligned.
- The footway currently on the existing bridge would be removed and replaced on the eastern side of the proposed additional bridge. It would be linked to the existing footway along the A4061 north of the junction via a pedestrian crossing over the M4 eastbound on-slip and off-slip. An at-grade pedestrian crossing across the on-slip is not an ideal solution, and an alternative option comprising a separate footbridge is also considered. This separate footbridge would cross the eastbound on-slip and the M4 mainline before re-joining the active travel route on the south side of the M4.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- Junction 36 of the M4 Vissim Modelling (October 2017)
- WelTAG Stage 1 Report: M4 Junction 36 (October 2018)
- Bridgend Destination Management Plan 2018-2022 (2018)
- Bridgend Destination Action Plan 2018-2022 (2018)
- Bridgend Public Services Board Well-being Plan 2018-2023
- WelTAG Stage 1 Report: M4 J35 Pencoed to J49 Pont Abraham: Strategic Outline Case (July 2019)
- WelTAG Stage 1 IAR: M4 J35 Pencoed to J49 Pont Abraham (July 2019)
- Benefits Realisation Plan M4 J35-38 (March 2021)
- WelTAG Stage 2 Executive Summary Note: M4 J35-38 (undated)
- WelTAG Stage 2 IAR: M4 J35-38 (May 2021)
- WelTAG Stage 2 Report: M4 J35-38 (Draft, May 2021 and Final, September 2021)

3. Objectives

The objectives are as follows:

- Improve highway efficiency and resilience of the motorway, interchanges and connecting road network
- Improve road safety and journey time reliability
- Improve multi-modal travel options that reduce dependence on the motorway
- Improve access to employment and for business and tourism to support sustainable economic growth and development to bring enhanced prosperity
- Improve access to local services, education, health and cultural facilities to support social inclusion, health and well-being
- Improve health and the local and global environment, including reducing air and noise pollution
- Improve communication and information to users and management of the motorway

4. Has the case for change been made?

The M4 J35-38 WelTAG Stage 2 study developed from two earlier WelTAG Stage 1 studies: an assessment of M4 J35-49 in 2019, aimed at tackling congested locations on the trunk road and motorway network; and an assessment of Junction 36 commissioned by Bridgend County Borough Council in 2018.

The case for change is founded on traffic growth forecasts that pre-date the Wales Transport Strategy and Net Zero Wales, and that are not consistent with Welsh Government's aim of reducing car mileage per person by 10% by 2030. It is predicated on increasing private car capacity in order to cater for traffic growth.

At WelTAG Stage 2, no evidence is provided regarding road safety, or how the proposals would affect road safety. There is therefore no case for change made on safety grounds.

The Panel considers that there is a weak link between the problems and opportunities identified at WelTAG Stage 2, and the preferred scheme. The case for change has focused on reducing queuing and delays, but does not address the identified problems of poor public transport integration, deprivation, obesity, lack of opportunities for active travel, and road safety.

5. Are the objectives aligned with current policy?

The first objective of improving highway efficiency and resilience of the motorway, interchanges, and connecting road network is poorly aligned with current policy, but achievement of this objective appears to have been prioritised in option identification and selection. The resulting scheme risks undermining mode shift targets by increasing car dependency.

Objectives to improve road safety and improve multi-modal travel options are aligned with current policy. Despite the objective to improve road safety, and the detail provided in the WelTAG Stage 1 study, the analysis of safety at the junction itself does not feature prominently at WelTAG Stage 2. The objective of improving multi-modal travel options has also not been developed into the proposed scheme, either in terms of public transport or active travel.

6. Did the scheme development process examine all appropriate options?

The M4 J35–J49 WelTAG Stage 1 Report considered a wide range of options, including sustainable transport options. The M4 J36 WelTAG Stage 1 Report also considered some sustainable transport options. These options were not taken forward at WelTAG Stage 2, where the main focus was on road-based options. Some road-based options (such as improvements to traffic signal-control) were discounted with little consideration, and the active travel and public transport elements of the preferred option are, in the Panel's view, insufficiently specified and unlikely to offer significant benefits for pedestrians, cyclists and bus users.

Consideration was given to average speed enforcement on the M4 between Junctions 35 and 38, coupled with a reduction in the speed limit to 50mph. This option was expected to improve traffic flows and reduce congestion, and to offer benefits in relation to road traffic noise, carbon dioxide emissions, air quality and collision risk, but with disbenefits to biodiversity. The option was rejected at WelTAG Stage 2 because of the monetised disbenefits from increased journey times. The Panel does not consider that the effect on journey times provides sufficient justification for rejection of this option.

7. What is the effect on carbon dioxide emissions?

The effect of the scheme on carbon dioxide emissions has not been quantified.

Some significant construction would be required, including the construction of a road bridge, and this would increase emissions due to embodied carbon in construction materials.

It is not clear whether changes in traffic flows and speeds at the junction will increase or reduce carbon dioxide emissions. The appraisal suggests that there may be a reduction in emissions as a result of reduced congestion (and hence changes in speeds); it is assumed that there would be no increase in emissions as a result of induced traffic. The Panel considers that the scheme could have the effect of increasing traffic, and consequently could lead to an increase in carbon dioxide emissions.

The effect of average speed enforcement between Junctions 35 and 38, coupled with a 50mph speed limit, has been quantified. It is estimated that this would reduce carbon dioxide emissions by 13,000 tonnes in the scheme opening year. This option was rejected at WelTAG Stage 2.

8. Will the scheme be good for people and communities?

The scheme lacks integration with wider walking and cycling routes, and does not prioritise public transport. The Walking, Cycling and Horse-riding Assessment and Review suggests opportunities which merit further consideration, and these are not contingent on the core scheme being proposed. The WelTAG Stage 2 Report suggests that the improved crossings for pedestrians and cyclists will reduce severance, but the Panel considers that it is unclear whether the additional footbridge would provide useful connections for pedestrians and cyclists.

There are no significant impacts on air quality. There is no evidence that the scheme will increase or reduce noise at receptors, although the Panel considers that there is a risk of adverse noise impacts if the scheme facilitates traffic growth. The WelTAG Stage 1 assessment notes that there were 33 collisions at the junction in the period 2012-2016; this is not updated in the Stage 2 Report and it is not clear how the scheme would affect road safety at the junction.

9. Will the scheme be good for the environment?

The scheme does not affect any sites with a national or international designation for their environmental value. However, it may result in adverse ecological impacts, including impacts on some protected and priority species, and there is potential for damage or loss of habitat from the locally-designated Cefn Hirgoed Site of Importance for Nature Conservation, which may be within and/or adjacent to the northern end of the scheme. Such environmental impacts would need a more thorough assessment (including consideration of any impacts due to vegetation clearance and opportunities for biodiversity net gain).

Natural Resources Wales mapping identifies areas of restored ancient woodland to the west of Junction 36. This area would not be affected by the scheme, although it could have been impacted by another option (FO3) that the WelTAG Stage 1 appraisal did not recommend to proceed.

There are no impacts on nationally or locally-designated landscapes.

10. Will the scheme be good for places and the economy?

The scheme aims to improve the operation of Junction 36, reducing delays and improving journey times. This is estimated to generate a Benefit to Cost Ratio (BCR) of 3.7 which represents high value for money, or more conservatively a BCR of 1.8 representing medium value for money. Journey time savings account for 97% of the monetised benefits.

This economic benefit is based on assumed traffic flow increases, but the magnitude of the assumed increases is not clear. Since Welsh Government policy includes an aim to reduce car mileage per person by 10% by 2030, the forecasts are inconsistent with current policy.

It has not been demonstrated that the proposals are necessary to support economic development or improve surrounding places.

11. Will the scheme be good for culture and the Welsh language?

The Panel does not consider there to be materially significant impacts on the Welsh language or sustainable travel for arts, sports, recreation or cultural activities.

12. How robust is the case for the scheme to different futures?

The case for the scheme would be weakened under a scenario in which travel by private motor vehicle was lower. It involves the construction of additional structures and these will create future

maintenance liabilities which are larger than current liabilities; these liabilities have not been considered fully by the reporting to-date.

13. Conclusion

The Panel considers that the link is weak between the problems and opportunities and the preferred scheme. The scheme is focused on reducing queuing and delays, but does not address the identified problems of poor public transport integration, deprivation, obesity, lack of opportunities for active travel, and road safety. It is predicated on traffic growth assumptions that are inconsistent with Welsh Government's aim of reducing car mileage per person by 10% by 2030.

The scheme risks undermining the mode share target by increasing car dependency. It is unclear why the importance of public transport improvement identified in the M4 J36 WelTAG Stage 1 Report has not resulted in the development of a scheme with dedicated public transport provision; nor why the integration of active travel proposals into the wider network does not feature more strongly.

Both the M4 J35–J49 WelTAG Stage 1 Report and the M4 J36 WelTAG Stage 1 Report considered some sustainable transport options. These options were dropped at WelTAG Stage 2, where the main focus was on options to increase road capacity.

The scheme lacks clear integration with wider walking and cycling routes, and it does not prioritise public transport through the reconfigured junction. The Walking, Cycling and Horse-riding Assessment and Review offers some alternative opportunities which may merit consideration. These are not contingent on the core scheme being proposed.

Some significant new construction is involved, including the construction of a new road bridge representing new carbon dioxide emissions.



SUMMARY

The scheme would involve alterations to a 2.6km dual-carriageway section of the A40 to the east of the A40 / A470 roundabout on the outskirts of Brecon. Five crossovers between the eastbound and westbound carriageways would be closed and a new roundabout would be constructed at the eastern end of the dualled section. There would be some improvements for pedestrians and cyclists at, and immediately east of, the A40/A470 roundabout.

The scheme is intended to improve road safety. There were 32 personal injury collisions in the period 2009-2019 on this section of the A40, some of which were associated with use of the crossovers. Due to the frequency of collisions, the Panel considers that there is a case for intervention to improve road safety, and that the proposed measures would help to achieve this aim.

However, the safety benefits should be benchmarked against other safety schemes (including those in the Local Safety Schemes programme and on local authority roads), and the scheme should only proceed if it is among the best of schemes waiting for funding.

The scheme originally included a reduction in the speed limit from 70mph to 50mph, but this is not included in the most recent version of the appraisal documents. The Panel's assessment is that the poor safety record is not solely due to use of the crossovers. A speed limit reduction from 70mph to 50mph would achieve further safety benefits.

Although the scheme has an objective to enhance opportunity for modal shift, the preferred option would have little impact on mode choice. Interventions to encourage modal shift should be further developed.

If the scheme proceeds, embodied carbon associated with construction should be minimised. The proposed scheme is not likely to result in increases in carbon emissions from induced traffic, and if the speed limit is reduced there would be emissions savings. The scheme would be largely within the current A40 boundary and would therefore be unlikely to have significant adverse ecological impacts.

The Panel makes the following recommendation:

Welsh Government could continue to support the A40 Millbrook Farm scheme, subject to more detailed development and subject to benchmarking against other safety schemes to demonstrate that the scheme is among the best of those waiting for funding. Regardless of the decision made about whether to proceed with the highway works, a reduction in the speed limit from 70mph to 50mph should receive further consideration.

1. Scheme description

The scheme would involve alterations to a 2.6km dual-carriageway section of the A40 to the east of the A40 / A470 roundabout on the outskirts of Brecon.

Five crossovers between the eastbound and westbound carriageways would be closed and a new roundabout would be constructed at the eastern end of the dualled section. This would mean that drivers wishing to turn right onto the A40 from one of the farms or other minor access roads would instead turn left and drive to one of the roundabouts at either end of the dualled section.

The scheme includes some modest improvements for pedestrians and cyclists at, and immediately east of, the A40 / A470 roundabout. These would provide a better route between a caravan park, the settlement of Groesffordd, and the Monmouthshire and Brecon canal towpath that provides an off-road route into Brecon town centre.

The appraisal documents provided to the Panel originally included a reduction in the speed limit from 70mph to 50mph in the preferred scheme. This was not included in the preferred scheme in later scheme documents.

The estimated cost of the scheme is £2.3 million.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- WelTAG Stage 1 Report: A40 Millbrook Farm (Version E July 2021 and Version G February 2022)
- WelTAG Stage 2 Report: A40 Millbrook Farm (Version D July 2021 and Version F February 2022)
- Impact Assessment Report (Version E November 2021 and Version F February 2022)
- IAR Supporting Evidence (including Accident Savings Spreadsheet, Value for Money Spreadsheet, and Baseline Carbon Assessment, November 2021)
- Walking, Cycling and Horse-riding Assessment and Review (November 2021)

Points of clarification were addressed in written correspondence with the scheme sponsor.

3. Objectives

The objectives are:

- Maintain efficient traffic flow along the route
- Reduce frequency and severity of accidents
- Reduce emissions of carbon and other pollutants
- Minimise departures from appropriate design standards
- Improve road alignment to meet current design standard
- Provide safe access points to properties on the route, while minimising use of crossovers
- Optimise visibility along the route
- Reduce danger posed by hazards close to the road, such as trees, telegraph poles and signs
- Allow highway maintenance to be undertaken without full road closures
- Enhance provision of active travel
- Enhance opportunity for modal shift

4. Has the case for change been made?

This 2.6km dualled section of the A40 has a poor safety record. Between 2009 and 2019, there were 32 personal injury collisions, an average of 2.9 per year. This is higher than the average for an equivalent length of A road in Powys (1.7 per year). One of the collisions caused a fatality; nine resulted in serious injuries; and 22 resulted in slight injuries.

The poor safety record is partly attributable to poor visibility and layout of five crossovers between the eastbound and westbound carriageways that provide access to farms and other properties. Four of the collisions, resulting in four serious and four slight casualties, were due to a vehicle attempting to turn around using a crossover and colliding with another vehicle. Dyfed-Powys Police consider unsafe use of the crossovers to be a continuing issue.

The poor safety record is also attributable to a mismatch between the speed limit and the geometry of the road: the speed limit is 70mph, but the existing geometry has a design speed of 85km/h, for which a 50mph speed limit is appropriate. Even at 50mph, some of the road geometry is sub-standard. This results in poor forward visibility, which reduces the time for drivers to react to unexpected hazards, and makes it more difficult for drivers to safely cross or enter the carriageway.

Two of the collisions involved a cyclist or pedestrian, in both cases at the A40 / A470 roundabout.

5. Are the objectives aligned with current policy?

Some of the objectives are aligned with current policy, in particular the objectives to reduce the frequency and severity of collisions; to reduce emissions of carbon dioxide and other pollutants; to enhance provision for active travel; and to enhance opportunity for modal shift.

Other objectives are largely neutral in relation to current policy.

The scheme has the potential to be effective in reducing collisions, thus achieving one of its objectives. It would involve a small improvement in provision for active travel. However, it would make only a limited contribution to reducing carbon dioxide emissions or enhancing the opportunity for modal shift.

6. Did the scheme development process examine all appropriate options?

The scheme development process considered an appropriate range of options to tackle the safety issues that are associated with the crossovers. These included closing all crossovers and building a roundabout at the eastern end of the dual-carriageway (the preferred option); reconfiguring the road to be single carriageway (removing the need for crossovers); constructing crossovers that are compliant with the standards in the Design Manual for Roads and Bridges; and building two new roundabouts, one at the eastern end of the dual-carriageway and one half-way along.

The scheme development process recognised that there were wider safety issues than just those associated with the crossovers. This originally resulted in inclusion of a lower speed limit (50mph instead of the current 70mph) in the preferred package. However, the speed limit reduction was removed from the preferred package in later (2022) versions of the appraisal documents, on the basis that it was not necessary to address the poor safety record and because a lower speed limit would reduce overtaking opportunities. The Panel advises that the 50mph limit should be considered again. This is because:

- Of the 32 personal injury collisions (2009-19), only four were at crossovers. The remaining

28 collisions (of which one was fatal and nine were serious) represent an average of 2.5 collisions per year, higher than the average for an equivalent length of A road in Powys (1.7 per year). Some of these collisions might have been avoided, or had less serious consequences, if vehicle speeds had been lower, in line with a 50mph limit.

- A 50mph limit could also reduce carbon dioxide emissions, which is an objective of the scheme that will not otherwise be achieved.

Two options in relation to sustainable travel were considered during the scheme development process: modest active travel improvements at the A40 / A470 roundabout and more bus services along the A40. Improvements to bus services were not taken forward to the shortlist on the basis that they would not contribute to the objective of improving road safety. Active travel improvements at the A40 / A470 roundabout were taken forward to the shortlist and included in the preferred package.

It would be desirable to look afresh at how the objectives in relation to active travel and modal shift can be met. The Panel suggests that bus service improvements warrant more attention, and more ambitious active travel options (for example, providing a cycle path between Llanhamlach and Brecon, a distance of about 5km) would also merit attention.

7. What is the effect on carbon dioxide emissions?

Scheme construction is estimated to result in emissions of 213 tonnes of carbon dioxide.

The WelTAG Stage 3 Report does not include a quantitative assessment of the effect of use of the scheme on carbon dioxide emissions. The scheme does not increase road capacity or enable car-dependent development, and so the Panel concludes it would not be likely to result in induced traffic. There would be a slight increase in distance travelled for drivers who must divert via one of the roundabouts at either end of the dual-carriageway section, but it is reasonable to treat this as negligible.

A reduction in the speed limit from 70mph to 50mph (coupled with enforcement) would have the potential to reduce carbon dioxide emissions. This should be quantified at the next stage of appraisal.

8. Will the scheme be good for people and communities?

The scheme is likely to reduce the number and severity of collisions.

It would not have a significant impact on access to employment and services for people who suffer social exclusion, or on air quality, noise, or community severance.

9. Will the scheme be good for the environment?

This section of the A40 lies within the Brecon Beacons National Park, but the scheme would largely be constructed within the existing highway boundary and so it will not worsen the existing impact of the road on the landscape. There are no impacts on sites that are protected for their environmental value, and no other issues in relation to biodiversity.

10. Will the scheme be good for the environment?

A scheme of this nature is unlikely to have benefits to economic well-being, either locally or nationally.

The preferred scheme has poor value for money, with a Benefit to Cost Ratio (BCR) of 0.13. The monetised benefits arise solely from the expected reduction in casualties. The poor BCR means

that safety schemes in other locations may be higher priority for the available budget. However, the Panel notes that the method used to estimate the safety benefit of this scheme was more conservative than the method used to estimate the safety benefit of other schemes (the Mid-Wales Safety Schemes).

11. Will the scheme be good for culture and the Welsh language?

The scheme has no significant impacts (positive or negative) on use of the Welsh language. It may affect a Scheduled Ancient Monument (the Bronze Age Peterstone) that is within a few metres of the existing road, close to where the new roundabout is proposed. The scheme documents indicate that this would require further exploration at the next phase of scheme development.

12. How robust is the case for the scheme to different futures?

Overall, the case for the scheme is robust to different futures.

13. Conclusion

The Panel considers that there is a case for intervention to improve road safety on the A40 at this location. Part of the poor safety record is attributable to use of the crossovers between the eastbound and westbound carriageways, and removing these is likely to reduce the number of collisions.

However, the safety benefits should be benchmarked against other safety schemes (including those in the Local Safety Schemes programme and on local authority roads), and the scheme should only proceed if it is among the best of schemes waiting for funding.

A speed limit reduction from 70mph to 50mph, ruled out at the shortlisting stage, could deliver further safety benefits. It could also reduce carbon emissions. A lower speed limit was partly ruled out because it would reduce overtaking opportunities, with disbenefits for journey times. The Panel considers that in the context of current Welsh Government policy, greater weight in scheme appraisal should be placed on the safety and carbon benefits of lower speeds.

Although the scheme has an objective to enhance opportunity for modal shift, the preferred option would have little impact on mode choice. Interventions to encourage modal shift should be further developed.

If the scheme proceeds, embodied carbon associated with construction should be minimised. The proposed scheme is not likely to result in increases in carbon emissions from induced traffic, and if the speed limit is reduced there would be emissions savings. The scheme would be largely within the current A40 boundary and would therefore be unlikely to have significant adverse ecological impacts.



SUMMARY

The March 2021 WelTAG Stage 1 A44 Llangurig to Aberystwyth Study considered approximately 34km of the A44 trunk road between the A470 roundabout east of Llangurig, Powys, and the A4159 Lovesgrove roundabout east of Aberystwyth, Ceredigion. The study identified 18 options in packages covering route resilience and efficiency; safety; management of the route; active travel; public transport; the route's functions relating to freight and tourism; and the fuelling of vehicles in the future.

The Panel recognises there is a case for change relating to safety, active travel, and bus services and infrastructure, and there are sub-standard structures and drainage issues.

The study recommends two sets of options that have costs categorised as 'high' (defined as exceeding £10 million). These are asset renewals; and schemes that are described as 'safety' schemes but originated in the Mid-Wales Overtaking Opportunities (MWOO) Programme: wide single 2+1 carriageway sections (with two lanes in one direction and one lane in the other direction); differential acceleration lanes; modifications to the road radius; and verge widening.

The A44 is included in the Major Asset Renewals programme. The Panel recommends that renewals of sub-standard structures, drainage systems, and vehicle restraint systems should be compared to other asset renewal priorities elsewhere, to ensure that the highest priority schemes for the available renewals budget are progressed.

The options that originated in the MWOO Programme are unlikely to improve safety, and may encourage car use and higher speeds, leading to larger carbon dioxide emissions. The Panel recommends that they should not proceed.

Active travel and bus service and infrastructure enhancements are categorised as medium cost. They would reduce severance, make it easier for residents of the settlements along the A44 to access employment and services in Aberystwyth, and are aligned with Ceredigion County Council's active travel Integrated Network Map. They should be progressed, but the Panel does not consider that continuation of the current WelTAG process is a proportionate means to progress them, once the high-cost schemes are removed. Low-cost measures relating to tourism, laybys for Heavy Goods Vehicles, road safety education and minor safety measures, communications, winter maintenance, and review of speed limits could all be taken forward by the Trunk Road Agent as minor packages of improvements.

The Panel makes the following recommendation:

The A44 Llangurig to Aberystwyth study should not proceed to the next stage because the high-cost elements that increase road width and encourage overtaking would increase private motor vehicle use, speeds and carbon emissions. Asset renewals should be considered as part of the Zero-Base Review of all renewals and maintenance schemes. Medium-cost active travel and bus infrastructure enhancements should be taken forward independently.

1. Study description

The WelTAG Stage 1 A44 Llangurig to Aberystwyth Study covers approximately 34km of the A44 between the A470 roundabout east of Llangurig, Powys, and the A4159 Lovesgrove roundabout east of Aberystwyth, Ceredigion. The road is single-carriageway, with some sections having hatched and coloured central road markings to deter overtaking. The area is largely rural but the road passes through the settlements of Llangurig, Ponterwyd, Goginan and Capel Bangor.

The study sets out a longlist of 18 options, grouped into seven packages for further development as follows: resilience and efficiency; road safety; network management; active travel enhancement; strategic public transport enhancement; strategic corridor enhancement; future mobility.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- WelTAG Stage 1 Report: Mid-Wales Overtaking Opportunities (May 2018)
- WelTAG Stage 1 IAR: A44 Llangurig to Aberystwyth (March 2021)
- WelTAG Stage 1 Report: A44 Llangurig to Aberystwyth (March 2021)

3. Objectives

The objectives are:

- Improve the local and global environment, including reducing air and noise pollution and reducing greenhouse gas emissions, as well as protect and enhance biodiversity and ecosystem resilience.
- Improve journey reliability along the network.
- Create a more resilient and future-proofed network including adapting to the impact of climate change.
- Improve safety on the network for all users.
- Improve access to employment and tourist attractions for people and goods by all modes to support sustainable economic growth and enhanced prosperity.
- Improve access to local services, education, health facilities to support social inclusion, health and well-being, as well as improve access to natural and cultural heritage to support a vibrant culture and thriving Welsh language.
- Improve the accessibility and attractiveness of sustainable transport choices (public transport and active travel) for journeys within and between settlements.

4. Has the case for change been made?

The WelTAG Stage 1 study was commissioned to investigate resilience and asset condition along the A44. The study identifies problems that may be summarised as follows:

- Poor drainage that can lead to localised flooding
- Sub-standard structures, including vehicle restraint systems
- Lack of resilience, particularly in winter
- High vehicle speeds, and speed limits that are set too high for the road layout and geometry
- Lack of overtaking opportunities leading to driver frustration

- A high rate of personal injury collisions compared to other roads in Wales
- Poor provision for active travel
- Inadequate bus services

The Panel considers that the case for change has been only partly demonstrated.

There are drainage issues, particularly west of Lovesgrove Roundabout, which is subject to fluvial flooding. Some substandard safety-related structures have been identified.

There is a case for change relating to road safety: speeds are high relative to the road layout and there is a high rate of personal injury collisions. There were 123 personal injury collisions between 2015-2019, of which 28 resulted in serious injury. Based on earlier data (2013-2015), the collision rate in different sections of the A44 was between 25% and 100% above the Wales trunk road average. The section of the A44 between Llangurig and Ponterwyd has the worst collision rate. At different times over the last six years, the road has been assessed by EuroRAP (Road Assessment Programme) as medium or high risk, in terms of the frequency of crashes resulting in death or serious injury relative to the volume of traffic. Traffic speeds have been raised as a concern, and stakeholder and community feedback is that speed limits are set too high. In sections with a 60mph speed limit, 85th percentile speeds are below 50mph; but in sections through settlements with 30mph or 40mph speed limits, 85th percentile speeds exceed the speed limit.

There is also a case for change in relation to poor provision for active travel and poor bus services. There is a lack of safe footways and cycleways and safe crossing facilities within the settlements of Llangurig, Ponterwyd, Coginan and Capel Bangor, including on routes to school. There is also a lack of active travel provision between communities, including between Capel Bangor and Aberystwyth, and between Blaengeuffordd and Capel Bangor. Bus service frequencies are low, with services running roughly once every two hours.

However, the Panel does not consider that the case for change has been made in relation to driver frustration due to lack of overtaking opportunities. No evidence is provided to substantiate the issue, or to show how often delay may occur.

5. Are the objectives aligned with current policy?

The objectives are partly aligned with current policy. One objective covers improving sustainable transport but others, and the approach taken to applying them, have resulted in identification, development and selection of options that increase private car trips, which is counter to the modal shift targets of Wales Transport Strategy and to the car trip reduction requirements of Net Zero Wales.

The sponsor's own appraisal acknowledges that the packages proposed would not achieve the objective of reducing air and noise pollution and greenhouse gas emissions, and protecting and enhancing biodiversity.

Given the Panel do not recommend this study should proceed, a refresh of the objectives is not required unless necessary to take forward consideration of the active travel and public transport measures endorsed by the Panel.

6. Did the scheme development process examine all appropriate options?

The 18 options were grouped in seven packages.

As the study has only reached WelTAG Stage 1, there are no detailed cost estimates, but all options were categorised as either under £1 million (low cost), £1 million - £10 million (medium cost), or more than £10 million (high cost). They are as follows:

Package 1 - Resilience and efficiency enhancements

- Asset renewals and improvements (high cost)
- Afon Rheidol fluvial flooding (medium cost) – reduce frequency and severity of river flood risk

Package 2 – Road safety

- Road safety educational and enforcement campaign programme (low cost)
- Road safety infrastructure delivery plan (low cost) – road markings and signing; review and improvements to side road junctions, visibility splays, re-texturing the road surface
- Speed limit review (low cost)
- Mid-Wales Overtaking Schemes (high cost) - review and further development of the overtaking enhancement package identified within the MWOO Study for the A44 corridor including radii improvements, differential acceleration lanes and some widened carriageway sections to allow overtaking

Package 3 - Network management

- Mid-Wales trunk road communication delivery plan (low cost) – improve driver communications across the Mid-Wales trunk network in the event of road closures
- A44 winter maintenance measures (low cost) – deployment of weather sensors, exploration of installing snow gates / snow fencing and snow and ice matrix signs

Package 4 - Active travel enhancement

- Active travel enhancements within communities (medium cost) – footway widening, footway creation, reviewing speed limits and implementing crossing facilities
- Active travel enhancements between communities (medium cost) – interventions between Capel Bangor, Blaengeuffordd and Aberystwyth
- Active travel enhancements to improve access to recreational routes (medium cost)
- Cycling infrastructure measures (low cost) – cycle storage, signage and e-bike charging

Package 5 - Strategic public transport enhancement

- Strategic bus network enhancement (cost dependent on Transport for Wales review)
- Bus infrastructure measures (medium cost) – provision and improvement of bus stops

Package 6 – Strategic corridor enhancement

- Freight enhancement plan (low cost) – measures to improve journey reliability, signs, and HGV parking (such as laybys)
- Tourism plan (low cost) - opportunities for sustainable travel to tourist attractions

Package 7 – Future mobility

- Future mobility strategy (low cost) – consider future fuel (e.g., electricity and hydrogen) and transport needs for all vehicle types

Package 1 (resilience and efficiency enhancements) includes review and maintenance of sub-standard structures; improvements to drainage; resolution of issues with vehicle restraint systems; and interventions to reduce fluvial flooding on the A44 at Lovesgrove Roundabout near Aberystwyth. The cost is categorised as high (over £10 million). The Panel notes that the A44 is included in the Major Asset Renewals programme, and recommends that the measures in this package should be compared to other asset renewal priorities elsewhere, to ensure that the highest priority schemes for the available renewals budget are progressed, as part of the Zero-Base Review of maintenance and renewals schemes proposed by the Lugg Review.

Package 2 (road safety) includes some elements that would improve safety and are aligned with current policy: a review of speed limits; average speed enforcement cameras; and a package of minor road safety measures (signs, road markings, anti-skid surfacing, and improving visibility at junctions). These are all categorised as low cost (under £1 million). Part of this package has already been implemented: the speed limit between Llangurig and Ponterwyd (the section of the A44 with the worst safety record) was reduced from 60mph to 50mph in March 2021, and the existing 30mph limit at Ponterwyd was extended with a 40mph buffer zone at the same time.

However, package 2 also includes schemes described as 'safety schemes' that are unlikely to improve safety and may encourage car use. These originated in the 2018 MWOO Programme: they comprise construction of six wide single 2+1 carriageway sections (with two lanes in one direction and one lane in the other direction); two differential acceleration lanes; five modifications to the road radius; and verge widening. These measures are categorised as 'high cost' (defined as costing over £10 million); from similar schemes reviewed by the Panel as part of the Mid-Wales Safety Schemes Programme, the cost could be significantly more than this.

Packages 4 (active travel enhancement) and 5 (public transport enhancement) would be beneficial and aligned with current policy. Ceredigion's active travel Integrated Network Map identifies the need for a walking and cycling route between Capel Bangor, Blaengeuffordd and Aberystwyth. It would be beneficial to extend active travel paths along the A44 east of Capel Bangor: Nant yr Arian visitor centre between Ponterwyd and Goginan is a significant visitor attraction with cycle trails, but there is no safe cycle path to reach it.

There is little information in relation to other packages.

The Panel considers that the low-cost safety measures are appropriate and could be taken forward, building on the recent speed limit reduction between Llangurig and Ponterwyd. The active travel enhancements within and between settlements should also be progressed, as should improvements to laybys and Heavy Goods Vehicle (HGV) parking. Consultation with the relevant bodies should be undertaken at an early stage to develop solutions that avoid ecological impacts as well as identifying opportunities for the maintenance and enhancement of biodiversity.

Elements of package 1 should be considered as part of the Zero-Base Review of the Major Asset Renewals programme. The elements of package 2 that originated in the MWOO Programme should not be taken forward.

7. What is the effect on carbon dioxide emissions?

The WelTAG Stage 1 Report made no assessment of effects on carbon dioxide emissions.

Construction of the differential acceleration lanes and road widening would generate emissions due to land-clearance and construction. Similar measures that were part of the MWOO / Mid-Wales Safety Schemes Programme (reviewed separately by the Panel) resulted in embodied

carbon emissions of 200-1,400 tonnes carbon dioxide (for differential acceleration lanes) and 9,100 tonnes carbon dioxide (for climbing lanes).

There would also be potential increases in emissions in use. The measures that were investigated as part of the MWOO / Mid-Wales Safety Schemes Programme resulted in increases in carbon emissions in use of 140-500 tonnes carbon dioxide (for differential acceleration lanes) and 3,000 tonnes carbon dioxide (for climbing lanes).

8. Will the scheme be good for people and communities?

Enhancements to active travel and public transport would make it easier for people who do not have access to a car to reach employment and services, and would reduce severance within settlements. Some of the proposed safety measures would be beneficial (specifically, lower speed limits, speed enforcement and minor road safety measures like signs, road markings, and improved visibility at junctions). No noise or air quality impacts have been identified.

9. Will the scheme be good for the environment?

The A44 lies immediately adjacent to Rheidol Shingles and Backwaters Site of Special Scientific Interest (SSSI), Afon Rheidol ger Capel Bangor SSSI, and Rheidol Woods and Gorge Special Area of Conservation (SAC) and SSSI. It crosses or runs adjacent to the River Wye (Upper Wye) SAC and SSSI from midway to the eastern extent. Several areas of ancient woodland are located along the length of the scheme including directly adjacent to the A44 between Ponterwyd and Capel Bangor. The scheme appraisal suggests that package 1 (asset renewals and measures to address fluvial flooding), package 2 (road safety) and package 3 (active travel) could have a moderate adverse environmental impact on protected sites.

The A44 is subject to drainage issues and fluvial flooding (several times per year) in one section. The proposals seek to improve resilience to flooding and drainage issues, but river flood defences along the Afon Rheidol could have significant environmental impacts.

The scheme would not affect any nationally designated landscapes. The differential acceleration lanes and some road widening would be in areas that have local designations for their landscape: the Northern Uplands Special Landscape Area, through which the A44 passes between east of Ponterwyd and east of Capel Bangor, and the Rheidol Valley Special Landscape Area between Capel Bangor and Lovesgrove Roundabout.

10. Will the scheme be good for the environment?

The appraisal suggests that package 6 (to develop sustainable travel connections to tourism attractions and provide better parking and layby facilities for HGV drivers) could improve connectivity between businesses, their customers, their supply chain and labour supply. It is suggested that package 1 (asset renewals) and package 2 (road safety) may improve journey reliability.

The value for money of the scheme has not been assessed.

11. Will the scheme be good for culture and the Welsh language?

The Panel notes that Welsh-medium primary schools at Capel Bangor and Ponterwyd could potentially benefit from provision of active travel facilities within and between settlements. Active travel measures and bus improvements could make it easier for people to travel by sustainable means for arts, sport and cultural activities, and would also provide better access to recreational cycling routes. The potential impact on the historic landscape is uncertain but there are many

listed structures and Scheduled Monuments along or near the A44 corridor, including 27 listed structures within 50 metres of the road.

12. How robust is the case for the scheme to different futures?

The scheme is in an area that is vulnerable to flooding and includes measures to increase resilience to this, which will be more important as extreme weather events become more common.

13. Conclusion

The highest-cost options considered in this study are the asset renewals and the schemes categorised as 'safety' schemes that originated in the MWOO Programme. The Panel consider the latter unlikely to improve safety and likely to increase carbon emissions.

The asset renewals should be considered as part of a Zero-Base Review of all trunk road asset maintenance and renewal schemes, so that the highest priority schemes for the available budget are progressed.

The Panel recommends that the MWOO schemes should not be progressed.

Active travel and bus infrastructure improvements are categorised as medium-cost (between £1 million and £10 million). They should be progressed, but the Panel does not consider that continuation of the current WelTAG process is a proportionate means to progress them.



SUMMARY

The A470 Alltmawr scheme is a proposed modification of a junction between the A470 and an unclassified single-track road south of Builth Wells.

The case for a revised junction layout is that it would improve safety, but no personal injury collisions or damage-only collisions have occurred at the junction in the last five years. The case for the scheme is therefore weak. It is a relatively low-cost scheme, but the money could be more effectively invested in small-scale safety improvements at other sites.

High traffic speeds are an issue on this section of the A470, with 18% of vehicles travelling above the 60mph speed limit. The appraisal originally included options to reduce vehicle speeds: a lower speed limit, speed-activated signs, and road markings. These were assessed as deliverable in a short timescale at low cost, but they were not shortlisted. The Panel thinks there should be further consideration of these and other low-cost interventions to reduce speed and improve safety on the A470 between Builth Wells and Erwood.

The Panel makes the following recommendation:

The scheme should not proceed because the case for change is weak. The safety of the junction should continue to be monitored. There should be investigation of low-cost options to reduce speed and improve safety on the A470 between Builth Wells and Erwood.

1. Scheme description

The scheme is a proposed modification of a junction between the A470 and an unclassified single-track road 7km south of Builth Wells and 5km north of the village of Erwood. The minor road joins the A470 at an acute angle and on the inside of a bend with poor visibility. Overtaking is prohibited at this location on the A470 by double solid white centre lines. The speed limit is 60mph but there is an advisory 30mph speed limit associated with a sharp bend sign approximately 260 metres south of the junction and another approximately 100 metres north of the junction.

Two options have been shortlisted to take forward to the next stage of appraisal: relocating the junction to the north of the existing junction; or modifying the existing junction with visibility splays and a lower approach gradient on the minor road.

The cost of the scheme is £300,000 for junction relocation, or £180,000 for junction modification.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- Draft WelTAG Stage 1 IAR (March 2021)
- Draft WelTAG Stage 1 & 2 Report (October 2021)

- Minutes of Erwood Community Council (2018 – 2022)

Points of clarification were addressed in written correspondence with the scheme sponsor.

3. Objectives

The objectives are:

- Improve road safety
- Improve access to local services, employment, tourism and leisure opportunities
- Reduce emissions of carbon
- Enhance the environment
- Enhance network resilience
- Enhance opportunity for sustainable transport

4. Has the case for change been made?

The case for a revised junction layout is based on improving junction safety. However, neither of the two personal injury collisions recorded in the scheme area in the period 2015-2019 occurred at the junction. Dyfed Powys Police recorded 21 damage-only collisions in the section of the A470 between Builth Wells and Erwood and none of these were at the junction. The single-track road serves a church and two dwellings (one of which is a business premises for an agricultural contractor). No data on the level of use of the junction are given, but turning movements are anticipated by the sponsor to be very low, even if the scheme proceeds. The case for change is therefore weak.

5. Are the objectives aligned with current policy?

The objectives are aligned with current policy as set out in the Wales Transport Strategy, Net Zero Wales and Future Wales. However, the proposed scheme would not be effective in achieving the objectives: there have been no collisions at the junction so there is little potential to improve road safety; it does not improve access to services and employment; and there is no evidence that it would reduce carbon dioxide emissions, enhance the environment, or enhance opportunities for sustainable transport. It may have a small effect on network resilience.

6. Did the scheme development process examine all appropriate options?

The scheme development process included all appropriate options relating to safety in the longlist. However, some longlisted options that could have improved safety were rejected without reasonable justification and should have been examined more thoroughly. In addition to the two preferred options of moving or modifying the existing junction, the options in the longlist were:

- Three options related to vehicle speeds: reducing the speed limit on the approaches to the junction; installing speed-activated signs; and signs and road markings to reduce traffic speeds
- Three road layout options: stopping up the side road; making the side road 'one-way' at the junction (allowing vehicles to turn into the side road from the A470, but not the reverse); and providing traffic signal-control or a roundabout
- Provision of bus stops and footways

- Two larger schemes to realign the A470 over a length of about 4km or 11km
- 'Do-Nothing'

None of the three speed-related options were taken forward to the short-list, but the Panel considers that they merit further consideration. The appraisal noted that these three options would be deliverable in a short timescale at low cost. This section of the A470, over about 400 metres, has many tight bends and there are advanced warning signs and, on some bends, chevron signs. An advisory 30mph speed limit associated with a sharp bend sign lies approximately 260 metres south of the junction, and another approximately 100 metres north of the junction. Vehicle speeds at this location are not known, but 1.4km north of the junction, 18% of northbound vehicles exceed the 60mph limit. A lower mandatory speed limit would have safety benefits over a greater distance than a junction modification, including at another access onto the A470 that is 300 metres to the north of the site of the proposed scheme.

While the case for change was primarily about road safety, the scheme objectives were broader, and included enhancing the opportunity for sustainable transport. The longlisted options to address this objective were unambitious and no options relating to sustainable transport were shortlisted. The Panel considers that provision of bus stops and footways should have been taken forward to the shortlist.

7. What is the effect on carbon dioxide emissions?

No quantitative assessment has been undertaken of carbon dioxide emissions, but the scheme is unlikely to help achieve the Welsh Government carbon reduction target.

8. Will the scheme be good for people and communities?

The scheme would not have a significant impact on access to employment and services for people who suffer social exclusion, or on the number and severity of collisions, air quality, noise, or community severance.

9. Will the scheme be good for the environment?

An assessment of the environmental impact has not yet taken place, but the Panel notes that there are two environmentally important sites nearby: the River Wye Otter Special Area of Conservation / Site of Special Scientific Interest which is adjacent to the scheme (at seven metres distance); and an ancient woodland site 280 metres north of the junction.

10. Will the scheme be good for places and the economy?

The scheme would make it easier for the agricultural contractor based at one of the dwellings to access their business with large agricultural vehicles. There are no other significant impacts. The value for money of the scheme has not yet been assessed.

11. Will the scheme be good for culture and the Welsh language?

No significant impacts have been identified.

12. How robust is the case for the scheme to different futures

The scheme is in a location identified as vulnerable to flooding from rivers (low risk) and surface water / small watercourses (high risk), and mitigation would need to be considered if the scheme were to proceed.

13. Conclusion

The case for a revised junction layout is that it is needed to improve safety, but no personal injury collisions or damage-only collisions have occurred at the junction in the last five years. Use of the junction is very low. The case for the scheme is therefore weak. Although it is a low-cost scheme, the money could be more effectively invested in small-scale safety improvements at other sites.

The WelTAG appraisal included options to reduce vehicle speeds, which were deliverable in a short timescale at low cost, but they were not shortlisted. A lower mandatory speed limit would have safety benefits over a greater distance than a junction modification, The Panel believes this and other measures to reduce speeds on the A470 between Builth Wells and Erwood merit further consideration.



SUMMARY

These proposals originated as the Mid-Wales Overtaking Opportunities (MWOO) programme in 2017. It was renamed as the Mid-Wales Safety Schemes (MWSS) programme in 2021, to reflect a change in the primary rationale.

Seven trunk road schemes are proposed, at four locations on the A470 (Llangurig, Llanidloes, Caersws and Pontybat) and three locations on the A487 (Aberarth, Llanrhystud and Machynlleth). Their main features are roundabouts (three locations), differential acceleration lanes on the exit arms of roundabouts (five locations) and climbing lanes (one location).

The original rationale of the MWOO programme was to provide overtaking opportunities to reduce journey time and improve journey time reliability. The six schemes that include a differential acceleration lane or climbing lane would result in journey time savings for drivers. The Panel considers that journey time savings may encourage car use, and therefore run counter to Welsh Government's aim to reduce car mileage per person by 10% by 2030. Differential acceleration lanes and climbing lanes also promote acceleration and higher speeds which may lead to higher emissions.

The new rationale when the programme was renamed as the MWSS programme was that driver frustration from slow-moving vehicles leads to risky overtaking behaviour, and that formal overtaking opportunities can reduce collisions. However, there is a lack of evidence to support this assumption.

Six of the schemes are not at collision cluster sites: A470 Llangurig; A470 Llanidloes; A470 Pontybat; A487 Aberarth; A487 Llanrhystud and A487 Machynlleth. At these sites there are not significantly more personal injury collisions within the scheme boundaries than elsewhere along these roads. The safety case for any intervention at these six locations is therefore weak. The A470 Caersws scheme is at a collision cluster site, and there may be a safety case for the proposed roundabout. The A470 Caersws scheme does not include a differential acceleration lane or climbing lane.

The estimated cost of the six schemes that the Panel recommends should not proceed is £48 million. The estimated cost of A470 Caersws is £6 million.

The method used by the Sponsor to assess the safety benefit of the MWSS programme was not the same as the method used to assess the safety benefit of other schemes on the trunk road network, or on local authority roads, and the safety benefit may be overstated. The Panel suggests that the safety benefit of the A470 Caersws scheme should be benchmarked against other safety schemes (including those in the Local Safety Schemes programme and on local authority roads), and the scheme should only proceed if it is among the best of schemes waiting for funding.

If the A470 Caersws scheme is taken forward, the carbon associated with construction should be minimised. The proposed scheme is not likely to result in significant increases in carbon emissions from induced traffic or higher speeds. It would not have significant adverse ecological impacts.

Three of the seven schemes (at A470 Caersws, A487 Aberarth and A487 Llanrhystud) were modified in later stages of scheme development to improve active travel provision, with shared use foot/cycleways and, in the case of the A470 Caersws scheme, a foot / cycle bridge across the River Severn. These measures are aligned with the aim of the Wales Transport Strategy to promote modal shift. Their potential impact is however

limited because they do not provide a complete route between one settlement and the next along the trunk roads concerned.

The Panel recognises the importance of improving connectivity for active travel within some of the areas under consideration, and the active travel proposals, with further enhancements to their extent, may have merit in their own right.

At A470 Caersws, consideration should be given to extending the active travel route along the A489 to Newtown, in line with Powys County Council's recent Integrated Network Map, and to innovative configuration of the roundabout consistent with the principles of Welsh Government's Active Travel Act Guidance, to ensure the design is appropriate for active travel.

The shared use foot/cycleways from Llanrhystud southwards along the A487, and from Aberarth northwards along the A487, may have merit as interventions in their own right. Consideration should be given to constructing both shared use foot/cycleways, and extending them to the settlement of Llan-non, where they would connect.

The Panel also advises that although A470 Pontybat Junction is not a collision cluster site, personal injury collisions at the junction should be kept under review to establish whether or not there may be a case for a low-cost Local Safety Scheme or roundabout without differential acceleration lane, and, if so, to determine the relative priority of such an intervention alongside other road safety schemes.

The Panel makes the following recommendations:

Recommendation 1 - Welsh Government could continue to support the A470 Caersws scheme, subject to further development to improve provision for active travel, and subject to benchmarking against other safety schemes to demonstrate that the scheme is among the best of safety schemes waiting for funding.

Recommendation 2 - The A470 Llangurig, A470 Llanidloes, A470 Pontybat, A487 Aberarth, A487 Llanrhystud and A487 Machynlleth schemes should not proceed because the case for change is weak. However, consideration should be given to constructing shared use foot/cycleways between Llanrhystud and Aberarth. Personal injury collisions at A470 Pontybat Junction should be kept under review to establish whether there may be a case for a low-cost Local Safety Scheme or roundabout without differential acceleration lane.

1. Scheme description

In 2017, a programme was initiated to provide overtaking opportunities on the Mid-Wales trunk road network. The Mid-Wales Overtaking Opportunities (MWOO) programme aimed to provide regular overtaking opportunities on all north-south trunk road links, on sections of the A44(W), A470, A483 and A487, across Powys and Ceredigion. The routes were split into 10 corridors of around 20-40km in length, and 100 sites were identified where road layout modifications could enable vehicles to overtake safely.

Two WeITAG Stage 2 studies for the A470 and A487 corridors were completed in 2018 and 2019. These studies focussed on the most readily deliverable overtaking opportunities, known as 'Batch 1' schemes.

The MWOO programme was renamed as the Mid-Wales Safety Schemes (MWSS) programme at WelTAG Stage 3, in 2021. The elements of the 'Batch 1' schemes designed to facilitate overtaking were retained, and some schemes were modified to include infrastructure for active travel.

There are no plans to bring forward further batches of schemes.

The seven resulting schemes are as follows (with Site Identification numbers from the original list of 100 sites):

A470: Modifications between Llangurig (Site 27), Llanidloes (63c) and Caersws (62a); and at Pontybat (34b). These schemes comprise roundabouts at Caersws and Pontybat, and the introduction of a differential acceleration lane to allow overtaking of slower-moving vehicles on the exit from roundabouts at Llangurig, Llanidloes and Pontybat. At WelTAG Stage 3, a shared use path for active travel (including a new bridge over the River Severn) and some bus stop enhancements were included in the design for Caersws, and bus stop enhancements were added to the design for Pontybat.

A487: Modifications between Aberarth (Sites 17 and 17a) and Llanrhystud (18); and at Machynlleth (53). These schemes comprise north and southbound climbing lanes north of Aberarth; a roundabout and differential acceleration lane at Llanrhystud; and replacement of an existing roundabout and addition of a differential acceleration lane at Machynlleth. At WelTAG Stage 3, a shared use path for active travel was included in the design for Aberarth and Llanrhystud, along with the replacement of an existing layby with a more formal stopping area on the Aberarth scheme. A shared use path for active travel is also part of the design for the Machynlleth scheme, but this replaces an existing shared use path that would be lost if the differential acceleration lane were built.

The total estimated cost of the schemes is £54 million, broken down as follows: A470 Llangurig £5.1 million; A470 Llanidloes £3.7 million; A470 Caersws £6 million; A470 Pontybat £7.2 million; A487 Aberarth £17.4 million; A487 Llanrhystud £6 million; A487 Machynlleth £8.2 million.

2. Information reviewed

The following information sources have been consulted in evaluating these schemes:

- WelTAG Stage 1 Report: Mid-Wales Overtaking Opportunities (May 2018)
- WelTAG Stage 2 Report: Mid-Wales Overtaking Opportunities A470 Batch 1 Schemes (October 2018)
- WelTAG Stage 2 Report: Mid-Wales Overtaking Opportunities A487 Batch 1 Sites (October 2019)
- A489(T) Moat Lane Cluster Site Collision Investigation and Prevention Study (Local Safety Schemes programme, December 2019)
- WelTAG Stage 3 Report: Mid-Wales Safety Schemes (November 2021)
- Carbon Zero Climate Change Appraisal Summary Reports: A470 Pontybat (December 2021); A470 Llangurig, A470 Llanidloes, A470 Caersws, A487 Aberarth and A487 Llanrhystud (February 2022)
- Local Safety Schemes and Mid Wales Upgrade Schemes collision cluster site data (unpublished data, January 2022)

Points of clarification were addressed in meetings with the scheme sponsor. There was also a site visit to A470 Pontybat.

3. Objectives

The original objectives of the MWOO in WelTAG Stage 1 and WelTAG Stage 2 were:

- Improve links between local and main centres of population
- Improve safe overtaking opportunities
- Improve journey time and reliability
- Reduce the number of collisions
- Reduce driver stress
- Improve walking and cycling facilities
- No significant adverse impacts on environmental sensitive receptors

The MWOO objectives were significantly revised to reflect the Wales Transport Strategy when the programme was re-named as MWSS in 2021. They are stated in the WelTAG Stage 3 Report as:

- Improve safety on the network for all users
- Reduce driver stress / frustration
- Support modal shift to active modes (walking and cycling) for shorter journeys and public or third sector transport for longer journeys
- Improve connectivity between mid-Wales communities
- Protect and enhance biodiversity and ecosystem resilience;
- Reduce greenhouse gas emissions through smarter design, construction, operation and maintenance of the road network, including support to Electric Vehicle (EV) charging
- Encourage and support key economic sectors of the Mid Wales economy, such as tourism, by improving links to work, leisure and education
- Create a more resilient Strategic Road Network, including managing the impact of climate change by future proofing infrastructure
- Improve journey time reliability for longer journeys on the Strategic Road Network

4. Has the case for change been made?

Originally, the MWOO programme was focussed on improving journey times and reliability. The rationale was that by providing regular overtaking opportunities every 3-5km, journey times for longer distance travel could be reduced.

At WelTAG Stage 3, the rationale shifted to focus on safety, but the main scheme elements remained the same: roundabouts, differential acceleration lanes and climbing lanes. This was justified by the assumption that driver frustration from slow-moving vehicles leads to risky overtaking behaviour, and that formal overtaking opportunities provided by differential acceleration lanes and climbing lanes can therefore reduce collisions. However, the Panel found that the evidence to support this assumption was inconclusive.

The case for change therefore now rests on:

- Whether each site has a poor safety record: for example, whether it is a collision cluster site. Welsh Government guidance defines a collision cluster site as a site where there have been four personal injury collisions in a three-year period within a 100m radius. Over a five-year period (the time-period for which collision data are reported in the WelTAG studies), this is equivalent to 6.7 personal injury collisions.
- Whether the proposed scheme elements could reduce risk at each site.

The safety record and the Panel's understanding of the case for change at each site is as follows:

A470 Llangurig: There were two personal injury collisions in the period 2015-2019 in the scheme area (though not within the scheme boundary itself). This is not, therefore, a collision cluster site. One of the collisions involved an overtaking manoeuvre and was a short distance south of the scheme. In the absence of evidence that a differential acceleration lane reduces risk, the rationale for this scheme at this location is weak. Alternative locations or strategies may be a better focus for road safety investment.

A470 Llanidloes: There were three personal injury collisions in the period 2015-2019 at or within 100 metres of the existing roundabout. This is not, therefore, a collision cluster site. Collision information does not point to overtaking being a factor in two of the collisions; information is incomplete for the third collision. In the absence of evidence that a differential acceleration lane reduces risk, the rationale for this scheme at this location is weak. Alternative locations or strategies may be a better focus for road safety investment.

A470 Caersws: There were eight personal injury collisions in the period 2015-2019 at the A470 / A489 priority junction. This is, therefore, a collision cluster site. The proposed replacement of the priority junction with a roundabout has potential to improve safety at the junction. However, the speed limit approaching the junction was reduced from 50mph to 40mph in June 2021 to improve safety. It is not yet clear whether the lower speed limit has improved safety or whether further intervention is required.

A470 Pontybat: There were four personal injury collisions in the period 2015-2019 at or within 100 metres of the A470 / A438 priority junction. This is not, therefore, a collision cluster site. Collision information does not point to overtaking being a factor in the collisions. The proposed replacement of the priority junction with a roundabout has potential to improve safety at the junction, but the rationale for a differential acceleration lane is weak.

A487 Aberarth: There were 10 personal injury collisions in the period 2015-2019 in the 3km section of the A487 where overtaking lanes are proposed, but there are no collision cluster sites and none of the collisions were attributable to overtaking. The rationale for climbing lanes is therefore weak. Alternative locations or strategies may be a better focus for road safety investment.

A487 Llanrhystud: There were four personal injury collisions in the period 2015-2019 on the A487 to the west of the proposed differential acceleration lane (though not within the scheme boundary itself). This is not, therefore, a collision cluster site. Three of the collisions involved an overtaking manoeuvre. In the absence of evidence that a differential acceleration lane reduces risk, the rationale for this scheme at this location is weak. Alternative locations or strategies may be a better focus for road safety investment.

A487 Machynlleth: There were no personal injury collisions in the period 2015-2019 within the scheme boundary. This is not, therefore, a collision cluster site. In the absence of evidence that a differential acceleration lane reduces risk, the rationale for this scheme at this location is weak. Alternative locations or strategies may be a better focus for road safety investment.

5. Are the objectives aligned with current policy?

Some of the objectives at WelTAG Stage 3 are aligned with current policy, in particular the objectives to improve safety for all users; support modal shift to active modes and public or third sector transport; protect and enhance biodiversity and ecosystem resilience; and reduce greenhouse gas emissions.

Other objectives are largely neutral in relation to current transport policy.

However, the Panel has concerns about the extent to which the proposed schemes contribute towards meeting the objectives. At most locations the safety benefits, if they exist, are marginal. The shared use paths are likely to have only limited effect on travel mode choice because they do not complete the network between adjacent settlements. The bus stop improvements at A470 Caersws and A470 Pontybat are small low-cost interventions that are also unlikely to affect mode choice. There are some potential benefits to biodiversity at some locations due to planting of hedgerows, but also some losses due to felling of trees. The schemes would create carbon emissions due to embodied carbon in construction materials and potentially higher traffic speeds.

The main focus is on measures geared towards private car-based transport, which is inconsistent with the Sustainable Transport Hierarchy.

6. Did the scheme development process examine all appropriate options?

The option development process at WeITAG Stage 1 focused on providing overtaking opportunities and included road widening, additional lanes (climbing lanes and differential acceleration lanes), curve radius modification and verge widening. From this, seven schemes were identified to take forward to Stage 2, where again the development work on the options focused on overtaking opportunities.

Although the objectives changed at Stage 3, there was no reconsideration of whether the seven locations were the most appropriate locations for road safety schemes, nor of whether the proposed schemes would be effective in improving road safety. The evidence in relation to the safety benefits of each type of intervention is as follows:

- **New roundabouts** (A470 Pontybat, A470 Caersws, A487 Llanrhystud) – No evidence is provided in the WeITAG Reports, but Welsh Government’s Guidelines for the Submission of Road Safety Schemes suggest that roundabouts may reduce the number of incidents by 20-50%.
- **Climbing lanes** (A487 Aberarth) – Qualitative evidence from WeITAG Stage 1 indicates that climbing lanes may reduce collisions, but the analysis of the data does not suggest there would be a significant benefit at this location because none of the collisions were attributable to overtaking.
- **Differential acceleration lanes** (A470 Pontybat, A470 Llangurig, A470 Llanidloes, A487 Machynlleth) – There was no evidence about the safety benefits of differential acceleration lanes in the WeITAG Reports. The Panel therefore undertook a literature review. This found a lack of evidence that differential acceleration lanes offer a safety benefit, and some indications that they may encourage more risky driving.

The Panel concludes that the scheme development process did not examine all appropriate options with regard to road safety. Other options that could have been considered include lower speed limits and speed enforcement along entire corridors; and local speed limit reduction on approaches to junctions.

At WeITAG Stage 3, three of the schemes were modified to provide active travel infrastructure. The A470 Caersws scheme was modified to include a pedestrian and cycling bridge over the River Severn and an active travel route between Caersws and the A470/A489 Junction, replacing the present road alignment. The A487 Aberarth and A487 Llanrhystud schemes were modified to include shared use paths. However, all the proposed active travel improvements are confined to the scheme boundaries. They do not provide complete routes between adjacent settlements.

There are no significant active travel or public transport improvements associated with the other four schemes.

If the scheme development and appraisal was repeated with the MWSS objectives and in the context of current policy, the Panel concludes that a different set of options would result. Within the current set of options, it seems likely that the active travel infrastructure at A470 Caersws, A487 Aberarth and A487 Llanrhystud would be retained, but probably extended to connect adjacent settlements. A roundabout at A470 Caersws might be retained. The differential acceleration lanes and climbing lanes would not be likely to emerge from a repeat appraisal.

7. What is the effect on carbon dioxide emissions?

Quantitative assessments of effects on carbon dioxide emissions were available for six of the seven schemes. No assessment was undertaken for A487 Machynlleth.

For these six schemes, emissions associated with construction and land clearance (mainly due to embodied carbon in construction materials) are estimated to be 11,750 tonnes of carbon dioxide. The differential acceleration lanes and climbing lanes would lead to increased vehicle speeds for overtaking vehicles, and this is estimated to increase emissions by 4,156 tonnes of carbon dioxide over the 60-year appraisal period. No change in emissions from induced traffic was predicted. The net effect is that emissions are estimated to increase by 15,906 tonnes of carbon dioxide over the 60-year appraisal period.

Three-quarters (76%) of the estimated increase in emissions is attributable to the A487 Aberarth scheme, and a further 12% is attributable to the A487 Llanrhystud scheme.

The overall effect of the MWSS programme would be to increase carbon dioxide emissions. The absolute size of the increase would, in the Panel's view, be significant in relation to current carbon dioxide emissions on the Welsh trunk road network and would therefore hinder achievement of Welsh Government carbon reduction targets and budgets.

8. Will the scheme be good for people and communities?

Six of the seven schemes would have little or no impact on access to employment, local services and leisure for people in socially excluded groups. The exception is the A470 Caersws scheme, where there are some benefits in terms of access to leisure (but not access to employment or local services). There, the shared use route that forms part of the scheme would make it easier for residents to access the football ground and would make cycling on National Cycle Network route 81 more attractive.

All seven schemes are in areas where poor air quality is not identified as an issue, although the schemes' appraisals noted some slight adverse impacts on air quality for housing near to the A470 Llanidloes, A487 Llanrhystud and A487 Machynlleth schemes. The appraisal suggests some negligible increases and decreases in noise levels for different receptors close to the schemes, except at A487 Machynlleth where the noise impact is predicted to be moderately adverse.

None of the schemes resulted in (or relieved) community severance that could be classified as moderate or severe. The shared use routes associated with the schemes at A470 Caersws, A487 Aberarth and A487 Llanrhystud offer the potential to slightly reduce community severance, but the impact is less than if the active travel routes continued to a significant destination.

The evidence that the schemes would result in an increase in road safety is weak (as noted earlier). Most of the schemes do not correspond with collision cluster sites: that is, there are not significantly more collisions within the scheme boundaries than elsewhere. The A470 Caersws scheme is an exception: this location is a collision cluster site, and the speed limit on the

approaches to the junction was reduced in June 2021 to address this issue. There is a risk that the A470 Llangurig scheme may increase risk for pedestrians, as the differential acceleration lane may result in vehicles travelling at higher speeds at a location where public rights of way converge and pedestrians have to walk for 150 metres along the A470. Although A470 Pontybat is not a collision cluster site, public consultation highlighted significant concern about the safety of the junction layout, suggesting that there is a case for ongoing monitoring and potentially for a low-cost Local Safety Scheme or roundabout (as at A470 Caersws).

Most of the schemes would create little to no benefit for people and communities. The exception is the A470 Caersws scheme, where the proposed shared use route and new pedestrian / cycle bridge across the River Severn offer a benefit.

9. Will the scheme be good for the environment?

Four of the schemes (A470 Llangurig, A470 Llanidloes, A487 Aberarth and A487 Machynlleth) would have a significant impact on trees and hedgerows. This would have impacts on biodiversity, landscape and release of stored carbon.

The schemes would have little or no impact on the water environment. There are no direct impacts identified on sites that are protected for their environmental value.

None of the schemes are in locations that have national protection for their landscape value. However, two schemes (A487 Aberarth and A487 Llanrhystud) lie along the boundary of the locally designated Ceredigion Coast Special Landscape Area.

10. Will the scheme be good for places and the economy?

There are no significant impacts on local or national economic well-being.

Impacts on liveability and local place-making are mixed. There has been public consultation for five of the schemes, but not for A470 Caersws or A487 Machynlleth. This consultation revealed highly negative local opinion about the A470 Llanidloes scheme, with 86% of survey respondents opposed to it. Conversely, 95% of survey respondents support the A470 Pontybat scheme, reflecting concern about the junction layout as noted above. For the remaining schemes, the proportions supporting and opposing were more evenly balanced.

There is potential for the shared use paths at A470 Caersws, A487 Aberarth and A487 Llanrhystud to improve liveability, although the benefit is smaller than if the paths provided node-to-node links between settlements. In the public consultations on A487 Aberarth and A487 Llanrhystud, the most popular element of both schemes was the shared use path, but almost a fifth of all survey respondents made the unprompted comment that it should run all the way to the village of Llan-non.

There is no impact (positive or negative) on reliability of freight movements.

Most of the estimated monetised benefit relates to casualty savings, with 'overtaking benefits' (journey time savings) also being significant. Benefit-cost ratios (BCRs) for the schemes as reported at WelTAG Stage 3 vary between 0.6 (A470 Caersws) and 3.2 (A487 Llanrhystud). The scheme sponsor indicated in written correspondence that the BCR for Llanidloes would be higher than reported at WelTAG Stage 3 (7.1 instead of 1.6) if a fatal collision was taken into account. Based on the BCRs in the WelTAG Stage 3 Report, value for money is considered poor at A470 Caersws; low at A487 Machynlleth; medium at A470 Llanidloes and A470 Pontybat; and high at A487 Aberarth, A487 Llanrhystud, and A470 Llangurig. The assumptions used in order to calculate the safety benefits are inconsistent with the assumptions used for other road safety schemes, and the Panel considers they may overstate the benefit.

When compared to smaller-scale safety improvements, the schemes may not offer good value for money. This is highlighted at A470 Caersws, where the scheme has a First Year Rate of Return (FYRR) slightly above 1%; the Local Safety Scheme intervention in June 2021 to reduce speed limits from 50mph to 40mph on the approaches to the same junction had an estimated FYRR of 391%.

11. Will the scheme be good for culture and the Welsh language?

The Panel notes that the Welsh-medium primary school at Llan-non could potentially benefit from provision of an active travel path between Aberarth and Llanrhystud. Other impacts on use of the Welsh language have not been identified.

Most of the schemes would have little or no effect on opportunities to travel by sustainable means for arts, sports, recreation and cultural activities, except for A470 Caersws where the shared use path would provide benefits for people using the NCN81 cycle route for recreation. Most of the schemes would not have adverse effects on the historic landscape, but A487 Llanrhystud potentially affects the setting of a Scheduled Monument and Grade II* Listed Plas Gwyn; and A470 Caersws potentially affects the setting of Grade II Listed Caersws Bridge.

12. How robust is the case for the schemes to different futures?

The schemes' value would be diminished in a future with less car use.

13. Conclusion

These schemes are geared towards private car-based transport.

Differential acceleration lanes and climbing lanes provide overtaking opportunities which may reduce journey times and improve journey time reliability. For the six MWSS schemes with differential acceleration lanes and climbing lanes, journey time savings are estimated. Such savings may encourage car use, and run counter to Welsh Government's aim to reduce car mileage per person by 10% by 2030. Differential acceleration lanes and climbing lanes also promote acceleration and higher speeds which may lead to higher emissions.

Collisions occur at multiple locations along the A470 and A487 and, with one exception, the schemes are not located at collision cluster sites. The total estimated cost of these schemes at £48 million amounts to a substantial investment in interventions with unproven benefits for road safety.

The A470 Caersws scheme is at a collision cluster site, and there may be a safety case for the proposed construction of a roundabout. However, the method used to assess the safety benefit of the MWSS programme was not the same as the method used for other trunk road and local authority safety schemes, and the safety benefit may be overstated. The safety benefit of the A470 Caersws scheme should be benchmarked against other safety schemes (including those in the trunk road Local Safety Schemes programme and on local authority roads), and the scheme should only proceed if it is among the best of schemes waiting for funding.

If the A470 Caersws scheme is taken forward, the carbon associated with construction should be minimised. The proposed scheme is not likely to result in significant increases in carbon emissions from induced traffic or higher speeds. It would not have significant adverse ecological impacts. Consideration should be given to extending the active travel route along the A489 to Newtown, in line with Powys County Council's recent Integrated Network Map, and to innovative configuration of the roundabout consistent with the principles of Welsh Government's Active Travel Act Guidance to ensure the design is appropriate for active travel.

The shared use foot/cycleways from Llanrhystud southwards along the A487, and from Aberarth northwards along the A487, may have merit as interventions in their own right. Consideration should be given to constructing both shared use foot/cycleways, and extending them to the settlement of Llan-non, where they would connect.

The Panel also advises that although A470 Pontybat Junction is not a collision cluster site, personal injury collisions at the junction should be kept under review to establish whether or not there may be a case for a low-cost Local Safety Scheme or roundabout without differential acceleration lane, and, if so, to determine the relative priority of such an intervention alongside other road safety schemes.



SUMMARY

This scheme involves construction of a roundabout to replace the existing priority junction between the A487 and C1007 at Comins Coch, north of Aberystwyth. The speed limit would be reduced and a shared use path provided along the A487 either side of the roundabout.

The scheme is intended to improve road safety. There were five collisions in the period 2014-2019 at, or within 100 metres, of this junction. Due to the frequency of collisions, the Panel agrees there is a case for the scheme. However, its safety benefit should be benchmarked against other safety schemes (including those in the Local Safety Schemes programme and on local authority roads), and the scheme should only proceed if it is among the best of schemes waiting for funding.

If the scheme proceeds, the Panel has identified some points that the promoter should consider. These are to design the roundabout to be appropriate for cyclists; to provide safe crossing points of the A487 and step-free access to the A487 bus stops; and to provide additional traffic calming in Comins Coch in order to discourage an increase in traffic through the village. In order to maximise the benefit of the shared use path provided as part of the scheme, the Panel suggests that Welsh Government and Ceredigion Council should complete the active travel route between the town centre and Comins Coch (and beyond) as a priority.

The carbon associated with construction should be minimised. The proposed scheme is not likely to result in significant increases in carbon emissions from induced traffic or higher speeds. Whilst there would be no direct impacts on environmentally designated sites, there would be impacts on some ecological features. Measures to avoid or mitigate these impacts, and for enhancement, should be identified and implemented if the scheme is taken forward.

The Panel makes the following recommendation:

Welsh Government could continue to support the A487 Dorglwyd Comins Coch scheme, subject to consideration of the Panel's advice on scheme design, and benchmarking against other safety schemes to demonstrate that the scheme is among the best of safety schemes waiting for funding.

1. Scheme description

The scheme would involve changes to the junction between the A487 and C1007 north of the village of Comins Coch on the outskirts of Aberystwyth. It is proposed that a roundabout is constructed approximately 140 metres north of the existing junction. The C1007 and A487 will be realigned, with the existing route of the A487 being retained to provide access points for properties to the north of the road.

Currently, the national speed limit for single carriageways of 60mph applies, but a speed reduction plan is being developed for this route, and the roundabout has been designed for a maximum speed of 85km/h (approximately 50mph).

The scheme includes a 3-metre-wide shared use path, as part of Ceredigion County Council's proposed active travel route between Aberystwyth to the south and the Gogerddan Campus of Aberystwyth University and settlement of Bow Street to the north.

Currently, bus services for Comins Coch either use two bus stops on the C1007 or a southbound-only stop on the A487. The proposed scheme includes the provision of a northbound bus stop on the A487.

The estimated cost of the scheme is £8 million.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- WelTAG Stage 1 Report: A487 (T) Comins Coch Junction, Aberystwyth (January 2019)
- Draft WelTAG Stage 2 & 3 Initial Environmental Appraisal: A487 Dorglwyd (November 2021)
- Draft WelTAG Stage 2 Report: A487 (T) Comins Coch Junction, Aberystwyth (undated)

Points of clarification were addressed in written correspondence with the sponsor.

3. Objectives

The objectives are:

- Reduce congestion on A487 (T) and improve traffic flows
- Reduce congestion on County Roads
- Reduce delays exiting Comins Coch onto A487 (T)
- Reduce delays exiting A487 (T) into Comins Coch
- Improve pedestrian and cycling access through the junction
- Reduce greenhouse gas emissions from traffic
- Improve road safety for all road user groups
- Improve facilities for public transport and non-motorised users

4. Has the case for change been made?

There were three collisions at the junction in the period 2014-2019, with a further two collisions within 100 metres of the junction. Four of the collisions occurred between 2017 and 2019, making the location a collision cluster site. Most reported collisions lead to slight injuries.

The proposed speed limit reductions may offer further safety improvements along the A487 corridor.

The roundabout would also assist in the implementation of Ceredigion County Council's proposed active travel route linking Aberystwyth with the Gogerddan Campus and Bow Street. By constructing safe routes for cyclists and pedestrians as part of the scheme, additional layout alterations can be avoided in the future.

5. Are the objectives aligned with current policy?

While there are objectives relating to congestion, there is limited evidence that this is an issue for the A487 at Dorglwyd Comins Coch.

The remaining objectives reflect the problems and opportunities identified through the WelTAG process. The objectives are aligned with current Welsh Government policy relating to safety, public transport and active travel, and the proposed scheme would ensure that these objectives are met.

6. Did the scheme development process examine all appropriate options?

Options considered at WelTAG Stage 1 included traffic signal-control or a roundabout at either the current junction location or 140 metres to the north, as well as complete closure of the junction.

At WelTAG Stage 2, a roundabout at the existing location and complete closure of the junction were discarded as options. Additional options for new active travel and public transport infrastructure were included. The view of the Panel is that these are all appropriate options, and the review process has led to a suitable solution to improve safety at the junction. If the process was repeated with current policy objectives, a similar solution would likely result.

Sustainable transport options identified in WelTAG Stage 2 will offer an improvement on current provision. The active travel route complements the aspirations of Ceredigion County Council's active travel Integrated Network Map. The Panel has identified some design elements of the preferred option that need further consideration at WelTAG Stage 3. These are:

- Consideration of innovative configurations of the roundabout, consistent with the principles of Welsh Government's Active Travel Act Guidance, to ensure the design is appropriate for active travel;
- Identifying safe crossing points for pedestrians and cyclists (including from the northbound A487 bus stop);
- Step-free access to both A487 bus stops.

Speed reduction would feature as part of the scheme, the new limit being determined as part of WelTAG Stage 3. Demand management was not considered, and the Panel has concerns that the new junction could increase traffic flows along the C1007. Therefore, additional traffic calming measures may be required in Comins Coch to mitigate this.

7. What is the effect on carbon dioxide emissions?

No quantitative assessment of carbon dioxide emissions has been completed, and this would be carried out as part of WelTAG Stage 3. There would be embodied carbon resulting from construction. There is unlikely to be a significant change to carbon dioxide emissions in use.

8. Will the scheme be good for people and communities?

The scheme would bring benefits to the community in Comins Coch because of improvements to safety at the junction and an additional bus stop. Those living further north towards Bow Street would benefit from improved active travel infrastructure. The full benefit of this will only be realised when the complete route between Aberystwyth and Bow Street and beyond has been constructed.

9. Will the scheme be good for the environment?

There are no impacts on sites that are protected for their environmental value, but the planned work would impact some ecological features and could require removal of a section of hedgerow. Additional work in assessing the environmental impact would take place as part of WelTAG Stage 3 including a Preliminary Ecological Assessment that would provide recommendations for avoidance, mitigation and enhancement measures. No nationally or locally designated landscapes are affected by the scheme.

10. Will the scheme be good for places and the economy?

A scheme of this nature is unlikely to have benefits for economic well-being, either locally or nationally. A full cost-benefit analysis of the scheme has yet to take place. The scheme cost is higher than for a traffic signal-controlled junction but may, with a roundabout design suitable for active travel users, offer better safety.

11. Will the scheme be good for culture and the Welsh language?

The scheme has no significant impacts on culture and the Welsh language. Once the full active travel route is completed, residents living in the corridor to Bow Street will be able to access arts, recreation or cultural activities in Aberystwyth more easily by sustainable modes.

12. How robust is the case for the scheme to different futures?

Overall, the scheme is robust to different possible futures although the embankments and retaining wall required for the junction relocation may lead to additional liabilities.

13. Conclusion

The scheme at A487 Dorglwyd Comins Coch represents a relatively small-scale development that could reduce collision risk for vehicles entering and leaving the village of Comins Coch. Due to the frequency of collisions, the Panel agrees there is a case for the scheme. However, its safety benefit should be benchmarked against other safety schemes (including those in the Local Safety Schemes programme and on local authority roads), and the scheme should only proceed if it is among the best of schemes waiting for funding.

Although more costly than the introduction of traffic signal-control, the expected safety benefits from a roundabout would be larger. Further, the scheme could offer enhancements for active travel users as part of a longer active travel route planned by Ceredigion County Council.

The carbon associated with construction should be minimised. The proposed scheme is not likely to result in significant increases in carbon emissions in use from induced traffic or higher speeds. The overall impact on the environment appears to be small, although more detailed work would be carried out as part of WelTAG Stage 3 to confirm this assessment.



SUMMARY

The scheme is intended to address defective safety barriers on the A487 at Rhiwstaerdywyll, just south of Cadair Idris. The longlist of options includes retention of the 30mph temporary speed limit; a permanent 30mph speed limit; installing a new safety barrier or other road restraint system; or modifications to the highway alignment.

In the Panel's view there is a case for change, given the risk of vehicle rollover down a steep hillside, although the road safety record at this location is good.

Making the temporary 30mph speed limit permanent may sufficiently reduce the safety risk without the need for major expenditure, disruption, environmental impacts or carbon emissions from construction works.

The Panel considers that safety barriers, or other methods of vehicle restraint, could be progressed if a 30mph speed limit is found to be insufficient to lower the risk to an acceptable level. Depending on what type of restraint system is used, there may be some disruption due to road closure; greater expenditure; and some environmental impact from clearing trees. A combination of a road restraint system and 30mph speed limit may offer a lower-cost, lower-impact solution than a combination of a road restraint system and higher speed limit.

Modification of the highway alignment would cause carbon emissions from construction. It has the potential for a significant impact on biodiversity and landscape, as the scheme would be within a Site of Special Scientific Interest and near a Special Area of Conservation and National Nature Reserve. It would have a visual impact on the landscape of Snowdonia National Park. It would also involve disruption, and potentially significant expenditure on a road that has relatively low traffic flows.

The Panel makes the following recommendation:

Welsh Government could continue to support the A487 Rhiwstaerdywyll scheme, subject to more detailed consideration of the 30mph speed limit and barrier options. It is unlikely to be appropriate to progress the highway modification option. The safety benefit should be benchmarked against other safety schemes (including those in the Local Safety Schemes programme and on local authority roads), and the scheme should only proceed if it is among the best of schemes waiting for funding.

1. Scheme description

The scheme is intended to address defective safety barriers on the A487 between Machynlleth and Dolgellau at Rhiwstaerdywyll, just south of Cadair Idris. The defective barriers were identified in an inspection in 2008. The 1.4km section of the A487 is narrow with minimal or no verges, a steep hill to the east and a steep drop to the west. The defective barriers are included in a list of 15 highest priority sites for safety barrier renewal along the trunk road network in North Wales.

The existing barriers are three un-tensioned corrugated beam safety barriers on timber and metal posts. The existing barriers are short in length but replacement barriers would need to be a minimum of 850 metres in length to meet current standards. Inspections concluded that the terrain, vegetation and narrowness of the road make the problem difficult to rectify without major civil engineering works.

Because the existing safety barriers could not be replaced to standard due to the insufficient highway width, a 30mph temporary speed limit was put in place whilst solutions were being developed, which according to the project sponsor brought the risk down to an acceptable level for a temporary solution. Additional issues identified included poor edge of highway strength and a highway pavement with a less than a 20-year residual life.

The WelTAG Stage 1 & 2 Report is in draft and further work is ongoing to finalise options. This involves further development of technical and operational solutions; undertaking a risk assessment (Local Policy Vehicle Restraint System Risk Assessment (<50mph)); ascertaining pavement needs and intervention periods; value for money appraisal; assessment of earth slip risk; and re-engagement with key stakeholders.

The longlist in the draft report identifies four possible options:

- Option A: Retain 30mph temporary speed limit and review signage
- Option B: Provide a permanent 30mph speed limit and review signage
- Option C: Road Restraint Systems. Install a system to provide containment for an errant vehicle: options include safety barriers, containment walls, parapet or trief (high) kerbs.
- Option D: On-line highway improvements. Modify the horizontal and vertical alignment along the A487 carriageway, and modify junctions, accesses and field accesses to meet current design standards

Options A and B are estimated to cost £25,000. Options C and D have not been costed. Although the draft report states that Option D has been discounted, it is the Panel's understanding from discussions with the project sponsor that it remains under consideration but is not the preferred option.

2. Information reviewed

The following information source has been consulted in evaluating this scheme:

- Draft WelTAG Stage 1 & 2 Report (November 2021)

Points of clarification were addressed in a meeting with the scheme sponsor. A site visit also took place.

3. Objectives

The objectives are:

- Improve the resilience of the A487 (T)
- Ensure the A487 (T) conforms to current design standards
- Ensure active travel provision in line with current guidance
- Ensure Public Transport provision
- Minimise the impact of transport improvements on local environment and heritage features
- Minimise carbon impact

4. Has the case for change been made?

The underlying case for change is to address the defective safety barriers. In the Panel's view there is a case for change, given the risk of vehicle rollover down the hillside, with a particular concern being Heavy Goods Vehicles (HGVs).

5. Are the objectives aligned with current policy?

The objective of improving resilience is aligned with current policy, in that the options being explored seek to address a safety issue. The Panel's assessment is that the scheme would be effective in meeting this objective.

The objectives in relation to active travel and public transport are aligned with current policy, but the scheme is unlikely to meet these objectives as active travel and public transport improvements are not proposed.

The objective to minimise carbon impacts would only be achieved if Option D (on-line highway improvements) is not progressed.

6. Did the scheme development process examine all appropriate options?

Based on the information reviewed, Options A and B may address the safety risk without the need for major expenditure, disruption and carbon emissions from construction works. Option C could be progressed if the 30mph speed limit and other small-scale measures are found to be ineffective in lowering the risk to an acceptable level. Within Option C, the WelTAG Stage 1 & 2 Report notes that a safety barrier would not provide containment for a 100km/h design speed. The Panel considers that it is neither necessary nor desirable to increase the design speed of the road, and that there are benefits in retaining a lower speed limit.

In the Panel's judgement, the scheme development process has examined all appropriate options.

7. What is the effect on carbon dioxide emissions?

No quantitative assessment has been undertaken at this stage, but it seems likely that the main (negative) carbon dioxide impact of the scheme would arise from construction if Option D is progressed.

8. Will the scheme be good for people and communities?

The scheme would have no benefits for people who suffer social exclusion, and has no effects on air quality, noise, or community severance.

This is not a location with a significant road safety issue: in the five-year period 2015-2019 there was one slight personal injury collision involving a motorcyclist on this section of the A487. There are more collisions on the section of the A487 to the north. However, the scheme would reduce risk for road users, with the particular concern being HGVs.

9. Will the scheme be good for the environment?

The scheme is at an early stage of development, and environmental impacts have not yet been fully assessed.

Based on the available information, no significant environmental impacts have been identified for Options A or B. Depending on the solution chosen for Option C, there may be some

environmental impact: the draft WelTAG Stage 1 & 2 Report suggests that a large number of trees may need to be cleared. However, no ancient woodland is affected.

Option D would have the most environmental impact. The scheme lies within Cadair Idris Site of Special Scientific Interest and is within 400 metres of Cadair Idris Special Area of Conservation and Cadair Idris National Nature Reserve. The scheme also lies within Snowdonia National Park and within view of Cadair Idris. It would have a visual impact on the landscape of the National Park as a result of the major construction works required in this sensitive location.

10. Will the scheme be good for places and the economy?

The scheme is unlikely to have permanent impacts on economic well-being, either locally or nationally. The route has relatively low use, with about 2,700 vehicles per day. It is used by around 200 HGVs per day, including for timber transport, but it is unlikely that the scheme would affect journey times or reliability for freight. If Option C were chosen, construction of some, but not all, restraint systems would require road closure for four months, with a potential temporary adverse impact on local economic well-being.

The costs and value for money of the scheme have not yet been assessed.

11. Will the scheme be good for culture and the Welsh language?

The scheme has no significant impacts (positive or negative) on culture and the Welsh language. Options A, B and C are unlikely to affect historic features, but further investigation would be required at a later stage in the scheme. The impacts of Option D on historic features are as yet unknown.

12. How robust is the case for the schemes to different futures?

Overall, the scheme is robust to different possible futures although consideration would be required of flood risks at the option selection and detailed design phase.

13. Conclusion

The underlying case for change is to address defective safety barriers. In the Panel's view there is a case for change, given the risk of vehicle rollover down the hillside, although the road safety record at this location is good.

Retention of a 30mph speed limit (Options A and B) may sufficiently address the safety risk without the need for major expenditure, disruption, environmental impacts or carbon emissions from construction works.

Safety barriers, or other methods of vehicle restraint (Option C) could be progressed if a 30mph speed limit is found to be insufficient to lower the risk to an acceptable level. Depending on what type of restraint system is used, there may be some disruption due to road closure; greater expenditure; and some environmental impact from clearing trees. A combination of a road restraint system and 30mph speed limit may offer a lower-cost, lower-impact solution than a combination of a road restraint system and higher speed limit.

Modification of the highway alignment (Option D) would cause carbon emissions from construction. It has the potential for a significant impact on biodiversity and landscape, as the scheme would be within a Site of Special Scientific Interest and 400 metres away from a Special Area of Conservation and National Nature Reserve. It would have a visual impact on the landscape of Snowdonia National Park. It would also involve disruption, and potentially significant expenditure on a road that has relatively low traffic flows.



SUMMARY

The scheme would involve modification to the junction of the A494 with Maesgamedd, an unclassified road north of the village of Gwyddelwern. Two options have been developed, and both involve construction of an extension of Maesgamedd to connect to the A494 at two different positions further south along the A494.

The case for change is based on the alignment of the A494 not meeting current design standards, visibility constraints at the junction, and safety concerns. However, no options have been considered relating to speed management, or to improve the visibility splays at the current junction location.

The Panel makes the following recommendation:

The scheme should not proceed in its current form. The safety of the junction should continue to be monitored. Further options to reduce speed and improve the visibility splay at the existing junction should be developed if the collision record suggests that action should be taken.

1. Scheme description

The scheme would involve modification to the junction of the A494 with Maesgamedd, an unclassified road lying to the east of the A494 and just north of the village of Gwyddelwern, between Bala and Ruthun. Two design options have been developed involving the construction of two different short sections of new road alignment to connect Maesgamedd to the A494 at one of two possible locations further south than the current junction location.

The estimated costs of the two options are £484,000 and £401,000.

2. Information reviewed

The following document has been reviewed:

- WelTAG Stage 2 Report: A494 Maesgamedd Bends Appraisal (August 2017)

3. Objectives

No objectives are specifically stated, but the strategic case is predicated on the following:

- Reduce the number of collisions

4. Has the case for change been made?

The alignment of the A494 does not meet current design standards, the junction has visibility constraints, and there is a record of collisions. In the five-year period from January 2011 to January 2016 there were five collisions, with the highest level of injury in three collisions being serious. There is a high severity ratio (three out of five collisions are severe, i.e. the ratio is 60%).

Welsh Government guidance defines a collision cluster site as a site where there have been four personal injury collisions in a three-year period within a 100 metre radius. Over the five-

year period for which collision data are reported, this would be equivalent to 6.7 personal injury collisions. This is not therefore a collision cluster site.

The Panel notes that there have been no collisions in the five-year period to 2021.

5. Are the objectives aligned with current policy?

The scheme is aligned with the Wales Transport Strategy in the sense that its aim is to reduce collisions. However, the site does not meet the criterion for a cluster site and the benefit of the scheme is relatively small-scale.

6. Did the scheme development process examine all appropriate options?

The range of options considered in the appraisal process was too narrow, focussing only on the construction of two options for two different lengths of new highway in order to connect Maesgamedd to the A494 at one of two points further south than the location of the existing junction.

The current speed limit at the junction is 40mph. The speed limit is reduced to 30mph about 70 metres south-east of the junction on the approach to Gwyddelwern. Both of the two proposed junctions would lie within the current 30mph speed limit area. Consideration has not been given to extending the speed limit of 30mph to a point north of the junction.

Approaching the junction from the north, there is a bend which starts about 90 metres from the junction. A 40mph speed limit begins approximately 120 metres before the bend, and prior to that the speed limit is the national speed limit for single carriageway roads of 60mph. Even though the bend north of the junction is within a signed speed limit of 40mph, there is an additional warning sign immediately prior to the bend with an advisory speed limit of 20mph. Drivers are hence receiving a mix of messages about the appropriate speed within a short distance of the bend, and then the junction.

Assuming Welsh Government introduces a default 20mph speed limit on restricted roads, Gwyddelwern is likely to have a 20mph speed limit up to the current limits of the 30mph speed limit.

The issue of speed is closely related to the required dimensions for an appropriate visibility splay to provide visibility to Maesgamedd Junction from the A494, and along the A494 in each direction from Maesgamedd. No consideration has been given in option development to a Do-Minimum solution which may comprise further speed management on the A494, perhaps combined with visibility splay improvements at the location of the existing junction. There would be further opportunities in future in this regard with the introduction of the 20mph speed limit in the village of Gwyddelwern..

7. What is the effect on carbon dioxide emissions?

No quantitative assessment has been undertaken of carbon dioxide emissions, but it is likely that the main negative impact of the scheme would arise from embodied carbon associated with construction rather than from induced traffic or changes in vehicle speeds.

8. Will the scheme be good for people and communities?

The scheme offers some safety benefits, but the safety benefit relative to the cost of the scheme is not estimated. The scheme would not have a significant impact on access to employment and services for people who suffer social exclusion, or on air quality, noise, or community severance.

9. Will the scheme be good for the environment?

Based on the available information, no significant environmental impacts have been identified.

10. Will the scheme be good for places and the economy?

There are no significant economic impacts. The value for money of the scheme has not yet been assessed.

11. Will the scheme be good for culture and the Welsh language?

The Panel does not consider there to be materially significant impacts on the Welsh language or sustainable travel for arts, sports, recreation or cultural activities.

12. How robust is the case for the scheme to different futures?

There are no robustness issues in relation to different possible futures.

13. Conclusion

The proposed scheme involves works to the junction of Maesgamedd, an unclassified road, and the A494 just north of the village of Gwyddelwern, between Bala and Ruthun.

The alignment of the A494 does not meet current design standards, the junction has visibility constraints, and there is a record of collisions. Two design options have been developed. Both options involve construction of an extension of Maesgamedd to a position further south along the A494 and the creation of a new priority junction at one of two different locations. The case for change is based on the sub-standard alignment, the visibility and the collisions record. In the five-year period from 1st January 2011 to 23rd January 2016 there were five collisions, with the highest level of injury in three collisions being serious. The cost of the two road options is £484,000 and £401,000. No options have been considered relating to speed management, or to consider improvement to the visibility splays at the current junction location.



SUMMARY

This scheme would make modifications to the A483 Junctions 3 to 6 around Wrexham. The first phase would include a relocated larger capacity junction at Junction 4 (A483/A525) and later phases would be smaller-scale modifications to Junctions 3, 5 and 6 including some active travel provision.

The rationale for the scheme is to enable development of land identified for residential and employment uses in the emerging (but not yet adopted) Local Development Plan, and to reduce congestion at the junctions.

The Panel considers that there may be a case for transport investment in order to support economic development in Wrexham. However, the need for an increase in junction capacity has not been demonstrated. Congestion at the junctions is predicted to worsen, but this prediction is based on traffic growth forecasts that do not take account of Welsh Government's aims to increase sustainable transport mode share, increase the proportion of people working remotely, and reduce car mileage. If traffic growth is less than predicted, the congestion at the junctions will also be less than predicted.

The proposed scheme is not aligned with Welsh Government policy, because it provides substantial additional private motor vehicle capacity which is likely to promote car use and low-density car-dependent development, and increase carbon dioxide emissions. There would also be significant embodied carbon emissions associated with construction.

A Wrexham-wide strategy to reduce traffic, combining non-transport options, demand management, and active travel and public transport investment, could reduce traffic demand at the junctions. It could be combined with a masterplan with ambitious sustainable transport proposals and correspondingly ambitious investment in sustainable modes to achieve an exemplar sustainable residential and employment development in North Wales.

The Panel makes the following recommendation:

The A483 Wrexham Junctions 3-6 scheme should not proceed as the case for change is not well-aligned with Welsh Government's aim to reduce car mileage. The scheme would increase private car capacity and carbon emissions. Welsh Government could consider providing support for an alternative approach to create an exemplar residential and employment development with low levels of car use.

1. Scheme description

The scheme would involve changes to Junctions 3-6 of the A483 around the western side of Wrexham. Junctions 3, 4, 5 and 6 each connect the A483 to one of the radial routes into Wrexham.

The WelTAG Stage 1 appraisal (A483/A5 Transport Corridor Chirk to Rossett) was commissioned by Wrexham County Borough Council (WCBC) and the WelTAG Stage 2 appraisal was commissioned by North and Mid Wales Trunk Road Agent.

The scheme would have two phases. The first phase is the larger, and would involve changes to Junction 4 comprising:

- Replacing the existing Junction 4 signal-controlled grade-separated arrangement with a grade-separated large diameter roundabout junction about 500 metres south of the current junction location, with connecting roads to the north-west back to the A525, and to the south-east back to the A525 via land zoned for development
- Retention of the existing A525 bridge over the A483 for all traffic
- Improvements to pedestrian and cyclist provision along the A525 and across the A483

The second phase would comprise changes to Junctions 3, 5 and 6 as follows:

- Junction 3: An additional flare lane on the B5605 approach to the roundabout
- Junction 5: Signals for the A541 Mold Road entry to the roundabout and improved signalisation of the Plas Coch roundabout
- Junction 6: An additional lane on the A5445 Chester Road southbound and Blue Bell Lane approaches and an additional circulatory lane between the A483 northbound off-slip and the Gresford Industrial Estate access road

Works to active travel routes in and around the junctions would include controlled and uncontrolled at-grade crossings at the roundabouts and widened or new lengths of shared use routes.

The estimated cost of the scheme is £53 million.

2. Information reviewed

The following information sources have been considered in evaluating this scheme:

- WelTAG Stage 1 Report: A483/A5 Transport Corridor Chirk to Rossett (October 2017)
- Statement of Common Ground: Between Wrexham County Borough Council and Welsh Government for A483 Junctions 3-6 (August 2019)
- WelTAG Stage 2 IAR: A483 Wrexham Key Stage 2 (December 2019)
- A483 Wrexham: TEAM Wider Economic Benefits Technical Note (February 2020)
- A483 Wrexham: Economic Appraisal Report (March 2020)
- A483 Wrexham: Forecasting Report (April 2020)
- Walking, Cycling & Horse Rider Review: A483 Wrexham Preliminary Design Review (July 2020)
- A483 Wrexham Bypass Junction 3 to 6 Improvements: Carbon Assessment (December 2020)
- A483 Wrexham J3 to J6: Review of Wales Transport Strategy Consultation Strategy (February 2021)
- WelTAG Stage 2 Report: A483 Wrexham Key Stage 2 (February 2021)
- Letter received from Wrexham CBC (May 2022)
- A483 Wrexham: Alignment of scheme objectives with the Welsh Transport Strategy (2021) and Programme for Government (PfG) objectives (undated)

Points of clarification were addressed in a meeting with the scheme sponsor. A site visit also took place.

3. Objectives

The WelTAG Stage 2 Report defines three higher priority objectives as follows:

- Support and enable the Local Development Plan growth aspirations of Wrexham
- Maintain the strategic function of the A483/A5 corridor by improving resilience and journey time reliability
- Improve air quality and noise impact along A483 between Junctions 3 and 6

Five secondary objectives have also been defined:

- Contribute to the reduction of the high car mode share for journeys starting or ending within the Wrexham County Borough area that use the A483 and its junctions
- Ensure that the A483 is effective in serving local movements
- Enhance connectivity, accessibility and transport network coherence for journeys that cross the A483 corridor
- Minimise disruption during construction
- Have no adverse impact on safety (personal injury accidents) and reduce the level of incidents

4. Has the case for change been made?

The primary rationale for the scheme is to increase junction capacity in order to enable development of sites that are identified in Wrexham County Borough Council's emerging (but not yet adopted) Local Development Plan.

Junction 4 has flows in excess of capacity in both peak periods, while Junction 5 has flows in excess of capacity in the evening peak period. This can lead to traffic tailing back onto the A483 from the junction off-slips, or to bottlenecks on local roads leading to the A483. Without an increase in junction capacity, the WelTAG Stage 2 Report suggests that the proposed development may not be viable. The local authority considers the scheme to be of key importance to unlock future development.

The development includes two large sites immediately east of A483 Junction 4. These are Lower Berse Farm Key Strategic Site 1, where land is allocated for 1,500 dwellings (of which 200 would be delivered during the LDP period to 2028); and Western Gateway employment site, adjacent to a large call centre (Moneypenny) which wishes to expand.

The WelTAG Stage 2 Report and supporting documents also note that public transport alternatives are relatively poor, with infrequent bus services and long journey times for short distances. The area near the A483 has a fragmented cycling network and the pedestrian crossings across the A483 are poor. It is suggested that an increase in capacity of Junction 4 would result in lower traffic levels on the east-west A525 and that this would enable reliable bus services and a shared pedestrian / cycle path on the A525.

Traffic is predicted to grow by 12% between 2018-2037, based on Department for Transport (DfT) National Trip End Model, DfT road traffic forecasts (RTF18) and impacts of local developments that are likely to proceed. If the scheme does not proceed, modelling of operational performance predicts that average speeds will decrease by 9-11% in 2037 (compared to 2018); whereas with the scheme, average speeds will increase by 0-4% in 2037.

The Panel considers that there may be a case for investment in order to support sustainable economic development in Wrexham, but that the case for change in relation to junction capacity has not been demonstrated, for two reasons.

First, the traffic modelling took place in 2020, and therefore pre-dates Welsh Government's aims to increase sustainable transport mode share; increase the proportion of people working remotely; and reduce car mileage per person by 10% by 2030. Improvements in public transport as a result of the North Wales Metro programme and recommendations of the North Wales Transport Commission are not factored into the traffic modelling. If traffic grows by less than the 12% predicted, the congestion issues at the junctions will also be less than predicted.

Second, the case for change in relation to the road scheme has to be considered in the context of the case for the proposed housing and employment developments. An edge-of-settlement location may be appropriate for this development, if it can be demonstrated that there are insufficient suitable development sites within the existing built-up area. However, Planning Policy Wales 11 requires spatial strategies to reduce reliance on the private car and increase walking, cycling and use of public transport. It also requires developments to be located so that they can be well serviced by existing or planned infrastructure, and requires infrastructure choices that support decarbonisation. Developments are required to encourage modal shift by virtue of their location, design and provision of on- and off-site sustainable transport infrastructure. These requirements point to the need for housing and employment developments to implement demand management measures to achieve low levels of car use. This would reduce, or potentially eliminate, the requirement for an increase in junction capacity on the A483. At present, the scheme is described in the traffic forecasting report as providing a 'step change' in junction capacity. This removes any incentive for the developers to implement effective demand management measures.

The Panel acknowledges that there is a lack of good examples in Wales of large-scale residential and employment development sites that achieve low levels of car use, and that it is necessary to look to examples in Europe (such as Vauban, on the outskirts of Freiburg, and Houten, in The Netherlands). There is a case for Welsh Government to work with the local authority to create a development model for the Lower Berse Farm and Western Gateway sites that achieves low levels of car use, potentially obviating the need for capacity increases at the A483 junctions or requiring smaller increases in capacity. This could provide an exemplar for other locations.

5. Are the objectives aligned with current policy?

The objective of supporting Wrexham's growth aspirations can only be considered consistent with current policy if those growth aspirations are themselves consistent with current policy. The local authority's model for growth assumes that additional capacity is needed to support the development of strategic sites, and this is inconsistent with Welsh Government aims for modal shift and less car mileage per person. The implementation of junction capacity increases would, over time, result in journey time savings which would make private car use more attractive to users.

The objective of maintaining the strategic function of the A483/A5 corridor is neutral with respect to current policy. However, increasing capacity to enable more local trips from sites near the junction undermines the strategic function of the road.

The objective of improving air quality and reducing noise is aligned with current policy, but will not be achieved by the scheme.

6. Did the scheme development process examine all appropriate options?

At WelTAG Stage 1, a longlist of 71 options was considered. These included options that would increase junction or mainline carriageway capacity; active travel and public transport options; park and ride; travel demand management; and land use policy. The options were combined into packages and scored for their social and cultural impact; environmental impact; and economic impact. The packages that scored best for their social and cultural impact involved sustainable transport measures including travel planning, cycle routes and bus improvements. The package that scored best for its environmental impact was a reduction in car commuter trips into Wrexham city centre. The packages that scored best for their economic impact were increases in road and junction capacity. The resulting shortlist contained six options:

- Increases in road and junction capacity (three options)
- A483 signing review, to reduce traffic using Junction 4
- West Wrexham town sustainable transport package, including travel planning for new developments and workplaces, flexible working, active travel and bus measures and a park & share site
- Rail frequency enhancement package

At WelTAG Stage 2, it was decided that the non-road options were out of scope. The range of options considered in the WelTAG Stage 2 appraisal process was narrow, focussing on various design options to increase capacity at the junctions. Other options shortlisted, such as active travel improvements, are small-scale. Larger-scale active travel opportunities identified in the Walking, Cycling and Horse-riding Assessment and Review were not included in the proposed scheme. Increased public transport services and bus priority measures, included in the longlist of options at WelTAG Stage 1, were not considered at WelTAG Stage 2.

The scheme sponsor stated that the West Wrexham town sustainable transport package identified at WelTAG Stage 1 was being taken forward as a separate activity by Transport for Wales, Wrexham Council and Welsh Government. In correspondence with the Panel, the local authority stated that the A483 J3-6 scheme would enable improvements for active travel and bus services.

The preferred option does not support the scheme objective to 'reduce the high car mode share for journeys starting or ending within the Wrexham CBC area that use the A483 and its junctions'.

7. What is the effect on carbon dioxide emissions?

The embodied carbon dioxide from scheme construction has been estimated as 19,200 tonnes, with over 90% of this resulting from the Junction 4 works.

The WelTAG Stage 2 Report estimates that the scheme would result in an increase in carbon dioxide emissions during use of 6% in 2022 (the year of opening), reducing to 1% by 2037. The increase in emissions is from higher traffic flows on less congested roads and junctions and as a result of an increase in road length of 1km. The absolute increase in emissions during use (in tonnes carbon dioxide over the 60-year appraisal period) is not reported. The model makes no allowance for induced traffic, which may increase emissions further.

8. Will the scheme be good for people and communities?

Community severance would be reduced by improved facilities for cycling across the A483. There may be a slight reduction in collisions. The scheme assessment suggests a slight benefit in relation to noise.

The scheme would not improve access to employment and services for people who suffer social exclusion, because of the lack of focus on public transport and the likelihood that it would enable car-dependent development. The scheme assessment suggests a net disbenefit in relation to air quality.

9. Will the scheme be good for the environment?

The Panel did not receive the Environmental Scoping Report, and so did not have full information about environmental effects. The WeITAG Stage 2 Report states that the scheme would involve some loss of existing habitats at Junctions 3 and 4. There may be potential for impacts on ancient woodland. The effect of the junction schemes on landscape was considered to be negligible, with the proposed residential development considered to have a more significant bearing on the landscape than the junction modification.

10. Will the scheme be good for places and the economy?

One of the higher priority objectives for the scheme is to 'support and enable the Local Development Plan growth aspirations of Wrexham.' There may be benefits to the local economy if the scheme enables development of the Western Gateway employment site and other employment sites.

The objective to support local development may suggest that the wider economic benefits of the scheme could be significant. It is estimated that full development of the employment sites within 2km of Junctions 4 and 5 would generate £80 million Gross Value Added (net GVA) per year in wider economic benefits, and support an additional 1,800 jobs, if their full potential were realised.

The route is identified as a major freight corridor but no impacts on freight movements are identified.

No impacts on local place-making and liveability are identified.

The Benefit to Cost Ratio (BCR) of the scheme is 0.5 for Junction 4 alone, or 0.3 for the entire scheme, including Junctions 3, 5 and 6. This represents poor value for money, with the costs substantially in excess of the benefits. Benefits are largely due to journey time savings for drivers (which are, by implication, very small). The economic assessment report states that the low BCR is as expected because the network is largely uncongested.

11. Will the scheme be good for culture and the Welsh language?

The scheme has no significant impacts on culture or the use of the Welsh language.

12. How robust is the case for the scheme to different futures?

The case for the scheme is worse in a scenario in which traffic grows by less than is forecast. The BCR is based on forecast traffic growth that is inconsistent with Welsh Government's aim to reduce car use. In a scenario in which traffic growth is lower, the BCR is 0.06, suggesting that there are almost no journey time savings to drivers.

13. Conclusion

The proposed scheme is focused on junction modifications that would increase private motor vehicle capacity. It does not support Welsh Government's targets for modal shift or reducing car use.

There is a lack of consideration of sustainable transport options in line with the Sustainable Transport Hierarchy. Active travel improvements are suggested as options within the scheme, but are not well connected to the wider active travel network or other improvements being taken forward in Wrexham such as the Wrexham Gateway sustainable travel scheme. Public transport improvements have not been considered during WelTAG Stage 2.

The Panel acknowledges the importance of supporting economic well-being in Wrexham, as the largest city in north Wales, and especially in the context of the opportunities offered by its new status as a city. However, it is not evident that expansion of junction capacity on the A483 is necessary to achieve economic development.

A Wrexham-wide strategy to reduce traffic, combining non-transport options, demand management, and active travel and public transport investment, could reduce traffic demand at the junctions. It could be combined with a masterplan with ambitious sustainable transport proposals and correspondingly ambitious investment to achieve an exemplar sustainable residential and employment development for Wrexham. There would be economic benefits for the city if the residential and employment sites were connected with the city centre, rather than primarily connected to the trunk road network via Junction 4 (which would encourage out-commuting). Reduced requirement for car parking would enable greater use of land for green space and community facilities.



SUMMARY

This scheme is on a 1.7km section of the A487 north of Porthmadog. The draft WelTAG Stage 1 & 2 Report sets out a shortlist of four options. These are realignment of the A487 with junction modifications and a shared use path; junction modifications; overtaking restrictions, warning signs and a lower speed limit; or doing nothing.

Several junctions on this section of the A487 have poor visibility. The layout at one of the junctions means that heavy goods vehicles (HGVs), including concrete lorries from Porthmadog Concrete works, have difficulty when turning left out of the junction. Safety concerns were raised following an incident when an HGV overturned, but the number of collisions is low.

The road realignment is the most expensive option at about £8.3 million. It would increase carbon emissions due to embodied carbon in construction and probably also due to increased vehicle speeds. It has not been demonstrated that road realignment is necessary to address the identified safety issues.

The Panel considers that junction modifications, or overtaking restrictions, warning signs and a lower speed limit, could address the identified issues.

The safety benefits of junction modifications should be benchmarked against other safety schemes (including those in the Local Safety Schemes programme and on local authority roads), and the scheme should only proceed if it is among the best of schemes waiting for funding.

If the scheme proceeds, embodied carbon associated with any construction should be minimised. Junction modifications are unlikely to increase carbon emissions in use and the scheme would be unlikely to have significant adverse ecological impacts.

The Panel makes the following recommendation:

Welsh Government could continue to support the A487 Llwyn Mafon scheme, subject to more detailed development to ensure safety benefits to walkers, cyclists, equestrians and motorised road users; and subject to benchmarking against other safety schemes to demonstrate that the scheme is among the best of safety schemes waiting for funding. The road realignment element of Option 1 is not aligned with current policy and should be removed from the shortlist of options.

1. Scheme description

The scheme lies north of Porthmadog on the A487 near Llwyn Mafon, along a 1.7km length of road between the west of Llwyn Mafon Isaf and the junction near Garreg Frech. The draft WelTAG Stage 1 & 2 Report sets out a shortlist of four options:

- Option 1: Improving the A487 alignment and its junctions and providing a shared use path adjacent to the road at an estimated cost of £8.3 million
- Option 2: Junction improvements at an estimated cost of £500,000

- Option 3: Limiting overtaking, increasing warning signage and lowering the speed limit at an estimated cost of £17,000
- Option 4: Do-Nothing

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- A487 (T) Llwyn Mafon Feasibility Study Report (October 2019)
- Llwyn Mafon Impacts Assessment Report (September 2021)
- Llwyn Mafon Draft WeITAG Stage 1 & 2 Report (November 2021)

Points of clarification were addressed in written correspondence with the scheme sponsor.

3. Objectives

The objectives are:

- Improve actual and perceived road safety
- Enhance provision of active travel and for equestrians
- Reduce emissions of carbon and minimise environmental impacts
- Enhance network resilience
- Enhance opportunity for modal shift

4. Has the case for change been made?

There are safety issues relating to poor visibility and layout of junctions and high average speeds.

The number of personal injury collisions is low (two between 2016-2020), but added to these are eight damage-only incidents attended by North and Mid Wales Trunk Road Agent, six of which occurred in the Glan Byl area just north of the Pentrefelin (Porthmadog Concrete works) junction. One of these, in 2018, which involved an overturned HGV, prompted a ministerial commitment to a review.

There are several likely contributing factors. Junction visibility is poor, with four of the seven junctions or private means of access having a sight distance of 10 metres or less. Concrete lorries turning left onto the A487 from the Pentrefelin Junction have to perform several manoeuvres on the trunk road in order to make the turn. In addition, the 85th percentile speed of 55mph along the road is relatively high.

5. Are the objectives aligned with current policy?

The objectives are aligned with current policy.

However, the options under consideration may make only a limited contribution to meeting the objectives. There is little potential to improve road safety because of the small number of collisions at this location. The scheme sponsor has indicated that the shared use path is not seen as a priority as there is an existing National Cycle Network Route 8 along parallel minor roads and no active travel improvements have been identified by the Local Authority. None of the options would improve public transport. This suggests that objectives in relation to modal shift, active travel and carbon would not be met.

6. Did the scheme development process examine all appropriate options?

The options identified were appropriate to address the safety objective. However, the active travel element of Option 1 is unlikely to proceed, and the remaining element, realignment of the A487, is not consistent with Welsh Government policy and therefore should not be considered further. This is mainly because of its effect on carbon dioxide emissions, described below.

The other options would be appropriate to take forward to the next stage of appraisal if Welsh Government decide to proceed with the scheme. It would be desirable to look afresh at how the objectives in relation to active travel and modal shift can be met.

7. What is the effect on carbon dioxide emissions?

No quantitative assessment of carbon dioxide emissions has been completed at this stage. There would be embodied carbon resulting from construction work, and if Option 1 were to be progressed it is also likely that there would be some increase in emissions because of increased speeds.

8. Will the scheme be good for people and communities?

The scheme could provide safety benefits for vehicles travelling along the route as well as vehicles (and in particular HGVs) using the junctions. It may provide some safety benefits for pedestrians, equestrian users, and cyclists if the lower speed limits and junction visibility improvements are implemented.

The scheme would not have a significant impact on access to employment and services for people who suffer social exclusion, or on air quality, noise, or community severance.

9. Will the scheme be good for the environment?

The scheme is at an early stage, and so environmental impacts have not yet been fully assessed. The Panel review has used the available information from the combined WelTAG Stage 1 & 2 Report and other relevant sources, but some impacts may not yet be known. The scheme would potentially have a moderate impact on protected species and biodiversity and limited impact on the landscape in the mid-term following completion of construction. The proposed mitigation measures appear sufficient.

10. Will the scheme be good for places and the economy?

A scheme of this nature and scale is unlikely to have an impact on economic well-being, either locally or nationally, though the scheme would improve the ability of HGVs to turn at the Pentrefelin Junction that accesses the Porthmadog Concrete works, and this would therefore have a marginal benefit to the businesses serviced by this route.

A full cost-benefit analysis of the scheme has yet to take place, but Option 1 involving road realignment and junction improvement is expected to cost approximately £8.3 million. Options 2 and 3 are estimated to cost £500,000 and £17,000 respectively. They may offer safety benefits similar to Option 1 at much lower cost.

11. Will the scheme be good for culture and the Welsh language?

The scheme has no significant impacts (positive or negative) on culture and the Welsh language. The scheme may affect archaeological sites in the vicinity. This would require further exploration with Gwynedd Archaeological Trust at the next phase of scheme development.

12. How robust is the case for the scheme to different futures?

Overall, the scheme is robust to different possible futures although consideration of flood risks would be required at the options selection and detailed design phase.

13. Conclusion

The road realignment element of Option 1 is poorly aligned with current policy because of its carbon impact, both in terms of embodied carbon in construction and probably also due to increased vehicle speeds. It has not been demonstrated that road realignment is necessary to address the identified safety issues. The Panel therefore considers that it should be removed from the shortlist of options. The shared use path in Option 1 is unlikely to progress as National Cycle Network Route 8 lies along parallel minor roads and no active travel improvements have been identified by the Local Authority.

The Panel considers that junction modifications, or overtaking restrictions, warning signs and a lower speed limit, could address the identified issues.

The safety benefits of junction modifications should be benchmarked against other safety schemes (including those in the Local Safety Schemes programme and on local authority roads), and the scheme should only proceed if it is among the best of schemes waiting for funding.

If the scheme proceeds, embodied carbon associated with any construction should be minimised. Junction modifications are unlikely to increase carbon emissions in use and the scheme would be unlikely to have significant adverse ecological impacts.



SUMMARY

The Lôn Fawr / Corwen Road Junction scheme would replace an existing Y-junction with a T-junction with a 90° angle to improve sight lines.

The case for a revised junction layout has been made based on the collision record. However, the number of collisions does not meet the Welsh Government criterion for a collision cluster site. The Panel considers the case for change to be weak.

The improvement to the sight lines, with the roads being maintained with a 60mph speed limit, would be unlikely to have a significant effect on reducing the number of collisions. No consideration has been given to limiting speed as an alternative to lengthening sight lines. There may also be the possibility of wider area traffic management to limit the use of Corwen Road between the junction and Ruthun, reducing conflicting movements at the junction.

The Panel makes the following recommendation:

The scheme should not proceed because the case for change is weak. The safety of the junction should continue to be monitored, and further options to reduce speed, or divert traffic to reduce conflicting movements should be considered if the collision record suggests that action should be taken.

1. Scheme description

The scheme would convert a Y-junction with joining 'side road' at a 45° angle to the 'main road' to a T-junction with a 90° angle. The A494 trunk road forms the southern 'main road' arm and the north-west 'side road' arm. Hence traffic from the south turns left at the junction to carry on along the A494 in a northbound direction. In reverse, traffic from the north-west on the A494 turns right at a give-way to carry on southbound along the A494. The unclassified Corwen Road forms the northern 'main road' arm of the junction.

Based on a March 2013 count, vehicle flows on the northern arms of the Y are between 400 and 560 in each direction of travel in a 12-hour period. On the southern arm the flow is about 1,000 vehicles in each direction. Virtually all traffic from the A494 Lôn Fawr (north-west arm) turns right at the give-way line.

The sight lines are not to current standard, and the scheme is designed to create a junction to standard. The preferred scheme is Option F2, which preserves the current arrangement of priorities.

The construction cost of the scheme (not including design and land acquisition) was estimated in 2017 to be £145,000.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- A494 Lon Fawr, Ruthin, Junction Improvement, Junction drawing number H2-16228-D-10- Option F2 (February 2017)

- A494 Lon Fawr, Ruthin, Junction Improvement, Environmental Assessment (March 2017)
- A494 Lon Fawr, Ruthin, Junction Improvement, Engineering Report (March 2017)
- A494 Lon Fawr Junction Improvement - Assessment Table (undated)

Points of clarification were addressed in written correspondence with the scheme sponsor.

3. Objectives

There appears to be only one objective, noted at the end of paragraph 1.2 of the Engineering Report:

- To review the existing junction layout and determine what improvements could be made to benefit the safety of road users

4. Has the case for change been made?

The case for a revised junction layout has been made on the basis of the collision record. However, in the three-year period to 2016 there was one (serious) collision. This rate does not meet the Welsh Government criterion for a collision cluster site (four collisions in the most recent three-year period). It also appears unlikely that this site would meet the criterion for a cluster site in future: in the five-year period to 2016 there were five collisions (four slight and one serious); and in the ten-year period to 2016 there was an average of one collision per year. The case for change is therefore weak.

5. Are the objectives aligned with current policy?

The objective of improving safety for road users is aligned with current policy. However, the site does not meet the criterion for a cluster site and would be unlikely to significantly assist in reducing fatal and serious collisions.

6. Did the scheme development process examine all appropriate options?

The range of options considered in the appraisal process was too narrow, focussing mainly on options that modified the road layout to maintain speeds at the national speed limit. Other options that might have been appropriate were not considered in sufficient detail. No consideration has been given to limiting speed as an alternative to lengthening sight lines. There may also be the possibility for wider area traffic management to limit the use of Corwen Road between the junction and Ruthun. This may be achieved by diverting traffic from the A494 south of the junction to and from Ruthun onto Lôn Fawr / A494 and via the B5105 / Mwrog Street / Lôn Fawr roundabout west of Ruthun.

7. What is the effect on carbon dioxide emissions?

No quantitative assessment has been undertaken, but the scheme is unlikely to help achieve the Welsh Government carbon reduction target.

8. Will the scheme be good for people and communities?

The scheme would have some safety benefits, but these are limited. It would be unlikely to have a significant impact on air quality, or on access to employment and services for people who suffer social exclusion.

9. Will the scheme be good for the environment?

Based on the available information, no significant environmental impacts have been identified.

10. Will the scheme be good for places and the economy?

An economic analysis is not available in the reports, but there are unlikely to be significant economic benefits or impacts.

11. Will the scheme be good for culture and the Welsh language?

The Panel does not consider there to be materially significant impacts on the Welsh language or sustainable travel for arts, sports, recreation or cultural activities.

12. How robust is the case for the scheme to different futures?

Based on available documentation, the scheme is not vulnerable to adverse impacts of climate change such as flooding. The scheme's value would be diminished in a future with less car use.

13. Conclusion

The proposed modification, from a Y-junction with a 45° angle between the side road and the main road, to a T-junction with a 90° angle, would improve sight lines.

The improvement to the sight lines, with the roads being maintained with a 60mph speed limit, is unlikely to have a significant effect on reducing the number of collisions. No consideration has been given to limiting speed as an alternative to lengthening sight lines: this could provide safety benefits over a greater length of the A494. There may also be the possibility of wider area traffic management to limit the use of Corwen Road between the junction and Ruthun, reducing conflicting movements at the junction.



SUMMARY

The scheme comprises modifications to the A483/A5 Halton roundabout lying to the north-east of Chirk. The changes involve increasing the diameter of the roundabout, creating additional lanes on approaches and around the roundabout, and signing improvements for active travel.

The A483 and A5 are trunk roads and the scheme is part of Welsh Government's Pinch Points programme. The case for change is that there is congestion on the approaches to the roundabout during peak periods and on Sundays, and that this could worsen if traffic grows; and that the geometry of the roundabout and its entries cause vehicles to stop rather than give way on entry, and heavy goods vehicles (HGVs) to straddle lanes on the roundabout approaches. There have also been safety issues.

The effect of the scheme would be to improve manoeuvrability for HGVs around the roundabout and to increase the capacity of the roundabout and reduce queuing on the approaches.

The Panel does not consider that there is a case for change in relation to congestion. Modelling predicted that without the scheme, queuing will worsen due to traffic growth. However, if growth is less than assumed, in line with Welsh Government's aim to reduce car mileage per person by 10% by 2030, the queuing problem will not worsen as predicted. There is a risk that by increasing private vehicle capacity the scheme could lead to induced traffic. The risk is greater if this scheme is combined with another scheme that would increase junction capacity on the A483 10km to the north, at Junctions 3-6 west of Wrexham. There has been no consideration of the potential impact on private motor vehicle demand of these two schemes taken together.

The scheme may improve safety. However, although the site was previously a collision cluster site, it is no longer classified as such because the number of personal injury collisions has fallen. All collisions are slight. The Panel considers that there is not a case for intervention to improve safety at present, but this could change if the collision rate increases in future.

The scheme involves minimal consideration of sustainable transport and inadequate consideration of small-scale measures to improve safety, including speed limit changes. The carbon impact would be neutral, with some potential for carbon saving from smoother traffic flow, offset by increased emissions associated with construction.

The Panel makes the following recommendation:

The scheme should not proceed because the case for change is weak. The safety of the junction should continue to be monitored. Further options to reduce speed and improve safety should be developed if the collision record suggests that action should be taken.

1. Scheme description

The scheme comprises modifications to the A483/A5 Halton roundabout lying to the north-east of Chirk. The A5 arms lie to the south connecting to Oswestry, and to the west to Llangollen. The A483 lies to the north connecting to Wrexham, and a C class road lies to the east connecting to the hamlet of Halton, a fast-food outlet, and a car boot sale site. The A483 and A5 are trunk roads and the scheme is part of Welsh Government's Pinch Points programme.

The scheme would involve an increase in the size of the roundabout, from an Inscribed Circle Diameter (ICD) of 55 metres to approximately 80 metres; an additional third entry lane on the two A5 and the A483 approach arms; and an additional third lane on the circulatory carriageway. There would also be minor signing improvements for active travel and local facilities on adjacent side roads.

The cost is estimated as £3.2 million.

2. Information reviewed

The following information sources have been consulted in reviewing this scheme:

- WelTAG Stage 1 Report: A483/A5 Halton Roundabout Pinch Point (May 2018)
- WelTAG Stage 2 Report: A483/A5 Halton Roundabout Pinch Point (February 2022)
- Wrexham County Borough Council Integrated Network Map for active travel (consultation version, 2021)

Points of clarification were addressed in a meeting with the scheme sponsor.

3. Objectives

The objectives as set out in the WelTAG Stage 2 Report are:

- Improved safety record at the Local Safety Scheme (LSS) cluster site
- Safe, effective and resilient use of the junction by heavy goods vehicles (HGVs) through improved manoeuvrability ensuring the efficient movement of freight
- Improved access to the local services, employment, tourism and leisure opportunities and accommodation of future growth as set out in the Local Development Plan (LDP), through adequate and attractive provision for all modes
- Protect and enhance biodiversity and ecosystem resilience
- Reduce greenhouse gas emissions through smarter design, construction, operation and maintenance of the road network
- Create a more resilient Strategic Road Network, including managing the impact of climate change and making best use of existing infrastructure
- Improved journey time reliability through the junction by reducing delay on the A483(N) and A5/A483(S) arms

These objectives are a modification of the five scheme objectives at WelTAG Stage 1, amended to align better with the Wales Transport Strategy. Objective 4 was revised to be more specific, and objectives 5 and 6 relating to climate change were added.

4. Has the case for change been made?

The issues at the roundabout may be summarised as follows: lack of junction capacity and queuing traffic; issues with larger vehicles negotiating the roundabout; safety issues; and lack of provision for sustainable transport modes.

There is some congestion on approaches to the roundabout during morning and afternoon weekday peaks and on Sundays. Surveys of queue lengths suggest that traffic can build up behind vehicles waiting to enter the roundabout, but that these queues clear quickly. Modelling predicted that queuing would worsen in future due to traffic growth. The modelling assumes traffic growth between 2017-2035 of +21% for light vehicles; +6% for two- and three-axle rigid goods vehicles; and +13% for all other goods vehicles. If traffic growth is less than assumed, in line with Welsh Government's aim to reduce car mileage per person by 10% by 2030, the congestion problem will not worsen as predicted.

The geometry of the roundabout and its entries cause vehicles to stop rather than give way on entry, and HGVs straddle lanes on the roundabout approaches. Goods vehicles make up 11% of the traffic using the roundabout, which is higher than the average for Welsh rural trunk roads.

At WelTAG Stage 1 in 2018, safety was identified as an issue and the roundabout was a Local Safety Scheme collision cluster site (defined as having four or more personal injury collisions in a three-year period within a 100-metre radius). More recently, the number of collisions has fallen such that the scheme is no longer classed as a collision cluster site. Collisions are typically rear-end shunts. Changes to the roundabout geometry that improved vehicle flow would potentially reduce collisions. All recorded personal injury collisions at the roundabout since 2006 have resulted in slight injury.

The Panel does not consider that there is a case for change in relation to congestion. There is also not a case for intervention to improve safety at present, but this could change if the collision rate increases in future.

5. Are the objectives aligned with current policy?

The objectives were updated in 2021, to reflect the Wales Transport Strategy, and are well-aligned with current Welsh Government policy. However, the preferred option does not effectively meet all these objectives, in particular the objectives linked with adequate provision for all modes, and the environment and climate-related objectives.

6. Did the scheme development process examine all appropriate options?

The eleven options considered at WelTAG Stage 1 were largely changes to the arrangement of the roundabout of varying scale, with some sifted out after consideration of performance against objectives. All options considered are related to changes to the road layout at the roundabout, and there is little in the proposed scheme other than for private vehicles and freight.

The WelTAG Stage 2 study considered the following options: Option 2a, alterations to the roundabout geometry to provide an increased Inscribed Circle Diameter (the preferred option); Option 2b, at-grade priority controlled elongated roundabout; Option 4, grade-separated priority controlled roundabout arrangement; Option 5, reconfiguration as signal-controlled junction; Option 11, provision of a throughabout (roundabout with a carriageway through the middle of the central island).

The scheme would increase the capacity of the roundabout and reduce queuing on the approaches to the roundabout. It would improve manoeuvrability of HGVs around the

roundabout and may improve safety. However, there was no consideration of the wider context for sustainable travel, or development of opportunities for active travel other than minor signage for pedestrians and cyclists on adjacent side roads. The study did not give sufficient consideration to speed limit reductions or small-scale interventions to improve safety at the junction, although the WelTAG Stage 2 Report acknowledges that further review of collision data and design development would be undertaken in later stages to assess whether changes to the speed limit are required.

7. What is the effect on carbon dioxide emissions?

WelTAG Stage 2 estimates of changes in carbon dioxide emissions from traffic suggests a reduction of 3,840 tonnes carbon dioxide over 60 years, as a result of more efficient traffic flows. This does not account for induced traffic; the carbon assessment notes that the scheme would improve journey times for general traffic, potentially leading to induced demand. A qualitative assessment of carbon dioxide emissions relating to construction was undertaken. Overall, it was concluded that the adverse impacts of embodied carbon and tree loss are likely to erode the potential reduction in user emissions, resulting in a negligible change in lifetime net carbon dioxide emissions.

8. Will the scheme be good for people and communities?

The scheme would bring road safety benefits for road users. It is unlikely to directly affect community severance as the scheme is limited in location to the existing roundabout. The scheme does not improve access for people who experience social exclusion.

9. Will the scheme be good for the environment?

The scheme would not affect any sites that are protected for their environmental value. It would require a small area of permanent land take and vegetation removal from within the highway verge. There are no nationally or locally designated landscapes affected by the scheme.

10. Will the scheme be good for places and the economy?

The enlarged roundabout would assist manoeuvres by large and articulated vehicles, causing less delay to HGVs and other traffic, so there will be benefits for freight reliability.

The Benefit to Cost Ratio of the preferred Option 2a is 13.9, which represents very high value for money. The benefit is primarily due to journey time savings (which account for over 90% of the total benefit).

The scheme is unlikely to affect local or national economic well-being, or to contribute to local place-making.

11. Will the scheme be good for culture and the Welsh language?

The scheme would have no significant impacts on culture and the Welsh language.

12. How robust is the case for the scheme to different futures?

The scheme is robust to different possible futures with respect to climate change impacts. The scheme extent is limited to the local area of the existing roundabout which is not identified as being in a flood zone.

The benefits of the scheme are predicated on the assumption that traffic will grow from 2017-2035, which is not consistent with Welsh Government's aim to reduce car mileage per person by

10% by 2030. If traffic growth is less than this or traffic reduces in line with policy, the economic justification for the scheme is weaker (although still likely to remain high).

The scheme does not require significant new structures so does not substantially increase current maintenance liabilities.

13. Conclusion

The scheme at the A483/A5 Halton Roundabout represents a medium-scale modification of this junction, which has been identified as a pinch point on the Strategic Road Network. The scheme would increase capacity and reduce queuing on the approaches to the roundabout, thereby reducing journey times and improving reliability. It would improve manoeuvrability of HGVs around the roundabout, and may improve safety. The overall impact on the environment and on carbon dioxide emissions appears to be minor.

However, the case for change is based on assumed growth in traffic from 2017-2035. The shortlisted options and the preferred option predominantly provide benefits for private cars and HGVs with little consideration of sustainable transport options and insufficient consideration of speed reduction measures. The scheme objectives were updated in 2021 following publication of the Wales Transport Strategy but with limited changes to the options being considered, and the preferred option (Option 2a) remained the same.

There is also a potential concern about the effect of this scheme in combination with proposed increases in junction capacity on the A483 10km to the north, at Junctions 3-6 west of Wrexham. The A483 J3-6 scheme has been reviewed separately by the Panel. There has been no consideration of the potential impact on private motor vehicle demand of these two schemes taken together, and there is a risk that they could lead to significant induced traffic.



SUMMARY

The A55 / A494 is the main highway route across North Wales. The Network Resilience study covers the A55 between Holyhead on Anglesey in the west and the English border in the east. The study also includes the A494 between Ewloe interchange on the A55 and the English Border, and the strategic and tactical diversion routes for when the A55 / A494 may be closed.

Individual schemes recommended for progression to enhance network resilience were categorised into seven themes as follows: asset management; demand and capacity; communication; incident management; diversion routes; sustainable travel; and future proofing.

The WelTAG Stage 2 Report recommends 35 schemes for progression out of over 100 schemes considered. Some schemes have no cost associated with them because they involve only changed management practices. Otherwise, the costs of schemes range from the tens of thousands of pounds up to £470 million for creating a two-lane expressway.

The case for large-scale change is predicated on the basis of traffic growth projections which indicate that, without significant interventions, normal operation of the road will start to break down in the medium term. On this basis medium and long-term interventions are proposed to enhance resilience.

The Panel does not consider that the case for large-scale change remains valid. The assumed traffic growth does not take account of Welsh Government targets for modal shift, reduced car trips and increased remote working; the impact of Brexit, given the function of the route as an access to Holyhead; or the likely improvements in the public transport network as a result of the work of the North Wales Transport Commission and North Wales Metro Programme. The North Wales Transport Commission was established in Spring 2022 to develop proposals for encouraging a shift to more sustainable means of travel and freight movement in the region. Their recommendations will influence the further development of measures relating to the A55 and the A494. All these factors may be expected to lead to lower levels of traffic than the projections that underpin the case for large-scale intervention.

There may however be a case for some small-scale interventions to support efficient operation, so long as they do not undermine other Welsh Government aims. These small-scale interventions are listed below.

- Nine interventions that could reduce incidents or enable them to be managed better; would not cause higher carbon emissions; and offer at least medium value for money or are zero cost. These are: review and enhance maintenance processes (S19); preventative maintenance planning (S20); construction of offline maintenance bays and access points (S21); high tech asset monitoring software (S22); route-based maintenance (S23); long term asset specification (S26); change to programming of funding (S44); A55 layby operational review (S93); and review of prohibition of entry regulation orders on slip roads (S114).
- Three interventions within which some individual elements could be progressed if there are safety benefits, and if they are among the best of safety schemes awaiting funding. These are ramp metering (S55); remodelling of some junctions to meet current design standards (S58); and restrictions on heavy goods vehicle overtaking (S72a).
- Four interventions would increase carbon emissions due to embodied carbon or induced traffic or both, and should not be progressed. These are three options to create an expressway (S56f, S56g, S56h); and one scheme to construct a climbing lane (S72b). A further two options to replace steel safety barriers with concrete barriers (S59a, S59c)

would involve carbon dioxide emissions due to embodied carbon and have poor value for money. The case for their safety benefit has not been made, and so they should not be progressed.

Five interventions categorised as 'sustainable travel' involve closure of at-grade pedestrian crossings and would offer limited or no benefit to pedestrians. They would only be appropriate to progress if there is evidence of a safety issue. They are S71a, S71b, S71c, S71d, S108.

The remaining schemes have low or poor value for money.

Progress beyond the WelTAG Stage 2 A55 / A494 Network Resilience Study is being delivered in the following Stage 1 studies: A55 J23-24; A55 J24-29; A55 J29-33B; A55 J32-33; A55 J33B Ewloe to A494 Queensferry; A55 At-grade pedestrian crossing review; and A55 Slow moving vehicle overtaking restrictions. All Stage 1 studies are subject to a separate review by the Panel, where information has been provided.

The Panel makes the following recommendation:

The A55 / A494 Network Resilience Study should not proceed. The case for change is not well-aligned with Welsh Government's aim to reduce car mileage. The scheme would increase private car capacity and result in a mode shift from public transport to car travel, and this would undermine the target to increase sustainable transport mode share.

1. Scheme description

The A55 / A494 is the main highway route across North Wales. The study area covers the A55 between Holyhead on Anglesey in the west and the English border in the east; the A494 between Ewloe interchange on the A55 and the English border; and the strategic and tactical diversion routes for when the A55 / A494 may be closed.

The WelTAG Stage 1 Report identified over 100 possible interventions to improve resilience on the A55 / A494. Quick wins and short-term schemes arising from that study have already been completed. The WelTAG Stage 2 Report recommended a further 35 schemes for progression, categorised under the following themes: asset management, demand and capacity, communication, incident management, diversion routes and sustainable travel.

Some schemes have no cost associated with them because they involve only changed management practices. Otherwise, the costs of schemes range from the tens of thousands of pounds up to £470 million for creating an end-to-end two-lane expressway.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- WelTAG Stage 1 Report: A55 / A494 Network Resilience Study (October 2017)
- WelTAG Stage 2 Report: A55 / A494 Network Resilience Study (June 2021)
- WelTAG Stage 2 Executive Summary: A55 / A494 Network Resilience Study (June 2021)
- WelTAG Stage 5 Report: A55 / A494 Network Resilience Study (Quick and Short-Term

Options) (December 2021)

A site visit took place. A meeting was also held with the North Wales Metro team.

3. Objectives

- Improve real time and advanced communication with travelling public, the media and elected members regarding network performance and levels of disruption.
- Improve asset management planning to minimise disruption on the network.
- Design for reduced whole life maintenance interventions of assets.
- Progressive improvement in journey time: 1) across the A55 and A494 (long term), 2) through pinch points (short/medium term).
- Progressive improvement in journey time reliability: 1) across the A55 and A494 (long term), 2) through pinch points (short/medium term).
- Reduce the number of fatal and serious road traffic collisions across the A55 / A494 corridor from Holyhead to Welsh/English borders.
- Reduce the level of incidents across the A55 / A494 corridor from Holyhead to Welsh/English borders.
- Reduce incident duration and associated delays.
- Improve suitability and directness of strategic and tactical diversion routes.
- Reduce the number of times strategic and tactical diversion routes are required as a result of incidents and planned works.
- No significant adverse impacts on environmentally sensitive receptors during construction and operation (to which the following phrase was added at Stage 2: protect and enhance the historic, built and natural environment including landscape and settlement character of the area).
- Improve provision for sustainable travel.
- Plan for a transport network that is future-ready e.g., decarbonisation and future technology.

4. Has the case for change been made?

Despite being a rural dual-carriageway all-purpose road, the A55 / A494 is managed in a way similar to a motorway with a traffic officer service and traffic management centre. There is some congestion at some locations in peak periods, and some lengths of the route are described as being vulnerable as a result of incidents or road works. This vulnerability results from a combination of traffic volume, topography, infrastructure constraints and lack of viable diversion routes. The route has a low to medium risk of death or serious injury based on analysis conducted by European Road Assessment Programme (EuroRAP).

The case for large-scale change is predicated on traffic growth projections which indicate that, without significant interventions, normal operation of the road will start to be compromised in the medium term. On this basis medium and long-term interventions are proposed to enhance resilience.

The Panel does not consider that the case for large-scale change as presented remains valid, for two reasons:

- The work for WelTAG Stage 2 was primarily undertaken in the period 2018-2021. The analysis assumes traffic problems would worsen in future years without intervention. The appraisal does not take account of targets for modal shift and reduced car trips from recent policies in Wales Transport Strategy and Net Zero Wales. The appraisal also does not consider the impact of other recent changes in policy and other factors such as the impact of Brexit especially given the function of the route as an access to Holyhead; and the impact of increased working from home (and 30% remote working target).
- The A55 corridor is part of the area now covered by the North Wales Transport Commission which is charged with developing recommendations for multi-modal, integrated transport solutions. The North Wales Metro Programme is investing in rail, bus and active travel across North Wales, and connections to England. Thus, policy intent is now translating into interventions which may be expected, in the medium term, to lead to lower levels of traffic than the projections that underpin the case for intervention.

The Union Connectivity Review of November 2021 recommended improving the A55 and the North Wales Coast Main Line to create faster journey times, resilience and capacity. The Panel considers that the North Wales Coast Main Line should be the investment priority, because it has potential to encourage mode shift from car to rail. This would reduce demand on the A55 and enhance its resilience, while also helping to meet Welsh Government policy aims in relation to modal shift and carbon reduction.

There may however be a case for some small-scale interventions on the A55 to support its efficient operation, so long as the chosen interventions do not undermine other Welsh Government aims.

5. Are the objectives aligned with current policy?

The objective to reduce fatal and serious collisions is aligned with current policy, but investment on the A55 / A494 corridor may not be a priority because the safety record is generally good. It is also not clear that the proposed options would be effective in achieving the objective.

The objective to improve provision for sustainable travel is aligned with current policy, but the recommended schemes would not be effective in achieving it.

The objective of reducing journey time would be likely to result in induced traffic and hence increase carbon emissions, so it is inconsistent with current policy.

Other objectives are largely neutral in relation to current policy.

6. Did the scheme development process examine all appropriate options?

The WelTAG Stage 2 Report considered a number of short-term and long-term options classified within seven themes as follows: asset management (14 options); demand and capacity (18 options); communication (8 options); incident management (35 options); diversion routes (19); sustainable travel (10); and future proofing (4). Quick wins and short-term schemes arising from the study have already been completed and evaluated in the WelTAG Stage 5 report.

The 35 schemes that were recommended to be progressed in the medium or long term were as follows:

Asset management (9 schemes)

1. Review and enhance maintenance processes (S19) £35,000

2. Preventative maintenance planning (S20) £200,000
3. Construction of offline maintenance bays and access points (S21) £925,000
4. High tech asset monitoring software (S22) £67,000
5. Route based maintenance (S23) no cost
6. Long term asset specification (S26) no cost
7. Change to programming of funding (S44) no cost
8. Concrete central reserve barriers at road traffic collision hotspots (S59a) £48 million
9. Concrete central reserve barriers along whole route of A55 excluding Britannia Bridge, the tunnels, and Anglesey (S59c) £280 million

Demand and capacity (10 schemes)

10. Ramp metering (S55) £1.6 million
11. Two-lane expressway - Eastern / Deeside hotspots (S56h) £76 million
12. Two-lane expressway at congestion hotspots (S56f) £232 million
13. Two-lane expressway (whole corridor) (S56g) £470 million
14. Improve non-standard junctions (S58) £2 million
15. Reduce number of junctions (closing six) (S69) £2 million
16. Limit heavy goods vehicle (HGV) overtaking on uphill gradients (S72a) £76,000
17. Introduce a climbing lane on Northop Hill in the westbound direction (S72b) £3 million
18. Vehicle access restrictions (S84) £372,000
19. Review prohibition 'No Entry's on junctions and slip roads (S114) no cost

Communications (1 schemes)

20. Variable message signs (strategic infill) (S6a) £3 million

Incident management (9 schemes)

21. Additional CCTV cameras (S7a) £1.5 million
22. Sidefire Radar (queue protection) (S8) £720,000
23. Integrated Control Room Systems and Data (S12) £10 million
24. Integrated Control Room (new or expanded) (S31a) £10 million
25. Virtual Integrated Control Room software and technology (S31b) £240,000
26. Additional laybys at 2.5km intervals (S57) £3 million
27. A55 lay-by operational review (S93) no cost
28. Improve water supply for Emergency Services (S102) £11,000
29. Improve Rest Areas (two new rest areas) (S103) £5 million

Diversion routes (1 schemes)

30. Wireless electronic driver information sign at Waterloo Bridge A5 / A470 Junction (S77b) £140,000

Sustainable travel (5 schemes)

31. Close five at-grade pedestrian crossings (S71a) £70,000

- 32. Close and reroute four at-grade pedestrian crossings (71b) £60,000
- 33. Close five at-grade pedestrian crossings and create new routes (71c) £920,000
- 34. Close four at-grade pedestrian crossings and replace with footbridges (71d) £5 million
- 35. Improve existing non-motorised user routes located parallel with A55 i.e. re-route away from carriageway (S108) £2 million

Some of these schemes could reduce incidents on the A55 / A494 or enable them to be managed better, hence improving resilience. They each in various ways assist in maintaining the route as a safe route for use, but without increasing capacity. Their costs range from zero to £10 million. They are:

- Asset management: S19, S20, S21, S22, S23, S26, S44
- Demand and capacity: **S114**
- Communications: **S6a**
- Incident management: S7a, S8, S12, S31a, S31b, S57, S93, S102, S103
- Diversion routes: **S77b**

Two asset management schemes, **S59a** and **S59c**, involve replacement of existing steel safety barriers with concrete barriers. This would be costly (£48 million for selective replacement at collision hotspots; £280 million for the whole corridor) although it would reduce inspection, maintenance and repair costs of steel barriers. There is no assessment of the embodied carbon but it may be significant. There may be safety benefits, but these have not been demonstrated in the context of this route which has a low to medium risk of death or serious injury.

In the Panel's judgement, the consideration given to demand management and speed management as means to improve resilience was not sufficient. There were ten options under the theme of 'demand and capacity', but rather than managing demand, many would increase capacity. This would be likely to lead to induced traffic and increased carbon emissions. Schemes of most concern are:

- Two-lane expressways: Eastern / Deeside hotspots (**S56h**); Congestion hotspots (**S56f**); and Whole corridor (**S56g**). Expressways would include modernised junctions, a concrete central reserve barrier, provision of emergency refuge and maintenance areas, the use of advanced technology to detect and help clear incidents and future-proofing the network using Intelligent Transport Solutions communication network infrastructure. The WelTAG Stage 2 Report suggested that S56h should be implemented first, followed by S56f and finally the whole corridor, S56g. The total cost for the whole corridor is estimated to be £470 million.
- Introduce a climbing lane on Northop Hill in the westbound direction (**S72b**): This scheme is also the subject of a separate WelTAG Stage 1 Report (A55 Northop (J33) to Holywell (J32) Study), which has been separately reviewed by the Panel. The latter study, recently completed, estimates the cost of the scheme as £15 million, which is considerably higher than the £3 million estimate made by the A55 / A494 Network Resilience study.

None of these schemes are consistent with current policy.

Other 'demand and capacity' schemes would individually have less effect on capacity, although still potentially increasing it significantly if they were implemented in aggregate.

These schemes are:

- Ramp metering (**S55**): this would control access onto the A55 at times of high flow. It

would be effective over a limited range of flows. It may reduce congestion and increase capacity.

- Improve non-standard junctions (**S58**): nine junctions that do not meet current design standards would be remodelled, for example by lengthening entry/exit slips. This would eliminate disruption to mainline flows resulting from slow-moving vehicles.
- Reduce number of junctions (**S69**): junctions that do not meet current standards or have little use would be closed.
- Limit HGV overtaking on uphill gradients (**S72a**): this would reduce delays to other traffic in congested conditions.
- Vehicle access restrictions (**S84**): Prohibition of slow-moving vehicles (such as tractors) on the entirety of the network to increase capacity.

The Panel does not consider that there is a case on resilience grounds for implementing these schemes. There may be a case for implementing some elements of some schemes if it can be shown that they would improve safety, and are among the best of safety schemes awaiting funding.

At WelTAG Stages 1 and 2, little to no consideration was given to sustainable transport options which could increase the resilience of the A55 / A494. Bus and train options were introduced at WelTAG Stage 1 but deemed not relevant at Stage 2. The remaining options for sustainable travel relate to closure of at-grade pedestrian crossings. For three schemes which include the closure of 14 footpath crossings of the A55, the pedestrian route would be longer (**S71a, S71b, S71c**). The four closures as part of scheme **S71d** would be provided with footbridges. There appears to be little consideration of enhancing walking routes, and these closure schemes would not promote sustainable travel. However, the scheme to re-route existing walking and cycling routes that are located parallel to the A55 along alternative routes away from the carriageway (**S108**) would make these routes more comfortable, attractive and safe. No evidence of levels of use of the at-grade crossings and parallel active travel routes is provided, so it is not possible to judge whether there is a case for any of these schemes.

In summary, the schemes will result in some, and variable depending on the scheme, increases in overall private vehicle capacity. Some 19 interventions (mostly small in scale) may increase resilience and support efficient operation of the A55 / A494 without increasing capacity, and of these, the ones offering the greatest benefit could be progressed. Four interventions would increase carbon emissions due to embodied carbon or induced traffic or both, and should not be progressed. Two options to replace steel safety barriers with concrete barriers would involve carbon dioxide emissions due to embodied carbon, and the case for their safety benefit has not been made. Another six interventions would increase capacity if implemented in aggregate, but some individual elements of them could be progressed where there would be clear safety benefits, if they were among the best of safety schemes awaiting funding. Five interventions categorised as 'sustainable travel' would offer doubtful, if any, benefit to pedestrians, and would only be appropriate to progress if there is evidence of a safety issue.

7. What is the effect on carbon dioxide emissions?

No quantitative assessment has been undertaken of carbon dioxide emissions. There would be large increases in emissions due to construction, maintenance, operation and use from the schemes that increase private vehicle capacity. Replacement of steel safety barriers with concrete barriers would have unknown but potentially significant embodied carbon.

The recent WelTAG Stage 2 Report (dated June 2021) makes no reference to embodied carbon from construction, induced traffic or higher speeds as relevant considerations in deciding which schemes should be progressed.

8. Will the scheme be good for people and communities?

Closure of at-grade pedestrian crossings without provision of a footbridge would result in longer pedestrian routes and greater severance. There are 21 designated Noise Action Planning Priority Areas situated along the A55 and A494 between Holyhead and Broughton. The schemes will not significantly reduce noise levels and some schemes may increase noise levels. EuroRAP rates the A55 / A494 as having a low to medium risk in relation to collisions, based on frequency and type of collisions when compared with other routes in the UK. This rating suggests that the potential for safety benefits is limited. There are no impacts (positive or negative) in relation to air quality or access to employment and services for people who suffer social exclusion.

9. Will the scheme be good for the environment?

Environmental impacts have not yet been assessed. There is insufficient information to make a judgement about impacts on sites that are protected for their environmental value or biodiversity, but the A55 / A494 corridor is adjacent to or within 100 metres of nine Sites of Special Scientific Interest, two Special Protection Areas and three Special Areas of Conservation, and there is ancient woodland adjacent to the road in many locations. Schemes that increase road capacity could increase emissions from induced traffic, potentially causing deterioration of ancient woodland adjacent to the road.

The A55 passes through two Areas of Outstanding Natural Beauty and Snowdonia National Park, and there could be moderate adverse landscape effects from some schemes.

10. Will the scheme be good for places and the economy?

The A55 has an important function for road freight travelling to Holyhead, so improvements to network resilience could have benefits for freight reliability. There may be some local economic benefits if improved resilience attracts more (car-based) tourism, although issues with car-based tourism in Snowdonia suggest that a strategy focussed on investment in visitor access by sustainable modes would be preferable. Making it easier for local residents to commute to work outside their immediate area could be either a benefit or a disbenefit to the local economy. No benefits for place-making are identified.

Value for money has been assessed for 30 of the 35 schemes: there was no benefit that could be estimated in monetary terms for schemes S23, S26, S44, S114 and S93. Of the remaining schemes, 15 had poor value for money, that is to say a Benefit to Cost Ratio (BCR) of less than 1. The listing below summarises value for money for the other 15 schemes. The schemes in **bold** are the 'demand and capacity' schemes, and the schemes in *italics* are the 'sustainable travel' schemes. The remaining schemes are 'asset management' schemes.

- Low value for money, three schemes (BCR of 1 to 1.5): **S56h, S69, S84**
- Medium value for money, four schemes (BCR of 1.5 to 2): S21, **S56f, S72b**, *S71b*
- High value for money, six schemes (BCR of 2 to 4): S19, S20, S22, **S55, S56g**, *S71a*
- Very high value for money, two schemes (BCR greater than 4): **S58, S72a**

The benefits for the two sustainable travel schemes, S71a and S71b, result from fewer collisions. The benefits for the demand and capacity schemes derive from journey time savings, with

the exception of S58, which results from collision savings as a result of improvements to non-standard junctions. The benefits from asset management schemes result from enhanced asset management processes.

11. Will the scheme be good for culture and the Welsh language?

The Panel does not consider there to be materially significant impacts on sustainable travel for arts, sports, recreation or cultural activities.

Any scheme that improves accessibility into North Wales has potential to impact on the Welsh language as this route serves areas of Wales with a high proportion of Welsh speakers. Improvements to the route may increase tourist visits.

The scheme does not directly affect any historic or cultural sites.

12. How robust is the case for the scheme to different futures?

The A55 / A494 route is vulnerable to flooding in a number of areas, and it is not evident that this has been a consideration in option identification. The value for money of some schemes would be less if Brexit reduces use of the A55 by freight traffic. Value for money would be lower in a scenario in which travel by private motor vehicle was lower, in line with Welsh Government's aims for more remote working and lower car mileage per person.

13. Conclusion

There is a case to progress interventions that could reduce incidents on the A55 / A494 or enable them to be managed better, hence improving resilience, but at the same time would not increase carbon emissions from increases in capacity or higher speeds. There are nine interventions that meet this description and also have at least medium value for money or are zero cost. They are: review and enhance maintenance processes (S19); preventative maintenance planning (S20); construction of offline maintenance bays and access points (S21); high tech asset monitoring software (S22); route-based maintenance (S23); long term asset specification (S26); change to programming of funding (S44); A55 lay-by operational review (S93); and review of prohibition of entry regulation orders on slip roads (S114).

There may also be a case for implementing some elements of certain schemes if it can be shown that they would improve safety, and if they are among the best of safety schemes awaiting funding. There are three interventions that meet this description and also have at least medium value for money. They are: ramp metering (S55); improving non-standard junctions (S58); and limiting HGV overtaking on uphill gradients (S72a). However, the good safety record of the A55 / A494 means it may be less likely that these schemes will offer better safety benefits than safety schemes elsewhere.

Four interventions would increase carbon emissions due to embodied carbon and induced traffic, and should not be progressed. These are the three options to create an expressway (S56f, S56g, S56h); and one scheme to construct a climbing lane (S72b). A further two options to replace steel safety barriers with concrete barriers (S59a, S59c) would involve carbon dioxide emissions due to embodied carbon and have poor value for money. The case for their safety benefit has not been made, and so they should not be progressed.

Five interventions categorised as 'sustainable travel' would offer doubtful, if any, benefit to pedestrians, and would only be appropriate to progress if there is evidence of a safety issue.

The remaining schemes have low or poor value for money.

Progress beyond the WeITAG Stage 2 A55 / A494 Network Resilience Study is being delivered in the following Stage 1 studies: A55 J23-24; A55 J24-29; A55 J29-33B; A55 J32-33; A55 J33B Ewloe to A494 Queensferry; A55 At-grade pedestrian crossing review; and A55 Slow moving vehicle overtaking restrictions. All Stage 1 studies where information has been provided are subject to a separate review by the Panel.



SUMMARY

The WelTAG Stage 1 A55 Corridor Study (J23 – J24) examined a 5.5km length of the A55. Junction 23 is at Llanddulas and Junctions 23A and 24 are to the north and east of Abergele.

The case for change at this location has been partially made. The safety record on this part of the A55 appears to be worse than elsewhere on the A55 and this may be due in part to road layout and poor surface drainage, but further investigation is required. A number of defects and issues with structures are identified, but there is no assessment of the importance of addressing these issues relative to structural defects elsewhere. The Panel does not consider that the case for intervention to improve journey time reliability and resilience has been made.

39 options were shortlisted. They were as follows: road safety (7 schemes), repairs to structures (6 schemes), sustainable transport (6 schemes), public transport (4 schemes), emissions and biodiversity (3 schemes) and capacity and resilience (13 schemes). The process for moving from these 39 options to a preferred scheme is not explained in the report.

The Panel suggests that considering such a wide range of options within a single WelTAG study for a limited length of route is not an effective strategy to deliver the outcomes that the Wales Transport Strategy seeks. Better outcomes would be achieved through more narrowly-defined thematic programmes for (a) road safety; and (b) development of active travel routes and bus infrastructure on trunk roads to achieve modal shift. These programmes could cover a larger area. This would allow comparative analysis of issues and enable the best available schemes to be identified and prioritised. By moving some elements of appraisal up to the programme level, rather than the scheme level, analytical and engineering resource may be used to best effect.

Asset renewal priorities on this section of the A55 should be compared to other asset renewal priorities elsewhere, to ensure that the highest priority schemes for the available renewals budget are progressed.

The following proposed capacity and resilience interventions should not feature in any future programme because they would increase private vehicle capacity, and hence could cause induced traffic and increase carbon dioxide emissions:

- Belgrano to A55 link road (M8)
- Upgrades to A547 carriageway, widening where possible and make fit for purpose (M9)
- J23A eastbound access slips (A8)

The Panel makes the following recommendation:

The A55 J23-24 Study should not proceed to the next stage because there are concerns surrounding this process being the most appropriate to deliver relevant safety and multi-modal transport benefits for this area.

1. Study description

The WelTAG Stage 1 A55 Corridor Study (J23 – J24) examined a 5.5km length of the A55, including J23, J23A and J24. Junction 23 is at Llanddulas and Junctions 23A and 24 are to the north and east of Abergele.

The study follows previous studies of the resilience of the A55. These are the WelTAG Stage 1 and WelTAG Stage 2 A55 / A494 Network Resilience studies that covered the A55 between Holyhead on Anglesey in the west, and the English border in the east.

The aims widened during the J23 – J24 study. It was initially focused on improving journey times and reliability; but broadened to include improving network resilience and road safety, and addressing structural maintenance and road maintenance issues. Later, the Review Group broadened the aim again to reflect the Wales Transport Strategy priorities. This has led to identification of a large number of options (58), of which 39 have been shortlisted, covering road safety, structural maintenance, active travel, public transport, environmental measures, and capacity and resilience measures.

2. Information reviewed

The following documents have been reviewed:

- WelTAG Stage 1&2 IAR: A55 Corridor Study J23 – J24 (November 2021)
- WelTAG Stage 1 Report: A55 Corridor Study J23 – J24 (March 2022)
- A55 J23 to 24 Supporting Evidence (v2) (March 2022)

3. Objectives

The objectives are:

- To make a positive and long-lasting contribution to the realisation of the Wales Transport Strategy priorities of:
 - ▶ Reducing the need to travel
 - ▶ Accessible, sustainable and efficient transport services and infrastructure
 - ▶ Encourage greater use of sustainable transport
- To reduce the carbon impact and enhance the environment between J23-J24 of the A55
- To enhance the road safety of the A55 through improved design layout and driver behaviour related measures
- To maximise the resilience of the A55 especially at times of incidents
- To reduce the need and level of ongoing maintenance of the A55 by addressing the condition of the highway and structures
- To enhance opportunities for non-car trips by improving sustainable travel (active travel and public transport) provision in the vicinity of the A55
- To reduce adverse impacts on the local transport network including the A547

4. Has the case for change been made?

The case for change is summarised as follows:

- A need to improve road safety at specific locations as well as measures to improve driver behaviour

- Poor journey time reliability caused by seasonal and weekend capacity issues and incidents
- Poor resilience of the A55 during congested conditions and traffic incidents; lack of suitability of the diversion routes and poor resilience in wet weather
- Failing and life expired structures and the need for increased levels of maintenance and inspection. Maintenance levels are already high; the carriageway between J23-J24 has been fully closed 30 times over the past five years for maintenance
- A high level of car dependency and the severance caused by the A55
- A need to improve eastbound access at J23A from Pensarn and the A548 corridor

The Panel considers that the case for change has been partially but not fully demonstrated.

Looking at the elements of the case for change in turn:

- Regarding the **need to improve road safety**, the study identifies that there were 76 personal injury collisions between J23-J24 (including at the junctions) for the period 2010-2019. This is 40% higher than the average for the A55 as a whole (1.4 personal injury collisions per km per year, compared to 1.0 collisions per km per year for the A55 as a whole). Given that traffic volumes increase along the A55 from west to east, the collision risk relative to the volume of traffic may be significantly more at this location than elsewhere on the A55. To put this in context, the earlier A55/A494 Network Resilience Study (2017) notes that the A55 as a whole does not have a high collision rate in comparison with similar roads. This is corroborated by recent crash risk mapping¹, which categorises the whole of the A55, including J23-24, as 'low risk' in terms of the frequency of crashes resulting in death or serious injury, relative to the volume of traffic. The A55 between J23-J24 is thus a somewhat higher-risk section of a road where risk is generally low. The analysis in the WelTAG Stage 1 Report identifies two contributory factors: poor surface drainage of the eastbound carriageway west of J23A, which can cause vehicles to aquaplane in wet weather; and a bend in the carriageway at J23A. These factors were relevant to three of the 13 serious collisions between 2010 - 2019. Feedback from stakeholders also identified standing water on the eastbound carriageway west of J23A as a concern. However, review of collision locations by the Panel suggests that most collisions occur at J23 and J24, and not near J23A. The Panel recognises that there is a case for further investigation to confirm where collision risk is high and to understand the causes; and to identify how collisions may best be reduced.
- There is no analysis to substantiate **poor journey time reliability and resilience**. In the absence of data on vehicle queue lengths at junctions, vehicle delay minutes associated with traffic-related incidents and congestion, or data illustrating the impact of road closures for planned or reactive maintenance works (i.e., frequency and duration of works), the case for change is not clear.
- Considering **failing and life-expired structures**, there is a summary of the condition of seven bridges between J23-J24, based on Principal Inspection Reports and other assessments between 2012 - 2021. A number of defects and issues are identified, and there is a case for change. There is no assessment of the importance and urgency of addressing these issues relative to structural defects elsewhere on the A55.
- The study notes that there is a **high level of car dependency** for commuting, with travel by rail not seen as a viable alternative because of slow journey times; and that the A55 causes **severance**, particularly between Abergele and Pensarn. Further analysis of the main origin-destination pairs would be necessary to judge which car trips are most amenable to mode shift, and which measures would achieve this.

¹ Road Safety Foundation: Building Back Safer: Making roads fit for 2030 – British EuroRAP crash risk mapping results (2021)

- It is noted that **J23A** has only an eastbound off-slip and westbound on-slip, so that vehicles travelling east from Pensarn must travel via Abergele; and that there is queuing to access the A55 at J24. However, the case that intervention is required has not been made.

5. Are the objectives aligned with current policy?

The objectives of the study demonstrate alignment with current policy, particularly where there is a focus on reducing the need to travel, sustainable transport, enhancing the environment, reducing carbon impacts and improving road safety.

6. Did the scheme development process examine all appropriate options?

The longlist of 58 options comprised: mainline modifications (13); changes to slip roads and junction access (11); operational improvements (5); sustainable travel improvements (10); communication (1); traffic management (4); measures to improve surface water drainage (5); maintenance of structures (6); and environmental measures (3). As the process has only reached WelTAG Stage 1, there are, as yet, no detailed cost estimates, but all longlisted options were categorised as costing either less than £0.5 million, £0.5-1 million, £1-5 million, £5-10 million, or more than £10 million.

39 of the 58 options were shortlisted. They were divided into six groups: road safety measures (top priority); renewal of structures (second priority); walking and cycling measures (third priority); public transport measures (fourth priority); emissions and biodiversity measures (fifth priority); and capacity and resilience measures (sixth priority). The shortlisted options, and their estimated costs, are as follows:

Road safety (7 options)

- Closure of westbound layby and replacement in other location (M4A) – £500,000 - £1 million
- Improve standards of eastbound layby (M4C) – £500,000 - £1 million
- Change vertical alignment of the carriageway to improve drainage (SW4) – £5 million - £10 million
- Review placement of current temporary signs on the central reserve (SW2) – less than £500,000
- Plan of use for emergency crossing points (A3) – less than £500,000
- Repairs to the parapets/ road restraint system (M11) – £500,000 - £1 million
- Full review of signs along A55 corridor (TM3) – £500,000 - £1 million

Structures (6 options, all bridges)

- Package of works to Sea Road (S1) – £10 million +
- Package of works to Dundonald Avenue (S2) – £10 million +
- Package of works to Wern Road (S3) – £10 million +
- Package of works for River Gele (S4) – £10 million +
- Package of works for Beach House Road (S5) – £10 million +
- Package of works for Beach Road River Dulas (S6) – £10 million +

Sustainable transport (6 options)

- Active travel improvements to A547 diversion route (ST4) – £500,000 - £1 million
- Replace or repair Hen Wrych footbridge (ST5) – £1 million - £5 million
- Cycle hire scheme in Abergele (ST6) – £500,000 - £1 million
- Improvements to Maes Cybi underpass (ST8) – less than £500,000
- Improved pedestrian/cyclist facilities at connections over the A55 (ST9) – £1 million - £5 million
- Improvements to cycle infrastructure at Abergele and Pensarn railway station (ST10) - £500,000 - £1 million

Public transport (4 options)

- Improved bus services (ST1) – less than £500,000
- Improved rail services (ST2) – £500,000 - £1 million
- Abergele park and ride (ST3) – £5 million - £10 million
- Re-opening of rail halt located in Towyn area (ST7) – £1 million - £5 million

Emissions and biodiversity (3 options)

- Decarbonisation of diversion route A547 (E1) – £1 million - £5 million
- Noise barriers (E2) – £1 million - £5 million
- Biodiversity enhancements (E3) – less than £500,000

Capacity and resilience (13 options)

- Hard shoulder provision (M3) – £5 million - £10 million
- Variable Message Signs (VMS) Messaging Review (C1) – less than £500,000
- Concrete central reserve (M7) – £5 million - £10 million
- J24 Link Road – Belgrano to A55 link road (J24) to improve access to J24 including the Abergele and Pensarn Railway station and will also provide a link if the area is subject to flooding thereby improving resilience (M8) – £10 million +
- Ramp metering and improved standards (A2B) – £500,000 - £1 million
- Reduction in speed limit (O3) – less than £500,000
- Provide offline network access points for inspection and maintenance (A1) – less than £500,000
- J23 increase length of on-slip (A7) – less than £500,000
- J23A eastbound access slips (A8) – £1 million - £5 million
- Dedicated Traffic Officer laybys (M5) – £500,000 - £1 million
- Improvements to A547 diversion route (M9) – £500,000 - £1 million
- Traffic signalling in Abergele town centre (TM2) – £500,000 - £1 million
- Increased CCTV coverage (O4) – £500,000 - £1 million

The process for moving from this shortlist of 39 options to a preferred scheme is not explained in the report.

There are some shortlisted options that would result in an increase in private vehicle capacity, and hence could cause induced traffic and increase carbon emissions. The Panel considers that they should not be progressed. They are:

- Belgrano to A55 link road (M8)
- Upgrades to A547 carriageway, widening where possible and make fit for purpose (M9)
- J23A eastbound access slips (A8)

One shortlisted option under 'capacity and resilience', a reduction in the speed limit to 50mph (O3), would have safety, and capacity and resilience benefits. It would be appropriate to consider it as part of a programme of road safety measures. The Panel notes that a lower speed limit on the mainline carriageway could have safety benefits because some drivers, after a period of driving at high speed, may be underestimating their speed when leaving the A55 at J23 and J24.

The structural maintenance options each cost over £10 million. Repairs to the bridges in this section of the A55 are part of the Major Asset Renewal (MAR) programme, and the Panel considers that asset renewal priorities on this section of the A55 should be compared to other asset renewal priorities elsewhere, to ensure that the highest priority schemes for the available renewals budget are progressed.

The remaining road safety, sustainable transport, public transport, emissions and biodiversity, and capacity and resilience schemes are consistent with current policy.

7. What is the effect on carbon dioxide emissions?

No quantitative assessment has been undertaken of carbon dioxide emissions, but shortlisted options that increase private car capacity would increase emissions. The embodied emissions in some options, such as a concrete central reserve, may also be significant. Sustainable transport and public transport measures may reduce emissions if they result in modal shift. A reduction in the speed limit would improve vehicle efficiency and reduce emissions.

8. Will the scheme be good for people and communities?

The study identified a number of problems that adversely affect local communities, including severance and noise from the A55, poor quality pedestrian and cycling routes, the use of the local road network as a diversion route in the event of incidents on the A55, and high seasonal and weekend flows. Many of the shortlisted options would have a negligible impact on these problems. Some shortlisted options have potential, subject to their final designs, to address these problems, including options associated with road safety, sustainable transport, public transport, and emissions and biodiversity.

9. Will the scheme be good for the environment?

It is not possible to assess environmental impacts at this early stage. The most significant risk of environmental harm is associated with 'capacity and resilience' schemes that increase private vehicle capacity. There are several Sites of Special Scientific Interest (SSSIs) close to this section of the A55: Traeth Pensarn SSSI is approximately 30 metres from the highway boundary; Llanddulas Limestone and Gwrych Castle Wood SSSI is within 200 metres of the highway boundary; and Coed Y Gopa SSSI lies to the south of Abergele town centre. Liverpool Bay Special Protection

Area is to the north of the A55, and there is ancient woodland adjacent to the road to the east of Llanddulas.

10. Will the scheme be good for places and the economy?

The A55 has an important function for road freight travelling to Holyhead, so schemes that improve network resilience could have benefits for freight reliability. Schemes improving sustainable transport could have benefits for place-making and local economic well-being. Little discussion is presented within the WelTAG documentation regarding the impacts of the scheme on tourism, which is economically important to the region. However, issues with car-based tourism in Snowdonia suggest that a strategy focussed on improving visitor access by sustainable modes would be preferable.

11. Will the scheme be good for culture and the Welsh language?

Any scheme that improves accessibility into North Wales has potential to impact on the Welsh language as this route serves areas with a high proportion of Welsh speakers. Improvements to the route, alongside a wider programme of interventions, may increase tourist visits, which may impact on these areas. The schemes do not directly affect any historic or cultural sites.

12. How robust is the case for the scheme to different futures?

The scheme is in a location identified as vulnerable to flooding from rivers. Some of the options seek to improve surface water drainage, and the case for these interventions is potentially stronger if flooding and other extreme weather events become more common due to climate change. The inclusion of sustainable transport measures may well contribute to, and be more popular in, future-year scenarios with reduced rather than increased car use.

13. Conclusion

The Panel acknowledges the effort made by the scheme sponsor to broaden this study from an original focus on journey times and reliability, to address the new priorities of the Wales Transport Strategy. However, considering such a wide range of options within a single WelTAG study for a limited length of route is not an effective strategy to deliver the outcomes that the Wales Transport Strategy seeks. Better outcomes would be achieved through more narrowly-defined thematic programmes for (a) road safety; and (b) development of active travel routes and bus infrastructure on trunk roads to achieve modal shift. These programmes could cover a larger area. This would allow comparative analysis of issues and enable the best available schemes to be identified and prioritised. By moving some elements of appraisal up to the programme level, rather than the scheme level, analytical and engineering resource may be used to best effect.

Asset renewal priorities on this section of the A55 should be compared to other asset renewal priorities elsewhere, to ensure that the highest priority schemes for the available renewals budget are progressed.

The Panel understands that North and Mid Wales Trunk Road Agent (NMWTRA) is progressing a review of all existing and proposed local authority active travel routes that interface with the trunk road network, and that this includes a process of local authority consultation and route prioritisation. This regional approach could be an appropriate means to take forward the active travel schemes identified in the A5 J23-24 study, if they are among the best of schemes waiting for funding. In progressing these routes, NMWTRA should have regard to the Panel's recommendations on the importance of constructing complete routes that connect between settlements.



SUMMARY

The WelTAG Stage 1 A55 J33b Ewloe – A494 Queensferry Interchange Study examined a 4km length of the A494, between A55 Junction 33b at Ewloe (where the A494 and A55 join) and the Queensferry Junction of the A494 south-east of Connah's Quay.

The WelTAG Stage 1 Study was commissioned in September 2021, after the announcement of the Roads Review in June 2021. The Roads Review Panel took the view that it was within the Panel's Terms of Reference, and work on the study stopped in February 2022. It therefore represents an example of how the Trunk Road Agent sees its role in the light of recent changes to policy as set out in the Wales Transport Strategy, Net Zero Wales and the terms of reference of the Roads Review.

The case for change is not clearly articulated, but there are two main sets of issues. First, there are issues about the negative impact of the road on the community and the lack of sustainable transport: the study notes that the road passes through deprived areas; that there are high traffic volumes, mostly made up of local traffic; that traffic is forecast to grow; that car use is high and public transport use is low. The A494 causes severance that hinders access to local services by foot or cycle; and there are few direct public transport services. Second, there are issues about the condition of the A494: the study notes that incidents on the A494 can cause significant tailbacks; the road layout does not meet current standards; and there are a number of highway defects.

In response to these issues, 81 options are shortlisted. They are grouped as follows: reducing the need to travel (16 options), active travel (14 options), public transport (18 options), ultra-low emissions vehicles (5 options), road-based solutions (25 options) and environmental interventions (3 options).

The process for moving from these 81 options to a preferred scheme is not explained. The Trunk Road Agent does not have a remit for delivery of most of the shortlisted options. The Panel concludes that if the study were to proceed to the next stage, the options to emerge would be selected from those that could be delivered by the Trunk Road Agent. Of these, most (19 out of 28) are road-based.

Eight road-based options would increase private vehicle capacity or have significant embodied carbon. They would worsen the negative impact of the road on the community and undermine sustainable transport modes. The Panel considers that these options should not be progressed. They are:

- Prohibit slow-moving traffic on strategic road network by providing an alternative route (HS3)
- Connected vehicle corridor (HS8)
- Tactical diversion route for closure of the A494 St. David's to Queensferry (HS11)
- Safety improvements between A55 J33b and A494 St. David's Interchange (HS17)
- Re-design of major interchanges (HS20)
- Flintshire Corridor Red Route (HS22), which is subject to a separate Panel review
- New A494 to A55 link road at J33b (HS23)
- Improve connectivity of local road network (HS24)

The Panel suggests that considering such a wide range of options within a single WelTAG study for a limited length of route is not an effective strategy to deliver the outcomes that the Wales Transport Strategy seeks. There is instead a need for work at a regional level to identify and prioritise the best schemes to achieve modal shift and reduce car use. In North-East Wales, this will best be led by North Wales Transport Commission and Transport for Wales. The Trunk Road Agent would have a role in delivering elements of the resulting sustainable transport package on the A494, but this should follow, not precede, the strategic regional analysis.

The Panel makes the following recommendation:

The A55 Ewloe (J33b) to A494 Queensferry Interchange Study should not proceed to the next stage because the case for change has not been made and there are concerns surrounding this process being the most appropriate to deliver relevant multi-modal transport benefits for this area.

1. Study description

The WelTAG Stage 1 A55 J33b Ewloe – A494 Queensferry Interchange Study examined a 4km length of the A494, between A55 Junction 33b at Ewloe (where the A494 and A55 join) and the Queensferry Junction of the A494 south-east of Connah's Quay.

This part of the A494 was previously studied as part of the Flintshire Corridor 'Blue Option'. The Blue Option is no longer the preferred option for the Flintshire Corridor. (The preferred 'Red Option' is being separately reviewed by the Roads Review Panel).

The study follows previous studies of the resilience of the A55 and A494. These are the WelTAG Stage 1 and WelTAG Stage 2 A55/ A494 Network Resilience studies that covered the A55 and A494 between Holyhead on Anglesey in the west, and the English border in the east.

The WelTAG Stage 1 Study was commissioned in September 2021, after the announcement of the Roads Review in June 2021. The Roads Review Panel took the view that it was within the Panel's Terms of Reference, and work on the study stopped in February 2022.

The study identified a large number of options (88), of which 81 were shortlisted, covering reduction in the need to travel, active travel, public transport, ultra-low emission vehicles, road-based solutions and environmental issues.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- WelTAG Stage 1 Report: Strategic Outline Case A55 J33b Ewloe to A494 Queensferry Interchange (March 2022)
- WelTAG Stage 1 IAR: A55 J33b Ewloe to A494 Queensferry Interchange (March 2022)

3. Objectives

The objectives are:

- Protect and enhance biodiversity and ecosystem resilience
- Reduce carbon impacts and greenhouse gas emissions
- Reduce air and noise pollution from the transport system

- Improve safety on the transport network for all users
- Improve connectivity between local and regional communities
- Improve journey time reliability of the transport system
- Support well-being and the North-East Wales economy by improving links to work, business, leisure, education and healthcare
- Increase modal shift by improving accessibility, attractiveness and awareness of sustainable transport choices
- Manage and improve assets to create a more resilient and future-proofed network, including adapting to the impact of climate change

4. Has the case for change been made?

The study does not present a case for change, but identifies problems that may be summarised as follows:

Issues about the negative impact of the road on the community and the lack of sustainable transport

- Some relatively deprived areas; high car use and low public transport use.
- High traffic volumes, mostly due to local traffic; traffic forecast to grow by up to 9% by 2027 and 22% by 2042.
- Lack of connectivity of walking and cycling infrastructure; severance caused by A494 makes access to local services by foot and cycle more difficult.
- A lack of good, co-ordinated public transport services: some significant trip origin-destination pairs are not served by direct public transport services.

Issues about the condition of the A494

- Incidents can cause significant tailbacks; rear-end shunt collisions are an issue.
- At-grade junctions and road layout are not to current standards.
- Wide ranging highway defects including those related to the carriageway, highway drainage, road studs and markings, traffic signs, vehicle restraint systems, boundary fencing and roadside furniture.

There is no indication of the importance of the issues that have been identified relative to the same issues in other locations. The Panel does not consider that a case for change has been fully demonstrated.

5. Are the objectives aligned with current policy?

The objectives that relate to enhancing biodiversity, reducing carbon and air and noise pollution, improving safety and modal shift to sustainable transport are aligned with current policy. Other objectives are largely neutral in relation to current policy.

6. Did the scheme development process examine all appropriate options?

The longlist comprised 88 options, of which 81 were shortlisted. They were divided into six groups as follows: reducing the need to travel, active travel, public transport, ultra-low emissions vehicles, road-based solutions and environmental issues.

As the study has only reached WelTAG Stage 1, there are as yet no detailed cost estimates, but all options were categorised in three ways as follows: the delivery body that would be responsible

(Trunk Road Agent, Transport for Wales, Flintshire County Council, Welsh Government, UK Government); the delivery timescale (quick/ short/ medium/ long); and capital expenditure bandings (£0, under £250,000, £250,000-£500,000, £500,000-£1 million, £1 million-£5 million, £5 million-£10 million, £10 million-£25 million, £25 million-£50 million, £50 million-£100 million or over £100 million).

The shortlisted options, and their estimated costs, are listed below. The options for which the Trunk Road Agent would be the delivery body are shown in bold.

Reducing the need to travel (16 options; Trunk Road Agent would not be the delivery body for any of the options)

1. Digital Connectivity (RT1) – £1 million-£5 million
2. Drone Delivery (RT2) – £1 million-£5 million
3. Remote access to public services (RT3) – £500,000-£1 million
4. Improved planning of public service facilities within future developments (RT4) – £0 long
5. Welsh Government suppliers drive to zero car trips (RT5) – £0 quick
6. Coworking hubs (RT6) – £500,000-£1 million
7. Mobility hubs (RT7) – £1 million-£5 million
8. Community car club / car hire scheme (RT8) – £250,000-£500,000
9. Heavy goods vehicle distribution hubs (RT9) – £1 million-£5 million
10. Increase rail freight – Intermodal freight terminal at Deeside Industrial Park (RT10) – £10 million-£25 million
11. Increase rail freight – Rail freight terminal at the Port of Holyhead (RT11) – £50 million-£100 million
12. Changes to working practices (RT13) – £1-£250k
13. Parking charges (RT14) – £1-£250k
14. Congestion charges (RT15) – £1 million - £5 million
15. Workplace parking levy (RT16) – £0 medium
16. Reduce on-street parking (RT17) – £500,000 - £1 million

Active travel (14 options; Trunk Road Agent would be a delivery body for 3 options)

1. Active travel promotion (AT1) – £500,000 - £1 million
2. Establish a Deeside cycle hire scheme (AT2) – £1 million - £5 million

3. Multi-agency integrated delivery programme (AT3) – £0 quick

4. Improved active travel crossings of the strategic road network (AT4) – £5 million-£10 million

5. Active travel route parallel to the Strategic Road Network corridor (AT5) – £1 million-£5 million

6. Improve active travel links at Queensferry Interchange (AT6) – £1 million-£5 million

7. Improved active travel wayfinding (AT7) – £250,000-£500,000
8. Improvements to existing active travel infrastructure (AT8) – £500,000-£1 million
9. Deeside cycle super highway (AT9) – £1 million-£5 million
10. Long-distance recreational cycle routes (AT10) – £10 million-£25 million

11. Improved active travel infrastructure to and at Hawarden and Shotton stations (AT11) – £500,000-£1 million
12. Improved active travel infrastructure to and at key bus interchanges and stops (AT12) – £500,000-£1 million
13. Improved cycle storage facilities at trip generators (AT13) – £1-£250,000
14. Reallocate road space for active travel (AT14) – £500,000-£1 million

Public transport (18 options; Trunk Road Agent would be a delivery body for 3 options)

1. Smart ticketing (PT1) – £0 short
2. Subsidised ticketing (PT2) – £0 quick
3. 3.Integration of bus and rail timetables (PT3) – £0 short

4. Improved directness of bus routes (PT4) – £10 million-£25 million

5. Express Deeside bus service (PT5) – £1-£250,000
6. Deeside circular bus service (PT6) – £1-£250,000
7. Real-time travel information (PT7) – £250,000-£500,000
8. Improved public transport wayfinding (PT8) – £1-£250,000
9. Increased cycle holding capacity on buses (PT9) – £1-£250,000
10. Improved bus interchanges (PT10) – £1 million-£5 million
11. Expand bus park & ride (PT11) – £1 million-£5 million
12. Improved rail park & ride (PT12) – £500,000-£1 million

13. Bus priority infrastructure (PT13) – £1 million-£5 million

14. Bus only infrastructure (PT14) – £1 million-£5 million

15. Extension of Deeside Industrial Park Shuttle Bus Service (PT15) – £0 short
16. Improved access for all at stations (PT16) – £5 million-£10 million
17. Deeside Parkway Station (PT17) – £5 million-£10 million
18. Increased service frequency of Borderlands Line (PT18) – £1 million-£5 million

Ultra-Low Emissions Vehicles (5 options; Trunk Road Agent would not be the delivery body for any of the options)

1. EV charging infrastructure (EV1) – £1 million-£5 million
2. ULEV Buses (EV2) – £1 million-£5 million
3. Sustainable energy for transport infrastructure (EV3) – £50 million-£100 million
4. Hydrogen Fuel Technology (EV4) – £25 million-£50 million
5. Solar Roads (EV5) – £10 million-£25 million

Road-based solutions (25 options; Trunk Road Agent would be the delivery body for 19 options)

- 1. Holistic maintenance and renewals strategy for highway assets (HS1) – £1-£250,000**
- 2. 50mph speed limit on A494 / A55 (HS2) – £250,000-£500,000**
- 3. Prohibit slow-moving traffic on strategic road network by providing an alternative route (HS3) – £10 million-£25 million**
- 4. Redistribute traffic from A494 to A55 south of Chester (HS6) – £1 million-£5 million**

- 5. Technological congestion solutions: queue detection monitoring, variable message signs and CCTV incident detection (HS7) – £1 million-£5 million**
- 6. Connected vehicle corridor (HS8) – £10 million-£25 million**
- 7. Improved access for emergency responders (HS9) – £1-£250,000**
- 8. Provide additional emergency lay-bys (HS10) – £500,000-£1 million**
- 9. Create a tactical diversion route for closure of the A494 St. David's to Queensferry (HS11) – £10 million-£25 million**
- 10. Provide hard strip on A494 (HS12) – £5 million-£10 million**
- 11. Concrete central reserve safety barrier on A494 (HS14) – £1 million-£5 million**
- 12. Improve sub-standard A494 junctions (HS15) – £500,000-£1 million**
- 13. Close A494 junctions (HS16) – £500,000-£1 million**
- 14. Safety improvements between A55 J33b and A494 St. David's Interchange (HS17) – £25 million-£50 million**
- 15. Safety Improvements at Queensferry Interchange (HS18) – £1 million-£5 million**
- 16. Signage review (HS19) – – £500,000-£1 million**
- 17. Re-design of major interchanges (HS20) – £10 million-£25 million**
18. Relocate DVSA inspection site (HS21) – £1 million-£5 million
19. Flintshire Corridor Red Route (HS22) – £100 million+
20. New A494 to A55 link road at J33b (HS23) – £5 million-£10 million
21. Improve connectivity of local road network (HS24) – £10 million-£25 million
- 22. Gateway signage (HS25) – £1 million-£5 million**
23. Drone Incident Management (HS26) – £1-£250,000
24. Drone Asset Management (HS27) – £1-£250,000
- 25. Technology inventory database (HS28) – £1-£250,000**

Environmental (3 options; Trunk Road Agent would be the delivery body for all 3 options)

- 1. Develop soft estate landscape (EN2) – – £500,000-£1 million**
- 2. Living barriers / biodiversity corridors (EN3) – £1 million-£5 million**
- 3. Air quality monitoring sites (EN4) – £1-£250,000**

The Panel does not consider that this approach to scheme development, generating a shortlist of over 80 options for a 4km section of trunk road, is likely to be effective. Moreover, the body that has commissioned the appraisal, i.e. the Trunk Road Agent does not have a remit for delivery of most of the shortlisted options.

It seems likely that if the study were to proceed to the next stage, the options to emerge would be those that can be delivered by the Trunk Road Agent, as has been seen with other studies reviewed by the Panel. Of these, most (19 out of 28) are road-based.

Eight shortlisted options would increase private vehicle capacity or have significant embodied carbon. They would worsen the already negative impact of the road on the community and undermine sustainable transport modes.

The Panel considers that none of these options should be progressed. They are:

- Prohibit slow-moving traffic on strategic road network by providing an alternative route (HS3).

- Connected vehicle corridor (HS8) – large cost estimate of £10 million-£25 million suggests that this is likely to involve significant carbon emissions from construction and may increase capacity and/or speeds.
- Create a tactical diversion route for closure of the A494 St. David's to Queensferry (HS11)
- Safety improvements between A55 J33b and A494 St. David's Interchange (HS17) – large cost estimate of £25 million-£50 million suggests that this is likely to involve significant carbon emissions from construction and may increase capacity and/or speeds.
- Flintshire Corridor Red Route (HS22), which is subject to a separate Panel review.
- Re-design of major interchanges (HS20) – large cost estimate of £10 million-£25 million suggests that this is likely to involve significant carbon emissions from construction and may increase capacity and/or speeds.
- New A494 to A55 link road at J33b (HS23) – would increase capacity.
- Improve connectivity of local road network (HS24) – would increase capacity.

One shortlisted option under 'road-based solutions', 50mph speed limit on A494 / A55 (HS2), would have safety benefits, capacity and resilience benefits, and would also reduce carbon emissions. There is already a 50mph speed limit on part of the road to address poor air quality, which is enforced by average speed cameras. It would be appropriate to consider extending this.

7. What is the effect on carbon dioxide emissions?

No quantitative assessment has been undertaken of carbon dioxide emissions, but shortlisted options that increase private vehicle capacity would increase emissions. The embodied carbon in some options may also be significant. Active travel and public transport measures may reduce emissions if they result in modal shift. A reduction in the speed limit (HS2) would improve vehicle efficiency and reduce emissions.

8. Will the scheme be good for people and communities?

Planting alongside the carriageway to absorb pollution (EN2, EN3) could reduce the impact of traffic noise and local air pollution on residential areas adjacent to the A494. Active travel and public transport options would make it easier for people who experience social exclusion, and who are less likely to have access to a car, to reach employment and services. Lower speed limits (HS2), prohibition of heavy goods vehicle overtaking on Aston Hill (HS4), emergency lay-bys (HS10) and improved access for emergency responders (HS9) could improve road safety.

9. Will the scheme be good for the environment?

It is not possible to assess environmental impacts because the study is at an early stage. The most significant risk of environmental harm is associated with road-based solutions that increase private vehicle capacity. Deeside and Buckley Newt Sites Special Area of Conservation (SAC) and Buckley Claypits and Commons Site of Special Scientific Interest (SSSI) are adjacent to the carriageway. Construction of new link roads, alternative routes or diversion routes (HS3, HS11, HS22, HS23) could also affect designated sites. Within 2km of the A494 site boundary there are another two sites with SAC, Special Protection Area (SPA) and Ramsar designations, four SSSIs, and 11 non-statutory Sites of Importance to Nature Conservation.

10. Will the scheme be good for places and the economy?

The A494 has an important function for road freight travelling to Holyhead, so measures that improve network resilience (such as queue detection monitoring, variable message signs and

CCTV incident detection HS7) could have benefits for freight reliability. Schemes improving sustainable transport could have benefits for place-making and local economic well-being.

11. Will the scheme be good for culture and the Welsh language?

No impacts on the Welsh language or historic or cultural sites have been identified.

12. How robust is the case for the scheme to different futures?

Most of the study area is located within Flood Zone 1, which is land having a low probability, in any given year, of flooding from rivers or the sea. However, the land immediately to the north-east of the A494 Queensferry Interchange is more vulnerable to flooding.

13. Conclusion

The Panel acknowledges the effort made by the scheme sponsor to address the new priorities of the Wales Transport Strategy. However, looking at such a wide range of options within a single WeITAG study for a limited length of route is not an effective strategy to deliver the outcomes that the Wales Transport Strategy seeks. There is instead a need for work at a regional level to identify and prioritise the best schemes to achieve modal shift and reduce car use. In North-East Wales, this will best be led by North Wales Transport Commission and Transport for Wales. The Trunk Road Agent would have a role in delivering some elements of the resulting sustainable transport package on the A494, but this should follow, not precede, the strategic regional analysis.



SUMMARY

The proposed scheme would involve a 3km westbound climbing lane, 5.4km concrete central reserve barrier and consequent closure of two at-grade pedestrian crossings on the A55 between Junction 33 at Northop and Junction 32 at Holywell.

The scheme is intended to address journey time reliability and resilience issues. There is a steep uphill gradient from Northrop heading westbound, and slower vehicles, such as heavy goods vehicles (HGVs), can cause delays to other vehicles. This is mainly an issue during holiday periods, due to cars towing caravans. When there is congestion, it can cause long tailbacks. This may increase the risk of collisions, particularly rear-end shunts.

The Panel does not consider that the case for change has been demonstrated. Delays caused by slower vehicles appear to be mainly confined to Friday afternoons during holiday periods. It would be more consistent with current policy to invest in public transport improvements to support sustainable tourism, rather than increasing private car capacity to cater for peak demand at some times of year.

The safety record at this location is relatively good. A westbound climbing lane is unlikely to be the most effective, or cost-effective, option to improve safety.

The westbound climbing lane would increase private car capacity, and in some circumstances this could increase carbon emissions due to induced traffic, although it is also possible that emissions could be reduced in circumstances of smoother traffic flow. There would be embodied carbon emissions associated with construction of the climbing lane and concrete central reserve barrier.

The Panel makes the following recommendation:

The A55 Northop (J33) to Holywell (J32) scheme should not proceed because the case for change is weak.

1. Study description

The Interim WelTAG Stage 2 A55 Northop (J33) to Holywell (J32) Study examined a 5.25km length of the A55. Northop is south of Flint, and Holywell is to the north-west of Northop. This length of the A55 also includes Junctions 32a and 32b and a junction at Halkyn Services.

The study follows previous studies of the resilience of the A55. These are the WelTAG Stage 1 and WelTAG Stage 2 A55/ A494 Network Resilience Studies that covered the A55 between Holyhead on Anglesey in the west, and the English border in the east; and the WelTAG Stage 1 A55 Ewloe (J33b) to Rhuallt (J29) WelTAG Stage 1 Study.

The Interim WelTAG Stage 2 J33 – J32 Study appraises a scheme comprising three elements that have been brought forward from the J33b – J29 Stage 1 Study. These are:

- 3km-length westbound climbing lane
- Concrete central reserve barrier (5.4km in length) replacing the existing tensioned corrugated beam safety barrier

- Closure of two at-grade pedestrian crossings between Northop and Holywell on the A55

The cost is provisionally estimated as £15.1 million.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- WelTAG Stage 2 Feasibility Report: A55 Northop to Holywell Corridor (September 2021)
- Interim WelTAG Stage 2 Report: A55 Northop (J33) to Holywell (J32) (January 2022)

3. Objectives

The objectives are:

- Improve the surrounding environment
- Develop carbon neutral solutions
- Improve safety for all road users
- Improve active travel provision
- Support delivery of the North Wales Metro and other emerging transport schemes in the region
- Support the future proofing of the study area for technological advances in transport
- Reduce the impact of operational, maintenance and asset renewal activities
- Reduce the impact of traffic increases, associated with the extended holiday period, on journey times

4. Has the case for change been made?

The main problems identified in the appraisal are as follows:

- Journey time reliability: low speeds and congestion occur at some times, particularly associated with visitor traffic during the holiday period which extends from April to October.
- Poor resilience of the A55 during congested conditions, traffic incidents, and slower moving vehicles travelling along the uphill gradient westbound.
- Localised and strategic reassignment of traffic: drivers take other routes when the A55 is congested or there has been a traffic incident.
- Road safety: there were 26 collisions between Northop and Holywell on the A55 between 2015-2019.
- Sub-standard central reservation and road restraint system in places.
- Lack of active travel provision along the route; the existing provision is considered to be sub-standard and to present a safety concern. There are limited alternative parallel east-west routes for pedestrians and cyclists, which encourages more people to travel by car for shorter journeys.

The Panel does not consider that the case for change has been demonstrated in relation to the principal issues of journey time reliability and road safety.

The westbound carriageway of the A55 between Northop and Halkyn has a steep uphill gradient over nearly 4km. The gradient presents difficulties for heavy goods vehicles (HGVs) and other slower moving vehicles, and this reduces speeds and can cause delays to other vehicles. When

there is congestion, it can lead to tailbacks as far as the English border, a distance of about 13km. However, INRIX Roadway Analytic data from 2019 shows that this problem is mainly confined to westbound traffic on Friday afternoons during holiday periods. The congestion is primarily due to cars towing caravans, which are slower moving than other cars on the incline between J32a and J33. Congestion is not identified as a main issue in the Wales Transport Strategy; and it is unlikely to be feasible to resolve it through highway interventions without attracting additional (induced) traffic.

Most of the 26 personal injury collisions between 2015-2019 were slight; but two were serious and one was fatal. The serious collisions and the fatality were due to drivers losing control and/or inappropriate speeds, and were therefore unrelated to tailbacks caused by slow vehicles. The slight collisions include rear-end shunts (which are more likely when there is congestion) and collisions related to poor weather and merging at junctions. The collision density is slightly lower than the average for the A55 as a whole (0.95 personal injury collisions per km per year, compared to 1.0 collisions per km per year for the A55 as a whole). Given that traffic volumes increase along the A55 from west to east, the collision risk relative to the volume of traffic is likely to be significantly less at this location than elsewhere on the A55. The WelTAG appraisal suggests there are three collision cluster sites; the Panel's interpretation of the collision data is that there are no cluster sites based on their definition as four or more collisions within 100 metres in a three-year period. However, there were six collisions within 200 metres in a five-year period south of J32a; and four collisions within 200 metres in a five-year period south of Halkyn Services. This section of the A55 is not therefore a priority for intervention from a safety perspective.

5. Are the objectives aligned with current policy?

The objectives that relate to sustainable transport, enhancing the environment, reducing carbon impacts and improving road safety are aligned with current policy. However, the proposed scheme would be ineffective in achieving these objectives. Construction of a 3km climbing lane and 5.4km central reserve barrier would increase carbon emissions due to embodied carbon, so these are not carbon-neutral solutions. There is no improvement in active travel provision. It is not clear how the scheme will support the delivery of North Wales Metro.

The objective of 'reducing the impact of traffic increases on journey times' is not consistent with Welsh Government's aim to reduce car mileage per person by 10% by 2030. If background levels of car use reduce as intended, high levels of traffic during holiday periods will be less of an issue.

6. Did the scheme development process examine all appropriate options?

The climbing lane, concrete central reserve barrier, and closure of at-grade pedestrian crossings are three of 97 shortlisted options in the WelTAG Stage 1 A55 Ewloe (J33b) to Rhualt (J29) WelTAG Study. Several other options in that study would be a better fit with the objectives and local context of the J33 to J32 Study. These include:

- Speed limit reduction.
- Limiting HGV overtaking on uphill gradients (to reduce closing speeds in the outside lane of the carriageway, hence reducing the potential for rear-end shunt collisions).
- Active travel links between Northop and Connah's Quay; Northop and Holywell; and adjacent to the A55.
- Measures to support North Wales Metro: bus priority infrastructure at J33.
- Measures to improve the surrounding environment: soft estate improvements to wildlife

habitats; mammal underpasses; green bridges.

It would be more consistent with current policy to invest in public transport improvements to support sustainable tourism, rather than increasing private car capacity to cater for peak demand during holiday periods.

It is not clear that a climbing lane would be the most effective, or cost-effective, option to improve safety. To the extent that there is a safety issue with rear-end shunts in congested holiday periods, a variable speed limit (i.e. a lower speed limit at busy times) combined with variable message signs to warn drivers of slow-moving traffic ahead deserves consideration.

The scheme would close the at-grade pedestrian crossings but not provide an alternative. This means that walkers would need to make significant diversions (2km or more), contradicting the objective to improve active travel provision. There is a risk that walkers could attempt to cross despite the closures. The closure of the at-grade pedestrian crossings is necessitated by the increased width of the carriageway with a climbing lane and the obstruction caused by the concrete barrier.

Replacement of the existing tensioned corrugated beam safety barriers in the central reserve with a concrete barrier would reduce the frequency of inspection, maintenance and repairs. Because a concrete barrier requires less width in the central reserve, it would enable construction of the climbing lane with less land-take. However, the J33 to J32 Study notes that concrete has a significant amount of embodied carbon and suggests that further investigation would be necessary to understand whether the benefit outweighs the disbenefit.

7. What is the effect on carbon dioxide emissions?

No quantitative assessment has been undertaken of carbon dioxide emissions. There would be increases in emissions from construction of a climbing lane and the concrete barrier. The increase in private car capacity may cause induced traffic, which would lead to greater carbon dioxide emissions in use; set against this, smoother traffic flow could reduce emissions in use.

8. Will the scheme be good for people and communities?

There may be some improvement in safety for drivers. The scheme may reduce the problem of traffic routing via settlements such as Halkyn and Pentre Halkyn when the A55 is congested. However, closure of at-grade pedestrian crossings would worsen severance.

There are no benefits in improved access to employment or services for people who experience social exclusion. There are no benefits or impacts with regard to air quality or noise.

9. Will the scheme be good for the environment?

A preliminary ecological appraisal has been completed but full environmental impacts are not yet known. There are extensive areas of ancient woodland adjacent to the A55 along this section, including at Coed y Cra and Celyn Local Wildlife Sites where there is likely to be a direct loss of habitat. Halkyn Mountain Special Area of Conservation (SAC) and Halkyn Common and Holywell Grassland Site of Special Scientific Interest (SSSI) are identified as within the zone of influence of the scheme.

Four watercourses culverted under the A55 potentially connect to ecological features.

10. Will the scheme be good for places and the economy?

The A55 has an important function for road freight travelling to Holyhead. The climbing lane would potentially reduce congestion and improve journey time reliability for HGVs.

The scheme may also reduce congestion for visitors travelling to North Wales by car during peak holiday periods. This may provide local economic benefits in terms of attracting more (car-based) tourism. However, issues with car-based tourism in Snowdonia suggest that a strategy focussed on improving visitor access by sustainable modes would be preferable.

11. Will the scheme be good for culture and the Welsh language?

Any scheme that improves accessibility into North Wales has potential to impact on the Welsh language as this route serves areas with a high proportion of Welsh speakers. Improvements to the route may increase tourist visits, which may impact on these areas.

The appraisal notes the potential for permanent physical harm to historic or cultural sites including an (unnamed) Scheduled Ancient Monument which may be Wat's Dyke medieval earthwork.

12. How robust is the case for the scheme to different futures?

There is no indication as to how the preferred scheme has taken account of the adverse impacts of climate change, including no available data associated with flood modelling, despite it being noted that potential changes in surface runoff, groundwater flow and flow paths may alter drainage and increase flood risk. The implementation of a new central barrier will reduce maintenance liabilities in the short to medium term; whilst the climbing lane will likely increase maintenance liabilities in the medium to long term.

13. Conclusion

This scheme is mainly intended to address journey time and resilience issues, especially during the holiday season, but the J33 – J32 Study has not demonstrated a case for intervention at this location.

Tourism is important to the North Wales economy. However, the significant issues caused by car-based tourism in Snowdonia suggest that rather than increasing private car capacity on the A55 to cater for peak levels of demand, it would be preferable to invest in improving visitor access by sustainable modes.

To the extent that rear-end shunts in congested conditions (mainly resulting in slight casualties) are a problem, there are other options that could offer a more cost-effective way forward, such as variable speed limits and variable message signs to warn drivers of slow-moving traffic ahead.

The climbing lane would increase private car capacity, and in some circumstances this could increase carbon emissions due to induced traffic, although it is also possible that emissions could be reduced in circumstances of smoother traffic flow. There would be embodied carbon emissions associated with construction of the climbing lane and concrete central reserve barrier.



SUMMARY

The WelTAG Stage 1 A55 Corridor Study (Junction 33b – Junction 29) examined a 22km length of the A55 between Junction 33b at Ewloe and J29 east of Rhualt.

The main issues prompting the study appear to be journey time reliability and road safety, but the Panel does not consider that the case for change has been demonstrated. The safety record is relatively good. The journey time reliability issues are mainly confined to Friday afternoons during holiday periods, and it would be more consistent with current policy to enhance public transport options for visitors, rather than increasing private car capacity to cater for peak demand.

97 options were shortlisted. They were as follows: road safety (15 schemes); managing demand (3 schemes); environmental (9 schemes); active travel (18 schemes); public transport (6 schemes); future technologies (8 schemes); operations and maintenance (23 schemes); and highway efficiency and resilience (15 schemes). The process for moving from these 97 options to a preferred scheme is not explained in the report.

The Panel suggests that considering such a wide range of options within a single WelTAG study for a limited length of route is not an effective strategy to deliver the outcomes that the Wales Transport Strategy seeks. Better outcomes would be achieved through more narrowly-defined thematic programmes for (a) road safety; and (b) development of active travel routes and bus infrastructure on trunk roads to achieve modal shift. These programmes could cover a larger area. This would allow comparative analysis of issues, and enable the best available schemes to be identified and prioritised. By moving some elements of appraisal up to the programme level, rather than the scheme level, analytical and engineering resource may be used to best effect.

The following proposed capacity and resilience interventions should not feature in any future programme because they would increase private vehicle capacity, and hence could cause induced traffic and increase carbon dioxide emissions:

- Increase capacity at pinch points on strategic diversion route (ER10)
- Increase capacity at pinch points on tactical diversion routes (ER11)
- West facing slips at Junction 33a (Connah's Quay) (ER14)
- Introduce a climbing lane on Northop hill in the westbound direction (ER16)
- Introduce a climbing lane to the west of J32 in the westbound direction (ER17)

The Panel makes the following recommendation:

The A55 Ewloe (J33b) to Rhualt (J29) study should not proceed to the next stage because the case for change has not been made and there are concerns surrounding this process being the most appropriate to deliver relevant safety and multi-modal transport benefits for this area.

1. Scheme description

The WelTAG Stage 1 A55 Study (Junction 33b – Junction 29) examined a 22km length of the A55 between J33b at Ewloe and J29 east of Rhualt.

The study follows previous studies of the resilience of the A55. These are the WelTAG Stage 1 and WelTAG Stage 2 A55 / A494 Network Resilience studies that covered the A55 between Holyhead on Anglesey in the west, and the English border in the east.

The study identified a large number of options (116), of which 97 were shortlisted, covering road safety, managing demand, environmental, active travel, public transport, future technologies, operations and maintenance, and highway efficiency and resilience.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- WelTAG Stage 1 Report: A55 Ewloe (J33b) to Rhualt (J29) (January 2022)
- WelTAG Stage 1 IAR: A55 Ewloe (J33b) to Rhualt (J29) (January 2022)

3. Objectives

The objectives are:

- Improve the surrounding environment
- Develop carbon neutral solutions
- Improve safety for all road users
- Improve active travel provision
- Support delivery of the North Wales Metro and other emerging transport schemes in the region
- Support the future-proofing of the scheme area for technological advances in transport
- Reduce the impact of operational, maintenance and asset renewal activities
- Reduce the impact of traffic increases, associated with the extended holiday period, on journey times

4. Has the case for change been made?

The main problems identified in the appraisal are as follows:

- Journey time reliability: low speeds and congestion occur at some times, particularly associated with visitor traffic.
- Poor resilience of the A55 during congested conditions and traffic incidents.
- Road safety: there were 61 collisions between J33b and J29 between 2015-2019.
- Lack of active travel provision along the route; the existing provision presents a safety concern and is undesirable for users.
- No bus provision or routes.

The Panel does not consider that the case for change has been demonstrated in relation to the principal issues of journey time reliability and road safety.

The journey time reliability issues are of limited duration and extent. INRIX Roadway Analytic data from 2019 shows no issues during weekday peak periods, except for westbound traffic on Friday

afternoons during holiday periods, and these are confined to a section of the A55 between J32a and J33 where there is a significant uphill gradient. This section is the subject of a concurrent study (WelTAG Stage 2: A55 Northop J33 to Holywell J32). The analysis suggests that congestion at this location is primarily due to high numbers of cars towing caravans and caravanettes, which are slower-moving than other cars. Congestion is not identified in the Wales Transport Strategy as an issue requiring intervention; and it is unlikely to be feasible to resolve it through highway interventions without attracting additional (induced) traffic. It would be consistent with current policy to enhance public transport options for visitors, rather than to increase private car capacity to cater for peak demand.

Most of the 61 personal injury collisions between 2015-2019 were slight; but nine were serious and one was fatal. The serious collisions and the fatality were mainly due to drivers losing control and/or inappropriate speeds. The slight collisions include rear-end shunts (which are more likely when there is congestion) and collisions related to poor weather and merging at junctions. The collision density is 45% lower than the average for the A55 as a whole (0.55 personal injury collisions per km per year, compared to 1.0 collisions per km per year for the A55 as a whole). Given that traffic volumes increase along the A55 from west to east, the collision risk relative to the volume of traffic is likely to be significantly less at this location than elsewhere on the A55. The WelTAG appraisal suggests there are five collision cluster sites; the Panel's interpretation of the collision data is that there are no cluster sites based on their definition as four or more collisions within 100 metres in a three-year period. However, there were six collisions within 200 metres in a five-year period south of J32a; and four collisions within 200 metres in a five-year period south of Halkyn Services. This section of the A55 is not therefore a priority for intervention from a safety perspective.

5. Are the objectives aligned with current policy?

The objectives that relate to sustainable transport, enhancing the environment, reducing carbon impacts and improving road safety are aligned with current policy.

The objective of 'reducing the impact of traffic increases on journey times' is not consistent with Welsh Government's aim to reduce car mileage per person by 10% by 2030. If background levels of car use reduce as intended, high levels of traffic during holiday periods will be less of an issue.

6. Did the scheme development process examine all appropriate options?

The longlist of 116 options comprised road safety (15 options); managing demand (3 options); environmental (9 options); active travel (18 options); public transport (6 options); future technologies (8 options); operations and maintenance (23 options); and highway efficiency and resilience (15 options). As the study has only reached WelTAG Stage 1, there are as yet no detailed cost estimates, but all longlisted options were categorised as either up to £1 million (low cost), £1 million - £5 million (moderate cost), and more than £5 million (high cost). 97 of the 116 options were shortlisted. The shortlisted options, and their estimated costs, are as follows:

Road Safety (15 options)

1. Improve non-standard junctions (SA1) – £1 million - £5 million
2. Reduce number of junctions (SA2) – £1 million - £5 million
3. Improve Service Stations / Rest Area (SA4) – £1 million - £5 million
4. Improve signage to service stations (SA5) – up to £1 million

5. Improve Heavy Goods Vehicle (HGV) parking at service stations (SA6) – £1 million - £5 million
6. Review of layby provision (SA7) – £1 million - £5 million
7. Provision of refuge areas (SA8) – £1 million - £5 million
8. Introduce measures to discourage rat running through Northop (SA9) – up to £1 million
9. Parking restrictions on B5122 near to J31 (SA10) – up to £1 million
10. Improve and/or provide new road restraint system at highway verge (SA11) – £1 million - £5 million
11. Concrete central reserve (SA12) – more than £5 million
12. Introduction of street lighting, where appropriate (SA13) – up to £1 million
13. Speed enforcement (SA14) – up to £1 million
14. Extension of 70mph average speed enforcement at Rhualt Hill to east (SA15) – up to £1 million
15. Sideline Radar (Queue Protection) (SA16) – up to £1 million

Managing demand (3 options)

1. Regional Travel Planning Strategy (MD1) – £1 million - £5 million
2. Introduction of dynamic road user charging (MD2) – more than £5 million
3. Promotion of changes to working practices/ employment areas (MD3) – up to £1 million

Environmental (9 options)

1. Speed limit reduction (EN1) – up to £1 million
2. Review extent of highway land and develop soft estate (EN2) – up to £1 million
3. Noise mitigation measures (EN3) – £1 million - £5 million
4. Construction of mammal underpasses (EN4) – £1 million - £5 million
5. Construction of green bridges (EN5) – £1 million - £5 million
6. Exclusion fencing at roadkill incident hotspots (EN6) – up to £1 million
7. Wildlife warning reflectors at roadkill incident hotspots (EN7) – up to £1 million
8. Air quality monitoring sites (EN8) – up to £1 million
9. Living barriers / Biodiversity corridors (EN9) – up to £1 million

Active Travel (18 options)

1. Improve provision of alternative active travel routes (AT1) – £1 million - £5 million
2. Implement a vegetation clearance management system (AT2) – up to £1 million
3. Improve and enhance active travel facilities at the junctions within the study area (AT3) – £1 million - £5 million
4. Improve active travel facilities and linkages to the east on the B5126 Connah's Quay Road overbridge (AT4) – £1 million - £5 million
5. Undertake route audits on active travel routes and implement relevant changes (AT5) – up to £1 million
6. Develop the Integrated Network Map [active travel infrastructure] within and surrounding the study area (AT6) – £1 million - £5 million

7. Improve existing walking and cycling routes running adjacent to the A55 (AT7) – £1 million - £5 million
8. Active travel route between St Asaph and Holywell (AT8) – more than £5 million
9. Active travel route between Holywell and Northop (AT9) – £1 million - £5 million
10. Active travel route between Northop and Ewloe/Deeside (AT10) – £1 million - £5 million
11. Renew and/or improve public rights of way signage (AT11) – up to £1 million
12. Improve existing grade-separated pedestrian crossings for active travel users (AT12) – £1 million - £5 million
13. Improve and provide pedestrian warning signage (AT15) – up to £1 million
14. Close at-grade pedestrian crossings and provide alternative route and/or provision if required (AT16) – £1 million - £5 million
15. Traffic Regulation Order prohibiting active travel users from the A55 (AT17) – up to £1 million
16. Improve access to Coleg Cambria – Northop by active travel modes (AT18) – £1 million - £5 million
17. Improve walking and cycling access to and within Service Stations (AT19) – £1 million - £5 million
18. Conversion of PRow footpaths to bridleways (AT20) – up to £1 million

Public Transport (6 options)

1. Develop proposals to support introduction of enhanced bus and rail corridors as part of the North Wales Metro (PT1) – more than £5 million
2. Localised introduction of bus lane adjacent to A55 carriageway (PT4) – £1 million - £5 million
3. Bus priority infrastructure at J33 (PT5) – £1 million - £5 million
4. Park and ride site(s) (PT7) – more than £5 million
5. Improve access to, and visibility of, surrounding rail stations (PT8) – up to £1 million
6. Marketing campaign to encourage drivers to travel by public transport (PT9) – up to £1 million

Future Technologies (8 options)

1. Smart Road Technology – EV Charging Points (FT1) – up to £1 million
2. Smart Road Technology – EV Charging Points within Laybys (FT2) – up to £1 million
3. Smart Road Technology – EV Charging Points (Alternative Sites) (FT3) – up to £1 million
4. Smart Road Technology – HGV Charging and Alternative Fuelling (FT6) – £1 million - £5 million
5. Smart Road Technology – Hydrogen Fuelling (FT7) – £1 million - £5 million
6. Roll-out Improved Digital Technology (FT10) – £1 million - £5 million
7. Improve electric supply (FT11) – £1 million - £5 million
8. Increase provision of Variable Message Signage (FT12) – up to £1 million

Operations and Maintenance (23 options)

1. Improved surveillance and enforcement (OM1) – up to £1 million

2. Integrating Control Room Systems and Data (OM2) – more than £5 million
3. Vehicle Recovery (OM3) – up to £1 million
4. Review and Enhance Maintenance Processes (OM4) – up to £1 million
5. Preventative Maintenance (OM5) – up to £1 million
6. Offline Access Points (OM6) – £1 million - £5 million
7. High Tech Asset Monitoring (OM7) – £1 million - £5 million
8. Corridor asset management plan (OM8) – £1 million - £5 million
9. Long Term Asset Specification (OM9) – up to £1 million
10. Integrated Control Room (OM10) – more than £5 million
11. Virtual Integrated Control Room (OM11) – up to £1 million
12. Extend Welsh Government Traffic Officer Operation to 24 hours (OM12) – £1 million - £5 million
13. Service Monitoring (OM13) – £1 million - £5 million
14. Programme of Funding (OM14) – up to £1 million
15. Improve refuse facilities (OM15) – up to £1 million
16. Marketing campaign to encourage drivers to dispose of litter appropriately and safely (OM16) – up to £1 million
17. Cross border collaboration (OM17) – up to £1 million
18. Enhanced diversion route operation procedures (OM18) – up to £1 million
19. Enhanced diversion route traffic management plans (OM19) – up to £1 million
20. Emergency resurfacing contractor (OM20) – up to £1 million
21. Improve monitoring/enforcement of overloaded vehicles (OM21) – £1 million - £5 million
22. Improve water supply for emergency services (OM22) – up to £1 million
23. Increase provision of emergency vehicle crossing points (OM23) – £1 million - £5 million

Highway efficiency and resilience (15 options)

1. Introduction of variable speed limit (ER1) – more than £5 million
2. Review carriageway in the context of current standards (ER3) – up to £1 million
3. Signage strategy (ER7) – up to £1 million
4. Strategic diversion symbol signs (ER8) – up to £1 million
5. Tactical diversion symbol signs (ER9) – up to £1 million
6. Increase capacity at pinch points on strategic diversion route (ER10) – £1 million - £5 million
7. Increase capacity at pinch points on tactical diversion routes (ER11) – £1 million - £5 million
8. Park and share site(s) (ER12) – £1 million - £5 million
9. West facing slips at J33a (Connah's Quay) (ER14) – more than £5 million
10. Introduce a climbing lane on Northop hill in the westbound direction (ER16) – more than £5 million

11. Introduce a climbing lane to the west of J32 in the westbound direction (ER17) – more than £5 million
12. Ramp metering (ER18) – £1 million - £5 million
13. Limit HGV overtaking (ER21) – up to £1 million
14. Prohibition of slow-moving vehicles (ER22) – up to £1 million
15. Prioritise the movement of freight by rail, as opposed to road-based methods (ER23) – up to £1 million

The process for moving from this shortlist of 97 options to a preferred scheme is not explained in the report.

There are some shortlisted options that would result in an increase in private vehicle capacity and/ or significant carbon emissions associated with construction, and that the Panel therefore considers should not be progressed. These are:

- Increase capacity at pinch points on strategic diversion route (ER10)
- Increase capacity at pinch points on tactical diversion routes (ER11)
- West facing slips at J33a (Connah's Quay) (ER14)
- Introduce a climbing lane on Northop hill in the westbound direction (ER16)
- Introduce a climbing lane to the west of J32 in the westbound direction (ER17)

Two shortlisted options under 'environmental' and 'highway efficiency and resilience', speed limit reduction (EN1) and introduction of variable speed limit (ER1) respectively, would have safety benefits and carbon-reduction benefits, and would be appropriate to consider as part of a programme of road safety measures.

The remaining road safety, managing demand, environmental, active travel, public transport, future technologies, operations and maintenance, and highway efficiency and resilience options are consistent with current policy.

7. What is the effect on carbon dioxide emissions?

No quantitative assessment has been undertaken of carbon dioxide emissions, but shortlisted options that increase private car capacity would increase emissions. The embodied emissions in some options, such as a concrete central reserve, may also be significant. Active travel and public transport measures may reduce emissions if they result in modal shift. A reduction in the speed limit would improve vehicle efficiency and reduce emissions.

8. Will the scheme be good for people and communities?

The study identified a number of problems that adversely affect local communities, including severance and noise from the A55, poor quality pedestrian and cycling routes, the use of the local road network as a diversion route in the event of incidents on the A55, and high seasonal and weekend flows. Many of the shortlisted options would have a negligible impact on these problems. Some shortlisted options have potential, subject to their final designs, to address these problems, including options associated with road safety, managing demand, environmental impacts, active travel, public transport and future technologies.

9. Will the scheme be good for the environment?

It is not possible to assess environmental impacts at this early stage. The most significant risk of environmental harm is associated with 'highway efficiency and resilience' schemes that increase

private vehicle capacity. There are several Sites of Special Scientific Interest (SSSIs) close to this section of the A55; in particular the Halkyn Common and Holywell Grasslands SSSI is bisected by the A55 to the west of J32. There are also extensive areas of ancient woodland close to the boundary of the A55, with the closest noted as being within 5 metres of the route.

10. Will the scheme be good for places and the economy?

The A55 has an important function for road freight travelling to Holyhead, so schemes that improve network resilience could have benefits for freight reliability. Schemes improving sustainable transport could have benefits for place-making and local economic well-being. Little discussion is presented within the WelTAG documentation regarding impacts on tourism, which is economically important to the region. However, issues with car-based tourism in Snowdonia suggest that a strategy focussed on improving visitor access by sustainable modes would be preferable.

11. Will the scheme be good for culture and the Welsh language?

Any scheme that improves accessibility into North Wales has potential to impact on the Welsh language as this route serves areas with a high proportion of Welsh speakers. Improvements to the route, alongside a wider programme of interventions, may increase tourist visits, which may impact on these areas. The schemes do not directly affect any historic or cultural sites.

12. How robust is the case for the scheme to different futures?

There are several areas of medium-high flood risk (Flood Zone 2/3) throughout the study area, notably the eastern end of the study area around Northop and the area where the Afon Conwy passes under the A55, and within the western section of the study area in the vicinity of J30. There are no options that seek to improve surface water drainage. The inclusion of sustainable transport measures may well contribute to, and be more popular in, future-year scenarios with reduced rather than increased car use.

13. Conclusion

The Panel acknowledges the effort made by the scheme sponsor to address the new priorities of the Wales Transport Strategy. However, considering such a wide range of options within a single WelTAG study for a limited length of route is not an effective strategy to deliver the outcomes that the Wales Transport Strategy seeks. Better outcomes would be achieved through more narrowly-defined thematic programmes for (a) road safety; and (b) development of active travel routes and bus infrastructure on trunk roads to achieve modal shift. These programmes could cover a larger area. This would allow comparative analysis of issues and enable the best available schemes to be identified and prioritised. By moving some elements of appraisal up to the programme level, rather than the scheme level, analytical and engineering resource may be used to best effect.



SUMMARY

The current main highway route connecting North Wales with England is the A55 / A494, which lies to the south and east of Connah's Quay. The proposed preferred scheme emerging from the WelTAG Stage 2 work, 'the Red Option', is a substitute long distance dual-carriageway route for the A55 / A494. It would lie to the north and west of Connah's Quay, mainly along the line of the A548. A new section of highway is also proposed to connect the A548 to the A55 at Northop Junction to the west of Connah's Quay. The approximate length of the scheme is 13km. The A55 / A494 route is proposed to be left in place.

The scheme had its origins in a comprehensive area-based transport study. However, the major highway proposal has been developed at WelTAG Stage 2 with little reference to the wider programme of work that was included in that initial study, the North-East Wales Area Based Transport Study (NEWABTS), or to the currently developing North Wales Metro proposals for the area.

The case for the scheme is that without it, congestion will worsen in future due to traffic growth. It is predicted that in a Do-Minimum scenario, weekday traffic flows on the A55 / A494 corridor will increase by up to 30% between 2015-2037. This forecast does not take account of Welsh Government's aim to reduce car mileage per person by 10% by 2030; the targets for modal shift; and the growth of remote working following the Covid-19 pandemic. Its validity may be reduced by changes in planning policy, which will discourage car-dependent development; and by the impact of Brexit on road freight from Holyhead. It does not take into account the public transport and active travel schemes that are currently being developed as part of North Wales Metro.

The increase in road capacity as a result of the scheme would make car travel more attractive, leading to a mode shift from public transport to car, and hence undermining mode share targets. There would be unknown additional carbon dioxide emissions from construction. There would be an additional 423,000 tonnes of carbon dioxide emissions in use, from induced traffic which would outweigh the emission benefits of improved traffic flow.

The scheme would have a moderate to large adverse impact on the River Dee Special Area of Conservation (SAC), Site of Special Scientific Interest (SSSI) and the Dee Estuary Ramsar, Special Protection Area (SPA), SAC and SSSI. It would directly affect ancient woodland.

The scheme may assist with the development of Deeside Industrial Park, although it would not support access for people by sustainable modes. North Wales Metro proposals seek to improve access for people by sustainable modes to the Industrial Park.

The Panel makes the following recommendation:

The scheme should not proceed. The case for change is not well-aligned with Welsh Government's aim to reduce car mileage. The scheme would increase private car capacity and result in a mode shift from public transport to car travel, and this would undermine the target to increase sustainable transport mode share.

1. Scheme description

The scheme is a substitute long-distance dual-carriageway route for the A55 and A494 in North-East Wales.

The A55 is the expressway across North Wales and connects the port of Holyhead in the west to England in the east. In North-East Wales, it lies south of Connah's Quay, and it forms the southern bypass to Chester. The A494 lies in a north-east to south-west orientation to the east of Connah's Quay and connects with the A55 at Ewloe interchange. East of Ewloe interchange there are therefore two high speed and high capacity routes connecting to England: the A494 to the north-east which connects to the M56 north of Chester, and the A55 south of Chester. The majority of traffic to England uses the A494.

The Red Option, which is the preferred scheme emerging from WelTAG Stage 2, connects the A494 north-east of Connah's Quay at Deeside Park Roundabout with the A55 at Northop Junction to the south-west of Connah's Quay via the A548, which is a road lying north of Connah's Quay. A new section of road is proposed as part of the scheme which connects from the A548 south of the Flintshire Bridge over the River Dee to the A55 at Northop Junction. The approximate length of the scheme is 13km. The estimated cost is £255 million.

The A55 / A494 route is proposed to be left in place. The A494 bridge over the River Dee is being replaced, and that scheme is not subject to review by the Roads Review Panel.

2. Information reviewed

The following documents have been reviewed:

- WelTAG Planning Stage Report: North-East Wales Area Based Transport Study, and Appendices A-F (October 2010)
- WelTAG Planning Stage Report: A55 / A494, and Appendices A-C and Executive Summary (October 2010)
- Deeside Park Interchange to Northop Junction Route Options Assessment (March 2012)
- WelTAG Stage 1 Report: A55 / A494 (July 2012), and Appendices A-F and A55 / A494 WelTAG Modelling Update (August 2012)
- WelTAG Stage 1 Report: North-East Wales Area Based Transport Study, and Appendices A-H (September 2012)
- Draft WelTAG Stage 2 Report: A55 / A494 / A548 Deeside Corridor Improvement (June 2017) and associated Technical Appraisal Report (September 2017)

Points of clarification were addressed in meetings with the scheme sponsor and the North Wales Metro team. A site visit also took place.

3. Objectives

The objectives are:

- To reduce journey time variability and enhance the transport network resilience of the A55 / A494 study corridor to periods of high demand, incidents and maintenance events
- To improve transport connections for businesses within the study area to key economic centres and employment sites
- To improve access between employment sites and workforce catchment areas
- To improve the actual and perceived safety and personal security of all transport users along the A55 / A494 study corridor

- To improve the permeability across the A55 / A494 corridor for non-motorised modes at key point of desire
- To ensure that the study area transport network facilitates necessary national and regional trip movements of people and freight
- To reduce carbon emissions from transport along the A55 / A494 study corridor
- To minimise adverse impacts on the human environment including air, noise and light pollution, and landscape and townscape
- To minimise adverse impacts on the natural environment including local air quality, water and soil pollution, and biodiversity impacts
- To maintain and make more efficient use of the existing transport infrastructure along the A55 / A494 study corridor

4. Has the case for change been made?

The case for change is that flows in excess of capacity on the A55 and A494 cause congestion and delays in the morning and evening peak hours. Closely-spaced junctions cause issues with vehicles weaving to leave and join the mainline carriageway.

The National Transport Plan published in March 2010 contained a commitment to ‘consider the potential contribution of all modes to identify the most appropriate package of potential proposals to the transport issues in the area between Wrexham, Chester and Deeside’ (italics added). To deliver this commitment, WelTAG Planning Stage and Stage 1 reports were prepared for both the ‘North-East Wales Area-Based Transport Study’ (NEWABTS) and the ‘A55 / A494 Study’. The A55 / A494 study considered all modes, and was consistent with the wider NEWABTS study.

The latest report on the scheme is a draft report for WelTAG Stage 2 dated June 2017 titled ‘A55 / A494 / A548 Deeside Corridor Improvement’. The A548 is incorporated in the scheme title at WelTAG Stage 2, and this is based on the prominence at this later stage of scheme development of options relating to the A548.

Hence, the scheme had its origins in a comprehensive area-based transport study. However, the major highway proposal has been developed at WelTAG Stage 2 with little reference to the wider programme of work that was referenced in the NEWABTS, or to the currently developing North Wales Metro proposals for the area.

The WelTAG Stage 2 appraisal predicts that congestion will worsen in future due to traffic growth. In a Do-Minimum scenario, it forecasts that weekday traffic flows on the A55 / A494 corridor will increase by up to 30% between 2015-2037. During the same period, it forecasts that public transport trips in the area will decrease by 8-10%.

These forecasts may now be in doubt for a number of reasons. They do not take into account Welsh Government’s aim to reduce car mileage per person by 10% by 2030; the targets for modal shift; and the growth of remote working following the Covid-19 pandemic (which may reduce peak-period traffic in particular). Their validity may be reduced by changes in planning policy, which will discourage car-dependent development; and by the impact of Brexit on road freight from Holyhead. They do not take into account the schemes that are currently being developed as part of North Wales Metro, which are likely to affect future travel demand on the highway network, including:

- An aspiration for four trains per hour on the North Wales Main Line and the Wrexham to Liverpool line, and necessary infrastructure improvements

- A new Deeside Station to the north side of the Deeside Industrial Park
- Aspirations for a station at Greenfield, to serve Holywell
- Active travel access to stations, including Flint and Shotton; and local authority investment in relation to active travel
- Enhancement of three bus corridors radiating from Chester: to Rhyl via Shotton & Connah's Quay; to Mold via Saltney, Broughton, Shotton, Connah's Quay and Northop; and to Mold via Saltney, Broughton, Hawarden, Buckley, Mynydd Isa and New Brighton

The Panel considers that the case for increasing road capacity has not been made, and increases in capacity would reinforce car-dependence, thus undermining Welsh Government policy.

5. Are the objectives aligned with current policy?

The objectives are not consistent with current policy as set out in the Wales Transport Strategy, Net Zero Wales and Future Wales. The scheme is mainly focussed on private motor vehicles, which are at level (iv) in the Sustainable Transport Hierarchy. There is little emphasis on active travel and public transport. The scheme does not increase the proportion of freight moved by sustainable modes. It risks undermining the mode share target by increasing car dependency.

6. Did the scheme development process examine all appropriate options?

There was consideration of a wide range of options in the NEWABTS study. However, the only options to be considered at WelTAG Stage 2 were two highway options: an upgrade to the existing A55 / A494 alignment, called the Blue Option, and the A548 corridor Red Option.

A longlist of 103 options is presented in NEWABTS Planning Stage WelTAG. Of these, the following number of options are taken forward to NEWABTS WelTAG Stage 1: 25 highway, 14 walking and cycling, 11 bus, 18 rail, 8 freight, 5 demand management and 3 other options, a total of 84 options. Options were considered within what were called 'mutually supporting packages' in NEWABTS WelTAG Stage 1 assessment report. These were:

- Managing demand: options which aim to reduce the demand for travel
- Making best use: options which seek to make more efficient use of existing transport facilities and infrastructure with minimal cost
- Capacity enhancements: options involving the provision of new infrastructure

Little consideration has been given to demand management or speed management options at WelTAG Stage 2 for the A55 / A494 / A548. The thrust has been in the opposite direction especially in relation to the Stage 2 Objective 1, 'To reduce journey time variability and enhance the transport network resilience of the A55 / A494 study corridor to periods of high demand, incidents and maintenance events.' This is now inconsistent with wider Welsh Government policy commitments to reduce car mileage per person.

The scheme will result in a significant increase in overall private vehicle capacity because it will involve the creation of a new dual-carriageway road to connect the A548 to the A55, hence creating a new highway while at the same time retaining the existing highway route via the A494 / A55. The appraisal notes that the increased capacity will make car travel more attractive and result in a mode shift from public transport to car.

It is unlikely that this scheme would have been the preferred option if the objectives were aligned with current Welsh Government policies and a full range of options had been considered. The range of options considered in the appraisal process for the major highway scheme was too

narrow, focussing only on major road-based schemes. Other options that might have been appropriate were not explored in sufficient detail subsequent to the NEWABTS.

7. What is the effect on carbon dioxide emissions?

Some significant construction would be required, and this would increase emissions due to embodied carbon in construction materials. The impact has not been quantified.

The WelTAG Stage 2 Report estimates that emissions of carbon dioxide in use will be 423,000 tonnes greater over the 60-year appraisal period, compared with the Do-Minimum Option. The Red Option will encourage an increased number of journeys, which outweighs the emission benefits of improvement to traffic flow. The WelTAG appraisal (in 2017, pre-dating Welsh Government's adoption of a 2050 net zero target) suggests that this increase in carbon emissions is marginal (+0.74%) and will not affect the achievement of national policies. The Panel considers that it is not consistent with the ambition statement in Net Zero Wales, and will hinder the achievement of Welsh Government carbon reduction targets and budgets.

8. Will the scheme be good for people and communities?

The scheme location is not within an Air Quality Management Area. The Red Option may relieve to some extent the potential for nitrogen dioxide and fine particulate exceedance as a result of diversion of some traffic away from the A494 at Aston Hill (to the east of Connah's Quay).

There are noise receptors in the Shotton, Queensferry and Ewloe area which fall within the 65-69dB band. The Red Option would expose 73 households to higher noise levels than in the Do-Minimum Option, and 1,041 households would be exposed to lower noise levels. The scheme will hence to some extent reduce but also displace the noise problem.

The WelTAG Stage 2 Report forecasts 177 fatalities in the 60-year economic analysis period in the Do-Nothing Option, and 179 fatalities with the Red Option. This is therefore a net increase in the number of deaths. The scheme will not support the ambition for moving to zero road deaths.

The effects for people and communities, as described in the WelTAG Stage 2 Report, are therefore marginal, with a displacement of noise impacts and a net increase in road deaths.

9. Will the scheme be good for the environment?

The scheme crosses the River Dee Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI); and, via the existing Flintshire Bridge, the Dee Estuary Ramsar Site, Special Protection Area (SPA), SAC and SSSI. The WelTAG Stage 2 Report assesses that construction works would have a moderate adverse effect on these sites, and that the impact of the scheme once it is completed will be between moderate adverse and large adverse. The WelTAG Stage 2 Report indicates that works would likely have a significant negative effect on the integrity of designated sites and the species and habitats included as qualifying features.

The scheme would result in loss of restored ancient woodland at Leadbrook Wood and emissions from traffic could result in the deterioration of woodland adjacent to the new road.

There are a large number of ponds within the Red Option corridor, and many of these are likely to be lost, or to experience changes in hydrology and pollution and sediment run-off from adjacent construction areas. The WelTAG Stage 2 Report assesses that there is likely to be a significant and permanent impact on amphibian populations including great crested newts.

The scheme does not affect any locally or nationally designated landscapes.

10. Will the scheme be good for places and the economy?

The Red Option would provide three grade-separated junctions on the A548 to the north of Deeside Industrial Park, a major employment site. These junctions will have higher capacity than the existing roundabout junctions that they replace. Welsh Government has been consulting with the owners of UPM Shotton Paper Mill in relation to the proposed Red Option grade-separated junction adjacent to their site.

Planning Policy Wales seeks growth in places where travel is sustainable, and Deeside Industrial Park is presently not easily accessible by sustainable modes of travel. North Wales Metro proposals seek to improve access for people by sustainable modes to the Industrial Park. The Red Option would not support sustainable travel to the Industrial Park.

The examination of the Flintshire Local Development Plan is on-going. In total there is just under 70 hectares of land allocated on Deeside Industrial Park for employment land use classes B1, B2 and B8. There are nine development sites on land north-west of Garden City (on the north bank of the River Dee immediately to the west of the A494), and 18.5 hectares of employment site at Sealand, north of the River Dee and east of the A494. Further afield, there are development sites at Broughton, Mold Business Park and Hawarden Airfield, and four sites in the Cheshire West and Chester Council area. The scheme may assist with the development of Deeside Industrial Park, notably the proposed development of the papermill in the north-west corner of the site, and other local developments, in the vicinity of the A494.

Wider economic benefits over 60 years and at 2015 prices are estimated to be £564-611 million. The Gross Value Added (GVA) impacts are estimated at £13 million per annum in 2032.

The A55 / A494 carries relatively high volumes of freight traffic, although the WelTAG documents do not give an explicit percentage, and indeed the percentage will vary on different stretches of the A55, A494 and A548. On the basis that the scheme will add capacity, and increase network reliability, then freight reliability will be improved.

The Red Option is stated to have a Benefit to Cost Ratio (BCR) of 2.8, defined as high value for money. The benefits are entirely attributable to journey time savings.

11. Will the scheme be good for culture and the Welsh language?

The Panel does not consider there to be materially significant impacts on the Welsh language or sustainable travel for arts, sports, recreation or cultural activities. The scheme does not affect any historic or cultural sites.

12. How robust is the case for the scheme to different futures?

The scheme is in a location identified by Natural Resources Wales that is known to have flooded in the past and is without significant flood defences, and there may be flood issues which have not been fully addressed.

The economic forecast in the WelTAG Stage 2 Report pre-dates Brexit and the Covid-19 pandemic. It assumes traffic growth, rather than the traffic reduction that may occur as a result of either of these events. In a scenario in which traffic growth was lower, in line with the Welsh Government aim to reduce car mileage per capita by 10% by 2030, the BCR would also be lower.

The scheme proposes a number of additional structures associated with the grade-separation and these will create future maintenance liabilities which are larger than current liabilities.

13. Conclusion

The proposed Red Option, which is the preferred option emerging from WelTAG Stage 2, is a substitute long distance dual-carriageway route for the A55 / A494, and the existing A55 / A494 would be left in place. This major highway proposal has been developed at WelTAG Stage 2 with little reference to the wider programme of work that was referenced in the North-East Wales Area Based Transport Study (NEWABTS) or to the currently developing North Wales Metro proposals for the area. In the context of current Welsh Government policy, the case for the scheme is weak.

The scheme risks undermining the mode share target by increasing car dependency. The scheme may hinder the achievement of Welsh Government carbon reduction targets and budgets. In relation to impacts on people and the community, there is marginal change, with a displacement of noise impacts and a net increase in road deaths. The works would likely have a significant effect on the integrity of sites that are designated for their environmental value, and the species and habitats included as qualifying features of those sites. The traffic forecasts used to estimate the value for money are out of line with the current policy. The scheme proposes a number of additional structures associated with the grade-separation and these will create future maintenance liabilities which are larger than current liabilities.



SUMMARY

The scheme would involve construction of a new A55 bridge over the Menai Strait between Anglesey and Gwynedd, and re-alignment of the A55 between Junction 7 (on Anglesey) and Junction 10 (on the mainland). The preferred option is a four-lane bridge. It would lie to the east of the existing A55 Britannia Bridge. The scheme includes improved routes for pedestrians and cyclists, better separated from motor traffic than the current provision.

The main elements of the case for change are the congestion and lack of resilience of the A55 Britannia Bridge and the older A5 Menai Bridge to the east. Britannia Bridge is the only section of single-carriageway on the A55. The proposed third bridge would increase highway capacity and resilience by diverting traffic away from Britannia Bridge.

Modelling suggests that traffic will increase by 17% between 2017-2038 on Britannia Bridge; and by a similar amount (18%) over the same period on Menai Bridge. In the absence of the scheme, this would cause congestion to worsen. The traffic modelling pre-dates Welsh Government's aim to reduce car mileage per person by 10% by 2030. It also pre-dates plans to improve the public transport network, including the North Wales Metro Programme and formation of the North Wales Transport Commission in Spring 2022. These initiatives are likely to encourage a shift to sustainable modes of transport. The North Wales Metro Programme includes enhancements to the North Wales Main Line and the bus network, and active travel links to stations. Future Metro plans may include double-tracking the North Wales Main Line over Britannia Bridge, and a multi-modal assessment on Anglesey.

Britannia Bridge is described as not being resilient to the effects of congestion and incidents, or to adverse weather conditions. When Britannia Bridge is closed or restricted, traffic is diverted via the 'Menai loop'. The loop connects to the A55 at Junctions 8 and 9 immediately north and south of Britannia Bridge and uses the A5 north of the strait, Menai Bridge, and the A487 south of the strait. The diversion route is considered unsuitable because Menai Bridge's narrow arches make it difficult for heavy goods vehicles and other large vehicles. Since 2017, Britannia Bridge has been closed ten times and Menai Bridge five times.

The scheme would induce additional traffic, with traffic volumes 10-12% higher in 2038 in a scenario with the bridge, compared to the Do-Minimum scenario without the bridge. There would consequently be an increase in carbon dioxide emissions, with an additional 119,000 tonnes carbon dioxide predicted to be emitted over 60 years. There would also be significant carbon emissions from land-clearance, construction, operation and maintenance, which have not been quantified.

Construction of the scheme would result in loss of 4.4 hectares of ancient woodland, and the scheme is assessed as having a large adverse impact on Menai Strait and Conwy Bay Special Area of Conservation and Glannau Porthaethwy Site of Special Scientific Interest (SSSI). There would be moderate adverse impacts on Coedydd Afon Menai SSSI and five candidate Wildlife Sites.

Whilst acknowledging the congestion and resilience issues, the Panel considers that the adverse impacts of the scheme, particularly in relation to modal shift, induced traffic and carbon, are such that it is not consistent with current policy. Other interventions to reduce congestion and improve resilience without increasing private vehicle capacity may be available.

The Panel makes the following recommendation:

The A55 Third Menai Crossing should not proceed. The case for change is not well-aligned with Welsh Government's aim to reduce car mileage. The scheme would lead to increased traffic and carbon dioxide emissions, and a mode shift from public transport to car travel, inconsistent with the target to increase sustainable transport

1. Scheme description

The A55 Britannia Bridge across the Menai Strait connects Anglesey and the port of Holyhead to the North Wales coast. It is the only section of single-carriageway on the A55. A second crossing via the A5 over the Menai Bridge lying to the east is also trunk road. The Britannia Bridge is owned by Network Rail and also carries the single-track North Wales Main Line, the sole rail connection between the mainland and Anglesey.

The scheme would involve construction of a new A55 bridge crossing the Menai Strait, and re-alignment of the A55 between Junctions 7 and 10. The preferred option is a four-lane bridge to the east of Britannia Bridge. The WelTAG Stage 2 Report recommends that the "Purple" route is taken forward to the next stage of scheme development. However, it also recommends that both four-lane options considered (the "Purple" and "Orange" routes) should be protected from development at this stage.

The scheme includes improved routes for pedestrians and cyclists better separated from motor traffic than the current provision.

The cost of the Purple four-lane option is estimated as between £261 million and £318 million, depending on the chosen structural form of the bridge.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- Britannia Bridge Feasibility of Wind Shielding (August 1993)
- Britannia Bridge Tidal Flow Study (April 1996)
- A55 Britannia Bridge Improvements Feasibility Study – Summary Options Report (March 2008)
- WelTAG Stage 1 Report: Third Menai Crossing Strategic Business Case (May 2016)
- A55 Third Menai Crossing Traffic Forecasting and Economic Assessment 2017 Menai Transport Model (May 2018)
- A55 Third Menai Crossing: Sustainable Development Report (May 2018)
- A55 Third Menai Crossing: 2017 Menai Transport Model - Public Transport Model Development and Validation Report (May 2018)
- WelTAG Stage 2 IAR: A55 Third Menai Crossing – Environment Volume (May 2018)
- Third Menai Crossing Health Impact Assessment – Screening Report (July 2019)
- Third Menai Crossing Scheme Appraisal Report – Key Stage 2 (August 2019)
- A55 Third Menai Crossing Key Stage 2 Summary Note of Key Stage 2 Outputs (September 2019)

- WelTAG Stage 2 Report: A55 Third Menai Crossing (December 2019)
- WelTAG Stage 2 Report: A55 / A494 Network Resilience Study (June 2021)

Points of clarification were addressed in written correspondence and a meeting with the scheme sponsor. Meetings also took place with Transport for Wales North Wales Metro team. A site visit also took place.

3. Objectives

The objectives are:

- To improve journey times between A55 Junctions 7 and 10 during peak periods, and to maintain improved journey time into the future
- To improve journey time reliability between A55 Junctions 7 and 10
- To improve network resilience and reduce reliance on the use of Menai Bridge as an alternative route during maintenance or emergencies
- Improve accessibility for pedestrians and cyclists crossing the Menai Strait including connections to long distance routes and key employment sites
- Promote safety for trips across the Menai Strait

4. Has the case for change been made?

The main elements of the case for change are the congestion and lack of resilience of the A55 Britannia Bridge and A5 Menai Bridge. Other factors are the local economic impact; safety; poor provision for public transport and active travel; and National Grid network improvements. Each is discussed in turn.

The high level of car dependency along the A55 corridor results in seasonal and peak period congestion. Modelling undertaken in 2018 suggested that traffic will increase by 17% between 2017-2038 on Britannia Bridge; and by a similar amount (18%) over the same period on Menai Bridge. In the absence of the scheme, this would cause congestion to worsen. The traffic modelling pre-dates Welsh Government's aim to reduce car mileage per person by 10% by 2030. It also pre-dates plans to improve the public transport network, including the North Wales Metro Programme and formation of the North Wales Transport Commission in Spring 2022. These initiatives are likely to encourage a shift to sustainable modes of transport. The North Wales Metro Programme includes enhancements to the North Wales Main Line and the bus network, and active travel links to stations. Future Metro plans may include double-tracking the North Wales Mainline over Britannia Bridge, and a multi-modal assessment on Anglesey. The North Wales Transport Model was developed after the WelTAG Stage 2 Report and is able to forecast the effects of these area-wide proposals.

Britannia Bridge is described as not being resilient to the effects of congestion and incidents, or to adverse weather conditions. It is closed when wind speeds exceed 70mph, and speed restrictions are applied when wind speeds exceed 35mph. The WelTAG Stage 2 IAR states that Britannia Bridge cannot be retro-fitted with wind-shielding (although the subsequent A55 / A494 Network Resilience Study in June 2021 included wind-shielding as an option). When Britannia Bridge is closed or restricted, traffic is diverted via the 'Menai loop'. The loop connects to the A55 at Junctions 8 and 9 immediately north and south of Britannia Bridge and uses the A5 north of the strait, Menai Bridge, and the A487 south of the strait. The diversion route is considered unsuitable because Menai Bridge's narrow arches make it difficult for heavy goods vehicles and other large vehicles. A bridge closure results in high-sided vehicles being diverted to safe stop-

over points, making use of business parks and the port of Holyhead. Since 2017, Britannia Bridge has been closed ten times and Menai Bridge five times.

Planned and emergency maintenance works on Britannia Bridge are noted as being problematic to carry out. A new bridge may provide savings in maintenance expenditure.

Congestion and lack of resilience of the crossings are considered to make Anglesey a less attractive destination for investment, limiting the future economic potential.

Safety concerns include the lack of a central reservation on the Britannia Bridge and the proximity of junctions either side of the Britannia Bridge. A third crossing would overcome these safety concerns. There is currently poor provision for buses, cycling and walking across the Menai Strait. Pedestrians are not allowed on Britannia Bridge. No separated provision for cycle traffic and a speed limit of 50mph makes Britannia Bridge unattractive for cyclists. Menai Bridge has narrow footways and a narrow carriageway. Improving local access for active travel would be beneficial.

A new bridge could provide the opportunity to accommodate National Grid network upgrades. The potential has recently re-emerged for two new nuclear reactors to address the UK's future energy needs at the Wylfa nuclear power station site on Anglesey.

5. Are the objectives aligned with current policy?

The objective to improve journey times is inconsistent with current policy because it is likely to result in induced traffic. This would be inconsistent with Welsh Government's aim to reduce car mileage per person by 10% by 2030. The Traffic Forecasting and Economic Assessment Report confirms that the scheme would lead to an increase in traffic volumes from induced demand.

The objective to improve accessibility for pedestrians and cyclists is aligned with current policy. However, the proposals benefit private car use to a greater extent than public transport and active travel, which is not consistent with the Sustainable Transport Hierarchy. The Traffic Forecasting and Economic Assessment Report states that the scheme could result in a shift away from public transport use to car use.

The objective to promote safety is aligned with current policy, and the scheme would be effective in achieving this objective, although the safety record is relatively good.

Other objectives are largely neutral in relation to current policy.

6. Did the scheme development process examine all appropriate options?

The Summary Options Report at the feasibility stage noted a range of options that included modifying the existing bridge; traffic demand management; rail interventions; and park and ride facilities. However, only road-based options were identified for further consideration, including the following: widening the existing bridge to form a dual-carriageway; constructing a new bridge alongside the existing bridge to carry traffic to the mainland; three-lane tidal flow on the existing bridge with the middle lane used in different directions to suit flow; three lanes on the existing bridge with one lane northbound to Anglesey and two lanes southbound at all times; and active traffic management.

At WelTAG Stage 1, the focus remained on road-based solutions including modifications to Britannia Bridge and construction of new bridges. The final recommendation was that a third bridge is required. The WelTAG Stage 2 study assessed six bridge options as shown in the table.

Bridge options considered at WelTAG Stage 2

Option name	Location relative to Britannia Bridge	Bridge carrying traffic to Anglesey	Bridge carrying traffic to mainland	Bridge carrying pedestrian and cycle routes
Red two-lane	Immediately west	New	Britannia	New
Pink two-lane	Immediately east	Britannia	New	New
Orange two-lane	Further east than Pink	Britannia	New	New
Orange four-lane	Further east than Pink	New*	New	Britannia
Purple two-lane	Further east than Orange	Britannia	New	New
Purple four-lane	Further east than Orange	New*	New	Britannia

* Britannia Bridge would carry local traffic (exiting at Junction 8a) to Anglesey

The WelTAG Stage 2 study made recommendations as follows:

- The four-lane variants of the Orange and Purple options are preferable to the two-lane variants because they generate greater economic and network resilience benefits, and separated walking and cycling routes on Britannia Bridge.
- The Purple four-lane Option alignment should be taken forward to the next stage of scheme development.
- Further work should be carried out to confirm highway options and bridge form due to the sensitive location.
- A corridor is protected from new development that covers both the Purple and Orange four-lane alignments.

Subsequent to the WelTAG Stage 2 study, further work has considered a Sienna route, which lies closer to Britannia Bridge than the Purple route, and further options relating to bridge structural form, a lower deck elevation to reduce landscape and visual impact, removal of all traffic on Britannia Bridge and a 'Three Bridges Park'. The bridge on the Sienna route would have four lanes.

The A55/ A494 Network Resilience WelTAG Stage 2 Study took place after the Third Menai Crossing WelTAG Stage 2. It identified measures that may contribute to addressing resilience issues including wind mitigation measures, traffic control and variable message signs, and operational improvements to reduce the possibility of vehicles leaving their lane on Britannia Bridge. The operational improvements have been implemented, but consideration of the other measures was deferred pending a decision on whether to construct a new bridge.

The new bridge options do not consider interventions that would better support the Sustainable Transport Hierarchy, including measures being considered as part of the North Wales Metro programme, or planned by Isle of Anglesey or Gwynedd councils. Whilst reference is made to the potential benefits for enhanced walking and cycling provision across the Menai Strait, the Panel concludes that insufficient consideration has been given to non-transport and other sustainable transport options, including bus and rail interventions.

7. What is the effect on carbon dioxide emissions?

The WelTAG Stage 2 IAR estimates that carbon dioxide emissions would increase by 119,000 tonnes over a 60-year appraisal period (2023-2082), comparing the Orange or Purple four-lane options to a Do-Minimum scenario. This estimate includes induced traffic, which is forecast to be an additional 10-12% in 2038 in the Traffic Forecasting and Economic Assessment Report. The increase in carbon emissions does not include carbon emissions from land-clearance, construction, operation and maintenance, which would be significant.

8. Will the scheme be good for people and communities?

The study identified problems that adversely affect local communities, including the lack of attractive separated walking and cycling routes across the Menai Strait, safety concerns associated with this section of the A55, and high seasonal and peak flows.

If the scheme reduces journey times and improves reliability for buses, it could improve access to employment and services for people who experience social exclusion, who are less likely to have access to a car. Access by active travel modes would also be improved.

Impacts on noise and air quality would be neutral or slightly beneficial, and there would be a reduction in collisions.

Disruption caused by incidents, restrictions or closure of the existing bridges would be less frequent.

9. Will the scheme be good for the environment?

The Environmental Assessment identifies significant impacts during construction and subsequent operation.

Construction of the Purple Option would result in loss of 4.4 hectares of ancient woodland, with an impact assessed as large adverse. The construction impact on two designated sites, Menai Strait and Conwy Bay Special Area of Conservation (SAC) and Glannau Porthaethwy Site of Special Scientific Interest (SSSI), is also assessed as large adverse. There would be a moderate adverse impact on Coedydd Afon Menai SSSI. A candidate Wildlife Site (Railway Cuttings Treborth candidate Wildlife Site) would be truncated by the southern approach road and four other candidate Wildlife Sites could be indirectly affected; the impact on these sites is assessed as moderate adverse.

During operation, there would be moderate adverse impacts due to pollution on Coedydd Afon Menai SSSI; the five candidate Wildlife Sites; and ancient woodland. Traeth Lafan Special Protection Area could be affected but the level of significance of the impact was unknown at the time of the Environmental Assessment, pending ornithological surveys.

There would also be moderate adverse impacts during construction or operation on species including red squirrels, bats, and freshwater macroinvertebrates and fish.

The scheme would lie within the Anglesey Area of Outstanding Natural Beauty. The landscape impact is assessed as large adverse.

10. Will the scheme be good for places and the economy?

The A55 has an important function for road freight travelling to Holyhead, and the scheme would improve reliability for freight movement. In addition, the scheme would improve connectivity to the Wylfa nuclear power station site.

Cost-benefit analysis suggests that the scheme would provide medium or high value for money, with a Benefit to Cost Ratio (BCR) ranging from 1.8 to 2.2 depending on the structural form of the bridge. About 90% of the total benefit is from journey time savings. The assumed journey time savings are based on assumptions about continued traffic growth; in a scenario consistent with Welsh Government's aim to reduce car mileage per person by 10% by 2030, the benefit from journey time savings would be less, and the BCR would be lower.

The WelTAG Stage 2 Report calculates 'wider economic benefits' (i.e. related to employment, productivity and induced investment) as £100 million over 60 years.

11. Will the scheme be good for culture and the Welsh language?

The Menai Strait and its bridges are part of an historic environment, containing the Menai Bridge (Grade I listed), Britannia Bridge (Grade II listed), registered parks and gardens, Anglesey Area of Outstanding Natural Beauty and other designations. The area is significant to the culture of Anglesey and this part of Gwynedd. Viewpoints and strategic footpaths such as the Isle of Anglesey Coast Path and Wales Coast Path provide access to and views of the historic landscape. A new bridge may have an adverse impact on the setting of this historic environment, and a direct impact at its location.

The Panel does not consider there to be materially significant impacts on sustainable travel for arts, sports, recreation or cultural activities.

This scheme is in an area with a high proportion of Welsh speakers and is claimed to support economic well-being and enhance employment opportunities. It therefore has the potential to support use of the Welsh language. Improvements to the route may increase tourist visits.

12. How robust is the case for the scheme to different futures?

Increased regularity and severity of weather events, resulting in restrictions or closure of Britannia Bridge, strengthen the case for a third crossing. A third crossing would have effective wind-shielding making it less prone to wind speed-related restrictions and closures than Britannia Bridge.

However, the case for providing an additional crossing would be less strong in a future where travel by private car is reduced.

The Britannia Bridge and Menai Bridge would remain operational in some form, and have continuing maintenance liabilities.

13. Conclusion

The A55 Britannia Bridge and the A5/ A487 Menai loop, including the Menai Bridge, carry large commuter, business, freight and tourist traffic flows. The bridges have congestion and resilience issues. However, the proposed third bridge over the Menai Strait would have adverse impacts, particularly in relation to modal shift, induced traffic and carbon, and the scheme is therefore not consistent with current policy.

There is potential for the congestion issue to be addressed through other interventions. The North Wales Metro programme reflects the Sustainable Transport Hierarchy and comprises twenty-four projects to enable a shift to sustainable modes of travel. The A55 corridor is part of the area now covered by the North Wales Transport Commission which is charged with developing recommendations for multi-modal, integrated transport solutions, and these recommendations will have implications for the road network across the Menai Strait.

There may be potential for the resilience issue to be addressed through other interventions. The A5 / A494 Network Resilience Study in 2021 identified options including wind mitigation measures, traffic control and variable message signs, and these may merit further consideration.



SUMMARY

The Cymmer Carriageway Improvements scheme would involve changes to road alignment in the village of Cymmer in the Afan Valley, Neath Port Talbot.

The reason for the scheme is that Cymmer Viaduct across the River Afan is structurally failing and may need to be closed to motor vehicles at some indeterminate point in the future. The alternative crossing of the River Afan, via Maesteg Road and Avon Street, is steeply sloping and has a tight hairpin bend (Albion bend), making it difficult or impossible for large vehicles to negotiate.

The scheme would realign the carriageway of Maesteg Road and Avon Street and modify Albion bend, enabling use by buses, heavy goods vehicles and emergency vehicles. There would also be a shared use footway/cycleway. Cymmer Viaduct would be restricted to pedestrian and cycle use.

The Panel considers that there is a case for the scheme in order to maintain access to communities on the north side of the River Afan. Due to the steeply sloping topography, extensive retaining walls would be required, and this means the embodied carbon from construction could be significant. The proposed scheme is not likely to result in significant increases in carbon emissions from induced traffic or higher speeds. It would not have significant adverse ecological impacts.

The scheme layout requires demolition and relocation of Cymmer Health Centre, which is the subject of separate consultation but is an important consideration in relation to the scheme. A decision to proceed should not be made until it is demonstrated that the local community has been fully engaged and is supportive of the proposed scheme, including the active travel and public transport elements and the effect on the location of the Health Centre.

The Panel makes the following recommendation:

The Cymmer Carriageway Improvements scheme could proceed, subject to quantification of the carbon impact of construction and evidence that it has been minimised, and evidence that the local community has been fully engaged and is supportive of the proposed scheme.

1. Scheme description

Cymmer is situated on the north and south sides of the River Afan in Neath Port Talbot. Neighbouring communities include Croeserw (south of the river); and Abercregan and Glyncorrwg (north of the river). The area is topographically challenging, with two alternative routes across the River Afan:

- The steeply sloping Maesteg Road/Avon Street (via Albion bend) on the south side of the river, and then a low-level bridge; or
- Cymmer Viaduct, which lies to the west of the low-level bridge.

Albion bend is a hairpin bend that restricts the movement of vehicles. Vehicles encroach into the opposite lane and heavy goods vehicles (HGVs), buses and some fire engines cannot negotiate the bend because of grounding. Provision for pedestrians and cyclists along Maesteg Road and Avon Street is poor. Maesteg Road crosses over two bridges that once spanned the railway and they are in poor structural condition.

Cymmer Viaduct is a Grade II listed structure built in 1924. Since 1999 it has been restricted to an 18-tonne weight limit, but more recent structural assessment has shown that it is only capable of carrying vehicles up to three tonnes. Traffic is restricted to one direction at a time by three-way traffic signal-control (northbound, westbound to southbound and eastbound to southbound being separately signalled). Ongoing deterioration of the viaduct means that without extensive repair it will have to close to vehicular traffic. This would prevent larger vehicles that cannot negotiate Albion bend from crossing the river. If restricted to pedestrians and cyclists, repairs to the viaduct may only need to be to the parapets.

The scheme involves the following:

- Cymmer Viaduct restricted to pedestrian and cycle use only
- Albion bend modified to allow passage of large vehicles
- Realignment of Maesteg Road carriageway, introducing a three-arm roundabout junction and removing two bridges that are in poor condition
- Reconfiguring Maesteg Road/Station Road/Lloyds Terrace Junction, with Station Road made one-way
- One controlled pedestrian crossing and several un-controlled pedestrian crossings
- A new access road and parking for the library and fire station
- A shared use footway/cycleway along the length of the scheme, connecting to National Cycle Network route NCN887
- A change in the speed limit from 30mph to 20mph on Avon Street
- Extensive retaining walls, which are necessary to support the revised road layouts due to the local topography

The preferred option requires Cymmer Health Centre to be demolished and relocated: this is the subject of separate consultation, but is an important consideration in relation to the scheme.

The estimated cost of the scheme is £11 million.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- WelTAG Stage 1 Report: Cymmer Carriageway Realignment (April 2019)
- WelTAG Stage 2 Report: Cymmer Carriageway Realignment (April 2020)
- Local Transport Fund Application Form 2021/22
- Local Transport Fund Application Form 2022/23
- Draft WelTAG Stage 3 Report: Cymmer Carriageway Realignment (February 2022)

Points of clarification were addressed in written correspondence and a meeting with the scheme sponsor.

3. Objectives

The objectives are:

- Improve movement for all modes of transport within Cymmer through improved journey times and improved personal safety
- Reduce the likelihood of incidents occurring on the road network through improved visibility and directness of route
- Reduce the need for vehicles, buses and other vehicles to travel over weight-restricted bridges through provision of a viable alternative route, without impacting on public transport;
- Encourage active modes of travel and reduce the reliance on, or the need to travel via, private vehicle
- Ensure that impacts to connectivity in Cymmer, and for neighbouring communities passing through, is minimised during construction of the option through maximising opportunities to work offline
- Ensure that the proposed improvements are accessible for all and that improvements are compliant with the Equality Act 2010
- Minimise any negative impact on sensitive environmental receptors during construction and operation
- Ensure that suitable vehicular and pedestrian access is maintained to the villages of Cymmer, Glyncorrwg and Abercregan
- Provide a suitable alternative access to replace the failing Cymmer Bridge
- Ensure access is maintained to the fire station, library and other key facilities/services

4. Has the case for change been made?

The Panel considers that there is a case for the scheme in order to maintain access to communities on the north side of the River Afan once Cymmer Viaduct is closed, particularly for buses, HGVs and emergency vehicles.

5. Are the objectives aligned with current policy?

The objectives for the scheme are aligned with current policy. They include improving movement for all modes of transport; encouraging active travel and reducing reliance on private vehicles; maintaining access to communities; and minimising environmental impacts.

Although it is not clear to what extent the proposed scheme would support modal shift, it would improve active travel and bus infrastructure. The preferred option includes shared use footway/cycleways alongside one or both sides of new or improved roads. The existing off-road cycle track which passes under Maesteg Road Bridge on the old railway alignment will be realigned alongside the road improvements as a result of the bridge being demolished.

6. Did the scheme development process examine all appropriate options?

A longlist of nine options was considered at WelTAG Stage 1 and reduced to four options for WelTAG Stage 2. Two options (B and C) were recommended to go forward to WelTAG Stage 3. WelTAG Stage 3 considered option C only, as development of option B design concluded that it would not sufficiently improve Albion bend for it to be usable by all vehicle types.

The scheme includes sustainable transport elements that will improve active travel provision and ensure bus services can continue to serve the community.

The Panel considers that a sufficient range of options were examined.

7. What is the effect on carbon dioxide emissions?

Construction of the scheme would increase emissions due to embodied carbon in materials. This has not been quantified.

Carbon dioxide emissions in use are estimated to increase by 10 tonnes per year due to changes in vehicle movements and speeds.

The Panel considers it unlikely that the scheme would lead to increased emissions from induced traffic. There may be some emissions savings from modal shift to buses and active travel as a result of the scheme.

8. Will the scheme be good for people and communities?

Cymmer has relatively high levels of deprivation that limit transport choices. Many residents rely on public transport to access employment and social activities. The scheme would maintain access by buses when Cymmer Viaduct closes, ensuring that residents who do not have access to a car do not become isolated.

There may be a small safety benefit from improvements in provision for pedestrians and cyclists.

The scheme would not have a significant impact on air quality or noise.

Although the scheme is likely to have a positive effect on the local community there are some unresolved issues.

- There is little evidence of stakeholder or public engagement about the scheme, other than with bus operators and local councillors. Community engagement will therefore be an important next step.
- The implementation of the preferred option is reliant on the relocation of Cymmer Health Centre. This relocation would need to be resolved alongside any subsequent scheme development. The local authority considers the demolition of the health centre to be an opportunity as it is an aging building.
- The scheme would involve significant construction in a residential area, with extensive retaining walls and sections of new road between Station Road, Maesteg Road and Cymmer Viaduct. There is potential for disruption during construction, and it will be important that this is minimised.

9. Will the scheme be good for the environment?

The environmental assessment indicates the following levels of effect:

- Neutral for noise, greenhouse gases, biodiversity and the water environment
- Slight beneficial for air quality
- Slight adverse for landscape and townscape

There are no landscape designations and no statutory protected sites for nature conservation within 2km of the study area. There is no effect on ancient woodland. The scheme sponsor has indicated that they will mitigate tree loss by replacing each tree removed with two being planted

10. Will the scheme be good for places and the economy?

There are some benefits to local economic well-being. The scheme will ensure residents of Abercregan and Glyncorrwg retain access to employment opportunities by public transport. It will provide easier access for larger vehicles (including caravans) to Glyncorrwg Mountain Bike Centre, which is a visitor attraction with campsite, bicycle shop, cafe and other facilities. There will be benefits for the small number of HGVs that use the road (10-20 in each direction per day).

There are no effects on national economic well-being.

The scheme has a Benefit to Cost Ratio of 2.2, representing high value for money. About two-thirds of the monetised benefit is from journey time savings and about a fifth is from collision reduction.

11. Will the scheme be good for culture and the Welsh language?

The Panel did not consider there to be materially significant impacts on the Welsh language or sustainable travel for arts, sports, recreation or cultural activities. The WelTAG assessment suggests that the proposed scheme will have a slight adverse effect on the Grade II listed Cymmer Viaduct. However, the structure is deteriorating and the scheme will restrict its use, prohibiting motorised vehicles, which may help in its preservation.

12. How robust is the case for the schemes to different futures?

The scheme is in a location identified by Natural Resources Wales as vulnerable to flooding from rivers. The Panel notes that there is limited consideration in the reports of potential flooding impacts and resilience to climate change and this would need to be considered further if the scheme progresses.

The scheme will improve infrastructure for buses and active travel connectivity, which is appropriate for a community with relatively low car ownership and a future with less car use. The long-term maintenance liabilities of the viaduct as an active travel route are not clear and further consideration of this issue is needed.

13. Conclusion

The Cymmer Carriageway Improvements will be necessary to enable larger vehicles, including buses, HGVs and emergency vehicles, to access communities north of the River Afan, once the Cymmer Viaduct cannot take motorised traffic.

Because of the steeply sloping topography, extensive retaining walls would be required, and this means the embodied carbon from construction could be significant.

The scheme layout requires demolition and relocation of Cymmer Health Centre, which is the subject of separate consultation but is an important consideration in relation to the scheme. A decision to proceed should not be made until it is demonstrated that the local community has been fully engaged and is supportive of the proposed scheme, including the active travel and public transport elements and the effect on the location of the Health Centre.



SUMMARY

This scheme would replace a 2.6km single-carriageway section of the A487 along the coast in the Pembrokeshire Coast National Park with a single-carriageway route of similar length about 1.5km inland. The preferred option would connect to the A487 south of the village of Newgale, and re-join the A487 north of Newgale near the settlement of Penycwm. A shared use path would be built parallel to the line of the existing road, but set about 100 metres inland.

The A487 is not a trunk road at this location. The scheme sponsor is Pembrokeshire County Council and funding has been requested from Welsh Government via the Resilient Roads Fund.

The case for the scheme is that the existing road is vulnerable to flooding and storm damage. With more frequent severe weather events, it will not be feasible to maintain it for more than another 10-20 years. Without the scheme, there would be a loss of connectivity for rural coastal communities.

The scheme is part of a broader coastal adaptation strategy at this location, with opportunities to create new habitat and enhance the natural environment in the low-lying land of the Brandy Brook valley immediately east of the existing road. However, the proposed scheme (and all alternative routes that have been identified) would have an adverse impact on the landscape of the National Park and also adversely affect biodiversity and protected sites where it crosses Brandy Brook valley.

The Panel considers that there is a case for intervention to adapt to the impacts of climate change. A sufficiently wide range of options has been examined and the proposed route, coupled with planned removal of the existing road, is an appropriate option.

In order to demonstrate best practice in climate adaptation in a protected landscape, the Panel advises that the scheme sponsor should:

- Minimise embodied carbon emissions, for example by adopting a lower design speed to reduce the requirement for embankments and cuttings. This would also reduce the visual impact of the scheme on the landscape of the National Park.
- Identify and compensate for any increase in carbon dioxide emissions as a result of the scheme, for example by reducing the speed limit to 50mph on derestricted sections of the A487 between Haverfordwest and St David's.
- Incorporate plans for closing (except for access) the A487 through Newgale to motorised traffic at scheme opening, in order to avoid an increase in road capacity that carries the risk of induced traffic; prioritise sustainable modes of travel in and to the village; create a sense of place; enhance the floodplain marsh; and avoid uncontrolled road break-up resulting from weathering and shingle bank collapse.
- Achieve a best practice level of net gain in biodiversity by mitigating impacts on habitats and protected sites, and through enhancement measures.
- Consider reducing further the visual impact of the scheme by using Pembrokeshire hedgebanks and avoiding using street lighting.

The Panel makes the following recommendation:

Welsh Government could continue to support the Newgale Coastal Adaptation and A487 Diversion scheme, subject to the scheme sponsor demonstrating a best practice approach to climate adaptation in accordance with the Panel's advice.

1. Scheme description

The scheme would replace a 2.6km single-carriageway section of the A487 along the coast in the Pembrokeshire Coast National Park with a single-carriageway route of similar length about 1.5km inland. The preferred option would connect to the A487 south of the village of Newgale, and re-join the A487 north of Newgale near the settlement of Penycwm.

National Cycle Network route 4 is conjoint with the A487 between the south end of Newgale beach and a point north of Newgale village. A shared use path would be built parallel to the line of the existing road, but set about 100 metres inland.

The A487 is not a trunk road at this location. The scheme sponsor is Pembrokeshire County Council and funding has been requested from Welsh Government via the Resilient Roads Fund. The cost of the scheme is estimated as £29.7 million.

The scheme is envisaged as part of a wider coastal adaptation strategy at this location. The current plan is to remove the existing road when it can no longer be feasibly maintained. The shingle bank between the existing road and the beach would be allowed to retreat inland, leading to changes in the flooding of the valley and the creation of new habitats including wet woodland and saline lagoon.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- Newgale Shingle Bank Vulnerability Assessment (2014)
- Newgale Adaptation Plan (2015)
- Newgale WelTAG Study: Planning Stage (February 2016)
- Newgale Masterplan: Sounding Board 2 (2016)
- Preferred scheme alignment plan and profile drawing (Option J) (February 2017)
- Newgale Coastal Adaptation Strategy Masterplan Consultation Presentation (March 2017)
- Newgale Coastal Adaptation Plan WelTAG Report – Response Report (March 2017)
- WelTAG Consultation Response Report Appendices A and B (March 2017)
- WelTAG Stage 1 Assessment Report: Newgale (July 2017)
- Newgale Habitat Creation Study Environmental Appraisal (2017)
- Newgale Coastal Adaptation Strategic Outline Case / Outline Business Case (July 2018)
- Newgale Coastal Adaptation Scheme: review of coastal change (June 2020)
- Newgale Coastal Adaptation Scheme: proposed habitat creation concepts and criteria (June 2020)

- Newgale Coastal Adaptation Scheme: technical report – design elements (June 2020)
- Newgale Coastal Adaptation: overview of implications of coastal change (July 2020)
- Local Transport Grant Application 2021/22: Application Form and Programme
- Newgale Coastal Adaptation Community and Stakeholder Engagement Plan (April 2021)
- Newgale Coastal Adaptation website (accessed 7 March 2022)
- Scheme drawings, including general arrangement, longitudinal section and cross-sections

Points of clarification were addressed in meetings with the scheme sponsor, Pembrokeshire County Council; their lead consultant; and the National Park Authority. A site visit also took place.

3. Objectives

Two sets of objectives are relevant: the broader objectives of the Newgale Coastal Adaptation Strategy, and the narrower objectives of the road scheme.

The draft objectives of the Coastal Adaptation Strategy are:

- Ensure residents and locals can input into the decision-making process for the project, taking a long-term view.
- Maintain or improve the quality and inclusivity of facilities in Newgale, where practicable. Secure appropriate infrastructure to retain the connections with the wider area including transportation, digital and services.
- Newgale remains a place for residents and visitors to continue to enjoy the natural environment of the coast and sea. The coastal path continues to provide a way for people to connect with the coast and coastal communities.
- The Newgale area remains a place for a range of businesses, appropriate to the changing coast.
- Newgale is supported to become a resilient community to changing coastline and climate.
- Newgale's natural habitats are improved for wildlife and offer appropriate opportunities for access and education for a range of users and businesses.
- The project demonstrates Coastal Climate adaptation in a protected landscape and best application of the legislation, policies and strategy in Wales.
- The need to adapt to climate change at Newgale is understood by people living and working in the area.

The scheme objectives, as set out in the Strategic Outline Case, are:

- To maintain sustainable long-term connectivity between St David's Peninsula, Haverfordwest and the Trunk Road Network in the context of coastal change.
- To provide the optimal solution in terms of impact to the Pembrokeshire Coast National Park.
- To maintain an attractive, safe and well-connected community which sustains well-being through maintaining livelihoods and ensuring future opportunities for prosperity.
- To protect the fabric, community, iconic nature and visual aspect of Newgale, while allowing the natural evolution of the coastline.
- To provide infrastructure which sustains business, tourism and regeneration to the wider economy of the St David's Peninsula.

4. Has the case for change been made?

The existing road lies north-south immediately behind a shingle bank next to Newgale beach, with the low-lying land of the Brandy Brook valley to its east. The road is vulnerable to flooding, requiring closure during storms. When this happens, traffic is diverted on a 6km inland route on minor single-track roads until the road has been cleared of pebbles and boulders, which can take several days.

Within the next 10-20 years, more frequent severe weather events due to climate change mean that the shingle bank between the existing road and Newgale beach will become less stable and collapse, blocking the road repeatedly for extended periods of time. After about the year 2030, as the situation worsens, it is expected that it will no longer be feasible to maintain the road.

Without the scheme, there would be a loss of connectivity for rural coastal communities.

The Panel considers that there is a case for intervention to adapt to the impacts of climate change.

5. Are the objectives aligned with current policy?

The objectives are moderately well-aligned with current policy as set out in Wales Transport Strategy, Net Zero Wales and Future Wales. While its primary focus is adaptation to climate change, the scheme would provide an improvement in connectivity for public transport and active travel over what would be available in future were no action to be taken.

6. Did the scheme development process examine all appropriate options?

The scheme development process considered many options. These included the following:

- Leaving the road in place, either with reinforced sea defences or on an embankment or causeway;
- Moving the road about 60 metres inland;
- Widening existing minor roads;
- Several inland routes across Brandy Brook Valley.

Pembrokeshire County Council's intention has been to keep the existing road open for as long as possible, until major storms make maintenance infeasible. However, there is a risk that if the road is not removed in a planned fashion, before a major storm leads to failure of the shingle bank, the road materials will be buried (and will eventually re-emerge on the beach, as the shingle bank retreats inland). This means that once the new road is opened, it would be preferable for the existing road to be removed immediately.

The Panel considers that all options (both those that have been developed by the sponsor and others identified during the Panel's discussions) have environmental drawbacks. The Panel's judgement is that a sufficiently wide range of options has been examined and the proposed route, coupled with planned removal of the existing road, would be an appropriate option.

The design speed for the scheme (80kph) requires use of cuttings and embankments because of the undulating valley landscape. It is understood that at an earlier stage in the scheme development, a lower design speed of 70kph was considered. The Panel takes the view that further consideration of the design speed would be worthwhile, to minimise embodied carbon emissions and reduce the impact of the scheme on the landscape of the National Park.

7. What is the effect on carbon dioxide emissions?

The embodied carbon emissions from scheme construction have not been estimated.

The WelTAG Stage 1 Report estimates that the scheme would result in an increase in emissions in use of 14,000 tonnes of carbon dioxide over a 60-year appraisal period. This is not disaggregated into effects of changes in vehicle speeds and effects from changes in vehicle mileage.

Pembrokeshire County Council is considering reducing the speed limit on currently derestricted sections of the A487 between Haverfordwest and St David's from the national speed limit to 50mph. If this is done, it may partially compensate for the emissions from construction and use of the new section of road.

8. Will the scheme be good for people and communities?

The existing road provides for bus services including the TrawsCymru route 11. If the road becomes unusable and is not replaced, there will be a negative impact on access to employment and services for people who suffer social exclusion. The scheme would ensure that Newgale residents continue to have public transport access.

The safety record on the existing road is good, so the scheme is unlikely to improve road safety. It would increase noise at receptor sites at either end of the scheme, but noise at receptors along the old road would reduce. It would not have a significant impact on air quality or severance.

The local authority is adopting a collaborative approach to coastal adaptation, with extensive engagement with the local community.

9. Will the scheme be good for the environment?

The scheme would have an adverse impact on the landscape of the National Park. The WelTAG Stage 1 Report suggests that the new route may be a detracting feature because it cuts through important and sensitive landscape features including hedgerows, woodland and trees. The cuttings and embankments that are needed because of the undulating landscape would permanently alter the landscape character. The National Park Authority considers that there are some actions that can be taken to reduce the adverse landscape impact of the scheme, including use of Pembrokeshire hedgebanks (which can reach a height of 1.5m), and avoidance of using street lighting.

A number of sites protected for their environmental value are within 2km of the scheme. A full ecological impact assessment would be undertaken at the next stage of scheme development. The WelTAG Stage 1 Report identified potential for the scheme to have a large adverse impact on the St David's Coast Peninsula Site of Special Scientific Interest (SSSI) and the National Park, through noise or artificial light disturbance in the chough and peregrine nesting season, and loss of semi-natural habitats in the National Park. There is potential for a slight adverse impact on three Special Areas of Conservation (St David's / Ty Dewi; Pembrokeshire Marine; and Cleddau Rivers) and one Special Protection Area (Ramsay and St David's Peninsula Coast). There would also be an impact on Brandy Brook Valley, which is considered by Natural Resources Wales to meet the criteria for an SSSI although it is not designated as such. About 300m of hedgerow would be lost and 10 woodland areas (not ancient woodland) would be affected.

There are records of many protected or notable species in the area (birds, amphibians, invertebrates, bats, otters, badgers and reptiles), and the appraisal suggests potential for a negative impact on biodiversity. However, the appraisal also notes that once the shingle bank is allowed to retreat naturally, it will lead to creation of important types of habitats, including wet

woodland and saline lagoon, which could create a biologically important area for invertebrates, plants and birds.

There would be a slight adverse impact on water quality because of road run-off where the scheme crosses Brandy Brook and several smaller watercourses.

10. Will the scheme be good for places and the economy?

The existing view on the approach to Newgale beach is seen as an important visual attraction on the Pembrokeshire coast, and the proposed route preserves this view. Options with the road in its existing location but protected by sea defences or on an embankment or causeway would have the potential to detract from the view, possibly making the area less attractive for tourism.

Some businesses in Newgale may be affected by the scheme including a surf shop, pub and campsite. The roundabout north of Newgale would connect the proposed route to the existing A487, and would provide access to the village. The visitor car park at the south end of Newgale Beach would be retained (and raised in level, using spoil from the scheme, to increase resilience to storms).

The A487 is the main tourist access route to the St David's Peninsula. Looking at economic impacts over this larger area, the appraisal estimates that if the A487 at Newgale were to close and not be replaced, there would be an adverse gross value-added economic impact of £26-69 million. The scheme is not expected to have impacts on national economic well-being.

Public consultation suggests there are mixed views in the local community about effects on place-making and liveability. Comments suggest higher acceptability of the proposed scheme if speeds are kept low and the scale and design are in keeping with the landscape.

The WelTAG Stage 1 Report calculates a Benefit to Cost Ratio of 3.0, based on journey time savings relative to a Do-Minimum option in which all traffic is in future routed via the current minor road diversion route.

11. Will the scheme be good for culture and the Welsh language?

The scheme has no significant impacts (positive or negative) on use of the Welsh language. It may adversely affect the setting of a Scheduled Monument, the Bay View Farm Defended Enclosure.

12. How robust is the case for the scheme to different futures?

Overall, the case for the scheme is robust to different possible futures and aims to provide essential infrastructure resilient to climate change.

13. Conclusion

Pembrokeshire County Council sees the Newgale Coastal Adaptation and A487 Diversion Scheme in the context of a wider coastal adaptation strategy. The council's desire to demonstrate best practice in climate adaptation in a protected landscape is welcomed by the Panel.

The Panel has identified some best practice actions that the local authority could take to minimise adverse impacts in relation to carbon emissions, biodiversity and landscape, whilst benefiting the local community and the visitor economy. A lower design speed could reduce the requirement for embankments and cuttings, which would minimise embodied carbon and reduce the visual impact on the National Park landscape. Reducing the speed limit to 50mph on derestricted sections of the A487 between Haverfordwest and St David's could partially

compensate for increased carbon emissions from construction and use. There are opportunities for enhancement of the floodplain marsh which could create a biologically important area for invertebrates, plants and birds. Closing the A487 through Newgale to motorised traffic (except for access) when the scheme opens would enable sustainable modes of travel to be prioritised and create a sense of place.



SUMMARY

The scheme would involve modification of the layout of Dyfatty Junction north of Swansea city centre; works to the A483 Carmarthen Road north of Dyfatty Junction and as far as Cadle in north-west Swansea, a distance of 4.5km; and works to the B4489 High Street south of Dyfatty Junction as far as its junction with Welcome Lane in the city centre, a distance of 0.9km. The scheme sponsor is Swansea Council.

Dyfatty Junction is used by a large number of bus services, but has no dedicated provision for bus movements or for cycle traffic. There are reported to be delays to buses at Dyfatty Junction and on Carmarthen Road and High Street. The case for change is to reduce delays to buses, prioritise bus journeys and promote active travel along the A483 corridor.

The Panel considers that there is a case for change to improve active travel and public transport provision along the corridor and at Dyfatty Junction. However, the proposed reconfiguration of Dyfatty Junction would increase capacity for private motorised vehicles and may therefore increase car use. Designs seen by the Panel would not make the junction safe and attractive for cyclists.

The scheme design should be reviewed to prioritise active travel and bus movements in line with the Sustainable Transport Hierarchy. Junction improvements for active travel should be developed with an understanding of the junction's function within the wider active travel network, and in particular the nature of future active travel provision on roads connecting to Dyfatty Junction. The capacity of Dyfatty Junction for car traffic should not be increased.

The Panel makes the following recommendation:

Welsh Government should not support the Swansea Northern City Link Sustainable Transport Corridor scheme as currently proposed, because the Dyfatty Junction reconfiguration is not consistent with the Sustainable Transport Hierarchy and may increase car use. However, there is a case for change and further support could be provided for WelTAG Stage 1 work to identify options for active travel and bus provision on the corridor and at Dyfatty Junction in line with the Sustainable Transport Hierarchy.

1. Scheme description

The scheme would involve the modification of Dyfatty Junction, a major junction north of Swansea city centre which is formed of two adjacent signal-controlled junctions. The western junction connects the A483 Carmarthen Road with Dyfatty Street to the west, B4489 High Street to the south, and Bridge Street to the east. The eastern junction connects the B4489 Llangyfelach Street with Bridge Street. There would also be works to the A483 Carmarthen Road between Dyfatty Junction and Cadle in north-west Swansea, a distance of 4.5km; and works to High Street

between Dyfatty Junction and its junction with Welcome Lane in the city centre, a distance of 0.9km.

The main elements are:

- Dyfatty Junction: reconfiguration is stated as being to improve traffic flow through the junction and facilitate continuity of active travel route provision, and to enable bus priority measures to be increased. A new signal-controlled junction would be constructed north of the existing western junction on Carmarthen Road and a link road constructed from that new junction to create a new north arm at the eastern junction. The two existing and one new junction would be at the three vertices of a triangle. A further, fourth, new signal-controlled junction on the new link road would create the connection to the B4489 to the north-east.
- Carmarthen Road: active travel route adjacent to Carmarthen Road between Cadle and Dyfatty Junction; improvements to bus passenger waiting facilities and information; bus priority measures.
- High Street: active travel and public transport improvements south of Dyfatty Junction.

The Dyfatty Junction scheme is estimated to cost £6.9 million. Costs of other scheme elements are not known.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- Dyfatty Junction Review (2017)
- Dyfatty Bus Flows (November 2018)
- Dyfatty Junction General Arrangement Drawings (February 2019)
- Regeneration Project Workbook FO2077 Swansea Railway Arches (February 2021)
- Local Transport Fund Application Form (2021/22)
- Local Transport Fund 2022/23 Northern City Link Sustainable Transport Corridor- Dyfatty Bus Flows (undated, after February 2022)
- Northern City Link Sustainable Transport Corridor Programme (undated)
- Northern City Link Sustainable Transport Corridor Drawing (undated)
- Logic Table for Proposed EU Operations, Swansea Dyfatty and The Strand Urban Congestion Alleviation (undated)
- Carmarthen Road, Swansea Preferred Option Package (undated)
- Air Quality Management Areas and Park and Ride Sites – Existing and Proposed (undated)

Points of clarification were addressed in written correspondence and a meeting with the scheme sponsor.

3. Objectives

The objectives are:

- To provide for active travel along the length of the corridor and create connections to existing active travel networks
- To move public transport vehicles through the corridor and junction more efficiently, including priority measures at junctions
- To provide enhanced public transport waiting facilities and information along the corridor

- To improve opportunities for multi-modal journeys
- To reduce total delay experienced by vehicles travelling through the junction

The desired outcomes are set out as:

- Reconfigured junction layout as set out in the scheme plans
- Improved bus priority provision
- Provision for cyclists along the corridor and through Dyfatty Junction, connecting with adjacent active travel facilities
- At-grade pedestrian crossings to replace the current grade-separated bridges at Dyfatty Junction which currently present a challenge to some mobility scooters and do not comply with active travel design standards

4. Has the case for change been made?

The aim is to reduce bus journey delay, prioritise bus journeys and promote active travel along the A483 corridor. Dyfatty Junction is one of the busiest points of entry to Swansea city centre and a strategically important junction, but it has no dedicated active travel infrastructure. This limits the ability to link active travel routes to the north with the city centre.

About 35 buses per hour use the junction, serving communities to the north and west of the city and running via High Street into the city centre. The bus operator identifies Dyfatty Junction as a particular problem because buses with high patronage are delayed. There are also reported to be delays to buses on Carmarthen Road (mainly at junctions) and High Street, although data on this are not provided. Swansea Railway Station is located on High Street, and there is a need to improve the integration between rail and bus services.

Although limited data are provided to substantiate the nature and extent of problems, the Panel considers that there is a case for change to improve provision for active travel and public transport. A sustainable travel corridor could make a positive contribution to well-being and Welsh Government policy and strategy.

The scheme documents suggest that Dyfatty Junction is at capacity and that this may compromise future development in the city centre and on Carmarthen Road. The Panel accepts that the junction may be at capacity in terms of vehicle movements but does not consider that this provides a case for increasing capacity for private motorised vehicles. It may, however, provide a case for reallocating space to buses, cyclists and pedestrians, as these modes are more efficient users of road space. The Panel suggests that appropriate reallocation of capacity to sustainable modes of travel could increase the total capacity of the junction for moving people.

5. Are the objectives aligned with current policy?

The objectives are well-aligned with current policy as set out in the Wales Transport Strategy, Net Zero Wales and Future Wales. The public transport and active travel elements of the scheme could be effective in achieving the objectives if appropriate provision is made for them in the scheme, and if there is no increase in private car capacity.

6. Did the scheme development process examine all appropriate options?

Preferred options have been developed for Dyfatty Junction and Carmarthen Road, but there is limited information about other options that were considered in the scheme development process. Options for High Street have not yet been developed. The scheme sponsor stated that if

the scheme receives Local Transport Fund support, the next stage would be for a WelTAG Stage 1 study to take place.

It is not clear from the information provided to the Panel that the proposals for Dyfatty Junction and Carmarthen Road are the most appropriate options to achieve the stated objectives.

The current layout of Dyfatty Junction is two adjacent four-arm crossroads. There is a short link between them that limits the queueing lengths within the junction. It is proposed to construct two new signal-controlled junctions, and their orientation within the junction would mean there are then three short links each of which would limit the queueing lengths within the junction. Scheme documents state that there would be priority for public transport. It is also stated that active travel infrastructure would be introduced. The Panel has identified a possible bus lane in Figure 6 of the Local Transport Fund Application Form (2021/22), but this does not appear in drawing R452-P-100-01 (note there are two Figure 6's and reference is being made to the first Figure 6). Figure 6 does not show any cycle infrastructure but drawing R452-P-100-01 shows cycle advanced stop lines, but no infrastructure to reach them. There are differences between Figure 6 and drawing R452-P-100-01 in the location of at-grade pedestrian crossings. The Panel consider this bus and active travel infrastructure is insufficient to create a significant change in bus capacity, and comfort and attractiveness for people walking and cycling.

The Carmarthen Road general plan seen by the Panel shows a schematic layout of bus priority measures between the A484 Junction and Dyfatty Junction. The measures include seven junctions with selective vehicle detection (and there is no selective vehicle detection proposed at Dyfatty Junction); a section of carriageway reallocated to a bus lane at the northern end of the scheme; bus gates at two bus stops and one further bus gate with associated carriageway widening. Designs are less advanced than for Dyfatty Junction and so the nature of the provision for active travel is not yet known.

It is unclear whether complementary scheme elements have been or will be considered to ensure attractive active travel links between communities with low car ownership and the city centre, via Dyfatty Junction.

The Panel suggests that further consideration of the design for Dyfatty Junction is required. The junction improvements for active travel should be developed with an understanding of the junction's function within the wider active travel network, and in particular the nature of future active travel provision on roads connecting to Dyfatty Junction. The design should apply the Sustainable Transport Hierarchy, to make the junction and the roads that feed into it safe and attractive for cyclists and pedestrians, as part of continuous, convenient active travel networks; and to give priority to buses.

7. What is the effect on carbon dioxide emissions?

No quantitative assessment has been undertaken of carbon dioxide emissions. There would be emissions from embodied carbon due to construction of the proposed arrangement at Dyfatty Junction. If the scheme is effective in encouraging a modal shift from cars to buses and active travel, there could be reductions in carbon dioxide emissions in use. However, if the design of the junction increased capacity for private cars, it would induce further car trips, thereby increasing emissions in use.

8. Will the scheme be good for people and communities?

The corridor runs through deprived communities and the proposed active travel provision could therefore potentially improve access to employment opportunities for people who are less likely

to have access to a car. By seeking to reduce journey times for bus services, the scheme could also potentially help improve access to employment opportunities.

Dyfatty Junction, parts of Carmarthen Road and parts of High Street are within an Air Quality Management Area. If the scheme achieves a mode shift from cars to active travel it would assist in improving air quality.

It is proposed that existing grade-separated pedestrian bridges at Dyfatty Junction, which do not meet active travel design standards and are difficult for people with mobility scooters, will be replaced by at-grade crossings. This would reduce severance.

9. Will the scheme be good for the environment?

Based on the early-stage information provided, no impacts on sites that are protected for their environmental value, or impacts on biodiversity, have been identified. Further assessment would be required should scheme development progress.

The scheme does not affect any designated landscapes.

10. Will the scheme be good for places and the economy?

The scheme may improve access to employment and economic centres, which would have a positive impact on local economic well-being.

The Panel considers that the quality of the design of Dyfatty Junction will be particularly critical with regard to place-making in the context of the local community and environment.

The value for money of the scheme has yet to be assessed.

11. Will the scheme be good for culture and the Welsh language?

If developed well, a sustainable transport corridor could help communities to access cultural activities and leisure facilities in the city centre through active travel and by public transport.

The scheme may affect the setting of Listed Buildings, and this would require further exploration during future scheme development. Any such impacts are not likely to be significant.

No effects on use of the Welsh language are identified.

12. How robust is the case for the scheme to different futures?

Based on the information provided the Panel is not confident that the intervention proposed at Dyfatty Junction would be necessary in a future scenario of reduced private car use. However, the objectives of the scheme to provide for active travel along the corridor, create connections to existing active travel networks, and provide enhanced public transport facilities are robust to different possible futures.

13. Conclusion

The scheme is at an early stage of development, with proposals for different elements being at different stages of maturity.

The Panel considers that there is a case for change to improve active travel and public transport provision along the A483 Carmarthen Road / B4489 High Street corridor and at Dyfatty Junction. The objectives related to active travel and public transport are well aligned with current policy. However, any increase in capacity for private cars at Dyfatty Junction would increase

attractiveness of car use within Swansea, undermining achievement of the sustainable transport objectives.

Any further work must focus on options for active travel and bus provision on the corridor and at Dyfatty Junction, in line with the Sustainable Transport Hierarchy.



SUMMARY

The A4046 Aberbeeg Road scheme relates to a 3km section of road between Cwm and Aberbeeg, on the east side of the steep-sided Ebbw Fawr valley.

Storm Dennis caused damage to the road in 2020 and it was closed for several months. During the summer of 2020 remedial works were carried out. A 2021 assessment for Blaenau Gwent County Borough Council identified the following options:

- A4046 to remain as existing.
- Close this section of the A4046 and divert traffic onto another route.
- Replace the existing A4046 between Cwm and Aberbeeg with a route that follows the railway line and river near the bottom of the valley.
- Maintain the current alignment, with carriageway reinforcement at critical locations; realignment of substandard geometrical features; extension of road restraint systems; and drainage improvement measures.

The A4046 connects the communities of Aberbeeg and Abertillery with Cwm and Ebbw Vale. The road carries school buses and a small number of freight vehicles. The Panel considers that the A4046 at this location should remain operational to provide access because the diversion route would be 13 miles long. The scheme should ensure safe operation of the road, while minimising risk of substantial future maintenance costs.

Online measures should be prioritised to avoid impacts on carbon emissions and biodiversity associated with offline construction. The online option could include carriageway reinforcement, extension of road restraint systems and drainage measures, but from the evidence presented so far it is not apparent that there is a safety case for realignment of the geometry of the road. The scheme, if progressed, should not increase capacity or vehicle speeds.

The Panel makes the following recommendation:

Welsh Government could continue to support the A4046 Aberbeeg Road scheme, if it is demonstrated that further work is necessary to stabilise the carriageway. The solution should be the minimum necessary to stabilise the carriageway, ensure drainage is satisfactory, and ensure vehicle safety, while minimising carbon emissions associated with construction.

1. Scheme description

The scheme relates to a 3km section of the A4046 between Cwm and Aberbeeg, on the east side of the steep-sided Ebbw Fawr valley. The Ebbw Fawr river and the railway line between Cardiff and Ebbw Vale lie about 40 metres below the road. The road carries traffic flows of about 10,700 vehicles per day.

Following Storm Dennis in February 2020, the carriageway showed signs of damage, resulting in this section being closed for several months. A separate small landslide from a watercourse below the highway also resulted in the railway line between Llanhilleth and Ebbw Vale being closed for five days. A limited reopening of the road followed, with one lane remaining closed and a carriageway weight limit applied.

During the summer of 2020 remedial works were carried out to stabilise the damaged section of highway and embankment. The reinforcement works consisted of the installation of a 40-metre-long piled reinforced concrete slab over the full width of the carriageway.

Four options are considered in a Stage 1 Scheme Assessment Report as follows:

- Maintain the A4046 in its current form, with monitoring, maintenance and occasional road closures.
- Close this section of the A4046; divert traffic onto the route used during previous closures.
- Replace the existing A4046 between Cwm and Aberbeeg with a route that follows the railway line and river near the bottom of the valley.
- Maintain the current alignment, with carriageway reinforcement at critical locations; realignment of substandard geometrical features; extension of road restraint systems; and drainage improvement measures.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- Local Transport Capital Fund Application Form (2021/22)
- Local Transport Fund Site Location Plan: Aberbeeg Road A4046 (undated but assumed to be 2021)
- Local Transport Fund Photographs: Aberbeeg Road A4046 (undated but assumed to be 2021)
- Stage 1 Scheme Assessment Report: A4046 Aberbeeg Road (January 2022) (note this is not a full WelTAG Stage 1 Report)

3. Objectives

No objectives are set out in any of the documents provided.

4. Has the case for change been made?

The Stage 1 Scheme Assessment Report (not a full WelTAG Stage 1 Report) was commissioned to determine the extent of issues. It noted there are a few sub-standard stretches of the highway, with defects such as longitudinal cracking, but that further investigation would be required to understand the extent of the problem. It will only be after these further investigations that the evidence will be available to properly justify particular interventions.

The report also notes that there are several sections of the A4046 that do not meet current standards for horizontal geometry and visibility. There were two personal injury collisions in the five-year period between 2016-2020, of which one was fatal (attributed to impairment caused by alcohol and drugs) and the other serious (attributed to failure to look properly). The fatal collision was in a location where the road does not meet current standards for horizontal geometry. There is insufficient evidence to assess the safety case for modification of highway alignment, but the potential to reduce casualties appears limited. If safety is being suggested as a rationale for realignment, more evidence would need to be provided.

The report does not assess the traffic impacts of the road being closed or otherwise restricted. However, the A4046 connects the communities of Aberbeeg and Abertillery with Cwm and Ebbw Vale. The road carries school buses and a small number of freight vehicles. During both the closure after Storm Dennis and the closure for the stabilisation works, traffic was diverted along the A467 from Aberbeeg to Brynmawr and on to Ebbw Vale via the A4047, a distance of approximately 13 miles.

The Panel considers that there were accessibility impacts and maintenance costs as a result of the road having been damaged in Storm Dennis. Following the remedial works in summer 2020 the case for further intervention has not yet been fully evidenced, and would need to be developed further.

5. Are the objectives aligned with current policy?

No objectives have been set out in any of the provided material and therefore it is not possible to determine if they align with policy.

6. Did the scheme development process examine all appropriate options?

The range of options considered in the Stage 1 Scheme Assessment Report is limited in scope since the focus was to address issues with the stability of the existing carriageway. The Stage 1 Report recommends that all options are carried forward into a Stage 2 Scheme Assessment Report and developed and appraised in further detail.

If at Stage 2 it is demonstrated that there is a need for further intervention to stabilise the carriageway, the Panel recommends that options that minimise embodied carbon in construction should be investigated. Online measures should be prioritised to avoid environmental impacts associated with offline construction.

7. What is the effect on carbon dioxide emissions?

No quantitative assessment has been undertaken, but it seems likely that the main (negative) carbon dioxide impact of the scheme will arise from construction (rather than from induced traffic or changes in vehicle speeds). There is an existing carbon dioxide impact from ongoing maintenance of this length of road, and from potential lengthy diversions, which would need to be considered in future net carbon calculations. The Stage 1 Report includes an offline option which would involve the construction of a replacement road and carbon dioxide emissions associated with this option would be higher than for other options.

8. Will the scheme be good for people and communities?

The scheme would reduce the risk of future road closures which would be of benefit to local people and communities. There would be no impacts (positive or negative) on air quality, noise, or community severance. The scheme would neither improve nor worsen access to employment and services for people who suffer social exclusion.

9. Will the scheme be good for the environment?

The locally-designated Ebbw (Fawr) River North & South Site of Importance for Nature Conservation (SINC) lies approximately 30 metres west of the A4046 at its closest point and runs almost parallel to the carriageway in the valley. This site supports both locally and nationally important protected and priority habitats and species. Areas of ancient woodland are located to

the west of the A4046, in the valley. Depending on the preferred option, there is therefore the potential for impacts to the SINC and loss or deterioration of areas of ancient woodland.

In addition, the potential route of the offline option would be located in an area at risk of flooding.

A more thorough assessment would be required should scheme development progress.

10. Will the scheme be good for places and the economy?

The scheme may have benefits to local economic well-being if it avoids future road closures. There would be no benefits to national economic well-being. There are no benefits to place-making and liveability. The road carries low volumes of freight (2% of total traffic flow), but following the damage to the highway in 2020, a weight restriction was imposed until remedial works were undertaken. Remedial works may avoid further weight restrictions in future. The value for money of the scheme has not been assessed at this stage.

11. Will the scheme be good for culture and the Welsh language?

The scheme would not have any impact on the Welsh language, or sustainable travel for cultural and recreational activities.

12. How robust is the case for the scheme to different futures?

The scheme may have the potential to reduce maintenance activities in the long run.

Flood risk (including the impact of climate change) would need to be considered in the viability and design of the offline option.

13. Conclusion

The Panel considers that the A4046 at this location should remain operational because the diversion route would be 13 miles long. The scheme should ensure safe operation of the road, while minimising risk of substantial future maintenance costs.

Online measures should be prioritised to avoid impacts on carbon emissions and biodiversity associated with offline construction.

The online option could include carriageway reinforcement, extension of road restraint systems and drainage measures, but from the evidence presented so far it is not apparent that there is a safety case for realignment of the geometry of the road. The scheme should not increase capacity or vehicle speeds.



SUMMARY

The scheme would stabilise the carriageway of the A469 at Troedrhifwuch in the Rhymney Valley, over a length of 150 metres.

The road is in the area of the Troedrhifwuch landslide, and ground instability caused by heavy rain has led to deformation and cracking of the carriageway on several occasions, most recently in 2020. Geotechnical analysis indicates that the risk of ground movement could be reduced by use of one or more piled retaining walls to intercept the slip planes. Temporary traffic management is currently in place with signal-controlled single-lane operation, and there is on-going monitoring and reactive repairs.

The Panel considers that there is a case for the scheme, in order for the A469 at this location to remain operational in a manner that is safe and reliable, and to minimise maintenance costs from potential future structural failure. Diversion of the A469 has been considered in the past but would be considerably more expensive (and have greater carbon impact) than reinstatement of two-way traffic operation at the existing location.

The Cardiff – Rhymney railway line lies 170 metres east (downhill) of the scheme. If the scheme proceeds, the scheme development process should take account of any potential impact or benefits in relation to the railway line. The A469 is identified as a future walking and cycling route on Caerphilly County Borough Council's Integrated Network Map, and the opportunity should be taken to improve the active travel network.

The scheme would have embodied carbon emissions associated with construction, and these should be minimised. It would not increase capacity or vehicle speeds, and so would not increase carbon emissions in use. Impacts on ecologically valuable sites are not yet known, and would need to be assessed at the next stage of appraisal if the scheme proceeds.

The Panel makes the following recommendation:

Welsh Government could continue to support the A469 Troedrhifwuch scheme, with consideration given to appropriate opportunities to enhance the active travel network in the area, and any necessary considerations given to issues in relation to the adjacent railway line.

1. Scheme description

The A469 in the Rhymney Valley forms part of Caerphilly County Borough Council's Strategic Highway Network. The scheme is in an area where landslips and ground movement are an issue. It would stabilise the carriageway of the A469 over a length of 150 metres at Troedrhifwuch, 10km north of Caerphilly between New Tredegar and Pontlottyn.

Geotechnical analysis indicates that the risk of landslips and ground movement could be reduced by use of a piled wall to intercept the slip planes. Three options for on-line stabilisation and reinstatement of the A469 to a suitable standard have been considered:

- Retaining wall at the edge of the highway corridor, constructed while keeping a single traffic lane open (estimated cost £12 million);
- Retaining wall at the edge of the highway corridor, with a total closure of the A469 during a 9-12 month construction period (estimated cost £9.6 million); and
- Two retaining walls lower down the slope accessed by a temporary road, while maintaining traffic flow during construction (estimated at £12.2 million).

The first two options involve a piled retaining wall 150 metres long on the eastern (down-slope) highway boundary. The third option involves two piled retaining walls down the slope with one lower down the slope than the other. This option has greater impact on landownership and landscape. To maintain a live traffic lane during construction, the first option also requires construction of a sheet piled wall to retain the up-slope ground on the western boundary (thereby increasing construction costs). Road reconstruction is expected to match with the existing highway at either end of the scheme, and the current 40mph speed limit would not change. The Panel understands that at this stage the first option is preferred by Caerphilly County Borough Council.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- Local Transport Fund Application Form (2021/22)
- A469 Cross-Section 27 Current FOS and Cross-Section 39 Current FOS (Appendix 1 of the Application Form) (May 2021)
- Preliminary A469 Remedial Options: Scoring Mechanism (Appendix 2 of the Application Form) (May 2021)
- Troedrhifwuch Highway Site Location Plan (May 2021)
- Indicative Construction Sequencing Phase 5 (May 2021)
- A469 Troedrhifwuch Highway Stabilisation Estimate Report (June 2021)
- General Arrangement Option X (Assumed Road Closure) (March 2022)
- General Arrangement Option Y (Road Closure - Road Reconstruction) (March 2022)
- Estimate Comparison of Shortlisted Options (undated)

Points of clarification were addressed in a meeting with the scheme sponsor.

3. Objectives

The objectives are:

- To prevent and reduce subsidence on the A469
- Future proof and make the A469 more efficient with managing traffic on the network
- Reduce the likelihood of road traffic collisions due to uneven surfaces thereby improving the safety for the highway users
- Reduce maintenance costs and risk
- Improved community resilience due to road closures
- Support air quality

4. Has the case for change been made?

In 2014, heavy rain and a burst water main resulted in ground movement and carriageway deformation. Stone-filled gabions were subsequently placed on the up-slope side of the A469 at the location where the scheme is proposed. Following heavy storms in early 2020, major cracking in the carriageway appeared.

The problem of ground stability has been examined in detail revealing factors of safety ranging from below to well below an acceptable level. Instability may be triggered by heavy rainfall and to a lesser extent by dynamic and static load changes caused by traffic. Consequently, temporary signal-controlled traffic management has been in operation with traffic using the northbound lane only.

The stability issues necessitate on-going traffic management, monitoring and reactive repair activities. It is reasonable to assume there will be continuing maintenance and remediation costs if the issue is not addressed, and that increased frequency of extreme weather events due to climate change may exacerbate the issue.

The Panel considers that there is a case for the scheme, in order for the A469 at this location to remain operational in a manner that is safe and reliable, and to minimise maintenance costs from potential future structural failure.

5. Are the objectives aligned with current policy?

The objectives are aligned with current policy as set out in Wales Transport Strategy, Net Zero Wales and Future Wales, particularly in relation to providing safe, well-maintained and managed transport infrastructure.

6. Did the scheme development process examine all appropriate options?

Previously, diversion of the A469 was considered as an option. Cost estimates were of the order of £75 million - £85 million. The range of options considered in the current option development process was limited to options to stabilise the carriageway on the existing alignment. Only one indicative option was originally developed due to an immediate requirement to prepare a cost estimate to inform an application for funding to Welsh Government. Subsequently, three options for reinstatement of the existing road to a suitable standard have been considered. Commissioning of WelTAG Stage 1 and WelTAG Stage 2 took place in February 2022 with completion expected later in 2022.

The A469 at this location is identified on Caerphilly's Integrated Network Map as a future walking and cycling route between New Tredegar and Pontlottyn, so it would be important for the appraisal process to consider opportunities to support active travel network development. The Panel understands that the opportunity to have a wider footway than at present exists within the design options.

The Panel considers that diversion of the A469 or continuation of the current traffic management arrangement are not viable options and that reinstatement of the existing highway to a suitable standard is appropriate. The Panel understands that there is a preference for the A469 to remain operational during construction because significant adverse connectivity issues would otherwise result during the construction period.

The Cardiff – Rhymney railway line lies 170 metres east (downhill) of the scheme. If the scheme proceeds, the scheme development process should take account of any potential impact or benefits in relation to the railway line.

7. What is the effect on carbon dioxide emissions?

No quantitative assessment has been undertaken, but it seems likely that the main (negative) carbon dioxide emissions impact of the scheme would arise from construction. Emissions from vehicles using the road, when compared to the situation prior to introduction of existing temporary traffic management, are unlikely to change as a result of the scheme.

8. Will the scheme be good for people and communities?

The scheme would reduce the risk of future road closures and improve bus service reliability along this length of road (by removing the existing temporary single-lane operation). There are no impacts on air quality, noise, road safety or severance.

9. Will the scheme be good for the environment?

The scheme is at an early stage, and so environmental impacts have not yet been fully assessed. The scheme may have some impact on a locally-designated Site of Importance for Nature Conservation, and there is the potential for impacts on protected species such as bats. A more thorough assessment would be required should scheme development progress.

The scheme does not affect any designated landscapes.

10. Will the scheme be good for places and the economy?

No impacts on economic well-being or on place-making and liveability have been identified. The value for money of the scheme has not been assessed.

11. Will the scheme be good for culture and the Welsh language?

There are two Welsh-medium secondary schools in the Caerphilly County Borough Council area (in Caerphilly and Blackwood), for which there may be reliance upon the A469 at this location for access from Rhymney and Pontlottyn.

The scheme would not have any impact on sustainable travel for cultural and recreational activities. It would not affect any designated historic sites.

12. How robust is the case for the scheme to different futures?

The scheme would reduce maintenance and remediation work in the long run. It would increase resilience to extreme weather events which are likely to become more common as a result of climate change.

13. Conclusion

The scheme is necessary in order for the A469 at this location to remain operational in a manner that is safe and reliable, and to minimise maintenance costs from potential future structural failure.

It would have embodied carbon emissions associated with construction, and these should be minimised. It would not increase capacity or vehicle speeds, and so would not increase carbon emissions in use. Impacts on ecologically valuable sites are not yet known, and would need to be assessed at the next stage of appraisal if the scheme proceeds.



SUMMARY

The Cynon Gateway North scheme is a proposed 1.2km rural single-carriageway road with a 50mph speed limit between a new junction with the A465 Heads of the Valleys Road (Croesbychan Junction) and the A4059 Aberdare bypass. Construction cost is estimated to be £56 million.

The A465 is being converted from a single three-lane carriageway to a dual two-lane carriageway with grade-separated junctions. Sections 5 and 6 from Dowlais Top (east of Merthyr Tydfil) to Hirwaun (north-west of Aberdare) are currently under construction. Grade-separation of junctions between the A465 and local roads will affect where traffic to or from the Cynon Valley leaves or joins the A465, potentially causing more traffic to use the B4276 via the village of Llwydcoed. The Cynon Gateway is intended both to discourage use of the route via Llwydcoed and to support economic development in the Cynon Valley.

Although there was a rationale for the scheme at the time of the Inquiry into the A465 dualling, the Panel considers that in the current policy context the case has not been adequately demonstrated.

The scheme would have a considerable environmental impact, cutting through a Site of Special Scientific Interest, ancient woodland and a Site of Importance for Nature Conservation. It would have a moderate to large adverse impact on the landscape in a Special Landscape Area. Carbon emissions from construction would be significant. It is also anticipated to have an adverse impact on residents through noise and visual intrusion from barriers.

The Panel recognises the importance of economic development to the Cynon Valley but considers that the scheme would facilitate a car-dependent approach to economic development and land use planning, and that new development should instead be designed to minimise car use.

The Panel acknowledges concerns about the traffic impact of the A465 dualling on Llwydcoed, but considers that other measures should be implemented to discourage traffic routing via the B4276, including traffic calming to keep vehicle speeds below 20mph; wider footways at some locations; separated cycleways; and signage to route Aberdare – Merthyr Tydfil traffic via the A4059 and Rhigos Junction. The local measures on the B4276 should be implemented in advance of completion of the A465 dualling. In addition, measures should be developed over a wider area to support modal shift to sustainable transport and to manage demand, to prevent increases in traffic arising from the A465 dualling.

The Panel makes the following recommendation:

Welsh Government should not provide further support for the Cynon Gateway North scheme because its construction would result in substantial increased emissions of carbon; there would be impacts on sites that are protected for their environmental value; and it would facilitate a car-dependent approach to economic development.

1. Scheme description

The Cynon Gateway North scheme is in the County Borough of Rhondda Cynon Taf (RCT), in the northern part of the Cynon Valley in South Wales. The proposal is for a 1.2km rural single-carriageway road with a 50mph speed limit between a new junction with the A465 Heads of the Valleys Road (Croesbychan Junction) and the A4059 Aberdare bypass. Much of the route will be on an embankment. Construction cost is estimated to be £56 million.

The A465 between Dowlais Top (east of Merthyr Tydfil) and Hirwaun (north-west of Aberdare) is currently a single three-lane carriageway. A scheme to convert the road configuration to a dual two-lane carriageway with grade-separated junctions is under construction and scheduled to be completed in 2025.

The A465 scheme will affect where traffic to or from Aberdare leaves or joins the A465. At present, the main junction is at Trewaun roundabout, where the A4059 from Aberdare intersects the A465. However, traffic to and from Merthyr Tydfil can also use Baverstock Junction, reached via the B4276 and the settlement of Llwydcoed. Currently, traffic towards Merthyr Tydfil is discouraged from taking this route by the layout of Baverstock Junction. Once the A465 scheme is complete, Baverstock Junction will be grade-separated and there will be a grade-separated junction between the A4059 and A465 at Rhigos, 1.5km west of Trewaun roundabout. Trewaun roundabout will no longer have access to the A465 because its proximity to Rhigos Junction means that it would not be possible to provide adequate weaving sections between the slip roads on the adjacent junctions. If the Cynon Gateway North scheme is not built, traffic travelling from Aberdare towards Merthyr Tydfil may be more likely to use the B4276 and Baverstock Junction, rather than the A4059 and Rhigos Junction. The Cynon Gateway North scheme would provide an alternative route to the A465, avoiding Llwydcoed.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

Cynon Gateway WelTAG documents

- WelTAG Stage 1 Report: Cynon Gateway (August 2019)
- WelTAG Stage 1 IAR: Cynon Gateway (August 2019), including:
 - A465 Heads of the Valleys Supplementary Traffic Forecasting Report without Cynon Valley Gateway (May 2018)
- WelTAG Stage 2 IAR: Cynon Gateway (June 2021)
- Draft WelTAG Stage 2 Report: Cynon Gateway (November 2021)

Cynon Gateway other documents

- RCT Strategic Transport Assessment (October 2007)
- RCT 2011-21 Adopted Local Development Plan
- Cynon Gateway Energizing the Region Outline Strategy, in RCT Report to Cabinet on Strategic Opportunity Areas (21 September 2017)
- Letter from Cabinet Secretary for Economy and Transport to Leader of Rhondda Cynon Taf Council (February 2018)
- Cynon Gateway Carbon Assessment (July 2020)
- A4059 Cynon Gateway North Economic Assessment Report (September 2020)
- RCT Report to Cabinet Cynon Gateway North (Aberdare Bypass) (24 September 2020)

- A4059 Cynon Gateway North Traffic Forecasting Report (October 2020)
- A4059 Cynon Gateway North Environmental Impact Assessment Volume 1: Environmental Statement (October 2020)
- A4059 Cynon Gateway North Environmental Impact Assessment Volume 2: Plans (October 2020)
- A4059 Cynon Gateway North Environmental Impact Assessment Volume 3: Appendices (October 2020)
- A4059 Cynon Gateway North Environmental Statement Volume 4: Non-Technical Summary (October 2020)
- RCT Committee Report on Bryn Pica Eco Park (14 January 2021)
- RCT Planning and Development Committee Planning Officer Recommendation regarding Planning Application 21/0273/08: Proposed Bypass (March 2022)

A465 Heads of the Valleys

- A465 Heads of the Valleys Sections 5 and 6 Dowlais Top to Hirwaun Stage 3 Scheme Assessment Report (July 2017)
- A465 section 5 and 6 Dowlais Top to Hirwaun new scheme plan: <https://gov.wales/sites/default/files/publications/2021-09/a465-section-5-and-6-dowlais-top-to-hirwaun-new-scheme-plan.pdf> (accessed 18.03.2022)
- Map and description of A465 new junctions: <https://gov.wales/rhigos-road-a465-roundabout-junction>; <https://gov.wales/hirwaun-junction>; <https://gov.wales/croesbychan-junction>; <https://gov.wales/baverstock-junction-swanssea-road>
- A465 Heads of the Valleys Sections 5 and 6 Dowlais Top to Hirwaun Public Inquiry under the Highways Act Inspector's Report (12 September 2018)

A site visit and a meeting with the scheme sponsor also took place.

3. Objectives

The objectives are as follows:

- To improve the attraction of Hirwaun and Aberdare corridor for inward investment
- To improve access to employment opportunities and key services for the population of Hirwaun and Aberdare and to support the latter's function as a principal town
- To reduce the adverse impacts of the traffic on the local environment
- To ensure compatibility with and maximise the benefits of future infrastructure projects
- To encourage Hirwaun and Aberdare to grow in a sustainable way and improve the health of the population by encouraging healthy lifestyles through active travel

4. Has the case for change been made?

The case put forward for the scheme is twofold.

First, modelling (using pre-pandemic baseline traffic data) predicted that when the A465 dualling is complete, and in a situation without the Cynon Gateway North scheme, there will be an increase in traffic on the two roads that link Aberdare to the A465 (B4276 through Llwydcoed, and A4059). The proposed Cynon Gateway route would provide shorter journey times (saving about two minutes over use of the existing B4276), and therefore reduce the volume of traffic using the B4276 through Llwydcoed, with local environmental and road safety benefits. Welsh

Government acknowledged in correspondence with the local authority in 2018 that closure of Trewaun Junction and reconfiguration of Baverstock Junction as part of the A465 dualling would increase traffic at Llwydcoed. This could be mitigated by the construction of Cynon Gateway North and there was a Ministerial commitment to work with the local authority to progress this scheme. The Inspector at the Public Inquiry into the A465 dualling in 2018 considered it desirable that the Cynon Gateway North scheme be progressed because of the potential adverse impact of the A465 dualling on Llwydcoed.

Second, the scheme may facilitate development in the northern Cynon Valley for employment, leisure and residential uses. The local authority is working to attract businesses to a Strategic Opportunity Area south of the A465, which includes the former Tower Colliery site; Hirwaun Industrial Estate; and Bryn Pica, a site with outline planning permission for commercial and industrial development as an Energy Park. The Strategic Opportunity Area has several renewable energy sites, including Pen y Cymoedd Wind Farm and other wind and solar farms, and the local authority considers that these make the area attractive to high-energy-use businesses that could benefit from a direct renewable energy connection. The local authority is also encouraging tourism-related development, such as Zip World (a visitor attraction that opened at the former Tower Colliery in 2021). The Local Development Plan (2011-2021) identifies a 28-hectare development site at Robertstown on the eastern edge of Aberdare, close to the town centre and railway station; 21 light industrial 'starter units' for new businesses are nearing completion here and the local authority has secured funding for remediation works to enable development of 375 dwellings on the site.

The Panel's comments about the two aspects of the case for the scheme are set out below.

First, the Panel acknowledges that in the policy context prevailing at the time of the Inquiry for the A465 dualling, in 2018, there may have been a case for the scheme on traffic grounds. However, the case for change is not compelling in the current policy context. The traffic modelling pre-dates, and therefore does not take account of, Welsh Government's aims to reduce car mileage per person by 10% by 2030, increase sustainable transport mode share, and increase the proportion of the workforce who work remotely. The baseline year for the modelling is 2019, before the changes in travel patterns due to the pandemic. The modelling does not take account of South Wales Metro emerging proposals to extend the railway line beyond Aberdare to a new station at Hirwaun; and does not take account of plans for a 20mph speed limit on the B4276 through Llwydcoed, which will make this route less attractive for drivers. All these factors mean that the change in traffic flows on the B4276 following completion of the A465 dualling is unknown. The change in flows is likely to be less than predicted, although it may be more than at present if there are no other mitigating measures.

Second, the Panel recognises the importance of economic development to the Cynon Valley, particularly for Hirwaun and Penywaun, which are in the most-deprived quintile of areas (Lower Super Output Areas) in terms of employment. The Panel's assessment is that in the context of the Wales Transport Strategy and Future Wales, all development should be designed to minimise car dependence, with low car parking provision, good active travel connections, and planning agreements to secure good public transport. If the Cynon Gateway North scheme went ahead, it could encourage a car-dependent approach to economic development and land use planning that would be inconsistent with the priorities of the Wales Transport Strategy and Future Wales.

The Panel therefore does not consider that the case for the scheme has been adequately demonstrated in the current policy context.

5. Are the objectives aligned with current policy?

The objectives are aligned or neutral with respect to current policy.

However, the scheme may not be effective in achieving the objectives that are most aligned with current policy for the following reasons:

- With respect to the first and second objectives listed in section 3, there is a risk that a faster road connection may undermine the viability of local shops and services in Aberdare town centre by making it quicker for residents to drive to Merthyr Tydfil and out-of-town retail at Cyfarthfa.
- With respect to the third objective, the scheme would reduce the adverse impacts of traffic on residents of Llwydcoed, but some residents of the lower-income area of Penywaun would experience an increase in traffic noise and visual intrusion from noise mitigation; there would be negative impacts on users of the active travel routes that intersect the scheme; and negative impacts on sites that are protected for their landscape and ecological value.
- With respect to the fifth objective, the scheme is unlikely to result in an overall increase in active travel because it makes it more attractive for people to drive.

The scheme does not reflect the Sustainable Transport Hierarchy and it risks undermining the sustainable transport mode share target. It is not well-aligned with the local Public Service Board's well-being objective in relation to the economy, which is "to grow a strong local economy with sustainable transport that attracts people to live, work and play in Cwm Taf".

6. Did the scheme development process examine all appropriate options?

Of the 20 options considered in the initial stages of scheme development, nine involved improved services or infrastructure for public transport and active travel:

- Hirwaun – Aberdare passenger rail service
- New East – West cross valley bus services
- Reopening the Aberdare – Merthyr railway via Abernant Tunnel
- Conversion of Hirwaun – Aberdare rail line to guided busway
- Express bus services between Hirwaun / Aberdare and Cardiff, Merthyr and beyond
- Bus priority on A4059 between Hirwaun and Aberdare
- Free bus travel for residents between Hirwaun and Aberdare railway station
- Walking and cycling infrastructure
- 'Sustainable travel centre' with a combination of capital and revenue measures to support greater use of sustainable modes

Two longlisted options involved park and ride: a proposal for a new park and ride site at Hirwaun; and expansion of an existing park and ride site at Aberdare. There were two longlisted non-transport options: offering economic incentives to businesses to locate in the Hirwaun / Aberdare area with the aim of creating local jobs; and encouraging flexible working patterns and school times.

Five options were shortlisted alongside the Cynon Gateway scheme: the Hirwaun – Aberdare passenger rail service; Hirwaun park and ride; walking and cycling infrastructure; sustainable travel centre; and encouragement of flexible working patterns and school times. The final, and

preferred, package was the Cynon Gateway road scheme coupled with walking and cycling infrastructure. The walking and cycling infrastructure comprises mainly upgrades to the existing Cynon Trail, rather than new routes.

The development and appraisal of the non-road options were far less detailed than the development and appraisal of the road scheme, and the non-road options were each considered in isolation rather than as a sustainable transport package.

There was insufficient consideration of demand and speed management measures to reduce the impact of traffic through Llwydcoed. The Panel notes that Welsh Government's plans to reduce the speed limit to 20mph in built-up areas will benefit Llwydcoed. There is potential for the local authority to build on this initiative, to ensure traffic levels through Llwydcoed do not increase when the A465 dualling is complete. There is already a heavy goods vehicle ban on the B4276 through Llwydcoed, but other options that would offer an improvement for the community include: traffic calming to keep vehicle speeds below 20mph; wider footways at some locations; separated cycleways; and signage to route Aberdare – Merthyr Tydfil traffic via the A4059 and Rhigos Junction. These measures should be implemented before the A465 dualling scheme is complete.

The Panel concludes that a package of sustainable transport, speed management and demand management (including limits on the amount of car parking associated with future development), would be better aligned with current policy than the Cynon Gateway North scheme.

7. What is the effect on carbon dioxide emissions?

There would be embodied carbon dioxide emissions of almost 45,000 tonnes due to construction. This figure does not include emissions from land clearance, operation and maintenance.

The appraisal suggests that the carbon emissions from construction would, over time, be offset by emissions savings in use, due to reduced congestion and vehicles travelling at more fuel-efficient speeds. The Panel does not consider that this claim is credible, for several reasons. First, the traffic modelling does not make allowance for induced traffic, which may arise from car-dependent development and from changes in trip frequency, trip length and destination choice due to faster journey times. In the context of the stated case for the scheme these effects may be significant. Second, the modelled emissions savings are approximately 1,000 tonnes carbon dioxide in each year of the 60-year appraisal period (2024-2083), but estimated savings after 2050 would not materialise because all vehicles must by that date be zero emission at tailpipe. Third, the modelling assumes there will be traffic growth between 2024-2039 (with car traffic increasing by 13%); this is inconsistent with the Welsh Government aim to reduce car mileage per capita by 10% by 2030. If traffic volumes reduce, or grow less than assumed in the modelling, the carbon savings between the Do-Something and Do-Nothing scenarios also reduce.

The Panel concludes that the scheme would lead to substantial carbon emissions from construction, and that the modelled carbon emissions savings due to use of the scheme were likely to be significantly overstated. Even allowing for work to minimise construction carbon at the detailed design stage, carbon emissions are likely to increase overall.

8. Will the scheme be good for people and communities?

The impact of the scheme is broadly neutral for air quality, safety, and access to employment and services for people who suffer social exclusion.

Noise impacts may be worse: it is predicted that approximately a third of residential properties within 2km of the scheme (316 properties out of 863 in total) would experience a noise increase. The noise increase would be minor for 127 properties but moderate or major for 189 properties. A 3-metre-high noise barrier would reduce noise impacts, but would have a significant light and visual impact on nearby properties. There would be a minor noise decrease for 43 properties; no properties would experience a moderate or major noise decrease.

The scheme would remove traffic from existing roads, and this would reduce community severance in residential areas, particularly in Llwydcoed. This benefit may be eroded over time if there is no traffic restraint.

9. Will the scheme be good for the environment?

The scheme would bisect Tir Mawr a Dderi Hir Llwydcoed Site of Special Scientific Interest (SSSI); would involve loss of ancient woodland; and would result in loss of five hectares of the Upper Cynon Floodplain Site of Importance for Nature Conservation (SINC). There are anticipated to be impacts on protected species including bats and otters although these could be mitigated. Severance of woodland and hedgerows would reduce habitat for dormice, which are considered vulnerable in this location. There is a threat of collisions with traffic for barn owls.

The scheme is within the Brecon Beacons Edge at Llwydcoed Special Landscape Area, and is anticipated to have a large to very large adverse impact on the landscape. This adverse impact is anticipated to remain moderate to large even after 15 years.

10. Will the scheme be good for places and the economy?

The scheme is being promoted to make the area more attractive as a location for existing and new businesses. It is expected to reduce journey times for business and freight travel between the Cynon Valley and both West Wales and the English borders. The scheme has a Benefit to Cost ratio of 2.4, representing high value for money, with most of the monetised benefit due to journey time savings.

11. Will the scheme be good for culture and the Welsh language?

The scheme would impact on the setting of the remains of Gamlyn Viaduct, a Scheduled Monument. It is unlikely to have significant impacts on the Welsh language.

12. How robust is the case for the scheme to different futures?

The scheme is not identified as being vulnerable to adverse impacts of climate change such as flooding. The value for money would be less under a scenario in which travel by private motor vehicles was lower. It is proposed that the loss of Tir Mawr a Dderi Hir Llwydcoed SSSI will be mitigated by improvement of the habitat of a compensation area close to the remaining areas of the SSSI. To be successful this will require long-term management.

13. Conclusion

The case for the Cynon Gateway North scheme has not been adequately demonstrated in the current policy context. The Panel recognises the importance of economic development to the Cynon Valley, but considers that the scheme would encourage a car-dependent approach to economic development and land use planning, and that new development should instead be designed to minimise car use. The Panel also acknowledges concerns about the traffic impact of the A465 dualling on Llwydcoed, but considers that other measures should be implemented to

discourage traffic routing via the B4276, including speed management, demand management, sustainable transport improvements and signage. The scheme would not improve road safety, and it would mean that more residential properties experience significant impacts from noise and from the visual intrusion of noise barriers.

The scheme would have a considerable environmental impact, cutting through a SSSI, ancient woodland and a SINIC. It would have a moderate to large adverse impact on the landscape in a Special Landscape Area. Carbon emissions from construction would be significant. The Panel does not consider it credible that carbon emissions from construction would be offset by reductions in carbon emissions in use over the 60-year appraisal period.



SUMMARY

The Llanharan Bypass scheme comprises a 1.6km single-carriageway road to the south of Llanharan in Rhondda Cynon Taf (RCT). This would form the final eastern section of a bypass. The central section is currently under construction by developers of the Llanilid strategic mixed-use development site, and the western section was completed in 2009 but is not yet open.

The case for change is that there is an Air Quality Management Area (AQMA) in Llanharan due to traffic; and that development of 2,100 dwellings in the area, for which planning permission has been granted, will increase demand on the local transport network. There are aspirations for up to 3,000 more dwellings as well as employment and leisure uses, which, if progressed, would further increase demand.

The Panel agrees that there is a case for change to improve air quality and to minimise traffic issues from the residential development that has planning permission. The Panel has not taken into account a case for change to meet aspirations for a further 3,000 dwellings. The site for this further development would come forward through the Local Plan Review process and require consideration of its sustainability as a location in relation to the policies of Planning Policy Wales 11 and Net Zero Wales. There would be a need to demonstrate how it would avoid being a highly car-dependent site.

The bypass would increase road capacity for private motorised vehicles, and it may therefore increase car use. It would incur loss of ancient woodland and would be likely to lead to a permanent loss of biodiversity and have direct impacts on a registered park and garden.

The Panel does not consider that it has been demonstrated that a bypass is required to improve air quality and accommodate traffic from committed development. Instead, the existing elements of the proposed scheme that improve provision for active travel and public transport could be retained and further developed. In particular, there may be opportunities to improve rail services as part of the current Transport for Wales Metro corridor study; and to develop a package of sustainable transport and demand management measures to encourage modal shift for local trips and reduce the impact of traffic on the A473 through the village. The Panel suggests that a wide-ranging transport planning exercise to consider all options that are in line with the Wales Transport Strategy should be undertaken. This could be taken forward in conjunction with other relevant bodies, including Transport for Wales.

The Panel makes the following recommendation:

Welsh Government should not provide further support to the A473 Llanharan bypass because it would be likely to increase car use. Other interventions to improve active travel and public transport, coupled with demand management, would provide a more sustainable basis for meeting future development aspirations.

There should be a multi-agency approach to developing sustainable travel and demand management interventions in Llanharan to address the existing transport issues.

1. Scheme description

Llanharan is a community within the Ewenny Valley in the County Borough of Rhondda Cynon Taf (RCT), in South Wales. The village has a railway station and the M4 is 3km to the south. The A473 lies in an east-west orientation in the centre of Llanharan.

The preferred scheme, as identified at the end of the WelTAG Stage 2 Report, is as follows:

- A 1.6km single-carriageway road to the south of Llanharan that would form the eastern section of a bypass
- Realignment of a 0.5km section of the A473 to the west of Llanharan at a relatively tight bend known as Cow Corner
- An active travel route along the whole length of the new road
- Increased car parking at Llanharan railway station
- Public transport infrastructure.

At its eastern end, the bypass would connect with the existing A473 at a roundabout. At its western end, it would connect with the central section of the bypass, which is currently under construction by developers and due to be completed when the 801st house is completed. This is estimated to be around 2026 at current development rates. The third, western section of the bypass is already constructed, but not yet opened, and connects with the A473 at a roundabout.

The bypass is included in the RCT Adopted Local Development Plan of 2011 (Policy SS18) and whilst the Plan states that it is essential to improve accessibility for local residents and improve the environment by removing vehicles from congested routes, it also states that the bypass would assist the implementation of the Council's Strategic Site of Llanilid (Policy SS9), which permits a mixed-use development including up to 2,100 dwellings.

The scheme is estimated to cost £20-28 million.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- WelTAG Stage 1 Report: Llanharan (November 2017)
- WelTAG Stage 2 Report: Llanharan (July 2019)
- WelTAG Stage 2 Draft IAR: Llanharan (October 2019)
- WelTAG Stage 2 Traffic Forecasting & Economic Report (October 2019)
- Llanharan Bypass, Environmental Impact Assessment Scoping Report (December 2020)
- Local Transport Fund Application Form 2021/22
- Llanilid: The Vision (Lichfields, March 2021)

Points of clarification were addressed in a meeting with the scheme sponsor.

3. Objectives

The objectives were set out in the WelTAG reporting and ranked in order of importance as follows:

- 1: To improve journey times on the east/west A473 corridor, improve access to the M4, and improve network resilience
- 2: To reduce the number of vehicle journeys on the existing A473
- 3: To improve local development opportunities/economic regeneration (including SSA9), and provide employment and social benefits

- 4: To improve active travel routes and promote for short journeys with the aim of improving the health and well-being of the local community
- 5: To improve environmental conditions for residents, including air quality and noise and to minimise the overall impact on the environment
- 6: To increase the patronage of public transport and to improve public transport reliability
- 7: To improve safety and reduce the number of collisions and KSIs on all east/west routes through Llanharan and neighbouring communities

4. 4 Has the case for change been made?

The case for change is as follows:

- The A473 in the centre of Llanharan has pinch points at which there is congestion during peak periods. The road extends through residential areas, and poor air quality has resulted in the designation of an Air Quality Management Area (AQMA).
- The bypass is seen as an enabler of development. The origin of the bypass was in the early 2000s, when redevelopment of the former Llanilid open-cast site south-west of Llanharan was proposed. The Llanilid site is identified in RCT's Local Development Plan (2011-2021) for a mixed-use development including up to 2,100 dwellings. Construction of housing is under way. There are also aspirations for up to a further 3,000 additional dwellings, leisure and employment uses south of the current Llanilid development.

The traffic issues were analysed in the 2019 Traffic Forecasting Report. It modelled junction delay and traffic flows for 2024 and 2039, assuming development of 2,000 dwellings and underlying traffic growth in line with the Department for Transport National Trip End Model. In the Do-Nothing forecast (without the bypass), two junctions would exceed capacity. At the A473 / Hillside Avenue junction, a relatively cheap traffic signal scheme could resolve capacity issues. This would not be feasible at the A473 / Llanharan Road junction, where demand would exceed capacity in 2039. Traffic flow along the A473 was forecast to increase from 13,500 Annual Average Daily Traffic (AADT) in 2018 to 19,300 AADT in 2039. The Traffic Forecasting Report suggests that the high traffic flow on the A473 through Llanharan and the side road capacity issue mean that the additional 2,000 dwellings exceed the amount of development that can be accommodated without the eastern section of the bypass.

The Panel identifies some uncertainties in relation to the traffic modelling. First, the modelling assumes background traffic growth that does not reflect Welsh Government's aim to reduce car mileage per person by 10% by 2030. It is not clear whether, with policies and schemes consistent with Welsh Government's aim, there would still be a traffic problem in future. Second, the Traffic Forecasting Report acknowledges uncertainty about the final scale and impact of development of 2,000 dwellings.

The Panel considers that there is a case for intervention to improve air quality in Llanharan. There is also a case for intervention to minimise traffic issues from the residential development with planning permission. In the context of current policy, the Panel has not taken into account a case for change to meet aspirations for a further 3,000 dwellings. The site would come forward through the Local Plan Review process and would require consideration of its sustainability as a location in relation to the policies of Planning Policy Wales 11 and Net Zero Wales. If it comes forward, there will be a need to demonstrate how it will avoid being a highly car-dependent site. The Panel notes that it has been suggested in the past that further development of the Llanilid site could require a link road from the bypass to a new junction on the M4, in addition to the current bypass scheme.

5. Are the objectives aligned with current policy?

The WelTAG Stage 2 Report states that the objectives (listed in section 3 above) have been ranked in the order shown. The Panel understands this to mean that they are ranked in order of priority.

The objectives to improve active travel routes, increase public transport patronage, improve air quality and noise conditions for residents, and improve safety are aligned with the Wales Transport Strategy. However, these are considered by the scheme sponsor to be lower priority objectives. The higher priority objective of improving journey times on the A473 is not aligned with current policy or with the Sustainable Transport Hierarchy.

6. Did the scheme development process examine all appropriate options?

The appraisal process initially considered many options, including several to improve sustainable travel, manage demand, or make localised highway modifications:

- Increase train frequencies through Llanharan
- Increase bus services, bus shelters and raised kerbs at two bus stops
- New active travel network to Pencoed (4.3km west of Llanharan) and Talbot Green (4km east of Llanharan) and a 'community route' (active travel route) along the length of the bypass
- Improve public transport infrastructure and introduce integrated ticketing/co-ordinated timetables
- Shuttle buses between Llanharan station Park & Ride and employment sites
- Removal of on-street parking (coupled with identification of off-street parking close by)
- Localised highway improvements where there is congestion on the A473 (railway bridge, High Corner junction, Llanharan Road junction)

The preferred scheme includes some of these options: the 'community route' (active travel route) alongside the bypass; an overspill car park for Llanharan station; and bus stop infrastructure improvements.

Other sustainable transport options from the longlist are not included in the preferred scheme: these are increased train frequencies, increased bus services, longer active travel route linking from Pencoed via Llanharan to Talbot Green; integrated ticketing and coordinated bus / rail timetables; and shuttle buses to connect between future employment sites and the station.

Some options were not considered to be feasible at the time the option longlist was being developed but may now be more feasible. For example, the 2017 WelTAG Stage 1 Report noted that increased train frequencies would have to be initiated by the local rail operator Arriva Trains Wales, and this option was ruled out because it was considered unlikely. Now that Transport for Wales is responsible for rail services there may be more opportunity for improvements: a Transport for Wales Metro corridor study is currently underway and includes Llanharan within the Bridgend to Cardiff corridor. Similarly, there may now be opportunities to increase bus services, or to construct active travel routes, that were not available in 2017.

Demand management and behaviour change options may also be worth revisiting, or considering for the first time, in the context of the case for change. The WelTAG Stage 1 Report acknowledges that much of the traffic has local origins or destinations. The option of removing on-street parking on the A473 (with replacement off-road parking for residents nearby) would enable road space to be reallocated to improve the environment of the village centre. This would

enable safe routes for pedestrians and cyclists between residential areas and Llanharan station. The developers of the new housing are already required to implement a travel plan as residents move in under each phase, and to set targets to reduce car use, and there may be low-cost opportunities for the local authority and the developer to increase the impact of the travel plan. Similarly, work with local schools could reduce the amount of car traffic for short 'school-run' journeys. If some long-distance through-traffic is using the A473, the extension of 20mph limits on the A473 throughout the built-up area may encourage re-routing to the parallel and nearby M4.

7. What is the effect on carbon dioxide emissions?

No quantitative assessment has been undertaken. The scheme would lead to an increase in emissions due to embodied carbon arising from construction.

The WelTAG Stage 2 Report suggests that the improved A473 would have effects beyond Llanharan itself and would attract additional trips to Talbot Green Retail Park to the east, and make shopping destinations in the Bridgend area to the west (such as McArthur Glen Designer Outlet) more accessible from the Talbot Green area. This is inconsistent with the assessment in the appraisal that the scheme would not result in induced traffic. It therefore seems likely that the increase in capacity would enable increased traffic which would increase carbon dioxide emissions.

8. Will the scheme be good for people and communities?

There is an Air Quality Management Plan in place for a section of the A473 through Llanharan (Bridgend Road) due to its designation as an AQMA. The bypass would improve air quality and reduce noise within Llanharan and could offer safety benefits. The scheme is unlikely to make it easier for people who do not have access to a car (including people on low incomes) to access local services, employment and leisure opportunities.

9. Will the scheme be good for the environment?

The proposed bypass does not affect sites with a national or international designation for their environmental value. It would cut through Dolau Slopes Site of Importance for Nature Conservation (SINC), having a direct impact, and is within 150 metres of Cynllan Woods SINC, with potential for indirect impact. Cynllan Woods SINC has a network of small ancient woodland sites and linking hedgerows that support a dormouse colony. The Environmental Impact Assessment Scoping Report identifies potential for adverse impact on bat habitat, dormouse habitat and connectivity, great crested newts, otters and water voles. The WelTAG Stage 2 Report assesses the effect of the scheme on biodiversity as moderate adverse.

The scheme does not affect any nationally designated landscapes but is within a Special Landscape Area. The WelTAG Stage 2 Report assesses the landscape impact as moderate adverse.

10. Will the scheme be good for places and the economy?

The Local Development Plan identifies the Llanilid area as a Strategic Opportunity Corridor (the 'Llanilid on the M4 Driving Regional Investment Strategic Opportunity Corridor', SOC). It considers that the full 715-hectare site between the A473 and the M4 offers an opportunity for major growth in the regional economy, with the potential for thousands of jobs. In 2017, the local authority identified that a new M4 junction was the key element to unlock the commercial potential of the whole site, and that completion of the A473 Llanharan Bypass would also be required. The strategy document for the SOC states that with 1,850 houses, a new primary school, village centre,

and film studios already consented, the remainder of the site is “a blank canvas for extensive development of a scale unseen in the region, bringing major economic growth, significant jobs and housing.”

Thus, it is possible that the bypass could be one part of a larger strategy that would result in significant development. The Traffic Forecasting and Economics Report suggests that the A473 Llanharan Bypass would not on its own be sufficient to achieve development beyond 2,000 houses, and that additional infrastructure would be required, such as a link from the Llanharan Bypass to a new junction with the M4.

In the view of the Panel, the shift in policy since 2017 requires a rethink of the economic potential of the SOC, focussed on development around public transport hubs rather than development close to the M4 (which risks increasing congestion at this location and elsewhere on the M4).

The Benefit to Cost Ratio is 3.7, which indicates high value for money. The majority (90%) of the benefits are attributed to journey time savings arising from the bypass.

11. Will the scheme be good for culture and the Welsh language?

The scheme would not make it easier for people to access culture and leisure opportunities by sustainable modes of transport.

There would be a direct effect on the designated historic landscape of Llanharan House and Grounds (a registered Park & Garden) as the scheme includes land-take for the eastern roundabout junction with the A473. Grade II* Llanharan House is 160 metres to the north-east of the scheme and eight Listed Buildings related to the Llanharan House complex are within 250 metres of the scheme. The scheme would be likely to have indirect effects on these buildings, or to affect their setting.

The scheme is unlikely to have significant impacts on the Welsh language.

12. How robust is the case for the scheme to different futures?

The value for money of the scheme would be lower in a scenario with less travel by private motor vehicle.

13. Conclusion

The Llanharan Bypass would increase road capacity for private motorised vehicles, and it may therefore increase car use. It would lead to loss of ancient woodland and a permanent loss of biodiversity, as well as impacts on cultural heritage.

The scheme is not required to facilitate existing development commitments. There are opportunities to reduce the impact of traffic through Llanharan through sustainable travel improvements given the proximity of the train station, plus options for bus routes, improving the cycle network and demand management. Although some consideration has been given to sustainable transport options, these should be prioritised to address current problems and future growth, along with options for demand management. The Panel suggests that a wide-ranging transport planning exercise to consider all options that are in line with the Wales Transport Strategy should be undertaken, and an integrated package of sustainable transport and demand management measures developed as a result of that. Measures to encourage modal shift in the area could be developed in conjunction with the Transport for Wales Metro corridor study.



SUMMARY

Severn Tunnel Junction (STJ) Station is located south of Rogiet on the South Wales Main Line (SWML) and the Gloucester – Newport Line (GNL) east of Newport. The station is accessed through Rogiet by Station Road, a narrow unclassified road unsuitable as a bus route that connects to the B4245 north of Rogiet. There is no direct bus service to the station at present, and active travel access to the station is poor.

The South East Wales Transport Commission (SEWTC), chaired by Lord Burns, recommended at the end of 2020 that STJ Station access should be improved. A 2021 study carried out for Welsh Government by the Transport for Wales 'Burns Delivery Unit' considered options for access improvement. Two road options were taken to public consultation in early 2022 as follows: Option 1 comprising a link road between the station and the B4245 east of Rogiet and enhancements to Station Road; and Option 2 comprising a longer link road connecting the station to both the B4245 and, further to the north, the M48 with two junction options, one allowing access only from the east, and the other providing for access from both the east and the west. The consultation also presented a station and interchange layout north of the railway, with a car park reached from the proposed access road (Option 3).

The Panel has considered the potential carbon and environmental adverse effects of providing a new road to the station, with the benefits of enabling interchange between bus and train services at the station and encouraging modal shift from car to bus / rail. The more significant option, with a proposed junction on the M48, would likely lead to increased private car traffic with associated carbon and environmental effects. Whilst the public consultation indicates there is greater support for this option, the Panel considers this more significant scheme has not been justified.

Given that buses cannot currently access the station, there is justification to provide a link road to the station from the B4245, and the scheme would support a shift to sustainable modes of travel. The scheme would have embodied carbon emissions associated with construction, and these should be minimised. It would not increase capacity or vehicle speeds, and so would not increase carbon emissions in use. The scheme would affect, and be affected by, flooding and further assessment of flooding and landscape considerations would need to be undertaken.

The Panel makes the following recommendation:

Welsh Government could continue to support this scheme as it has potential to support modal shift to public transport. The scheme must be carefully designed to prioritise active travel and bus access and not increase private car mileage. Option 2, with the link road extending to the M48, should not be considered further due to its potential to induce private car traffic and its substantial embodied carbon in construction.

1. Scheme description

Severn Tunnel Junction (STJ) Station is located south of Rogiet on the South Wales Main Line (SWML) and the Gloucester – Newport Line (GNL) approximately 10 miles east of Newport. It is used by approximately 230,000 passengers a year, and services go to Newport and Cardiff to the west and Bristol, London and South-West England to the east. Immediately east of STJ Station, the SWML and GNL diverge, therefore STJ is the most easterly interchange point between the two lines.

Caldicot lies to the east of Rogiet, and Undy and Magor to the west. The B4245 lies in an east-west direction north of Rogiet and south of the M48. The M4 lies south of the railway line.

A range of options was developed and shortlisted for appraisal in a WelTAG Stage 1 Report, and the following road access options were presented at a public consultation held in February and March 2022:

- Option 1 (Option 2b in the WelTAG Stage 1 Report) - B4245 link to STJ with enhancements to Station Road
- Option 2a and 2b (3b/3a in the WelTAG Stage 1 Report) - M48 connection and new junction (with Option 2a (and 3b) having east-facing slip roads only, and Option 2b (and 3a) having an all movements junction).

The road element of Option 1 is estimated to cost £15 million at 2020 prices. The road elements of Option 2 are estimated to cost £52 million (but it is unclear which junction option with the M48 this refers to). The public consultation also presented a station and interchange layout north of the railway, with a car park reached from the new access road (Option 3). The interchange layout includes a new car park (as existing car parking would be removed in order to construct the access road); a bus layby and bus turning facility; cycle parking and pedestrian facilities. The estimate for this car park and interchange facility is £16 million at 2020 prices.

The Panel notes that Monmouthshire County Council is also progressing proposals for a car park to the south of the station. That measure is outside of this review but given some consideration due to the interaction with the measures in review.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- Draft WelTAG Stage 1 Report: Severn Tunnel Junction Access (October 2021)
- Draft WelTAG Stage 1 IAR (April 2022)
- Draft WelTAG Stage 2 Report: Severn Tunnel Junction Access
- Meeting presentation slides (December 2021)
- Improving access to Severn Tunnel Junction Station – Information for public consultation (01 February to 11 March 2022)
- Severn Tunnel Junction Station access consultation document (February 2022)

Points of clarification were addressed in a meeting with the scheme sponsor.

3. Objectives

The draft WelTAG Stage 1 Report states the vision as being 'to provide efficient, reliable and inclusive transport access to STJ Station that prioritises the use of bus and active travel' and outlines three objectives:

- Make STJ Station more accessible for all people, in line with the Wales Transport Strategy Sustainable Transport Hierarchy.
- Increase public transport trips by delivering new bus services to STJ Station.
- Provide an accessible, sustainable and efficient transport access to the STJ Station to support regional connectivity and productivity.

4. Has the case for change been made?

STJ Station has been identified by South East Wales Transport Commission (SEWTC) as a location to become a multi-modal hub, allowing users transferring to rail services easy access by foot, cycle, bus or car. The scheme has been developed based on two SEWTC recommendations, firstly, that 'road access to the station is upgraded to allow bus access'. This is because it would result in 'far better accessibility to this strategically significant station'. Secondly, it also recommends 'Welsh Government should support Monmouthshire Council in developing and constructing a new, direct access junction from the M48 to the station' and notes that 'it should have bus priority and be designed to attract trips to the station rather than new motorway journeys'.

The station is currently accessed by motorised vehicles, walkers and cyclists via Station Road / Seaview Terrace, an unclassified road through Rogiet linking STJ Station to the B4245. This access route is constrained by its narrow width, exacerbated by on-street parking and its proximity to the primary school. It is unsuitable as a bus route and currently no buses serve the station, with the nearest bus stops being on the B4245 immediately to the east of its junction with Station Road, 800 metres north of the station. There is a lack of accessible and safe walking and cycling routes or cycle facilities. This scheme considers options to address these access issues in response to a recommendation made by the SEWTC to upgrade the road access to STJ Station to improve bus access.

The SEWTC report recognises the need for care in planning routes to stations and states that 'where [car] parking is provided, it should be accessible by roads that do not materially impact the communities living close to the stations'. Data from the WelTAG Stage 2 Report indicates that 95,000 (38%) of trips to STJ Station in 2019 were by walking and cycling with 100,000 (40%) using park and ride. The majority of the remainder were dropped off by car, with just 0.5% arriving by bus. Eighty percent of those using STJ park and ride live within 5km of the station and 90% of demand is generated here (as the origin of trips).

The Panel agrees there is a case for change to improve access to STJ Station as a rail-based hub, thereby supporting modal shift. The station is not currently served by bus, and the active travel provision is poor. The local road network is constrained, making access by bus difficult. The scheme has potential to enable modal shift for longer trips from car to bus / rail.

5. Are the objectives aligned with current policy?

The vision and objectives are well-aligned with current policy as set out in Wales Transport Strategy, Net Zero Wales and Future Wales. Option 1 (B4245 link to STJ Station with enhancements to Station Road) would be the most effective in achieving the objectives. Options 2a and 2b (M48 connection and new junction with either east-facing slip road or an all-movements junction) could more significantly increase private car movements, and therefore undermine more recently defined policy objectives.

6. Did the scheme development process examine all appropriate options?

The WelTAG Stage 1 appraisal considered a range of options to improve active travel and bus access to STJ Station. The study initially considered eight road options with 34 permutations, and 10 bus options with 16 permutations. As the objective of the scheme is to improve access to the station, options such as demand management and speed management measures were not relevant.

An initial sift of the options created a longlist of nine road options and seven bus options. These were then shortlisted to four road options (Options 2, 3, 6 and 8) and three bus options (Options B1 and B3, combined as one service, and Option B8). Only two of the Options (2 and 3, but re-labelled as Options 1 and 2) were taken to public consultation in 2022. The bus options are being considered by the Burns Delivery Unit. The longlist of options is as follows, and the four road and three bus options shortlisted are in bold:

Road options

- 1 Bus priority on B4245 between Chepstow and Magor
- 2 B4245 to STJ Station link road for use by all vehicles (2a B4245 link, 2b B4245 link and improvements to Station Road, and this was labelled as Option 1 for Public Consultation)**
- 3 M48 to STJ Station link road with B4245 connection for use by all vehicles (3a incorporates an all-movements junction at the M48, 3b incorporates east-facing slips only, and this was labelled as Option 2 for Public Consultation)**
- 4 Enhancements to Dewstow Road between A48 and M48
- 5a M4 to STJ Station bus only link road (south of the station)
- 5b M4 to STJ Station link road for use by all vehicles (north of station)
- 6 M48 to STJ Station link road for use by all vehicles with a connection to B4245 and an extension to connect STJ Station with the M4, but without it being possible to travel between the M48 and the M4 on the link road**
- 7 M48 to M4 link road for use by all vehicles with connection to the B4245 and STJ Station
- 8 B4245 to STJ Station link road and M4 to STJ Station link road for all vehicles but with no through link to connect the M48 and the M4**

Bus options

- B1b Bus link B4245 to serve Chepstow, Llanwern, Caerwent – existing services diverted to STJ Station**
- B1c Bus link B4245 to serve Chepstow, Llanwern, Caerwent – enhanced services, diverted to STJ Station**
- B3b East side of Newport – Llanwern /Magor to STJ Station**
- B5 Bus link from STJ Station to employment areas off the M49 to the south of STJ Station
- B8 Demand Responsive Transport service from local areas and hinterland**
- B9 Bus link to Park and ride site on the A4 at Bristol
- B10b Express coach service

The shortlisted options all include a separated walking and cycling path alongside the access road to enable active travel journeys to the station. Options for improvements to the wider

active travel network linking STJ Station with local communities and improvements to facilities at STJ Station itself were not included in the WelTAG appraisals, and they are being developed separately by Monmouthshire County Council and the Burns Delivery Unit.

The two link road options taken to public consultation could induce private car use, which has the potential to run counter to latest policy requirements to reduce car mileage. Such induced car mileage would only be justified if increased use of cars to access trains at the station resulted in less overall mileage driven. A net reduction in car mileage would result if longer distance travel was intercepted and diverted to rail for part of the journey, and at the same time there was no increase in car trip-making over longer distances to access STJ Station.

Whilst the intention of Option 2 is to improve bus access to STJ Station, there is no bus priority on the proposed road linking STJ and the M48, and private vehicle capacity would be increased. The proposal is therefore not aligned with the SEWTC recommendation that the link road should have bus priority, and, without further restrictions within the design, the proposals would be likely to make it easier to access the M48 for private vehicles, hence potentially inducing traffic.

As Option 1 links STJ Station only to the B4245, and not to the M48, the potential for inducing traffic is less than for Option 2. Any induced traffic may be offset by car mileage saved through a shift to rail for part of the journey. However, the net change in car mileage for Option 1 should be estimated through modelling to inform decision making at subsequent WelTAG stages.

The access road would pass through land between Rogiet to the west and Caldicot to the east designated as green wedge in Monmouthshire County Council's adopted Local Development Plan 2011-2021, and currently a candidate site for housing development. If development is approved, there would be opportunity for it to be public transport oriented due to the proximity to STJ Station, and this can happen regardless of whether the link road is constructed.

The WelTAG Stage 2 Report recognises that the effectiveness of the scheme in terms of modal shift will require other interventions to improve sustainable travel including delivery of bus services and improvements to the wider active travel network linking STJ Station with local communities. The proposed enhancements to facilities at STJ Station itself, including active travel facilities, parking provision and increased rail services, are also under development and form part of the Do-Minimum scenario. These enhancements are a necessary part of realising the scheme benefits. Further proposals are also being developed by Monmouthshire County Council for improvements to local active travel routes connecting to the wider network, and a car park south of the station accessed via Station Road/Seaview Terrace and the existing bridge over the railway. Taking into account the loss of car parking to the north, if these proposals are implemented there would be a net increase in car parking spaces of 122.

In summary, the Panel considers that an appropriate range of options to improve public transport and active travel access to the station has been identified, and one of the shortlisted options, the Option 1 that was taken to public consultation, is consistent with current policy. The option should be subject to further modelling in relation to net change in car mileage.

7. What is the effect on carbon dioxide emissions?

No quantitative assessment has been undertaken of carbon dioxide emissions. However, it seems likely that the main (negative) carbon dioxide impact of Option 1 will arise from construction rather than from induced traffic or changes in vehicle speeds. It is likely that Option 2 involving connecting the new access road to the M48 would result in significant increase in emissions, both from construction and induced traffic attracted either to use the station or to use just the new junction and link road.

8. Will the scheme be good for people and communities?

The scheme offers some safety benefits, especially for pedestrians and cyclists, by providing new access routes to STJ Station. Improving active travel and bus access could reduce the number of rail passengers who would otherwise arrive by car, bringing noise, air quality and severance benefits. The scheme would also make it easier for people who do not have access to a car (including people on low incomes) to access by rail both local and more distant services, employment, and leisure opportunities.

9. Will the scheme be good for the environment?

The scheme is in a flood zone and there is potential for it to be adversely affected by flooding as well as exacerbate flooding. Flood modelling and assessment would need to be undertaken as part of any further design and appraisal in order to ensure any negative impacts are minimised. The scheme is likely to have a negative effect in relation to some landscape considerations, as it passes through an area designated by Monmouthshire County Council as 'green wedge'. It does not affect any locations with a national landscape designation.

The Panel notes no statutory sites protected for biodiversity would be affected by the scheme.

10. Will the scheme be good for places and the economy?

The scheme could potentially have an economic benefit over a wide area as part of the 'network of alternatives' recommended by SEWTC, by helping to reduce traffic congestion and improve reliability on the M4. The scale of success of this would likely be linked to implementation of the increased rail service frequencies recommended by SEWTC as well as good bus services to STJ Station to maximise the 'reach' of the railway across a large area.

The value for money of the whole investment, of which the two road options are a part, has been estimated using two scenarios or 'cases'. The 'Foundation Case' is akin to the Department for Transport Central Case; the 'Policy On' scenario assumes that mode shares are aligned with the aspirations in the Wales Transport Strategy. The Benefit to Cost Ratios (BCRs) for the Foundation Case for Options 1 and 2a (east-facing slips) and 2b (all movements junction) are 0.6, 2.1 and 1.7. For the Policy On scenario the ratios are 1.4, 2.8 and 1.7. In the Policy On scenario these BCRs represent low, high and medium value for money respectively.

11. Will the scheme be good for culture and the Welsh language?

The scheme would provide sustainable travel options to cultural and sporting events such as in Cardiff and Newport. The scheme would be unlikely to affect the Welsh language.

12. How robust is the case for the scheme to different futures?

The scheme is in an area that is vulnerable to flooding from both the sea and surface water, with (rejected) options connecting with the M4 south of the railway having the greatest flood risk. Flood risk is a constraint which requires further investigation and assessment and will need to be considered in the design and appraisal of the access road and all STJ Station infrastructure and facilities.

The scheme benefits are unlikely to significantly worsen under a scenario in which travel by private motor vehicle was lower, as the scheme is to improve sustainable travel. However, high levels of working from home may potentially impact on the business case resulting from fewer trips by train. Consideration should also be given to whether the business case is robust in the

scenario that rail service frequencies are not improved as expected, or as soon as expected. These matters should be considered before a final decision is made.

13. Conclusion

There is a case for change to improve access to Severn Tunnel Junction (STJ) Station as a rail-based hub, thereby supporting modal shift. The station is not currently served by bus, and the active travel provision is poor. The local road network is constrained, making access by bus difficult.

An appropriate range of options to improve public transport and active travel access to the station has been considered. There are two scheme options under consideration for progression. Option 1 comprises a link road between STJ Station and the B4245 east of Rogiet and enhancements to Station Road; and Option 2 comprises a longer link road connecting the station to both the B4245 and, further to the north, the M48 with two junction options, one allowing access only from the east, and the other providing for access from both the east and the west.

In conjunction with improvements to public transport services and the active travel network, the Option 1 link road from the station to the B4245 would encourage modal shift for the majority of trips to the station, which are local in nature. Option 1 hence aligns with current Welsh Government policy. Any induced traffic may be offset by car mileage saved through a shift to rail for part of the journey. However, the net change in car mileage for Option 1 should be estimated through modelling to inform decision making at subsequent WelTAG stages. Option 1 would have embodied carbon emissions associated with construction, and these should be minimised. It would not increase capacity or vehicle speeds, and so would not increase carbon emissions in use. The scheme would affect, and be affected by, flooding and there would need to be further assessment of flooding and landscape considerations.

In Option 2, there is no bus priority on the proposed road linking STJ Station and the M48, and private vehicle capacity would be increased. Option 2 may increase car trip-making over longer distances to access STJ Station and this therefore could induce private car use, which would run counter to policy to reduce car mileage. The junction of the link road with the M48 would create significant carbon dioxide emissions from construction.



SUMMARY

This scheme would involve construction of a link road or gyratory system in Abergele town centre. Some footways would be widened and some cycleways provided. Three options have been shortlisted.

Conwy County Borough Council is promoting the scheme with the aim of reducing road congestion and improving safety and active travel provision. A further motivation is that there are plans for significant development south-east of the town centre, including residential, retail and employment uses and relocation of two schools, and this would increase traffic congestion in the town centre.

The Panel considers there is a case for a scheme in Abergele town centre. However, the three shortlisted options would all increase private motor vehicle capacity. This does not align with current Welsh Government policy, and may result in induced traffic, especially with the likely additional traffic from the developments to the south-east of Abergele.

The small size of the town (about 2km across) means that there is potential for many trips within the town to be made by foot or cycle. If this potential were realised, it could reduce motorised traffic in the town centre. The Panel advises that further consideration should be given to a scheme that aims to reduce traffic in the town centre through demand management; manage the impact of the remaining traffic; design new residential, retail and employment development to minimise car use and support active travel and public transport; and design a complete active travel network across the whole town to make it easy and attractive for new and existing residents to travel by foot or by bike. This approach could reduce town centre congestion without requiring construction of a link road or gyratory system.

The Panel makes the following recommendation:

The Abergele Town Centre Congestion Improvements scheme should not proceed in its current form. However, Welsh Government could continue to support development of a scheme for Abergele town centre, if justified against other transport priorities, with a focus on enhancing active travel provision for the whole town in line with the Sustainable Transport Hierarchy, and managing private car demand.

1. Scheme description

The scheme is at draft WelTAG Stage 2 and a shortlist of options has been identified to address congestion, safety and lack of active travel provision in Abergele town centre.

The main east-west shopping street in Abergele, Market Street (A547) has two signal-controlled junctions 95 metres apart. The eastern junction is with Water Street (A548), which lies north of Market Street; and the western junction is with Chapel Street (A548), which lies south of Market Street. The A547 has two-way traffic flows of approximately 2,700 vehicles per day. While this flow

is not that high, the timings of the two signal-controlled junctions have to operate in a way that avoids traffic being trapped in the link between the two junctions, which can create queues on the entry arms to this double junction.

The three shortlisted options are:

- Option 6: A one-way gyratory road layout in the town centre created by a new loop to the south side of the existing main shopping street (A547, Market Street) and new bridge structure crossing the Afon Gele watercourse (£8.6 million);
- Option 7: A new link road connecting the A548 Water Street north of Market Street with the junction of Chapel Street and Market Street to create one single main junction on Market Street (£5.5 million);
- Option 15: A new section of link road connecting Water Street from a point 220 metres north of the Market Street Junction with the A547 at a point 120 metres further east. The new junction is proposed to be a roundabout (£9.3 million).

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- Abergele Town Centre Proposals (2016)
- Abergele Place Making Plan Town Centre Study (2016)
- Abergele community event panels (2016/17)
- Abergele Town Centre Study (2016)
- Abergele Traffic Signals Options Assessment Report (October 2018)
- Abergele Town Centre Place Plan (2019)
- Abergele Place Plan Framework (2019)
- Replacement Local Development Plan preferred strategy (July 2019)
- Abergele Southeast Quadrant Study (April 2020)
- Local Transport Fund Application Form 2021/22
- WelTAG Stage 2 Report: Abergele Town Centre Study Outline Business Case (June 2021)
- Conwy Local Development Plan 2007-2022
- Conwy Local Development Plan SPG LDP28: Abergele South East Development Brief
- Abergele Active Travel Network Map

Points of clarification were addressed in a meeting with the scheme sponsor, Conwy County Borough Council, and a meeting was held with Transport for Wales North Wales Metro Programme team to discuss their bus and rail studies for the region. A site visit also took place.

3. Objectives

The objectives are:

- Improve safety for all users at key junctions
- Improve accessibility for pedestrians and cyclists in the town centre
- Reduce congestion, improve operational capacity of the junctions and improve journey times during peaks to allow for future growth and development

4. Has the case for change been made?

There is a case for change in Abergele town centre, to reduce the negative impacts of traffic congestion and improve safety and provision for pedestrians and cyclists.

Congestion in the town centre was highlighted by the local community as a major concern in the development of the Place Plan for Abergele. Several bus routes serve the town centre as part of the cross-country bus network, and these may be delayed by the congestion in the town centre, although the Panel has not been able to establish whether this is a 'hotspot' for bus congestion relative to other locations in the region. A547 Market Street is a strategic diversion route for the A55, and the area is known to be impacted by seasonal tourist traffic. Proposed developments to the south-east of the town centre could exacerbate these congestion issues.

The town centre has a cluster of collisions along A547 Market Street/Bridge Street, with a total of 19 collisions over a four-year period between 2015-2019. This included a fatal collision between a heavy goods vehicle and pedestrian at the signal-controlled junction of Water Street and Bridge Street.

Within the town centre itself, there is currently no cycling provision, though there is an on-road cycle route which connects the town with National Cycle Network route 5 along the coast. The Abergele Place Plan has identified the need to develop active travel infrastructure around the town centre, and the offset traffic signal-control junction in the town centre has been identified by Conwy County Borough Council as a barrier to developing active travel provision. The Active Travel Integrated Network Map identifies several proposed routes, and the local authority envisages that the proposals for the town centre will aid in the delivery of these routes.

Although the Panel recognises the case for change, it does not accept the logic that changes to the offset traffic signal-control junction are a necessary pre-condition in order to improve active travel infrastructure.

5. Are the objectives aligned with current policy?

The objectives of improving safety and improving accessibility for pedestrians and cyclists are aligned with current policy. However, the shortlisted options are unlikely to achieve these objectives. The appraisal suggests that safety will improve at some locations but that it may worsen at others. The scheme represents a marginal improvement for active travel, but the new active travel infrastructure is minimal in comparison to the improvements for private motor vehicle users, and it is likely to have little effect on mode share.

The objective of reducing congestion and improving operational capacity is not aligned with current policy. It is focussed on increasing capacity for private motor vehicle users, rather than for sustainable modes. Welsh Government's 'Future Wales National Plan 2040', Policy 6 (Town Centre First) states that 'new commercial, retail, education, health, leisure and public service facilities must be located within town and city centres'. Although the remit of this review does not extend to the development to the south-east of the town, the Panel notes that the development could increase car use, exacerbate congestion in the town centre, and also reduce the economic viability of town centre businesses and the pleasantness of the town centre environment. Recent residential development south-east of the town centre is low density and likely to be highly car-dependent.

6. Did the scheme development process examine all appropriate options?

The Abergele Traffic Signals Report identified 22 longlist options. There was no consideration of non-transport options at this stage, but some non-transport options might have been relevant. In particular, the location of proposed development is a relevant consideration, to avoid generating traffic and causing congestion in the town centre.

None of the longlisted options were primarily focussed on active travel. The appraisal suggested that four options offered moderate improvements for cyclists and pedestrians, and 13 offered minor improvements. At WelTAG Stage 2, active travel infrastructure improvements are included in all three shortlisted options, but the Panel considers that they are adjuncts to the main focus on providing for motor traffic.

The Panel considers that more work is needed to identify options that will encourage modal shift to sustainable travel modes, in line with the Sustainable Transport Hierarchy. Further work should:

- Develop options that are primarily focussed on improving provision for active travel and public transport to encourage significant modal shift (rather than options that are primarily focussed on increasing capacity for private motor vehicles);
- Consider transport interventions and high street enhancements that create a vibrant town centre for all to enjoy. Measures should seek to mitigate potential negative impacts on town centre trade from the south-east development, in line with Welsh Government planning policy in Future Wales;
- Give more consideration to non-transport solutions that reduce overall travel;
- Ensure that new analysis uses recent data, including safety data and data on the impacts of the Covid-19 pandemic on patterns of activity and travel; and
- Consider how future traffic flows will be impacted by changes in Welsh Government policies to reduce car use and support remote working, and trends in travel behaviour following the Covid-19 pandemic.

7. What is the effect on carbon dioxide emissions?

No assessment of embodied carbon emissions from construction is given in the documents reviewed by the Panel.

The WelTAG Stage 2 Report suggests that there would be savings in carbon dioxide emissions in use. This has been calculated using the TUBA (Transport User Benefit Appraisal) software package. Results are reported as monetised values, but not as tonnes of carbon dioxide saved. No details are given of the model input assumptions, and assumptions with regard to induced traffic are not set out. If the scheme results in induced traffic, and this is not fully accounted for in the modelling, the carbon savings from more efficient vehicle flow may be overstated.

8. Will the scheme be good for people and communities?

The scheme may offer some safety benefits, especially for pedestrians and cyclists, or it may lead to no improvement in safety, depending on the option that is chosen. The town centre is not an Air Quality Management Area, but there may be an improvement in air quality if congestion is reduced. The scheme does not provide more equal access to employment and services for people who suffer social exclusion.

Option 6 (the one-way gyratory system) would have a large adverse impact on severance due to changes to traffic flow and higher speeds. The gyratory would encircle some properties, and

convert a cul-de-sac into a through road. There would be loss of some residential and commercial property.

9. Will the scheme be good for the environment?

The scheme is at an early stage, and so environmental impacts have not yet been fully assessed. The WelTAG Stage 2 qualitative appraisal assumes a slight to moderate adverse impact on biodiversity across the three options as a result of habitat loss and land take. In Option 6 there may be adverse impacts from a new bridge over Afon Gele. There are no impacts on sites that are designated for their environmental value, or on ancient woodland. The scheme does not affect any designated landscapes.

10. Will the scheme be good for places and the economy?

The scheme has the potential to have a positive impact on local place-making. It seeks to address some of the issues raised in the Abergele Placemaking Plan, and would support the development of land at the south-east edge of the town for retail, employment and education uses. However, there is also a risk of negative impacts to the town centre and its economy, due to the loss of commercial properties through demolition, loss of parking near the town centre, and the loss of footfall from the town centre to the retail development to the south-east.

The proposals would increase the resilience of the A547 and would improve reliability for freight delivery vehicles during the morning peak. The shortlist options have a Benefit to Cost Ratio of between 1.8 and 2.5, representing medium to high value for money.

11. Will the scheme be good for culture and the Welsh language?

The scheme would have no significant impacts (positive or negative) on use of the Welsh language. One of the shortlist options (Option 15) may affect a Scheduled Ancient Monument to the north of the town centre.

12. How robust is the case for the scheme to different futures?

The cost-benefit analysis assumes traffic will grow by 16% in the morning peak. This includes the effect on traffic of the development south-east of the town, as well as background traffic growth.

In a future in which there is less traffic growth than forecast, either as a result of wider Welsh Government policies, or as a result of unanticipated factors affecting planned development, the value for money of the scheme would be less than predicted.

There is also a possible future in which the development south-east of the town causes an increase in traffic that is larger than can be accommodated by the increase in road capacity in the town centre. In this scenario, congestion in the town centre could increase. Shifting the emphasis of the scheme to focus on sustainable modes (which are more efficient in their use of road space) would mitigate this risk.

13. Conclusion

There is a case for a scheme in Abergele town centre to reduce traffic and improve safety and provision for pedestrians and cyclists. However, the three shortlisted options may not achieve the desired aims. This is because the increase in private motor vehicle capacity may lead to induced traffic, including additional traffic from the proposed development south-east of the town.

The small size of the town (about 2km across) means that there is potential for many trips within the town to be made by foot or cycle. If this potential were realised, it could reduce motorised

traffic in the town centre. The Panel advises that further consideration should be given to a scheme that aims to reduce traffic in the town centre through demand management; manage the impact of the remaining traffic; design new residential, retail and employment development to minimise car use and support active travel and public transport; and design a complete active travel network across the whole town to make it easy and attractive for new and existing residents to travel by foot or by bike. This approach could reduce town centre congestion without requiring construction of a link road or gyratory system.



SUMMARY

The scheme is focused on A470 Conway Road and Links Roundabout in Llandudno. The A470 Conway Road is the main road into the town centre from the south; Links Roundabout on Conway Road is about 700 metres from the junction of Conway Road and Llandudno's main shopping street, Mostyn Street.

The scheme would modify the layout of Links Roundabout and provide an active travel route along Conway Road between the roundabout and the town centre. The specifics and scale of the scheme have not yet been determined. The scheme sponsor, Conwy County Borough Council, intends to undertake a feasibility study and develop an outline design prior to a WelTAG Stage 2 appraisal.

The scheme would be the final part of a programme of measures initiated in 2014 that aims to reduce vehicle congestion and delays (including delays to public transport) in Llandudno. Reflecting more recent policy priorities, it would also aim to encourage modal shift for travel to Llandudno town centre and the railway station, which is to the west of the town centre.

The Panel considers that the active travel route would make a positive contribution to current policy aims, helping to achieve modal shift to sustainable transport. Regarding Links Roundabout, the Panel advises that the feasibility study should seek to reduce the number of vehicles using the roundabout at peak times, rather than seeking to maximise throughput of private motor vehicles. This would imply the following:

- Full incorporation of Active Travel Act Guidance into the design for cyclists and pedestrians at the roundabout, so that the roundabout is visibly an 'active travel gateway' into the town.
- Prioritising the efficient movement of buses through the junction, rather than general traffic.
- Reallocating road space on the approaches to the roundabout to match the capacity at the roundabout, so that the roundabout ceases to be a constraint in the network; with the potential for accompanying public realm enhancements.
- Considering how Welsh Government's planned implementation of 20mph speed limits in urban areas will help regulate speeds on the approaches to the roundabout.
- Exploring a package of measures to reduce car travel demand over a larger area, for example parking management and charges; a business travel planning partnership involving workplaces, tourism organisations and retailers; and reduced bus fares at peak times.

Such an approach would not increase road capacity for private motor vehicles or result in an increase in carbon emissions due to higher speeds. The location of the scheme is such that it would not affect ecologically valuable sites. The scheme design should seek to minimise carbon emissions from construction.

The Panel makes the following recommendation:

Welsh Government could continue to support the Llandudno Congestion Improvements scheme, subject to further development in line with the Sustainable Transport Hierarchy and consideration of the Panel's advice on the preferred approach at Links Roundabout.

1. Scheme description

The scheme is focused on A470 Conway Road and Links Roundabout in Llandudno. The A470 Conway Road is the main road into the town centre from the south; it connects to Mostyn Street (the main shopping street), two retail parks, a theatre, swimming pool, courts, and other services. Links Roundabout on Conway Road is the southern gateway to the town, about 700 metres from the point where Conway Road joins Mostyn Street.

The scheme would provide an active travel route along Conway Road and modify the layout of Links Roundabout.

The scheme sponsor, Conwy CBC, intends to undertake a feasibility study and develop an outline design prior to a WelTAG Stage 2 appraisal, and is seeking funding from Welsh Government's Local Transport Fund.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- Llandudno Town Centre Study with Plans (March 2014)
- Appendix 1 Transport and Highways Report: Llandudno Congestion Improvements (March 2014)
- Appendix 2 Transport and Highways Report: Addendum: Llandudno Congestion Improvements (June 2015)
- Local Transport Fund Application Form 2021/22 Llandudno Congestion Improvements Phase 4 Feasibility
- Active Travel Network Development Report (May 2021)

Points of clarification were addressed in a meeting with the scheme sponsor. A site visit also took place.

3. Objectives

The objectives are:

- Reduce congestion at Links Roundabout
- Improve public transport journey time reliability
- Improve active travel infrastructure to encourage active and sustainable journeys
- Increase the number of active travel journeys to Llandudno Station
- Improve access to key services
- Support the local economy through improved accessibility through all travel modes

4. Has the case for change been made?

The rationale is two-fold. Firstly, there is a need to develop a network of active travel routes in Llandudno to encourage modal shift, both for short journeys and as part of longer journeys that could be made by foot or cycle combined with train.

Secondly, the scheme seeks to address congestion issues at Links Roundabout by providing a more operationally efficient junction layout. From the evidence provided in the town centre traffic study, the congestion issues at the roundabout are more likely to occur on a Saturday, and while the roundabout is within theoretical capacity, it is suggested by the scheme sponsor that this does not accord with observations. Further analysis and design development would be required in the proposed feasibility study to resolve any perceived congestion issues at Links Roundabout in a way that is in line with current policy.

The Panel concludes that the case for change has been partially demonstrated.

5. Are the objectives aligned with current policy?

The objectives of improving public transport reliability; encouraging active and sustainable journeys; improving access to services; and supporting the local economy through improved accessibility for all travel modes are well-aligned with current policy as set out in the Wales Transport Strategy, Net Zero Wales, and Future Wales. The key element of the scheme (active travel improvement) will make a positive contribution to achieving current policy aims.

In relation to the objective of reducing congestion at Links Roundabout, the Panel recommends that the focus should be on improvements for active travel and bus users, in line with current policy and the Sustainable Transport Hierarchy. Given the early stage of the scheme there are opportunities to be innovative with the roundabout design.

6. Did the scheme development process examine all appropriate options?

The scheme stems from a programme of measures initiated in 2014 to reduce vehicle congestion and delays (including delays to public transport) in Llandudno. The options considered in the Llandudno Town Centre Study in 2014 were small in scale and included changes to carriageway markings and destination signs to improve lane discipline and operational efficiency of Links Roundabout. These measures have already been implemented. However, congestion is still observed to be a regular occurrence at peak times.

More recent work, including an Active Travel Network Development Report in 2021, shows a shift of emphasis to managing demand and improving active travel and public transport networks. Conwy County Borough Council and Transport for Wales have developed proposals for five active travel links to Llandudno Railway Station, as part of the North Wales Metro 'active travel to stations' programme. The scheme corridor, from Links Roundabout along Conway Road to Vaughan Street in the town centre and to the train station, is common to two of the five routes. These two routes would provide connections between the residential areas of Llanrhos (to the south) and Craig y Don (to the east) and the town centre and railway station.

The Panel considers that the active travel option is appropriate, although to have significant impact it would need to be accompanied by active travel infrastructure south of Links Roundabout along the A470 and B5115, in order to provide a complete route to Llanrhos. Initially, the scheme would mainly encourage active travel into the town centre, but if train frequencies to / from Llandudno are increased in future it could also encourage active travel to the railway station.

The specifics and scale of the scheme design at Links Roundabout have not yet been determined. The Panel considers that the proposed feasibility study is an opportunity to align the scheme to current policy, focussing on reducing the number of vehicles using the roundabout at peak times rather than maximising throughput of private motor vehicles. This would imply approaches such as:

- Full incorporation of Active Travel Act Guidance into the design for cyclists and pedestrians at the roundabout, so that the roundabout is visibly an 'active travel gateway' into the town.
- Prioritising the efficient movement of buses through the junction, rather than general traffic.
- Reallocating road space on the approaches to the roundabout to match the capacity at the roundabout, so that the roundabout ceases to be a constraint in the network; with the potential for accompanying public realm enhancements.
- Considering how Welsh Government's planned implementation of 20mph speed limits in urban areas will help regulate speeds on the approaches to the roundabout.
- Exploring a package of measures to reduce car travel demand over a larger area, for example parking management and charges; a business travel planning partnership involving workplaces, tourism organisations and retailers; and reduced bus fares at peak times.

This approach would recognise that the congestion at Links Roundabout is a symptom of a wider problem, and that treatment in isolation is therefore unlikely to be effective.

7. What is the effect on carbon dioxide emissions?

A scheme has not yet been defined and so no quantitative assessment of carbon dioxide emissions has been made. There is potential for the scheme to reduce carbon emissions through mode shift to active travel and more efficient traffic flow at the roundabout. However, if the scheme increases capacity at the roundabout there is potential for induced traffic to increase emissions.

8. Will the scheme be good for people and communities?

Subject to completion of the proposed studies and analysis of recent collision data, there would be potential for some safety benefits (especially for pedestrians and cyclists), enhanced connectivity and reduced severance. If the scheme reduces traffic and congestion, it could improve air quality for some disadvantaged communities adjacent to Links Roundabout. Access to employment and services could be improved for residents of Craig y Don and Tudno wards (the wards in which the scheme is located). This would be particularly beneficial for households in Tudno ward, 38% of which have no access to a car or van compared to the Wales average of 23%.

9. Will the scheme be good for the environment?

The scheme is at an early stage, and so environmental impacts have not yet been assessed, though it is unlikely based on the current proposals that there will be any significant effects.

10. Will the scheme be good for places and the economy?

There are no economic impacts identified given the early stage of the scheme. If the scheme achieves its objectives, there may be benefits for local place-making and for the town centre economy.

11. Will the scheme be good for culture and the Welsh language?

If the scheme achieves its objectives, it would make it easier for people to access recreational or cultural activities by sustainable modes of travel. No impacts on the Welsh language, or on historic or cultural sites, have been identified.

12. How robust is the case for the scheme to different futures?

The case for the scheme is robust to different possible futures.

13. Conclusion

The proposed active travel route would make a positive contribution to achieving current policy aims. However, in order for the scheme to be fully-aligned with current policy, it will be important that the approach taken at Links Roundabout is consistent with the Sustainable Transport Hierarchy. It should focus on improvements for active travel and bus users and should not increase capacity for private motor vehicles. If this approach is taken, the overall effect of the scheme would be to support mode shift to sustainable transport. The proposed feasibility study provides an opportunity to align with current policy priorities, rather than remaining tied to earlier policy priorities of reducing congestion for private motor vehicles.

Because the scheme is in an urban area with speed limits of 20mph and 30mph, there are no concerns about it causing an increase in emissions due to higher speeds. The location of the scheme is such that it would not affect ecologically valuable sites. The scheme design should seek to minimise carbon emissions from construction.



SUMMARY

The Chester Broughton Growth Corridor (CBGC) is a cross-border scheme being progressed by Cheshire West and Chester Council with partners Flintshire County Council, Wrexham County Borough Council and Welsh Government. Approximately half of the corridor length would be in Wales and half in England, with the northern and southern ends both being in England.

The scheme involves construction of a dual or single-carriageway road with associated active travel and public transport infrastructure. The road circumnavigates Chester on its western side connecting the A41 in the north and the A483 in the south, with a branch to the north-west connecting to the A494 at Deeside Industrial Park. One option involves construction of an active travel route on the same alignment but without a road.

The case for change is based on transport infrastructure being needed to accommodate an increased number of trips associated with planned residential and employment sites. Roads in the area are currently congested, and there is a need to improve provision for active travel and public transport to provide the means for modal shift.

The Panel does not consider that the case for change to cater for increased private vehicle trips from planned developments has been demonstrated.

There is evidence of congestion, although it is worse in Chester and on the English side of the border than on the Welsh side. There is a risk that provision of more transport infrastructure to access areas for dispersed development may increase car use and result in more, rather than less, congestion. In Wales, Planning Policy Wales 11 (PPW11) is likely to lead to less development in dispersed locations than might have occurred under previous policies. This means that there is likely to be less need for additional transport infrastructure.

The Panel considers that there is a case for better active travel and bus infrastructure. However, the proposed active travel routes are along the corridor of the proposed highway scheme, and this routeing may not be of prime importance for creating the optimum active travel network configuration to meet every-day travel patterns.

Other options for reducing congestion in Chester have not been considered; for example, demand management and investment in wide-area active travel and public transport networks that serve existing settlements and journey destinations.

The highway options would involve significant carbon emissions from construction. They are primarily focused on increasing road capacity for private cars and may lead to induced traffic and increased carbon emissions in use.

The Panel makes the following recommendation:

Welsh Government should not provide further support for the development of the highway schemes proposed for the Chester Broughton Growth Corridor. These schemes would increase road capacity for private cars and encourage dispersed land-use patterns.

1. Scheme description

The Chester Broughton Growth Corridor (CBGC) is a cross-border scheme that is being progressed by Cheshire West and Chester Council with partners Flintshire County Council, Wrexham County Borough Council and Welsh Government, with National Highways as a stakeholder. Approximately half of the scheme length would be in Wales and half in England, with the northern and southern ends both being in England.

Five options were shortlisted in the Strategic Outline Business Case (equivalent to WelTAG Stage 1), with four recommended to be progressed. Three options involve construction of a dual or single-carriageway road with associated active travel and public transport infrastructure. The road circumnavigates Chester on its western side, with a branch to the north-west connecting to Deeside Industrial Park. One option involves construction of an active travel route on the same alignment but without a road.

The geographical extent of the options varies, but the main highway and public transport corridor would lie between a new junction with the A483, south of the A55 North Wales Expressway; a modified A55 Junction 36A; and a new junction with the A41 to the north of the city. This is a distance of approximately 12km. The branch to the north-west would be an upgrade to A548 Sealand Road connecting to the A494, a distance of just under 4km.

The scheme cost is estimated to be £20 million for the active travel-only option; £203 million for a single-carriageway road; and between £315 million and £323 million for options with a dual-carriageway road.

2. Information reviewed

The following information sources have been consulted in evaluating this scheme:

- Need for Intervention Report: Chester Broughton Growth Corridor Access Road Study (January 2019);
- Environmental Constraints Appraisal: Chester Broughton Growth Corridor Access Road Study (January 2019);
- Option Assessment Report: Chester Broughton Growth Corridor Access Road Study (February 2019);
- Executive Summary Report: Chester Broughton Growth Corridor Access Road Study (April 2019);
- Chester Broughton Growth Corridor: Strategic Outline Business Case (WelTAG Stage 1 Report) (November 2021);
- Appendix B – Chester Broughton Growth Corridor Strategic Outline Business Case – Shortlisted Scheme Designs (November 2021);
- Appendix C - Chester Broughton Growth Corridor Strategic Outline Business Case – Economic Appraisal Report (November 2021);
- Appendix D - Chester Broughton Growth Corridor Strategic Outline Business Case – Costings – Appraised Scheme Options (November 2021).

Points of clarification were addressed in a meeting with the scheme sponsor.

3. Objectives

The objectives in the Strategic Outline Business Case are:

- Growth – to ensure the strategic transport network facilitates and supports economic growth;
- Environment – to minimise the adverse impacts of the transport network on the local environment;
- Journeys – to increase efficiency, reliability, safety and resilience on the transport network for all journey purposes in the vicinity of CBGC;
- Multimodal – to maximise opportunities for integration between highway, public transport and sustainable and active travel modes.

4. Has the case for change been made?

The case for change is based on identifications in the Local Development Plans (LDPs) (in Wales) and Local Plans (in England) of sites for residential and employment development, and hence the need for transport infrastructure to accommodate trips associated with these developments. The Strategic Outline Business Case (SOBC) also suggests that additional transport infrastructure could allow access to new areas for development (i.e. areas not yet identified in LDPs or Local Plans). The SOBC suggests intervention is required to reduce congestion; and that there is a need for more walking and cycling facilities and public transport routes to encourage modal shift.

The Panel does not consider that the case for change to cater for increased private vehicle trips from planned developments has been demonstrated, however, the Panel considers that there is a case for increased active travel and bus infrastructure.

The study identifies significant planned residential and employment developments, but the evidence for the dependency of these developments on more transport infrastructure is not provided. No indication is given about whether the location and design of the developments will seek to limit increases motor vehicle traffic. In Wales, the aim of Planning Policy Wales 11 (PPW11) is to have less development in dispersed locations. This means that there would be less need for additional transport infrastructure.

There is evidence of congestion in and to the west of Chester. The study uses 2018 'typical traffic' screenshots from Google Maps to show that traffic speeds are slower at peak times (and sometimes also in the off-peak period) in: Chester city centre; on the A5104 between the village of Broughton (in Wales) and Chester; and on the A483 to the south of Chester. The section of the A548 Sealand Road within Wales is not congested. There is more congestion on the English side of the border and relatively little on the Welsh side of the border. The 2018 traffic data pre-dates the changes in travel patterns associated with the Covid-19 pandemic, but the Panel compared the 2018 Google Maps 'typical traffic' screenshots with recent screenshots, and the picture was similar.

The study does not report what proportion of traffic within Chester is through-traffic, and so it is not possible to say whether provision of more transport infrastructure outside Chester would have a significant effect on traffic volumes and congestion within the city.

No consideration has been given to the risk of increased car use resulting from the provision of more transport infrastructure to access areas for dispersed development and this may create more, rather than less, congestion.

The North Wales Transport Model for 2019 shows a high proportion (85%) of commuter trips that start or end in Flintshire and Wrexham are by car, and this provides a case for the creation of more walking and cycling facilities and public transport routes to enable modal shift.

5. Are the objectives aligned with current policy?

The objectives are partially aligned with Welsh Government policy.

The objective of ensuring the transport network facilitates economic growth is neutral with respect to the Wales Transport Strategy. The objective of minimising the adverse impacts of the transport network on the local environment is less ambitious than the Wales Transport Strategy ambition of being 'good for the environment'.

The objective of increasing efficiency, reliability, safety and resilience is consistent with the Wales Transport Strategy, but the scheme may be ineffective in achieving this objective if the increase in highway capacity results in induced traffic.

The objective of maximising opportunities for integration between highway, public transport and sustainable and active travel modes is consistent with the Wales Transport Strategy. However, the implicit prioritisation in the wording of the objective (and in the scheme) is the inverse of the Sustainable Transport Hierarchy.

6. Did the scheme development process examine all appropriate options?

The shortlisted options are:

- **Option 1:** Active travel only. An active travel route on a new alignment between the A5104 south-west of Chester and the A41 north of Chester; a shared use path on A548 Sealand Road between the A494 and the junction with the new active travel route. The new route would connect with the Wales Coast Path, Chester Millennium Greenway and Shropshire Union Canal. It would also connect with an existing shared use path along the A5104 between Broughton and Saltney.
- **Option 3:** A new dual-carriageway road with separated active travel infrastructure connecting the A483 south of the A55 (North Wales Expressway); the A55; and the A41 north of Chester. A548 Sealand Road would be dualled and have separate footways and cycleways between the A494 and the junction with the new dual carriageway. The option includes seven active travel links in addition to those proposed in Option 1.
- **Option 4:** As Option 3, plus a bus route along the new dual carriageway between its junction with the A55 and Sealand Road, and along Sealand Road itself connecting with the A494. There would be bus priority measures at junctions.
- **Option 5:** As Option 3 but a single carriageway road, instead of a dual carriageway.

The scheme development process did not examine all appropriate options.

The longlist of options in the 2019 option assessment included active travel measures and bus links but no non-transport, demand management or behaviour change measures. Relevant non-transport options include: changes to planning policy to locate new development in or on the edge of urban areas; design of residential developments to support use of non-car modes; and remote working hubs. Relevant demand management options include parking management and road user charging in urban areas. Relevant behaviour change options include workplace travel planning with businesses.

The active travel options were focused along the corridor of the proposed highway scheme, rather than being designed with reference to main journey origins and destinations that should

be catered for by active travel routes. The considerable investment in active travel in Option 1 (the active travel-only option) may therefore not be of prime importance for creating the optimum active travel network configuration to meet every-day travel patterns.

Similarly, the bus options were focused along the corridor of the proposed highway scheme and may therefore not address the main highway constraints that delay bus services.

7. What is the effect on carbon dioxide emissions?

The effect of the scheme on carbon dioxide emissions has not been quantified. Three of the four options involve construction of significant new highway infrastructure and therefore would result in carbon dioxide emissions from construction, operation and maintenance.

The increase in road capacity in options 3, 4 and 5 is intended to facilitate dispersed car-dependent development patterns and is therefore likely to generate an increase in carbon emissions in use due to induced traffic.

Option 1 is for active travel only and could lead to a reduction in carbon dioxide emissions as a result of some trips switching from car to active travel.

8. Will the scheme be good for people and communities?

The scheme would improve active travel links and potentially improve bus services to main employment sites, and could therefore provide better access to employment and services for people who experience social exclusion. However, over the longer-term, the highway options (3, 4 and 5) would result in a more dispersed pattern of development, which could worsen access for people who do not have access to a car.

Options 3, 4 and 5 have been developed with the intention of reducing traffic volumes in Chester, potentially improving air quality and reducing noise and severance. However, there would be more noise along the new route, and severance. There are some settlements fairly close to the proposed new alignment, and people living along Sealand Road (which in some options would be dualled) would be affected.

The impact on road safety has not been assessed.

9. Will the scheme be good for the environment?

Environmental impacts have not yet been assessed.

Flood risk occurs on both sides of the River Dee and along an unnamed watercourse parallel and to the north of the England/Wales border and Sealand Road. The proposed options all cross the River Dee and other smaller watercourses and there would be potential for impacts on flood risk and water quality.

All scheme options cross the River Dee and Bala Lake Special Area of Conservation (SAC) and Site of Special Scientific Interest (SSSI). The route could directly or indirectly affect small pockets of ancient woodland near the A55 and south of Sealand Road.

The scheme would not affect any nationally designated landscapes.

10. Will the scheme be good for places and the economy?

The SOBC identifies employment development sites that could benefit from the scheme, including the Deeside Northern Gateway Strategic Site and Chester Aerospace Park and Hawarden Business Park near Broughton. There may be benefits for freight traffic between the

north and the south (for example between Merseyside and Deeside, and the Midlands) as the new alignment would be shorter than the current route via the A494 and A55.

The scheme could provide benefits in place-making and liveability in Chester if it resulted in a reduction in traffic.

The value for money of the scheme has been calculated, with a Benefit to Cost Ratio (BCR) of 0.4 (poor value for money) for option 1; BCR of 1.4 (low) for options 3 and 4; and BCR of 2.1 (high) for option 5.

11. Will the scheme be good for culture and the Welsh language?

The scheme does not support sustainable travel to arts, sports or cultural activities. No impact on the Welsh language is identified.

12. How robust is the case for the scheme to different futures?

The scheme is in a location that is vulnerable to flooding from rivers. The case for the scheme would be weaker under conditions of lower traffic growth.

13. Conclusion

The highway schemes that have been identified in the Chester Broughton Growth Corridor study would increase road capacity for private cars and encourage the development of dispersed settlement patterns. This is inconsistent with the aims of Planning Policy Wales 11 to avoid creation of car-based developments, minimise the need to travel, and reduce reliance on the car.

There is no estimate of the scheme's effect on carbon dioxide emissions. The scale of the scheme is substantial, with 12km of new dual or single-carriageway road, and, in some options, with 4km of dualling of existing single-carriageway road. This would result in significant carbon emissions from construction. The highway options may also generate an increase in carbon emissions in use due to induced traffic.

The Strategic Outline Business Case suggests there is a tension between the UK Government's focus on reducing carbon emissions through electrification of the vehicle fleet (without aiming to reduce car use) and the Welsh Government's strategy to also achieve modal shift and reduce car use to meet climate commitments. The Chester Broughton Growth Corridor, as a cross-border scheme, will need to align with both policies. The addition of active travel routes and bus priority measures is partly prompted by Welsh policy, but the Panel does not consider that an active travel route on the carriageway alignment (with or without a new highway) is the most effective investment to support modal shift in this context.

APPENDIX 2

OUR CRITERIA FOR SCHEME REVIEWS



Below are the criteria we used in our review. These evolved slightly from the criteria discussed in our Initial Report to reflect learning during the process. We consider that these questions are applicable to any type of transport scheme, not just a road scheme.

Has the case for change been made?

- Is there a clear ‘case for change’?
- Are the problems and opportunities as defined at the time of the appraisal still valid?
- Is the scheme required to enable land use developments that are appropriate in this location (i.e., consistent with Future Wales and Planning Policy Wales) and likely to proceed?
- Will the scheme make a positive contribution to well-being goals and Welsh Government policy and strategy?

Are the objectives of the scheme aligned with current policy?

- Are the scheme objectives aligned with Welsh Government objectives (particularly Wales Transport Strategy priorities, Net Zero Wales and Future Wales) and other stakeholder objectives (mainly local authority objectives, but possibly also other public service bodies or important stakeholders such as Network Rail)?
- Will the scheme be effective in achieving those objectives?
- Does the proposed infrastructure reflect the Sustainable Transport Hierarchy (i.e., prioritising (i) improvements for walking and cycling, then (ii) improvements for public transport, then (iii) improvements for ultra-low emission vehicles, and finally (iv) improvements for other private motor vehicles)?
- Does the scheme increase the proportion of freight moved by sustainable modes (water or rail)?

Will the scheme increase sustainable transport mode share?

Did the scheme development process examine all appropriate options?

- In generating options at the long-list stage, was there sufficient consideration of non-transport options (e.g., land use planning or technology options that reduce the need to travel)?
- Was there sufficient consideration of sustainable transport options (e.g., improved services or infrastructure for public transport, active travel and rail or water-borne freight)?
- For stages beyond WelTAG Stage 1, do the shortlisted options include appropriately ambitious sustainable transport options?
- Was there sufficient consideration of demand management or speed management options (e.g., parking management, road user charging, speed limits, speed enforcement)?
- Was there sufficient consideration of options that do not increase overall private car capacity on the road network (e.g., parallel road closures to compensate for construction of a new road; dedicated HGV or bus lanes; changes to road layout to reduce collisions)?

What is the effect on carbon dioxide emissions?

- Has the effect on carbon dioxide emissions of land-clearance, construction, operation and maintenance been quantified, and how big is it?
- Will the scheme increase or decrease carbon dioxide emissions due to induced passenger and freight traffic (for example by enabling car- and HGV-dependent development and activity patterns, and through more frequent vehicle trips, mode shift, longer trips, and higher car ownership)?
- Will the scheme increase or decrease carbon dioxide emissions due to changes in vehicle speed and flow?
- Looking at all the different effects of the scheme on carbon dioxide emissions, is the net effect more likely to help or hinder achievement of Welsh Government carbon reduction targets and budgets in the next 15 years?

Will the scheme be good for people and communities?

- Will the scheme ensure more equal access to employment, local services and leisure for people who suffer social exclusion, and is it the best option to achieve this?
- Will the scheme improve and not displace poor air quality, and is it the best option to achieve this?
- Will the scheme reduce and not displace noise problems, and is it the best option to achieve this?
- Will the scheme support the Welsh Government's ambition to move towards zero road deaths? Will it reduce road danger for vulnerable road users, especially for pedestrians and cyclists? Is it the best option to achieve this?
- Will the scheme reduce community severance, and is it the best option to achieve this?

Will the scheme be good for the environment?

- Does the scheme impact on the water environment in terms of increased risk of flooding or impacts on water quality?
- Does the scheme maintain biodiversity and enhance ecosystem resilience?
- Does the scheme adversely affect sites that are protected for their environmental value or biodiversity (e.g., Special Areas of Conservation, Sites of Special Scientific Interest)?
- Does the scheme impact on special qualities of landscape in protected landscapes (e.g., National Parks and Areas of Outstanding Natural Beauty)?

Will the scheme be good for places and the economy?

- Has the effect of the scheme on local economic well-being been assessed, and is it likely to be beneficial?
- Has the effect of the scheme on national economic well-being been assessed, and is it likely to be beneficial?
- Will the scheme make a positive contribution to local place-making and liveability?

- Will the scheme improve the efficiency and / or reliability of freight transport on a route where this is a problem?
- Does the scheme represent good value for money by offering a cost-effective way to meet Welsh Government objectives and policies?

Will the scheme be good for culture and the Welsh language?

- Will the scheme impact on the use of the Welsh language, for example by supporting businesses that will generate employment appropriate to the needs of local young people in areas where the Welsh language is strong, or by making Welsh-medium schools more viable?
- Will the scheme enable more people to travel by sustainable modes for arts, sports, recreation or cultural activities?
- Will the scheme protect the historic and cultural environment?

Is the scheme robust to different futures?

- Does the scheme take account of the adverse impacts of climate change in the assessment? (e.g., in flood modelling). How sensitive is the scheme to these impacts?
- Would the scheme be appropriate in a future in which other policies or social trends had resulted in a significant reduction in car use (e.g., as a result of policies arising from the aim in Net Zero Wales to reduce car mileage per person by 10%; or by meeting the Welsh Government's target of 30% of people working remotely; or because of changes in the number of young people choosing to drive)?
- How robust are the value for money calculations to trends not anticipated at the time of appraisal (e.g., revisions of economic and demographic forecasts; behaviour change due to Covid-19; economic change due to Brexit; geographical and other change due to climate effects)?
- Have the long-term liabilities of the scheme such as in ongoing maintenance and renewal requirements been considered and might these present future challenges and impacts such as carbon dioxide emissions?

