Number: WG14775

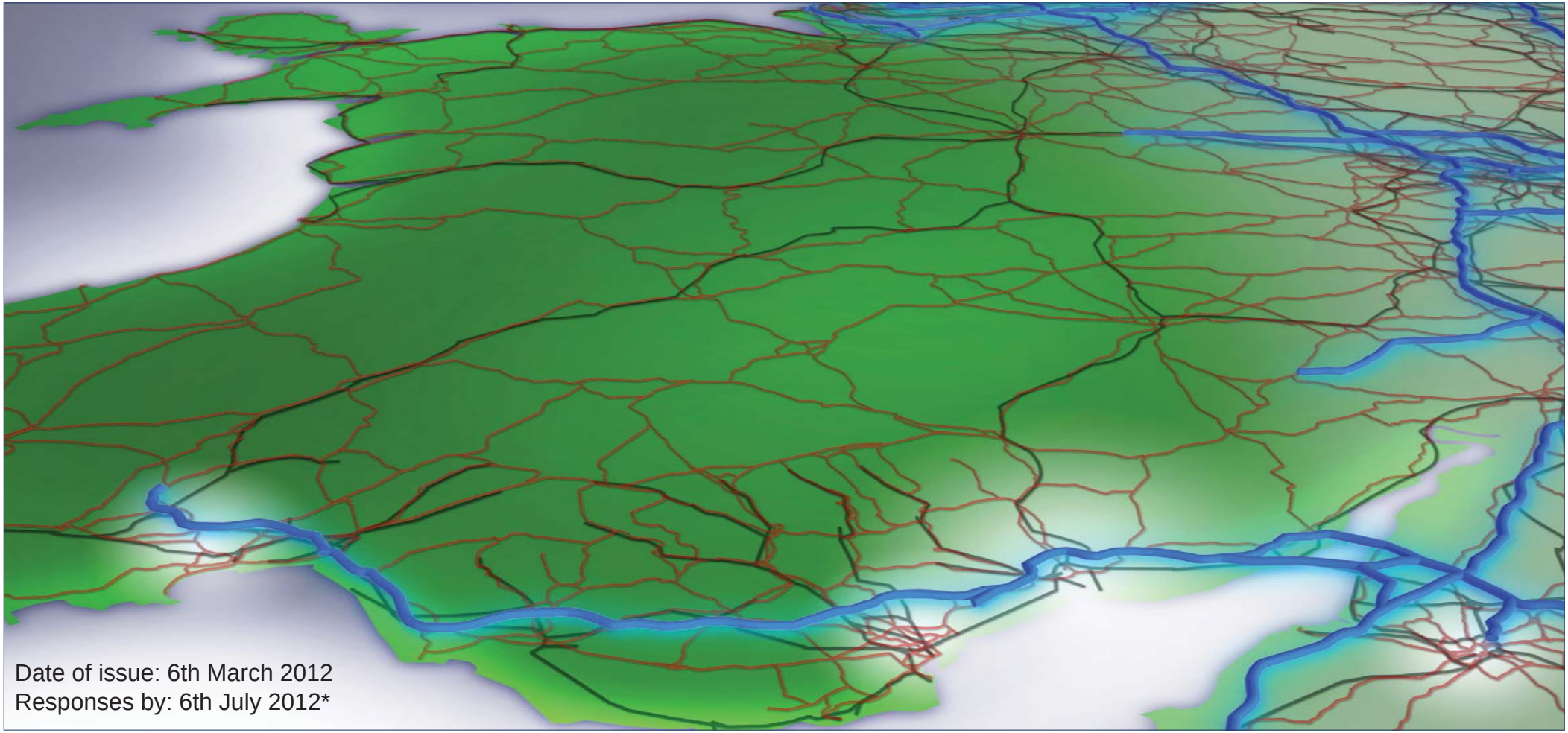
Welsh Government

Consultation Document

M4 Corridor Enhancement Measures Magor to Castleton (M4 CEM)
Easing the Flow

Llywodraeth Cymru
Welsh Government

www.cymru.gov.uk



Date of issue: 6th March 2012
Responses by: 6th July 2012*

Revision B*- Date for responses now extended to 6th July 2012

Overview

The Welsh Government is consulting on its approach to solving transport related problems affecting the M4 Corridor area around Newport in South East Wales.

People using the M4 Corridor and the surrounding highway network are aware of the congestion and potential hazards that result from the large number of vehicles using the M4. At peak times the volume of traffic is greater than the road was designed to accommodate. Travellers also notice the disruption caused by unexpected events and incidents. It can take considerable time following an incident before traffic flows normally again; this tells us the resilience of the M4 and surrounding highway network needs to be improved.

The dialogue with people who use and manage the transport network and/or access services in the M4 Corridor between Magor and Castleton, began over a year ago, and has already influenced what is presented as part of this Consultation.
If you have been part of helping us shape the M4 Corridor Enhancement Measures Programme, thank you!

Transport and access to services, homes, work and leisure are issues affecting us all, and we hope that anyone living, working and travelling through the Newport area will participate in this Consultation.

How to respond & further information

Please respond to this Consultation by using the Response Form included in this document. This can be completed by hard copy to the address shown below.

Alternatively, you can respond electronically via the following website links:

- www.wales.gov.uk/Consultations under Transport; or

This Consultation closes on 6 July 2012*

Large print versions of this document can be made available on request to m4cem@arup.com.

Contact details

For further information please contact:

m4cem@arup.com or write to:

Freepost M4 CEM CONSULTATION

Revision A -
This revision includes minor corrections to Figure 4 and 5 on Page 9, Figure 6 on Page 10, Table 1 on Page 11 and Figure 9 on Page 15. Revisions show sources of information and in places the original Consultation Document included inaccurate data due to transcription and spreadsheet errors. These revisions will not have a material effect on this consultation.

Revision B* -
Date for responses now extended to 6th July 2012

Workshops and Public Exhibitions

These are being held as part of this Consultation to provide you with the opportunity to ask questions about the various aspects of the M4 CEM Programme.

Date	Time	Location	Venue
Workshops			
Tuesday 13th March	10am-3pm	Newport	Tredegar House NP10 8YW
Thursday 15th March	10am-3pm	Cardiff	The Urdd Hall CF10 5AL
Tuesday 20th March	10am-3pm	Swansea	Guildhall Lord Mayor's Reception SA1 4PE

The workshops are open to all, but spaces will be limited. So, please book early by contacting: m4cem@arup.com.

Date	Time	Location	Venue
Public Exhibitions			
Wednesday 28th March	Noon-7pm	Liswerry	Coleg Gwent Newport City Campus NP19 4TS
Thursday 29th March	Noon-7pm	Magor	Ebenezer Baptist Church NP26 3HY
Friday 13th April	Noon-7pm	Brynglas	Brynglas House NP20 5QU
Tuesday 17th April	Noon-7pm	Newport	The Newport Centre NP20 1UH

A further three public exhibitions have been organised, open to all as listed below*. We will continue to promote the Consultation and have extended the period for responses from 6th June to 6th July 2012.

Date	Time	Location	Venue
Additional Public Exhibitions			
Friday 11th May	Noon-7pm	Brynglas	Brynglas House NP20 5QU
Tuesday 15th May	Noon-7pm	Magor	Ebenezer Baptist Church NP26 3HY
Thursday 17th May	Noon-7pm	Newport	The Newport Centre NP20 1UH

The exhibitions are open between the times indicated and are intended for you to drop-in at your convenience. Staff will be on hand to answer questions, and talk you through the opportunities available for expressing your opinions on the proposals presented.

Revision B* -
Additional dates for Public Exhibitions

Data protection

Any response you send us will be seen in full by Welsh Government staff and their consultants dealing with the issues which this Consultation is about. It may also be seen by other Welsh Government staff to help them plan future Consultations.

The Welsh Government intends to publish a summary of the responses to this document. We may also publish responses in full. Normally, the name and address (or part of the address) of the person or organisation who sent the response are published with the response. This helps to show that the Consultation was carried out properly. If you do not want your name or address published, please tell us this in writing when you send your response. We will then blank them out.

Names or addresses we blank out might still get published later, though we do not think this would happen very often. The Freedom of Information Act 2000 and the Environmental Information Regulations 2004 allow the public to ask to see information held by many public bodies, including the Welsh Government. This includes information which has not been published. However, the law also allows us to withhold information in some circumstances. If anyone asks to see information we have withheld, we will have to decide whether to release it or not. If someone has asked for their name and address not to be published, that is an important fact we would take into account. However, there might sometimes be important reasons why we would have to reveal someone's name and address, even though they have asked for them not to be published. We would get in touch with the person and ask their views before we finally decided to reveal the information.

Contents

1. Ministerial Foreword

How we in Wales manage transport and access to services, work, leisure and our homes can have huge benefits not only for our well-being and our economy but for our environment as well. There are tremendous opportunities in our local areas, across Wales, and beyond, for us to re-connect with one another to build stronger communities, to gain access to the education, training or health service that is most suited to our needs, to reach jobs, profitable markets and business environments and to put transport onto a carbon reduction pathway.

Motor vehicles are the predominant travel mode in Wales and the UK. Many of us seem addicted to using our cars. No wonder then that growing congestion is widely acknowledged as one of the most serious transport problems facing us, and action to improve road and rail networks is regarded as crucial to sustaining productivity and competitiveness. At the same time, others in our society, without access to a car or any appropriate means of transport, can experience real barriers to living happier, healthier and more fulfilling lives. We must act to improve opportunities for all.

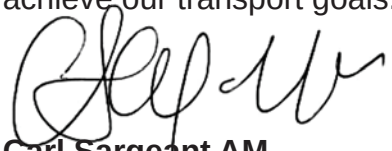
In the prioritised National Transport Plan, December 2011, Welsh Government set out a commitment to consult with you on a programme of measures to deal with resilience, safety and reliability issues on the M4 around Newport. This Consultation is your opportunity to help us decide on and deliver a transport and access strategy that works for all of us now, and into the future.

This document contains a description of the relevant history and context of the M4 Corridor and the way in which travel and transport patterns have changed. It takes you through an exploration of problems, goals and a range of different approaches to achieving the goals. Some supporting documents are also available on www.m4cem.com, providing more technical detail and background to the study. The purpose of these documents is to ensure all those with an interest in easing the flow on the M4 between Magor and Castleton are encouraged to give views on the approach and the options available.

Taking the feedback received during this Consultation into account, the Welsh Government will announce its strategy. This will aim to ease the flow of traffic on the M4 and relieve pressures on the highway network between Magor and Castleton over the next few years and into the future. This announcement will be made towards the end of 2012.

Solving transport problems is a complex challenge. One single intervention alone will not solve all the problems of transport and access in this area. By seeking to understand how problems affect you, how you prioritise the goals any intervention should achieve, and benefitting from your comments on proposed solutions, we believe we can formulate a strategy that will best meet your needs in the M4 Corridor area, Magor to Castleton. At the same time we hope to address our wider priorities of making the transport system work better to help tackle poverty, increase well-being and assist economic growth, and reduce carbon emissions associated with travel.

Please let us know what you think about the opportunities for tackling the problems we outline here, and how you can help us achieve our transport goals.

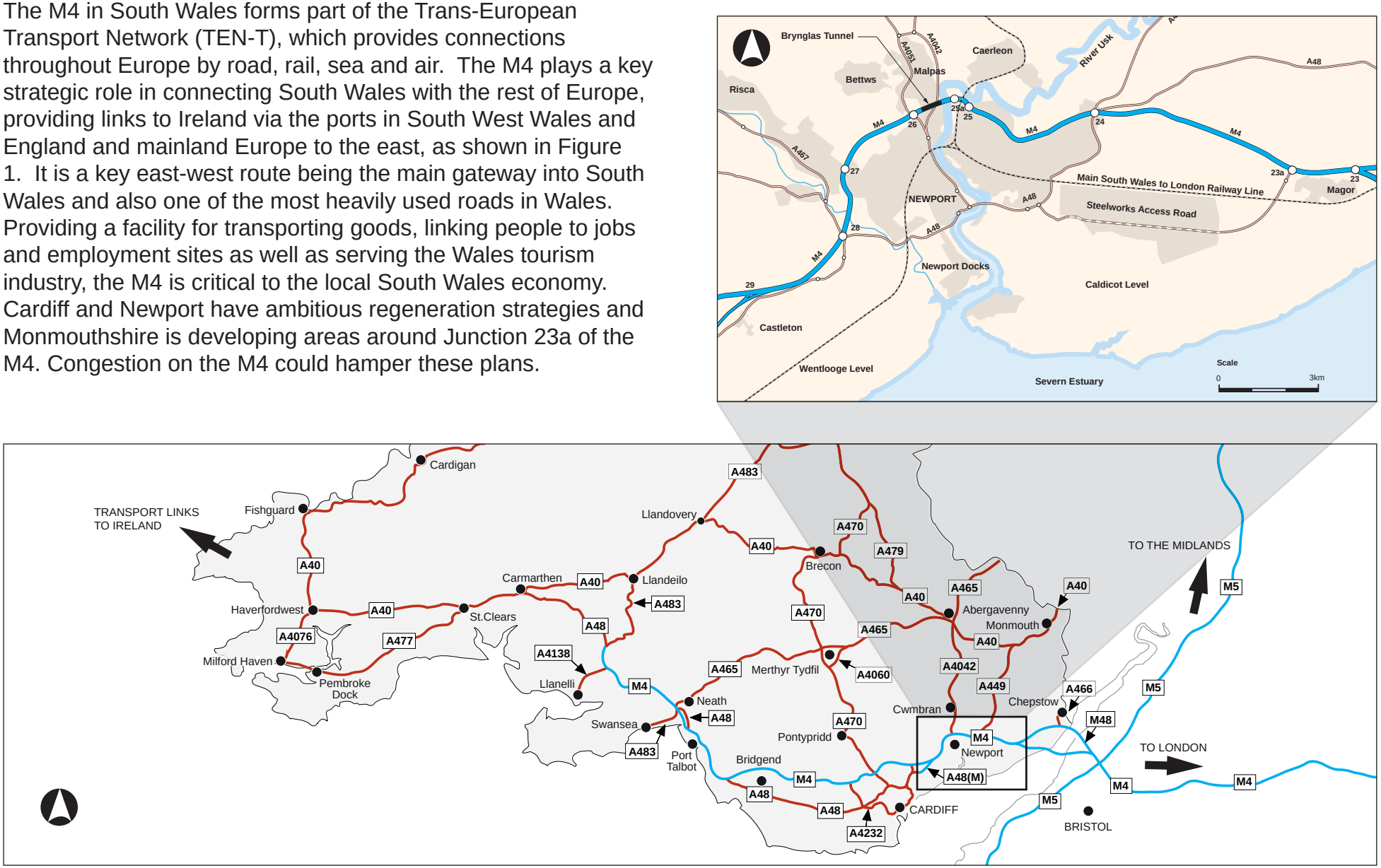


Carl Sargeant AM
Minister for Local Government and Communities

2. Background

The M4 in South Wales forms part of the Trans-European Transport Network (TEN-T), which provides connections throughout Europe by road, rail, sea and air. The M4 plays a key strategic role in connecting South Wales with the rest of Europe, providing links to Ireland via the ports in South West Wales and England and mainland Europe to the east, as shown in Figure 1. It is a key east-west route being the main gateway into South Wales and also one of the most heavily used roads in Wales. Providing a facility for transporting goods, linking people to jobs and employment sites as well as serving the Wales tourism industry, the M4 is critical to the local South Wales economy. Cardiff and Newport have ambitious regeneration strategies and Monmouthshire is developing areas around Junction 23a of the M4. Congestion on the M4 could hamper these plans.

Figure 1: The location and strategic importance of the M4.



The M4 between Junctions 28 and 24 was originally designed as the ‘Newport Bypass’ with subsequent design amendments in the 1960s to include the first motorway tunnels to be built in the UK. The M4 Motorway between Magor and Castleton falls well short of modern motorway design standards. This section of the M4 has many lane drops and lane gains, resulting in some two-lane sections, an intermittent hard shoulder and frequent junctions. It is congested during weekday peak periods resulting in slow and unreliable journey times and stop-start conditions with frequent incidents causing delays.

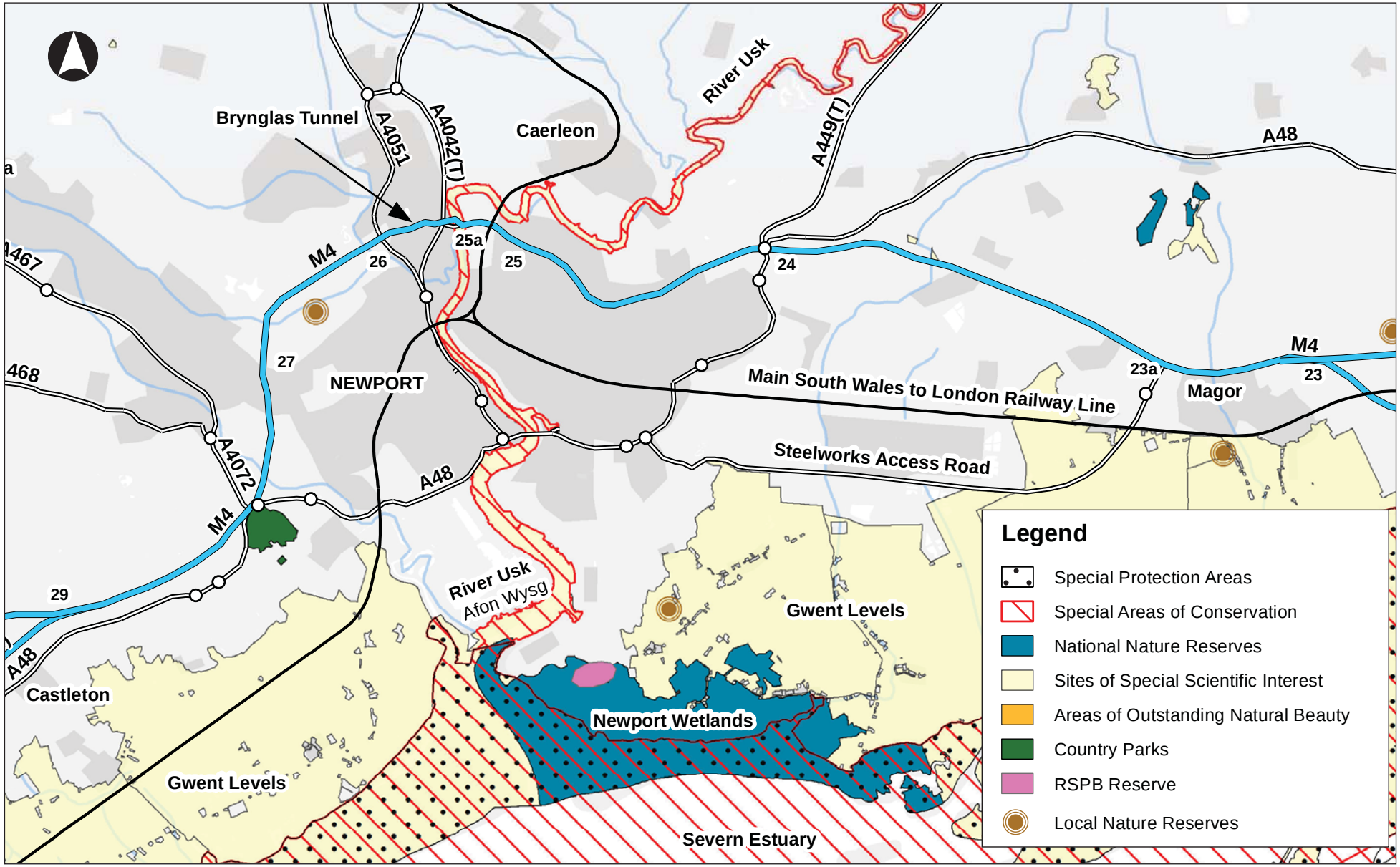
This, together with increasing traffic, is why problems with congestion and unreliable journey times have been a fact of life on the M4 around Newport for many years. The motorway and surrounding highway network does not cope with sudden changes in demand or operation, as a result of accidents or extreme weather events for example. These issues are worse at times of peak travel and, as the number of users on the network increase, they are set to worsen.

To address these issues, the feasibility of developing the M4 relief road was studied in significant detail. In July 2009, the Welsh Government announced that the project had become unaffordable. However, the Welsh Government recognised that important improvements could be made to the existing transport network. The M4 Magor to Castleton, Corridor Enhancement Measures Programme (M4 CEM) was set up to explore ways of making such improvements.

The Aims of the M4 CEM Programme are to:

1. Make it easier and safer for people to access their homes, workplaces and services by walking, cycling, public transport or road.
2. Deliver a more efficient and sustainable transport network supporting and encouraging long-term prosperity in the region, across Wales, and enabling access to international markets.
3. To produce positive effects overall on people and the environment, making a positive contribution to the overarching Welsh Government goals to reduce greenhouse gas emissions and to making Wales more resilient to the effects of climate change.

Figure 2: Main Environmental Constraints in the Newport area



An Introduction to the Problems

Located to the South of Newport are areas of largely undeveloped, wild, or agricultural land. Significant proportions of this, like the Caldicot levels, and the habitats and species they contain, are legally protected. The Severn, which the M4 crosses, and the Severn Estuary are also protected by law. The designated sites, nature reserves and country parks you see on Figure 2 are also valued as places for recreation and relaxation for local people and visitors.

South East Wales and the Newport area were different in the 1960s, when the M4 was designed and built. Since then, many changes have taken place. Our environmental concerns are different – we have new obligations to protect heritage sites, habitats and species. Many social changes have occurred, including population growth, expansion of towns and cities, employment patterns and our expectations of education, health and other services. The economy today is different in terms of the size and location of the markets and types of products and services supplied.

Today, the challenge is to reconcile our needs and aspirations with what the transport network can provide.

As a whole, society has become a lot more mobile, and there are a lot more of us than highway engineers in the 1960s could have anticipated. There is no conclusive evidence suggesting this trend of increasing traffic demand will reverse soon.

Existing problems encountered on the motorway between Magor and Castleton relate to capacity, resilience, safety and issues of sustainable development. We look at these in turn below:

a) Capacity – the ability for the M4 Corridor to accommodate traffic

Figure 3 shows the average daily traffic flow through section J27 to J28 increasing in recent years. While there are years where the traffic levels fall, the overall change for the period is an increase. This increase in traffic has exacerbated problems of congestion, particularly in the morning and evening peaks as shown in Figure 5.

Figure 3: Average Daily Traffic Flow through Section J27-J28

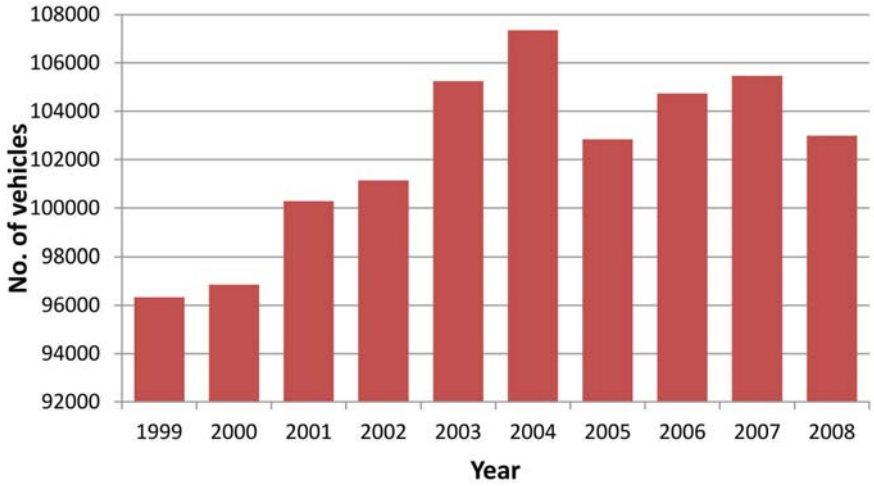
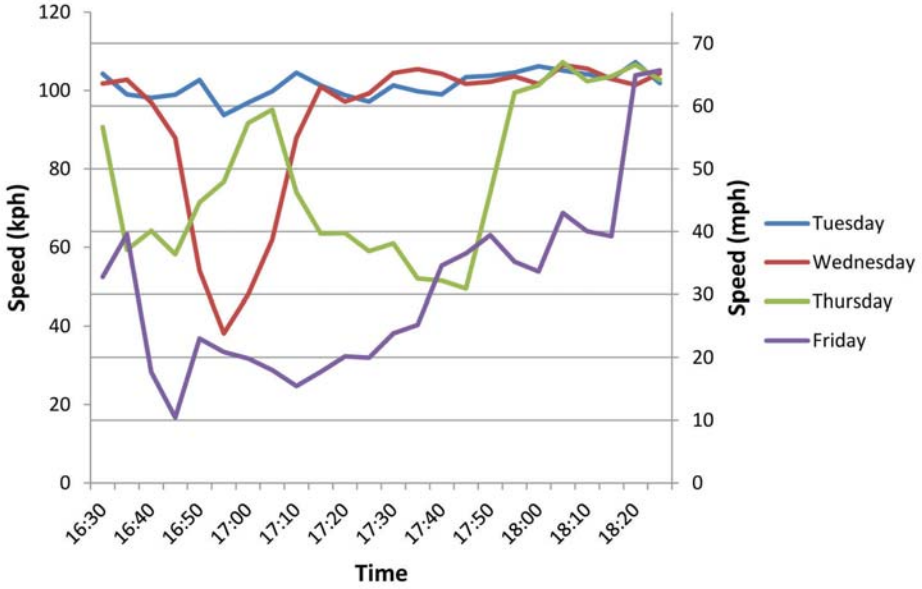


Figure 4 below illustrates the average recorded speed of traffic eastbound on the motorway between Junctions 27 and 26[1] during the evening peak period for a randomly selected period in March 2007. It shows that speeds can often fall below 60 kph (less than 40 mph) at times of congestion.

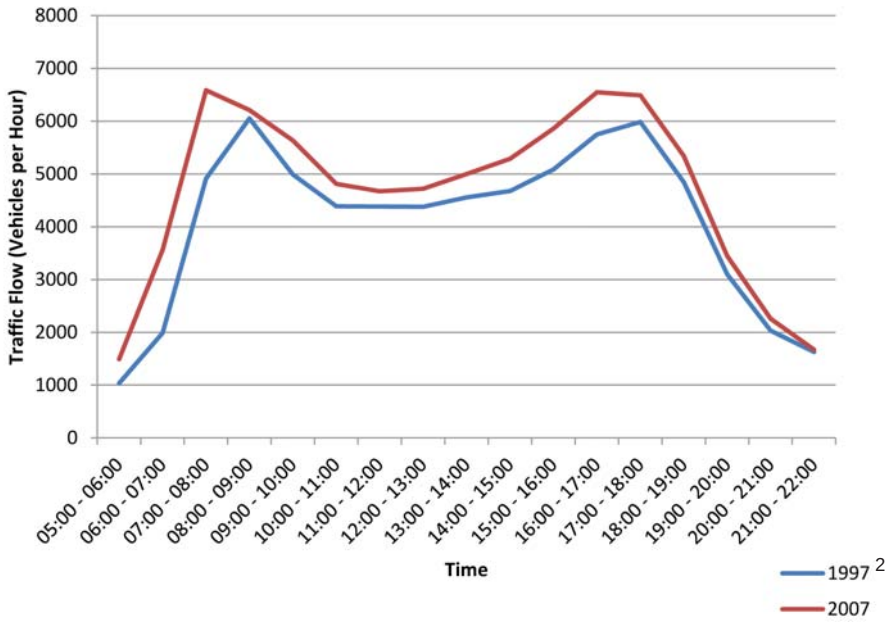
Figure 4: Average Speed on M4 J27-J26[1] (PM Peak Eastbound)



Note how dramatically traffic speeds vary over short periods of time and the lack of a consistent pattern from day to day. This means that journey times, particularly for commuters, can be extremely unreliable.

In addition to traffic volumes increasing overall, Figure 5 shows that the volume of traffic experienced in 1997 only during the morning and afternoon peak traffic ("rush hour") is now experienced, and even exceeded, over much longer periods.

Figure 5: Weekday Traffic Flows through Brynglas tunnels



It is also important to note that slow and congested traffic can result in higher CO_2 emissions than free-flowing traffic.

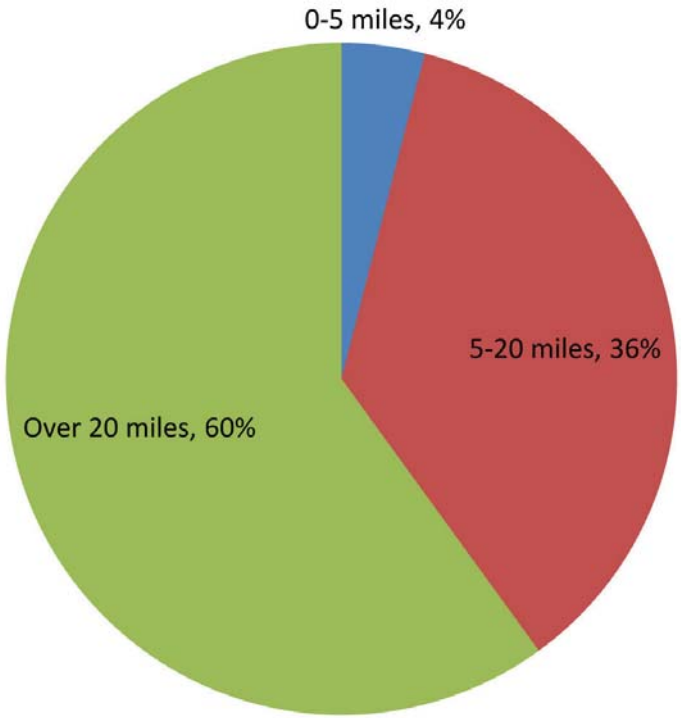
There is a mixture of local and long distance traffic using the motorway. This causes problems, as vehicles move between lanes to enter and exit the motorway.

Revision A - 1. The original document referred to Junctions 28 and 27. This was as a result of a transcription error and has no material effect on this consultation.

Revision A - 2. The original document included incorrect data for 1997. This was due to a minor spreadsheet error and has no material effect on this consultation.

Figure 6 shows that around 40% of journeys made on the M4 involve trips of less than 20 miles from start to finish. This would typically equate to a journey made between western Cardiff and eastern Newport.

Figure 6: The proportion of short, medium and long distance journeys using the M4 J23-J29 (2005 Roadside Surveys) [3]



Revision A - 3. Source of data added

Figure 7 shows where congestion levels are greatest on the M4 between Magor and Castleton. A lack of capacity on the road network may hinder the delivery of future developments (for example additional housing, essential services, commercial and industrial spaces) in South East Wales.

Other issues with capacity for the M4 Corridor include:-

- During peak periods, traffic flows exceed 80% of capacity along some stretches. It is generally accepted that once hourly traffic flows reach about 80%, some operational problems can be expected. The more congested road conditions become, the greater the risk of incidents and accidents occurring. Once flows reach above 90%, traffic can expect severe operational problems over longer periods.
- Approximately 40% of journeys made along the M4 between Magor and Castleton involve trips less than 20 miles. This contributes to a tension between people making local and longer distance journeys.
- The sub-standard inclines on the motorway slow down heavy vehicles and so increase congestion further, especially at peak times.
- Unlike modern motorways, the section between Magor and Castleton has many lane drops and lane gains, resulting in some two-lane sections, an intermittent hard shoulder and frequent junctions. This further adds to problems of congestion.
- Both Cardiff and Newport have ambitious regeneration strategies whilst Monmouthshire has a number of developments proposed in the vicinity of Junction 23a of the M4. Access to redevelopment sites could be hampered by congestion on the M4 motorway.

Figure 7: Problems of Capacity

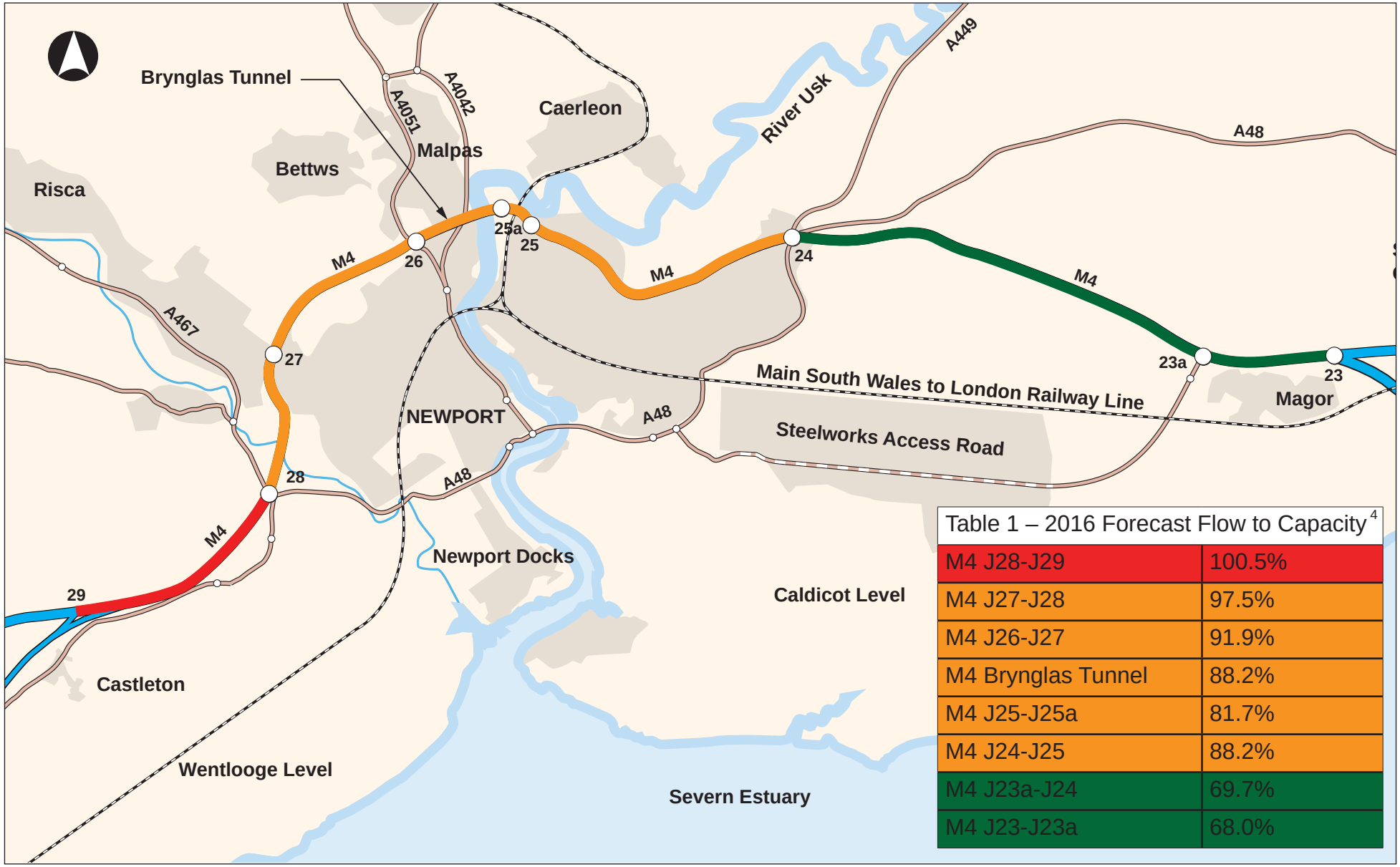


Table 1 – 2016 Forecast Flow to Capacity [4]

M4 J28-J29	100.5%
M4 J27-J28	97.5%
M4 J26-J27	91.9%
M4 Brynglas Tunnel	88.2%
M4 J25-J25a	81.7%
M4 J24-J25	88.2%
M4 J23a-J24	69.7%
M4 J23-J23a	68.0%

Revision A - 4. Source of data added

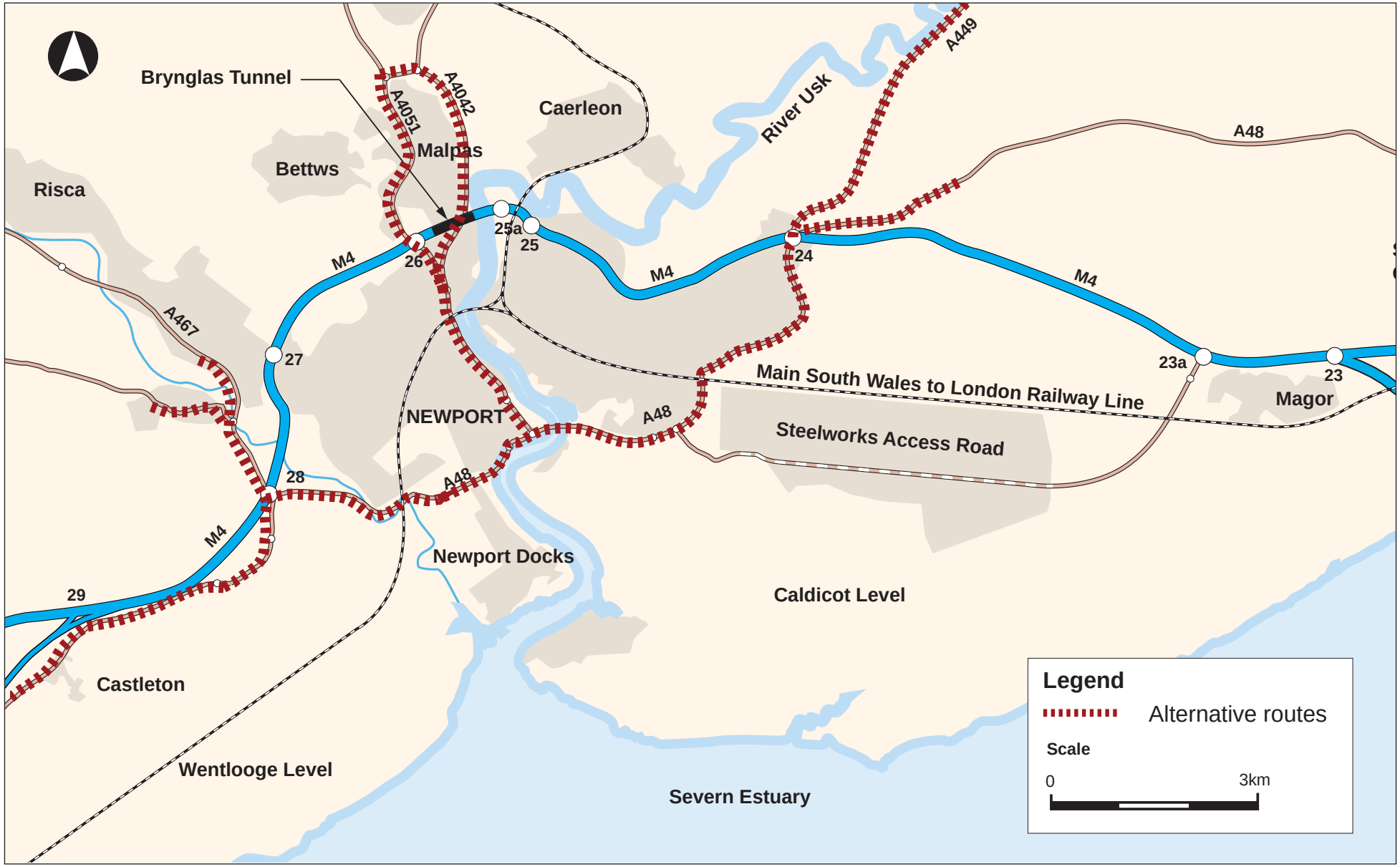
b) Resilience – the ability of the transport network to respond to accidents and delays

Figure 8 identifies the alternative routes to the M4 which provide network resilience at times of incidents or delays. Major maintenance works will be required in the short term which could cause significant disruption, particularly the Brynglas Tunnels.

Other issues with resilience on M4 Corridor include:-

- There is limited capacity on alternative routes when traffic needs to be diverted off the M4 around Newport.
- Adverse weather conditions can cause disruption to the transport network. This problem is exacerbated given the lack of capacity on alternative routes to the M4.
- Significant maintenance works are needed at the Brynglas Tunnels in order to satisfy an EU Directive and meet current standards by 2014 but is subject to availability of finance. This maintenance work is likely to take months, if not years to complete and is required independently of the M4 CEM Programme.
- There is a perceived lack of information sharing on the road network to drivers planning to use the M4 but who have not yet joined it. Enabling them to avoid using the M4 during incidents and delays.
- Temporary decreases in highway capacity due to incidents or essential roadworks result in significant delays and adverse effects on local roads being used as diversions.

Figure 8: Problems of Resilience



c) Safety

Figure 9 and Table 2 summarise safety conditions on the M4 Corridor between Magor and Castleton. They show the number of personal injury accidents (observed accidents per million vehicle kilometres, 2008 data) in comparison to the national motorway average. This illustrates that the highest proportion of incidents along this stretch occur between J24-J27.

Other issues with safety on the M4 Corridor include:-

- Some sections have alignments (gradients and bends) and discontinuities in the hard shoulder. In addition to this, there are frequent junctions, resulting in many 'weaving' movements with vehicles accelerating and decelerating and changing lanes over relatively short distances. These weaving movements reduce the capacity of the road and can also result in accidents.
- The most common accidents on the M4 between junctions 23 and 29 are rear-end shunts on both the westbound and eastbound approaches to the Brynglas tunnels. This is largely due to the stop-start conditions that occur during peak periods caused by the motorway reducing from 3 lanes to 2 lanes.
- The Variable Speed Limit (VSL) system, was introduced in June 2011 between J24-J28, in order to improve safety conditions and traffic flow in the short term. Accident data post June 2011 is not yet available so we are not able to assess the impact of the measure accurately.

Figure 9: Safety [5]

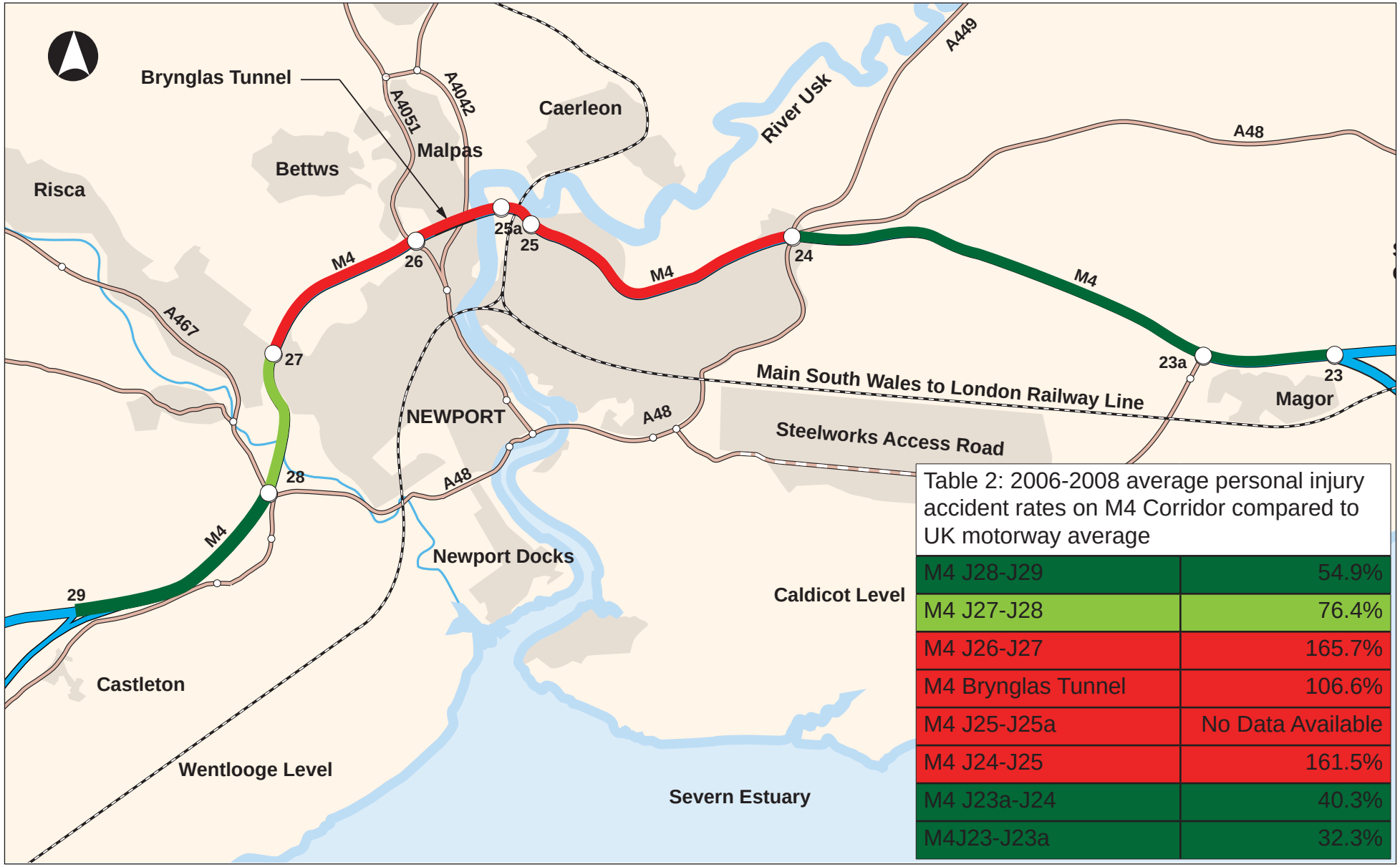


Table 2: 2006-2008 average personal injury accident rates on M4 Corridor compared to UK motorway average

M4 J28-J29	54.9%
M4 J27-J28	76.4%
M4 J26-J27	165.7%
M4 Brynglas Tunnel	106.6%
M4 J25-J25a	No Data Available
M4 J24-J25	161.5%
M4 J23a-J24	40.3%
M4J23-J23a	32.3%

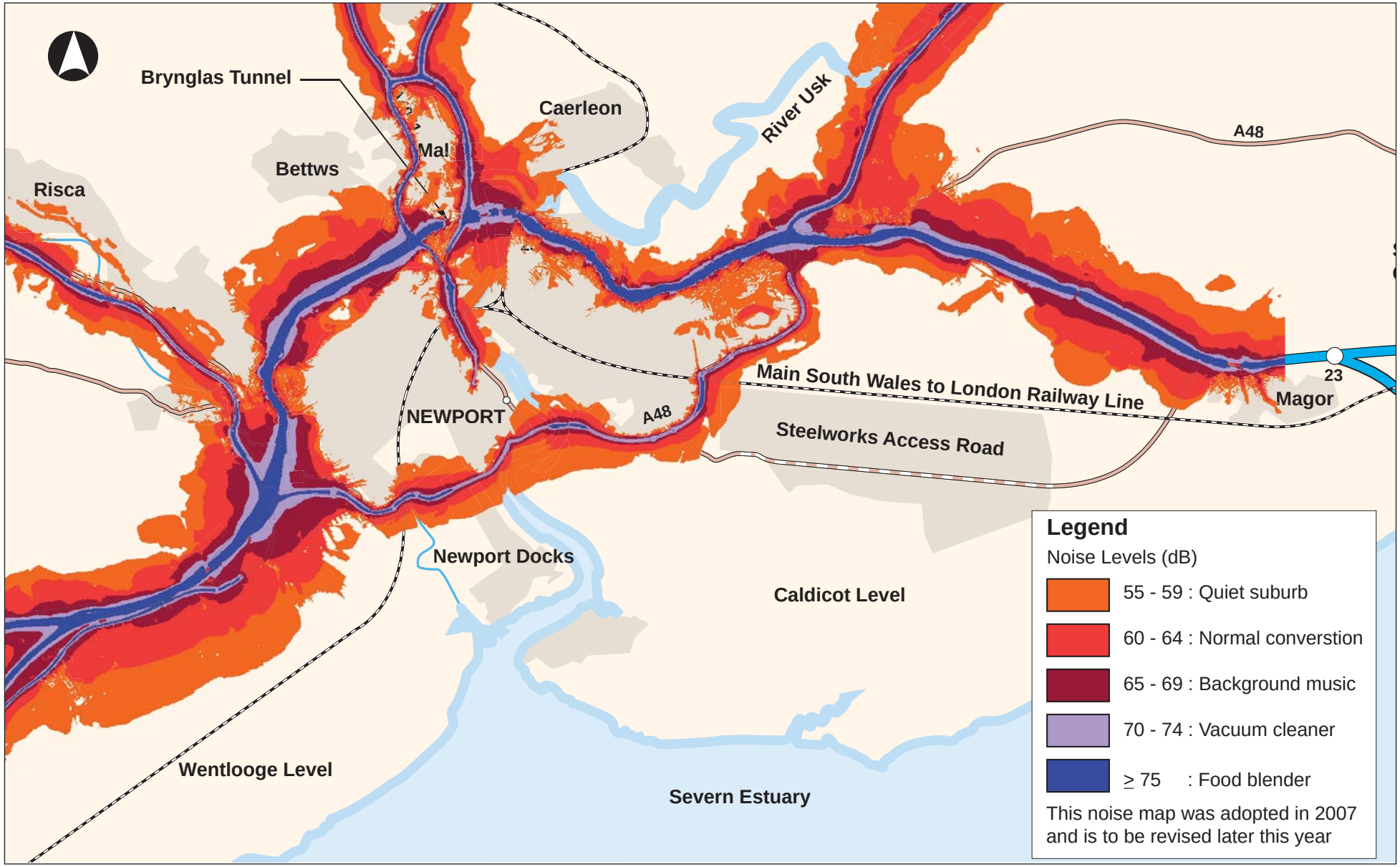
Revision A - 5. The original document included incorrect values in Table 2 and Figure 9 for the various sections of the M4 motorway. This was as a result of a transcription error and has no material effect on this consultation.

d) Sustainable Development

Figure 10 shows how traffic congestion adversely impacts on the local environment, community and economy around Newport. Other issues relating to sustainable development in the M4 Corridor include:

- For a significant number of journeys there are no convenient public transport alternatives to the car.
- In areas adjacent to the M4 noise levels can exceed 55 decibels. This means that some communities around Newport are subjected to noise levels the equivalent of background music.
- It is acknowledged that traffic emissions contribute towards air pollution in the Newport area.
- There is a perception that traffic congestion and the Severn Crossing tolls act as a constraint to economic development in South East Wales.

Figure 10: Sustainable Development



3. Transport Related Problems

(see Question 1 on Response Form)

The Welsh Government looked in detail at what travel related problems exist on the M4 Corridor Magor to Castleton, and asked people, including those involved in managing transport in and around Newport what they thought the problems amount to. This is what they said:

Capacity

1. A greater volume of traffic uses the M4 around Newport than it was designed to accommodate, resulting in regular congestion at peak times over extended periods.
2. The M4 around Newport is used as a convenient cross town connection for local traffic, with insufficient local road capacity.
3. HGVs do not operate efficiently on the motorway around Newport.
4. There is insufficient capacity through some of the Junctions (e.g. 3 lane capacity drops to 2 lane capacity).
5. The 2-lane Brynglas tunnels are a major capacity constraint.
6. The M4 cannot cope with increased traffic from new developments.

Resilience

7. Difficulties maintaining adequate traffic flows on the M4 and alternative highway routes at times of temporary disruption; alternative routes are not able to cope with M4 traffic.
8. The road and rail transport system in and around the M4 Corridor is at increasing risk of disruption due to extreme weather events.
9. When there are problems on the M4, there is severe disruption and congestion on the local and regional highway network.
10. The M4 requires essential major maintenance within the next 5-10 years; this will involve prolonged lane and speed restrictions, thus increasing congestion problems.
11. There is insufficient advance information to inform travel decisions when there is a problem on the M4.

Safety

12. The current accident rates on the M4 between Magor and Castleton are higher than average for UK motorways.
13. The existing M4 is an inadequate standard compared to modern design standards.
14. Some people's driving behaviour leads to increased accidents (e.g. speeding, lane hogging, unlicensed drivers).

Sustainable Development

15. There is a lack of adequate sustainable integrated transport alternatives for existing road users.
16. Traffic noise from the motorway and air quality is a problem for local residents in certain areas.
17. The existing transport network acts as a constraint to economic growth and adversely impacts the current economy.

Question 1a. In your opinion, which of the transport related problems listed are the most important to be addressed by the M4 CEM programme?

Question 1b. Would you like to make any other comments on the traffic related problems which should be addressed by the M4 CEM Programme?

Please give your answer in the Response Form choosing up to four from the numbered problems listed above. Choosing four does not signify other problems are not relevant but will help us understand your priorities. A box is also provided for your comments.

4. Goals of the M4 CEM Programme

(see Question 2 on Response Form)

In response to identifying the problems listed above, Welsh Government with the help of others identifies the following Goals, which the M4 Corridor Enhancement Measures Programme should aim to achieve in order to ease the flow in the M4 Corridor between Magor and Castleton:

When the M4 CEM Programme is concluded we will benefit from:

1. Safer, easier and more reliable travel east-west in South Wales.
2. Improved transport connections within Wales and to England, the Republic of Ireland and the rest of Europe on all modes on the international transport network.
3. More effective and integrated use of alternatives to the M4, including other parts of the transport network and other modes of transport for local and strategic journeys around Newport.
4. Best possible use of the existing M4, local road network and other transport networks.
5. More reliable journey times along the M4 Corridor.
6. Increased level of choice for all people making journeys within the transport Corridor by all modes between Magor and Castleton, commensurate with demand for alternatives.
7. Improved safety on the M4 Corridor between Magor and Castleton.
8. Improved air quality in areas next to the M4 around Newport.
9. Reduced disturbance to people from high noise levels, from all transport modes and traffic within the M4 Corridor.
10. Reduced greenhouse gas emissions per vehicle and/or person kilometre.
11. Improved travel experience into South Wales along the M4 Corridor.
12. An M4 attractive for strategic journeys that discourages local traffic use.
13. Improved traffic management in and around Newport on the M4 Corridor.
14. Easier access to local key services and residential and commercial centres.
15. A cultural shift in travel behaviour towards more sustainable choices.

Question 2a. In your opinion, which of the goals listed are the most important for the Welsh Government to achieve with the M4 CEM Programme?

Question 2b. Would you like to make any other comments on the goals of the M4 CEM Programme?

Please give your answer in the Response Form choosing up to four from the numbered goals listed above. Choosing four does not signify other goals are not important but will help us understand your priorities. A box is also provided for your comments.

5. How we will tackle the transport related problems and achieve our goals

Improving east-west travel is identified as a priority in the Welsh Government's prioritised National Transport Plan (NTP) and the Welsh Government is committed to solving transport problems around Newport.

However, given the range and complexity of the challenges arising within the M4 Corridor between Magor and Castleton, and forecasts about how these problems will develop over time, no single action will solve all the problems and achieve all the goals listed in the previous section. A new M4 CEM Strategy, comprising a range of different interventions is required.

The Welsh Government cannot deliver the M4 CEM Strategy successfully alone. Everyone, including Local Government, other Authorities and people using the transport system, has a role to play. Equally, taking everyone's opinions and insights into consideration now, at the planning stage, can help ensure that the strategy is the right one – resolving today's problems and those problems we can foresee arising in the future. That is why this Public Consultation exercise is highlighted in the current NTP.

Building on the feedback received during this Consultation, the Welsh Government will announce the strategy and a phased delivery plan.

Welsh Government has explored more than 100 possible interventions to see how they would help achieve the goals of the M4 CEM.

They fall into four broad categories:

Alternative travel modes: This is about getting more people to use public transport to travel and access services, homes, work and leisure without driving a car.

Smarter Sustainable Choices and Promoting Well-being: This means thinking of ways of organising our lives so that we can prevent further travel-related problems. This might be achieved through:

- government policy (better strategic land-use planning, linking travel and access plans to health, economy and environment agendas);
- action by businesses or individuals (flexible working hours, reducing travel by working from home, car sharing).

Highway infrastructure: This is about building and improving road networks so that they work more efficiently for travellers and cause fewer problems for people living near them.

Road network management: This is about managing our existing roads better. Measures include ideas to minimise peak-time congestion and heavy traffic associated with popular events and ideas to improve the response to accidents and bad weather, to minimise disruption.

Among all four categories of possible interventions, some target only the Newport area, and can deliver positive outcomes within the next few years, while others have potential to contribute to larger, regional or national scale strategies and may take longer to complete.

6. Measures already being delivered or programmed within the near future, to ease the flow

The Welsh Government is committed to continuing its delivery of interventions to ease the flow on the M4 between Magor and Castleton, and to improve safety and resilience within the next two to four years.

Practical measures to make travel safer and easier on the M4 between Junctions 23a and 29 began in 2008. Early work to improve safety included replacing sections of steel central barriers with concrete ones, the introduction of Variable Speed Limit systems and the deployment of traffic officers. To ease congestion, improvements have been made to the roundabout at Junction 24 at Coldra. Further details of the measures currently being delivered or programmed in the near future are provided in the supporting documents available at www.m4cem.com.

The outcomes of the measures currently being delivered or programmed within the near future combine to give us a starting point, or base-line picture, of the situation on the M4 when we begin to implement the M4 CEM Strategy.

7. Developing strategic approaches to achieving the M4 CEM Goals

Having established the problems and the need to tackle them, the Welsh Government has involved others in exploring a very wide range of possible ways of solving these problems and of delivering the goals of the M4 CEM Strategy. A long list of possible solutions has been explored.

No single solution delivers all the Goals, but through this methodology, measures that contribute towards a combination of compatible options, or ‘Packages’, have been identified. The Packages combine public transport, highway and other travel solutions.

The strategic approaches adopted by the Welsh Government to reduce congestion and to delivering the M4 CEM Goals all involve creating some new highway capacity on the M4, and /or elsewhere in the highway network between Magor and Castleton. However traffic congestion will not simply disappear as a result of capacity increase. This is because the development of new or up-graded, convenient and reliable roads tends to encourage more people on to them. This results in additional vehicles using additional road capacity (not a stable volume of vehicles using more / emptier roads).

To avoid this and to curb the rising demand for more highway capacity and to put transport onto a carbon reduction pathway, the M4 CEM Programme proposes increasing and improving the opportunities for access, and for travel and transport using alternatives modes, such as trains and buses (public transport), cycling and walking. We also propose minimising the need for certain types of journey.

To enable the sustained productivity and competitiveness of Wales, and the South East Wales region in particular, highway infrastructure must also be developed; several alternative approaches are possible, each with particular advantages and challenges. In addition, some other common measures can enhance the effectiveness of each of the possible strategies we are considering. The approach the Welsh Government may take is summarised below:

Public Transport Measures	+	Highway Infrastructure option A or B or C or D	+	Common Measures	=	M4 CEM Strategy (Package of measures)

The following sections of this document detail the various measures which could form part of the M4 CEM Strategy.

For each possible measure we present we show you how well it performs, judged againist it's ability to achieve the goals of the M4 CEM Programme.

Each measure is also appraised on its likely economic, social and environmental impact, according to criteria recommended by Welsh Transport and Appraisal Guidance (WelTAG).

WelTAG is a transport appraisal tool applicable to transport projects, plans and programmes in Wales. The Welsh Government requires that major transport initiatives seeking government funding are appraised with this guidance.

In order to help make the appraisal information easier to understand, each measure is assessed through appraisal tables using a 7-scale colour coding system:

Large Positive Impact	(+++)
Moderate Positive Impact	(++)
Slight Positive Impact	(+)
No (or Minimal) Impact	(N)
Slight Negative Impact	(-)
Moderate Negative Impact	(--)
Large Negative Impact	(---)

8. Public Transport Measures

(see Question 3 on Response Form)

Studies show that new or improved public transport services are likely to have only minimal impact with respect to reducing traffic on the M4. Generally, investment in public transport measures is more likely to be aimed at achieving wider benefits than relieving motorway traffic. These should encourage modal shift and reduce the reliance on the private vehicle in the Newport area, by increasing choice. They could specifically target journeys in the M4 corridor between Magor and Castleton.

The Welsh Government's priorities for delivering improvements in sustainable travel and improved public transport in the period to 2015 are set out in the prioritised National Transport Plan. They include improvements to the Valley Lines rail network which will make additional frequencies possible from Pontypridd, Rhymney, Caerphilly, Maesteg and the Vale of Glamorgan line from Bridgend to Cardiff, enabling increased rail journey opportunities to the network beyond, including Newport, Bristol and beyond. They are not thought likely to deliver a major impact in reducing traffic on the M4.

Linked to the prioritised National Transport Plan, the Welsh Government's key public transport objective is rail electrification - of the Great Western Main Line to Swansea and of the Valley Lines network. The Welsh Government has submitted very positive business cases for this to the UK Government, which is responsible for rail investment for England and Wales and which will be taking a decision on these proposals in July 2012.

For the purpose of this Consultation, an indicative programme of additional investment in improved public transport measures around Cardiff/Newport is considered. It is important to note that this indicative programme is outside current commitments and planned developments. It includes bus, rail and modal interchange improvements, such as new stations and park and ride facilities. To deliver these, the estimated capital cost is approximately £300m and ongoing subsidy costs totalling some £200m - £300m over a sixty year period. These include:

- Additional mainline train services between Swansea, Cardiff, Newport and Bristol;
- Additional train services on local routes;
- More stations with park and ride facilities;
- More bus/train connecting services;
- Additional express bus/coach services between Cardiff, Newport and Bristol;
- Additional local bus services around and across Newport.

A review of this indicative public transport investment package suggests that it could reduce traffic on the M4 around Newport by less than 3%. However, for the Newport area, it could also produce a significant mode share increase in use of public transport from 7% to approximately 11%. This level of modal shift, while significant, means that the investment in public transport considered here could not alone achieve the goals of the M4 CEM Programme.

In addition to the measures listed above, preliminary development of a vision to create an integrated transport metro system is ongoing. This would encompass the south Wales city region between Newport, Cardiff and Swansea and their surrounding areas. This vision is at an early stage and will be developed in the future. Its impact is therefore not appraised as part of the M4 CEM Programme.

Question 3a. Which of the public transport measures listed has/have the potential to reduce your use of the M4? (Please tick all that apply)

Question 3b. To what extent do you think the public transport measure(s) you have selected will address the problems and achieve the goals you have chosen?

Further information is provided below. Please give your answer in the Response Form.

Appraisal of Public Transport Measures

Appraisal against M4 CEM goals

1	Safer, easier and more reliable travel East-West in South Wales.	(+)
2	Improved transport connections within Wales and to England, the Republic of Ireland and the rest of Europe on all modes on the international transport network.	(N)
3	More effective and integrated use of alternatives to the M4, including other parts of the transport network and other modes of transport for local and longer distance journeys around Newport.	(+)
4	Best possible use of the existing M4, local road network and other transport networks.	(+)
5	More reliable journey times along the M4 corridor.	(N)
6	Increased level of choice for all people making journeys within the transport corridor by all modes between Magor and Castleton, commensurate with demand for alternatives.	(++)
7	Improved safety on the M4 Corridor between Magor and Castleton.	(N)
8	Improved air quality in areas next to the M4 around Newport.	(+)
9	Reduced disturbance to people from high noise levels, from all transport modes and traffic within the M4 corridor.	(+)
10	Reduced greenhouse gas emissions per vehicle and/ or person kilometre.	(+)
11	Improved travel experience into South Wales along the M4 Corridor.	(N)
12	An M4 attractive for longer distance journeys that discourages local traffic use.	(+)
13	Improved traffic management in and around Newport on the M4 Corridor.	(N)
14	Easier access to local key services and residential and commercial centres.	(+)
15	A cultural shift in travel behaviour towards more sustainable choices.	(++)

Acceptability, Feasibility, Deliverability and Risk

Public acceptability: The promotion of public transport use is likely to be greeted positively by communities in Newport and surrounding areas, although encouraging people to use more sustainable modes may be challenging without Travel Demand Management being put in place. This may include parking charge increase, or congestion charges in city centres, which are usually met with public opposition.
Acceptability to other stakeholders: Investment in public transport is likely to be supported by environmental, business and mobility groups in particular.
Technical and operational feasibility: The measures considered as part of this study have not been through formal design, therefore the technical and operational feasibility risks are unknown. In terms of creating modal shift, Travel Demand Management may be required to create disincentives to travel by car.
Financial affordability and deliverability: A phased approach to delivery could improve affordability and deliverability.
Risks: Significant investment in public transport would require political commitment at a local, regional and national level.

Welsh Government Transport Appraisal Guidance (WelTAG) Criteria

Criteria	Assessment	Significance
Economy		
Transport Economic Efficiency (TEE)	The public transport measures aim to encourage modal shift onto public transport and ultimately improve journey times and journey time reliability through reducing general traffic congestion levels. Whilst it is likely that the benefits will increase over time as the cultural shift in travel behaviour moves towards sustainable choices, the investment and revenue costs needed to deliver and operate public transport services may require public subsidy, which could be a significant ongoing revenue cost.	(-)
Economic Activity and Location Impact (EALI)	The public transport measures may have a positive impact on the local and regional economy as local accessibility within Newport is enhanced, together with improvements being made to longer distance travel by public transport.	(+)
Environment		
Noise	As modal shift trends are realised, noise nuisance would reduce along the M4 and local road network.	(+)
Local Air Quality	As modal shift trends are realised, air pollution would reduce along the M4 and local road network, leading to improvement in air quality in the Air Quality Management Areas in particular.	(+)
Greenhouse Gas Emissions	The public transport measures will help to reduce congestion, which should have some benefit in reducing vehicle emissions.	(+)
Landscape and townscape	As the individual schemes have not yet been fully designed, the full extent of the impact is unclear. However, it is likely that the schemes will require limited land take and thus the impact will be minimal.	(N)
Biodiversity	As the individual schemes have not yet been fully designed, the full extent of the impact is unclear. However, it is likely that the schemes will require limited land take and thus the impact will be minimal. New stations could be close to the River Usk SAC and SSSI and may have a negative impact on these habitats.	(-)
Heritage	It is likely that the schemes will require limited land take and thus the impact will be minimal.	(N)
Water environment	New stations are likely to be close to the River Usk SAC and SSSI, there may be negative impact.	(-)

Welsh Government Transport Appraisal Guidance (WelTAG) Criteria

Criteria	Assessment	Significance
Soils	As the individual schemes have not yet been fully designed, the full extent of the impact is unclear. However, it is likely that the schemes will require limited land take and thus that the impact will be minimal.	(N)
Social		
Transport safety	The public transport measures could improve road safety should modal shift result in reduced general traffic levels.	(+)
Personal security	The public transport measures would not be expected to impact on personal security.	(N)
Permeability	Movement by walking and cycling would benefit.	(+)
Physical fitness	Public transport trips often include a walk or cycle to or from the public transport start and end points. An increase in public transport should increase this physical activity.	(+)
Social inclusion	Local rail and bus services will be improved, benefiting those without access to a vehicle.	(++)
Equality, Diversity & Human Rights	The public transport measures proposed would aim to meet the needs of all groups of people.	(N)

9. Highway Infrastructure Measures

Four highway infrastructure measures are considered here which aim to increase highway capacity and improve resilience and safety within the M4 Corridor between Magor and Castleton. It is important to note that these indicative Highway Options are outside current commitments included in the prioritised National Transport Plan.

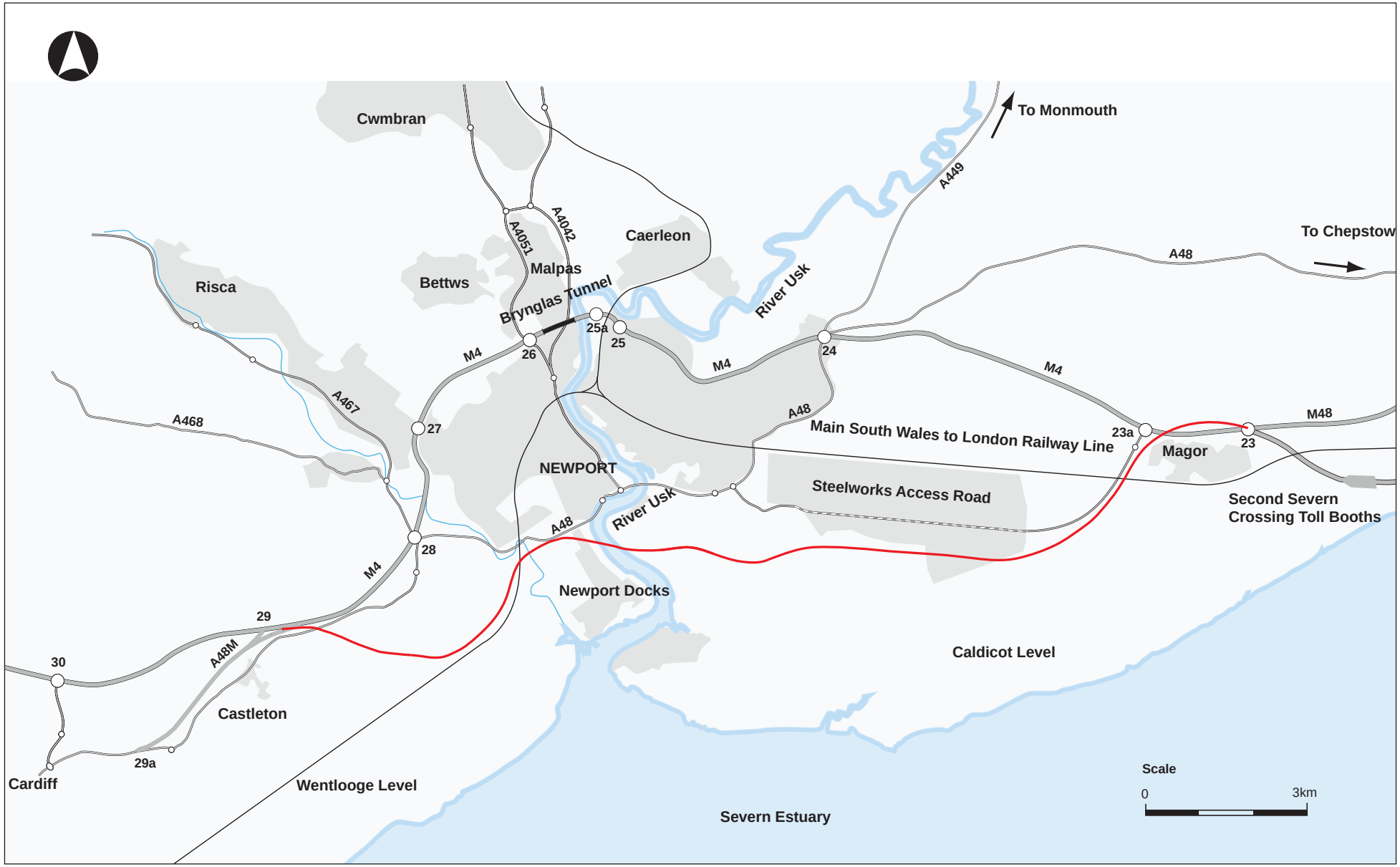
Highway Option A: Additional high quality road to the south of Newport (see Question 4a on Response Form)

Option A would involve the construction of an additional high quality road to the south of Newport, delivered alongside other traffic management and smarter choice measures (see Common Measures). The route the road would take is indicated in red on the diagram. The additional road would provide significant increased capacity in the highway network around Newport. It would also relieve traffic on the existing M4 motorway by offering an alternative route for longer distance journeys, especially those using the Severn Crossings, thereby improving the resilience of the highways network. The additional road, for the purposes of this consultation, has been appraised as a dual-carriageway, which could cost approximately £830m. A route has been planned to the south of Newport that aims to minimise negative impacts on local communities and the environment, whilst seeking to support economic development in South East Wales. Unlike the M4 relief road, this road could be delivered in phases, both to meet (and respond to) demand and improve affordability.

Question 4a. To what extent do you think Highway Infrastructure Option A will address the problems and achieve the goals you have chosen?

Further information is provided below. Please give your answer in the Response Form.

Highway Option A



Appraisal of additional high quality road to the south of Newport (Highway Option A)

Appraisal against M4 CEM goals

1	Safer, easier and more reliable travel East-West in South Wales.	(+++)
2	Improved transport connections within Wales and to England, the Republic of Ireland and the rest of Europe on all modes on the international transport network.	(++)
3	More effective and integrated use of alternatives to the M4, including other parts of the transport network and other modes of transport for local and longer distance journeys around Newport.	(++)
4	Best possible use of the existing M4, local road network and other transport networks.	(+)
5	More reliable journey times along the M4 corridor.	(+++)
6	Increased level of choice for all people making journeys within the transport corridor by all modes between Magor and Castleton, commensurate with demand for alternatives.	(+)
7	Improved safety on the M4 Corridor between Magor and Castleton.	(++)
8	Improved air quality in areas next to the M4 around Newport.	(+)
9	Reduced disturbance to people from high noise levels, from all transport modes and traffic within the M4 corridor.	(++)
10	Reduced greenhouse gas emissions per vehicle and/ or person kilometre.	(N)
11	Improved travel experience into South Wales along the M4 Corridor.	(++)
12	An M4 attractive for longer distance journeys that discourages local traffic use.	(+++)
13	Improved traffic management in and around Newport on the M4 Corridor.	(++)
14	Easier access to local key services and residential and commercial centres.	(++)
15	A cultural shift in travel behaviour towards more sustainable choices.	(--)

Acceptability, Feasibility, Deliverability and Risk

Public acceptability: The new road will create economic and social benefits. However, the environmental impact of the new road to the south of Newport may attract some opposition.
Acceptability to other stakeholders: The new road would help address many of the problems caused by congestion on the M4 in a phased and affordable manner, thus could attract support and be acceptable to other stakeholders, particularly business groups. However, adverse impacts on the environment could attract opposition from environmental groups and the wider public.
Technical and operational feasibility: The new road would include a crossing of the River Usk and would need to avoid or pass through the Docks Way landfill site.
Financial affordability and deliverability: The construction of the new road could be delivered in phases, which could improve affordability.
Risks: The new route would need to negotiate a landfill site requiring legal processes to be successfully concluded.

Welsh Government Transport Appraisal Guidance (WelTAG) Criteria

Criteria	Assessment	Significance
Economy		
Transport Economic Efficiency (TEE)	The new road will help reduce problems of congestion on the highway network, thus leading to journey time savings and improved journey time reliability. The new road would also provide resilience in times of maintenance on the existing M4. It could be delivered in phases that would achieve cumulative benefits and spread the investment costs.	(+++)
Economic Activity and Location Impact (EALI)	The construction of a new high quality road to the south of Newport would aim to support regional economic development, through enhancing accessibility to employment centres and improving the movement of people and freight. It is likely that there would be some disruption during construction of the junctions to connect the new road with the M4.	(+++)
Environment		
Noise	Noise impacts would be reduced along the route of the existing M4, which would reduce the noise nuisance to nearby residential properties. New noise impacts would arise along the new road route. The Common Measures promote forms of transport emitting lower noise intensities, including electric vehicles, walking and cycling; and promote noise reducing solutions.	(++)
Local Air Quality	A new route to the south of Newport would help reduce air pollution along the route of the current M4, improving conditions in the Air Quality Management Areas. However air quality would be expected to deteriorate in the area around the new road. The Common Measures promote more sustainable forms of transport, which will help to improve local air quality.	(+)
Greenhouse Gas Emissions	The new road will help to reduce congestion, which should have some benefit in reducing vehicle emissions; however it is not clear whether the additional road capacity would lead to an overall increase in emissions in the longer term.	(N)
Landscape and townscape	The new road to the south of Newport would cross the River Usk SAC and SSSI and the Gwent Levels, and thus is likely to impact adversely on the landscape.	(--)

Criteria	Assessment	Significance
Biodiversity	The new road would cross the River Usk SAC and SSSI and the Gwent Levels SSSIs. This means extra care will be required during construction. Mitigation and enhancement measures will be required to ensure that any adverse impacts on these habitats are compensated for. It is likely that wildlife corridors could be disrupted.	(---)
Heritage	The Gwent Levels are defined by Cadw as a Landscape of Outstanding Historical Interest. There are limited means by which the effects of construction of the new road on the Historic Built Environment can be mitigated.	(--)
Water environment	The new road would cross the River Usk SAC and SSSI. The construction in this area is likely to lead to some water contamination. Environmental management will be required during construction.	(--)
Soils	The new road would run through three distinctive topographical, geological and hydrogeological environments, including potentially contaminated sites within the central area of the scheme.	(-)
Social		
Transport safety	The new road would help improve road safety by reducing congestion levels, improving traffic flows, enhancing motorway junctions. On completion of the new road, it is forecast that the total number of accidents on major roads in Newport would fall from 85 to 77 per year (approximately 9% improvement). Common Measures could improve traffic management and response to incidents/events.	(++)
Personal security	Investment in walking and cycling facilities would improve safety for non-motorised users. There would be no adverse impact on personal security as a result of other measures.	(+)
Permeability	Movement by walking and cycling would be benefited.	(+)
Physical fitness	Improvements to walking and cycling facilities will help promote healthy lifestyles.	(+)
Social inclusion	These measures would be expected to have a negligible effect on social inclusion.	(N)
Equality, Diversity & Human Rights	The measures proposed would aim to meet the needs of all groups of people when progressed to project stage.	(N)

Highway Option B: At grade junction improvements to the A48 Newport Southern Distributor Road (SDR) (see Question 4b on Response Form)

Option B would involve a series of at-grade junction improvements to the Newport A48 Southern Distributor Road (SDR) in addition to other traffic management and smarter choice measures (see Common Measures). An “at-grade improvement” to a junction is made at the same level as the main road. For example, improvements to roundabouts are at grade; adding flyovers and underpasses are not at-grade improvements.

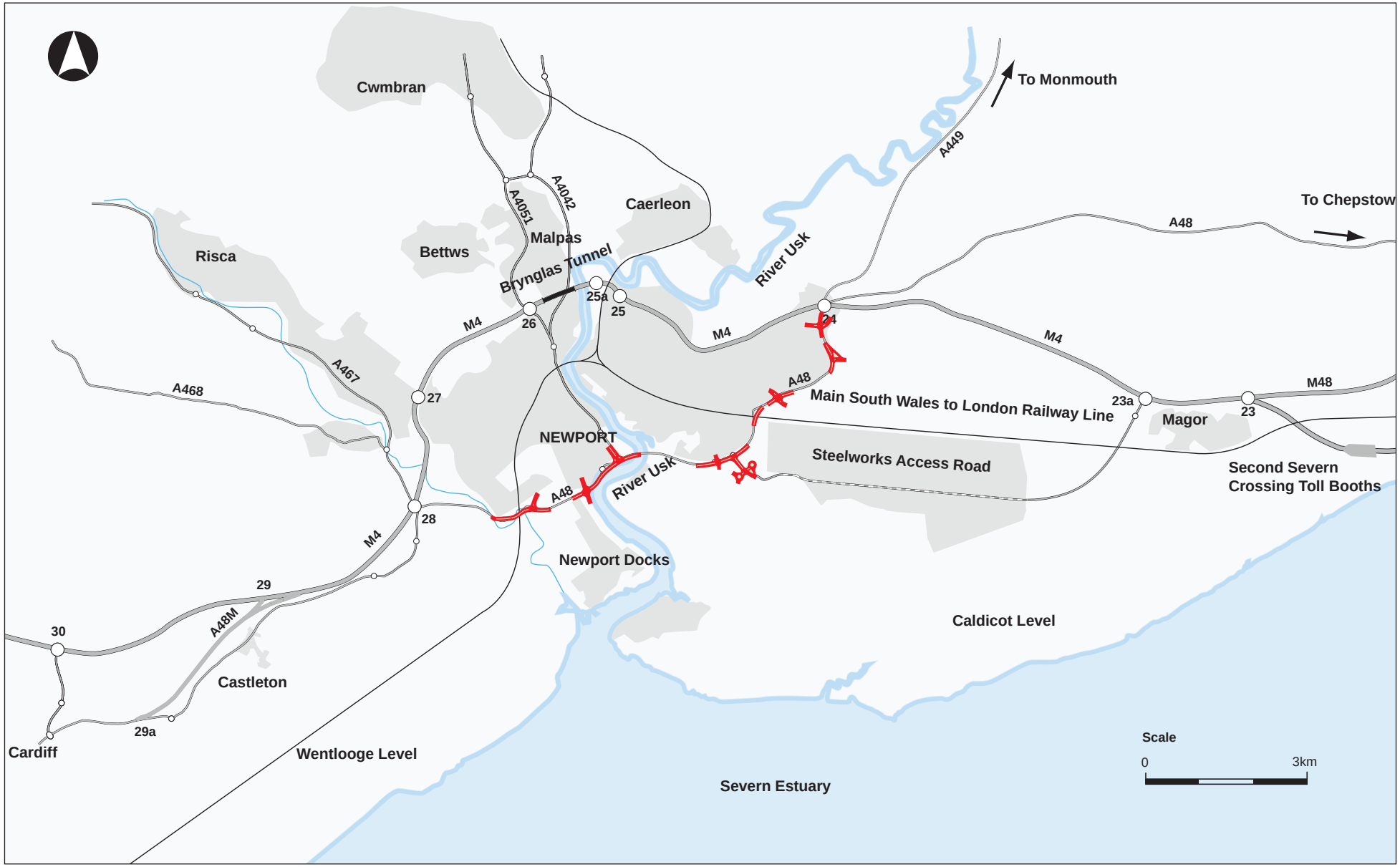
Traffic flows on the SDR are currently lower than were predicted prior to opening. In part, this is due to the number of roundabouts disrupting mainline flows. The roundabouts tend to disrupt main carriageway traffic flows by giving priority to circulating traffic. More efficient control of the entry of traffic from minor routes would reduce this disruption. The location of proposed junction improvements are shown in red on the diagram below. The SDR would be a more attractive alternative east-west traffic route if the main carriageway flows were given greater priority by signal control at all junctions. However, the prioritisation of east-west movements along the SDR could potentially cause delays on the local road network.

At-grade junction improvements would also aim to improve resilience along the highway network at times of incident or delay on the M4. Traffic light signal controls could help the through flow of traffic along the SDR, whilst other highway measures (see Common Measures) would aim to help the efficient movement of people and freight in South East Wales. At-grade junction improvements could be delivered in phases with a total cost estimated at approximately £45m.

Question 4b. To what extent do you think Highway Infrastructure Option B will address the problems and achieve the goals you have chosen?

Further information is provided below. Please give your answer in the Response Form.

Highway Option B



Appraisal of at grade junction improvements to the A48 Southern Distributor Road (SDR) (Highway Option B)

Appraisal against M4 CEM goals

1	Safer, easier and more reliable travel East-West in South Wales.	(+)
2	Improved transport connections within Wales and to England, the Republic of Ireland and the rest of Europe on all modes on the international transport network.	(N)
3	More effective and integrated use of alternatives to the M4, including other parts of the transport network and other modes of transport for local and longer distance journeys around Newport.	(+)
4	Best possible use of the existing M4, local road network and other transport networks.	(+)
5	More reliable journey times along the M4 corridor.	(+)
6	Increased level of choice for all people making journeys within the transport corridor by all modes between Magor and Castleton, commensurate with demand for alternatives.	(+)
7	Improved safety on the M4 Corridor between Magor and Castleton.	(+)
8	Improved air quality in areas next to the M4 around Newport.	(N)
9	Reduced disturbance to people from high noise levels, from all transport modes and traffic within the M4 corridor.	(+)
10	Reduced greenhouse gas emissions per vehicle and/ or person kilometre.	(N)
11	Improved travel experience into South Wales along the M4 Corridor.	(+)
12	An M4 attractive for longer distance journeys that discourages local traffic use.	(N)
13	Improved traffic management in and around Newport.	(+)
14	Easier access to local key services and residential and commercial centres.	(+)
15	A cultural shift in travel behaviour towards more sustainable choices.	(N)

Acceptability, Feasibility, Deliverability and Risk

Public acceptability: Improved operating conditions along the SDR could provide network resilience during incidents and delays on the M4. At-grade junction improvements could adversely affect local traffic, which may attract opposition from people making journeys in the Newport area.
Acceptability to other stakeholders: Improved resilience on the network could be supported by business groups, whilst additional impacts on the environment may be met with opposition from environmental groups.
Technical and operational feasibility: Any works to the SDR would require contractual negotiations with the SDR concessionaire.
Financial affordability and deliverability: Construction of the works could be delivered in phases, which could improve affordability.
Risks: Any works to the SDR would require contractual negotiations with the SDR concessionaire.

Welsh Government Transport Appraisal (WelTAG) Criteria

Criteria	Assessment	Significance
Economy		
Transport Economic Efficiency (TEE)	At-grade junction improvements to the SDR could improve operating conditions and attract some traffic from the M4. Whilst this would improve network resilience, the prioritisation of east-west movements along the SDR could cause delays on the local road network. On-line improvements to the SDR would lead to disruption during construction.	(-)
Economic Activity and Location Impact (EALI)	The construction of a new high quality road to the south of Newport would aim to support regional economic development, through enhancing accessibility to employment centres and improving the movement of people and freight. It is likely that there would be some disruption during construction of the junctions to connect the new road with the M4.	(N)
Environment		
Noise	Noise impacts could be reduced along the M4 route, which would reduce the noise nuisance to nearby residential properties. Noise levels would be expected to increase along the SDR. The extent to which these noise levels change depends on change in traffic flows. The Common Measures promote forms of transport emitting lower noise intensities, including electric vehicles, walking and cycling; and promote noise reducing solutions.	(+)
Local Air Quality	Alternative use of the SDR by local traffic would reduce air pollution along the route of the current M4, improving conditions in the Air Quality Management Areas. Pollution levels may increase along the SDR. The Common Measures promote more sustainable forms of transport, which will help to improve local air quality	(N)
Greenhouse Gas Emissions	The improvements to the SDR will have a negligible impact on congestion, and therefore on greenhouse gas emissions. The other core measures are likely to result in a very minimal improvement, but the overall effect will be negligible.	(N)
Landscape and townscape	The changes proposed will result in minor and very local adverse visual impacts, including some within a Historic Landscape Area, Green Wedge and the Tredegar House Historic Park and Garden.	(-)

Criteria	Assessment	Significance
Biodiversity	Part of the SDR is situated within the Gwent Levels SSSI. At-grade improvements would require the realignment of the SDR at Church Street which crosses the River Usk SAC mudflats, an ecologically sensitive area, which may require mitigation.	(-)
Heritage	At-grade improvements could have an adverse impact on the Tredegar House Historic Park and Garden, Grade 1 Listed Building and Conservation Area. They could also affect Grade II Listed Buildings.	(-)
Water environment	At-grade improvements would require drainage measures and the SDR is situated within TAN15 Flood Zones. Some junctions of the SDR run close to the Ebbw River and would need to accommodate flood mitigation works.	(-)
Soils	Some additional land will be required; generally there would be a negligible impact.	(N)
Social		
Transport safety	Option B will help improve road safety through improving traffic management on the SDR, enhancing motorway junctions. It is forecast that the total number of accidents on major roads in Newport would fall from 85 to 84 per year as a result of these improvements. Common Measures could improve traffic management and response to incidents/events.	(+)
Personal security	Investment in walking and cycling facilities would improve safety for non-motorised users.	(+)
Permeability	There would be no adverse impact on personal security as result of other Common Measures.	(+)
Physical fitness	Movement by walking and cycling would be benefited.	(+)
Social inclusion	There would be a negligible effect on social inclusion.	(N)
Equality, Diversity & Human Rights	Delivery would aim to meet the needs of all groups of people when progressed to project stage.	(N)

Highway Option C: Grade separated junction improvements to the A48 SDR (see Question 4c on Response Form)

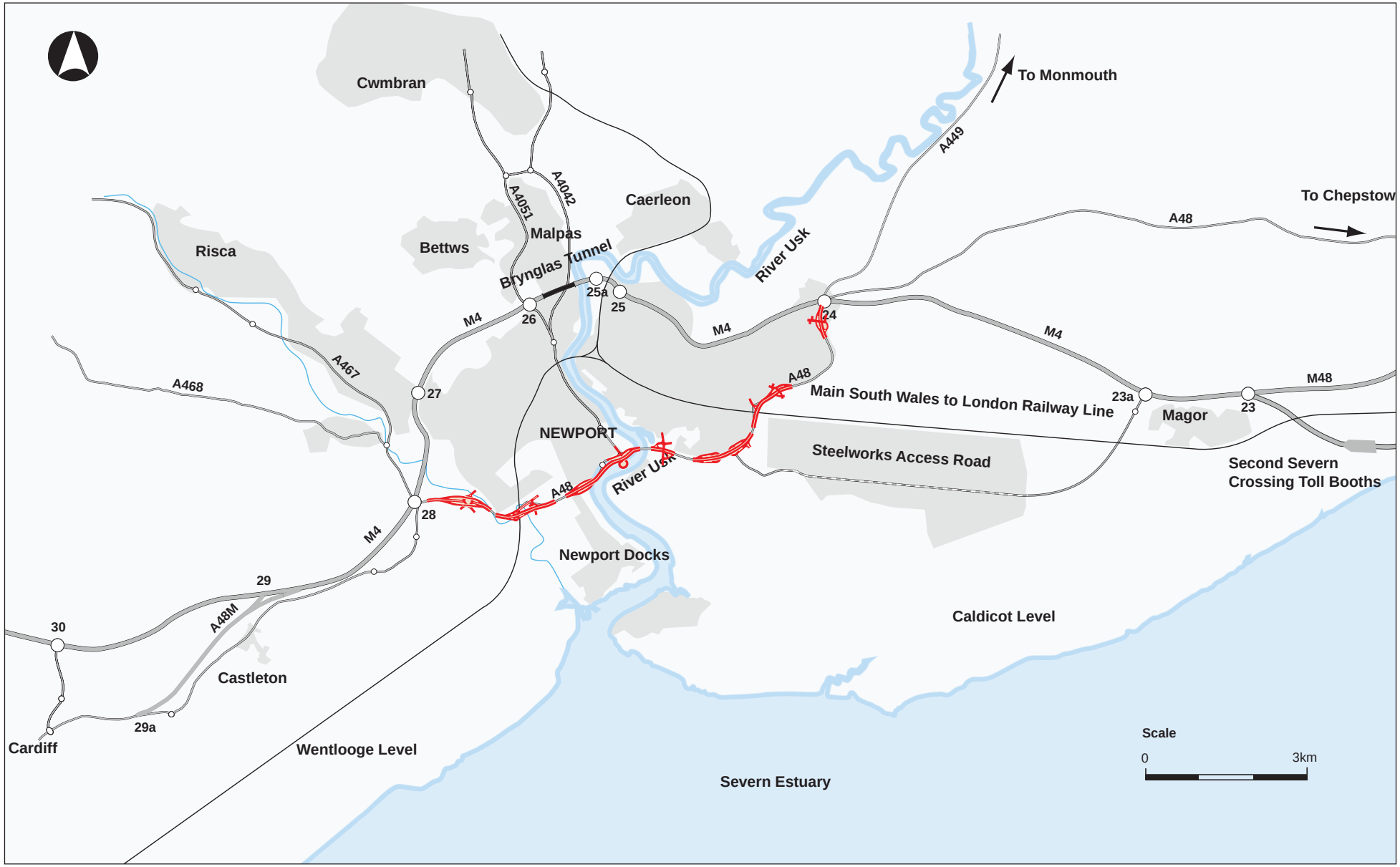
Option C would involve the grade separation of some junctions and partial or full closure of other junctions on the Newport A48 Southern Distributor Road (SDR) in addition to other traffic management and smarter choice measures (see Common Measures). Grade separation of a junction involves aligning a junction at different heights (e.g. development of a flyover), so that a junction will not disrupt the traffic flow on routes when they cross. Some demolition of existing properties is likely to be necessary to accommodate grade separation at some junctions.

Grade separated junctions would aim to provide free flowing traffic movements allowing for the efficient movement of people and freight along the SDR, as an alternative route to the M4. See the proposed changes shown in red on the following diagram. Grade separation would also reduce delays for traffic wanting to cross the SDR. The delivery of grade separated junctions could be delivered in phases to assist affordability. This scheme is estimated to cost approximately £300m.

Question 4c. To what extent do you think Highway Infrastructure Option C will address the problems and achieve the goals you have chosen?

Further information is provided below. Please give your answer in the Response Form.

Highway Option C



Appraisal of grade separated junction improvements to the A48 Southern Distributor Road (SDR) (Highway Option C)

Appraisal against M4 CEM goals

1	Safer, easier and more reliable travel East-West in South Wales.	(++)
2	Improved transport connections within Wales and to England, the Republic of Ireland and the rest of Europe on all modes on the international transport network.	(+)
3	More effective and integrated use of alternatives to the M4, including other parts of the transport network and other modes of transport for local and longer distance journeys around Newport.	(++)
4	Best possible use of the existing M4, local road network and other transport networks.	(++)
5	More reliable journey times along the M4 corridor.	(+)
6	Increased level of choice for all people making journeys within the transport corridor by all modes between Magor and Castleton, commensurate with demand for alternatives.	(+)
7	Improved safety on the M4 Corridor between Magor and Castleton.	(+)
8	Improved air quality in areas next to the M4 around Newport.	(+)
9	Reduced disturbance to people from high noise levels, from all transport modes and traffic within the M4 corridor.	(+)
10	Reduced greenhouse gas emissions per vehicle and/ or person kilometre.	(N)
11	Improved travel experience into South Wales along the M4 Corridor.	(+)
12	An M4 attractive for longer distance journeys that discourages local traffic use.	(+)
13	Improved traffic management in and around Newport on the M4 Corridor.	(+)
14	Easier access to local key services and residential and commercial centres.	(+)
15	A cultural shift in travel behaviour towards more sustainable choices.	(-)

Acceptability, Feasibility, Deliverability and Risk

Public acceptability: Improved operating conditions along the SDR could provide network resilience. Closure of some existing junctions could be detrimental to local travel patterns. Demolition of properties is an emotive issue and could attract public opposition.
Acceptability to other stakeholders: Improved resilience and accessibility on the network could be supported by business groups, whilst additional impacts on the environment may be met with opposition from environmental groups.
Technical and operational feasibility: The existing roundabouts are closely spaced. To comply with highway design standards, some of these roundabout junctions will require full or partial closure. Any works to the SDR would require contractual negotiations with the SDR concessionaire.
Financial affordability and deliverability: Construction of the works could be delivered in phases, which could improve affordability.
Risks: Any works to the SDR would require contractual negotiations with the SDR concessionaire.

Welsh Government Transport Appraisal Guidance (WelTAG) Criteria

Criteria	Assessment	Significance
Economy		
Transport Economic Efficiency (TEE)	Once complete, grade separation of the SDR will improve network resilience without disrupting local traffic. Journey time reliability will be improved and there would be journey time savings along the SDR. Improvements could be delivered in phases that would spread investment costs.	(+)
Economic Activity and Location Impact (EALI)	Providing additional network resilience will help reduce the negative economic impact caused by disruption during incidents and delays on the M4. There would be improvements to accessibility in southern Newport, benefiting the movement of people and freight to key employment areas and services.	(+)
Environment		
Noise	Noise impacts could be reduced along the M4 route and nearby residential properties. Noise levels would be expected to increase along the SDR. The extent to which these noise levels change depends on change in traffic flows. The Common Measures promote forms of transport emitting lower noise intensities, including electric vehicles, walking and cycling; and promote noise reducing solutions.	(+)
Local Air Quality	Alternative use of the SDR by local traffic would help reduce air pollution along the route of the current M4, improving air quality in the Air Quality Management Areas. Pollution levels may increase along the SDR. The Common Measures promote sustainable forms of transport, which will help to improve local air quality.	(+)
Greenhouse Gas Emissions	Improved operating conditions along the SDR will help to reduce congestion on the network, which should have some benefit in reducing vehicle emissions. It is not clear whether additional road use would lead to an overall increase in emissions in the longer term.	(N)
Landscape and townscape	The changes proposed will result in adverse visual impacts, including some within a Historic Landscape Area, Green Wedge and the Tredegar House Historic Park and Garden. Some properties may need to be demolished to accomodate grade separation at some junctions.	(--)

Criteria	Assessment	Significance
Biodiversity	Part of the SDR is situated within the Gwent Levels SSSI. Grade separated improvements would require the realignment of the SDR at Church Street which crosses the River Usk SAC mudflats, an ecologically sensitive area, which may require mitigation.	(--)
Heritage	Grade separated improvements could have an adverse impact on the Tredegar House Historic Park and Garden, Grade 1 Listed Building and Conservation Area. They could also affect Grade II Listed Buildings.	(-)
Water environment	Grade separated improvements would require drainage measures and the SDR is situated within TAN15 Flood Zones. Some junctions of the SDR run close to the Ebbw River and would need to accommodate flood mitigation works.	(-)
Soils	Some additional land will be required; generally there would be a negligible impact.	(N)
Social		
Transport safety	Option C will help improve road safety through improving traffic management on the SDR, enhancing motorway junctions, and improving traffic management and response to incidents/ events. It is forecast that the total number of accidents on major roads in Newport would fall from 85 to 77 per year as a result of these improvements.	(+)
Personal security	Investment in walking and cycling facilities would improve safety for non-motorised users. There would be no adverse impact on personal security as result of other Common Measures.	(+)
Permeability	Movement by walking and cycling would be benefited.	(+)
Physical fitness	Improvements to walking and cycling facilities could help promote healthy lifestyles.	(+)
Social inclusion	There would be a negligible effect on social inclusion.	(N)
Equality, Diversity & Human Rights	Delivery would aim to meet the needs of all groups of people when progressed to project stage.	(N)

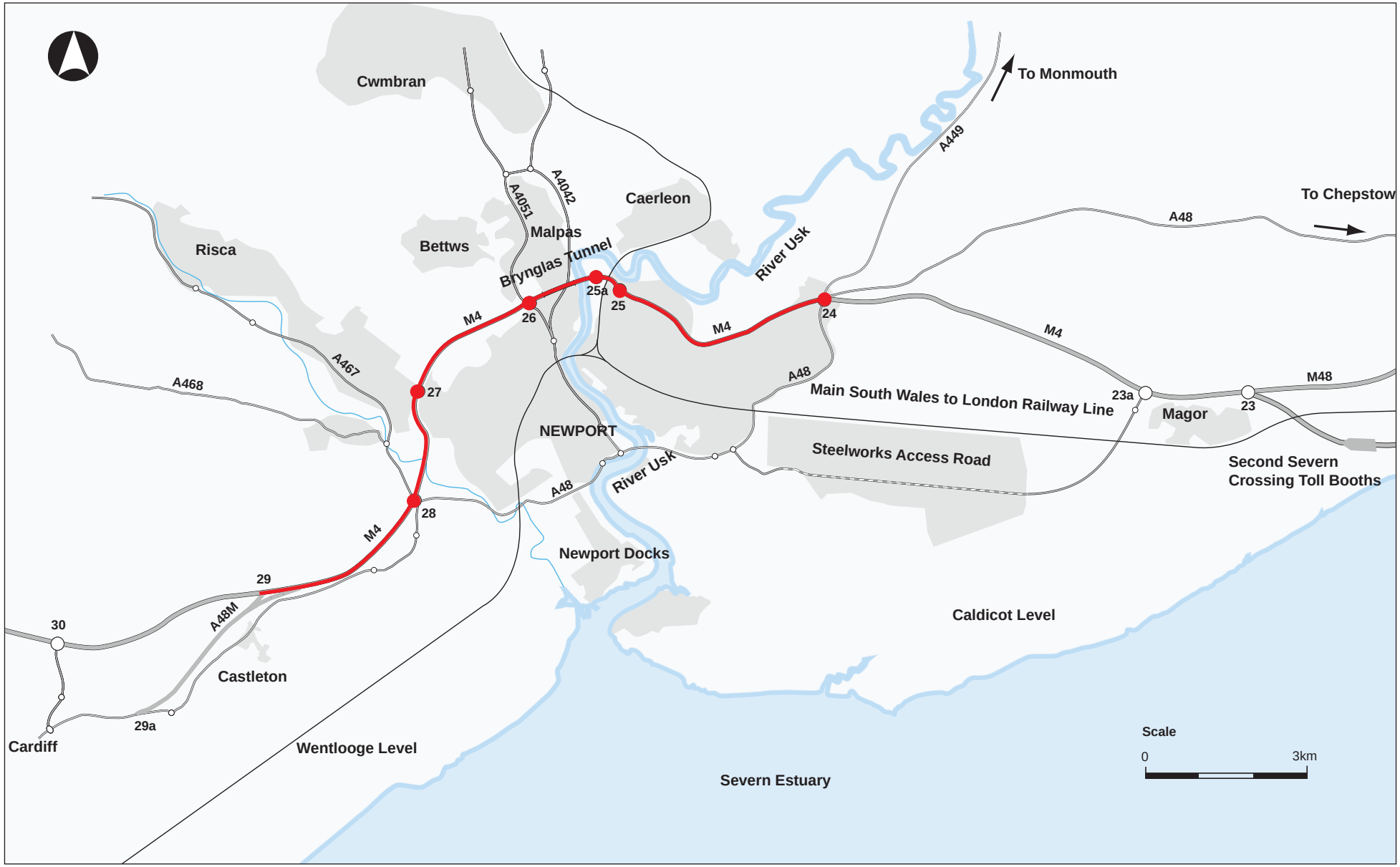
Highway Option D: Online Widening of the M4 between Junctions 24 and 29, including an additional tunnel at Brynglas (see Question 4d on Response Form)

Option D would involve a programme of major on-line widening of the existing M4 Corridor between Junctions 24 and 29 to dual 4 lane motorway standard with hard shoulders, as shown in red on the following diagram. This would see four lanes of traffic in each direction along this section of the M4, including an additional tunnel at Brynglas. Some demolition of existing properties is likely to be necessary to accommodate the online widening and additional tunnel. As part of the works Junction 25 would be closed to motorway access whilst the east facing slips of Junction 26 would be removed in order to prioritise the M4 for long distance journeys. Online widening would also be supported by other traffic management and smarter choice measures. Works could be phased in order to improve affordability and is estimated to cost approximately £550m.

Question 4d. To what extent do you think Highway Infrastructure Option D will address the problems and achieve the goals you have chosen?

Further information is provided below. Please give your answer in the Response Form.

Highway Option D



Appraisal of on-line widening of the M4 J24-29, including an additional tunnel at Brynglas (Option D)

Appraisal against M4 CEM goals

1	Safer, easier and more reliable travel East-West in South Wales.	(++)
2	Improved transport connections within Wales and to England, the Republic of Ireland and the rest of Europe on all modes on the international transport network.	(++)
3	More effective and integrated use of alternatives to the M4, including other parts of the transport network and other modes of transport for local and longer distance journeys around Newport.	(N)
4	Best possible use of the existing M4, local road network and other transport networks.	(++)
5	More reliable journey times along the M4 corridor.	(++)
6	Increased level of choice for all people making journeys within the transport corridor by all modes between Magor and Castleton, commensurate with demand for alternatives.	(+)
7	Improved safety on the M4 Corridor between Magor and Castleton.	(++)
8	Improved air quality in areas next to the M4 around Newport.	(N)
9	Reduced disturbance to people from high noise levels, from all transport modes and traffic within the M4 corridor.	(-)
10	Reduced greenhouse gas emissions per vehicle and/ or person kilometre.	(N)
11	Improved travel experience into South Wales along the M4 Corridor.	(+)
12	An M4 attractive for longer distance journeys that discourages local traffic use.	(++)
13	Improved traffic management in and around Newport on the M4 Corridor.	(+)
14	Easier access to local key services and residential and commercial centres.	(N)
15	A cultural shift in travel behaviour towards more sustainable choices.	(--)

Acceptability, Feasibility, Deliverability and Risk

Public acceptability: Once complete, improved traffic conditions on the motorway could attract public support. Disruption during construction could attract public opposition. Demolition of properties is an emotive issue and could attract public opposition.
Acceptability to other stakeholders: Improving operational efficiency on the M4 could attract support from businesses and safety groups. However, adverse impacts on the environment could attract opposition from environmental groups.
Technical and operational feasibility: On-line widening would require technically complex engineering works, in particular works to the Brynglas tunnels could face significant geotechnical challenges including unstable ground.
Financial affordability and deliverability: The on-line widening works could be delivered in phases, which could improve affordability.
Risks: The scheme is likely to have significant adverse economic, social and environmental impacts during construction.

Welsh Government Transport Appraisal Guidance (WelTAG) Criteria

Criteria	Assessment	Significance
Economy		
Transport Economic Efficiency (TEE)	Once complete, this option adds new capacity to the M4, reducing congestion and improving journey times and journey time reliability. It could be delivered in phases that achieve cumulative benefits and spread the investment costs. Disruption to motorway users would be expected throughout the construction period. On-line widening does not improve the resilience of the network in the event of maintenance works on the M4.	(+)
Economic Activity and Location Impact (EALI)	Once complete, the M4 would be more attractive for strategic long distance users and improved traffic flows and accessibility would have positive economic impacts for South East Wales. Delays caused by construction work will have a negative impact on economic activity in South East Wales.	(++)
Environment		
Noise	Reduced congestion would reduce noise impacts along the M4 and nearby residential properties. The new capacity may attract additional vehicles, leading to additional noise. Noise levels affecting residential properties will increase during construction works. The Common Measures promote forms of transport emitting lower noise intensities, including electric vehicles, walking and cycling; and promote noise reducing solutions.	(-)
Local Air Quality	Reduced congestion will help to reduce air pollution along the route of the current M4, improving conditions in the Air Quality Management Areas. Should on-line widening attract additional vehicles, it is likely that emissions may increase around Newport. The Common Measures promote more sustainable forms of transport, which will help to improve local air quality.	(N)
Greenhouse Gas Emissions	On-line widening will help to reduce congestion, which should have some benefit in reducing vehicle emissions; however it is not clear whether the additional road capacity would lead to an overall increase in emissions in the longer term.	(N)

Criteria	Assessment	Significance
Landscape and townscape	The changes proposed will result in adverse visual impacts, including some affecting Tredegar House and Beechwood Park. There would be adverse impact on areas of rural landscape. The visual impact of the motorway and the impact on properties through the built up area of Newport would be substantially increased. Some properties may be demolished on the Brynglas Ridge.	(-)
Biodiversity	On-line widening would entail works and potential increased traffic volumes which may adversely affect the River Usk Special Area of Conservation. In addition the Monmouthshire and Brecon Canal (Junctions 26 - 27) and the Allt-yr-Yn Local Nature Reserve (Junctions 26 - 27) may contain protected species.	(-)
Heritage	Widened structures would run close to a number of sites of historic and archaeological interest. On-line widening may affect Scheduled Ancient Monuments and a number of listed buildings.	(--)
Water environment	Construction could have an adverse impact on the local water environment. There would be opportunities to improve existing drainage and water quality, which would have slight beneficial impacts.	(N)
Soils	Works would impact on agricultural land adjoining the rural sections of the route. Works to Brynglas tunnels could affect local soils.	(--)
Social		
Transport safety	On-line widening will help improve road safety by improving operational efficiency of the motorway and enhancing motorway junctions. It is forecast that the total number of accidents on major roads in Newport would fall from 85 to71 per year as a result of these improvements. Common Measures could improve traffic management and response to incidents/events.	(++)
Personal security	Investment in walking and cycling facilities could improve safety for non-motorised users. There would be no adverse impact on personal security.	(+)
Permeability	Movement by walking and cycling would be benefited.	(+)
Physical fitness	Improvements to walking and cycling facilities could help promote healthy lifestyles.	(+)
Social inclusion	There is likely to be a negligible effect on social inclusion.	(N)
Equality, Diversity & Human Rights	The measures proposed would aim to meet the needs of all groups of people when progressed to project stage.	(N)

10. Common measures

These are additional measures being considered to support the strategic public transport and highway capacity measures in addressing travel related problems within the M4 Corridor between Magor and Castleton. They comprise a mix of highway infrastructure, demand management, alternative modes and smarter sustainable choices.

Common measure	Description
Promote A465 Heads of the Valleys road as alternative route	Promoting the A465 Heads of Valleys road as an alternative route to the M4 for long distance east-west travel.
J23a improvements	Adding capacity to J23a by widening roundabout entry and possibly introducing traffic signals.
Widening of west facing slip roads at J26	Adding an additional lane to the west facing slips at J26.
J27 safety improvements	Reconfigure slip roads into a conventional diamond shape.
J28 improvements (in addition to baseline)	A connection dedicated to providing free-flow eastbound traffic from the M4 to Forge Road.
Manage speed of traffic	The development of a revised speed management strategy for the study area.
Improve traffic monitoring	Introducing and improving intelligent transport systems to assist traffic monitoring and incident management.
Promote use of electric vehicles	Long term phased introduction of Electric Vehicle Infrastructure in Wales.
Improve aesthetics along the M4 Corridor	Natural and physical environment enhancements along M4.
Noise pollution reduction process	Introducing noise reducing technology.

Common measure	Description
Improve incident management	Utilising new technologies to tackle traffic congestion.
Better event management	Preparation and implementation of event management plans.
Encourage use of alternative routes to M4	Actively promoting use of alternative east-west routes to M4.
Improve road management during times of poor weather	Preparation and implementation of revised weather management plans.
Manage HGV traffic	Preparation and implementation of a HGV management plan.
Use of ramp metering	Controlling access to M4 through use of traffic signals on slip roads.
Provide better transport mode integration	Taking steps to improve the integration between different sustainable transport modes.
Provide cycle friendly infrastructure	Promoting the use of cycling as an alternative to the car for journeys of up to three miles.
Provide walking friendly infrastructure	Promote the use of walking as a primary modal choice for car users undertaking journeys of up to two miles.

11. Next steps

Once the formal Consultation period has ended, the Minister will decide which measures should be pursued as the best strategy aimed at addressing problems of capacity, resilience, and safety, and sustainable development on the M4 Corridor between Magor and Castleton in light of all the responses to the Consultation.

All participants in this Consultation process, for whom we have contact details, will be informed of the decision made by the Minister.

An implementation plan will be prepared by the project team once the Minister has made a decision, setting out a programme for delivery of the approved measures. We shall be engaging with local people and other interested parties on specific and detailed elements of this plan in due course. These measures will require further work as they are developed for delivery. As part of the delivery process, measures progressed will be monitored and evaluated so that we can gauge their success.

Thank you again for your interest and input in this Consultation.

Question 5: Have you any additional comments to make regarding how to address the travel related problems occurring in the M4 Corridor, Magor to Castleton?

Please give your answer on the Response Form.

Appendix 1: Frequently Asked Questions

This FAQ has been prepared in response to a number of popular requests for information made by the public and stakeholders throughout the M4 Corridor Enhancement Measures engagement process. This section provides a summary of responses to common queries. The technical evidence and sources supporting these summaries is available on request.

How many people use the M4 between Magor and Castleton now and how many people are predicted to use this road in the future?

Response
The most trafficked section of the M4 between Magor and Castleton is J27 and J28. On a typical day in 2008, around 103,000 vehicles use this section. By 2031, traffic using the M4 between J27 and J28 is forecast to rise to 136,000 (a 32% increase).

What are the projections for population growth and how many more cars could this equate to?

Response
There are currently around 2.1 million people living in 900,000 households South Wales. Growth forecasts suggest that there will be 2.4 million people (a 15% increase) living in 1.15 million households in Wales (a 28% increase) by 2033. Assuming an average of 1.05 cars per household, this could equate to an additional 260,000 vehicles on the regional road network by 2033.
For the purposes of the M4 CEM Programme, 'South Wales' comprises the following Local Authority areas: Blaenau Gwent, Bridgend, Caerphilly, Cardiff, Carmarthenshire, Merthyr Tydfil, Monmouthshire, Neath Port Talbot, Newport, Pembrokeshire, Rhondda Cynon Taff, Swansea, Torfaen and Vale of Glamorgan.

How much does road congestion cost the Welsh economy?

Response
There are no studies on the effect of traffic congestion on the Welsh economy. The most widely cited UK wide study suggests that the cost of congestion to the UK economy is around £30bn per annum (Goodwin, 2004). However, it is well acknowledged that there are positive links between investment in transport and economic development.

How many users of the M4 Corridor between Magor to Castleton are cross border travellers (i.e. use the Severn Crossing Tolls)?

Response
63% of traffic observed travelling between J23a and J24 of the M4 use the Severn Crossings as part of their journey. This percentage falls the further west that traffic is observed. 25% of traffic travelling between J28 and J29 use the Severn Crossings as part of their journey.

How many accidents have there been since the introduction of the temporary 50mph speed limit and permanent variable speed limit system – and how does this compare to historic data?

Response
Data is not currently available for the period following the introduction of the variable speed limit in June 2011, as assessment requires 12 months of data collection. However, in 2010, the first complete calendar year with a 50 mph speed limit and average speed cameras, there were 40 personal injury accidents on the M4 between Magor and Castleton. This compares to an average of 74 personal injury accidents per year for the period 2003-2007.

What percentage of vehicles using the M4 Corridor between Magor to Castleton are HGVs?

Response
HGVs make up between 6-20% of total daily traffic travelling along the M4 between Magor and Castleton, depending on the time of day and direction of travel.

Where are the noise levels highest along the M4 Corridor, Magor to Castleton?

Response
The Welsh Government has compiled strategic noise maps for the study area, which indicate areas subjected to particularly high noise levels. It shows that the communities and businesses worst affected on the M4 Corridor include those located around J25a to J26 (Malpas Relief Road to Malpas) and Junction 24 (Coldra). Please refer to Figure 10.

Where are the air pollution levels highest along the M4 Corridor, Magor to Castleton?

Response

Air Quality Management Areas (AQMAs) are created where air pollution levels are high enough to be a potential health risk and it is acknowledged that traffic emissions contribute towards air pollution. Whilst Newport has a total of nine AQMAs; four of these are located adjacent to the M4, at:

- Shaftesbury/Cridau;
- St Julians;
- Royal Oak Hill; and
- Glasllwch.

To what extent can 'smarter sustainable choices' actually help to reduce congestion?

Response

A Masterplan of public transport measures targeted at increasing modal shift on journeys made on the M4 Corridor between Magor and Castleton suggests that £300m of investment could increase the mode share to approximately 11% in the Newport area although this would equate to a reduction of less than 3% on M4 sections between J23 and J29.

How can you predict the impact of a proposed highway measure, and how accurate can you be?

Response

A traffic model was developed using the network analysis programme software 'SATURN' to assess the benefits of highway measures contributing towards the M4 CEM Programme, based on 2005 and 2007 data. Traffic forecasts were developed to inform the operational, environmental and economic assessments of proposed highway schemes in the study area. The forecast scenarios with these schemes in place were compared against the baseline scenario, which includes all highway improvement schemes to which Welsh Government is committed at the time of forecasting.

The forecast traffic demand used in the M4 CEM appraisals is likely to be high compared to current traffic growth projections, especially if some of Newport's planned development projects fail to be followed through to completion. This is likely to result in an over-prediction of economic benefits of any proposed schemes. Appraisal based on the traffic forecasts provide an indication of the relative performance of the different options presented in the Formal Consultation Document.

For further information, please contact
m4cem@arup.com or call 029 2047 3727